Referees of This Issue / Bu Sayının Hakemleri

Content

Executive Summary

The second issue of Sosyoekonomi Journal's 20th year brings good news to its authors and readers. The application, made on January 7, 2024, was approved on April 21, 2024, and the Sosyoekonomi Journal was accepted to the Scopus Index by The Scopus Content Selection & Advisory Board (CSAB). Within the next month, file transfers will be completed, and the indexing process will start.

There are 21 research articles in the 60th issue of the Sosyoekonomi Journal. The first article focuses on the example of Türkiye's electricity market and examines the situations that arise in regulating the natural monopoly market within the scope of the capture theory. The findings obtained are compatible with the assumptions of this theory. The following article examines the impact of carbon emissions on the borrowing cost of companies listed in the BIST Sustainability Index for 2017-2021. Total carbon emissions, emission intensity, leverage and structure variables significantly impact the cost of borrowing; however, it was concluded that size, return on assets, growth and cash flow variables do not significantly affect the cost of borrowing. The third article examined the relationship between fossil energy consumption (FEC) and economic growth by applying the non-linear ARDL method to the Turkish sample. In all models, the impact of reductions in energy consumption on economic growth outweighs increases in the long run. According to the causality results, the neutrality hypothesis is valid for coal consumption, the feedback hypothesis is valid for natural gas consumption, and the growth hypothesis is valid for oil consumption.

Doğan & Altun investigated the impact of corruption on public service prices. The research found that some reforms reduced prices while others contributed to price increases. The importance of the fight against corruption for the correct formation of public service prices was emphasised. Filiz-Baştürk examined the impact of solar energy production on economic growth in EU member countries. In the study, where the 2018-2021 period was considered with a two-way fixed effects model and Driscoll-Kraay standard errors, it was concluded that solar energy production has a positive and statistically significant effect on economic growth. In her article, Işık examines how tourism development, economic growth, green innovation, and government effectiveness affect the environment from the Ecological Modernization Theory (EMT) perspective. Empirical results support the validity of EMT across the panel, particularly in Germany, France, the United Kingdom, and Russia.

The seventh article examines the mediating role of fitness centre members' attitudes between perceived risk-behavioural intention and the moderating role of brand equity in the linkage between "perceived risk-behavioural intention" and "perceived risk-attitude-behavioural intention.". This article contributes to the fitness centre literature by exploring the role of brand equity and providing insights for managers. Berk Yıldız analyses the financial factors that affect the capital structure decisions of 29 shipping companies in the U.S. equity markets. The study focuses on the impact of International Maritime Organization (IMO) regulations and new initiatives. The results show that leverage negatively affects profitability and size compared to tangibility. By offering a model proposal, Suzan Oğuz examines the relationship between trade openness, economic growth, energy consumption, and carbon emissions (CO2) with Structural Equation Modelling (SEM). When the indirect effects are examined, it has been determined that economic growth and energy consumption mediate the relationship between trade openness and CO2, and energy consumption mediates the relationship between economic growth and CO2.

Betül Sarı-Aksakal argues in her article that it will be possible to reveal the theoretical and ideological realities behind the visible faces of classical economics, characterised as classical political economy and neoclassical economics, known as mainstream economics. The aim of the 11th article conducted in the aviation sector is to measure how effective stress is and whether it mediates social anxiety caused by the perception of social comparison experienced by individuals working in organisations. The study's findings revealed that social comparison and job stress significantly predicted social anxiety and that job stress had a mediating role. In their article, Gül & Altuntaş examine the role of ESG (environmental, social and corporate governance) ratings on stock returns. Results revealed that ESG rating and return on assets statistically positively influence stock market performance. Findings also provide new sights and show that firms, especially in emerging markets, might enhance their market values by paying attention to ESG practices.

Alper Yılmaz analysed the bilateral J-curve phenomenon in the Turkish economy. He applied both the linear and non-linear Autoregressive Distributed Lag (NARDL) co-integration methods and the asymmetric Toda-Yamamoto causality test to examine whether the impact of Turkish lira appreciations differs from that of lira depreciation. As a result, exchange rate policies are a determinant that should be considered in relationships with certain trading partners. Kaya & Tamer aim to identify and conceptualise Turkish female managers' strategies to break the glass ceiling through the qualitative research method within the framework of elements that create a glass ceiling, such as gender discrimination and gender prejudices in society, organisational culture, some female-specific

behavioural faults, personal compromises and encouragers for a career. Bulut & Çil investigate the causality relationship between public expenditures and tax revenues with Dumitrescu & Hurlin's (2012) panel asymmetric causality analysis for 12 transition economies. Asymmetric causality analysis findings determined an asymmetric causality relationship between public expenditures and tax revenues. The significance of the findings is that the results for positive and negative shocks differ for transition economies, and it has been determined that the result for positive shocks supports fiscal synchronisation. In contrast, the result for adverse shocks supports the expenditure-tax hypothesis.

Sevimli-Örgün & Aygün examine the relationship between cost stickiness, earnings management and firm characteristics using the data from 196 companies operating in Borsa Istanbul for 2012-2020. According to the results of the analysis using the balanced panel data analysis method, no statistically significant relationship between cost stickiness and earnings management could be obtained. On the other hand, it has been determined that there are significant relationships between cost stickiness and firm characteristics, including firm profitability, debt ratio, firm size and firm age. Ekinci et al. examine the short-term dynamic relationship between country risk premium, loans and macroeconomic variables in the Turkish economy for January 2011 - November 2021 within the framework of the VARX model. Main findings of the study: (i) Country risk premium reacts positively and significantly for the first month against inflation, exchange rate (depreciation in TL) and interest rate shock. (ii) The shock in the country's risk premium positively and significantly affects inflation, exchange rate, and interest rates during the first two months. (iii) The shock in the country risk premium has a negative effect on Turkish lira real loans for the whole response period, and the response is significant and negative in the second and third months. Sarı & Can-Akbalık aim to determine the attitudes of tourism product sellers toward tourism and tourists. As a result, tourism product sellers generally hold a friendly view of tourists and recognise their role in stimulating the local economy. However, tourists also contribute to the increased cost of living in the area.

In Abukan et al.'s study, from 2006 to 2019, in 11 cities with free zones and seaports in Türkiye, public investments and fiscal incentives were examined as economic growth dynamics at the local level. As a result of the findings, it was determined that while free port cities in Türkiye are expected to have a high growth potential, this is generally not valid at the local level. Yılmaz & Acar analyses the impact of liability dollarisation and exchange rate changes on investments as the best indicator of sectoral performance through "balance sheet effect" and "competitive effect" channels with the GMM estimator using data for 76 sectors in Türkiye for 2009-2022. Their findings indicate that, while the corporate sector is exposed to a significant negative balance sheet effect due to short-run liability dollarisation, there are no significant effects of long-run liability dollarisation on investments. Also, there are no significant findings regarding the competitiveness effect channel. In the Küçük & Yüce-Dural study, Türkiye's green economy performance was assessed using a Green Economy Progress (GEP) index developed through the Green Economy Measurement Framework. The findings demonstrate that Türkiye is indeed progressing towards a greener economy. However, the rate of progress falls short in terms of meeting the criteria set by the European Green Deal. Notably, the high greenhouse gas emissions present substantial challenges for Türkiye.

I am grateful to all the authors and editorial board members who have devotedly contributed to the Sosyoekonomi Journal for 20 years. Believing that the studies in this issue will contribute to the world of science, I want to express my respect to all the followers of Sosyoekonomi for their continued interest for 20 years.

Prof.Dr. Ahmet Burçin YERELİ
Editor

Editörün Notu

Sosyoekonomi Dergisi 20. yılının ikinci sayısında yine güzel bir haber ile yazar / okuyucu kitlesi ile buluşuyor. 7 Ocak 2024 tarihinde yapılan başvurumuz yetkili kurulların incelemelerinin ardından 21 Nisan 2024 tarihinde olumlu sonuçlanmış ve dergimiz Scopus Endeksine kabul edilmiştir. Önümüzdeki bir ay içinde dosya transferleri tamamlanarak dizinleme süreci başlatılmış olacaktır.

Sosyoekonomi Dergisinin 60. sayısında 21 adet araştırma makalesi yer almaktadır. İlk makale Türkiye'nin elektrik piyasası örneğine odaklanarak doğal tekel piyasasının düzenlenmesinde ortaya çıkan durumları ele geçirme teorisi kapsamında incelemektedir. Elde edilen bulgular bu teorinin varsayımları ile uyumludur. İzleyen makale 2017-2021 yılları için BİST Sürdürülebilirlik Endeksinde işlem gören şirketlerin karbon emisyonlarının borçlanma maliyeti üzerindeki etkisini incelemektir. Toplam karbon emisyonu, karbon emisyon yoğunluğu, kaldıraç ve yapı değişkenlerinin borçlanma maliyeti üzerine anlamlı bir etkisinin bulunduğu; ancak büyüklük, aktif kârlılık, büyüme ve nakit akışı değişkenlerinin borçlanma maliyeti üzerinde anlamlı bir etkisinin bulunmadığı sonucuna varılmıştır. Üçüncü makalede fosil enerji tüketimi (FEC) ile ekonomik büyüme arasındaki ilişki Türkiye örnekleminde doğrusal olmayan ARDL yöntemi uygulanarak incelenmiştir. Tüm modellerde, enerji tüketimindeki azalmaların ekonomik büyüme üzerindeki etkisi, uzun dönemdeki artışlardan daha baskındır. Nedensellik sonuçlarına göre kömür tüketimi için yansızlık hipotezi, doğal gaz tüketimi için geri besleme hipotezi ve petrol tüketimi için büyüme hipotezi geçerlidir.

Doğan & Altun yolsuzluğun kamu hizmeti fiyatları üzerindeki etkisini araştırmıştır. Araştırmada bazı reformların fiyatları düşürdüğü, bazılarının ise fiyat artışlarına katkıda bulunduğu tespit edilmiş; kamu hizmeti fiyatlarının doğru bir biçimde oluşumu için yolsuzlukla mücadelenin önemi vurgulanmıştır. Filiz-Baştürk, AB üyesi ülkelerde güneş enerjisi üretiminin ekonomik büyüme üzerindeki etkisini incelemiştir. 2018-2021 döneminin iki-yönlü sabit etkiler modeli ve Driscoll-Kraay standart hataları ile ele alındığı çalışmada, güneş enerjisi üretiminin ekonomik büyüme üzerinde pozitif ve istatiksel olarak anlamlı bir etkisi olduğu sonucuna ulaşılmıştır. Işık, makalesinde turizmin gelişiminin, ekonomik büyümenin, yeşil inovasyonun ve hükümet etkinliğinin çevreyi nasıl etkilediğini Ekolojik Modernleşme Teorisi (EMT) perspektifinden incelemektedir. Ampirik sonuçlar EMT'nin panel boyunca ve özellikle Almanya, Fransa, Birleşik Krallık ve Rusya için geçerliliğini desteklemektedir.

Yedinci makale, fitness merkezi üyelerinin tutumlarının algılanan risk-davranışsal niyet arasındaki aracılık rolünü ve marka denkliğinin "algılanan risk-davranışsal niyet" ile "algılanan risk-tutum-davranışsal niyet" arasındaki düzenleyicilik rolünü incelemektedir. Bu çalışma, marka denkliğinin rolünü araştırarak fitness merkezi literatürüne katkıda bulunmakta ve yöneticiler için içgörü sunmaktadır. Berk Yıldız, Uluslararası Denizcilik Örgütü (IMO) regülasyonlarının ve yeni girişimlerinin etkisine ve sermaye yapısı teorilerinin geçerliliğine odaklanarak, ABD'de listelenen 29 denizcilik şirketinin sermaye yapısı kararlarını etkileyen finansal faktörleri incelemiştir. Elde edilen sonuçlar, sabit varlık oranının aksine, karlılık ve işletme büyüklüğü faktörlerinin ABD borsalarında işlem gören denizcilik şirketlerinin sermaye yapıları üzerinde negatif bir etkiye sahip olduğunu göstermektedir. Suzan Oğuz, ticari açıklık, ekonomik büyüme, enerji tüketimi ve karbon emisyonları (CO2) arasındaki ilişkiyi bir model önerisi sunarak Yapısal Eşitlik Modellemesi (YEM) ile incelemektedir. Ekonomik büyüme ve enerji tüketiminin ticari açıklık ile CO2 arasındaki ilişkide, enerji tüketimin ise ekonomik büyüme ile CO2 arasındaki ilişkide aracılık ettikleri sonucuna ulaşılmıştır.

Betül Sarı-Aksakal tarafından kaleme alınan 10. makalede klasik ekonomi politik olarak nitelendirilen klasik iktisadın ve ana akım iktisat olarak bilinen neoklasik iktisadın görünen yüzlerinin ardındaki kuramsal ve ideolojik gerçeklikler tartışılmaktadır. 11. makalede, havacılık sektöründe çalışan bireylerin yaşamış oldukları sosyal karşılaştırma algısı ile meydana gelen sosyal kaygıda stresin ne derece etkili olduğu ve aracılık edip etmediği ölçülmektedir. Çalışmanın bulguları sosyal karşılaştırmanın ve iş stresinin sosyal kaygıyı anlamlı olarak yordadığını ve iş stresinin aracı rolü olduğunu ortaya koymuştur. Gül & Altuntaş'ın çalışmasında, ESG (çevresel, sosyal, kurumsal yönetişim) skorlarının hisse senedi getirileri üzerindeki rolü araştırılmaktadır. Sonuçlar, ESG skorunun ve aktif kârlılığının hisse senedi piyasası performansını istatistiksel olarak anlamlı ve pozitif etkilediği şeklindedir. Bulgular, yatırımcıların çevresel, sosyal ve yönetişim faaliyetlerine değer veren şirketlerin hisselerine yatırım yaparak portföy performanslarını artırabileceklerini işaret ederken, özellikle gelişen piyasalardaki şirketlerin ESG uygulamalarını ön planda tutarak piyasa değerlerini yükseltebileceklerini de göstermektedir.

Alper Yılmaz'ın çalışmasında Türkiye ekonomisi için J Eğrisi hipotezi analiz edilmiştir. Türk Lirasında meydana gelen devalüasyonların, revalüasyonlardan istatistiki olarak farklı olup olmadığı, Asimetrik Toda-Yamamoto nedensellik testine ek olarak doğrusal ve doğrusal olmayan ARDL eş bütünleşme yöntemi ile incelenmiştir. Sonuç olarak belli ticari partnerlerle olan ilişkilerde kur politikalarının dikkate alınması gereken bir belirleyici olduğu ortaya konulmaktadır. Kaya & Tamer, toplumdaki cinsiyet ayrımcılığı ve cinsiyetçi önyargılar,

örgüt kültürü, kadınlara özgü bazı davranışsal hatalar, kişisel tavizler ve kariyer için teşvik ediciler gibi cam tavan oluşturan unsurlar çerçevesinde Türk kadın yöneticilerin cam tavanı kırma stratejilerini nitel araştırma yöntemiyle belirleyerek kavramsallaştırmaya çalışmışlardır. Bulut & Çil, 12 geçiş ekonomisi için Dumitrescu & Hurlin (2012) panel asimetrik nedensellik analiziyle kamu harcamaları ile vergi gelirleri arasındaki nedensellik ilişkisini araştırmaktadırlar. Asimetrik nedensellik analizi bulgularına göre kamu harcamaları ile vergi gelirleri arasında asimetrik nedensellik ilişkisinin varlığı tespit edilmiştir. Geçiş ekonomileri için pozitif ve negatif şoklara ilişkin sonuçlar farklılık arz etmekte ve pozitif şoklara ilişkin sonuç mali senkronizasyon, negatif şoklara ilişkin sonuç ise harcama-vergi hipotezini desteklemektedir.

Sevimli-Örgün & Aygün tarafından yapılan çalışmada Borsa İstanbul'da faaliyet gösteren 196 firmanın 2012-2020 yıllarına ait verilerinden yararlanılarak maliyet yapışkanlığı ile kâr yönetimi ve firma karakteristikleri arasındaki ilişki incelenmiştir. Dengeli panel veri analizi yönteminin kullanıldığı analiz sonuçlarına göre maliyet yapışkanlığı ile kâr yönetimi arasında istatistiksel olarak anlamlı bir ilişki elde edilememiştir. Buna karşın maliyet yapışkanlığı ile firma kârlılığı, firmanın borçlanma oranı, firma büyüklüğü ve firma yaşını içeren firma karakteristikleri arasında anlamlı ilişkilerin varlığı tespit edilmiştir. Ekinci vd. tarafından yapılan çalışmada Türkiye ekonomisinde ülke risk primi, krediler ve makroekonomik değişkenler arasındaki kısa dönemli dinamik ilişkiyi Ocak 2011-Kasım 2021 dönemi için VARX modeli çerçevesinde incelemektedir. Elde edilen sonuçlara göre: (i) Enflasyon, kur (TL'deki değer kaybı) ve faizdeki şoka karşı, ülke risk primi ilk ay için pozitif ve anlamlı tepki vermektedir. (ii) Ülke risk primindeki şok, enflasyon, kur ve faiz üzerinde iki ay boyunca pozitif ve anlamlı bir etkiye sahiptir. (iii) Ülke risk primindeki şok, bankacılık sektörü Türk lirası reel kredilerde ikinci ve üçüncü ayda anlamlı ve tüm dönem için negatif etkiye sahiptir. Sarı & Can-Akbalık tarafından yapılan çalışmada ise Doğu Antalya Turizm Gelişim Bölgesi'ndeki turistik ürün satıcılarının turizme ve turistlere karşı tutumları belirlenmeye çalışılmıştır. Elde edilen verilere göre; araştırma sahasındaki turistik ürün satıcılarının turistleri arkadaşça gördüğü ve turistlerin bölgede yerel ekonomiyi canlandırdığı tespit edilmiştir

Abukan vd., 2006-2019 döneminde Türkiye'deki serbest bölgesi ve deniz limanı olan 11 kentte yerel düzeyde ekonomik büyüme dinamikleri olarak kamu yatırımları ve mali teşvik uygulamalarını incelemektedirler. Türkiye'deki serbest liman kentlerinin büyüme için yüksek potansiyellerinin olması beklenirken, yerel düzeyde bunun geçerli olmadığı görülmüştür. Yılmaz & Acar, borç dolarizasyonu ve döviz kuru değişimlerinin sektörel performansın en temel göstergesi olan yatırımlar üzerindeki etkisini araştırarak, Türkiye için 2009-2022 dönemine ilişkin 76 alt sektör verisi ile "bilanço etkisi" ve "rekabetçi etki" kanallarını GMM tahmincisi ile analiz etmişlerdir. Elde edilen bulgulara göre, kısa vadeli döviz cinsi borçlardan kaynaklı olarak reel sektör anlamlı bir negatif bilanço etkisine maruz kalırken, uzun vadeli döviz cinsi borçların yatırımlar üzerinde anlamlı etkileri bulunamamıştır. Rekabetçi etki kanalına ilişkin de anlamlı bulgular söz konusu değildir. Küçük & Yüce-Dural, Türkiye'nin yeşil ekonomi performansını hesaplamak için Yeşil Ekonomi Ölçüm Çerçevesi-GEP kullanarak bir GEP endeksi oluşturmuştur. Bulgular, Türkiye'nin yeşil bir ekonomiye doğru ilerlediğini göstermektedir. Ancak, bu ilerleme Avrupa Yeşil Mutabakatının belirlediği kriterleri karşılama konusunda yetersiz kalmaktadır. Özellikle yüksek sera gazı emisyonları, Türkiye için ciddi riskler oluşturmaktadır.

20 yıl boyunca büyük bir özveriyle Sosyoekonomi Dergisine katkı sunan tüm yazarlara ve yayın kurulu üyelerine müteşekkirim. Bu sayımızda yer alan çalışmaların bilim dünyasına katkı sağlayacağına olan inançla Sosyoekonomi Dergisinin tüm takipçilerine 20 yıldır süregelen ilgilerinden dolayı saygılarımı sunuyorum.

Prof.Dr. Ahmet Burçin YERELİ
Editör

Regulation of Natural Monopoly: The Turkish Electricity Market[1]

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Doğal Tekelin Düzenlenmesi: Türkiye Elektrik Piyasası[2]

Abstract

This study examines the situations that arise when regulating a natural monopoly market by focusing on Türkiye's electricity market. Specifically, this qualitative study investigates the Energy Market Regulatory Authority (EMRA) in terms of capture theory, drawing on various documentary sources, such as electricity sector regulation legislation (constitutions, sector laws, decree-laws, Plan and Budgeting Committee documents of The Grand National Assembly of Türkiye), EMRA official decisions, newspaper reports from 2001 to 2021, and media interviews. The empirical findings discussed throughout the article reveal numerous instances consistent with the capture theory.

Keywords : Natural Monopoly Markets, Regulatory Authority, Capture, Electricity Market.

JEL Classification Codes : L43.

Öz

Bu çalışma, Türkiye'nin elektrik piyasası örneğine odaklanarak doğal tekel piyasasının düzenlenmesinde ortaya çıkan durumları incelemektedir. Bunun için Enerji Piyasası Düzenleme Kurumu'nu (EPDK) elektrik sektörü düzenleme mevzuatı (anayasalar, sektör kanunları, kanun hükmünde kararnameler, Türkiye Büyük Millet Meclisi Plan ve Bütçe Komisyonu belgeleri), EPDK resmi kararları, 2001'den 2021'e kadar gazete haberleri ve medya röportajları gibi kaynaklardan yararlanarak) ele geçirme teorisi açısından incelemektedir. Makale boyunca tartışılan ampirik bulgular, ele geçirme teorisiyle tutarlıdır.

Anahtar Sözcükler : Doğal Tekel Piyasaları, Düzenleyici Kurum, Ele Geçirme, Elektrik Piyasası.

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1. Introduction

As a critical component of neoliberal economic policy, privatisation became one of the dominant practices in the 1980s in both early and late capitalist countries. One common feature of privatised industries is that they tend to be natural monopolies, such as water, electricity, natural gas, and telecommunications. The public finance literature has widely discussed the drawbacks of liberalising goods and services markets that are natural monopolies. The state should not privatise the sectors exhibiting the characteristics of a natural monopoly, or if privatisation is deemed necessary, an independent administrative authority should regulate the market. Yet, with the progression of privatisation, it became evident that more liberated markets often necessitate increased rules, regulatory agencies, and regulators (Vogel, 199: 2-3).

Indeed, the number and proliferation of independent regulatory authorities, particularly those operating in telecommunications, electricity, competition, securities and stock exchanges, food safety, pharmaceuticals, and the environment, have rapidly increased. The global count of independent regulatory authorities, which stood at 23 in 1986, surged to 169 by 2002 (Gilardi et al., 2006: 3). Regulation is also defined as the transfer of authority from politicians and ministries to expert and regulatory authorities (Thatcher, 2002: 955); however, the extent of independence in the activities of independent regulatory authorities remains a subject of debate. Over the years, research has demonstrated that the regulatory decision-making processes have not been able to stay insulated from political pressures precisely as intended (Kumar, 2022: 1).

This study examines post-privatization regulation processes in a natural monopoly through the example of electricity market privatisation and the Energy Market Regulation Authority (EMRA) in Türkiye. Under EMRA's control, the new electricity market converged with the global energy market by legally and administratively separating market activities, establishing an energy exchange, setting tariffs, and regulating licensing. However, studies of electricity market regulation in Türkiye show that the government has not been particularly enthusiastic about delegating its electricity ownership rights to an independent authority (Çetin & Oğuz, 2011: 6; Çetin & Yılmaz, 2010: 397). In their study, Çetin and Oğuz (2011) argued that an environment of legal uncertainty without constitutional safeguards has created a legitimacy issue for independent regulators. The state's arbitrary legal and bureaucratic interventions in the regulatory system have damaged the regulation's reputation and show that the government prioritises its political preferences before the market's requirements and efficiency (Çetin & Oğuz, 2011: 3).

Studies of Türkiye's electricity market also reveal several problems. Özel and Atiyas (2011) assessed the efficacy of regulators using regulatory impact analysis. They observed that rather than creating a rational market, the independent regulatory agencies' activities create new forms of interest and benefit that can have significant distributional consequences (Özel & Atiyas, 2011: 52). In their study discussing the feasibility of long-term competition under the new regime within the framework of public choice theory, Çetin and Oğuz (2007)

focus on the relationship between the government, the judiciary, and EMRA and argue that the decisions of the Constitutional Court, the Council of State, the Supreme Planning Council and the Ministry of Energy and Natural Resources politically influence EMRA's regulatory activities by affecting market trends (Çetin & Oğuz, 2007: 1769). The relationship between the government and independent authority has insufficient organisational control to prevent opportunistic behaviour from the government, leaving EMRA vulnerable to political influence (Durakoğlu, 2011: 5586). The conflicting interests of old and new public regulatory agencies have transformed the regulatory setting into "regulatory/institutional chaos", while the presence of multiple players in the bureaucratic structure with de facto or de jure veto power creates political and economic risks as well as higher operating costs for investors (Durakoğlu, 2011: 5586). The government has manipulated EMRA's activities in electricity privatisations to provide opportunities to companies politically linked to the government (Özcan & Gündüz, 2015: 19). In his 2018 study, where he analytically scrutinised the interplay between neoliberalism and energy policies in Türkiye, Erensü contended that the EMRA is a captured independent regulatory body that the influence of policy has co-opted (Erensü, 2018: 154).

In brief, the existing literature on Türkiye predominantly concluded on political intervention within the EMRA. However, Stigler (1971), a seminal figure in regulatory literature, had early on highlighted the risk of regulatory agencies in regulated sectors being captured by capital groups in the market. Against this backdrop, this study aims not only to examine the perspectives asserting the susceptibility of the regulatory institution for political interventions, as summarised above but also to scrutinise whether EMRA is subject to pressure from actors within the sector it regulates, as capture theory claimed. Therefore, the study seeks to determine whether EMRA can operate independently and fulfil its regulatory function of safeguarding the long-term interests of the market and all its actors, i.e., the capital. With this objective in mind, I will conduct an assessment by focusing on the regulatory role of the EMRA in the electricity distribution market, scrutinising the evolving ownership structure within the market, and examining how it manages the divergent demands of the various actors operating within the market. In other words, considering Türkiye as a developing country, this study aims to provide an empirical contribution by examining the example of electricity market regulation in Türkiye within the framework of capture theory.

Methodologically, this qualitative study used various documentary sources to grasp the issue's complexity completely. EMRA provided the primary data sources along with other documents, such as electricity sector regulation legislation (constitutions, sector laws, decree-laws, Plan and Budgeting Committee documents of The Grand National Assembly of Türkiye), EMRA official decisions, audit reports of the Court of Accounts, newspaper reports from 2001 to 2021, and media interviews.

The paper consists of three parts. The first section reviews the international literature on the independence of independent regulatory authorities in regulating natural monopolies. The following two sections constitute the case study part of the study. The first part describes

the development of Türkiye's electricity market and the new market structure under EMRA's regulation. Here, I explore how the electricity distribution market is concentrated in the hands of only a few large capital groups. The second part evaluates conflicts of interest among market actors and EMRA's regulatory authority on the market. In this part, we investigate governmental involvement in competitive disputes among market participants and the regulatory authority's lack of response. Finally, the paper concludes with a summary of the results discovered and recommendations for further academic research.

2. Regulation of Natural Monopoly Market

By early literary works, natural monopolies require a public economy to avoid disruptions in the market. In addition to the water and gas markets that Mill (1848: 63), the first economist to speak about monopoly (Sharkey, 1982: 14), pointed out, other sectors like telephone networks, electricity, and postal services are also subject to such market disruptions. These prevent their services from being produced and supplied in a competitive, liberal market due to the inherent characteristics of natural monopolies. One reason why natural monopoly markets are not competitive is that they are decreasing-cost industries. They feature increasing returns of scale, whereby average costs decrease as production increases (Stiglitz, 2000: 191). In industries, the larger the firm's production scale, the lower its costs, meaning that a single large firm is more efficient than multiple smaller-scale firms operating with higher costs (Kirmanoğlu, 2009: 168).

Given the potential for natural monopolies, characterised by diminishing costs, to exploit their dominant market positions by imposing elevated prices on consumers, one approach to mitigating such concerns involves the state's assumption of production responsibilities within this market. Alternatively, the state can entrust the sector to the private sector while regulating prices to prevent a single large firm from abusing its monopoly (Stiglitz, 2000: 195) and using public funds to compensate the firm for any losses due to reduced prices (Görgün, 1993: 39). Until the 1980s, the general practice regarding natural monopolies focused on efficiency, with only one firm operating in these sectors managed by public economic units. Since the 1980s, however, growing privatisation and market expansion in line with prevailing approaches and policies means that, in many countries, natural monopolies have private sector firms operating under rules set by regulatory bodies (Kirmanoğlu, 2009: 170).

Derived from this perspective, regulation can be characterised as a form of state intervention without expropriation whereby the state controls a sector's structure, codes of conduct, and performance. This generally requires a regulatory authority that is at least formally independent of politicians while operating within the central government's policy framework and regulatory system. Government intervention is usually limited to cases of market failure that do not fall within the scope of antitrust legislation, such as a natural monopoly or chronic market instability (Bailey, 1995: 312). The ultimate aims are to prevent monopoly companies from gaining excessive profits and combat market instability by

ensuring the sector's supply is at the desired level. Regulators achieve these goals through price controls and licensing to control entry into and exit the sector.

Notwithstanding, within scholarly discourse, there is an acknowledgement of arguments positing that independent regulatory authorities may be susceptible to interventions from both political authorities and the stakeholders within the sectors they supervise. Early studies of the role of independent regulators in regulating natural monopoly markets focused on their effectiveness in preventing market failures as well as the independence of players in the regulated sector and regulatory independence from political influence (Becker, 1983: 371; Bernstein, 1955: 130; Carpenter, 1996: 285; Mahon, 1979: 163 ; Peltzman, 1976: 2-4; Posner, 1968: 548-549; Stigler, 1971: 3; Stigler & Friedland, 1962: 11). For example, in their evaluation of the effects of US regulators' ability to control electricity prices, Stigler and Friedland compared electricity prices in state-regulated and non-regulated states (Stigler & Friedland, 1962: 11). And contrary to the generally accepted opinion, they found that regulation is not a *deus ex machina*[3] that can eliminate market failures; instead, it can cause more resource misallocation than it resolves (Peltzman, 1976: 2). In another early study, Posner reported that regulators and their staff are exposed to interest-group solid pressures because they are intimately involved in the affairs of the particular industry. To the extent that these pressures distort regulation, the emerging economic interests serve private benefits rather than social welfare (Posner, 1968: 624). According to his observations, Stigler argued that regulation is generally acquired by the industry and designed and operated primarily for its benefit (Stigler, 1971: 3). Focusing on the relationship between the central government and the regulator, Peltzman asserted that legislators shape regulatory activity to gain votes from the pressure groups whose support they seek. Accordingly, the legislator attempts to create a regulatory system to minimise consumer sector prices while enabling firms to maximise profitability. This means achieving an adequate level of regulation for both legislator and regulator (Peltzman, 1976: 4). In other words, to secure support from various societal segments, the political authority may attempt to influence the regulator's activities in a manner that simultaneously accommodates the profitability objectives of industry firms and ensures affordable access to the product for consumers.

Within the literature, deliberations also revolve around the question of whether entrusting the government's regulatory authority to an independent regulatory body, as suggested by Thatcher (2002: 954), enhances the reliability of the national economy, as contended by Majone (1996: 30; 1997: 140). Some argue that such delegation may result in the independent regulator being influenced or captured by the private interests of prominent firms within the sector, as articulated by Carpenter (2004: 627; 2014: 171), Laffont and Tirole (1991: 1118), Stigler (1971: 7-8), and Viscusi (1992: 275). The independence of

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[3] *Deus ex machina (Latin: "god out of the machine") is a person or device that appears suddenly and unexpectedly and resolves a seemingly unsolvable problem. The term comes from ancient Greek and Roman theatre, where actors playing gods were lowered onto the stage using a crane to resolve the conflict.*

regulatory bodies from interest groups operating in the market is scrutinised in the literature under the analytical framework of capture theory.

Although a critical reason for establishing independent administrative authorities is to make the regulated market more reliable by eliminating political influence, central government interventions can affect regulators in various ways. Studies on the administrative autonomy of institutions have shown that the senior management of these institutions interpret frequent structural reforms and legal changes as a form of intervention, which makes them more likely to avoid behaviours and decisions they deem risky (Kleizen et al., 2018: 15; Wynen et al., 2020: 14). Other political interventions that undermine the independence of administrative authorities include activities of ministries in charge of the regulated area (Böllhoff, 2005: 52), central government limits on or cuts to the regulator's budget (Carpenter, 1996: 299), and asymmetrical information problems when political principals who are less well informed than the regulatory agency use informational cues from the media, interest groups, and constituents as a political control tool over regulators (Hopenhayn & Lohmann, 1996: 209). Apart from these considerations, Carpenter (1996: 298-299) delves into examining the stance adopted by bureaucrats within regulatory authorities in response to political interventions. According to him, the actions of government organisations are shaped by political signals, influencing their varied performances in decision-making processes, such as issuing licenses or conducting inspections within their regulatory purview. However, it is essential to acknowledge that political influence can dictate the actions and inactions of an Independent Regulatory Authority (IRA). IRAs may, at times, refrain from taking action or exhibit high receptivity to regulated entities in implementing regulations. In essence, agencies may adjust the stringency of their approach toward the regulated sector based on the signals they receive from political figures. Gordon and Hafer (2014: 237) term this phenomenon "regulatory forbearance".

Up to this point, we have discussed the prominent findings in the international literature regarding the independence of regulatory authorities in regulating natural monopoly markets. In the subsequent section, following an overview of the historical development of the Turkish electricity market, which serves as the empirical case for this study, we will discuss the independence of the independent regulatory authority, EMRA, within this sector. This study represents an empirical attempt to contribute by examining Türkiye's electricity market regulation from the perspective of capture theory, considering Türkiye to be a developing country.

3. Regulation in the Electricity Market: The Case of Türkiye

This part of the study focuses on developing Türkiye's electricity market and prospects for the new market structure under EMRA's regulatory authority. The Turkish energy sector has developed under four time periods: (i) 1923-1984, public ownership; (ii) 1984-1993, liberalisation; (iii) 1993-2001, restructuring and separation; (iv) since 2001, privatisation. Under public ownership, one public administrative body, the Turkish

Electricity Administration (TEK), was tasked with generating, transmitting, and distributing electricity since 1970. TEK maintained its status as the main electricity generator during the liberalisation period. This situation was despite calls for reform and privatisation in response to the two major oil crises during the 1970s, which resulted in continuously rising energy costs alongside rapidly growing energy demand, which the energy investments of the time failed to meet (Bağdadioğlu, 2011: 123; Dubash, 2003: 147).

Following the enactment of Law No. 3096 in 1984, private enterprises have entered the market to generate, transmit, distribute, and trade electricity. Thus, TEK lost its monopoly in the sector. During the following period of restructuring and separation, market activities were separated into electricity generation transmission and distribution. Following a Cabinet decree[4] in 1993, the Turkish government divided TEK into two state-owned enterprises: the Turkish Electricity Generation-Transmission Company (TEAŞ) and the Turkish Electricity Distribution Company (TEDAŞ). The Electricity Market Law 2001 was the first step towards regulating Türkiye's energy market. It aimed to create a financially robust and transparent electricity market operating within the framework of the law, with fully independent regulation and supervision and a competitive environment. Established concurrently with the law, the EMRA was the independent administrative authority regulating the electricity, natural gas, petroleum, and liquefied petroleum gas (LPG) markets. In 2002, after its establishment, EMRA became a member of the Energy Regulators Regional Association (ERRA) and started coordinating with other member countries' energy market regulatory bodies for a more 'convergent'[5] and 'sustainable' market at national and international levels.

In the most recent stage, which refers to privatisation, with the enactment of Electricity Market Law No. 4628 in 2001, the government has separated TEAŞ into three state-owned enterprises responsible for electricity transmission, generation, and trade: TEİAŞ (Turkish Electricity Transmission Company), EÜAŞ (Electricity Generation Company), and TETAŞ (Turkish Electricity Trade and Contracting Company). These steps were followed by the privatisation of power facilities so that, by the end of 2013, all 18 of the electricity distribution facilities were privatised. Privatisation of the generation facilities is still underway (Özelleştirme İdaresi Başkanlığı, 2021).

3.1. Privatizations and the New Market Structure

3.1.1. Privatization of Electricity Distribution Facilities

The Privatization Administration of Türkiye started privatising electricity facilities in 2004. In preparation, TEK divided electricity facilities across the country into 21

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[4] *Decision of the Council of Ministers dated 12.08.1993 and numbered 93/4789.*

[5] *The term convergence, as used in the contemporary institutional economics literature, considers that an economy's smooth functioning depends on institutions free from interference from political power. It also assumes the ideal of 'convergence' between these institutions governing the exact market through similar administrative rules, forming a perfectly functioning world market.*

monopoly zones based on location. The Competition Authority recommended separating distribution and retail sales services before privatisation to ensure fair competition. However, the Privatization Administration has dismissed this recommendation. As a result, the privatisation of distribution facilities led to a few prominent players dominating the electricity distribution sector (Kirmanoğlu & Kahveci, 2016: 443).

As Table 1 shows, just two companies took control of half of Türkiye's electricity distribution: Kolin-Limak-Cengiz consortium, a capital group that grew in strength during the 2000s; Sabancı Holding, a large capital group that had internationalised itself after completing its domestic capital accumulation in the 1980s; its subsidiary, Enerjisa[6].

Table: 1
Company Percentage Shares in Electricity Distribution, MWh, 2020

Corporations that Own Electricity Distribution Companies	Consumption, MWh	Distribution, %
Cengiz-Kolin-Limak	46.513.933,94	26
Enerjisa	42.356.761,71	24
Aydem Enerji	23.987.376,62	14
İşkaya	11.152.888,91	6
Akcez	9.072.350,23	5
Alarko - Cengiz	9.594.630,98	5
IC Holding	6.801.241,32	4
Aksa-Kazancı Holding	6.222.062,51	4
Eti Gümüş	6.334.243,41	4
Çalık	4.962.299,47	3
Kipaş Holding	3.632.786,80	2
Kiler	2.399.788,68	1
Türkerler	2.005.232,65	1
Kayseri Metropolitan Municipality	2.350.184,51	1
TOTAL	177.385.781,74	100

Source: Created by the author based on data provided in the EMRA Sector Report 2020 (EPDK [EMRA], 2021).

These companies are also exclusively authorised to distribute and sell electricity in their respective regions, which gives them a powerful market position. To prevent this problem of 'horizontal concentration', the now-repealed Article 3 of Law No. 4628[7] called for separation in the energy market based on accounting and licensing. Accordingly, each operation or facility requires a separate balance sheet, account, and license. However, the 2008 amendment[8] limited this separation to the legal aspect: "From 1/1/2013 onwards, distribution companies may only carry out generation and retail sales activities under separate legal entities".

In 2013, the new Electricity Market Law No. 6446 separated distribution and retail sale services only in terms of licensing and accounting, mandating individual licensing and

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[6] *Kolin-Limak-Cengiz Consortium controls four zones (Boğaziçi-Istanbul European Side, Akdeniz, Uludağ, and Çamlıbel); Enerjisa owns three zones (AYEDAŞ-Istanbul Anatolian Side, Toroslar, and Başkent); and Aydem Enerji controls two (Gediz, and Menderes).*

[7] *Law on the Organization and Duties of the Energy Market Regulatory Authority, published in the Official Gazette No. 24335 dated March 3, 2001.*

[8] *Law Regarding Amendments to the Electricity Market Law and Other Laws No. 5784, published in the Official Gazette No. 26948 dated July 26, 2008.*

record-keeping for each facility. However, more detailed regulation was left to secondary legislation, most of which still needs to be enacted.

Moreover, the Regulation on Electricity Licensing was amended in 2013 to impose organisational and executive separation for generation, distribution, and retail companies operating in the same region. Accordingly, the same individuals may not sit on the boards of directors of distribution companies and retail companies. In addition, the board members of distribution and retail companies may not serve on the boards of directors of the parent groups of these companies.

Nevertheless, despite being legally separated under the Electricity Market Law, retail companies and distribution companies still operate under the ownership of the same legal entity. Since the parent company appoints the managers of the distribution company, the executives may make decisions that serve the interests of the parent company or other entities controlled by it, thereby impeding the achievement of the desired level of effective competition in the market (Üstündağ, 2021: 641-642). Indeed, the same conglomerate may own distribution, retail, and generation facilities. As the issues examined in the following sections demonstrate, the existing legislation must be revised to create a competitive market.

3.1.2. Privatization of Electricity Generation Facilities

Since 2006, the events within the electricity generation market have mirrored analogous trends in the electricity distribution market. Privatization Authority privatised electricity generation facilities via asset sale, transfer of operating rights, build-operate-transfer, and build-operate models. In 2020, EÜAŞ generated only 18.9% of Türkiye's total electricity consumption (EPDK [EMRA], 2021: 21), with the remaining 81% supplied by private sector companies, of which 78.2% are independent private generation plants, 2.68% are facilities privatised via transfer of operating rights, and a negligible 0.15% are facilities privatised via build-operate-transfer. A closer look at the electricity generators and the ownership structure within the electricity generation market reveals that certain companies enjoy a significant market share despite regulations for separation. The EMRA Sector Report 2020 provides the names and market shares of the ten largest electricity generators, as seen in Table 2 below.

Table: 2
Türkiye's Top 10 Electricity Generators and Their Percentage Market Shares, 2020

Electricity Generator	Parent Group / Holding	Market Share (%)
EÜAŞ	Public	18,97
Eren En.El.Ür.A.Ş.	Eren Holding	6,36
Enerjisa En.Ür.A.Ş.	Sabancı Holding	5,61
Cenal El.Ür.A.Ş.	Cengiz Holding - Alarko Holding partnership	3,51
İskenderun En.Ür.Ve Tic.A.Ş.	German Steag - OYAK partnership	3,09
Atlas En.Ür.San.A.Ş.	Diler Holding	2,95
İçdaş El.En.Ür.ve Yat. A.Ş.	Necati Aslan	2,93
Yeniköy Kemerköy El.Ür.ve Tic.A.Ş.	Limak Holding	2,24
Hamitabat El.Ür.ve Tic.A.Ş.	Limak Holding	1,97
Akenerji El.Ür.A.Ş.	Akkök Holding	1,58

Source: Created by the author based on data provided in the EMRA Sector Report 2020 (EPDK [EMRA], 2021).

The list of companies generating electricity in Türkiye contains some familiar names from the distribution and retail sales sectors. Two groups stand out with around 8% despite having entered the market after Enerjisa, namely electricity generation facilities owned by Cengiz Holding and Limak Holding. In summary, the management of the privatisation process in the sector and legal gaps have led to a concentration that empowers a few companies in the industry.

3.2. Conflicts in the Market and EMRA's Regulatory Authority

3.2.1. Complaints Regarding the Restriction of Competition

Upon the completion of the privatisation of electricity distribution facilities in 2013, an examination of market functions and activities conducted by the EMRA revealed discontent and objections emerging from within the sector regarding issues related to free competition.

Between 2000 and 2023, 30 out of 91 complaints submitted to the Competition Authority regarding restraint of competition and abuse of dominant position in the market pertained to the electricity market. Within these 30 unique complaints, the activities of a total of 39 electricity distribution companies were brought into question with allegations of restricting competition. The Board, after evaluating these complaints, unanimously decided that only one of them involved obstructing competition and abusing the dominant market position. This case resulted in fines imposed on AYEDAŞ, Toroslar, and Başkent electricity distribution companies operating under the Sabancı Holding's Enerjisa group in 2018 (Rekabet Kurumu [Competition Authority], 2023).

Apart from distribution companies, Çukurova Electric Inc., under Uzan Holding, engaged in electricity market activities and faced complaints in 2003 and 2007, resulting in penalties. Gediz Electric Retail Sales Inc. was another company penalised in 2018 following a complaint. As shown in Table 3 below, numerous complaints regarding competition constraints and abuse of dominant positions are observed in the sector. However, the Competition Authority rejected most of these complaints without requiring an investigation and referred only three to the EMRA.

Table: 3
Complaints to Competition Authority and Decisions, 2000-2023

No	Decision Date	Decision No	Complaint Company	Decision
1	20.06.2000	00-23/232-125	ABB Electric Industry Inc. Alstom Electric Industry Inc.	The unanimous decision is not to initiate an investigation, and the complaint has been rejected.
2	30.04.2002	02-26/262-102	TEİAŞ Başkent Electric Distribution Inc. BEDAŞ Boğaziçi Electric Distribution Inc. Aktaş Electric Trade Inc.	The unanimous decision is not to initiate an investigation, and the complaint has been rejected.
3	27.02.2003	03-13/140-67	Ministry of Energy and Natural Resources EMRA TETAŞ	The unanimous decision is not to initiate an investigation, and the complaint has been rejected.
4	10.11.2003	03-72/874-373	Çukurova Electric Inc.	The complaint has been found justified, and a monetary penalty has been imposed.

5	4.05.2004	04-32/370-93	Türkiye Radio Television Corporation	The unanimous decision is not to initiate an investigation, and the complaint has been rejected.
6	8.02.2007	07-13/101-30	Çukurova Electric Inc.	The complaint has been found justified, and a monetary penalty has been imposed.
7	16.06.2011	11-37/773-241	ELKO Electric Trade Inc. OSEL Electric Industry Inc.	The unanimous decision is not to initiate an investigation, and the complaint has been rejected.
8	26.01.2012	12-03/91-30	Çamlıbel Electric Distribution Inc. Uludağ Electric Distribution Inc.	The unanimous decision is not to initiate an investigation, and the complaint has been rejected.
9	4.07.2012	12-36/1039-327	Akdeniz Electric Distribution Inc	The unanimous decision is not to initiate an investigation, and the complaint has been rejected. (Referral to EMRA)
10	31.05.2012	12-29/847-248	Enerjisa Başkent Electric Distribution Inc.	The unanimous decision is not to initiate an investigation, and the complaint has been rejected.
11	1.11.2012	12-53/1491-519	Çalık Yeşilırmak Electric Distribution Inc	MAJORITY VOTE has decided to reject the complaint and not initiate an investigation.
12	29.08.2013	13-49/698-296	Osmangazi Electric Distribution Inc. Akedaş Electric Distribution Inc. Aydem Electric Distribution Inc	The unanimous decision is not to initiate an investigation, and the complaint has been rejected.
13	6.11.2013	13-62/857-365	Başkent Electric Distribution Inc. Enerjisa Electric Retail Sales Inc.	The unanimous decision is not to initiate an investigation, and the complaint has been rejected.
14	6.11.2013	13-62/856-364	Sakarya Electric Distribution Inc. Sakarya Electric Retail Sales Inc.	The unanimous decision is not to initiate an investigation, and the complaint has been rejected.
15	29.01.2014	14-05/83-36	Boğaziçi Electric Distribution Inc. CLK Boğaziçi Electric Retail Sales Inc. Akdeniz Electric Distribution Inc. CLK Akdeniz Electric Retail Sales Inc.	The unanimous decision is not to initiate an investigation, and the complaint has been rejected.
16	25.06.2014	14-22/426-190	Başkent Electric Distribution Inc. Enerjisa Electric Retail Sales Inc.	The unanimous decision is not to initiate an investigation, and the complaint has been rejected.
17	24.09.2014	14-35/683-300	Çoruh Electric Retail Sales Inc.	The unanimous decision is not to initiate an investigation, and the complaint has been rejected.
18	22.10.2014	14-42/762-338	Boğaziçi Electric Distribution Inc. CLK Boğaziçi Electric Retail Sales Inc. Akdeniz Electric Distribution Inc. CLK Akdeniz Electric Retail Sales Inc.	MAJORITY VOTE has decided to reject the complaint and not initiate an investigation.
19	3.12.2014	14-47/860-390	Gediz Electric Distribution Inc. Gediz Electric Retail Sales Inc. AYDEM Electric Distribution Inc. AYDEM Electric Retail Sales Inc.	MAJORITY VOTE has decided to reject the complaint and not initiate an investigation.
20	12.02.2015	15-07/89-34	Dicle Electric Distribution Inc.	The unanimous decision is not to initiate an investigation, and the complaint has been rejected. (Referral to EMRA)
21	18.03.2015	15-12/169-79	Akdeniz Electric Distribution Inc. Boğaziçi Electric Distribution Inc. Çamlıbel Electric Distribution Inc. Uludağ Electric Distribution Inc. Trakya Electric Distribution Inc. Çoruh Electric Distribution Inc. Fırat Electric Distribution Inc.	The unanimous decision is not to initiate an investigation, and the complaint has been rejected. (Referral to EMRA)
22	24.02.2016	16-06/120-54	Çamlıbel Electric Distribution Inc.	The unanimous decision is not to initiate an investigation, and the complaint has been rejected.
23	2.03.2016	16-07/134-60	Meram Electric Distribution Inc.	MAJORITY VOTE has decided to reject the complaint and not initiate an investigation.
24	30.03.2016	16-12/186-81	Trakya Electric Distribution Inc. Trakya Electric Retail Sales Inc.	The unanimous decision is not to initiate an investigation, and the complaint has been rejected.
25	8.08.2018	18-27/461-224	Enerjisa Energy Inc. AYEDAŞ Electric Distribution Inc. Başkent Electric Distribution Inc. Toroslar Electric Distribution Inc. Enerjisa İstanbul Anatolian Side Electric Retail Sales Inc. Enerjisa Başkent Electric Retail Sales Inc. Enerjisa Toroslar Electric Retail Sales Inc.	It has been unanimously decided that AYEDAŞ, Başkent, and Toroslar have abused their dominant market positions, and fines have been imposed.
26	1.10.2018	18-36/583-284	Bereket Energy Group Inc. Gediz Energy Investment Inc. Aydem Electric Retail Sales Inc. ADM Electric Distribution Inc. Gediz Electric Retail Sales Inc. GDZ Electric Distribution Inc.	It has been unanimously decided that Gediz Electric Retail Sales Inc. and Aydem Electric Retail Sales Inc. have abused their dominant positions in the market, and fines have been imposed.
27	14.11.2019	19-40/669-287	Meram Electric Distribution Inc.	The unanimous decision is not to initiate an investigation, and the complaint has been rejected.
28	16.01.2020	20-04/41-23	Meram Electric Distribution Inc.	The unanimous decision is not to initiate an investigation, and the complaint has been rejected.

29	24.07.2020	20-35/467-206	Boğaziçi Electric Distribution Inc. CK Boğaziçi Electric Retail Sales Inc. CK Energy Partnership Wholesale Electricity Sales Inc. Hipar Trade Inc.	The unanimous decision is not to initiate an investigation, and the complaint has been rejected.
30	30.03.2023	23-16/281-97	Uludağ Electric Distribution Inc.	The unanimous decision is not to initiate an investigation, and the complaint has been rejected.

Source: The author has compiled the information from the following address: <https://www.rekabet.gov.tr/tr/Kararlar>.

What stands out here is the frequent complaints lodged against the electricity distribution companies under the partnership of Cengiz Holding and Koloğlu Holding (Bedaş 6 times, Çamlıbel 3 times, Uludağ 3 times, Akdeniz 4 times). These complaints, however, have been cases deemed unnecessary for investigation by the Competition Authority. In July 2015, representatives of operators from six electricity distribution regions filed a formal complaint with EMRA, claiming that the Cengiz-Limak-Kolin consortium and the IC İÇTAŞ and AKSA companies were preventing free competition[9] by exclusively signing subcontracts with their subsidiaries for new investment and service procurement tenders. The claim was that these distribution companies, rather than issuing transparent and competitive tenders for investment and service procurement, issued mock tenders by invitation that only listed the name and amount of the work procured without announcing tender dates or conditions. In response, EMRA referred the case to the Competition Authority, claiming that the matter fell under the scope of the Competition Law. After examining the case, the Competition Authority ruled that signing subcontracts with subsidiaries was not illegal under the Competition Law. However, it also noted that such transactions may be deemed objectionable and harmful to the electricity market as its law regulates it. It then referred the case back to EMRA, claiming it fell under EMRA's jurisdiction (Rekabet Kurumu [Competition Authority], 2015: 3).

The file remains open as EMRA has yet to rule on the case. Given that the Cengiz-Limak-Kolin consortium, one of the groups named in the complaint, controls 26% of the electricity distribution sector, EMRA has likely avoided making any decision that would harm a strong actor with significant capital in its regulated field. In short, its behaviour supports the captured regulator theory explained at the beginning of this paper.

3.2.2. Complaints Regarding Eligible Consumer Limit

Another objection from sector players concerns regulation on the eligible consumer limit. The Electricity Market Supply Security Strategy Document, published by the High Planning Council in 2009, called for a gradual annual reduction in the eligible consumer limit[10]. The document also stated that the goal was to make all electricity consumers eligible in the future, specifying 2015 as the year when EMRA would remove the eligible consumer

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[9]   The companies and electricity distribution zones named in the complaint were Akdeniz, Boğaziçi, Çamlıbel, and Uludağ, controlled by the Cengiz-Limak-Kolin consortium; Trakya owned by IC Holding; and Çoruh and Fırat controlled by AKSA.

[10] To become an eligible consumer, an electricity consumer's annual consumption must exceed the limit set by EMRA each year. Eligible consumers, natural persons, or legal entities who consume more than the limit can choose electricity suppliers.

limit, allowing all consumers to select their electricity suppliers. However, by 2024, EMRA was behind schedule in meeting this objective, so the eligible consumer limit, although still being gradually reduced, remains in place at 950 kW for 2024[11].

Those electricity distribution companies are less potent than the Cengiz-Kolin-Limak consortium, and Enerjisa has complained about this delay because of the unfair competitive advantage offered to larger distribution companies. Companies currently the sole distributors in their respective zones gain a continuous and profitable revenue stream because all zones are dominated by non-eligible consumers (mostly households) with low electricity consumption who pay higher prices than eligible consumers. Table 4 shows the total number of electricity subscribers in Türkiye (eligible and non-eligible) and the share of companies.

Table: 4
Electricity Subscribers and Percentage Share of Distribution Companies, 2020

Owner of the Distribution Company	Number of Subscribers (eligible and non-eligible)	Share of the Company (%)
Cengiz-Kolin-Limak	11.864.497	26
Enerjisa	11.446.176	25
Aydem	5.545.608	12
Aksa-Kazancı Holding	2.443.193	5
Alarko-Cengiz	2.227.181	5
Çalık	2.206.997	5
Akcez	1.963.823	4
Eti Gümüş	1.888.406	4
İşkaya	1.993.050	4
IC Holding	1.168.941	3
Kiler	1.059.704	2
Türkerler	745.985	2
Kipaş Holding	758.175	2
Kayseri Met. Mun.	770.120	2
TOTAL	46.081.856	100

Source: Created by the author based on data provided in the EMRA Sector Report 2020 (EPDK [EMRA], 2021).

According to 2020 data, Türkiye has 46,081,856 electricity subscribers, of whom around 80% are supplied by the six largest distributors (see Table 4). Despite benefitting from being one of the two most prominent players, Enerjisa supports the removal of the eligible consumer limit. For instance, Yetik Mert, Former CEO of Enerjisa, argued that this would create a more competitive market (Enerji Günlüğü, 2015). However, in its 2008 sectoral report as part of its energy strategy series, the Turkish Industry and Business Association (Türk Sanayicileri ve İş İnsanları Derneği -TÜSİAD) showed no strong demand for removing the limit. Instead, it argued that uncertainties over market liberalisation should be eliminated to enable accurate long-term predictions. It called for a definite, regulated schedule for when and to what extent EMRA will liberalise the market (TÜSİAD, 2008: 68-70).

Despite these demands from the sector to remove the consumer limit, the practice is still in place. As long as almost all consumers are non-eligible, removing the limit would reduce major distributors' subscriber base and profitability by enabling non-eligible consumers to select the distribution companies they want to buy electricity. Thus, the delay

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[11] *EMRA Resolution published in Official Gazette No. 32415 dated December 30, 2023.*

reflects the market's current condition and power relations. Consequently, removing the limit is a straightforward test of EMRA's capacity as an independent regulator.

3.3. Independent Regulation

3.3.1. Transparency and Audit

As mentioned earlier, frequent structural reforms and legislative changes to regulating a natural monopoly threaten the regulator's independence (Kleizen et al., 2018: 15; Wynen et al., 2020: 14). Türkiye's energy market has followed this trend through legal changes and delegation of audit and control powers.

Between 2001 and 2012, Electricity Market Law No. 4628 was amended 12 times, inevitably turning it into a patchwork of legislation. After large capital owners complained, the Cabinet ratified Electricity Market Law No. 6446 in 2013. During this period, electricity market licensing regulations were also amended 20 times[12], thereby introducing heightened probabilities of uncertainty within the sector and adversely impacting the reputation and reliability of EMRA.

As to delegation of audit, firstly, under the Electricity Market Law of 2008, the authority to monitor and achieve energy supply security was transferred from TEİAŞ to the Ministry of Energy and Natural Resources and the Cabinet[13]. This legal interference carries a risk of damaging EMRA's independence. Secondly, a statutory decree[14] issued by the Cabinet in 2011 has made eight independent regulators, including EMRA, subordinate to the ministries in charge of their respective areas. As a result, the Ministry of Energy and Natural Resources now has audit power over EMRA, which may cause one to question EMRA's independence. During the same period, the then Deputy PM, Ali Babacan, clarified the government's position by stating, 'The powers of EMRA and the Tobacco Authority may be revised. It has gone overboard. Some of their powers have to be transferred to the government. Many issues require political intervention. Sometimes, the burden falls on the Minister of Energy, subject to unfair criticism. A certain amount of power must be transferred to the government' (Akşam, 2011).

In addition, audit and control power over privatised electricity distribution facilities was transferred to the Ministry of Energy and Natural Resources under an amendment in 2013[15], which suggests a likelihood of political interference in the jurisdiction of an independent regulatory authority. This change authorised the Ministry to audit distribution

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[12] *Electricity Market Licensing Regulation published in the Official Gazette No. 28809 dated November 2, 2013.*

[13] *Law No 5784 on The Amendments to Law on The Electricity Market and Certain Laws, published in the Official Gazette dated 26.07.2008 and numbered 26948, Article 6.*

[14] *Decree-Law Numbered 649, published in the Official Gazette dated August 17, 2011, on the Organization and Duties of the Ministry of European Union, and Decree-Law on Making Amendments to Some Laws and Decree-Laws, Article 45.*

[15] *Communiqué on Inspection and Audit of the Activities of Electricity Distribution Companies, published in the Official Gazette No. 28617 dated April 13, 2013.*

companies and their investment activities, customer services, product and service procurement and sales, work and maintenance, financials, legal processes, general disclosures, information technologies and grid operations, and other aspects of their operation as deemed necessary by the Ministry. This delegation of authority harbours the inherent risk of compromising the autonomy and administrative prowess of EMRA. The Ministry then prepared a secondary Electricity Distribution Companies Audit Regulation, which abolished 'yearly audits in March' and replaced it with the phrase at least once per year, thereby introducing a certain degree of arbitrariness[16]. In addition, during both these periods, the Ministry delegated its audit power to TEDAŞ.

However, according to the Ministry and Natural Resources 2018 Audit Report published by the Court of Accounts in 2019 (Sayıştay Başkanlığı [Turkish Court of Accounts], 2019: 24-25), TEDAŞ did not use this audit power effectively. It even failed to audit 10 of the 21 electricity distribution companies. Although the report does not name the unaudited companies, the fact that the audit authority was taken from the independent regulator and given to a state-controlled enterprise highly susceptible to political influence represents a significant problem regarding EMRA's independence and control of the market.

On the other hand, the audit reports on electricity distribution companies prepared by TEDAŞ for the years 2017-2018 and submitted to EMRA by the Ministry include findings related to the procurement processes of electricity distribution companies. Accordingly, parallel to the complaints alleging competition violation submitted to the Competition Authority, some distribution companies have been identified as acting contrary to fundamental principles such as competition, transparency, equality, and reliability in their procurement, service acquisition, and construction tenders. Court of Accounts found that these companies did not comply with the tender announcement conditions (Sayıştay Başkanlığı [Turkish Court of Accounts], 2020: 12). In addition, the 2020 EMRA report by the Court of Accounts noted that companies managing these distribution companies, which have separate legal entities, participate in the tenders (Sayıştay Başkanlığı [Turkish Court of Accounts], 2021: 14). This situation underscores the need for creating a healthy competitive environment (Sayıştay Başkanlığı [Turkish Court of Accounts], 2021: 18). Furthermore, the 2021 EMRA report by the Court of Accounts reiterated the same observation, suggesting that for the establishment of a more robust competitive environment, EMRA should make regulatory amendments in the Regulation on Procurement and Sales Transactions of Electricity Distribution Companies (Sayıştay Başkanlığı [Turkish Court of Accounts], 2022: 24).

3.3.2. Administrative Fines and EMRA's Authority

Administrative fines are one of the most crucial punitive measures ensuring the authorities' control in the markets regulated by supervisory institutions. When examining

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[16] *Electricity Distribution Companies Audit Regulation published in the Official Gazette No. 30258 dated December 2, 2017.*

the activities of the EMRA in this regard, one can say that out of the total administrative fines amounting to 3,755,109,540.94 Turkish Lira imposed between 2013 and 2017, EMRA could collect only 2.67% (Sayıştay Başkanlığı [Turkish Court of Accounts], 2018: 14). Within this total amount, Court of Accounts identified that companies that received administrative fines paid only 100 out of 207 fines issued within the scope of electricity market regulation (Sayıştay Başkanlığı [Turkish Court of Accounts], 2018: 17).

One reason for the low collection of administrative fines at this level is that 60% of the companies appeal and initiate legal proceedings against the penalties imposed on them. In the same report, the Turkish Court of Accounts stated that 96.4% of the cases resulted against EMRA and most of the annulments were due to procedural issues (Sayıştay Başkanlığı [Turkish Court of Accounts], 2018: 22-23). Those who do not file lawsuits and do not pay their fines within the maximum period specified are also subject to having their documents sent to the tax offices to which the companies are affiliated. Therefore, after this stage, the collection of administrative fines becomes the responsibility of the Ministry of Treasury and Finance.

Critical for the EMRA is the provision under Article 16 of Law No. 6446 on the Electricity Market, which allows EMRA to request 25% of the administrative fines collected by the Ministry of Treasury and Finance as an institutional share. However, despite the EMRA requesting information from tax offices regarding the collection of administrative penalties in 2014, 2016, and 2017, healthy feedback has not been possible (Sayıştay Başkanlığı [Turkish Court of Accounts], 2018: 22).

Regulatory and supervisory institutions are autonomous bodies responsible for making independent regulations in their respective fields and have the authority to oversee compliance with these regulations through laws. Undoubtedly, administrative fines are the most potent enforcement tool for these institutions. The Turkish Court of Accounts emphasised in its audit report on the EMRA that the effective implementation of administrative fines also determines the effectiveness of the overarching institutions' core responsibilities. Accordingly, 97.33% of the administrative fines imposed between 2013 and 2017 have yet to be collected, which poses a risk to the EMRA's independent regulatory function (Sayıştay Başkanlığı [Turkish Court of Accounts], 2018: 20). EMRA's inability to collect administrative fines imposed based on the law, regardless of the cause of the delay, raises questions about the institution's authority over the regulated sector.

3.3.3. Licenses, Capital Fractions and Political Power

Under the Electricity Market Law, all private sector facilities must obtain a license from EMRA based on the nature of their operations. EMRA is the only institution with the power and authority to grant this license. However, as the case discussed below shows, EMRA could not act as an independent administrative authority.

In 2007, Doğan Holding, a large conglomerate and TÜSİAD member, applied to EMRA for a license to establish an oil refinery in the Ceyhan region, granted in June 2007. EMRA also announced the approval publicly. Soon after, Diler Holding[17] filed a license application to build an electricity generation facility in the same region. Subsequently, EMRA postponed the permit procedures involving Doğan Holding, which had already been granted a license, for 14 months without any reasonable justification.

In 2008, EMRA finally made a regulatory change that clarified the situation with Doğan Holding. This stated that if an application for a refinery production license is made within 15 days for an electricity generation license in the electricity market or a refinery and/or storage license in the oil market involving the same region, EMRA may prioritise the electricity generation license application if local natural resources are available in the region and if one of the applicants is proposing to use the resources as part of the license[18].

Soon after this change, Diler Holding was granted an electricity generation license in Ceyhan. Two other companies applied for a refinery license in the same region, namely POAŞ and SOCAR-TURCAS, which EMRA also turned down. However, another individual capital owner, Çalık Holding, also applied for a refinery license in the same region, which was granted. One key point about Çalık Holding is that, at the time, the company's CEO was Berat Albayrak, who went on to serve in the Cabinet of the 64th and 65th governments as Minister of Energy and Natural Resources while Çalık Holding has close ties to the AKP government.

Furthermore, Aydın Doğan, owner of Doğan Holding, claimed that he raised the issue of bureaucratic red tape hindering his company's refinery development in Ceyhan despite being granted a license, to which Erdoğan reportedly said, 'No, Çalık wants that region, and we promised it to him' (Doğan, 2008). This demonstrates that Türkiye's government has embraced a highly politicised economic management that favours the short-term interests of a particular capital group above the broader, long-term interests of the Turkish capital. Moreover, companies that have won privatisation tenders or obtained licenses under the oversight of this government have secured financing using either large long-term loans extended by public banks (Sözcü, 2016) or through incentives (Milliyet, 2010).

4. Conclusion

The literature acknowledges that independent regulatory authorities may face susceptibility to interventions from political authorities and stakeholders within their sectors. Early studies primarily focused on the effectiveness of independent regulators in preventing market failures, the independence of players in the regulated sector, and regulatory independence from political influence. Contrary to the widely accepted belief, some studies

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[17] *There are clear indicators about the political affiliation of Diler Holding as the group is neither a member of TÜSİAD nor of associations with known ties to the government, such as MÜSİAD or ASKON.*

[18] *Regulation Regarding Amendments to the Electricity Market Licensing Regulation published in the Official Gazette No. 27077 dated December 7, 2008.*

found that regulation does not eliminate market failures but can lead to resource misallocation. Interest-group pressures on regulators were identified, indicating a potential distortion of regulation serving private benefits rather than social welfare.

Debates centre around whether entrusting regulatory authority to an independent body enhances the reliability of the national economy or risks being influenced or captured by private interests within the sector. While establishing independent regulatory authorities aims to eliminate political influence, central government interventions can impact regulators in various ways. These interventions include structural reforms, legal changes, ministries' activities, budget constraints, and asymmetrical information problems. The influence of political figures can sometimes lead IRAs to refrain from taking action and remain silent on matters they regulate rather than actively intervening.

The literature on electricity market regulation in Türkiye concentrates on the perception of EMRA as an administrative authority susceptible to political interference and manipulated by the government. This study aligns with the Turkish literature, demonstrating how EMRA is a politicised institution in line with the political signal theory due to its lack of authority to oversee companies in the sector, its regulation, frequent legislative changes in licensing, and vulnerability to political intervention.

However, the empirical findings discussed throughout the article also reveal numerous instances consistent with the capture theory. Accordingly, despite legal separation regulations, companies operating in the electricity distribution, retail, and production sectors are associated with a few significant holdings or consortia, with their managements appointed by the parent company; complaints about distribution companies related to these significant holdings preferring companies within the same structure in infrastructure tenders, and EMRA remaining silent as a regulatory authority despite complaints; only two holdings hold half of the electricity distribution sector; EMRA staying far behind the planned schedule for resetting the consumer limit despite complaints from small firms in the sector; and the fact that EMRA has not collected 97% of the administrative fines imposed by EMRA so far, all indicate that large firms in the sector have captured EMRA.

Nevertheless, what makes Türkiye unique as an example of a developing country is the insufficient institutionalisation of regulatory and administrative authority in the electricity market and the visible interventions of the political authority occurring parallel to the interests of significant capital groups in the sector. In other words, political power is integrated with specific capital segments operating in the sector and behaves almost like one of these capital fractions. Here, the political authority, rather than acting in line with the long-term interests of the national capital in Türkiye, tends to protect the short-term interests of specific capital fractions and intervenes in EMRA accordingly.

References

Akduran, Ö. & S. Temelli (2015), "Politik iktisadın yeni gözdesi olarak teşvik politikaları: Son dönem içerisinden Türkiye'ye bakış", in: H. Mıhçı (ed.), *Finansallaşma, Devlet ve Politik İktisat* (221-250), Ankara: NotaBene Yayınları.

Akşam (2011), *Babacan 'Kantarın topuzu Kaçtı' Dedi. EPDK İki Parçaya Ayrılıyor*, <https://www.aksam.com.tr/ekonomi/babacan-kantarin-topuzu-kacti-dedi-epdk-iki-parcaya-ayriliyor--22102h/haber-22102>, 01.09.2021.

Bağdadioğlu, N. (2011), "Regulation in the Turkish electricity industry", in: T. Çetin & F. Oğuz (eds.), *The Political Economy of Regulation in Turkey* (123-143), New York: Springer.

Bailey, S.J. (1995), *Public Sector Economics: Theory, Policy and Practice*, UK: Macmillan International Higher Education.

Becker, G.S. (1983), "A Theory of Competition Among Pressure Groups for Political Influence", *The Quarterly Journal of Economics*, 98(3), 371-400.

Bernstein, M.H. (1955), "Independence, responsibility, and the public interest", in: *Regulating Business by Independent Commission* (126-163), NewJersey: Princeton University Press.

Böllhoff, D. (2005), "Developments in Regulatory Regimes: Comparison of Telecommunications, Energy and Rail", in: D. Coen & A. Heritier (eds.), *Refining Regulatory Regimes: Utilities in Europe* (15-52), Cheltenham: Edward Elgar Publishing.

Carpenter, D.P. (2004), "Protection without Capture: Product Approval by a Politically Responsive, Learning Regulator", *The American Political Science Review*, 98(4), 613-631.

Carpenter, D.P. (2014), "Corrosive Capture? The Dueling Forces of Autonomy and Industry Influence in FDA Pharmaceutical Regulation", in: D. Carpenter & D.A. Moss (eds.), *Preventing Regulatory Capture: Special Interest Influence and How to Limit it* (152-172), Cambridge: Cambridge University Press.

Carpenter, DP. (1996), "Adaptive Signal Processing, Hierarchy, and Budgetary Control in Federal Regulation", *American Political Science Review*, 90(2), 283-302.

Çetin, T. & F. Oguz (2007), "The Politics of Regulation in the Turkish Electricity Market", *Energy Policy*, 35(3), 1761-1770.

Çetin, T. & F. Oğuz (2011), *The Political Economy of Regulation in Turkey*, NewYork: Springer Science & Business Media.

Çetin, T. & F. Yilmaz (2010), "Transition to the Regulatory State in Turkey: Lessons from Energy", *Journal of Economic Issues*, 44(2), 393-402.

Doğan, A. (2008), "Demokrasi ve Özgür Basını İçine Sindir", *Interviewer: M.A. Birand*, Kanal D Haber (Vol 1 Eylül), Hürriyet, İstanbul.

Dubash, N.K. (2003), "Revisiting Electricity Reform: The Case for a Sustainable Development Approach", *Utilities Policy*, 11(3), 143-154.

Durakoğlu, S.M. (2011), "Political Institutions of Electricity Regulation: The Case of Turkey", *Energy Policy*, 39(9), 5578-5587.

Enerji Günlüğü (2015), *Mert: Serbest Tüketici Limiti Sıfırlanmalı*, <https://www.enerjigunlugu.net/mert-serbest-tuketici-limiti-sifirlanmali-12823h.htm>, 01.09.2017.

EPDK [EMRA] (2021), *Electricity Market Sector Report 2020*,
        <https://www.epdk.gov.tr/Detay/Icerik/3-0-24-3/elektrikyillik-sektor-raporu>,
        02.03.2022.

Erensü, S. (2018), "Powering Neoliberalization: Energy and Politics in the Making of a New
        Turkey", *Energy Research & Social Science*, (41), 148-157.

Gilardi, F. et al. (2006), "Regulation in The Age of Globalization: The Diffusion of Regulatory
        Agencies Across Europe and Latin America", *IBEI Working Papers*, Barcelona.

Gordon, S.C. & C. Hafer (2014), "Conditional forbearance as an alternative to capture: Evidence
        from coal mine safety regulation", in: D. Carpenter & D.A. Moss (eds.), *Preventing
        Regulatory Capture: Special Interest Influence and How to Limit it* (208-238),
        Cambridge University Press.

Görgün, S. (1993), *Kamu Maliyesine Giriş Ders Notları*, İstanbul: SBF Yayınları.

Haberler (2015), *Elektrik Şirketlerinin Bankalara Borcu Türkiye'yi Tehdit Ediyor*,
        <https://www.haberler.com/elektrik-sirketlerinin-bankalara-borcu-turkiye-7668864-
        haberi/>, 01.09.2017.

Hopenhayn, H. & S. Lohmann (1996), "Fire-alarm Signals and the Political Oversight of Regulatory
        Agencies", *The Journal of Law, Economics, and Organization*, 12(1), 196-213.

Kirmanoğlu, H. & M. Kahveci (2016), "Restructuring the Electricity Sector in Turkey: Who are the
        Beneficiaries?", in: *Handbook of Research on Public Finance in Europe and the MENA
        Region* (429-446), IGI Global.

Kirmanoğlu, H. (2009), *Kamu Ekonomisi Analizi*, İstanbul: Beta.

Kleizen, B. et al. (2018), "Structural Reform Histories and Perceptions of Organizational Autonomy:
        Do Senior Managers Perceive Less Strategic Policy Autonomy When Faced with
        Frequent and Intense Restructuring?", *Public Administration*, 96(2), 349-367.

Kumar, S. (2022), "Taking Root: Independent Regulatory Agency Model of Regulation in Indian
        Electricity Sector", *Energy Policy*, (164), 112863.

Laffont, J.-J. & J. Tirole (1991), "The Politics of Government Decision-Making: A Theory of
        Regulatory Capture", *The Quarterly Journal of Economics*, 106(4), 1089-1127.

Mahon, R. (1979), "Regulatory Agencies: Captive Agents or Hegemonic Apparatuses", *Studies in
        Political Economy*, 1(1), 162-200.

Majone, G. (1996), "Theories of Regulation", in: G. Majone (ed.), *Regulating Europe* (28-46),
        London: Routledge.

Majone, G. (1997), *Independent Agencies and the Delegation Problem: Theoretical and Normative
        Dimensions*, Springer.

Mill, J.S. (1848), *Principles of Political Economy with Some of Their Applications to Social
        Philosophy* (Abridged) Edited, with Introduction, by Stephen Nathanson,
        Indianapolis/Cambridge: Hackett Publishing Company, Inc.

Milliyet (2010), *Çalık 15 Milyar TL'lik Teşvik Belgesi Aldı*, (Vol. 2021), İstanbul.

Özcan, G.B. & U. Gündüz (2015), "Energy Privatisations, Business-Politics Connections and
        Governance Under Political Islam", *Environment and Planning C: Government and
        Policy*, (33), 1714-1737.

Özel, I. & İ. Atiyas (2011), "Regulatory Diffusion in Turkey: A Cross-Sectoral Assessment", in: T. Çetin & F. Oğuz (eds.), *The Political Economy of Regulation in Turkey* (51-73), NewYork: Springer.

Özelleştirme İdaresi Başkanlığı (2021), *3. Proje Grup Başkanlığı Portföyü, Elektrik Üretim A.Ş.*, <https://www.oib.gov.tr/3-proje-grup-baskanligi/,%20Eri%C5%9Fim%20Tarihi:%201%20Aral%C4%B1k%202021>, 10.2.2022.

Peltzman, S. (1976), "Toward a More General Theory of Regulation", *The Journal of Law & Economics*, 19(2), 211-240.

Posner, R.A. (1968), "Natural Monopoly and Its Regulation", *Stanford Law Review*, (21), 548-643.

Rekabet Kurulu (2023), Rekabet Kurulu Kararları, <https://www.rekabet.gov.tr/tr/Kararlar>, 01.01.2024.

Sharkey, W.W. (1982), *The Theory of Natural Monopoly*, Cambridge: Cambridge University Press.

Sözcü (2016), *Çalık'ın Kredisi Sır Oldu*, <https://www.sozcu.com.tr/2016/ekonomi/calikin-kredisi-sir-oldu-1343034/>, 01.09.2021.

Stigler, G.J. & C. Friedland (1962), "What Can Regulators Regulate? The Case of Electricity", *The Journal of Law and Economics*, 5, 1-16.

Stigler, G.J. (1971), "The Theory of Economic Regulation", *The Bell Journal of Economics and Management Science*, (2), 3-21.

Stiglitz, J.E. (2000), *Economics of The Public Sector Third Edition*: WW Norton & Company.

T.C. Sayıştay Başkanlığı (2018), Enerji Piyasası Düzenleme Kurumu 2017 Yılı Sayıştay Düzenlilik ve Denetim Raporu, <https://www.sayistay.gov.tr/reports/NaQ5pqLgqB-enerji-piyasasi-duzenleme-kurumu>, 01.01.2024.

T.C. Sayıştay Başkanlığı (2019), Enerji ve Tabii Kaynaklar Bakanlığı 2018 Yılı Sayıştay Denetim Raporu, <https://www.sayistay.gov.tr/reports/download/372-enerji-ve-tabii-kaynaklar-bakanligi>, 01.01.2024.

T.C. Sayıştay Başkanlığı (2020), Enerji Piyasası Düzenleme Kurumu 2019 Yılı Sayıştay Denetim Raporu, <https://www.sayistay.gov.tr/reports/NaQ5pqLgqB-enerji-piyasasi-duzenleme-kurumu>, 01.01.2024.

T.C. Sayıştay Başkanlığı (2021), *Enerji Piyasası Düzenleme Kurumu 2020 Yılı Sayıştay Denetim Raporu*, <https://www.sayistay.gov.tr/reports/NaQ5pqLgqB-enerji-piyasasi-duzenleme-kurumu>, 01.01.2024.

T.C. Sayıştay Başkanlığı (2022), *Enerji Piyasası Düzenleme Kurumu 2021 Yılı Sayıştay Denetim Raporu*, <https://www.sayistay.gov.tr/reports/NaQ5pqLgqB-enerji-piyasasi-duzenleme-kurumu>, 01.01.2024.

Thatcher, M. (2002), "Regulation after delegation: independent regulatory agencies in Europe", *Journal of European Public Policy*, 9(6), 954-972.

TÜSİAD (2008), *Enerji Piyasasının Serbestleşmesi ve Arz Güvenliğinin Sağlanması için Öneriler*, <https://tusiad.org/tr/yayinlar/raporlar/item/4835-tusiad-enerji-stratejisi-dizisi-no--1---elektrik-piyasasinin-serbestlesmesi-ve-arz-guvenliginin-saglanmasi-icin-oneriler>, 01.12.2021.

Üstündağ, B. (2021), "Elektrik Dağıtım Faaliyeti ile Diğer Elektrik Piyasası Faaliyetleri Arasında Yönetim Ayrıştırmasının Uygulanabilirliği", *Yıldırım Beyazıt Hukuk Dergisi*, (2), 611-646.

Viscusi, W.K. (1992), *Fatal Tradeoffs: Public and Private Responsibilities for Risk*, New York: Oxford University Press.

Vogel, S. (1996), *Freer Markets, More Rules*, Ithaca, NY: Cornell University Press.

Wynen, J. et al. (2020), "Keeping a Watchful Eye in Times of Turmoil? How Repeated Structural Reform Leads to More Attention to Political Signals", *Public Administration*, 98(3), 570-590.

The Impact of Carbon Emissions on Corporate Cost of Debt (COD): A Research on Borsa İstanbul (BIST) Sustainability Index

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Karbon Emisyonlarının Şirketlerin Borçlanma Maliyeti Üzerine Etkisi: BİST Sürdürülebilirlik Endeksinde Bir Araştırma

Abstract

This study examines the influence of carbon emissions of companies traded on the BIST Sustainability Index on the cost of debt for 2017-2021. In other words, the study aims to guide decision-makers towards carbon emissions reduction by showing a significant impact between the cost of debt and carbon emissions. The data were obtained from the Public Disclosure Platform, companies' financial statements, annual reports, sustainability reports, integrated reports, and the DataStream database and were subjected to statistical analysis. Panel data pooled OLS method was used in the study. The study found a significant impact of total carbon emissions, carbon emission intensity, leverage, and structure variables on the cost of debt. However, it was concluded that the size, return on assets, growth, and cash flow variables did not significantly impact the cost of debt.

Keywords : Cost of Debt, Carbon Emissions, Sustainability, Panel Data Analysis.

JEL Classification Codes : M40, M41, Q56.

Öz

Bu çalışmanın amacı, 2017-2021 yılları için BİST Sürdürülebilirlik Endeksinde işlem gören şirketlerin karbon emisyonlarının borçlanma maliyeti üzerindeki etkisini incelemektir. Bir başka ifade ile borçlanma maliyeti ile karbon emisyonu arasında anlamlı bir etki olduğunu göstermek suretiyle karar alıcıları, karbon emisyonu azaltımına yöneltmektir. Çalışmada veriler Kamuyu Aydınlatma Platformundan (KAP), şirketlerin finansal tablo dipnot ve açıklamaları, faaliyet raporları ile sürdürülebilirlik raporları, entegre raporları ve DataStream veri tabanından elde edilerek istatiksel analize tabi tutulmuştur. Çalışmada panel veri havuzlanmış EKK yöntemi kullanılmıştır. Çalışma sonunda toplam karbon emisyonu, karbon emisyon yoğunluğu, kaldıraç ve yapı değişkenlerinin borçlanma maliyeti üzerine anlamlı bir etkisinin bulunduğu tespit edilmiştir. Ancak büyüklük, aktif kârlılık, büyüme ve nakit akışı değişkenlerinin borçlanma maliyeti üzerinde anlamlı bir etkisinin bulunmadığı sonucuna varılmıştır.

Anahtar Sözcükler : Borçlanma Maliyeti, Karbon Emisyonları, Sürdürülebilirlik, Panel Veri Analizi.

1. Introduction

It is possible to mention the many adverse effects of global warming and climate change that threaten sustainable development (SD). Initially, the concept of SD, which was put forward for continuous economic growth and protection and development of the environment, was expanded to include social and economic perspectives alongside environmental concerns (Gedik, 2020: 1). No widely accepted description of SD exists in the literature. However, the definition put forward by the Brundtland Commission[1], "The ability of humanity to SD, that is, to meet the needs of the present without compromising the ability of future generations to meet their own needs," can be considered the most standard and accepted definition (Kates et al., 2005: 10).

The most crucial factor leading to climate change and global warming is greenhouse gas (GHG) emissions. GHGs consist of gases such as carbon dioxide (CO_2), ozone (O_3), nitrous oxide (N_2O), water vapour (H_2O), methane (CH_4), and gas compounds such as perfluorocarbon (PFC), hydrofluorocarbon (HFC), and sulphur hexafluoride (SF_6) that are formed during industrial production processes. Carbon emissions (CE) have a significant share among these GHG emissions. CO_2 gas accounts for approximately 80% of the total GHG emissions (Demirtürk, 2021: 1082).

For a long time, governments and regulatory authorities have been implementing many regulations and taking some measures to combat the GHG effect and climate change. The UN's Framework Convention on Climate Change (UNFCCC) was signed in 1992 at the Rio Conference on Environment and Development with the participation of many countries (Sultanoğlu & Özerhan, 2020: 177-178). The Kyoto Protocol was signed in 1997 under the UNFCCC, which aims to reduce CE (Güneysu & Atasel, 2022: 1184). The protocol imposed internationally binding emission reduction targets on the parties and was enacted in 2005. The parties to the UNFCCC accepted the Paris Climate Agreement in 2015. According to the agreement, CE expressed as Scopes 1, 2, and 3 must be reduced to deficient levels (Sultanoğlu & Özerhan, 2020: 178). Türkiye officially became a party to the UNFCCC on May 24, 2004, and to the protocol on August 26, 2009. Nonetheless, Türkiye signed the Paris Agreement on April 22, 2016, and the law on its acceptance was enacted on October 7, 2021 (Güneysu & Atasel, 2022: 1184).

As a result of these regulations, companies should disclose what measures they have taken to reduce CE and the trend of their CE over the years through sustainability reports and Carbon Disclosure Project (CDP) reports for internal and external stakeholders. The amount of CE by companies affects their financial status, carbon risk, and cost of debt (COD), and hence their sustainability.

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[1] *World Commission on Environment and Development (WCDE), which was established in 1983 as a subsidiary of the United Nations with the purpose of "recommending long-term environmental strategies to achieve sustainable development until 2000 and beyond" with the UN General Assembly Resolution is also known as Gro Harlem Brundtland, Norwegian Prime Minister Former Head of the Commission.*

Caragnano et al. (2020: 2) stated that corporate lenders, credit rating agencies, and institutional investors included carbon risk assessments in their credit risk evaluation processes with the implementation of strict environmental regulations and policies, particularly for medium and large companies operating in environmentally friendly sectors. Additionally, the study highlighted that with the increasing global interest in reducing GHG emissions and regulations aimed at reducing environmental issues, cash flows can be affected significantly, and current costs and potential future damages can increase, particularly for companies that pollute the environment more. It was also emphasised that lenders and credit institutions that finance environmentally irresponsible companies may be at risk of damaging their reputation and long-term capability of retaining existing customers and attracting new ones, as well as their future operations and competitive position. Therefore, companies with higher levels of CE were expected to incur higher costs to finance their operations than companies that pollute the environment less.

In some studies in the literature (Spicer, 1978; Mahapatra, 1984; Klassen & McLaughlin, 1996; Russo & Fouts, 1997; Montabon et al., 2007; Russo & Pogutz, 2009), there is a prevailing view that a positive association exists between environmental and economic performances (Caragnano et al., 2020: 2).

In their study, Li et al. (2014) attracted attention to three factors to justify the association between COD and carbon risk. Firstly, rating agencies such as S&P may reduce the borrowing amount of certain enterprises due to concerns about GHGs, which can increase the credit default risk premium for these companies. Secondly, companies with high carbon risk (carbon emission intensity - CEI) may have a higher risk of violating loan contracts because carbon costs can reduce the diversity of assets held by creditors. This means that companies with many carbon-intensive assets may need to sell these assets to increase their borrowing capacity, thereby reducing the diversity of their assets. The Carbon Pollution Reduction Scheme (CPRS), which was repealed in 2009, argues in its criticism that lenders may avoid lending to companies with high carbon costs because high-emission assets are considered riskier. Therefore, lenders may want to impose stricter terms and higher costs on loans to companies with high CE to secure their loans. Finally, companies with high CE may face financial problems if the costs of litigation and CE reduction increase, which can reduce the financial resources available to pay back debts. This study suggests that COD increases as companies' CE increases.

In a study conducted by Jung et al. (2018), it was noted that lending institutions take CEI into account during their general risk assessments, and they may repeat loan agreement terms related to collateral, loan maturity, and loan cost to reduce the influence of CEI on borrowers (enterprises). Additionally, they stated that CODs are lower for environmentally conscious companies with low CEI and high carbon awareness, which enables them to borrow at lower rates.

In studies focusing on the influence of GHGs on the environment and detail examined in the literature review, a positive association between COD and GHGs was found. In other

words, companies with high GHG emissions were found to have higher COD. However, studies have also reported that environmentally conscious companies that reduce carbon risk and have heightened awareness for reducing carbon have lower COD. This research aims to investigate the influence of CE on COD in Türkiye, determine whether companies can reduce their COD by reducing their CE, and encourage companies to reduce their CE.

Various studies[2] have been carried out on CE in the literature, such as carbon cost and management accounting, CE accounting, carbon disclosures, carbon reporting, GHG emission accounting and reporting, GHG disclosures and assurance, carbon footprint reporting, and carbon transparency project disclosures. Even though studies[3] exist in the international literature examining the influence of CE on COD, no study investigating the effect of CE on COD has been found in Türkiye. To contribute to the field, this research examines the impact of CE of companies traded on the BIST Sustainability Index (SI) on COD. In this context, data on the CE and COD of 38 out of 65 companies traded on the BIST-SI, which published sustainability or integrated reports in 2021, were obtained from the Public Disclosure Platform (PDP), companies' financial statement footnotes and disclosures, annual reports, sustainability reports, integrated reports, and the DataStream database. The data were then subjected to statistical analysis using the STATA package software, and the effect of CE on COD was investigated.

In the study, the literature on the effect of CE on COD was first reviewed, the variables were explained with the dataset, and then the developed hypotheses, research method, and findings were presented. Finally, the findings were discussed in the conclusion section, and recommendations were given.

2. Literature Review

Based on the literature review, it is noticed that various studies have been carried out on CE, including carbon accounting, GHG emission accounting and reporting, reporting of carbon footprints, disclosure of GHG emissions, assurance of emissions, carbon transparency project disclosures, and CE disclosures. While studies on the impact of CE on COD have been conducted in some countries (such as European countries, the USA, Australia, Canada, India, the UK, and China), at the time of this study, no direct research has been found in Türkiye examining the impact of CE on COD. In this context, the findings

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[2]   *Kardeş Selimoğlu et al. (2022); Kızıltan and Doğan (2021); Demircioğlu and Ever (2020); Aliusta and Yılmaz (2020); Öktem (2020); Sultanoğlu and Özerhan (2020); Çokmutlu and Ok (2019); Güleç and Bektaş (2019); Qian et al. (2018); Altınbay and Golagan (2016); Gonzalez and Ramirez (2016); Chithambo and Tauringana (2014); Choi et al. (2013); Zhang et al. (2013); Tsai et al. (2012); Hrasky (2012); Luo et al. (2012); Solomon et al. (2011); Burritt et al. (2011); Ratnatunga and Balachandran (2009); Stanny and Ely (2008); Simnett and Nugent (2007).*

[3]   *Analysed in detail in the literature review section [Panjwani et al. (2022); Kozak (2021); Vullings (2021); Caragnano et al. (2020); Palea and Drogo (2020); Pizzutilo et al. (2020); Wang et al. (2020); Jung et al. (2018); Maaloul (2018); Kumar and Firoz (2018); Kleimeier and Viehs (2018); Zhou et al. (2017)] by studies.*

of studies covering some countries outside of Türkiye on the effects of CE on COD are as follows:

Panjwani et al. (2022) examined the impact of Scope 3 CE disclosure on firms' COD. The study analysed panel data from 2720 companies in the MSCI All Country World Index for 2015-2020. The study found that companies that disclose their Scope 3 emissions have lower COD.

Kozak (2021) examined the relationship between CEI and COD for 255 large-scale non-financial companies in 15 EU countries between 2018 and 2021. The study, which used fractional logit regression analysis, detected a significant association between CEI and COD, with low CEI firms having lower COD.

Vullings (2021) examined the impact of CEI on COD for 2737 firms operating in the US and Europe between 2013 and 2019 and the mitigating role of carbon policy in the US and Europe. The study used multiple regression analysis and found a significantly positive effect of CEI on COD.

Caragnano et al. (2020) investigated the effect of GHGs on COD for EuroStoxx 600 firms. The study analysed panel data from 592 firms from 2010-2017. A positive association existed between CEI and COD. The study also found that firms with high CEI have higher COD. The study also concluded that control variables (profitability, size, leverage, and cash flow) positively correlate with COD.

Palea and Drogo (2020) examined the relationship between CE and COD for companies in the European region from 2010 to 2018. The OLS analysis was conducted to estimate the effect of CEI on COD. The study found a positive association between CE and COD, and COD increased as CE increased.

Pizzutilo et al. (2020) investigated the relationship between CEI and COD of EuroStoxx 600 companies. The data of 616 companies from 2010-2017 were analysed using panel data analysis. In the study, the data relevant to the COD were obtained from the Bloomberg Data Service. A positive association existed between CEI and COD. The study concluded that companies with high CEI and, therefore, high CEI had higher COD. In this respect, it was stated that companies with high carbon risk due to carbon intensity had high COD.

In Wang et al. (2020) study, the relationship between corporate CE and COD of 112 companies operating in the global tourism industry was examined for the period between 2003 and 2016. Data for the study was obtained from Thomson Reuters, DataStream, and Worldscope databases. Panel data analysis, correlation, and regression analysis were conducted in the study, and a positive association existed between CE and COD. The companies with high CE had higher COD.

Jung et al. (2018) examined the impact of CEI and CEI awareness on the COD of 255 companies listed on the ASX between 2009 and 2013. The study used panel regression analysis. The study found that companies with high carbon awareness were more inclined to answer the CDP survey and more likely to manage CEI. Additionally, companies with high CEI were found to have higher CEI, which positively affected their COD.

Maaloul (2018) examined the effect of GHG emissions on the COD of 318 companies listed on the S&P/TSX in Canada between 2012 and 2015. Data on GHGs were obtained from CDP reports, while COD and other financial information were accepted from the Bloomberg Professional Data Service. The study used correlation and regression analysis and found a positive association between COD and GHGs. The study also identified that control variables (size, profitability, leverage, market/book ratio, and volatility) positively correlated with COD.

Kumar and Firoz (2018) examined the impact of CE on the COD of 46 manufacturing and service sector companies in India between 2011-2014. The study used panel data analysis and found a significant effect of CE on COD.

Kleimeier and Viehs (2018) investigated the effect of voluntary carbon emission disclosure (CED) by publicly traded companies in the UK FTSE 500 on their COD from 2007 to 2013. The study used panel regression analysis and detected a negative relationship between voluntary CED and COD.

Zhou et al. (2017) studied the association between CEI and COD for 191 Chinese firms in high-carbon industries between 2011 and 2015. The study also examined the media's regulatory role. The study used panel regression analysis and detected a U-shaped association between CEI and COD. The study identified corporate governance and ownership structure as media intermediaries and suggested that positive media effects of corporate governance could reduce the relationship between CEI and COD.

A positive relationship between CE and COD can be observed when the literature above is evaluated to examine the effect of carbon emissions on COD. Findings from these studies "Caragnano et al. (2020); Palea and Drogo (2020); Pizzutilo et al. (2020); Wang et al. (2020); Jung et al. (2018); Maaloul (2018)" indicate that companies with higher CEI also have higher COD.

3. Research on the Impact of CE on COD of Companies Listed in BIST-SI

3.1. Aim and Significance of the Study

This study aims to investigate the impact of CE on the COD of companies listed in the BIST-SI on a company-specific basis. To this end, the study examines the association between total CE and CEI as independent variables and control variables such as size, return on assets (ROA), leverage, growth, structure, and cash flow on COD. The data used in the

study is collected from 38 companies[4] listed in the BIST-SI. This study is considered a pioneering work in Türkiye, presenting findings that support a positive association between CE and COD. It is crucial for providing insights on Turkish companies, motivating them to take measures to reduce CE, and contributing to the literature.

3.2. Scope and Limitations of the Study

This research examines the data of the companies listed in the BIST-SI. The sustainability reports published by the companies in the BIST-SI were reviewed over the years. It was noticed that the years with the highest number of sustainability reports published were between 2017-2021. Therefore, the sustainability reports and data of the companies between 2017-2021 were analysed. During the research in October 2022, 65 companies were listed in the BIST-SI. It was found that 38 companies had published their sustainability or integrated reports for 2021. This limited number of companies is also a constraint of the study.

3.3. Dataset and Variables of the Study

The study dataset consists of the 2017-2021 data of 38 companies listed on the BIST-SI. The data for the companies were obtained from the PDP in October 2022, official activity reports, footnotes and disclosures, sustainability reports, integrated reports, and the DataStream database published on the companies' official websites.

Table: 1
Research Variables and Their Definitions

Abbreviations of the Variables	Names of the Variables
Ln Cod*	COD: Ln (Interest Expense / Total Debt Related to Interest Expense)
Ln Total CE**	Total CE*** The logarithm of (the total amount of Scope 1 and 2 or Scope 3 GHGs in metric tons)
TS	Total Sales
Carbon Emissions Intensity (%)	CEI**** = Total CE / Total Sales
TA	Total Assets
NP	Net Profit
ROA (%)	Return on Assets = Net Profit / Total Assets
SIZE*****	ln (Total Assets)
TD	Total Debts
LEVERAGE (%)	Total Debts / Total Assets
MV	Market Value
BV	Book Value
GROWTH (%)	Market Value / Book Value
STRUCTURE (%)	Tangible Fixed Assets /Total Assets
CASH FLOW (%)	Cash Flow = Net Cash Flow /Total Assets

In this study, finance expense corresponding to the research period was used as the variable for the cost of debt, and its logarithm was calculated to ensure linearity.

*** The total CE variable was taken as the total amount of Scope 1 and 2 or Scope 3 GHGs in metric tons, and its logarithm was calculated to ensure linearity.*

**** Scope 1 and 2 are emissions owned or controlled by a company. Scope 3 emissions, however, result from a company's activities but come from sources not owned or controlled. In other words, Scope 1 is what you burn, Scope 2 is what you buy, and Scope 3 is everything beyond that <https://www.zorlu.com.tr/akillihayat2030/yazilar/kapsam-1-2-3-ne-anlama-geliyor>, 01.12.2022.*

***** Carbon emission intensity indicates a company's carbon risk and is calculated by dividing total carbon emissions by total sales. Similar calculations of carbon emission intensity have been used in the literature by Zhou et al. (2017), Maaloul (2018), Jung et al. (2018), Palea and Drogo (2020), and Vullings (2021).*

****** This study used Total Assets as the size variable, and its logarithm was calculated to ensure linearity.*

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4   *Information about the companies is presented in Appendix 1.*

In the study, the dependent variable of COD was taken to examine the impact of CE on COD. COD can be expressed as finance expenses incurred during the research period. Information related to the COD variable was obtained from the DataStream database. The logarithm of the received data was included in the analysis to ensure linearity.

CE were taken as independent variables in the study, and Total CE and CEI variables were used to examine the relationship between CE and COD. The calculation of these variables is given in Table 1, and information related to these variables was obtained from the companies' annual reports and sustainability reports.

Previous studies such as Vullings (2021); Caragnano et al. (2020); Pizzutilo et al. (2020); Wang et al. (2020); Palea and Drogo (2020); Maaloul (2018); Zhou et al. (2017); Jung et al. (2018) examining the impact of CE on COD were used as a basis for this study, and size, ROA, leverage, growth, structure, and cash flow were taken as control variables. These variables, also taken as control variables in previous studies, influence COD. The calculation of these control variables is given in Table 1, and information related to these variables was obtained from the companies' annual reports, financial statement footnotes and disclosures, and the DataStream database.

3.4. Research Model and Hypotheses

To detect the influence of CE on COD of companies listed in the BIST-SI, CE [Total CE (in Metric Tons); CEI = Total CE / Total Sales] was taken as the independent variable, while size, ROA, leverage, growth, structure, and cash flow were taken as control variables. COD was taken as the dependent variable, and the research model is shown in Figure 1.

Figure: 1
Research Model: The Impact of CE on COD
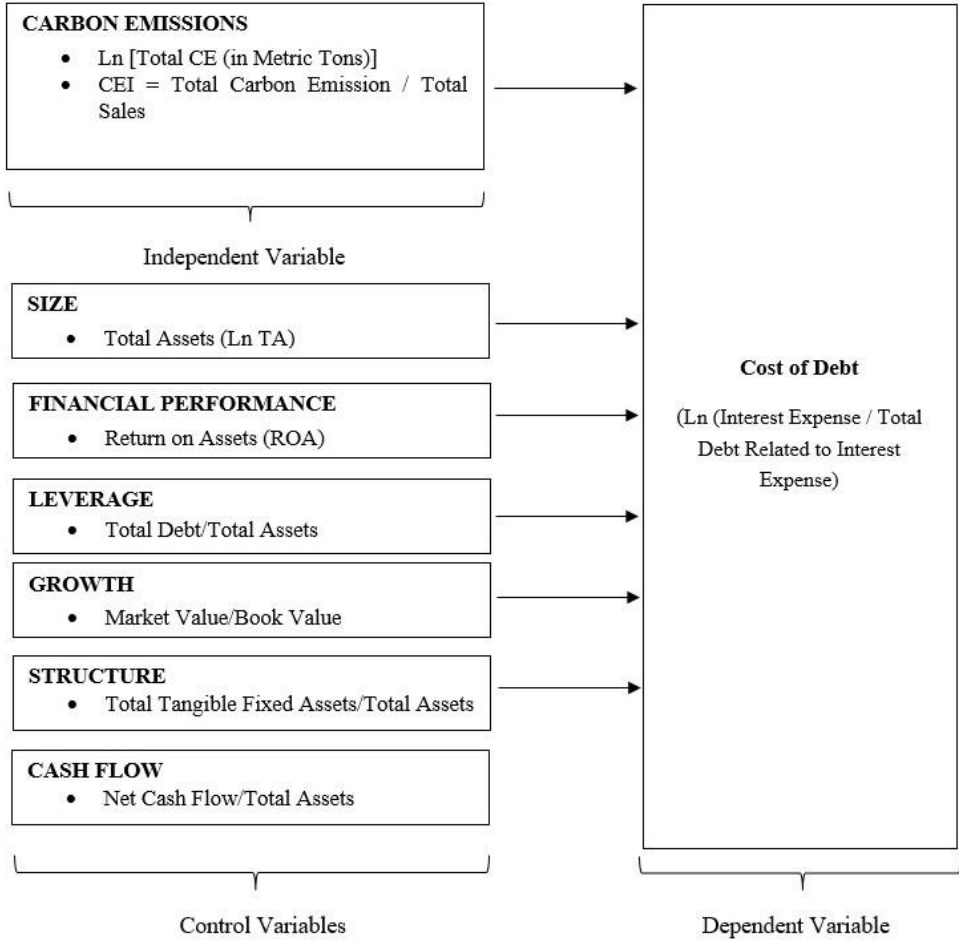
$$LnCOD_{(i,t)} = \beta_0 + \beta_1(LnTotalCE)_{(i,t)} + \beta_2(CEI)_{(i,t)} + \beta_3(LnSIZE)_{(i,t)} + \beta_4(ROA)_{(i,t)} + \beta_5(LEV)_{(i,t)} + \beta_6(GROWTH)_{(i,t)} + \beta_7(STRUCTURE)_{(i,t)} + \beta_8(CASHFLOW)_{(i,t)} + \epsilon_t \quad (1)$$

In this model, i = 1, 2,……..N represents the number of companies (38); t = 1, 2, 3, …T represents the periods (5 years - from 2017 to 2021).

NxT represents the total number of observations in the dataset (38x5 = 190).

The hypotheses developed within the scope of the research model are as follows:

Hypothesis 1: Total CE (Scopes 1, 2, and 3 GHG emissions in metric tons) significantly affect COD.

Hypothesis 2: CEI has a significant effect on COD.

Hypothesis 3: Company size has a significant effect on COD.

Hypothesis 4: ROA has a significant effect on COD.

Hypothesis 5: Leverage has a significant effect on COD.

Hypothesis 6: Growth (Market Value/Book Value) significantly affects COD.

Hypothesis 7: Company structure has a significant effect on COD.

Hypothesis 8: Company cash flow has a significant effect on COD.

3.5. Research Methodology

The objective of the research is to detect the influence of CE on COD, using data from 38 companies in the sample. Data was obtained from the companies' annual reports, financial statement footnotes, sustainability reports, and integrated reports and was encoded in Microsoft Excel 2020 using total CE (sum of Scopes 1-2-3 GHGs in metric tons), CEI (total CE/total sales), size, return on assets (ROA), leverage, growth, structure, cash flow, and COD as variables. The encoded data was analysed using the STATA package software, and the pooled OLS method was used in the panel dataset.

3.6. Descriptive Statistics

Descriptive statistics related to dependent and independent variables used in the analysis are shown in Table 2.

Table: 2
Descriptive Statistics

Variables (n=190)	Mean	Standard Dev.	Minimum	Maximum
Ln COD	12.780	1.649	8.055	16.623
Ln Total CE	12.388	2.425	6.361	16.943
CEI (%)	0.492	2.560	0.000	19.297
SIZE	18.653	2.731	10.293	23.751
ROA (%)	0.044	0.064	-0.273	0.239
LEV (%)	0.699	0.223	0.075	1.837
GROWTH (M/B) (%)	2.115	19.344	-172.710	196.320
STRUCTURE (%)	6.913	40.826	0.001	261.591
CASH FLOW (%)	3.903	23.488	0.000	182.840

The minimum and maximum values, averages and standard deviations of dependent, independent and control variables are shown in Table 2. Accordingly, the sample's minimum and maximum values of the dependent variable, COD, were 8.055 and 16.623, respectively. The minimum and maximum values of the independent variable, total CE, were 6.361 and 16.943, respectively, while the minimum and maximum values of CEI were 0.000 and 19.297, respectively. The fact that the means of the ROA, growth, structure, and cash flow

variables were smaller than their respective standard deviation values suggests significant variability in these series.

3.7. Correlation Analysis

Correlation analysis is a statistical method used to measure the degree of linear relationship between two variables. As a result of the correlation analysis, whether a correlation coefficient finds a linear relationship between the variables and the degree of this relationship. The correlation coefficient, denoted by "r," measures the degree of correlation among variables, which may range between -1 and +1 (Sungur, 2014: 115; Özşahin-Koç, 2017: 110).

Table 3 presents the correlation matrix between independent and control variables and COD.

Table: 3
Correlation Matrix for Independent and Control Variables

	Ln COD	Ln Total CE	CEI (%)	SIZE	ROA (%)	LEV (%)	GROWTH (M/B) (%)	Structure (%)	CASH FLOW (%)
Ln Total CE	0.057	1							
CEI (%)	0.039	0.067	1						
SIZE	0.005	0.070	-0.479**	1					
ROA (%)	-0.373**	-0.062	-0.066	-0.238**	1				
LEV (%)	0.511**	-0.221**	-0.160*	0.125	-0.517**	1			
GROWTH (M/B) (%)	-0.006	0.003	-0.010	-0.105	0.037	0.031	1		
Structure (%)	0.048	0.027	0.977**	-0.475**	-0.062	-0.157*	-0.010	1	
CASH FLOW (%)	0.042	0.023	0.972**	-0.472**	-0.060	-0.155*	-0.009	0.982**	1

Note 1: ** and * indicate significance at p<0.01 and p<0.05, respectively.
Note 2: The correlation Coefficient is weak if it is 50 and lower and strong if it is 50 and over (Nakip, 2003: 322).

When examining Table 3, it can be stated that the size variable has a weak negative correlation with CEI. It has also been determined that ROA's COD and size have a weak negative correlation with a worthless degree of relationship.

Leverage has a relatively strong positive correlation with COD and a weak negative correlation with total CE, CEI, and ROA. The structure has a very strong positive correlation with CEI, a weak negative correlation with size, and a weak negative correlation with leverage. Similarly, cash flow has a very strong positive correlation with CEI, a weak negative correlation with size, and a weak negative correlation with leverage. However, the correlation analysis results do not indicate any significant relationship between total CE or CEI and COD. Moreover, no significant relationship was found between growth and COD.

3.8. Panel Data Analysis

In this study, the Pooled Ordinary Least Squares (POLS) method, a traditional static panel data analysis, is employed to analyse the determinants of COD.

The panel dataset includes both the series' horizontal and time dimensions. The method of combining time series and cross-sectional analysis and testing appropriate models is called panel data analysis. The difference between panel data regression and well-known time series or cross-sectional regressions is that the variables have a dual index (i, t)

(Sayılgan & Süslü, 2011: 83). Also, the data obtained by combining time series and cross-sectional data is called "Longitudinal or Pooled Data". In this context, the Pooled OLS (POLS) method was used for panel data analysis, and the results are presented in Table 4. Possible variable variance and autocorrelation were considered in the COD model, and robust standard errors were reported.

Tablo: 4
Pooled OLS Analysis Results for Panel Data

Independent Variables	Standardised Beta Coefficients	T value	Standard Error
Ln Total CE	0.129***	2.90	0.044
CEI (%)	-0.172*	-1.79	0.096
SIZE	-0.026	-0.69	0.038
ROA (%)	-2.796	-1.40	1.991
LEV (%)	4.526***	5.99	0.755
GROWTH (M/B) (%)	-0.001	-0.45	0.004
STRUCTURE (%)	0.015***	3.53	0.004
CASH FLOW (%)	-0.017	-0.25	0.006
$R^2 = 0.377$			
F= 8.178			
N= 190			
Note 1: ***, **, and * indicate significance at p<0.01; p<0.05; and p<0.10, respectively.			

Dependent Variable: COD (Ln COD)
Independent Variable: Ln Total CE, CEI (%), SIZE, ROA (%), LEV (%), GROWTH (M/B) (%), STRUCTURE (%), CASH FLOW (%)

The panel data analysis results show that the total CE variable significantly impacts COD at p<0.01. In other words, when total CE increases by one unit, COD increases by 0.129. Therefore, the analysis results show that as companies' CE - the total amount of CE (in metric tons) they release into the environment - increases, their COD from credit institutions also increases. The variable used to examine the effect of CE on COD, CEI (GHG Emissions Intensity), also has a significant impact on COD at p<0.10 level. In other words, when CEI decreases by one unit, COD decreases by 0.172. The control variables, leverage, and structure significantly impact COD at a 1% level. The leverage ratio indicates the percentage of a company's assets financed by debt, and a high ratio implies that the company has a higher financial risk. The significance between COD and leverage implies that companies with high debt financing, or in other words, companies that prefer debt financing in their capital structure, face higher COD. However, it was found that the variables of size, ROA, growth, and cash flow do not significantly affect COD. Falk and Miller (1992) stated in their study that the R^2 value should be equal to or higher than 0.10 for the variance to be considered sufficient. In the study conducted by Cohen (1988), it was stated that an R^2 value of 0.26 is significant, 0.13 is moderate, and 0.02 is weak in explaining the variance. In this context, the determination coefficient (R^2) value of the current study model is 0.377, which is considered a sufficient and significant value for explaining the variance.

The acceptance and rejection status of the hypotheses of the study model resulting from the analyses performed is presented in Table 5.

Table: 5
Results of Hypothesis Testing in the Study Model

Hypotheses	Accept/Reject
Hypothesis 1: Total CE (the total amount of Scopes 1, 2, and 3 GHGs in metric tons) significantly affects COD.	Accept
Hypothesis 2: CEI has a significant effect on COD.	Accept
Hypothesis 3: The size of the company has a significant impact on the COD.	Reject
Hypothesis 4: ROA has a significant influence on COD.	Reject
Hypothesis 5: Leverage has a significant influence on COD.	Accept
Hypothesis 6: Growth (Market Value/Book Value) has a significant effect on COD	Reject
Hypothesis 7: Corporate structure has a significant influence on COD	Accept
Hypothesis 8: The company's cash flow has a significant influence on COD	Reject

Table 5 shows that both supporting and non-supporting results were obtained for the study's hypotheses.

4. Conclusion

CE and GHGs, significant issues for our planet today, have become a vital threat to all living creatures, especially humans. Appropriately managing and reducing CE and other GHGs is crucial for the UN's Sustainable Development Goals (SDG) for nature and the life cycle. Therefore, regulatory and supervisory bodies, especially country administrations, have significant roles. Legal regulations, framework agreements, and commercial agreements such as the UNFCCC, the Kyoto Protocol, and the Paris Climate Agreement have been made in this context. It is essential for companies, as significant components of the global commercial system and those that emit the most carbon into the atmosphere, to comply with environmental and social regulations to ensure their sustainability.

In this study, which examines the effect of companies' CE on COD, the annual reports, footnotes, sustainability, and integrated reports of 38 companies traded on the BIST-SI between 2017 and 2021 were analysed. It was concluded that total CE, CE intensity, leverage, and company structure variables significantly impact COD. However, it was found that the size, return on assets (ROA), growth, and cash flow variables do not substantially affect COD.

It was found that total CE, CE intensity, leverage, and company structure variables impact COD, while the size, ROA, growth, and cash flow variables do not. When compared with similar studies in the literature, this study's findings show both similarities and differences.

Jung et al. (2018) concluded that CEI and leverage significantly affected COD. Palea and Drogo (2020) found that CEI and leverage significantly affected COD. Wang et al. (2020) found that total CE, CEI, and structure variables had significant effects on COD, while ROA did not have a considerable effect. Zhou et al. (2017) found that CEI, leverage, and structure variables significantly affected COD, but growth variables did not. Kumar and Firoz (2018) found that total CE and leverage significantly affected COD. Maaloul (2018) saw that total CE, CEI, and leverage significantly affected COD. Caragnano et al. (2020) found that total CE, CEI, and leverage significantly affected COD. Pizzutilo et al. (2020)

found that CEI and leverage significantly affected COD. Kozak (2021) found that CEI and leverage significantly affected COD. Vullings (2021) found that CEI and leverage significantly affected COD. These findings are similar to those obtained in this study.

Jung et al. (2018) detected that size and cash flow significantly affected COD. Wang et al. (2020) found that size and growth had significant effects on COD, while leverage did not have a considerable effect. Zhou et al. (2017) found that size, ROA, and cash flow significantly affected COD. Kumar and Firoz (2018) found that size significantly affected COD. Maaloul (2018) found that size, ROA, and growth significantly affected COD. Caragnano et al. (2020) found that size, ROA, and cash flow significantly affected COD. Pizzutilo et al. (2020) found that size and ROA significantly affected COD. Kozak (2021) found that size and ROA significantly affected COD. Vullings (2021) found that size, ROA, and growth significantly affected COD. These findings contradict those obtained in this study.

Based on the findings obtained in this study, the following recommendations are made to practitioners and researchers regarding CED:

To serve the SDG adopted by the UN, lending institutions are advised to consider non-financial information such as risk reports, CED, and CEI when assessing the credibility of companies and considering environmental performance indicators. On the other hand, companies can include strategic plans to cope with climate change and manage the CEI they are exposed to or may face. Efforts should also be made to raise awareness of CEI.

Regulatory authorities are recommended to develop new technologies that eliminate or minimise CE, support renewable energy industries, and create financial support and incentive packages. Also, developing countries with lower environmental awareness are recommended to pass binding and incentivising CE-related laws. Such mandatory regulations can contribute to reducing CE.

This study examined the relationship and impact between the CE of companies listed on the BIST-SI and their COD. Future studies can investigate the relationship and effect between CED and COD of companies listed on other indexes (BIST 30, BIST 100, etc.). In the following studies, regarding this research, the impact of CE on COD can be applied to companies traded on different exchanges in several countries, and data can be analysed comparatively. This study examined Total CE (the total amount of Scopes 1, 2, or 3 GHGs in metric tons). Moreover, in future studies, the impact of only Scope 3 indirect GHG emissions on COD can be investigated, or comparative analyses can be conducted by examining the effect of Scopes 1 and 2 direct GHG emissions and Scope 3 indirect GHGs on COD separately. When examining the impact of CE on COD, size, ROA, leverage, growth, structure, and cash flow were included as control variables in the analysis. In the following studies, other control variables such as volatility, company age, Altman Z Score, beta, and Tobin's Q Ratio can be added to the analysis. This study used five-year annual reports of companies, financial statement footnotes and disclosures, sustainability reports,

and integrated reports as information sources for CED. In future studies, time series analyses can be conducted by expanding the years (beyond a five-year dataset) and examining the CED of companies. In Türkiye, the relationship between CE and capital costs can be discussed.

References

Aliusta, H. & B. Yılmaz (2020), "Karbon Maliyetlerinin Muhasebeleştirilmesi: Çimento Sektörü Uygulaması", *Eskişehir Osmangazi Üniversitesi İktisadi ve İdari Bilimler Dergisi*, 15(1), 267-294.

Altınbay, A. & M. Golagan (2016), "Küresel Isınma Sorununa Muhasebecilerin Bakışı: Karbon Muhasebesi", *Itobiad: Journal of the Human & Social Science Researches*, 5(7), 2106-2119.

Altunışık, R. et al. (2007), *Sosyal Bilimlerde Araştırma Yöntemleri SPSS Uygulamalı*, 5th ed., Sakarya Yayıncılık, Sakarya.

Burritt, R.L. et al. (2011), "Carbon Management Accounting: Explaining Practice in Leading German Companies", *Australian Accounting Review*, 21(1), 80-98.

Caragnano, A. et al. (2020), "Is it Worth Reducing GHG Emissions? Exploring the Effect on the Cost of Debt Financing", *Journal of Environmental Management*, 270, 110860.

Chithambo, L. & V. Tauringana (2014), "Company Specific Determinants of Greenhouse Gases Disclosures", *Journal of Applied Accounting Research*, 26(1), 323-338.

Choi, B.B. et al. (2013), "An Analysis of Australian Company Carbon Emission Disclosures", *Pacific Accounting Review*, 25(1), 58-79.

Cohen, J. (1988), *Statistical Power Analysis for the Behavioral Sciences*, 2nd ed., Routledge, New York.

Çokmutlu, M.E. & Ş. Ok (2019), "Borsa İstanbul Sürdürülebilirlik Endeksi İşletmelerinin Sera Gazı Beyanlarına Yönelik Güvence Denetimleri: ISAE 3410 Güvence Denetim Standardına İlişkin Bir Araştırma", *IBAD Sosyal Bilimler Dergisi*, (5), 164-174.

Demircioğlu, E. & D. Ever (2020), "Karbon Maliyetlerinin Belirlenmesine İlişkin Demir Çelik İşletmesinde Uygulama", *İşletme Araştırmaları Dergisi*, 12(1), 649-662.

Demirtürk, D. (2021), "Sürdürülebilir Ulaşımda Sera Gazı Etkisini Azaltmaya Yönelik Çalışmalar", *Mühendislik Bilimleri ve Tasarım Dergisi*, 9(4), 1080-1092.

Falk, R.F. & N.B. Miller (1992), *A primer for soft modeling*, University of Akron Press.

Gedik, Y. (2020), "Sosyal, Ekonomik ve Çevresel Boyutlarla Sürdürülebilirlik ve Sürdürülebilir Kalkınma", *International Journal of Economics, Politics, Humanities & Social Sciences*, 3(3), 196 -215.

Gonzales-Gonzales, J.M. & C.Z. Ramirez (2016), "Voluntary Carbon Disclosure by Spanish Companies: an Empirical Analysis", *International Journal of Climate Change Strategies and Management*, 8(1), 57-79.

Güleç, Ö.F. & T. Bektaş (2019), "Karbon Muhasebesi ve Karbon Maliyetlerinin İncelenmesi", in: *XIII. IBANESS Congress Series on Economics, Business and Management* (1010-1022), Tekirdağ, 5-6 October 2019.

Güneysu, Y. & O.Y. Atasel (2022), "Karbon Emisyonları ile Finansal Performans Arasındaki İlişkinin İncelenmesi: BIST 100 Endeksinde Bir Araştırma", *Fırat Üniversitesi Sosyal Bilimler Dergisi*, 32(3), 1183-1193.

Hrasky, S. (2012), "Carbon Footprints and Legitimation Strategies: Symbolism or Action?", *Accounting, Auditing & Accountability Journal*, 25(1), 174-198.

Jung, J. et al. (2018), "Carbon Risk, Carbon Risk Awareness and the Cost of Debt Financing", *Journal of Business Ethics*, 150(4), 1151-1171.

Kardeş-Selimoğlu, S. et al. (2022), "Güvence Denetiminin Unsurları Bağlamında Uluslararası Güvence Denetimi Standardı 3410'a Göre Sera Gazı Beyanlarına İlişkin Güvence Oluşturulması", *Muhasebe ve Finansman Dergisi*, (95), 21-34.

Kızıltan, B. & D. Umut-Doğan (2021), "Çimento Sektöründe Karbon Ayak İzlerinin Raporlanması Amacıyla Bir Çerçeve Önerisi", *Çağ Üniversitesi Sosyal Bilimler Dergisi*, 18(1), 40-58.

Kleimeier, S. & M. Viehs (2018), *Carbon Disclosure, Emission Levels, and the Cost of Debt. Emission Levels, and the Cost of Debt*, 7 January 2018.

Kozak, S. (2021), "Will the Reduction of CO_2 Emissions Lower the Cost of Debt Financing? The Case of EU Countries", *Energies*, 14(24), 8361.

Küçüksille, E. (2014), "Basit Doğrusal Regresyon", in: Ş. Kalaycı (ed.), *SPSS Uygulamalı Çok Değişkenli İstatistik Teknikleri* (199-201), Asil Yayın Dağıtım Ltd. Şti., Ankara.

Kumar, P. & M. Firoz (2018), "Impact of Carbon Emissions on Cost of Debt-Evidence From India", *Managerial Finance*, 44(12), 1401-1417.

Li, Y.Q. et al. (2014), "Carbon Emissions and the Cost of Capital: Australian Evidence", *Rev. Account Finance*, 13(4), 400-420.

Luo, L. et al. (2012), "Corporate Incentives to Disclose Carbon Information: Evidence From the CDP Global 500 Report", *Journal of International Financial Management & Accounting*, 23(2), 93-120.

Maaloul, A. (2018), "The Effect of Greenhouse Gas Emissions on Cost of Debt: Evidence From Canadian Firms", *Corporate Social Responsibility and Environmental Management*, 25(6), 1407-1415.

Nakip, M. (2003), *Pazarlama Araştırmaları Teknikler ve (SPSS Destekli) Uygulamalar*, 1st ed., Seçkin Yayıncılık, Ankara.

National Academy of Sciences (2011), *Sustainability and the U.S. EPA*, Committee on Incorporating Sustainability in The U.S. Environmental Protection Agency, <https://clu-in.org/greenremediation/docs/Sustainability_and_the_USEPA.pdf>, 01.01.2023.

Özşahin-Koç, F. (2017), "İşletmelerde Risk Raporlaması: BİST İmalat Sektöründe Faaliyet Gösteren İşletmelerde Bir Araştırma", *Doktora Tezi*, Sosyal Bilimler Enstitüsü, İşletme Anabilim Dalı, Erciyes Üniversitesi, Kayseri.

Palea, V. & F. Drogo (2020), "Carbon Emissions and the Cost of Debt in the Eurozone: The Role of Public Policies, Climate Related Disclosure and Corporate Governance", *Business Strategy and the Environment*, 29(8), 2953-2972.

Panjwani, A. et al. (2022), *Do Scope 3 Carbon Emissions Impact Firms' Cost of Debt?*, <https://ssrn.com/abstract=4205875> or <http://dx.doi.org/10.2139/ssrn.4205875>, 21.11.2022.

Pizzutilo, F. et al. (2020), "Dealing With Carbon Risk and the Cost of Debt: Evidence from the European Market", *International Journal of Financial Studies*, 8(4), 61.

Qian, W. et al. (2018), "Environmental Management Accounting and Its Effects on Carbon Management and Disclosure Quality", *Journal of Cleaner Production*, 174, 1608-1619.

Ratnatunga, J.T. & K.R. Balachandran (2009), "Carbon Business Accounting: The Impact of Global Warming on the Cost and Management Accounting Profession", *Journal of Accounting, Auditing & Finance*, 24(2), 333-355.

Robert, K.W. et al. (2005), "What is Sustainable Development? Goals, Indicators, Values, and Practice", *Environment: Science and Policy for Sustainable Development*, 47(3), 8-21.

Sayilgan, G. & C. Süslü (2011), "Makroekonomik Faktörlerin Hisse Senedi Getirilerine Etkisi: Türkiye ve Gelişmekte Olan Piyasalar Üzerine Bir İnceleme", *BDDK Bankacılık ve Finansal Piyasalar Dergisi*, 5(1), 73-96.

Simnett, R. & M. Nugent (2007), "Developing an Assurance Standard for Carbon Emissions Disclosures", *Australian Accounting Review*, 17(42), 37-47.

Solomon, J.F. et al. (2011), "Private Climate Change Reporting: an Emerging Discourse of Risk and Opportunity?", *Accounting, Auditing & Accountability Journal*, 24(8), 1119-1148.

Stanny, E. & K. Ely (2008), "Corporate Environmental Disclosures About the Effects of Climate Change", *Corporate Social Responsibility and Environmental Management*, 15(6), 338-348.

Sultanoğlu, B. & Y. Özerhan (2020), "İklim Değişikliği Raporlaması: Türkiye'deki İşletmelerin Gönüllü Karbon Saydamlık Projesi (CDP) Açıklamaları", *Muhasebe Bilim Dünyası Dergisi*, 22, 176-194.

Sungur, O. (2014), "Korelasyon Analizi", in: Ş. Kalaycı (ed.), *SPSS Uygulamalı Çok Değişkenli İstatistik Teknikleri* (115-125), Asil Yayın Dağıtım Ltd. Şti., Ankara.

Tsai, W.H. et al. (2012), "Integrating Information About the Cost of Carbon Through Activity-Based Costing", *Journal of Cleaner Production*, 36, 102-111.

Vullinghs, M. (2021), "Examining the Impact of Carbon Intensity on Cost of Debt: the Moderating Effects of Forward-Looking Indicators", *Master's Thesis*, Rotterdam School of Management (Erasmus University) Rotterdam, The Netherlands.

Wang, Y.C. et al. (2021), "Corporate Carbon Dioxide Emissions and the Cost of Debt Financing: Evidence from the Global Tourism Industry", *International Journal of Tourism Research*, 23(1), 56-69.

Zhang, L.X. et al. (2013), "Carbon Emission Reduction Potential of a Typical Household Biogas System in Rural China", *Journal of Cleaner Production*, 47, 415-421.

Zhou, Z. et al. (2018), "Carbon Risk, Cost of Debt Financing and the Moderation Effect of Media Attention: Evidence from Chinese Companies Operating in High Carbon Industries", *Business Strategy and the Environment*, 27(8), 1131-1144.

Appendix

Appendix: 1
BIST Sustainability Index List of Companies Inspected

Rank	Code	Company Title
"1"	"AKBNK"	"AKBANK T.A.Ş."
"2"	"AKCNS"	"AKÇANSA ÇİMENTO SANAYİ VE TİCARET A.Ş."
"3"	"AKENR"	"AKENERJİ ELEKTRİK ÜRETİM A.Ş."
"4"	"AKSA"	"AKSA AKRİLİK KİMYA SANAYİİ A.Ş."
"5"	"AKSEN"	"AKSA ENERJİ ÜRETİM A.Ş."
"6"	"ALBRK"	"ALBARAKA TÜRK KATILIM BANKASI A.Ş."
"7"	"AEFES"	"ANADOLU EFES BİRACILIK VE MALT SANAYİ A.Ş."
"8"	"ARCLK"	"ARÇELİK A.Ş."
"9"	"ASELS"	"ASELSAN ELEKTRONİK SANAYİ VE TİCARET A.Ş."
"10"	"AYGAZ"	"AYGAZ A.Ş."
"11"	"BRISA"	"BRİSA BRIDGESTONE SABANCI LASTİK SANAYİ VE TİCARET A.Ş."
"12"	"CCOLA"	"COCA-COLA İÇECEK A.Ş."
"13"	"CIMSA"	"ÇİMSA ÇİMENTO SANAYİ VE TİCARET A.Ş."
"14"	"DOAS"	"DOĞUŞ OTOMOTİV SERVİS VE TİCARET A.Ş."
"15"	"ENKAI"	"ENKA İNŞAAT VE SANAYİ A.Ş."
"16"	"EREGL"	"EREĞLİ DEMİR VE ÇELİK FABRİKALARI T.A.Ş."
"17"	"FROTO"	"FORD OTOMOTİV SANAYİ A.Ş."
"18"	"SAHOL"	"HACI ÖMER SABANCI HOLDİNG A.Ş."
"19"	"KERVT"	"KEREVİTAŞ GIDA SANAYİ VE TİCARET A.Ş."
"20"	"KORDS"	"KORDSA TEKNİK TEKSTİL A.Ş."
"21"	"LOGO"	"LOGO YAZILIM SANAYİ VE TİCARET A.Ş."
"22"	"MGROS"	"MİGROS TİCARET A.Ş."
"23"	"OTKAR"	"OTOKAR OTOMOTİV VE SAVUNMA SANAYİ A.Ş."
"24"	"POLHO"	"POLİSAN HOLDİNG A.Ş."
"25"	"SKBNK"	"ŞEKERBANK T.A.Ş."
"26"	"SOKM"	"ŞOK MARKETLER TİCARET A.Ş."
"27"	"TOASO"	"TOFAŞ TÜRK OTOMOBİL FABRİKASI A.Ş."
"28"	"TCELL"	"TURKCELL İLETİŞİM HİZMETLERİ A.Ş."
"29"	"TUPRS"	"TÜPRAŞ-TÜRKİYE PETROL RAFİNERİLERİ A.Ş."
"30"	"GARAN"	"TÜRKİYE GARANTİ BANKASI A.Ş."
"31"	"HALKB"	"TÜRKİYE HALK BANKASI A.Ş."
"32"	"ISCTR"	"TÜRKİYE İŞ BANKASI A.Ş."
"33"	"TSKB"	"TÜRKİYE SINAİ KALKINMA BANKASI A.Ş."
"34"	"SISE"	"TÜRKİYE ŞİŞE VE CAM FABRİKALARI A.Ş."
"35"	"VAKBN"	"TÜRKİYE VAKIFLAR BANKASI T.A.O."
"36"	"ULKER"	"ÜLKER BİSKÜVİ SANAYİ A.Ş."
"37"	"YKBNK"	"YAPI VE KREDİ BANKASI A.Ş."
"38"	"ZOREN"	"ZORLU ENERJİ ELEKTRİK ÜRETİM A.Ş."

Source: Public Disclosure Platform (2022).

Do Increases and Decreases in Non-renewable Energy Consumption Have the Same Effect on Growth in Türkiye?

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Türkiye'de Yenilenemeyen Enerji Tüketimindeki Artış ve Azalışların Ekonomik Büyüme Üzerindeki Etkisi Aynı Mıdır?

Abstract

This study examines the relationship between fossil energy consumption (FEC) and economic growth by applying the non-linear ARDL method in the Türkiye sample. This relationship was addressed in 3 different models to eliminate the multicollinearity between the oil, natural gas, and coal variables that make up the FEC. According to the analysis results, all models have an asymmetric cointegration between the variables. In all models, the effect of decreases in energy consumption on economic growth is more dominant than increases in the long run. According to the causality results, the neutrality hypothesis is valid for coal consumption, the feedback hypothesis is valid for natural gas consumption, and the growth hypothesis is valid for oil consumption.

Keywords	:	Energy Consumption, Non-linear Cointegration, Growth, NARDL, Non-Renewable Energy.
JEL Classification Codes	:	B22, Q43, Q47.

Öz

Bu çalışmada fosil enerji tüketimi (FEC) ile ekonomik büyüme arasındaki ilişki Türkiye örnekleminde doğrusal olmayan ARDL yöntemi uygulanarak incelenmiştir. Bu ilişki, FEC'i oluşturan petrol, doğal gaz ve kömür değişkenleri arasındaki çoklu doğrusal bağlantıyı ortadan kaldırmak için 3 farklı modelde ele alınmıştır. Analiz sonuçlarına göre oluşturulan tüm modellerde değişkenler arasında asimetrik bir eşbütünleşme bulunmaktadır. Tüm modellerde, enerji tüketimindeki azalmaların ekonomik büyüme üzerindeki etkisi, uzun dönemdeki artışlardan daha baskındır. Nedensellik sonuçlarına göre kömür tüketimi için yansızlık hipotezi, doğal gaz tüketimi için geri besleme hipotezi ve petrol tüketimi için büyüme hipotezi geçerlidir.

Anahtar Sözcükler	:	Enerji Tüketimi, Asimetrik Eşbütünleşme, Büyüme, NARDL, Yenilenemez Enerji.

1. Introduction

Türkiye is a developing country located in Europe and Asia continents. Furthermore, this country has neighbouring countries with rich energy resources. As the economy is overgrowing, it is assumed that this economic growth of Türkiye will last with a similar tendency in the hereafter. Türkiye has grown by an average of 5,9% in the last ten years and 4,5% in the previous 50 years. Except for 2018 and 2019, it has an average growth rate above the European Union and the world average since 2001 (Göksu, 2021: 70-71). In Türkiye, the rapid increase in the population (approximately 85 million) and the economy's steady growth have led to increased energy demand and foreign dependency on energy in the last two decades. Even though Türkiye has tripled its renewable energy generation in the previous decade, the massive dependence on imports for fossil fuels, predominantly gas and oil (99% and 93%, respectively) (International Energy Agency, 2021: 11) still is one of the essential issues of the Türkiye economy.

When the changes in the growth and development goals of the countries in the historical process were examined, the increase in GDP first came to the fore in economic policies. Following this goal, countries focused on increasing their GDP per capita. The inadequacy of per capita income to show the level of human welfare has led to a shift to the "Human Development Index", which includes non-monetary indicators such as education and health as well as income. After that comes an evolving paradigm shift with the "Millennium Development Goals" and, finally, the "Sustainable Development Goals" (SDGs). The SDG aims to increase the well-being of all humanity, including all societies, to reduce poverty, protect social and cultural values, and prevent environmental destruction, which is included in the sustainable development agenda. Türkiye, like many other countries, wants to advance in these goals. However, Türkiye has advantages and disadvantages in achieving these goals. Dependence on foreign countries for non-renewable energy, inadequacy in using clean energy in the production process, and targeting high growth rates despite high inflation in recent years continue to put pressure on environmental problems. On the other hand, because more than half of the country's borders are surrounded by seas, the number of sunny days and wind-rich regions is an opportunity for clean energy and sustainable development goals.

The oil crisis in the 70s threatened countries' energy resources and made them understand the importance of diversifying their energy sources. This awakening has brought about different debates about the importance of energy for the Gross Domestic Product (GDP). The ongoing debate revolves around whether energy, deemed an essential production element, functions as a direct or intermediate production factor. Ghali and El-Sakka (2004) encapsulate this discourse through two perspectives: The neo-classical economists' standpoint posits energy's neutrality concerning economic growth, termed the 'neutrality hypothesis.' Conversely, ecological economists share an alternative view, asserting that energy is the primary factor of production. In this view, energy is characterised as a limiting factor in the scope of economic growth. The neo-classical economic growth model, commonly called the Solow growth model, significantly contributes to classical

economics by providing analytical insights and establishing a foundational theoretical framework. This model emerged in response to the Harrod-Domar growth model, which attempted to extend Keynesian short-term static analysis into the long-term, addressing the complexities of dynamic growth issues.

This study, handled within the ecological economics framework, investigates whether non-renewable energy sources are inevitable for the Turkish economy. Tuğcu and Topçu (2018) criticised the literature on energy economics, which mainly uses linear methods in the energy-growth relationship and bypasses the possible asymmetry between the variables. At the end of their studies, they underlined that asymmetric methods should be considered empirical methodology for future studies. This approach constitutes the primary motivation source of the study. This research can be qualified as a complement to earlier empirical studies on energy economics. However, the present study differs from the current literature because we explore the affinity between growth and fossil energy consumption (FEC) with the asymmetric approach for Türkiye. This study will separately analyse the impact of increases and decreases in FEC upon economic growth. Ergo, the study's primary question is whether the increases and decreases in FEC have the same effect on the Türkiye economy. Another sub-question related to this question is whether producers or consumers predominantly use FEC. If increases in FEC increase per capita income, it shows that the resources are predominantly used for production by the producers; on the contrary, it indicates that they are predominantly used for consumption by the consumers. Operating non-linear auto-regressive distributed lag (NARDL) models in 1972-2020 annual data, we introduce whether growth is connected to or not energy in the Türkiye sample. This study will present a new vision for policymakers to design fundamental policies balancing FEC and growth. In the subsequent sections of the research, following a concise examination of empirical literature in Section 2, Section 3 outlines the presentation of data and empirical methodology. Section 4 encompasses the exposition of findings and ensuing discussions, whereas Section 5 encapsulates the conclusive remarks.

2. Literature Review

Many studies have dissected the nexus between FEC and economic growth (EG), especially since the 1970s. The study of Kraft and Kraft (1978) can be considered one of the pioneering studies in energy economics. The study covering the years 1947-1974 in the sample of the US economy embraces the "linear" and "supply side" methods. As a result of the analysis performed with Sims's causality test method, a two-way Granger causality relationship was found between gross national income and FEC.

Progress in applied econometrics, especially concerning unit root and co-integration tests, has prompted rich empirical literature on energy economics in recent years (Smyth & Narayan, 2015: 351). In recent years, Apergis & Payne (2010a); Belke et al. (2011); Tang et al. (2016); Alper & Alper (2017); Shahbaz et al. (2018); Benkraiem et al. (2019); Abbasi et al. (2021); Khan et al. (2021); Alam (2022); Uçan et al. (2022) can give examples of the linear co-integration method. In contrast, we can give examples of studies conducted with

the non-linear co-integration method by Shahbaz et al. (2017), Tugcu & Topcu (2018), Benkraiem et al. (2019), Shastri et al. (2020), Awodumi & Adewuyi (2020) studies.

Using linear methods, Apergis and Payne (2010a) examined the relationship between coal consumption and economic growth for 25 OECD countries and found that they were cointegrated. In this study, the real gross fixed capital formation and labour force coefficients are positive, while the coefficients for coal consumption are negative. A bidirectional causality exists between coal consumption and short- and long-term economic growth. Using the panel data analysis method, Uçan et al. (2022) obtained similar findings for 15 developed countries, examining the relationship between energy consumption and economic growth. While Abbasi et al. (2021) and Alam (2022) obtained similar findings for non-renewable energy consumption, Khan et al. (2021) obtained similar findings by considering renewable and non-renewable energy consumption.

If the studies conducted with asymmetric methods in economic literature are examined in detail, Tuğcu and Topçu (2018) studies are remarkable. The study investigated the nexus between energy consumption (EC) and EG in G7 countries from 1980 to 2014. The non-linear ARDL approach and Hatemi-J asymmetric causality procedure were employed in the study. Researchers found that EC and EG in the G7 countries are cointegrated. The causality results support the asymmetric cointegration relationship and differ in energy types. Another study with asymmetric methods by Luqman M. et al. (2019) investigated the effects of renewable and nuclear energy on EG in Pakistan. As a result, they provided evidence of asymmetric cointegration between variables. In addition, they determined that shocks to nuclear and renewable energy variables will positively affect EG. Another study using asymmetric methods was conducted by Awodumi and Adewuyi (2020). Researchers used asymmetric methods to examine the relationship between non-renewable EC, EG, and carbon emissions for Africa's top oil-producing economies between 1980 and 2015. They conclude that per capita consumption of both oil and natural gas has an asymmetric effect on EG and per capita carbon emissions in all selected countries except Algeria.

In the energy economy, studies generally can be classified into three approaches: the supply side, the demand side, and the supply-demand side. The supply-side method analyses the impact of EC and output within conventional production (Landwehr & Jochem, 1997; Sari & Soytas, 2007; Bloch et al., 2015; Alam & Murad, 2020; Amin et al., 2020; Hasanov, 2021). The demand side method examines the nexuses between energy prices, EG, and EC (Narayan & Singh, 2007; Rafiq & Salim, 2009). In addition, some approaches include both energy supply and demand (Zhong, 2018; Bloch et al., 2012).

In addition, these studies were conducted in different countries or groups using different variables and methods, and they can be classified under four hypotheses. These are neutrality, growth, conservation, and feedback hypotheses (Payne, 2010a; Bildirici & Bakirtas, 2014; Omri, 2014; Apaydın et al., 2019). First, the "neutrality hypothesis" (Ouédraogo, 2010; Payne, 2010b; Dogan, 2015) states no relationship between GDP and

FEC. Second, the "conservation hypothesis" (Le Quang, 2011; Hwang & Yoo, 2014; Kumari & Sharma, 2016; Güllü & Yakışık, 2017) suggests that EC has either no or only a minor impact on growth, especially in countries with low energy dependence. Third, according to the "growth hypothesis" (Masuduzzaman, 2012; Azam et al., 2021; Zhang et al., 2021), EC enhancement may positively affect growth, while reducing EC negatively affects growth. Finally, according to the "feedback hypothesis" (Apergis & Payne, 2010b; Bildirici, 2012; Al-Mulali et al., 2014; Ahmad et al., 2016), there is a bidirectional nexus between growth and EC. The following studies illustrate these hypotheses.

Doğan's (2015) study is an example of the "neutrality hypothesis". The study analysed the relationships between EG and electricity consumption generated from renewable and non-renewable sources in Türkiye. Although the variables are cointegrated, the researcher determined that the "neutrality hypothesis" is valid in Türkiye in the short run. When the study of Kumari & Sharma (2016), which is among the studies supporting the "conservation hypothesis," was examined in detail, the researchers found no cointegration relationship between the variables. In addition, finding a one-way Granger causality relationship from EG to electricity consumption is empirical evidence for the conservation hypothesis. Shastri et al. (2020) indicate in their study for India that the relationship between EG and EC is asymmetrical. The non-linear causality test results detected a unidirectional causality running from non-renewable EC and renewable EC to EG. Therefore, according to the researchers, the "growth hypothesis" is valid for India. Ha and Ngoc (2021) investigated the relationship between EC and EG in Vietnam using the NARDL cointegration approach. They found that the effects of electricity consumption on EG are asymmetrical. They also found that the effect of decreases in electricity consumption is more remarkable than increases. This result is the opposite for oil consumption. The study supports the "feedback hypothesis" for Vietnam regarding causality.

As underlined in the explanations above, although extensive energy economy literature discusses the correlation between FEC and EG by applying linear methods, non-linear methods are relatively inadequate, especially for Türkiye. With the present study, we aimed to fill this gap in the energy economy literature in Türkiye.

3. Data & Methodology

Since using oil, gas, and coal consumption variables as independent variables in the same model causes a multicollinearity problem, we established three models to explore the potential relationship between FEC and economic growth in Türkiye. To rule out the multicollinearity problem, we added the oil, gas, and coal consumption variables separately to the models as independent variables. These models represent neo-classical aggregate production functions and are based on previous work by Stern (1993), Lee and Chang (2008), and Ajlouni (2015).

$$Model\ 1: lnGNI_t = \beta_0 + \beta_1 lnOIL_t + \beta_2 K_t + \beta_3 lnL_t + \mu_t \tag{1}$$

$$Model\ 2: lnGNI_t = \alpha_0 + \alpha_1 lnCOAL_t + \alpha_2 K_t + \alpha_3 lnL_t + \mu_t \tag{2}$$

$$Model\ 3: lnGNI_t = \theta_0 + \theta_1 lnGAS_t + \theta_2 K_t + \theta_3 lnL_t + \mu_t \tag{3}$$

where *lnGNI* is the dependent variable and the gross national income per capita, *lnOIL* stands for the total final oil consumption, *lnGAS* is the total final natural gas consumption, *lnCOAL* is the total final coal consumption, *lnL* is labor, *K* is the gross fixed capital formation, and μ_t is the error term. The annual data in the models cover the years 1972-2020. These data were collected by open access from the IEA, the World Bank, and the University of Groningen database. All variables are represented in logarithmic form except for the capital variable because this variable is the percentage. The variables used in the models and their explanations are presented in Table 1.

Table: 1
Summary Explanations About the Variables

Variable Symbol	Description	Unit	Expected impact	Source
GNI	GNI per capita	Atlas method (Current US$)	Dependent variable	WB
OIL	Total final oil consumption	Petajoule (PJ)	+	IEA
COAL	Total final coal consumption	Petajoule (PJ)	+	IEA
GAS	Total final natural gas consumption	Petajoule (PJ)	+	IEA
K	Gross fixed capital formation	(% of GDP)	+	WB
L	Number of persons engaged	in millions	+	PWT 10.01

Source: URL1, WB: World Bank; and URL2, IEA: International Energy Agency, URL3, University of Groningen, Penn World Table version 10.01.

Analyses made without considering the differences in the reactions of economic variables to shocks may be insufficient to reveal hidden relationships and undermine confidence in the analyses (Aydın, 2017). Therefore, before conducting the cointegration test, we apply the BDS (Brock-Dechert-Scheinkman) test to ascertain the presence of non-linear dependencies (Broock et al., 1996). Table 2 displays the BDS findings and verifies the data's non-linearity at the 1% significance level. The findings of the BDS test encourage us even more to continue the NARDL analysis (Syed et al., 2021). In addition, the absence of statistically significant results from the ARDL method is another critical reason for choosing the NARDL method (Göksu & Balkı, 2023).

Table: 2
BDS Test Results

BDS statistic	Embedding dimensions = m				
	m=2	m=3	m=4	m=5	m=6
lnGNI	0,191895***	0,321295***	0,408817***	0,469044***	0,508722***
lnOIL	0,188716***	0,31667***	0,411716***	0,477125***	0,526493***
lnCOAL	0,178116***	0,310125***	0,401221***	0,461977***	0,499866***
lnGAS	0,203796***	0,345828***	0,445732***	0,513084***	0,560681***
K	0,133839***	0,228778***	0,280769***	0,302971***	0,306408***
lnL	0,191909***	0,32488***	0,414718***	0,48055***	0,527644***

The implementation of the NARDL analysis practised the following steps. First, like the ARDL procedure, none of the variables are I(2); Lee and Strazicich (2003) (LS) unit-root tests are performed to decide whether the variables are I(0)/I(1). Second, equation 2 is estimated using the standard OLS method. Third, co-integration between variables is assessed using bound tests (F_{PSS} and t_{BDM}). The fourth detects long-term and short-term asymmetry using the Wald test. Fifth, the normality test (Jarque-Bera), serial correlation test

(LM test), and heteroscedasticity test (BPG and ARCH test) apply to the reliability of the results obtained from the established model. Finally, CUSUM tests were applied to scan the structural solidity.

To specify asymmetric effects between the variables in Model 1, we can write follow Pesaran et al. (2001) and Shin et al. (2014) Equation 4:

$$\Delta lnGNI_t = \beta_0 + \sum_{i=1}^{k=2} \beta_{1i} \Delta lnGNI_{t-i} + \sum_{a=1}^{l=1} \beta_{2a} \Delta OIL_{t-i}^+ + \sum_{b=1}^{m=1} \beta_{3b} \Delta OIL_{t-i}^- +$$
$$\sum_{c=1}^{n=0} \beta_{4c} \Delta K_{t-i}^+ + \sum_{d=1}^{o=2} \beta_{5d} \Delta K_{t-i}^- + \sum_{e=1}^{p=2} \beta_{6e} \Delta lnL_{t-i}^+ + \sum_{f=1}^{q=1} \beta_{7f} \Delta lnL_{t-i}^- +$$
$$\phi lnGNI_{t-1} + \psi_1^+ lnOIL_{t-1}^+ + \psi_1^- lnOIL_{t-1}^- + \psi_2^+ lnK_{t-1}^+ + \psi_2^- lnK_{t-1}^- + \psi_3^+ lnL_{t-1}^+ +$$
$$\psi_3^- lnL_{t-1}^- + \mu_t \tag{4}$$

where "Δ" is the primary difference; "μ_t" is error term; "k, l, m, n, o, p, q" are the lag orders; "β_0" is the constant; "β_1", "β_2", "β_3", "β_4","β_5", "β_6" "β_7" are coefficients of the short-run impacts; "ϕ", "ψ_1", "ψ_2", "ψ_3" are coefficients of the long-run impacts. We will adapt all the equations and hypotheses created for Model 1 to Models 2 and 3. Firstly, we decompose oil consumption, capital, and labour variables as following Equation 5:

$$"lnOIL_t^+ \sum_{i=1}^{t} \Delta lnOIL_i^+ = \sum_{i=1}^{t} max(\Delta lnOIL_i, 0); \ lnOIL_t^- \sum_{i=1}^{t} \Delta lnOIL_i^- =$$
$$\sum_{i=1}^{t} min(\Delta lnOIL_i, 0)"$$

$$"lnCOAL_t^+ \sum_{i=1}^{t} \Delta lnCOAL_i^+ = \sum_{i=1}^{t} max(\Delta lnCOAL_i 0); lnCOAL_t^- \sum_{i=1}^{t} \Delta lnCOAL_i^- =$$
$$\sum_{i=1}^{t} min(\Delta lnCOAL_i 0)"$$

$$"lnGAS_t^+ \sum_{i=1}^{t} \Delta lnGAS_i^+ = \sum_{i=1}^{t} max(\Delta lnGAS_i, 0); \ lnGAS_t^- \sum_{i=1}^{t} \Delta lnGAS_i^- =$$
$$\sum_{i=1}^{t} mi n(\Delta lnGAS_i, 0)" \tag{5}$$

F-Bounds and t-Bounds tests co-integration between variables in the model. The hypotheses of this test:

$$"H_0: \phi = \psi_1^+ = \psi_1^- = \psi_2^+ = \psi_2^- = \psi_3^+ = \psi_3^- = 0" \Rightarrow "There\ is\ no\ cointegration"$$

$$"H_A: \phi \neq \psi_1^+ \neq \psi_1^- \neq \psi_2^+ \neq \psi_2^- \neq \psi_3^+ \neq \psi_3^- \neq 0" \Rightarrow "There\ is\ cointegration"$$

The calculated F statistic is compared with the lower and upper critical values derived by Narayan (2005) for the small sample and derived by Pesaran et al. (2001) for large samples. If H_0 rejects and H_A accepts, it decides that there is cointegration between the variables in the model. If the estimated F statistic value is smaller than the critical values, there is no cointegration between variables in the model.

Long-term asymmetric relationships are evaluated using the following hypotheses with the help of the Wald test.

$$"H_0: \frac{\psi_1^+}{-\phi} = \frac{\psi_1^-}{-\phi}; \ H_0 = \frac{\psi_2^+}{-\phi} = \frac{\psi_2^-}{-\phi}; \ H_0 = \frac{\psi_3^+}{-\phi} = \frac{\psi_3^-}{-\phi}"$$

$$"H_A: \frac{\psi_1^+}{-\phi} \neq \frac{\psi_1^-}{-\phi}; \; H_A = \frac{\psi_2^+}{-\phi} \neq \frac{\psi_2^-}{-\phi}; \; H_A = \frac{\psi_3^+}{-\phi} \neq \frac{\psi_3^-}{-\phi}"$$

According to the Wald test applied, the model has long-term asymmetric relationships if H_0 is rejected, and H_A is accepted. Short-run asymmetric relationships are assessed using the following hypotheses with the help of the Wald test, like the long-run.

$$"H_0: \sum_{i=0}^{b} \varphi_{1i}^+ = \sum_{i=0}^{c} \varphi_{1i}^- \; ; \sum_{i=0}^{d} \varphi_{2i}^+ = \sum_{i=0}^{e} \varphi_{2i}^- \; ; \sum_{i=0}^{f} \varphi_{3i}^+ = \sum_{i=0}^{g} \varphi_{3i}^- "$$

$$"H_A: \sum_{i=0}^{b} \varphi_{1i}^+ \neq \sum_{i=0}^{c} \varphi_{1i}^- \; ; \sum_{i=0}^{d} \varphi_{2i}^+ \neq \sum_{i=0}^{e} \varphi_{2i}^- \; ; \sum_{i=0}^{f} \varphi_{3i}^+ \neq \sum_{i=0}^{g} \varphi_{3i}^- "$$

According to the Wald test applied, if H_0 is rejected and H_A is accepted, there are short-term asymmetric relationships between variables in the model.

Finally, we applied the Toda and Yamamoto (1995) Granger causality test to determine the causal relationships between the variables. In this analysis procedure, first, the appropriate lag length is determined. The maximum degree of integration is added to this lag length. Then, the VAR model is estimated. The VAR model for Model 1 oil consumption and growth is below Equations 6 and 7.

$$lnGNI_t = \delta_0 + \sum_{i=1}^{k+d_{max}} \delta_{1i} \, lnGNI_{t-i} + \sum_{i=1}^{k+d_{max}} \varphi_{1i} \, lnOIL_{t-i} + \mu_{1t} \tag{6}$$

In Equation 6, where the dependent variable is economic growth, the null hypothesis is that there is no causality from oil consumption to economic growth.

$$lnOIL_t = \theta_0 + \sum_{i=1}^{k+d_{max}} \delta_{2i} \, lnOIL_{t-i} + \sum_{i=1}^{k+d_{max}} \varphi_{2i} \, lnGNI_{t-i} + \mu_{2t} \tag{7}$$

On the other hand, in Equation 7, where the dependent variable is oil consumption, the null hypothesis is that there is no causality from economic growth to oil consumption. These equations will be adapted to other models.

4. Results and Discussions

According to the descriptive statistics values in Table 3, all variables' close average and median values give the impression that they are normally distributed. Except for the lnGAS variable, all variables exist normally distributed since the probability values of the Jarque-Bera test statistic are more remarkable than 0,05.

Table: 3
Descriptive Statistics

	lnGNI	lnOIL	lnCOAL	lnGAS	K	lnL
Mean	8,139225	6,787692	5,764395	4,793703	22,52347	16,74754
Median	8,051978	6,952512	5,820112	5,393851	23,57077	16,79202
Maximum	9,443830	7,421371	6,430642	7,017787	29,85714	17,17384
Minimum	6,327937	5,860294	4,822378	0,321214	14,39553	16,30722
Std. Dev.	0,891971	0,415133	0,494873	2,191022	5,006016	0,247175
Skewness	0,007404	-0,432130	-0,531938	-1,010563	-0,266968	-0,096703
Kurtosis	1,879850	2,219630	2,043833	2,704977	1,693271	2,115902
Jarque-Bera	2,562201	2,768341	4,177430	6,779482	3,985258	1,638069
Probability	[0,2777]	[0,2505]	[0,1238]	[0,0337]	[0,1363]	[0,4409]
Observations	49	49	49	39	48	48

First, we evaluate the stationarity to verify that none of the variables is I(2), which is a critical rule for NARDL approaches (Akçay, 2021: 3). Table 4 proves that none of these variables is I(2). According to the LS test in Table 4, all variables except gas consumption are I(1). The gas consumption and capital variables are I(0).

Table: 4
Lee and Strazicich (LS) Unit-Root Test Results

Variables	Level			First Difference			Decision
	Lag	Break Years	t-statistic	Lag	Break Years	t-statistic	
lnGNI	1	1999-2009	-3,618525*	2	1988-1998	-4,958640***	I (1)
lnOIL	3	1999-2013	-4,729090	4	1985-1992	-8,114618***	I (1)
lnCOAL	1	1991-2006	-3,992974	1	1978-2017	-5,335692***	I (1)
lnGAS	3	1981-1998	-10,34347***	-	-	-	I (0)
K	2	1985-2009	-3,766012**	-	-	-	I (0)
lnL	3	1994-2007	-3,280069	0	1978-1980	-3,778664**	I (1)

*Notes: *, **, and *** denote 10, 5, and 1% significance levels, respectively.*

Following the stationarity tests, a possible non-linear co-integration relationship is detected by F-bounds and t-bounds tests. For these tests, the proper lag length is first figured out. Since the data is annual, the maximum lag length is 2. Also, lags are determined based on (AIC) the Akaike Information Criterion. F-bounds and t-bound test outcomes are exhibited in Table 5. According to Model 1, the F_{PSS} statistic is higher than the upper-critic value at a 1% significance level; the t_{BDM} value is much less than the lower critical limit value at a 10% significance level. On the other hand, these bounds test results are significant at the 1% significance level according to Model 2 and at the 5% significance level according to Model 3. In addition, the fact that the short-term error correction term coefficient in all models is negative and statistically significant provides additional evidence that the models are cointegrated. According to these test results, all models have a non-linear co-integration relationship. Similar findings were found in the studies of Hammoudeh et al. (2015), Bayramoglu & Yildirim (2017), Luqman et al. (2019), Jiang & Chen (2020), Awodumi & Adewuyi (2020), Wu (2020); Ha & Ngoc (2021).

Table: 5
F-Bounds and t-Bounds Test Results

Model 1: NARDL (2, 1, 1, 0, 2, 2, 1) k:6 m:2			F critical values		F critical values		t-critical values	
ʃ (lnGNI | lnOIL$_t^+$, lnOIL$_t^-$, K$_t^+$, K$_t^-$, lnL$_t^+$, lnL$_t^-$)			n=1.000		n=45			
F and t-statistic	Result		I (0)	I (1)	I (0)	I (1)	I (0)	I (1)
F PSS: 5,55* **	Co-integration	10%	2,12	3,23	2,327	3,541	-2,57	-4,04
**t BDM: -3,57* **	Co-integration	5%	2,45	3,61	2,764	4,123	-2,86	-4,38
		1%	3,15	4,43	3,79	5,411	-3,43	-4,99
Model 2: NARDL (2, 2, 1, 0, 2, 1, 0) k:6 m:2			F critical values		F critical values		t-critical values	
ʃ (lnGNI | lnCOAL$_t^+$, lnCOAL$_t^-$, K$_t^+$, K$_t^-$, lnL$_t^+$, lnL$_t^-$)			n=1.000		n=45			
F and t-statistic	Result		I (0)	I (1)	I (0)	I (1)	I (0)	I (1)
F PSS: 9,56* **	Co-integration	10%	2,12	3,23	2,327	3,541	-2,57	-4,04
t BDM: -5,96* **	Co-integration	5%	2,45	3,61	2,764	4,123	-2,86	-4,38
		1%	3,15	4,43	3,79	5,411	-3,43	-4,99
Model 3: NARDL (2, 2, 0, 1, 2, 2, 2) k:6 m:2			F critical values		F critical values		t-critical values	
ʃ (lnGNI | lnGAS$_t^+$, lnGAS$_t^-$, K$_t^+$, K$_t^-$, lnL$_t^+$, lnL$_t^-$)			n=1.000		n=35			
F and t-statistic	Result		I (0)	I (1)	I (0)	I (1)	I (0)	I (1)
F PSS: 5,10 **	Co-integration	10%	2,12	3,23	2,387	3,671	-2,57	-4,04
t BDM: -4,80 **	Co-integration	5%	2,45	3,61	2,864	4,324	-2,86	-4,38
		1%	3,15	4,43	4,016	5,797	-3,43	-4,99

*Note: k: number of independent variables; m: lag length; n: number of observations. *, **, and *** denote 10, 5, and 1% significance levels, respectively.*

Table 6 refers to both short and long-term asymmetry tests. For Model 1, Wald test results reveal that only the capital variable has a symmetric effect on economic growth, while oil consumption and labour variables have asymmetric impacts in the short run. On the other hand, only the labour variable has a symmetric effect on economic growth, while oil consumption and capital variables have asymmetric impacts in the long run. Model 2, in which coal consumption is an independent variable, is remarkable because all variables have asymmetric effects both in the short and long run. Parallel results are also valid for the long term of Model 3. Because in Model 3, all variables have asymmetric effects in the long run. However, in the short run, only the labour variable has asymmetric effects, while the natural gas consumption and capital variables have symmetric effects.

Table: 6
Long and Short-run Asymmetry Test Results

Model 1					
Long run asymmetry			**Short run asymmetry**		
	Coefficient	p-value		Coefficient	p-value
W$_{LR, lnOIL}$	4,005936**	[0,0453]	W$_{SR, lnOIL}$	16,50221***	[0,0001]
W$_{LR, lnK}$	19,18069***	[0,0000]	W$_{SR, lnK}$	0,229597	[0,6318]
W$_{LR, lnL}$	0,230705	[0,6310]	W$_{SR, lnL}$	23,62052***	[0,0000]
Model 2					
	Coefficient	p-value		Coefficient	p-value
W$_{LR, lnCOAL}$	12,88953***	[0,0003]	W$_{SR, lnCOAL}$	20,12940***	[0,0000]
W$_{LR, lnK}$	32,25771***	[0,0000]	W$_{SR, lnK}$	12,86543***	[0,0003]
W$_{LR, lnL}$	5,837989**	[0,0157]	W$_{SR, lnL}$	37,10628***	[0,0000]
Model 3					
	Coefficient	p-value		Coefficient	p-value
W$_{LR, lnGAS}$	5,180483**	[0,0228]	W$_{SR, lnGAS}$	1,570986	[0,2101]
W$_{LR, lnK}$	33,05549***	[0,0000]	W$_{SR, lnK}$	0,066093	[0,7971]
W$_{LR, lnL}$	4,379709**	[0,0364]	W$_{SR, lnL}$	55,78171***	[0,0000]

*Notes: *, **, and *** denote 10, 5, and 1% significance levels, respectively. "WLR" is the long-run Wald test, and "WsR" is the short-run Wald test.*

Table 7 shows NARDL estimation results and forms the basis for calculating long-term coefficients. For example, the long-term positive coefficient (L$_{lnOIL}^+$) value (1,862858) of the oil variable in Table 8 for Model 1 is calculated as follows: the coefficient of the

L_{LNOIL}^+ variable, which expresses the one-period lag value of the increases in the oil variable (0,450126), and the coefficient of the $lnGNI_{t-1}$ dependent variable (-0,241632), found by dividing by its negative sign value. $[- lnOIL_{t-1}^+ / lnGNI_{t-1} = -(0,450126/ -0,241632 = 1,862858]$. Similarly, the long-term coefficient estimation of other independent variables was calculated separately in the light of the explanations made, and the estimation results are presented in Table 8 below.

Table: 7
Estimation of NARDL Results

	Model 1		Model 2		Model 3	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Constant	1,737091***	[0,0020]	2,660569***	[0,0000]	3,943329***	[0,0001]
$lnGNI_{t-1}$	-0,241632***	[0,0013]	-0,362567***	[0,0000]	-0,568530***	[0,0001]
K_{t-1}^+	0,021018**	[0,0117]	0,036511***	[0,0000]	0,043386***	[0,0007]
K_{t-1}^-	-0,006434	[0,4777]	-0,026823***	[0,0056]	-0,004525	[0,4948]
L^+	-0,909097**	[0,0242]	-0,767084***	[0,0007]		
L_{t-1}^+					-1,434303***	[0,0005]
L_{t-1}^-	-0,524413	[0,5630]	-2,386289***	[0,0006]	1,713874	[0,1510]
$lnOIL_{t-1}^+$	0,450126*	[0,0986]				
$lnOIL_{t-1}^-$	1,324579**	[0,0141]				
$lnCOAL_{t-1}^+$			-0,185501**	[0,0466]		
$lnCOAL^-$			0,380613***	[0,0001]		
$lnGAS_{t-1}^+$					0,082055***	[0,0029]
$lnGAS^-$					-0,312784	[0,3455]
$\Delta lnGNI_{t-1}$	0,276170**	[0,0313]	0,328661***	[0,0055]	0,375769**	[0,0125]
ΔK^+	0,031941***	[0,0017]	0,033358***	[0,0003]	0,022140**	[0,0142]
ΔK_{t-1}^+			-0,018964**	[0,0128]		
ΔK^-	0,023994	[0,0069]	0,004418	[0,5743]	0,015920*	[0,0820]
ΔK_{t-1}^-					-0,012812	[0,1337]
ΔL^+					-0,197494	[0,7970]
ΔL_{t-1}^+					0,688039	[0,2643]
ΔL^-	2,005337	[0,1008]	1,184739	[0,1585]	0,788598	[0,4207]
ΔL_{t-1}^-	3,419241**	[0,0104]	4,757093***	[0,0000]	4,642178***	[0,0010]
$\Delta lnOIL^+$	-0,125908	[0,6724]				
$\Delta lnOIL_{t-1}^+$	-0,977374***	[0,0007]				
ΔOIL^-	0,433220	[0,4655]				
$\Delta lnCOAL^+$			-0,384582***	[0,0052]		
$\Delta lnGAS^+$					-0,157400***	[0,0093]
$\Delta lnGAS_{t-1}^+$					-0,068635	[0,2324]

Notes: "+" and "-" denote negative and positive partial sums, and *, **, and *** denote 10, 5, and 1% significance levels, respectively.

The coefficients in Table 8 are calculated based on Table 7 and show the long-term coefficients. For Model 1, the long-term positive coefficient of oil consumption does not significantly impact long-term economic growth, while the negative coefficient is significant. This result means that in the long run, in case of a negative shock of 1% in total oil consumption, per capita income will decrease by about 5,5%. The response of per capita income to a decrease in oil consumption predominates more than the increase in oil consumption out and away.

Like the asymmetric test results, all the long-term coefficients of Model 2 are statistically significant. In the long run, both positive and negative shocks in coal consumption affect economic growth negatively. In case of a 1% increase in coal consumption, the economy will contract by 0,5%, while in a 1% decrease in coal consumption, the economy will contract by 1,05%. Parallel to Model 1, the effect of adverse shocks is more evident in Model 2. In other words, the response of economic growth to a

decrease in coal consumption is nearly twice as remarkable as its response to an increase in coal consumption.

In Model 3, the long-term positive coefficient of the gas consumption variable is significant and positive at the 1% significance level. This result means that if there is a 1% positive shock in total gas consumption in the long term, economic growth increases by approximately 0,14%. However, the long-run negative coefficient of this variable is statistically insignificant and positive. To summarise, in this study, we focused on fossil energy consumption. The adverse effects of decreases in fossil energy consumption on economic growth are more dominant than the positive effects of increases in fossil energy consumption on economic growth in general.

Table: 8
Long-Run Coefficients Estimation

	Coefficient	p-value		Coefficient	p-value
Model 1					
	Coefficient	p-value		Coefficient	p-value
$L_{lnOIL}{}^{+}$	1,862858	[0,1800]	$L_{lnOIL}{}^{-}$	5,481803*	[0,0589]
$L_K{}^{+}$	0,086983***	[0,0043]	$L_K{}^{-}$	-0,026627	[0,4825]
$L_{lnL}{}^{+}$	-3,762320*	[0,0690]	$L_{lnL}{}^{-}$	-2,170297	[0,5557]
Model 2					
	Coefficient	p-value		Coefficient	p-value
$L_{lnCOAL}{}^{+}$	-0,511633**	[0,0449]	$L_{lnCOAL}{}^{-}$	1,049774***	[0,0008]
$L_K{}^{+}$	0,100703***	[0,0000]	$L_K{}^{-}{}^{+}$	-0,073980***	[0,0047]
$L_{lnL}{}^{+}$	-2,115704***	[0,0006]	$L_{lnL}{}^{-}$	-6,581655***	[0,0030]
Model 3					
	Coefficient	p-value		Coefficient	p-value
$L_{lnGAS}{}^{+}$	0,144328***	[0,0005]	$L_{lnGAS}{}^{-}$	-0,550163	[0,3144]
$L_K{}^{+}$	0,076313***	[0,0000]	$L_K{}^{-}$	-0,007959	[0,4883]
$L_{lnL}{}^{+}$	-2,522827***	[0,0000]	$L_{lnL}{}^{-}$	3,014570	[0,1273]

*Notes *, **, and *** denote 10, 5, and 1% significance levels, respectively.*

Table 9 denotes diagnostic tests. Diagnostic tests reveal no heteroscedasticity, serial correlation, or functional form problems for Models 1 and 2. However, these explanations for Model 3 cannot be verified.

Table 9
Diagnostic Tests Results

	Model 1		Model 2		Model 3	
	Test value	p-value	Test value	p-value	Test value	p-value
X^2_{SC}	3,904411	[0,1420]	2,739156	[0,2542]	17,82379	[0,0001]
X^2_{FF}	0,303611	[0,5860]	0,093431	[0,7620]	1,956635	[0,1799]
X^2_{NORM}	2,139000	[0,3432]	2,286966	[0,3188]	4,870085	[0,0876]
$X^2_{HET(ARCH)}$	0,461455	[0,4969]	0,100682	[0,7510]	0,228555	[0,6326]
$X^2_{HET(BPG)}$	7,577173	[0,9396]	10,37994	[0,7339]	19,86021	[0,2814]
CUSUM	Stable		Stable		Stable	
CUSUM^2	Stable		Stable		Unstable	

"X^2_{SC}": Serial correlation; "X^2_{NORM}": Normality: Jarque-Bera; "X^2_{FF}": Functional form; "$X^2_{HET(BPG)}$ and $X^2_{HET(ARCH)}$": Heteroscedasticity.

For Models 1 and 2, the CUSUM and CUSUMSQ graphs also show stability because the plot is inside critical bounds at 5%. However, some problems exist in Model 3. Model 3 has a serial correlation problem and an unstable CUSUMSQ graph, so its coefficients are suspicious.

Figure: 1
NARDL CUSUM and CUSUM of Squares Graphs
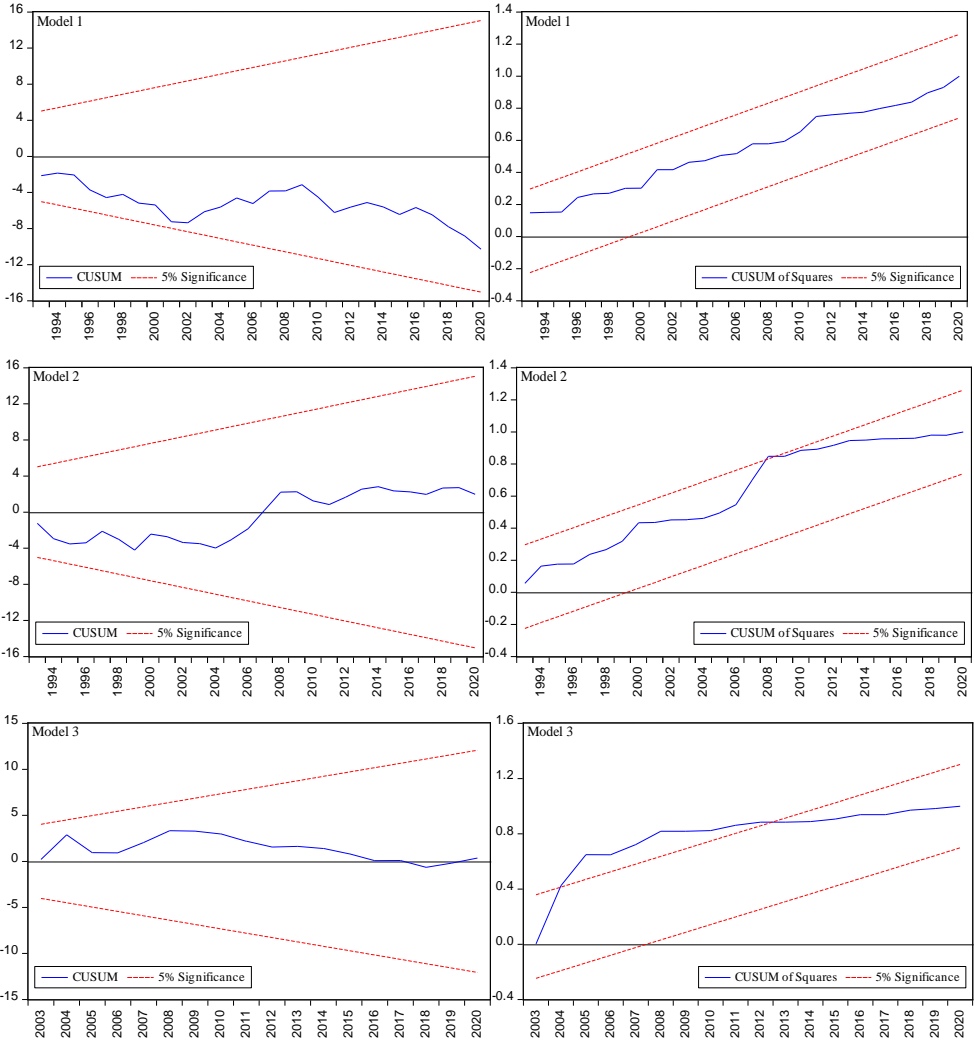
According to the NARDL test results, long-term asymmetrical cointegration is clear. Because of the cointegration, causality relationships can be predicted. The Toda-Yamamoto causality test is preferred because the variables are not stationary at the same level. For this test, the first step is to decide the most appropriate lag length. For this purpose, the information criteria obtained from the standard VAR model are in Table 10. According to

this table, the optimal lag lengths for Models 1 and 2 are 2. On the other hand, the optimal lag length for Model 3 is 1.

Table: 10
VAR Latency Length Criteria

	Lag	LogL	LR	FPE	AIC	SC	HQ
Model 1	0	-63,19833	NA	0,000249	3,054470	3,216669	3,114621
	1	134,9855	351,3260	6,34e-08	-5,226616	-4,415620*	-4,925860
	2	159,7715	39,43223*	4,33e-08*	-5,625978*	-4,166187	-5,084617*
	3	170,8015	15,54229	5,71e-08	-5,400070	-3,291482	-4,618104
	4	184,8519	17,24369	6,87e-08	-5,311452	-2,554068	-4,288881
Model 2	0	-100,9102	NA	0,001384	4,768648	4,930847	4,828799
	1	94,73697	346,8292	3,95e-07	-3,397135	-2,586140*	-3,096379*
	2	113,1113	29,23192*	3,61e-07*	-3,505060*	-2,045269	-2,963699
	3	119,6356	9,193260	5,84e-07	-3,074344	-0,965757	-2,292378
	4	134,4119	18,13459	6,80e-07	-3,018723	-0,261339	-1,996152
Model 3	0	-122,8634	NA	0,013521	7,047969	7,223916	7,109379
	1	60,29140	315,4333*	1,26e-06*	-2,238411*	-1,358678*	-1,931361*
	2	75,14766	22,28439	1,39e-06	-2,174870	-0,591351	-1,622180
	3	82,65487	9,592547	2,45e-06	-1,703048	0,584257	-0,904718

Figure 2 shows the models' inverse roots of AR characteristic polynomials inside the unit circle (Hendry & Juselius, 2001). Therefore, we interpret the established VAR model as stationary (Karakuş & Atabey, 2021).

Figure: 2
Inverse Roots of AR Characteristic Polynomial in Models
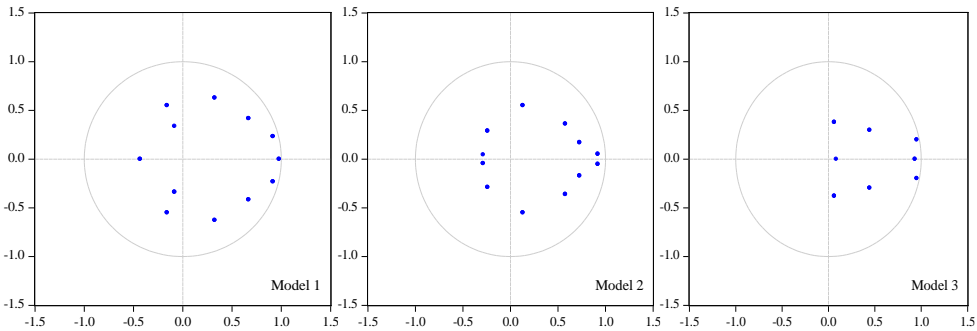
The LS unit root tests in the Table above show that the variables are stationary at the maximum I(1) level. Therefore, we decide that the highest degree of integration of the series is $d_{max}=1$. In Table 10 above, we detect that for Models 1 and 2, optimal lag length values (k) were two, while Model 3 was one. For the Toda-Yamamoto causality analysis, we decide that the optimal total lag lengths for the first two models are 3 ($k+d_{max}=2+1=3$), while Model 3 is 2 ($k+d_{max}=2+1=3$). The results obtained for this situation are in Table 11.

Tablo: 11
Toda-Yamamoto Causality Test Results

H_0	Model 1		Model 2		Model 3		H_0 Decision		
	Wald Stat.	Prob.	Wald Stat.	Prob.	Wald Stat.	Prob.	Model 1	Model 2	Model 3
lnOIL⇏lnGNI	7,3438**	[0,0254]	-	-	-	-	Reject	-	-
lnGNI⇏lnOIL	3,0875	[0,2136]	-	-	-	-	Accept	-	-
lnCOAL⇏lnGNI	-	-	3,6229	[0,1634]	-	-	-	Accept	-
lnGNI⇏lnCOAL	-	-	0,1922	[0,9084]	-	-	-	Accept	-
lnGAS⇏lnGNI	-	-	-	-	5,4005**	[0,0201]	-	-	Reject
lnGNI⇏lnGAS	-	-	-	-	5,3366**	[0,0209]	-	-	Reject
lnGNI⇏K	10,8865***	[0,0043]	4,0776	[0,1302]	2,2245	[0,1358]	Reject	Accept	Accept
K⇏lnGNI	13,7199***	[0,0010]	9,2478***	[0,0098]	12,8883***	[0,0003]	Reject	Reject	Reject
lnGNI⇏lnL	11,3168***	[0,0035]	11,135***	[0,0038]	12,3031***	[0,0005]	Reject	Reject	Reject
lnL⇏lnGNI	14,2901***	[0,0008]	8,4033**	[0,0150]	13,5905***	[0,0002]	Reject	Reject	Reject

*Notes: *, **, and *** denote 10, 5, and 1% significance levels, respectively. Model 1 and 2: $k+d_{max}=2+1=3$. Model 3: $k+d_{max}=1+1=3$*

According to the Toda-Yamamoto Granger causality test results for Model 1, a one-way (unidirectional) causality relationship exists, going from oil consumption to economic growth. This result shows that oil consumption is an influential factor in economic growth. There is a two-way (bidirectional) causality between economic growth and other variables. In other words, bidirectional causality relationships exist between economic growth and capital variables and between economic growth and labour variables. These results show a feedback relationship between economic growth, labour, and capital variables and that these variables can shape each other.

In Model 2, there is no causal relationship between coal consumption and economic growth. However, a unidirectional causality relationship exists, going from the capital variable to economic growth. In addition, bidirectional causality relationships exist between economic growth and labour variables.

In Model 3, bidirectional causality relationships exist between economic growth and natural gas consumption variables and between economic growth and labour variables. On the other hand, like Model 2, a unidirectional causality relationship exists, going from capital variable to economic growth.

5. Conclusion

In realising sustainable economic growth and development efforts, energy is undoubtedly one of the most fundamental factors countries should have. After steam power in machines, energy is essential for economic development and growth. Especially in recent years, technological advances have increased the need for energy. For these reasons, production and EC are among the most significant issues on policymakers' agendas. Due to this essential function, both the production and consumption of energy are considered indicators of development for countries today.

Despite this increasing EC, sustainable economic development targets (Selçuk et al., 2019) nearly every country's principal goals. In order to achieve this goal, there is no doubt that energy resources should not be wasted, waste of energy resources should be prevented, and renewable energy resources should be used rather than fossil fuels. The understanding

of "sustainable development," which envisages the realisation of development without consuming the resources of future generations today, is a complex process involving many actors and factors (Göçoğlu, 2022: 2). While this understanding provides that future generations live in a better environment, it also brings along a complex policy process that must manage effectively to ensure the optimum use of resources against the ever-increasing world population and human needs (Campagna, 2005: 3). It can be said that more effective energy policies are necessary, especially in countries like Türkiye, where energy production does not meet EC. Foreign dependency on energy causes high prices of energy resources in the country and creates pressure, especially on producer costs. Rising energy costs weaken competitiveness, exclude domestically produced goods and lower national income.

According to earlier empirical studies on FEC, linear methods are predominant. In other words, these studies conducted with linear methods show that the effects of increases and decreases in the coefficients of the independent variables on the dependent variable are the same. This paper explores the impacts of FEC usage on growth in Türkiye by employing the NARDL method. Results reveal that there is an asymmetric co-integration relationship between the variables. This means that the effect of the increase and decrease in the independent variable on the dependent variable is different. When examining the models comprehensively, it becomes evident that the impact of declining energy consumption on gross national income per capita across all models is significantly more pronounced than the effect of increased energy consumption. This discrepancy primarily stems from Türkiye's reliance on imported energy resources, particularly in fossil fuels like oil and natural gas, due to the limited availability of domestic resources. Using fossil fuels as a critical input within Türkiye's industrial production means reducing energy consumption, which decreases gross national income per capita. In this context, policymakers should primarily turn to alternative and renewable energy sources instead of fossil fuels to reduce foreign dependency and diversify energy supply. Exploration activities for discovering domestic energy resources should be accelerated, and more investments should be made in research and development studies for renewable energy technologies. On the other hand, while increases in the capital variable, a common independent variable in the models, positively affect economic growth in the long term, the negative effect of the labour variable, which expresses the number of persons engaged, is striking. Causality tests reveal a bidirectional relationship between economic growth and natural gas consumption and confirm the feedback hypothesis. No causality between economic growth and coal consumption has been found, and the neutrality hypothesis is confirmed. A one-way causality relationship between oil consumption and economic growth confirms the growth hypothesis. Finally, an essential limitation of the study is that it does not include renewable energy sources. Therefore, modifying the created models to renewable energy sources can be recommended for future studies.

References

Abbasi, K.R. et al. (2021), "How Energy Consumption, Industrial Growth, Urbanization, and CO2 Emissions Affect Economic Growth in Pakistan? A novel dynamic ARDL simulations approach", *Energy*, 221, 119793.

Ahmad, A. et al. (2016), "Carbon Emissions, Energy Consumption and Economic Growth: An Aggregate and Disaggregate Analysis of The Indian Economy", *Energy Policy*, 96, 131-143.

Ajlouni, S.A. (2015), "Energy Consumption and Economic Growth in Jordan: An ARDL Bounds Testing Approach to Co-integration", *Jordan Journal of Economic Sciences*, 2(2), 143-161.

Akçay, S. (2021), "Are Oil Prices and Remittance Outflows Asymmetric? Evidence from Saudi Arabia", *Energy Research Letters,* 2(1), 18948.

Alam, M.M. &. W. Murad (2020), "The Impacts of Economic Growth, Trade Openness and Technological Progress on Renewable Energy Use in Organization for Economic Co-Operation and Development Countries", *Renewable Energy*, 145, 382-390.

Alam, M.S. (2022), "Is Trade, Energy Consumption and Economic Growth Threat to Environmental Quality in Bahrain-Evidence from VECM and ARDL Bound Test Approach", *International Journal of Emergency Services*, 11(3) 396-408.

Al-Mulali, U. et al. (2014), "Electricity Consumption from Renewable and Non-Renewable Sources and Economic Growth: Evidence from Latin American Countries", *Renewable and Sustainable Energy Reviews*, 30, 290-298.

Alper, F.Ö. & A.E. Alper (2017), "Karbondioksit Emisyonu, Ekonomik Büyüme, Enerji Tüketimi İlişkisi: Türkiye için bir ARDL Sınır Testi Yaklaşımı", *Sosyoekonomi*, 25(33), 145-156.

Amin, S.B. et al. (2020), "Energy-Output Nexus in Bangladesh: A Two-Sector Model Analysis", *Energy Strategy Reviews*, 32, 100566.

Apaydın, Ş. et al. (2019), "Türkiye'de Yenilenebilir Enerji Tüketiminin Ekonomik Büyüme Üzerindeki Asimetrik Etkileri", *Mehmet Akif Ersoy Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 6(1), 117-134.

Apergis, N. & J.E. Payne (2010a), "Coal Consumption and Economic Growth: Evidence from A Panel of OECD Countries", *Energy Policy*, 38(3), 1353-1359.

Apergis, N. & J.E. Payne (2010b), "Renewable Energy Consumption and Economic Growth: Evidence from A Panel of OECD Countries", *Energy Policy*, 38(1), 656-660.

Awodumi, O.B. & A.O. Adewuyi (2020), "The Role of Non-Renewable Energy Consumption in Economic Growth and Carbon Emission: Evidence from Oil Producing Economies in Africa", *Energy Strategy Reviews*, 27, 100434.

Aydin, M. (2017), "Gelişmekte Olan Ülkelerde Borsa ile Döviz Kurları Arasındaki İlişki: Simetrik ve Asimetrik Nedensellik Analizi", *Ekonometri ve Istatistik Dergisi*, 27, 1-15.

Azam, A. et al. (2021), "Analyzing the Relationship Between Economic Growth and Electricity Consumption from Renewable and Non-Renewable Sources: Fresh Evidence from Newly Industrialized Countries", *Sustainable Energy Technologies and Assessments*, 44, 100991.

Bayramoglu, A.T. & E. Yildirim (2017), "The relationship between energy consumption and economic growth in the USA: a non-linear ARDL bounds test approach", *Energy and Power Engineering*, 9(03), 170.

Belke, A. et al. (2011), "Energy consumption and economic growth: New insights into the co-integration relationship", *Energy Economics*, 33(5), 782-789.

Benkraiem, R. et al. (2019), "The Asymmetric Role of Shadow Economy in The Energy-Growth Nexus in Bolivia", *Energy Policy*, 125, 405-417.

Bildirici, M. (2012), "Economic Growth and Electricity Consumption in Africa and Asia: MS-VAR and MS-Granger Causality Analysis", *Available at SSRN 2129017*.

Bildirici, M.E. & T. Bakirtas (2014), "The Relationship Among Oil, Natural Gas and Coal Consumption and Economic Growth in BRICTS (Brazil, Russian, India, China, Turkey and South Africa) countries", *Energy*, 65, 134-144.

Bloch, H. et al. (2012), "Coal Consumption, CO2 Emission and Economic Growth in China: Empirical Evidence and Policy Responses", *Energy Economics*, 34(2), 518-528.

Bloch, H. et al. (2015), "Economic Growth with Coal, Oil and Renewable Energy Consumption in China: Prospects for Fuel Substitution", *Economic Modelling*, 44, 104-115.

Broock, W.A. et al. (1996), "A Test for Independence Based on the Correlation Dimension", *Econometric Reviews*, 15(3), 197-235.

Campagna, M. (2005), "GIS for Sustainable Development", in: *GIS for Sustainable Development* (23-40), CRC Press.

Dogan, E. (2015), "The Relationship Between Economic Growth and Electricity Consumption from Renewable and Non-renewable Sources: A Study of Turkey", *Renew Sustain Energy Rev.* 52, 534-546.

Ghali, K.H. & M.I. El-Sakka (2004), "Energy Use and Output Growth in Canada: A Multivariate Cointegration Analysis", *Energy Economics*, 26(2), 225-238.

Göçoğlu, V. (2022), "Agenda-Setting for Sustainable Development on Twitter: Actors, Motivations, and Issues in Turkey", *Journal of Asian Public Policy*, DOI: 10.1080/17516234.2022.2055522.

Göksu, S. & A. Balkı (2023), *ARDL ve NARDL Eşbütünleşme Analizleri: Adım Adım Eviews Uygulaması*, Serüven Yayınevi.

Göksu, S. (2021), "Dünya Ekonomisinde Ekonomik Büyüme ve Kalkınma", in: Ö. Özçelik (ed.), *Güncel Paradigmalar Işığında Dünya Ekonomisi* (65-88), Bursa: Ekin Yayınevi.

Güllü, M. & H. Yakışık (2017), "The Impact of Carbon Emission and Energy Consumption on Economic Growth: A Comparison of the MIST Countries", *Sosyoekonomi*, 25(32), 239-253 .

Ha, N.M. & B.H. Ngoc (2021), "Revisiting the Relationship Between Energy Consumption and Economic Growth Nexus in Vietnam: New Evidence by Asymmetric ARDL Co-Integration", *Applied Economics Letters*, 28(12), 978-984.

Hammoudeh, S. et al. (2015), "An Empirical Analysis of Energy Cost Pass-Through to CO2 Emission Prices", *Energy Economics*, 49, 149-156.

Hasanov, F.J. (2021), "Theoretical Framework for Industrial Energy Consumption Revisited: The Role of Demographics", *Energy Reports*, 7, 2178-2200.

Hendry, D.F. & K. Juselius (2001), "Explaining Cointegration Analysis: Part II", *The Energy Journal*, 22(1), 75-120.

Hwang, J-H. & S-H. Yoo (2014), "Energy Consumption, Emissions and Economic Growth: Evidence from Indonesia", *Quality and Quantity*, 48, 63-73.

International Energy Agency (2021), *Turkey Energy Policy Review*, <https://www.iea.org/reports/turkey-2021>, 27.11.2022.

Jiang, W. & Y. Chen (2020), "Asymmetries in The Nexus Among Energy Consumption, Air Quality and Economic Growth in China", *Energy Reports*, 6, 3141-3149.

Karakuş, M. & A.Ö. Atabey (2021), "Genç İşsizlik, İhracat ve Büyüme Arasındaki İlişki: Türkiye için Ampirik bir Analiz", *Alanya Akademik Bakış*, 5(2), 865-882.

Khan, I. et al. (2021), "The Dynamic Links Among Energy Transitions, Energy Consumption, and Sustainable Economic Growth: A Novel Framework for IEA Countries", *Energy*, *222*, 119935.

Kraft, J. & A. Kraft (1978), "On the Relationship between Energy and GNP", *The Journal of Energy and Development*, 401-403.

Kumari, A. & A.K. Sharma (2016), "Analyzing the Causal Relations Between Electric Power Consumption and Economic Growth in India", *The Electricity Journal*, 29(4), 28-35.

Landwehr, M. & E. Jochem (1997), "From Primary to Final Energy Consumption-Analysing Structural and Efficiency Changes on The Energy Supply Side", *Energy Policy*, 25(7-9), 693-702.

Le Quang, C. (2011), "Electricity Consumption and Economic Growth in Vietnam: A Co-Integration and Causality Analysis", *Journal of Economics and Development*, 43, 24-36.

Lee, C.C. & C.P. Chang (2008), "Energy Consumption and Economic Growth in Asian Economies: A More Comprehensive Analysis Using Panel Data", *Resource and Energy Economics*, 30(1), 50-65.

Lee, J. & M.C. Strazicich (2003), "Minimum Lagrange Multiplier Unit Root Test with Two Structural Breaks", *Review of economics and statistics*, 85(4), 1082-1089.

Luqman, M. et al. (2019), "Nuclear Energy, Renewable Energy and Economic Growth in Pakistan: Evidence from Non-Linear Autoregressive Distributed Lag Model", *Renewable Energy*, 139, 1299-1309.

Masuduzzaman, M. (2012), "Electricity Consumption and Economic Growth in Bangladesh: Co-integration and Causality Analysis", *Global Journal of Management and Business Research*, 12(11), 46-56.

Narayan, P.K. & B. Singh (2007), "The Electricity Consumption and GDP Nexus for the Fiji Islands", *Energy Economics*, 29(6), 1141-1150.

Narayan, P.K. (2005), "The Saving and Investment Nexus for China: Evidence from Co-Integration Tests", *Applied Economics*, 37(17), 1979-1990.

Omri, A. (2014), "An International Literature Survey on Energy-Economic Growth Nexus: Evidence from Countryspecific Studies", *Renewable and Sustainable Energy Reviews*, 38, 951-959.

Ouédraogo, I.M. (2010), "Electricity consumption and economic growth in Burkina Faso: A cointegration analysis", *Energy Economics*, 32(3), 524-531.

Payne, J.E. (2010a), "Survey of the Electricity Consuption-Growth Literature", *Applied Energy*, 87(3), 723-731.

Payne, J.E. (2010b), "Survey of the International Evidence on the Causal Relationship Between Energy Consumption and Growth", *Journal of Economic Studies*, 37(1), 53-95.

Pesaran, M.H. et al. (2001), "Bounds Testing Approaches to the Analysis of Level Relationships", *Journal of Applied Econometrics*, 16(3), 289-326.

Rafiq, S. & R.A. Salim (2009), "Temporal Causality Between Energy Consumption and Income in Six Asian Emerging Countries", *Applied Economics*, 55(4), 335.

Sari, R. & U. Soytas (2007), "The Growth of Income and Energy Consumption in Six Developing Countries", *Energy Policy*, 35(2), 889-898.

Selçuk, I.Ş. et al. (2019), "Energy Poverty in Turkey", *Sosyoekonomi*, 27(42), 283-299.

Shahbaz, M. et al. (2017), "Energy Consumption, Financial Development and Economic Growth in India: New Evidence from a Nonlinear and Asymmetric Analysis", *Energy Economics*, 63, 199-212.

Shahbaz, M. et al. (2018), "The Energy Consumption and Economic Growth Nexus in Top Ten Energy-Consuming Countries: Fresh Evidence from Using the Quantile-on-Quantile Approach", *Energy Economics*, 71, 282-301.

Shastri, S. et al. (2020), "Economic Growth, Renewable and Nonrenewable Energy Consumption Nexus in India: Evidences from Nonlinear ARDL Approach and Asymmetric Causality Analysis", *International Journal of Energy Sector Management*, 14(4), 777-792.

Shin, Y. et al. (2014), "Modelling Asymmetric Co-integration and Dynamic Multipliers in a Nonlinear ARDL Framework", in: R.C. Sickles & W.C. Horrace (eds.), *Festschrift in Honor of Peter Schmidt* (Vol. 44) (281-314), Springer, New York.

Smyth, R. &, P.K. Narayan (2015), "Applied Econometrics and Implications for Energy Economics Research", *Energy Economics*, 50, 351-358.

Stern, D.I. (1993), "Energy and Economic Growth in the USA: A Multivariate Approach", *Energy Economics*, 15(2), 137-150.

Syed, A.A. et al. (2021), "An Empirical Investigation of Nuclear Energy and Environmental Pollution Nexus in India: Fresh Evidence Using NARDL Approach", *Environmental Science and Pollution Research*, 28(39), 54744-54755.

Tang, C.F. et al. (2016), "Energy Consumption and Economic Growth in Vietnam", *Renewable and Sustainable Energy Reviews*, 54, 1506-1514.

Toda, H.Y. & T. Yamamoto (1995), "Statistical Inference in Vector Autoregressions with Possibly Integrated Processes", *Journal of Econometrics*, 66(1-2), 225-250.

Tugcu, C.T. & Topcu, M. (2018),"Total, Renewable and Non-Renewable Energy Consumption and Economic Growth: Revisiting the Issue with an Asymmetric Point of View", *Energy*, 152, 64-74.

Uçan, O. et al. (2022), "Analysis of Relationship between Economic Growth and Energy Consumption in Developed Countries", *Journal of Human, Earth, and Future*, 3(1), 82-89.

Wu, H.M. (2020), "The Impact of Non-Clean Energy Consumption on Economic Growth: Evidence from Symmetric and Asymmetric Analyses in the US", *Energy & Environment*, 31(2), 291-307.

Zhang, H. et al. (2021), "Electricity Consumption and Economic Growth in BRI countries: Panel
Causality and Policy Implications", *Emerging Markets Finance and Trade*, 57(3), 859-
874.

Zhong, S. (2018), "Structural Decompositions of Energy Consumption between 1995 and 2009:
Evidence from WIOD", *Energy Policy*, 122, 655-667.

Impact of Corruption on Utility Prices: A Theoretical and Empirical Analysis for the Electricity Markets[1]

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Yolsuzluğun Kamu Hizmeti Fiyatları Üzerindeki Etkisi: Elektrik Piyasaları için Teorik ve Ampirik Bir İnceleme[2]

Abstract

This study investigates the influence of corruption on utility prices. We develop a game-theoretical model to explore the interactions between the government, an interest group formed by firms, and consumers in determining utility prices. The model suggests that an increase in corruption correlates with a rise in utility prices, a relationship confirmed through empirical analysis of electricity sectors in 21 OECD countries from 1995 to 2015. Additionally, we explore the effects of regulatory reforms on electricity prices, revealing mixed outcomes. The findings emphasise the importance of anti-corruption efforts in shaping fair utility prices.

Keywords : Regulatory Capture, Corruption, Political Agency, Utility Prices, Electricity Prices, Regulatory Reforms.

JEL Classification Codes : D72, D73, L94, L98.

Öz

Bu çalışmada, yolsuzluğun kamu hizmeti fiyatları üzerindeki etkisi araştırılmıştır. Öncelikle, oluşturulan oyun-teorisi modeliyle, görevdeki politikacı, firmalardan oluşan lobi grubu ve temsili tüketicinin kamu hizmeti fiyatının belirlenmesi sürecindeki etkileşimi analiz edilmiştir. Model, yolsuzluğun artması ile kamu hizmeti fiyatlarının yükseldiğine işaret etmektedir. Bu öngörü, 21 OECD ülkesinin 1995-2015 dönemine ait elektrik piyasası verileriyle ampirik olarak test edilmiş ve doğrulanmıştır. Ayrıca, seçilmiş reform değişkenlerinin elektrik fiyatları üzerindeki etkileri de incelenmiştir. Bazı reformların fiyatları düşürdüğü, bazılarının ise fiyat artışlarına katkıda bulunduğu tespit edilmiştir. Bu bulgular, kamu hizmeti fiyatlarının doğru bir biçimde oluşumu için yolsuzlukla mücadelenin önemini vurgulamaktadır.

Anahtar Sözcükler : Düzenleyiciyi Ele Geçirme, Yolsuzluk, Vekalet Teorisi, Kamusal Hizmet Fiyatları, Elektrik Fiyatları, Düzenleyici Reformlar.

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[1] *This article is derived from the PhD Dissertation titled "The Impact of Corruption on Prices and Efficiency in the Electricity Market", prepared by Funda Altun and supervised by Prof.Dr. M. Kadir Doğan in the Graduate School of Social Sciences, Ankara University, in 2021.*

[2] *Bu makale, 2021 yılında Ankara Üniversitesi, Sosyal Bilimler Enstitüsü'nde Prof. Dr. M. Kadir Doğan danışmanlığında Funda Altun tarafından hazırlanan "Yolsuzluğun Elektrik Piyasasında Fiyatlara ve Etkinliğe Etkisi" başlıklı tezden türetilmiştir.*

1. Introduction

Utility prices, especially in the electricity sector, have been extensively examined in economic research. This examination becomes even more relevant in deregulated markets where multiple factors interplay to determine prices, including political and economic influences. Historically, state-owned enterprises dominated the provision of utility services, often leading to inefficiencies and capacity shortages. The liberalisation of these markets, a trend that gained momentum in OECD countries in the 1990s, responded to these challenges, aiming to create competitive markets, reduce public expenditure, and improve service quality (Boehm, 2007). However, this transition has not been without its complexities, particularly concerning the role of corruption in influencing utility prices.

This study is motivated by a notable gap in economic literature: the precise impact of corruption on utility prices within deregulated electricity markets. While prior research has extensively examined the influence of regulatory reforms and market structures on utility prices, the nuanced role of corruption has received comparatively less attention. Studies such as those by Estache and Kouassi (2002) and Dal Bo and Rossi (2007) have primarily focused on the efficiency of utilities or the broad interactions between corruption and regulatory reforms. However, the direct correlation between corruption levels and utility prices, especially in deregulated electricity markets, remains underexplored.

This paper aims to bridge this gap by comprehensively analysing how corruption influences electricity prices. To assess the impact of corruption on utility prices, we formulated a model that integrates the political agency theories of Barro (1973) and Ferejohn (1986) with the interest group models proposed by Baron (1994) and Grossman and Helpman (1994, 1996). In our model, a representative consumer and an interest group attempt to influence the incumbent politician's decisions regarding utility pricing. The interest group may offer a payment to the politician, incentivising the setting of higher utility prices. Conversely, the consumer may utilise the forthcoming election to incentivise the politician towards lower utility prices. The model postulates that increased levels of corruption correlate with higher utility prices, a hypothesis we test using a panel data set from 21 OECD countries covering the period from 1995 to 2015. Our empirical findings indicate a significant positive correlation between corruption and industrial and residential electricity prices, validating our theoretical model.

The empirical analysis also investigates the impact of regulatory reforms on electricity prices. It is observed that establishing a wholesale market and introducing a retail market exert negative influences on both industrial and residential electricity prices. Conversely, the unbundling of generation from transmission positively impacts both prices. Furthermore, introducing independent power producers is associated with a negative impact on residential electricity prices, while establishing a regulatory agency is correlated with a positive influence on residential electricity prices.

This study contributes to the existing literature by proposing a new theoretical framework for understanding the relationship between corruption and utility prices, and it provides empirical evidence on how corruption can counteract the intended benefits of market liberalisation. Moreover, it enriches the empirical research on the impact of regulatory reforms on electricity prices. While the study focuses on OECD countries, where corruption is typically less prevalent, it highlights that even lower levels of corruption can significantly affect utility prices. The study's insights are important for policymakers and regulatory bodies, highlighting the necessity of combating corruption in the electricity market.

The paper is organised as follows: Section 2 reviews the relevant literature. Section 3 explains the theoretical model underpinning this study. In Section 4, we present our empirical analysis and the resultant findings. Finally, Section 5 discusses the broader implications of our study for economic policy and future research.

2. Literature Review

Research on utility market dynamics and corruption is extensive and diverse. Before the deregulation of utility markets, these services were predominantly provided by state-owned enterprises. However, under public ownership, issues such as capacity shortages and inefficiencies in production were widespread, leading to the liberalisation and opening of some parts of these services to competition (Boehm, 2007).

Government intervention in economic processes is a debated topic in political economy. First developed by Pigou (1932), public interest theories of regulation advocate state intervention to correct market failures due to externalities or public goods. Conversely, the regulatory capture theory, articulated by Stigler (1971), suggests that state intervention is often motivated by private interests, with regulation acquired by the industry and primarily operating for its benefits[3]. This emphasises the potential for corruption in regulatory processes[4].

Corruption is defined as the abuse of entrusted powers for private gain[5]. Within the context of utility reforms, it significantly influences the operational dynamics of utility services, affecting their quality, accessibility, and affordability. This relationship has been the subject of various empirical investigations. For instance, Estache and Kouassi (2002)

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[3]   *See Dal Bo (2006) and Boehm (2007) for a detailed literature review of regulatory capture.*

[4]   *Regulatory capture has aspects that fall under both grand and political corruption. According to Transparency International, corruption has three types: grand, political, and petty. Grand corruption occurs at high levels of government when leaders benefit at the expense of the public interest. Political corruption occurs when political decision-makers manipulate policies, institutions and rules of procedure in allocating resources and financial benefits. To gain power, wealth and status, these decision-makers misuse their position. The last one, petty corruption, occurs when low or middle-level public officials abuse their entrusted power in their official actions. This kind of corruption occurs in institutions like police departments, schools and hospitals. Petty corruption is the extortion performed by low-level bureaucrats against citizens and is out of the context of regulatory capture.*

[5]   *Jain (2001) provides a detailed theoretical and empirical review of corruption.*

studied the efficiency of 21 African water utilities and found that corruption negatively affects efficiency. In related research, Estache et al. (2006) investigate the effects of private capital and the establishment of independent regulatory authorities on the performance of the telecommunications sectors of 204 countries. Using panel data from 1990 to 2003, they incorporate an analysis of the influence of corruption on sectoral performance and the interaction between reform policies and corruption. The researchers conclude that corruption plays an important role in explaining the performance dynamics within the telecommunications sector and exhibits interaction with reform policies. Furthermore, Estache et al. (2009) extend their analysis to evaluate the impact of reform policies and corruption across three performance dimensions -access, affordability, and quality- in the electricity, telecommunications, and water sectors. Employing service prices as proxies for affordability, they find that corruption does not significantly affect electricity prices but leads to higher local phone call prices in the telecommunications sector. Focusing on electricity distribution firms, Dal Bo and Rossi (2007) analyse 80 entities across 13 Latin American countries during 1994-2001. They developed a theoretical model suggesting that corruption exacerbates inefficiencies by escalating factor requirements in these firms. Their empirical findings substantiated this model, indicating that heightened corruption levels, as measured by the International Country Risk Guide (ICRG) and Transparency International indexes, correlate with increased inefficiencies in electricity distribution firms. They also find that, in comparison to private firms, public firms demonstrate significantly lower efficiency levels. Expanding on this research, Wren-Lewis (2015) investigated the link between corruption and the productivity of regulated firms, particularly focusing on the influence of policy reforms on this relationship. Their empirical analysis, which encompasses the productivity of 153 electricity distribution firms across 18 countries in Latin America and the Caribbean from 1995 to 2007, finds that an independent regulatory agency significantly mitigates the negative impact of corruption on productivity. Furthermore, they observe that the detrimental interaction between corruption and productivity is comparatively less pronounced in privately owned firms, although this finding exhibits less robustness. In a later study, Imam et al. (2019) investigate the impact of corruption, alongside the establishment of independent regulatory agencies and private sector participation, on three performance indicators. Their dynamic panel data analysis, encompassing 47 Sub-Saharan African countries over the 2002-2013 period, demonstrates that corruption adversely affects technical efficiency, access to electricity, and income levels. In the study by Chang et al. (2018), government quality is examined through the corruption variable, focusing on its influence on energy efficiency. Utilising a panel dataset from 31 OECD countries from 1990 to 2014, their research reveals that an increase in government efficiency correlates with a decrease in energy intensity. This reduction is attributed to the enhancement of energy efficiency across OECD countries. Similarly, a recent study by Liu et al. (2023) explores the impact of corruption on energy efficiency, particularly focusing on its influence via energy investment projects. Analysing data from 30 Chinese provinces from 2000 to 2017, their study uncovers that corruption adversely affects energy efficiency, with energy investments serving as an intermediary in this dynamic. Another study focusing on the electricity sector is that of Kaller et al. (2018), which

is closely aligned with our empirical investigation. It examines the impact of regulatory quality and corruption on residential electricity prices across 22 European countries from 2005 to 2013 within the context of electricity market reforms. Their findings reveal that the static model did not yield significant results. However, the dynamic model indicates that enhancements in regulatory quality and reductions in corruption contribute to lower prices for end-users.

While the studies summarised above explore the nexus between corruption, efficiency, and regulatory reforms within utility sectors, another strand of research investigates the influence of various regulatory reforms on utility prices. The seminal work by Stigler and Friedland (1962) serves as the foundational analysis in this domain. Subsequent investigations, such as those conducted by Steiner (2000), Zhang et al. (2002), Hattori and Tsutsui (2004), Nagayama (2007, 2009), Estache et al. (2006, 2009), Erdogdu (2011), Fiorio and Florio (2013), Bacchiocchi et al. (2015), Hyland (2016), Kaller et al. (2018), and Ahmed and Bhatti (2019) have also examined the impacts of regulatory reforms on utility prices.

Considering the existing studies, the distinctive contribution of our research lies in its dual approach. It enriches the existing literature with both theoretical and empirical insights. Firstly, it offers a novel theoretical framework for understanding the relationship between corruption and utility prices, particularly in deregulated electricity markets. Secondly, empirical analysis provides new perspectives on how corruption can counteract the intended benefits of market liberalisation, such as reduced prices. Finally, it augments the empirical literature concerning the effects of regulatory reforms on electricity prices.

3. The Theoretical Model

We have designed a game-theoretical model to analyse interactions among politicians, an interest group formed by firms, and consumers in determining utility prices. The model is based on the political agency models of Barro (1973) and Ferejohn (1986) and the interest group models of Baron (1994) and Grossman and Helpman (1994, 1996)[6]. There are three infinitely-lived players: an incumbent politician, a representative consumer who votes in elections, and an interest group aiming to maximise the firms' profits.

In each period, the politician sets the utility price[7]. We assume a constant marginal cost for the utility, denoted as c. The politician is not allowed to put a price lower than c, to

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[6] *According to the political agency models, elections incentivise office-seeking politicians to act in their constituents' interests. Additionally, interest group models argue that these groups may influence a politician's policy choices by offering political contributions contingent on the policy.*

[7] *In most countries, the utility markets are regulated, and the prices of utilities are determined through a regulatory process. However, elected politicians have significant control over regulators. They can change the organisational basis, powers, and duties of independent regulatory agencies (IRAs). This control is exerted through legislation, reappointing agency members, nominating agency heads, and determining budgets (Thatcher, 2005). Hanretty and Koop (2013) emphasise that the degree to which IRAs operate independently from politics in practice (actual political independence of IRA) differs from the degree of independence from*

avoid shortages, and there is an upper limit, $\bar{p}$ (where $\bar{p} > c$), representing the maximum price consumers can afford. Therefore, in period t, the price of the utility, p_t, can be in the interval $[c, \bar{p}]$. In a given period, the politician receives a combination of wage and ego rents from holding the office, denoted by w. The discount factor of the politician is represented by $\delta \in (0,1)$. The politician has no term limits, but if they lose an election, they are never re-elected, and their outside payoff is normalised to zero. We also assume that the politician and their opponents are identical in abilities and preferences, and at least one previously unelected opponent exists for the politician in the elections.

Consumer demand for the utility is considered constant in each period, represented by θ. Since the price of the utility cannot be lower than its marginal cost, θ units of utility will be produced by the firms at any given price in a given period. The consumer prefers lower prices to higher prices but has no direct influence on determining the utility price. Still, if the politician wants to hold the office, the consumer can induce the politician to choose a low price by applying a retrospective voting strategy. Since the politician and their opponents are identical in abilities and preferences, the only reason for not re-electing the politician is to punish them ex-post. It is indeed weakly optimal for the consumer to carry out this punishment. Therefore, we assume that the consumer sets a threshold price level $\hat{p}_t \in [c, \bar{p}]$ in period t and re-elects the politician if and only if the politician chooses the price no more than this level.

We assume that utility-producing firms form an interest group aiming to influence the politician's decision through payments. More specifically, before the politician sets the price in a given period, the interest group offers a payment schedule to the politician contingent on the utility price and the threshold price level chosen by the consumer. It carries out the relevant payment after the price is set. This payment is a monetary transfer from the interest group to the politician. In period t, the interest group thus chooses a transfer function $\beta_t: [c, \bar{p}]^2 \to R_+$, implying that the transfer to be made to the politician is $\beta_t(p_t, \hat{p}_t)$.

A monetary transfer exposes politicians and interest groups to the possibility of legal sanctions and, thus, is not fully efficient (Laffont & Tirole, 1991). The politician can only receive some portion of the transfer due to transfer costs. Let $\mu \in [0,1]$ denote the rate of the monetary transfer received by the politician. In a more transparent and less corrupt political system, it will be more complex and more costly for the politician to receive a monetary

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politics inherent in the legal instruments that constitute and govern the agency (formal political independence of IRA). For example, Fernández-i-Marín et al. (2016) find evidence of the significant prevalence of political ties among IRA members, which supports that IRAs are not entirely independent from elected politicians. In a recent paper, Englmaier et al. (2017) demonstrate the control of politicians over electricity prices by providing evidence that the price of electricity is adjusted in response to electoral cycles in Germany. That is, electricity prices systematically decrease in the run-up to elections, and the price reduction is quickly reversed after the elections. Therefore, in this paper, we assume that the incumbent politician controls the regulatory agencies and the determination of the utility prices.

transfer from the interest group, and thus μ will take lower values. Therefore, μ depends on, and increases with, the level of corruption.

The politician's payoff in the period t, given as $[w + \mu\beta_t(p_t, \hat{p}_t)]$, comprises wage and ego rents from holding the office and the payment received from the interest group. The interest group's payoff in period t is displayed by $[(p_t - c)\theta - \beta_t(p_t, \hat{p}_t)]$, which is equal to the difference between the profit of the firms and the transfer made to the politician.

The sequence of the events is as follows. In each period $t \geq 1$:

1. The consumer sets a threshold price level $\hat{p}_t \in [c, \bar{p}]$ which specifies the consumer's re-election decision.

2. The interest group chooses a function $\beta_t: [c, \bar{p}]^2 \rightarrow R_+$ determining the transfer to be made to the politician. β_t can only be observed by the politician.

3. The politician chooses the utility price $p_t \in [c, \bar{p}]$, and then receives a payment of $\mu\beta_t(p_t, \hat{p}_t)$ from the interest group.

4. The election is held, and the consumer re-elects the politician if and only if $p_t \leq \hat{p}_t$.

Our equilibrium concept is the subgame perfect equilibrium in pure strategies. We focus on the stationary subgame perfect equilibria (SSPE), which requires players to act identically and optimally when faced with identical continuation games, implying history-independent strategies. Therefore, the consumer's stationary strategy can be represented by using a threshold price level $\hat{p} \in [c, \bar{p}]$ so that, in a given period, the politician is re-elected if and only if they choose the utility price no more than $\hat{p}$. The interest group's stationary strategy is a function $\beta: [c, \bar{p}]^2 \rightarrow R_+$ so that, in a given period, the transfer to be made to the politician can only depend on the utility price and the threshold price level in that period. In the politician's stationary strategy, the utility price in a given period can only depend on the transfer function of the interest group and the threshold price level in that period.

In the rest of this section, we first characterise the strategies of the politician, the interest group and the consumer in SSPE, respectively. Then, we analyse the outcome in SSPE, focusing on the impact of corruption on the utility price.

Given the consumer's threshold price level $\hat{p}$ and the interest group's transfer function β, the payoff of the politician from a stationary strategy that sets the utility price as p is the following.

$$V(p) = \begin{cases} \frac{\omega + \mu\beta(p,\hat{p})}{1-\delta} & if \; p \leq \hat{p} \\ \omega + \mu\beta(p,\hat{p}) & if \; p > \hat{p} \end{cases}$$

The politician faces a trade-off when choosing the utility price. If the politician wants to be re-elected, they will choose the utility price in the $[c, \hat{p}]$ interval which provides the highest transfer from the interest group (indicated by p^L). That is,

$$p^L \in arg \max_{p \in [c, \hat{p}]} \beta(p, \hat{p}).$$

In this case, the payoff of the politician will be equal to the following.

$$V(p^L) = \frac{\omega + \mu \beta(p^L, \hat{p})}{1 - \delta} \tag{1}$$

On the other hand, if the politician does not care about re-election, he will choose the price which yields the highest transfer from the interest group (indicated by p^H) which can be displayed as follows.

$$p^H \in argmax_{p} \beta(p, \hat{p})$$

In this case, the payoff of the politician will be equal to the following[8].

$$V(p^H) = \omega + \mu \beta(p^H, \hat{p}) \tag{2}$$

Note that, given $\hat{p}$, p^L is the maximum of $\beta(p, \hat{p})$ under the constraint that $p \in [c, \hat{p}]$, whereas p^H is its maximum in the domain. Accordingly, p^L cannot be greater than p^H. Given the consumer's threshold price level and the interest group's transfer function, the utility price that the politician sets in SSPE is described in Lemma 1.

Lemma 1: *In any SSPE, given the consumer's threshold price level $\hat{p}$ and the interest group's transfer function β, the politician chooses $p = p^H$ if $\beta(p^H, \hat{p}) \geq \frac{\delta w}{(1-\delta)\mu} + \frac{\beta(p^L, \hat{p})}{(1-\delta)}$ and $p = p^L$ otherwise.*

Proof: In SSPE, the politician compares the payoffs under p^L and p^H price levels and decides accordingly. The politician chooses $p = p^H$ if $V(p^H) \geq V(p^L)$ and $p = p^L$ otherwise. Equations (1) and (2) imply that $V(p^H) \geq V(p^L)$ if $\beta(p^H, \hat{p}) \geq \frac{\delta w}{(1-\delta)\mu} + \frac{\beta(p^L, \hat{p})}{(1-\delta)}$. ∎

Given the threshold price level $\hat{p}$, when choosing the transfer function, the interest group considers the profits of the firms at p^L and p^H price levels that the politician can choose and the transfers that should be made to the politician to set these prices. Therefore, the interest group selects the transfer function that induces the politician to choose the price

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[8] *Here, it is assumed that $\hat{p} < \bar{p}$ and $p^H > \hat{p}$. That is, when the politician chooses the price to maximise the transfer from the interest group, the politician will not be re-elected. When the SSPE is constructed, it is observed that this assumption holds. In other words, in SSPE, the price that maximises the transfer function on its domain is greater than the threshold price level set by the consumer.*

level, maximising its payoff. The transfer function of the interest group thus solves the following problem.

$$\max_{\beta(p,\hat{p})} (p-c)\theta - \beta(p,\hat{p})$$

$$s.t. \ p^L \in arg \max_{p\in[c,\hat{p}]} \beta(p,\hat{p})$$

$$p^H \in argmax_{p} \beta(p,\hat{p})$$

$$p \in arg \max_{p\in\{p^L,p^H\}} V(p)$$

Given the consumer's threshold price level $\hat{p}$, the following Lemma characterises the transfer function and the payoff of the interest group, and the utility price in SSPE when the interest group wants to induce the politician to choose p^L.

Lemma 2: *In any SSPE, given the consumer's threshold price level $\hat{p}$, if the interest group wants to induce the politician to choose p^L, then it selects the following transfer function.*

$$\beta(p,\hat{p}) = \begin{cases} 0 \ if \ p \in [c,\hat{p}] \\ \alpha \in \left[0, \frac{\delta\omega}{(1-\delta)\mu}\right) \ if \ p \in (\hat{p},\bar{p}] \end{cases}$$

Then, the politician chooses $p = \hat{p}$ and receives no payment from the interest group, is re-elected, and the interest group receives a payoff of $U^L = (\hat{p} - c)\theta$.

Proof: The interest group's payoff increases with p^L and decreases with the transfer made to the politician. Therefore, if a transfer function can induce the politician to choose the highest level of p^L (which is equal to $\hat{p}$) with no transfer, then it is the optimum transfer function for the interest group to induce the politician to choose p^L.

If the interest group selects the transfer function given in the Lemma, the politician will choose $p^L = \hat{p}$ because $\beta(p,\hat{p}) = 0$ for $p \in [c,\hat{p}]$ and thus the politician cannot be better off by choosing another price in the interval $[c,\hat{p}]$. Moreover, given $p^L = \hat{p}$ and $\beta(\hat{p},\hat{p}) = 0$, Lemma 1 implies that the interest group should make a transfer of at least $\frac{\delta w}{(1-\delta)\mu}$ to the politician in order to induce the politician to choose a price higher than $\hat{p}$. But since $\beta(p,\hat{p}) < \frac{\delta w}{(1-\delta)\mu}$ for $p \in (\hat{p},\bar{p}]$, the politician does not choose a price higher than $\hat{p}$. Consequently, the interest group can induce the politician to choose $\hat{p}$ (the highest value of p^L) with no transfer by using the transfer function given in the Lemma, and thus it is the optimum transfer function for the interest group to induce the politician to choose p^L. Consequently, the interest group will receive a payoff of $U^L = (\hat{p} - c)\theta$ since the politician chooses the utility price as $\hat{p}$ and receives no payment. ∎

Given the consumer's threshold price level $\hat{p}$, the following Lemma characterises the transfer function and the payoff of the interest group and the utility price in SSPE when the interest group wants to induce the politician to choose p^H.

Lemma 3: *In any SSPE, given the consumer's threshold level of price $\hat{p}$, if the interest group wants to induce the politician to choose p^H, then it selects the following transfer function.*

$$\beta(p,\hat{p}) = \begin{cases} 0 \; if \; p \in [c,\hat{p}] \\ \alpha \in \left[0, \frac{\delta\omega}{(1-\delta)\mu}\right) \; if \; p \in (\hat{p},\bar{p}) \\ \frac{\delta w}{(1-\delta)\mu} \; if \; p = \bar{p} \end{cases}$$

Then, the politician chooses $p = \bar{p}$ and receives a transfer of $\frac{\delta w}{(1-\delta)\mu}$ from the interest group and is not re-elected, and the interest group receives a payoff of $U^H = (\bar{p}-c)\theta - \frac{\delta w}{(1-\delta)\mu}$.

Proof: Lemma 1 and Lemma 2 imply that the interest group should make a transfer of at least $\frac{\delta w}{(1-\delta)\mu}$ to the politician in order to induce them to choose a price higher than $\hat{p}$ because the politician will not be re-elected in this case. The interest group's payoff increases with p^H and decreases with the transfer made to the politician. Therefore, if a transfer function can induce the politician to choose the highest possible price ($\bar{p}$) with a transfer of $\frac{\delta w}{(1-\delta)\mu}$, then it is the optimum transfer function to induce the politician to choose p^H. If the interest group selects the transfer function given in the Lemma, the politician chooses the price as $\bar{p}$ and receives a transfer of $\frac{\delta w}{(1-\delta)\mu}$, since the politician cannot reach a higher payoff by setting another price. Consequently, it is the optimum transfer function for the interest group to induce the politician to choose p^H. Then, the interest group receives a payoff of $U^H = (\bar{p}-c)\theta - \frac{\delta w}{(1-\delta)\mu}$ since the politician chooses the utility price as $\bar{p}$ and receives a transfer of $\frac{\delta w}{(1-\delta)\mu}$. ∎

Accordingly, given the consumer's threshold price level $\hat{p}$, the interest group decides on the utility price to induce the politician by comparing its payoffs under the prices $p^L = \hat{p}$ and $p^H = \bar{p}$. The price level that the interest group will induce the politician to choose in SSPE is described in Lemma 4.

Lemma 4: *In any SSPE, given the consumer's threshold level of price $\hat{p}$, the interest group induces the politician to choose the following price.*

$$p = \begin{cases} \hat{p} \ if \ \hat{p} \geq \bar{p} - \frac{\delta\omega}{(1-\delta)\mu\theta} \\ \bar{p} \ otherwise \end{cases}$$

Proof: Given the consumer's threshold level of price $\hat{p}$, if $U^L \geq U^H$, then the interest group induces the politician to choose the utility price as $\hat{p}$ in SSPE by selecting the transfer function given in Lemma 2. On the other hand, if $U^L < U^H$, then the interest group induces the politician to choose the utility price as $\bar{p}$ in SSPE by selecting the transfer function given in Lemma 3. Moreover, Lemma 2 and Lemma 3 imply that $U^L \geq U^H$ if $\hat{p} \geq \bar{p} - \frac{\delta w}{(1-\delta)\mu\theta}$. ∎

The consumer prefers lower to higher prices and thus wishes the interest group to induce the politician to set the lowest possible price. Besides, Lemma 4 indicates that there exist only two price levels, $\hat{p}$ and $\bar{p}$ with $\hat{p} \leq \bar{p}$, that the interest group can induce the politician to set. Therefore, as threshold price level, the consumer chooses the lowest price such that the interest group prefers to induce the politician to set price as $\hat{p}$ instead of $\bar{p}$. That is, as threshold price level, the consumer sets the lowest $\hat{p} \in [c, \bar{p}]$ satisfying the following condition.

$$\hat{p} \geq \left(\bar{p} - \frac{\delta\omega}{(1-\delta)\mu\theta} \right) \tag{3}$$

Proposition 1: *If $(\bar{p} - c)\theta \leq \frac{\delta w}{(1-\delta)\mu}$, then there exist SSPE with unique outcome in the game. In SSPE, the politician chooses $p = c$, receives no payment from the interest group and is re-elected.*

Proof: In this case, $\left(\bar{p} - \frac{\delta w}{(1-\delta)\mu\theta} \right) \leq c$, and thus the lowest threshold price level satisfying the condition given in equation (3) will be lower than or equal to the marginal cost of the utility. Therefore, for any $\hat{p} \in [c, \bar{p}]$, the interest group prefers to induce the politician to set $\hat{p}$ instead of $\bar{p}$ in SSPE, and thus selects the transfer function given in Lemma 2. Hence, the consumer sets the lowest possible price as the threshold price level, which is equal to c. Consequently, in SSPE, the politician sets the price as the marginal cost of the utility, receives no payment from the interest group and is re-elected. ∎

Note that $(\bar{p} - c)\theta$ represents the highest profit that can be obtained by the interest group in a given period. On the other hand, the term $\frac{\delta w}{(1-\delta)\mu}$ represents the minimum transfer that the interest group must offer to the politician to incentivise setting a price higher than $\hat{p}$. So, if $(\bar{p} - c)\theta \leq \frac{\delta w}{(1-\delta)\mu}$, then for any threshold price level $\hat{p} \in [c, \bar{p}]$ chosen by the consumer, it is not profitable for the interest group to induce the politician to set a price higher than $\hat{p}$. Hence, in this case, in SSPE, the consumer can induce the politician to set the utility price as the marginal cost of the utility.

We assume that $(\bar{p} - c)\theta > \frac{\delta w}{(1-\delta)\mu}$ in the rest of the paper. That is, in a given period, the highest profit that the firms can achieve is greater than the lowest transfer required to induce the politician to set a higher price than the threshold price level chosen by the consumer. Thus, if the consumer chooses $\hat{p} = c$, then the interest group prefers to induce the politician to choose the price as $\bar{p}$ instead of c.

Proposition 2: *If $(\bar{p} - c)\theta > \frac{\delta w}{(1-\delta)\mu}$, then there exist SSPE with unique outcome in the game. In SSPE, the politician chooses $p^* = \bar{p} - \frac{\delta w}{(1-\delta)\mu\theta}$, receives no payment from the interest group and is re-elected.*

Proof: In this case, $\left(\bar{p} - \frac{\delta w}{(1-\delta)\mu\theta}\right)$, the lowest threshold price level satisfying the condition given in equation (3), is in the interval $(c, \bar{p}]$. Hence, in SSPE, the consumer sets $\hat{p} = \bar{p} - \frac{\delta w}{(1-\delta)\mu\theta}$ and the interest group chooses the transfer function given in Lemma 2. In SSPE, the politician chooses the utility price $p^* = \bar{p} - \frac{\delta w}{(1-\delta)\mu\theta}$ and accordingly receives no payment from the interest group and is re-elected. ∎

Having constructed the equilibrium, we now examine its implications. The following proposition states the impact of corruption on the utility price.

Proposition 3: *In SSPE, the utility price increases with the level of corruption.*

Proof: Since μ increases with the level of corruption, the proposition implies that p^* increases with μ. The derivative of p^* with respect to μ is equal to $\frac{\delta w}{(1-\delta)\theta\mu^2}$ and it is positive since δ, w, θ and μ are all positive. Therefore, the utility price in SSPE increases with the level of corruption. ∎

Note that the discount factor of the politician (δ), the wage and ego rents that the politician receives from holding the office (w), and the consumer's demand for the utility (θ) also affect the price of the utility in SSPE, together with the level of corruption. The utility's equilibrium price decreases with the politician's discount factor and with the wage and ego rents that the politician receives from holding the office but increases with the consumer's demand for the utility.

4. The Empirical Model and Analysis

The empirical model employed in this study is derived from the theoretical framework developed in the preceding section. This framework, rooted in game theory, analyses the interaction among politicians, interest groups, and consumers in determining utility prices, postulating that higher levels of corruption correlate with higher utility prices. To empirically test this hypothesis, we construct an econometric model reflecting this

theoretical prediction. The model aims to quantify the impact of corruption on electricity prices while controlling for other relevant factors that might influence these prices. These factors include regulatory reforms, per capita GDP, fuel costs, net electricity production, and transmission and distribution losses. Their inclusion is informed by both their theoretical relevance, as discussed in the literature review, and their empirical significance, as evidenced by prior studies such as Steiner (2000), Zhang et al. (2002), Hattori and Tsutsui (2004), Nagayama (2007), Estache et al. (2009), Erdogdu (2011), Fiorio and Florio (2013), Hyland (2016), Kaller et al. (2018), and Ahmed and Bhatti (2019).

The empirical model is encapsulated in the following equation:

$$y_{it} = \alpha + X'_{it}\beta + \mu_i + \lambda_t + v_{it} \tag{4}$$

where y_{it} denotes the industrial and residential electricity prices, and *X* encompasses relevant explanatory variables: a corruption indicator, per capita GDP, the cost of fuels used in electricity production, net electricity production, transmission and distribution losses, alongside an array of regulatory reform indicators. Within this framework, μ_i represents the unobservable time-invariant country-specific effect, λ_t the unobservable time-specific effect and v_{it} the disturbance term. The subscripts *i* and *t* respectively signify the country and the period under consideration.

The regulatory reform variables selected for inclusion in our econometric model align with those conventionally utilised in analysing the impact of regulatory reforms on utility prices. This selection is grounded in the precedent seminal works in the field (see Steiner, 2000; Zhang et al., 2002; Hattori & Tsutsui, 2004; Nagayama, 2007, among others). The following regulatory reform measures are formed as dummy variables:

1) *Existence of independent power producers (IPPs)*: We assume the presence of IPPs from the time the first one starts operating in a market.
2) *Privatisation*: This variable is defined as the initiation of privatisation within the generation segment. It is indicated by the sale of government-owned assets to private companies.
3) *Unbundling of generation from transmission*: Following the framework suggested by Nagayama (2007), we consider unbundling to have occurred with the legal separation of transmission system operations within any state or province of a country.
4) *Existence of a wholesale electricity market*: We assume the presence of a wholesale electricity market in a country when at least one of its provinces or states has established such a market.
5) *Establishment of a regulatory agency*: This is assumed to exist within a country when an independent regulatory authority is dedicated explicitly to overseeing the electricity sector.

6) *Introduction of retail competition*: The enactment of legislation that allows consumer groups in the retail electricity market to select their suppliers is used to indicate this measure.

4.1. Sampling and Data

The empirical analysis employs a panel dataset encompassing 441 observations from 21 OECD countries from 1995 to 2015. The time frame is dictated by data availability, with 1995 serving as the starting point of the Corruption Perceptions Index (CPI) in that year. The sample encompasses Austria, Belgium, Canada, Czech Republic, Finland, Germany, Hungary, Ireland, Israel, Italy, Japan, Korea, Mexico, Netherlands, Poland, Portugal, Slovak Republic, Spain, Türkiye, the United Kingdom, and the United States. Countries with insufficient data on electricity prices and fuel costs are omitted from the analysis. The panel is unbalanced due to some missing observations.

Dependent variables in this study, industrial and residential electricity prices inclusive of taxes, are derived from various editions of the Energy Prices and Taxes report by the International Energy Agency. The primary independent variable under scrutiny is the corruption level, represented by the Corruption Perceptions Index (CPI) from Transparency International, ranging from 0 (highly corrupt) to 100 (very clean). Additional independent variables include per capita GDP (sourced from the World Development Indicators database of the World Bank), fuel costs (steam coal and natural gas prices are weighted based on their share in electricity production, with price data from Energy Prices and Taxes and shares in production from the World Development Indicators database of the World Bank), net electricity production (excluding power plant self-consumption, sourced from the International Energy Agency's Electricity Information database), and transmission and distribution losses (comprising all losses in electrical energy transport and distribution, as well as transformer losses not integral to power plants, sourced from International Energy Agency's Electricity Information database). The regulatory reform data is gathered from various national and international energy regulator websites, with each reform measure assigned a binary value (1 for implementation, 0 otherwise).

Table: 1
Descriptive Statistics

	Observation	Mean	Std. Dev.	Min	Max
Industrial price (USD/MWh)	422	118,4	45,1	51,7	330,0
Residential price (USD/MWh)	434	190,9	66,0	78,0	369,1
Corruption Perceptions Index (CPI)	435	64,3	18,2	26,6	100,0
Per capita GDP (USD)	441	31.592	14.944	7.652	70.116
Fuel costs (USD/MWh)	441	17,3	8,4	2,9	46,1
Net electricity production (GWh)	441	401.936	826.503	16.818	4.190.552
Losses (GWh)	441	26.751	51.621	515	269.162
IPPs	441	0,97	0,17	0	1
Privatisation	441	0,85	0,35	0	1
Unbundling	441	0,76	0,43	0	1
Wholesale market	441	0,65	0,48	0	1
Regulatory agency	441	0,83	0,37	0	1
Retail competition	441	0,67	0,47	0	1

Table 1 presents descriptive statistics for the dependent and independent variables. Electricity prices, GDP per capita and fuel costs are adjusted for inflation and converted to 2010 U.S. dollars for each country using consumer price indices and exchange rates from OECD statistics.

4.2. Analysis

In our analytical framework, we assume the presence of country-specific effects. Additionally, we integrate time-specific effects to account for standard cyclical components in prices. As explained by Greene (2012), choosing between fixed effects (FE) and random effects (RE) models depends on whether the individual effect is related to the variables we are studying or not. We use the RE model when the individual effect is unrelated to these variables. On the other hand, we use the FE model when there is a connection between the individual effect and any of the variables. Our study conducted a Hausman-type test to determine which model works best for our analysis.

Table: 2
Estimation Results

	(1)	(2)	(3)	(4)
	Log of IP	Log of IP	Log of RP	Log of RP
	FE	FE (DK)	FE	FE (DK)
Log of CPI	-0,129*	-0,129*	-0,298***	-0,298***
	(0,072)	(0,074)	(0,063)	(0,042)
Log of per capita GDP	0,544***	0,544***	0,467***	0,467***
	(0,080)	(0,072)	(0,068)	(0,064)
Log of fuel costs	0,192***	0,192***	0,079**	0,079*
	(0,038)	(0,032)	(0,033)	(0,041)
Log of net electricity production	-0,480***	-0,480***	-0,384***	-0,384***
	(0,081)	(0,069)	(0,070)	(0,087)
Log of losses	0,010	0,010	-0,237***	-0,237**
	(0,055)	(0,036)	(0,048)	(0,092)
IPPs	0,027	0,027	-0,118**	-0,118***
	(0,062)	(0,038)	(0,054)	(0,022)
Privatisation	-0,032	-0,032	0,035	0,035
	(0,034)	(0,038)	(0,030)	(0,036)
Unbundling	0,096***	0,096**	0,113***	0,113***
	(0,034)	(0,034)	(0,030)	(0,024)
Wholesale market	-0,095***	-0,095***	-0,051**	-0,051***
	(0,029)	(0,023)	(0,025)	(0,015)
Regulatory agency	0,033	0,033	0,045	0,045*
	(0,039)	(0,040)	(0,034)	(0,026)
Retail competition	-0,052	-0,052*	-0,037	-0,037**
	(0,032)	(0,025)	(0,028)	(0,017)
Constant	4,868***	4,868***	8,297***	8,297***
	(1,055)	(0,979)	(0,908)	(1,187)
Number of observations	416	416	428	428

Notes: Variables, except for dummies, are expressed in natural logarithms.
IP: Industrial Price, RP: Residential Price.
FE (DK) denotes the Fixed Effects Model with Driscoll and Kraay standard errors.
Standard errors are indicated in parentheses.
Significance levels: ***, **, and * correspond to 0,01; 0,05; and 0,1 levels, respectively.

We detect heteroscedasticity and autocorrelation in the residuals of the FE model's estimates, with the residuals also correlated across individuals. To overcome this problem, we estimate the FE model with Driscoll and Kraay (DK) standard errors. Then, we ran the Hausman-type test proposed by Hoechle (2007) for FE models, which is robust to general

forms of cross-sectional and temporal dependence. According to the results of this test, the null hypothesis of the RE model is rejected against the alternative of the FE model. Hence, we use the estimates of the FE model with Driscoll and Kraay standard errors.

4.3. Results and Discussion

The estimation results are depicted in Table 2. The results of the industrial price equation for the fixed effects model with Driscoll and Kraay standard errors indicate that the CPI exhibits a statistically significant negative coefficient at the 0,1 level. This coefficient suggests a 1% increase in the CPI correlates with a 0,13% decrease in industrial electricity prices. Interpreting this negative association, it becomes evident that higher corruption leads to higher industrial electricity prices, as inferred from lower CPI scores.

The analysis of the regulatory reform variables reveals a positive correlation between the unbundling of generation from transmission and industrial electricity prices, significant at the 0,05 level. This finding suggests that such unbundling initiatives contribute to elevating industrial electricity prices. Conversely, the presence of a wholesale market, significant at the 0,01 level, appears to exert a downward pressure on these prices. Similarly, introducing a retail market is associated with reduced industrial electricity prices. Other reform variables did not demonstrate a significant impact within this model.

Additional variables, namely per capita GDP, fuel costs, and net electricity production, exhibit significant relationships at the 0,01 level with industrial electricity prices. A rise in per capita GDP is linked with higher industrial electricity prices, presumably attributable to augmented demand. Fuel cost increases correspond with increased industrial electricity prices, indicative of heightened production costs. Conversely, an augmentation in net electricity production is associated with reduced industrial electricity prices, likely due to an expanded supply. Within the scope of the investigated variables, transmission and distribution losses are not statistically associated with significant variations in industrial electricity prices.

The residential electricity price analysis reveals a parallel trend with the CPI. As the CPI increases by 1%, residential electricity prices experience a reduction of 0,3%. This outcome aligns with the findings of Kaller et al. (2018), affirming the hypothesis that heightened corruption levels lead to increased residential electricity prices. All reform variables, except privatisation, significantly impact residential electricity prices. The introduction of IPPs, the existence of a wholesale electricity market, and the introduction of a retail market are observed to diminish residential electricity prices. In contrast, the unbundling of generation from transmission and the establishment of a regulatory agency correlate with increased residential electricity prices.

The impacts of per capita GDP, fuel costs, and net electricity production on residential electricity prices mirror those observed in the industrial sector. Increased per capita GDP and fuel costs result in elevated residential electricity prices, while increased net

electricity production leads to price reductions. Notably, residential electricity prices decrease as transmission and distribution losses increase, a phenomenon that, as Nagayama (2007) suggests, may indicate the inability to transfer these losses to consumer prices.

While primarily focused on the impact of corruption on utility prices, our analysis also allows for a comparative assessment with existing studies on the effects of regulatory reforms in the electricity sector. In our empirical investigation, corruption significantly negatively influences electricity prices, both for industrial and residential sectors. This finding aligns with the broader literature, reinforcing that increased corruption corresponds to higher utility prices. Simultaneously, our study offers insights into the impacts of regulatory reforms, with observations that align yet differ in certain respects from previous findings. Specifically, we note that the presence of wholesale and retail markets, IPPs, and regulatory agencies exhibit varied effects on electricity prices. This pattern reflects the mixed outcomes reported in other empirical studies, as summarised in Table 3. A particularly consistent observation across these studies is that simply unbundling electricity market operations does not always result in lower prices. On the contrary, it often leads to price increases. This phenomenon emphasises the complexity of regulatory reforms and highlights the critical need for tailoring these reforms to the specific economic and regulatory contexts of individual countries. Our study, therefore, contributes to understanding how corruption influences utility prices and provides more details about the effectiveness of regulatory reforms in the electricity sector.

Table: 3
Summary of Studies on the Impact of Regulatory Reforms on Electricity Prices

Reform Variable	Industrial Price		Residential Price	
	Positive (+)	Negative (-)	Positive (+)	Negative (-)
IPPs		Erdogdu(2011) Ahmed & Bhatti (2019)	Fiorio & Florio (2013)	Our result Ahmed & Bhatti (2019)
Privatisation	Steiner (2000) Estache et al. (2009) Erdogdu (2011)	Hattori & Tsutsui (2004) Nagayama (2007)	Estache et al. (2009) Erdogdu (2011) Fiorio & Florio (2013)	Nagayama (2007)
Unbundling	Our result Erdogdu (2011) Hyland (2016)		Our result Nagayama (2007) Erdogdu (2011) Kaller et al. (2018)	
Wholesale Market	Hattori & Tsutsui (2004) Nagayama (2007) Ahmed & Bhatti (2019)	Our result Steiner (2000) Erdogdu (2011) Hyland (2016)	Kaller et al. (2018)	Our result Erdogdu (2011) Bacchiocchi et al. (2015)
Regulatory Agency		Erdogdu (2011)	Our result Nagayama (2007)	Erdogdu (2011)
Retail Competition		Our result Hattori & Tsutsui (2004)	Erdogdu (2011) Fiorio & Florio (2013)	Our result Nagayama (2007)

5. Conclusion

This study investigates the effects of corruption on utility prices, with a specific focus on electricity. We develop a theoretical model based on game theory, examining the interplay between government, firms, and consumers in setting utility prices. The model posits that higher levels of corruption lead to increased utility prices, a hypothesis we empirically validate using data from the electricity sectors of 21 OECD countries between

1995-2015. Our findings reveal that corruption correlates with higher electricity prices in both industrial and residential sectors.

Additionally, the study examines the effects of regulatory reforms on electricity prices, revealing a complex and inconsistent relationship. We observe varied effects: Certain reforms, such as introducing wholesale and retail markets, generally decrease prices, whereas others, like the unbundling of electricity generation from transmission, lead to price hikes. Introducing IPPs is associated with reduced residential electricity prices, but establishing a regulatory agency is linked to increased residential prices. These findings highlight the heterogeneity of regulatory reforms' impact, emphasising the need for country-specific policy approaches.

In our empirical evaluation of the various factors affecting electricity prices, we have identified political corruption as a significant influencing element. This underscores the importance of combating corruption, not only for ethical reasons and its negative implications on economic growth (Mauro, 1995; Treisman, 2000), income distribution (Johnston, 1989; Li et al., 2000), and public spending in sectors like education and health (Gupta et al., 2001; Lewis, 2006), but also due to its direct effect on escalating utility prices.

To effectively combat the influence of corruption on electricity prices and ensure equitable and efficient utility services, we align with the World Bank's recommendations (World Bank, 2009). Implementing mechanisms to improve transparency in the utility sector is a vital first step. Equally crucial is holding corrupt officials accountable. Additionally, establishing robust regulatory frameworks, empowering independent regulatory bodies, and fostering competition in electricity markets are essential for deterring regulatory capture, often linked to corruption. Involving the public in decision-making processes and facilitating independent oversight are vital strategies for monitoring and reducing corruption. Adopting international standards and best practices in utility regulation and management also plays a significant role in combating corruption.

Our study broadens the understanding of the corruption-utility price nexus, particularly in OECD countries where corruption is less prevalent yet still impactful. This expands the focus of corruption studies, traditionally concentrated on developing countries, to include corruption's subtle but significant effects in varied economic contexts. It suggests that corruption can significantly influence utility prices even in economies with comparatively low corruption levels. However, our results necessitate cautious interpretation due to the lower corruption levels in the countries studied. We recommend further investigations encompassing a broader spectrum of developmental categories and diverse economic and geographical contexts. Such comprehensive analyses are crucial for deepening our understanding of the corruption-utility price relationship and formulating more general conclusions.

This study focuses solely on the impact of corruption on utility prices, reflecting utility services' affordability. Recognising the constraints in data availability and accuracy,

it is suggested that future research should broaden its scope. They should investigate how corruption affects other critical dimensions of utility services, such as quality and accessibility, to provide a more comprehensive understanding of corruption's overall impact on the utility sector.

In conclusion, through its theoretical framework and empirical evidence, this study highlights the importance of anti-corruption measures in influencing utility prices. These measures are crucial not only for ethical and economic reasons but also due to their significant impact on the affordability of utilities. Addressing corruption in the utility sector, especially in electricity markets, requires a multifaceted strategy. This strategy should encompass regulatory reforms, market competition enhancement, and a commitment to transparency and public accountability. By adopting such an approach, governments can achieve fair pricing for consumers and significantly improve the overall efficiency and sustainability of the utility sector.

References

Ahmed, T. & A.A. Bhatti (2019), "Do power sector reforms affect electricity prices in selected Asian countries?", *Energy Policy*, 129, 1253-1260.

Bacchiocchi, E. et al. (2015), "Asymmetric effects of electricity regulatory reforms in the EU15 and in the New Member States: Empirical evidence from residential prices 1990-2011", *Utilities Policy*, 35, 72-90.

Baron, D.P. (1994), "Electoral Competition with Informed and Uninformed Voters", *American Political Science Review*, 88(1), 33-47.

Barro, R.J. (1973), "The Control of Politicians: An Economic Model", *Public Choice*, 14(1), 19-42.

Boehm, F. (2007), "Regulatory Capture Revisited-Lessons From Economics of Corruption", Internet Centre for Corruption Research (ICGG) *Working Paper*, No: 22.

Chang, C.P. et al. (2018), "Is higher government efficiency conducive to improving energy use efficiency? Evidence from OECD countries", *Economic Modelling*, 72, 65-77.

Dal Bo, E. & M. Rossi (2007), "Corruption and Inefficiency: Theory and Evidence From Electric Utilities", *Journal of Public Economics*, 91(5-6), 939-962.

Dal Bo, E. (2006), "Regulatory Capture: A Review", *Oxford Review of Economic Policy*, 22(2), 203-225.

Englmaier, F. et al. (2017), "Power Politics: Electoral Cycles in German Electricity Prices", *Annual Conference 2017 (Vienna): Alternative Structures for Money and Banking*, 168267, Verein für Socialpolitik / German Economic Association.

Erdogdu, E. (2011), "The Impact of Power Market Reforms on Electricity Price-Cost Margins and Cross-Subsidy Levels: A Cross Country Panel Data Analysis", *Energy Policy*, 39(3), 1080-1092.

Estache, A. & E. Kouassi (2002), "Sector Organization, Governance, and the Inefficiency of African Water Utilities", World Bank Policy Research *Working Paper* No: 2890.

Estache, A. et al. (2006), "Telecommunications Performance, Reforms, and Governance", World Bank Policy Research *Working Paper* No: 3822.

Estache, A. et al. (2009), "Utilities Reforms and Corruption in Developing Countries", *Utilities Policy*, 17(2), 191-202.

Ferejohn, J. (1986), "Incumbent Performance and Electoral Control", *Public Choice*, 50(13), 5-25.

Fernández-i-Marín, X. et al. (2016), "Are Regulatory Agencies Independent in Practice? Evidence from Board Members in Spain", *Regulation and Governance*, 10(3), 230-247.

Fiorio, C.V. & M. Florio (2013), "Electricity Prices and Public Ownership: Evidence from the EU15 over Thirty Years", *Energy Economics*, 39, 222-232.

Greene, W.H. (2012), *Econometric Analysis*, Boston and London: Pearson, 7th edition.

Grossman, G.M. & E. Helpman (1994), "Protection for Sale", *American Economic Review*, 84(4), 833-850.

Grossman, G.M. & E. Helpman (1996), "Electoral Competition and Special Interest Politics", *The Review of Economic Studies*, 63(4), 265-286.

Gupta, S. et al. (2001), "Corruption and the Provision of Health Care and Education Services", in: A.K. Jain (ed.), *The Political Economy of Corruption*, New York: Routledge.

Hanretty, C. & C. Koop (2013), "Shall the law set them free? The formal and actual independence of regulatory agencies", *Regulation and Governance*, 7(2), 195-214.

Hattori, T. & M. Tsutsui (2004), "Economic Impact of Regulatory Reforms in the Electricity Supply Industry: A Panel Data Analysis for OECD Countries", *Energy Policy*, 32(6), 823-832.

Hoechle, D. (2007), "Robust Standard Errors for Panel Regressions with Cross-Sectional Dependence", *The Stata Journal*, 7(3), 281-312.

Hyland, M. (2016), "Restructuring European electricity markets-A panel data analysis", *Utilities Policy*, 38, 33-42.

Imam, M.I. et al. (2019), "Sector reforms and institutional corruption: Evidence from electricity industry in Sub-Saharan Africa", *Energy Policy*, 129, 532-545.

Jain, A.K. (2001), "Corruption: A Review", *Journal of Economic Surveys*, 15(1), 71-121.

Johnston, M. (1989), "Corruption, Inequality, and Change", in: P.M. Ward (ed.), *Corruption, Development and Inequality: Soft Touch or Hard Graft*, New York: Routledge.

Kaller, A. et al. (2018), "The impact of regulatory quality and corruption on residential electricity prices in the context of electricity market reforms", *Energy Policy*, 123, 514-524.

Laffont, J.J. & J. Tirole (1991), "The Politics of Government Decision-making: A Theory of Regulatory Capture", *The Quarterly Journal of Economics*, 106(4), 1089-1127.

Lewis, M. (2006), "Governance and Corruption in Public Health Care Systems", Center for Global Development *Working Paper*, No: 78.

Li, H. et al. (2000), "Corruption, Income Distribution, and Growth", *Economics and Politics*, 12, 155-182.

Liu, J. et al. (2023), "Corruption induced energy inefficiencies: Evidence from China's energy investment projects", *Energy Policy*, 183, 113825.

Mauro, P. (1995), "Corruption and Growth", *Quarterly Journal of Economics*, 110 (3), 681712.

Nagayama, H. (2007), "Effects of Regulatory Reforms in the Electricity Supply Industry on Electricity Prices in Developing Countries", *Energy Policy*, 35(6), 3440-3462.

Nagayama, H. (2009), "Electric Power Sector Reform Liberalization Models and Electric Power
Prices in Developing Countries: An Empirical Analysis Using International Panel Data",
Energy Economics, 31(3), 463-472.

Pigou, A.C. (1932), *The Economics of Welfare*, Fourth Edition 1932, reprinted 1960, London:
MacMillan.

Steiner, F. (2000), "Regulation, Industry Structure, and Performance in the Electricity Supply
Industry", OECD Economics Department *Working Papers*, No. 238.

Stigler, G.J. & C. Friedland (1962), "What Can Regulators Regulate? The Case of Electricity", *The
Journal of Law and Economics*, 5, 1-16.

Stigler, G.J. (1971), "The Theory of Economic Regulation", *The Bell Journal of Economics and
Management Science*, 2(1), 3-21.

Thatcher, M. (2005), "The Third Force? Independent Regulatory Agencies and Elected Politicians in
Europe", *Governance: An International Journal of Policy, Administration, and
Institutions*, 18(3), 347-373.

Treisman, D. (2000), "The Causes of Corruption: A Cross-National Study", *Journal of Public
Economics*, 76(3), 399-457.

World Bank (2009), *Deterring Corruption and Improving Governance in the Electricity Sector*,
Energy, Transport & Water Department and Finance, Economics & Urban Department.

Wren-Lewis, L. (2015), "Do infrastructure reforms reduce the effect of corruption? Theory and
evidence from Latin America and the Caribbean", *The World Bank Economic Review*,
29(2), 353-384.

Zhang, Y.F. et al. (2002), "Electricity Sector Reform in Developing Countries: An Econometric
Assessment of the Effects of Privatization, Competition and Regulation", Centre on
Regulation and Competition-Manchester, Institute for Development Policy and
Management *Working Paper*, No. 31.

Solar Energy Production and Economic Growth: An Analysis for EU Countries

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Güneş Enerjisi Üretimi ve Ekonomik Büyüme: AB Üyesi Ülkeler İçin Bir İnceleme

Abstract

Producing and consuming solar energy as a clean energy resource in economies has gained importance. The importance of solar energy is based on reducing costs due to technological developments. Responsive to whether the contribution of investing in solar energy to reach proclaimed new development strategies in the EU Green Deal has been one of the critical indicators for policymakers nowadays. In this context, this paper analysed the impacts of solar energy production on the economic growth of EU member countries. After the analysis, using a two-way fixed effects model and Driscoll-Kraay standard errors 2018-2021, solar energy production's positive and statistically significant effects on economic growth were found.

Keywords   :   Solar Energy, Economic Growth, EU Economies, Green Economy, European Green Deal.

JEL Classification Codes :   Q2, Q5.

Öz

Temiz bir enerji kaynağı olarak güneş enerjisinin kullanımı ve güneş enerjisinin ekonomiler üzerindeki etkisi gün geçtikçe artmaktadır. Bu artışı belirleyen temel faktör ise son yıllarda gelişen teknoloji ile birlikte güneş enerjisinin maliyetlerinde gerçekleşen belirgin düşüştür. Güneş enerjisinin Avrupa Yeşil Mutabakatında açıklanan yeni büyüme stratejisine katkı sağlayıp sağlamayacağı politika yapıcıların cevap bulmaya çalıştığı soruların başında gelmektedir. Bu bağlamda çalışmada AB üyesi ülkelerde güneş enerjisi üretiminin ekonomik büyüme üzerindeki etkisi incelenmiştir. 2018-2021 döneminin iki-yönlü sabit etkiler modeli ve Driscoll-Kraay standart hataları ile ele alındığı çalışmada, güneş enerjisi üretiminin ekonomik büyüme üzerinde pozitif ve istatiksel olarak anlamlı bir etkisi olduğu sonucuna ulaşılmıştır.

Anahtar Sözcükler   :   Güneş Enerjisi, Ekonomik Büyüme, AB Ekonomileri, Yeşil Ekonomi, Avrupa Yeşil Mutabakatı.

1. Introduction

Energy sources are one of the main inputs for realising economic development targets. Nevertheless, non-renewable energy sources damage the environment and cause global climate change. The damage caused by global climate changes to national economies has resulted in a profound revision of development policies. The EU took the first concrete initiative through the European Green Deal, which was approved in December 2019 and proclaimed that it would adopt a new economic development policy to prevent the developmental issues of global climate change (European Commission, 2019). Following the recent economic growth strategy, the EU has confirmed that the targets of Europe will be reaching the first climate-neutral continent by 2050 and reducing carbon emissions by a minimum of 55% in 2030 compared to the 1990s. The new environment-friendly development targets of the EU have become binding for member countries since the enactment of the European Climate Law in July 2021(European Commission, 2021).

The member countries have become more interested in renewable energy sources to achieve the EU's targets. The main factor in using renewable energy sources is the cost of these sources. One of the renewable energy sources, solar energy cost, especially in PV (solar PV), has been consistently reducing since the beginning of the 2010s (Kougias et al., 2021: 2). These cost advantages have made solar energy more strategic than ever. Thus, solar PV products reached the highest growth rate between 2013 and 2020 (Al-Shetwi, 2021: 6). In 2019, solar and wind energy sources reached the most increased new energy production for the first time worldwide (European Commission, 2020: 5). While solar PV constituted 43% of renewable energy investments in 2020, wind energy accounted for 47% (IRENA, 2023: 15). In 2021, solar PV and wind energy continued to be the dominant new renewable energy investments, and the sharing of solar PV and wind energy constituted 56% and 40% of the all-new renewable energy investments. Moreover, more than 10% of global electricity production will come from solar and wind energy sources in 2021 (REN21, 2022: 175). Specifically, in the EU, photovoltaic energy has been the second most growing renewable energy source after wind energy (Wolniak & Skotnicka-Zasadzien, 2022: 5). As Borawkski et al. (2022) indicated, solar energy will catalyse the growth of renewable energy sources. In this context, although Germany has been a leader in the solar installed capacity among EU member countries, the share of other members has steadily been rising. The same growth trends may be observable in the share of solar energy sources in electricity production in EU member countries (European Commission, 2022).

The evaluation of the role of solar energy looks inevitable because of its growing importance worldwide, specifically in EU countries. The primary objective of this paper is to explore the potential contribution of solar energy production to the economic growth of EU countries within this context. Accomplishing this has the potential to make a meaningful impact on the current literature in three distinct ways. Firstly, it has the potential to contribute to the ongoing discussions regarding integrating solar energy into the economic growth strategy of the European Green Deal. Secondly, the European Green Deal has developed as a policy goal to achieve climate neutrality throughout the continent by 2050. Assessing solar

energy's impact on economic growth as a renewable energy source is essential for realising this policy implication. The findings could prove beneficial for policymakers and practitioners in shaping policy priorities. Finally, and in conclusion, despite the increasing body of literature regarding the relationship between renewable energy and economic growth, there remains a scarcity of comprehensive research examining the impact of solar energy generation on economic growth. This study tries to fill this gap and speculate the research relationship between solar energy and economic growth. To achieve this, the effect of solar energy production on economic growth will be analysed with a two-way fixed effects model and Driscroll-Kraay standard errors for EU member countries in 2018-2021.

This paper is organised as follows: The next part focuses on the debates in the existing literature. The third part gives details on the data set and methods. The fourth section interprets the empirical results of the analysis. Finally, a general evaluation will be made in the conclusion section.

2. Literature Review

After the sharp decline in production costs, the share of solar energy sources has increased in total renewable energy resources (Kabir et al., 2018: 898). This increase in solar-based energy has made investigating the relationship between solar energy and economic growth inevitable. Although the need to understand this relationship is critical, research is rarer than studies of renewable energy and economic growth. Despite the increasing number of studies addressing the relationship between renewable energy and economic growth for developed economies (Payne, 2009; Tugcu et al., 2012; Chang et al., 2015; Rafindadi & Ozturk, 2017; Behera & Mishra, 2020; Filiz-Baştürk, 2021), and developing economies (Sadorsky, 2009; Apergis & Payne, 2011a; Ocal & Aslan, 2013; Pau & Fu, 2013; Lin & Moubarak, 2014; Ozcan & Ozturk, 2019; Azam et al., 2021; Filiz Baştürk, 2022), separately and examining this relationship together for both country groups (Apergis & Payne, 2011b; Singh et al., 2019; Polat, 2021) they have yet to conclude common results. These reverse results in the literature are mainly due to differences between the covered periods, selected countries or groups, and set econometric methods (Ozturk, 2010).

As an illustration, Payne (2009) analysed the long-run relationships within developed economies, specifically focusing on the period from 1949 to 2006 for US data. The Toda-Yamamoto causality test was utilised in this study to assess the linkage between renewable-non-renewable energy consumption and economic growth. The Toda-Yamamoto causality test revealed no Granger causality association between renewable energy consumption and real GDP. The findings confirmed the neutrality hypothesis. Furthermore, Tugcu et al. (2012) examined the period from 1980 to 2009 in the G7 nations. Their investigation revealed a bidirectional causality between renewable energy consumption and economic growth based on the assumption of utilising the classical production function. Chang et al. (2015) conducted a study analysing renewable energy consumption and economic growth from 1990-2013, providing another example of a subject of G7 countries analysis. The results of this study demonstrate a causality between renewable energy consumption and

economic growth for all panels. A country-specific analysis confirmed the neutrality hypothesis for Germany, Italy, the US, and the UK. However, causality was found between renewable energy consumption and economic growth in France, Canada, and Japan. The research conducted by Rafinaldi and Ozturk (2017) investigated German quarterly data from 1971 to 2013. The findings revealed that a 1% increase in renewable energy consumption resulted in a 0.2194% boost in economic growth. In their study, Behera & Mishra (2020) examined the relationship between economic growth and non-renewable and renewable energy consumption in G7 countries. The analysis utilised data from the period 1990-2015. The results of their research present findings that contradict those mentioned in previous studies, indicating a negative impact of renewable energy consumption on economic growth after analysis. The research conducted by Filiz Baştürk (2021) yielded yet another contradictory outcome concerning the relationship between renewable energy consumption and economic growth. The study found no long-run relationship between these variables based on data from 1990-2017 for G7 countries.

Additionally, the literature consists of studies exploring developing nations' cases. According to Sadorsky's (2009) study, which analysed generalised data from developing countries, a 1% increase in real GDP per capita led to a 3.5% increase in renewable energy consumption per capita in the long run. In a separate study, Apergis and Payne (2011a) analysed data from 1990-2007 to examine the relationship between non-renewable and renewable electricity consumption and economic growth in 16 emerging markets. The findings of their study indicate a causality relationship between economic growth and renewable electricity consumption in the short run, whereas analysis reveals a bidirectional causality between the two variables in the long run. Also, Ocal & Aslan (2013) employed Türkiye-specific data from 1990-2010 to examine the causal relationship between renewable energy consumption and economic growth. The research findings suggest causality from economic growth to renewable energy consumption. The study conducted by Pao & Fu (2013) examined data from Brazil. Their research determined that a 1% rise in renewable energy consumption resulted in a 0.20% increase in economic growth. In their study, Lin and Moubarak (2014) found evidence of a bidirectional causality between renewable energy consumption and economic growth in China from 1977 to 2011. Ozcan & Ozcan's (2019) investigation relied on cross-country data encompassing 17 emerging markets from 1990 to 2016. The primary focus was to explore the association between renewable energy consumption and economic growth. The results of their research validated the neutrality hypothesis for all countries in the sample, apart from Poland. Moreover, the findings from the Polish data align closely with the arguments presented by the growth hypothesis. Azam et al. (2021) study has pointed out different aspects of investigating the relationship between renewable electricity generation and economic growth, and their analysis confirmed the feedback hypothesis by detecting bidirectional causality between variables in both short-run and long-run for 25 developing countries' data from 1990 to 2017 period. In her study, Filiz Baştürk (2022) examined the relationship between renewable energy consumption and economic growth among five emerging markets, Türkiye, Brazil, China, India, and Mexico,

from 1995-2007. The analysis confirmed the feedback hypothesis for Türkiye, China, and Mexico while validating the neutrality hypothesis for Brazil and India.

Moreover, a body of literature analysed the link between renewable energy consumption and economic growth in developed and developing economies. One of the studies that examined the connections between non-renewable and renewable energy consumption and economic growth for developed and developing economies from 1990 to 2017 is Aspergis & Payne's (2011b) research. The analysis concluded that bidirectional causality existed between variables in the short and long run. Another study examining the relationship between renewable energy production and economic growth in developed and developing countries is by Singh, Nyuur, and Richmond (2019). In this study, which covers the period 1995-2016, it is stated that renewable energy production affects positive and statistically significant economic growth for both country groups. According to Polat's (2021) work, the analysis confirmed the neutrality hypothesis between renewable energy consumption and economic growth for both groups of countries.

These confusing results can be found in studies on EU member countries. For example, Smolovic et al. (2020) divided all member countries into two groups, as new and former members. They found positive and statistically significant effects between renewable energy consumption and economic growth for both groups in the long run. Similarly, Armenau et al. (2017) claimed that primary renewable energy production positively affected GDP per capita for EU-28 countries. However, research by Menegaki (2011) did not find any granger causal relationship between renewable energy consumption and economic growth in 27 EU member countries. Also, Marques and Fuinhas (2012) indicated completely disparate conclusions and found negative effects of renewable energy sources on economic growth in 24 EU members. They explained these negative effects by the high-level opportunity costs of renewable energy subsidies. They also highlighted in their research conclusion the role of political justification rather than economic ones in the decision to develop renewable energy. This result may not be a surprise because the decline in wind and solar energy production costs started after 2010.

After the beginning of the sharp cost decline period in 2010, studies on the interactions between solar energy and economic growth have gained more importance. However, a few research studies have been done in the literature. Only limited-time relevant data could be available in many countries, which has been the main obstacle to the deepening of literature. On the other hand, simultaneously enriched available data sources and increasing solar energy investment will redound the rising number of quantitative and qualitatively convincing studies.

Like the confusing results of studies on renewable energy and economic growth, the studies specifically focused on solar energy on economic growth have not reached precise conclusions. For example, in a study focused on the impact of each renewable energy source on economic growth in EU countries, Busu (2020) found that each energy source (solar, wind, biomass, geothermal, and hydropower) positively affected economic growth.

However, Jaraite et al. (2017) used data from EU-15 countries and confirmed the positive impacts of solar and wind energy production on economic growth. However, this relationship was only possible in the short run, and the effects had yet to stimulate economic growth. Other research by Bulut and Apergis (2021) used US data for the 1984-2018 periods and centred on the impacts of solar energy consumption on GDP. Their analysis confirmed the statistically significant and positive relationship between solar energy consumption and economic growth. In his study, Koç (2021) reached the growth hypothesis about solar energy use impacts on economic growth, which covered 19 countries. Further, Yang and Kim (2020) examined a different point of view. They handled the relationship between producing electric energy from renewable sources and economic growth within the firm-based analysis. They generated two country groups for research: one cluster of countries based on solar PV producers' firms and the other on wind energy producers' firms. After the analysis, they found evidence of the growth hypothesis for Canada, the conservative hypothesis for China, and the feedback hypothesis for the US and Korea.

Additionally, some studies have shown that solar energy has a non-significant impact on economic growth. For instance, Ohler and Fetters (2014) examined the relationship between electricity generation from renewable energy sources and economic growth in 20 OECD countries. They found a one-way relationship between solar energy production and economic growth. The direction of the relationship was from economic growth to solar energy production. Bulut and Menegaki (2020) investigated the relationship between solar energy production and economic growth for ten countries with the highest solar power generation capacity as of 2017. They found statistically non-significant impacts of solar energy production on economic growth from 1999-2015. Their results showed no causal relationship between the two variables and confirmed the neutrality hypothesis. Similarly, Topcu and Dogan (2022) examined 11 leading countries in solar energy production and concluded that solar energy production was no effect on economic growth. When they looked at the causality relationship between the variables, they found a causality from economic growth to solar energy production.

Tablo: 1
Literature Review of Solar Energy and Economic Growth

Author(s)	Countries	Period	Methodology	Results
Ohler & Fetters (2014)	20 OECD Members	1990-2008	Panel ECM	Unidirectional relationship from economic growth to solar electricity generation
Jaraite et al. (2017)	15 EU Members	1990-2013	Panel ECM	Solar energy production affects economic growth in the short run, but not in the long run.
Busu (2020)	European Union	2004-2017	Panel ARDL	Solar energy production has a positive effect on economic growth
Bulut & Menegaki (2020)	Top 10 Countries	1999-2015	Panel Cointegration	Solar energy production does not affect GDP and has no causal relationship exists between solar energy production and GDP
Bulut & Apergis (2021)	USA	1984-2018	Cointegration	Solar energy consumption has a positive effect on the GDP
Koç (2021)	19 Countries	1990-2019	Fixed Effect, Random Effect, GMM	Solar energy use has a positive effect on the GDP
Topcu & Dogan (2022)	11 Leading Countries	2000-2019	Dynamic SUR	Solar energy production does not affect economic growth; unidirectional causality runs from economic growth to solar energy production.

Eventually, the limited number of studies in the literature have no consensus, and these studies have indicated different types of relationships between solar energy and economic growth. Table 1 highlights studies in the literature examining the relationship between solar energy and economic growth.

3. Data and Methodology

3.1. Data Set and Model Variables

Table 2 shows the variables and data sources used for this paper. The natural logarithm was used for all variables in the predicted model, and the analysis was made in Stata 16.0. The model used real GDP (constant 2015 US$) to show economic growth. It also used the total labour force as the labour force and gross fixed capital formation (constant 2015 US$) as the capital. Solar energy production data was derived from BP (2022). World Development Indicator data set from the World Bank (2022) used for real GDP, capital, and labour.

Table: 2
Definitions of Used Variables in the Analysis

Variables	Symbol	Source
Solar production (GWh)	lnsolar	BP Statistical Review of World Energy- all data, 1965-2021
Real GDP (constant 2015US$)	lnY	World Development Indicators (World Bank)
Labor force	lnL	World Development Indicators (World Bank)
Gross fixed capital formation (constant 2015 US$)	lnK	World Development Indicators (World Bank)

3.2. Model Specification

This paper examined the impact of solar energy on the economic growth of 26 EU member countries (the analysis did not include Malta's solar generation/production data because it was unavailable) by production function for the 2018-2021 period. Lutkephol (1982) warned of the possibility of omitted variables for two-variable analysis. The study used labour and capital variables to eliminate the risk of omitted variables (Payne, 2010: 730). The production function used in this paper is as follows:

$$Y = f(\text{solar}, L, K) \tag{1}$$

The log-linear model estimated in the study is as follows:

$$\ln Y_{i,t} = \alpha_0 + \beta_1 \ln \text{solar}_{i,t} + \beta_2 \ln L_{i,t} + \beta_3 \ln K_{i,t} + e_{i,t} \tag{2}$$

The *i* symbol indicates the country; also, *t* shows the period. α_0 is used to express the constant term. β_1, β_2, and β_3 represent solar, labour, and capital elasticity for output, respectively. Finally, e shows as the error term.

The hypothesis that was tested for analysis is as follows;

Hypothesis: Solar energy production has had a positive impact on economic growth.

3.3. Estimation Method

Panel data is characterised by the inclusion of cross-sectional data along with a time dimension. The standard representation of the panel data model is as follows (Yerdelen-Tatoğlu, 2018: 4):

$$Y_{it} = a_{it} + \beta_{it}X_{it} + u_{it} \qquad \text{i=1,.......,N;} \qquad \text{t=1,......,T} \qquad (3)$$

Here i: shows cross-section; t: shows time dimension; Y: shows dependent variable; X_k: independent variables; α: fixed parameter; β: slope parameters and u means error term. In most panel data applications, a one-way error component model addresses disturbances (Baltagi, 2013: 13).

$$u_{it} = \mu_i + v_{it} \qquad (4)$$

In here μ_i: shows the unobservable individual-specific effect and v_{it}: remainder disturbance.

The fixed effect model is estimated as one-way and two-way (Torres-Reyna, 2007: 18-19). In the one-way fixed effects model, μ_i are considered the fixed parameters that need to be estimated. It is assumed that the remaining disturbances v_{it} follow a stochastic, independent, and identically distributed IID (0, σ_v^2) (Baltagi, 2013: 14). As stated by Baltagi (2013: 14), it is postulated that X_{it} assumed to be independent of v_{it} for all i and t.

If we take into account Equation-3 as disturbances involving a two-way error component (Baltagi, 2013: 39);

$$u_{it} = \mu_i + \delta_t + v_{it} \qquad \text{(i=1,.........,N; t=1,......,T)} \qquad (5)$$

In here μ_i: shows the unobservable individual effect, δ_t: unobservable time effect, v_{it}: remainder stochastic disturbance term. Also δ_t, individual-invariant and time-specific effects that are not accounted for in the regression are considered. Given that μ_i and δ_t are the parameters to be estimated, and the disturbance $v_{it} \sim$ IID (0, σ_v^2) are stochastic, equation 5 can be seen as the error component model with two-way fixed effects. For all i and t, it is assumed that X_{it} is independent of v_{it} (Baltagi, 2013: 39).

Generally speaking, it can be expressed in the following manner. Only individual-specific variables could be included in a one-way fixed effects model. In contrast, it could be possible for both individual-specific and time-specific variables to enter into a two-way fixed effects model (Greene, 2002: 336). Equation (6) contains the one-way fixed effects model, and equation (7) shows the two-way fixed effects model (Baltagi, 2013: 15-40; Torres-Reyna, 2007: 18-19).

One-way fixed effects model:

$$Y_{it} = (a_i + \mu_i) + \beta X_{it} + v_{it} \quad \text{i = 1...n, T = 1.....T} \qquad (6)$$

Two-way fixed effects model:

$$Y_{it} = (a_i + \mu_i + \delta_t) + \beta X_{it} + v_{it} \quad i = 1\ldots n, \; T = 1\ldots.T \tag{7}$$

where:

Y_{it} : outcome variable

a_i : is the intercept term

X_{it} : is a vector of predictors

μ_i: unobservable individual-specific effect

δ_t : unobserveble time specific effect

v_{it} : ($v_{it} \sim$ IID $(0, \sigma_v^2)$)

β: model coefficients

In this paper, an estimation of the impacts of solar energy on economic growth is made using the fixed effects model for 26 EU member countries. Baltagi (2013: 14) indicated that the fixed effects model is an appropriate framework for searching specific N group situations, such as in EU or OECD member countries.

4. Empirical Results

Panel data analysis has problems with heteroskedasticity, cross-sectional dependence, and autocorrelation. These problems may occur individually, doubled, or all during estimation. These assumption violation problems of panel data analysis may create misleading outcomes (Croutzet & Dabbous, 2021: 1613; Dabbous & Tarhini, 2021: 63). Accordingly, autocorrelation, heteroscedasticity, and cross-sectional dependence were checked respectively in predicting the fixed effects model to avoid assumption violation problems. Firstly, Wooldridge's (2002) test was used to check the analysis's autocorrelation problem (AC). The results of the Wooldridge test (p-value = 0.211) confirmed as not a rejection of the H_0 hypothesis (H_0: no serial correlation). Secondly, Wald tests were used to check the heteroscedasticity problem (HC). After the outcomes of the modified Wald test results (p-value = 0.000), the H_0 hypothesis was rejected (H_0: no heteroscedasticity). This means heteroscedasticity according to cross-units. The Pesaran CD (2015) test was used to control cross-sectional dependence. Test results (p-value = 0.000) showed that the H_0 hypothesis (H_0: no cross-sectional dependence) was rejected, and the correlation between cross-units exists.

For decision-making, whether a model used in this paper is fit controlled via two tests, as in Dabbous and Tarhini (2021). First, the F-test allowed the choice between the pooled OLS and the fixed-effects model. Then, Hausman's (1978) test decided whether fixed

effects or random effects were valid. However, some details should be considered; the Hausman test is invalid in heteroskedasticity and autocorrelation problems. In that case, the robust Hausman test should be performed. For this reason, a robust Hausman test was performed because the model had an HC problem. According to the robust Hausman test result (p-value= 0.010), using the fixed-effects model was appropriate. Consistent with the robust Hausman test, the F test results (F (25,75) =105.12 and p-value=0.000) verify that the fixed-effects model fits the analysis.

The utilisation of a two-way fixed effects model was necessitated in this study by the COVID-19 pandemic. The two-way fixed effects model was predicted because time dummy variables are significant. The collective significance level of used time dummies was tested via a joint-F test. The test outcomes (p-value=0.000) confirmed that used time dummies have a collective significance level. Moreover, each time dummies have an individual significance level. After predicting the two-way fixed effects model, a control test was performed to determine whether existing HC and CD problems were still valid. While HC problems still occur according to the Modified Wald test outcome (p-value = 0.000), results of the Pesaran CD (2015) test (p-value = 0.812) showed eliminated CD problems. To adjust the HC problem, a two-way fixed effects model was estimated to be robust to HC. In addition, the two-way fixed effects model was estimated with Driscoll-Kraay's (1998) standard errors, which are robust to HC, AC, and CD problems, as Hoechle (2007) recommended. Estimation outcomes are shown in Table 3.

Table: 3
Regression Results

Dependent Variable: lnY	Fixed Effect (One-Way)	Fixed Effect (Two-Way)	Fixed Effect (Two-Way) Robust	Fixed Effect (Two-Way) Driscoll-Kraay
lnsolar	0.018** (0.008)	0.024*** (0.008)	0.024* (0.012)	0.024*** (0.002)
lnL	0.718*** (0.252)	0.418** (0.187)	0.418* (0.221)	0.418* (0.154)
lnK	0.054 (0.044)	-0.012 (0.034)	-0.012 (0.065)	-0.012 (0.053)
Constant	13.710*** (4.041)	19.883*** (3.046)	19.883*** (2.929)	19.883** (3.496)
Year Dummies				
2019		0.020*** (0.007)	0.020*** (0.004)	0.020** (0.004)
2020		-0.031*** (0.008)	-0.031*** (0.008)	-0.031*** (0.001)
2021		0.020** (0.009)	0.020* (0.010)	0.020** (0.003)
F statistics	105.12*** [0.000]			
Wooldridge AC Test	1.646 [0.211]			
Modified Wald Test	387.34*** [0.000]	9237.25*** [0.000]		
Pesaran CD Test	23.393*** [0.000]	-0.238 [0.812]		
Robust Hausman Test	[0.010]			
Observations	104	104	104	104
Number of Countries	26	26	26	26

Notes: Standard errors are in parentheses. The values in square parentheses are the probability values of the coefficient. *** p < 0.01, ** p < 0.05, * p < 0.10.

Obtained coefficients may be interpreted as elasticity estimates because all variables were shown as natural logarithms (Apergis & Payne, 2010: 658). According to the two-way fixed effects model result, a 1% rise in solar energy production increased economic growth by 0.024%, as shown in Table 3. The impact of solar energy production on economic growth was positive and statistically significant in the model. This study's findings support the notion that solar energy could contribute to achieving the policy objectives outlined in the European Green Deal's new growth strategy. In addition, these findings can be understood as EU member countries' solar energy investments reflecting coherent policy justifications. Moreover, the beneficial consequences of solar energy on economic growth ensure the security of the energy supply. The potential benefits discussed in this context can bolster the credibility of renewable energy-based policies for policymakers and practitioners.

The outcomes of this analysis are similar to other studies, although there is no consensus in the literature. For instance, Busu (2020) found that solar energy production had a 0.007 positive impact on the GDP of 28 EU member countries. For US data, Bulut and Apergis (2021) also concluded that solar energy consumption increased by 0.009 of economic growth. Koç's (2021) analysis focused on data from 19 countries and found that solar energy consumption increased economic growth by 0.07 for the random effect model and 0.006 for the GMM model. Although Ohler and Fetters's (2014) studies found a unidirectional causality relationship between economic growth and solar electricity generation, results confirmed the positive impacts of a 1% increase in solar energy generation has increased economic growth by 0.055%.

5. Conclusion and Policy Implications

Environmental issues related to climate change and the effects of global warming have become a tremendous hurdle for contemporary economies. Many economies have configured some policy targets to cope with these problems. In this context, the EU has set a target to be the first climate-neutral continent in the world until 2050, according to their policy aims, which included being the global policy leader in reducing climate change risks. Renewable energy resources are vital to new growth strategies for reaching climate change-reduced policy targets. Solar and wind energy have been gaining importance because of the recent reduction in costs within renewable energy resources. Specifically, solar energy as a clean energy resource has begun to be considered a priority after striking cost reduction due to the development of more effective production technology.

This paper has aimed to test these priorities for 26 EU member countries by evaluating the impacts of solar energy production on economic growth for 2018-2021. After the analysis, which used a two-way fixed effects model and Driscoll-Kraay standard errors, it has been found that solar energy production has positive and statistically significant effects on economic growth. These outcomes of analysis have been some hints for policymakers. Firstly, it has been implied that solar energy investments made by EU countries have been policy-rational due to the positive impacts of solar energy production on economic growth. Secondly, it has hinted that increasing solar energy investment will support reaching

European Green Deal targets for EU member countries. Finally, these analysis outcomes may present some positive arguments to policymakers for encouraging the continuation of regulative and incentive policies for solar energy investment so as not to lose momentum.

Although some studies in the literature have similar outcomes (for example, Busu (2020), Bulut and Apergis (2021), Koç (2021)), some others are in different directions (for example, Bulut and Menegaki (2020), Topçu and Doğan (2022), Ohler and Fetters (2014)). There has yet to be any consensus in the literature about the impacts of solar energy on economic growth. Multidirectional results in existing research in the literature have created some obstacles for policymakers to follow the optimal path. The policy-making process may be straightforward for investing in solar energy while enriching the research in the literature.

Like others in the literature, this paper has some limits. The first one is related to the cover of data. The analysis in this paper deals with 26 countries of 27 EU members because data on one member country (Malta) has not been available. Secondly, the study just looked at solar energy data. The potential impacts of other renewable energy resources were ignored in the research. Naturally, other renewable energy resources, such as wind energy, which is at least as important as solar energy for EU countries, should be analysed for impacts on economic growth.

References

Al-Shetwi, A.Q. (2022), "Sustainable development of renewable energy integrated power sector: Trends, environmental impacts, and recent challenges", *Science of the Total Environment*, 822, 153645.

Apergis, N. & J.E. Payne (2010), "Renewable energy consumption and economic growth: Evidence from a panel of OECD countries", *Energy Policy*, 38(1), 656-660.

Apergis, N. & J.E. Payne (2011a), "Renewable and non-renewable electricity consumption-growth nexus: Evidence from emerging market economies", *Applied Energy*, 88(12), 5226-5230.

Apergis, N. & Payne, J.E. (2011b), "On the causal dynamics between renewable and non-renewable energy consumption and economic growth in developed and developing countries", *Energy Systems*, 2, 299-312.

Armeanu, D.Ş. et al. (2017), "Does renewable energy drive sustainable economic growth? Multivariate panel data evidence for EU-28 countries", *Energies*, 10(3), 381.

Azam, A. et al. (2021), "Renewable electricity generation and economic growth nexus in developing countries: An ARDL approach", *Economic Research-Ekonomska Istraživanja*, 34(1), 2423-2446.

Baltagi, B.H. (2013), *Econometric analysis of panel data*, Fifth Edition, England: John Wiley& Sons, Ltd.

Behera, J. & A.K. Mishra (2020), "Renewable and non-renewable energy consumption and economic growth in G7 countries: evidence from panel autoregressive distributed lag (P-ARDL) model", *International Economics and Economic Policy*, 17, 241-258.

Borawski, P. et al. (2022), "Development of renewable energy sources in the European Union in the context of sustainable development policy", *Energies*, 15, 1545.

BP British Petroleum (2022), *Statistical Review of World Energy, All-Data 1965-2021*, <https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy/power-by-fuel.html>, 20.11.2022.

Bulut, U. & A. Menegaki (2020), "Solar energy-economic growth nexus in top 10 countries with the highest installed capacity", *Energy Sources, Part B: Economics, Planning, and Policy*, 15(5), 297-310.

Bulut, U. & N. Apergis (2021), "A new methodological perspective on the impact of energy consumption on economic growth: Time series evidence based on the Fourier approximation for solar energy in the USA", *GeoJournal*, 86, 1969-1980.

Busu, M. (2020), "Analyzing the impact of the renewable energy sources on economic growth at the EU level using an ARDL model", *Mathematics*, 8(8), 1367.

Chang, T. et al. (2015), "Renewable energy and growth: Evidence from heterogeneous panel of G7 countries using Granger causality", *Renewable and Sustainable Energy Reviews*, 52, 1405-1412.

Croutzet, A. & A. Dabbous (2021), "Do FinTech trigger renewable energy use? Evidence from OECD countries", *Renewable Energy*, 179, 1608-1617.

Dabbous, A. & A. Tarhini (2021), "Does sharing economy promote sustainable economic development and energy efficiency? Evidence from OECD countries", *Journal of Innovation & Knowledge*, 6, 58-68.

Driscoll, J.C. & A.C. Kraay (1998), "Consistent covariance matrix estimation with spatially dependent panel data", *Review of Economics and Statistics*, 80(4), 549-559.

European Commission (2019), "The European Green Deal". *Communication from the Commission COM(2019) 640 Final*, Brussels, <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1596443911913&uri=CELEX:52019DC0640#document2>, 25.06.2020.

European Commission (2020), "Renewable Energy Progress Report", *Communication from the Commission COM(2020) 952 Final*, Brussels, <https://data.consilium.europa.eu/doc/document/ST-11866-2020-INIT/en/pdf>, 23.06.2021.

European Commission (2021), "'Fit for 55': delivering the EU's 2030 climate target on the way to climate neutrality", *Communication from the Commission COM(2021) 550 Final*, Brussels, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC0550&from=EN>,12.06.2022.

European Commission (2022), *EU Energy in figures*, <https://op.europa.eu/en/publication-detail/-/publication/7d9ae428-3ae8-11ed-9c68-01aa75ed71a1/language-en>, 25.01.2023.

Filiz-Baştürk, M. (2021), "G-7 Ülkelerinde yenilenebilir enerji ile büyüme arasındaki ilişki: Panel veri analizi", *İstanbul Ticaret Üniversitesi Sosyal Bilimler Dergisi*, 20(42), 1086-1101.

Filiz-Baştürk, M. (2022), "Yükselen piyasa ekonomilerinde yenilenebilir enerji tüketimi-iktisadi büyüme ilişkisi", *Finans Politik & Ekonomik Yorumlar*, 660, 9-23.

Greene, W.H. (2002), *Econometric Analysis*, Fifth Edition, Upper Saddle River, New Jersey 07458. Prentice Hall.

Hausman, J.A. (1978), "Specification tests in econometrics", *Econometrica*, 46(6), 1251-1271.

Hoechle, D. (2007), "Robust standard errors for panel regressions with cross-sectional dependence", *Stata Journal*, 7(3), 281-312.

IRENA and CPI (2023), *Global landscape of renewable energy finance*, International Renewable Energy Agency, Abu Dhabi, <https://www.irena.org/Publications/2023/Feb/Global-landscape-of-renewable-energy-finance-2023>, 1.03.2023.

Jaraite, J. et al. (2017), "Policy-induced expansion of solar and wind power capacity: Economic growth and employment in EU countries", *The Energy Journal*, 38(5), 197-222.

Kabir, E. et al. (2018), "Solar energy: Potential and future prospects", *Renewable and Sustainable Energy Reviews*, 82, 894-900.

Koç, Ü. (2021), "Güneş enerjisi ve ekonomik büyüme", *Ekonomi, Politika & Finans Araştırmaları Dergisi*, 6(2), 515-533.

Kougias, I. et al. (2021), "The role of photovoltaics for the European Green Deal and the recovery plan", *Renewable and Sustainable Energy Reviews*, 144, 111017.

Lin, B. & M. Moubarak (2014), "Renewable energy consumption-economic growth nexus for China", *Renewable and Sustainable Energy Reviews*, 40, 111-117.

Lutkepohl, H. (1982), "Non-causality due to omitted variables", *Journal of Econometrics*, 19, 367-378.

Marques, A.C. & J.A. Fuinhas (2012), "Is renewable energy effective in promoting growth?", *Energy Policy*, 46, 434-442.

Menegaki, A.N. (2011), "Growth and renewable energy in Europe: A random effect model with evidence for neutrality hypothesis", *Energy Economics*, 33, 257-263.

Ocal, O. & A. Aslan (2013), "Renewable energy consumption-economic growth nexus in Turkey", *Renewable and Sustainable Energy Reviews*, 28, 494-499.

Ohler, A. & I. Fetters (2014), "The causal relationship between renewable electricity generation and GDP growth: A study of energy sources", *Energy Economics*, 43, 125-139.

Ozcan, B. & I. Ozturk (2019), "Renewable energy consumption-economic growth nexus in emerging countries: A bootstrap panel causality test", *Renewable and Sustainable Energy Reviews*, 104, 30-37.

Ozturk, I. (2010), "A literature survey on energy-growth nexus", *Energy Policy*, 38(1), 340-349.

Pao, H.T. & H.C. Fu (2013), "Renewable energy, non-renewable energy and economic growth in Brazil", *Renewable and Sustainable Energy Reviews*, 25, 381-392.

Payne, J.E. (2009), "On the dynamics of energy consumption and output in the US", *Applied Energy*, 86(4), 575-577.

Payne, J.E. (2010), "A survey of the electricity consumption-growth literature", *Applied Energy*, 87, 723-731.

Pesaran, M.H. (2015), "Testing weak cross-sectional dependence in large panels", *Econometric Reviews*, 34(6-10), 1089-1117.

Polat, B. (2021), "The impact of renewable and nonrenewable energy consumption on economic growth: a dynamic panel data approach", *Asia-Pacific Journal of Accounting & Economics*, 28(5), 592-603.

Rafindadi, A.A. & I. Ozturk (2017), "Impacts of renewable energy consumption on the German
economic growth: Evidence from combined cointegration test", *Renewable and
Sustainable Energy Reviews*, 75, 1130-1141.

REN21 (2022), *Renewables 2022*: *Global Status Report*, (Paris: REN21 Secretariat),
<https://www.ren21.net/wp-content/uploads/2019/05/GSR2022_Full_Report.pdf>,
20.01.2023.

Sadorsky, P. (2009), "Renewable energy consumption and income in emerging economies", *Energy
Policy*, 37(10), 4021-4028.

Singh, N. et al. (2019), "Renewable energy development as a driver of economic growth: Evidence
from multivariate panel data analysis", *Sustainability*, 11, 2418.

Smolovic, J.C. et al. (2020), "How does renewable energy consumption affect economic growth in
the traditional and new member states of the European Union?", *Energy Reports*, 6, 505-
513.

Topcu, B.A. & M. Dogan (2022), "The effect of solar energy production on financial development
and economic growth: Evidence from 11 selected countries", *Energy Sources, Part B:
Economics, Planning, and Policy*, 17(1), 2141377.

Torres-Reyna, O. (2007), *Panel data analysis fixed and random effect using Stata (v.6.0)*,
<https://www.princeton.edu/~otorres/Panel101.pdf>, 5.06.2022.

Tugcu, C.T. et al. (2012), "Renewable and non-renewable energy consumption and economic growth
relationship revisited: Evidence from G7 Countries", *Energy Economics*, 34(6), 1942-
1950.

Wolniak, R. & B. Skotnicka-Zasadzien (2022), "Development of photovoltaic energy in EU
countries as an alternative to fossil fuels", *Energies*, 15(2), 662.

Wooldridge, J.M. (2002), *Econometric analysis of cross-section and panel data*, Cambridge, MA:
MIT Press.

World Bank (2022), *World Bank Development Indicators*,
<https://databank.worldbank.org/source/world-development-indicators>, 10.11.2022.

Yang, M. & J. Kim (2020), "Revisiting the relation between renewable electricity and economic
growth: A renewable-growth hypothesis", *Sustainability*, 12, 3121.

Yerdelen-Tatoğlu, F. (2018), *Panel veri ekonometrisi: Stata uygulamalı*, Dördüncü Baskı, İstanbul:
Beta Yayınları.

Journey to Discover the Footprint of Tourism from the Perspective of Ecological Modernization

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Ekolojik Modernleşme Perspektifinden Turizmin Ayak İzini Keşfetme Yolculuğu

Abstract

This research aims to investigate tourism's environmental impacts through the lens of Ecological Modernization Theory (EMT). The study examines how tourism development, economic growth, green innovation, and government effectiveness affect the environment. According to the Augmented Mean Group (AMG), the results revealed that tourism growth and economic expansion negatively impact the environment. In contrast, green innovation and government effectiveness have positive effects. The study also provides country-specific coefficient estimates. The empirical results support the validity of the EMT across the panel, specifically for Germany, France, the UK, and Russia.

Keywords : Environmental impact, Tourism, Ecological Modernization Theory, Dynamic Panel Data Analysis, AMG Estimator.

JEL Classification Codes : Q51, Q57, Z30, C33.

Öz

Bu araştırmanın amacı, turizmin ekolojik etkilerini Ekolojik Modernleşme Teorisi (EMT) merceğinden araştırmaktır. Çalışma, turizmin gelişiminin, ekonomik büyümenin, yeşil inovasyonun ve hükümet etkinliğinin çevreyi nasıl etkilediğini incelemektedir. Sonuçlar, Artırılmış Ortalama Grubuna (AMG) göre hem turizm büyümesinin hem de ekonomik genişlemenin çevre üzerinde olumsuz bir etkiye sahip olduğunu ortaya koydu. Buna karşılık, yeşil yenilik ve hükümet etkinliğinin olumlu etkileri vardır. Çalışma ayrıca ülkeye özgü katsayı tahminleri de sunmaktadır. Ampirik sonuçlar EMT'nin panel boyunca ve özellikle Almanya, Fransa, Birleşik Krallık ve Rusya için geçerliliğini desteklemektedir.

Anahtar Sözcükler : Çevresel Etki, Turizm, Ekolojik Modernleşme Teorisi, Dinamik Panel Veri Analizi, AMG Tahmincisi.

1. Introduction

Since the 1980s, attention to tourism as a catalyst for economic progress in developing countries, coupled with the expansion of mass tourism from Europe and the Mediterranean to new areas such as Southeast Asia, the Far East, Africa, and the Caribbean, has stimulated academic research into the environmental consequences of tourism (Holden, 2016: 68-69). While 277 million tourists travelled worldwide in 1980, 1,460 million tourists travelled in 2019, generating tourism revenues of US$1,481 billion. At the beginning of the 21st century, tourism became one of the most economically productive sectors, supporting one out of every ten jobs globally and contributing to 10.4 per cent of the globe's gross domestic product (UNWTO, 2020). Over time, the natural environment has been negatively affected by the increasing mobility of tourism and the diversification of tourism activities. The environment is one of the critical elements of the tourist experience. Tourists look for attractive and distinctive environments that can support their activities. They visit natural beauties, historical and archaeological sites, open-air museums, national parks, and marine and coastal areas (Hillery et al., 2001: 854). Tourist-oriented activities put pressure on the environment, causing it to become polluted, damaged, or unusable. (Andereck, 1993: 77-78; Becken et al., 2020: 1605). The environment is also needed by tourism enterprises such as accommodation, transport, catering, recreation, tour operators and travel agencies. Tourism enterprises, which cause various types of pollution (air, water, noise, traffic, soil, etc.) and waste problems using natural resources and surplus carbon-based energy, threaten the maintenance of environmental quality (Gössling & Hall, 2006: 13-14; Buckley, 2011: 401; Jaz et al., 2023: 117).

Telfer & Sharpley (2008) describe the potential development contribution of tourism and environmental damage as the "tourism development dilemma". According to the authors, tourism catalyses economic and social development in destinations. Physical, social, and cultural attractions are the elements of tourism. On the other hand, the tourism sector has the potential to degrade or destroy the natural environment. Zhang & Liu (2019) state that the transport sector, directly related to tourism activities, is responsible for more than 75% of total CO_2 emissions. Total global CO_2 emissions increased by 1% in 2022 compared to 2021. This represents a new record high of 36.6 billion tons of CO_2 (<www.globalcarbonproject.org>, 2022). In 2022, average monthly CO_2 levels were observed to exceed 420 parts per million for the first time. The increase is about 100 times faster than in all previous geological periods. (<www.noaa.gov>, 2022). Razzaq et al. (2021) emphasise that the overconsumption of natural resources due to tourism increases the ecological footprint (EF) and thus depletes the biological capacity. The EF is the ecological capacity required to generate the resources used and to manage the waste produced by individual and company activities, considering current technology and resource management. It is also accepted as an indicator of whether the planet is living within the limits of self-renewal by comparing biological capacity. The world's biological capacity in 2022 is 1.5 global hectares per person, while EF is 2.7 global hectares per person. In 2022, total biological capacity increased by 0.4% compared to the previous year, while total EF increased by 1.2% simultaneously. (<www.wwf.org>, 2022).

The theoretical framework explaining environmental damage is based on Schnaiberg's (1980) Treadmill Production Theory. According to this theory, new production systems after 1945 are capital-intensive. Due to large production scales, more material inputs are needed, and more energy is used. As a result, companies' growing population and efforts to control the extraction of raw materials and the sale of consumer goods to increase profits and market share lead to more significant depletion of natural resources incompatible with the ecosystem and a range of environmental problems. This theory links environmental degradation to economic growth factors. Mol & Sonnenfeld (2000) are among those who have argued that it is possible to remedy environmental problems while at the same time achieving economic growth. This systems-based approach, which came to the fore with the studies of Huber (1982) and Janicke (1985) and has evolved, is called Ecological Modernization Theory. According to Theory, environmental degradation caused by modernisation can be solved by using more modern technology. In other words, economic and environmental goals can be reconciled. This consensus is achieved by supporting research into clean technologies and green innovation, by taxing energy, transport, industrial pollution, and water use, and by reducing labour costs by using the revenue from these taxes for social security payments (Gouldson & Murphy, 1997: 82). To do this, it is suggested that the state should steer industry towards ecological, green innovations that will raise the standard of environmental protection. Regarding achieving economic growth without causing environmental problems, EMT plays a central role in technology and government.

An extensive literature has emerged that empirically investigates whether it has an impact on the environment, including growth theories (Grossman & Krueger, 1995; Apergis & Payne, 2010; Özcan et al., 2020), sustainable development model (Bilen, 2008; Khan et al., 2019), treadmill production theory (Stretesky et al., 2013; Long et al., 2018; Ahmed et al., 2022), environmental Kuznest Curve (EKC) hypothesis (Fodha & Zaghdoud, 2010; Örnek & Türkmen, 2019; Akbaş & Lebe, 2023) and STIRPAT environmental model (Lin et al., 2009; Bargaoui, 2014; Jahanger et al., 2022). With the rapid development of tourism, the sector was also included in the models as a variable (Deniz, 2019; Jebli et al., 2019; Abbasi et al., 2021; Karadağ, 2021; Yurtkuran, 2022; İlban & Liceli, 2022). However, the literature on empirical models that include tourism is relatively new compared to other studies. In addition, if necessary, measures regarding tourism are not taken in time that disrupts the ecosystem and the natural environment. It may lead to more destructive consequences for the sector's sustainability and humanity. Therefore, new studies are needed to diversify solutions and policy recommendations to balance tourism's economic benefits and potential environmental threats. Thus, this study's core objective is to explore tourism's environmental impact by formulating an econometric framework in line with EMT's propositions and to seek evidence of whether EMT is supported. Based on this primary objective, the study aimed to assess the dynamic links between modernisation, tourism, and environmental stability and to measure the impact of tourism activities on environmental damage quantitatively. EMT emphasises the importance of technological progress in solving environmental problems, adopting environmentally friendly policies and management strategies, addressing environmental issues globally, and social participation and awareness.

The effort to establish an econometric model by combining the elements of EMT with time and space factors and to obtain quantitative estimates through multidimensional analysis is an essential novelty in adopting scientific and data-based approaches. In this context, it is also one of the objectives that the results of the panel data analysis will contribute to predicting future environmental trends, developing effective policies and management strategies in this area, and supporting global decision-making processes by stakeholders in the tourism industry.

The study is expected to significantly contribute to the current scientific discourse in three main areas. First, it examines the environmental impact of tourism within the EMT framework. In this sense, it differs from other studies that intensively use growth theories, the EKC hypothesis and STIRPAT models. The inclusion in the econometric model of government effectiveness and green innovation variables, which are directive according to EMT, can be the cornerstone of new insights and discussions. As far as we know, the model to be created can be a candidate for taking its place among the first examples of the literature. Second, using EF data to represent the environment in the empirical analysis is preferred. In empirical studies, environmental damage caused by tourism is mainly associated with the transport sector and the environmental factor is represented by CO_2 emission rates. However, the environmental damage caused by tourism involves more than air pollution. Hence, the comprehensiveness of environmental deterioration goes beyond being solely encapsulated by CO_2 emission rates. Accordingly, EF data is regarded as a comparatively superior metric. Furthermore, specialised long-term elasticity coefficients are computed for European nations experiencing substantial tourist influx. Delving into country-specific analysis holds significance in enhancing the diversity of policy formulation. Consequently, this investigation employs the AMG estimator, introduced by Eberhardt & Teal (2010), to ascertain long-term elasticities.

After the introductory section, the second segment provides instances of empirical research within the existing literature, highlighting the interplay between tourism and its environmental implications. The third section discusses the utilised methodology, while the fourth section presents the unveiled research outcomes. The conclusive section deliberates upon these findings and assesses potential policy recommendations.

2. Literature Review

Indeed, examining the ecological consequences of tourism's growth is pivotal for identifying, monitoring, and formulating plausible remedies. However, the research evidence on the environmental impacts of tourism is not sufficient and explicit (Katırcıoğlu et al., 2020: 392; Shahbaz et al., 2021).

In most empirical studies, including the tourism factor, the environmental impact has been expressed regarding CO_2 emissions. Raza et al. (2016) delved into the ramifications of tourism on environmental degradation within the United States, spanning from 1996(1) to 2015(3), utilising the wavelet transform methodology. This technique enables the dissection

of temporal series into diverse frequency components. The empirical insights divulged that tourism wields a predominantly positive impact on CO_2 emissions across short, medium, and long-term timeframes. Using the FMOLS technique, Balsalobre-Lorente et al. (2020) probed the interconnections among international tourism expenditure, globalisation, and CO_2 emissions per capita across 1994 and 2017 across OECD nations. The model encompassed economic growth, energy consumption, and globalisation as explanatory factors. The investigation was complemented by cointegration tests, including Pedroni, Kao, and Westerlund, alongside a causality test by Dumitrescu and Hurlin to unearth the long-term relationship dynamics. The empirical findings, derived from the FMOLS estimation, ratified an inverted U-shaped association between international tourism expenditure and environmental deterioration, affirming the EKC hypothesis. Tandoğan & Genç (2019) proved the existence of the relationship between the number of tourists and CO_2 emissions with the RALS-Engle and Granger co-integration tests for the period 1980-2014. Tandoğan and Genç (2019) exposed the coexistence of a cointegration relationship between tourist numbers and CO_2 emissions through RALS-Engle and Granger cointegration tests from 1980 to 2014. The ensuing causal analysis revealed bidirectional causality between the two variables, emphasising the dual-edged impact of tourism. While acknowledging the economic benefits of tourism, the authors emphasised the imperativeness of mitigating environmental degradation through sustainable practices and renewable energy promotion. Zhang et al. (2019) explored tourism's interplay with environmental degradation, logistics, transport operations, and crime rates in Thailand from 2001 to 2017. The research, utilising the ARDL method, highlighted intricate relationships. Logistics and transport operations positively correlated with tourism, while elevated carbon emissions and fossil fuel utilisation displayed adverse connections. The study underscored the critical role of deforestation and inadequate sustainability in influencing tourism and recommended enforcing green practices in the logistical and transport realms. Ahmad et al. (2019) examined the relationships between tourism and pollution in Indonesia, the Philippines, and Vietnam from 1995 to 2014. The FMOLS approach was employed, utilising data encompassing CO_2 emissions, tourist arrivals, per capita income, and energy consumption. The outcomes corroborated the adverse influence of tourism on the environment within Indonesia and the Philippines while conversely indicating an improvement in environmental quality within Vietnam. Notably, this outcome underscores the nuanced regional diversity in the relationship, contingent upon distinct country-specific attributes and pertinent environmental protection policies. Gulistan et al. (2020) analysed the relationship between the environment and growth, energy consumption, trade openness, and tourism. Their study spanned 112 countries from 1995-2017, stratified by income and region. Utilising Pooled Least Squares and Generalized Least Squares methods, the research established the comprehensive greening effect and delineated income levels where environmental quality improved. The intricate interactions unfolded, indicating that economic growth, energy consumption, and tourism bore adverse effects, while trade openness displayed no significant statistical impact. Haseeb & Azam (2021) explored the interrelations involving tourism, corruption, democracy, and environmental degradation. By applying FMOLS analysis and Dumitrescu-Hurlin causality tests, data spanning 1995-2015 were examined across country groupings. The study divulged

significant contributions of corruption and tourism to CO_2 emissions, with the influence being more pronounced in low-income countries. Complex causal relationships were also unveiled, emphasising the intricate interplay between democracy, corruption, tourism, and CO_2 emissions. Ballı (2021) scrutinised the tourism and environmental degradation across 32 OECD countries, leveraging the Emirmahmutoğlu-Köse panel estimation technique. Notably, the outcomes highlighted the joint escalation of CO_2 emissions. A unidirectional causality emerged from tourism to CO_2 emissions. The nuanced country-level analysis uncovered bidirectional relationships in some nations and unidirectional influences in others, underscoring the multifaceted nature of these dynamics. Liu et al. (2022) delved into the spatial spillover effect of tourism expansion on CO_2 emission, scrutinising panel data from 70 nations spanning 2000-2017. The empirical results revealed a dualistic influence of tourism, encompassing a direct positive effect and an indirect negative effect on environmental pollution. This indirect impact was noted to surpass the positive direct effect, ultimately leading to a substantial overall detrimental effect. Population density, trade openness, and economic growth were found to modulate environmental pollution significantly.

The use of EF to represent the environment in empirical analysis is relatively new. It is difficult to comment on the general trend by evaluating the results of these studies, which are very few. Godil et al. (2020) added to the discourse by probing the interplay of globalisation, tourism, and environmental degradation in China (1978Q1-2017Q4). The findings highlighted a complex interplay, with economic growth catalysing emissions and environmental impact assessments confirming their existence. Intriguingly, the nuanced influence of tourism on environmental quality emerged, while globalisation's impact was predominantly adverse. Karadağ (2021) explored the repercussions of tourism expansion on the environment by analysing Türkiye's tourist numbers and EF from 1990-2016. Employing FMOLS and DOLS techniques for long-term coefficient estimation, the research underscored the exacerbating impact of increasing tourist numbers on environmental degradation. Proposals for sustainable development were rooted in the diversification of tourism offerings. Nathaniel et al. (2021) sought to understand the environmental impacts of tourism, growth, natural resource rent, urbanisation, and energy in the ten most visited tourist destinations between 1995 and 2016. Employing Westerlund's cointegration technique and CUP-FM and CUP-BC estimators for long-term coefficient determination, the research illuminated intricate relationships. Economic growth was unveiled as a determinant with a negative relationship with urbanisation and natural resources. Kutlu & Kutlu (2022) investigated the influence of tourism activities on EF using the ARDL bounds test method, encompassing data from 1970-2017 in Türkiye. The study disclosed that tourism expenditures and energy consumption engender long-term increases in ecological footprint, while per capita income and tourism revenues exhibit inverse effects. İlban & Liceli (2022) employed the Dumitrescu-Hurlin panel causality test to assess the interplay between EF and tourist influx across the top ten countries attracting the most tourists in 2020. The findings delineated a bidirectional causal relationship between EF and tourist numbers, prompting the suggestion of sustainable and alternative tourism strategies.

Han et al. (2022) analysed Türkiye's tourism-driven environmental impact from 1995
to 2017 by including both variables. Two different models were used for EF and CO_2
emissions. These models integrated variables such as tourist inflow, GDP per capita and
energy consumption. Both models unveiled compelling evidence attributing tourism
development to environmental degradation, prompting further exploration into the specific
ecological impacts attributed to tourism-related activities.

3. Data and Model

The research delves into the dynamic interconnections between the environment and
the progression of tourism, economic growth, green innovation, and government
effectiveness between 2000-2018 while assessing their alignment with the EMT. The
selection of nations for data analysis is predicated on the World Tourism Organization's
European Region, encompassing Austria, France, Greece, Germany, the United Kingdom,
Spain, Italy, Türkiye, Poland, and Russia. These countries collectively constitute over 50%
of global tourist arrivals and approximately 30% of worldwide tourism receipts (UNWTO,
2020). Fuelled by their rich historical, cultural, and natural assets, these nations hold a strong
global competitive edge. Moreover, locales such as Italy, Spain, and France have witnessed
local populations voicing concerns about the adverse impacts of intensive tourist mobility
on the environment (Milano et al., 2018: 3-4; Çam & Çelik, 2022: 75-76; Turizm Gazetesi,
21.06.2023). As tourism may continue to pose an environmental threat and tourist mobility
is predicted to increase, the ten European countries receiving the most tourists in 2019 were
appropriately selected as the analytical sample. The availability of the necessary data was
considered when determining the working time. In defining the variables, care was taken to
reflect the essence of EMT and to be consistent with the empirical examples found in the
current literature. A comprehensive breakdown of the variables used in the study is presented
below.

The EF, chosen as the dependent variable in our model, quantifies the intricate
balance between nature's provision and human demand. The EF methodology adopts a
systemic approach towards natural resource accounting, operating across global, regional,
local, and personal scales of supply and demand (Wackernagel & Rees, 1998). This method
offers a holistic perspective on natural resources, facilitating the evaluation of an ecosystem's
biocapacity to endure human consumption of biological assets and the ensuing waste
production. Calculated in terms of biomass areas produced through photosynthetic energy
utilisation, the EF for a population embodies the utilisation and consumption dynamics
(Kitzes et al., 2009). Lately, EF has garnered recognition as a more encompassing gauge for
encapsulating environmental dimensions (Chu, 2022: 23781).

The tourist flows act as an embodiment of tourism demand and visitor inclinations.
Over time, an upswing in tourist numbers directly corresponds to escalated requisites for
services, transportation, lodging, sustenance, shopping, and other tourist activities within a
country. Consequently, the augmentation in tourist figures, while contributing to economic
aspects, concurrently manifests as an indicator of straining the carrying capacity of host

destinations and encroaching upon the environment (Solarin, 2014; Vita et al., 2015; Katırcıoğlu et al., 2018). This study harnessed the count of international tourists as a metric to gauge the tourism sector's scale and impact.

Gross domestic product per capita emerges as a representation of economic prosperity. Elevated levels of economic activity inevitably engender augmented energy and material requisites, yielding heightened waste byproducts. The depletion of natural resources, combined with the accumulation of waste and the concentration of pollutants, can exceed the Earth's carrying capacity, leading to an erosion of environmental quality and a decline in human well-being despite rising incomes (Xepapadeas, 2005:1254). The nexus between environmental deterioration and elevated resource consumption is well-established, with a discernible correlation between heightened fossil fuel utilisation for energy and economic growth detrimentally impacting the environment (Ahmad et al., 2021).

Environmental technology patents were embraced as a representative indicator of green innovation. These patents confer a competitive edge upon patent holders, fostering environmental sustainability through their contributions to the burgeoning green economy (Sun et al., 2007: 1033). This metric is gauged through the number of licensed environmental patent applications, encompassing domains like renewable energy technologies, energy efficiency enhancements, waste management, recycling, clean water technologies, green construction, and materials. This dataset essentially mirrors the tally of environmental technologies originating from a company or nation, thus signifying a robust indicator capturing the degree and intensity of green technological innovation, both utilised and owned (Oyebanji et al., 2022: 8; Kirikkaleli et al., 2023: 101564). Within this study, green innovation patents are posited to conduce to a reduction in the EF.

The efficacy of government policies is found in the dataset on government effectiveness. This parameter epitomises how a government efficiently crafts policies, legislates, delivers public services, and caters to citizens' requirements. Government effectiveness is a barometer for a government's adeptness in addressing societal needs, securing public trust, and orchestrating prudent policies conducive to sustainable development (Yasmeen et al., 2022; Al Mulali, 2022).

Table: 1
Source of Data

Variables	Symbol	Unit	Source
Ecologic Footprint	EF	Global Hectare	Global footprint network (<www.footprintnetwork.org/>)
Tourist Arrival	TA	Number	Word Bank(<www.data.worldbank.org/>)
GDP per Capita (Constant 2015)	EG	US$	Word Bank (<www.data.worldbank.org/>)
Environmental Technology Patents	GI	Number	OECD (<www.data.oecd.org/>)
Government Effectiveness	GE	Value	Word Bank (<www.data.worldbank.org/>)

The model, formulated in a logarithmic configuration as delineated in Equation (1), aims to embody the EMT by drawing on the research of Koçak et al. (2020), Alola et al. (2021), Nathaniel et al. (2021), and Bugden (2022).

$$\ln EF_{it} = \alpha_i + \beta_1\,(lnTA_{it}) + \beta_2(lnEG_{it}) + \beta_3(lnGI_{it}) + \beta_4(lnGE_{it}) + \varepsilon_{it} \tag{1}$$

In Equation (1), α signifies the constant coefficient, while β1, β2, β3, and β4 represent the coefficients corresponding to the number of tourists, gross domestic product per capita, environmental technology patents, and government efficiency parameters, respectively. The term ε denotes the error component. Herein, i and t represent the dimensions of country and time, respectively.

The descriptive statistics have been delineated in Table 2.

Table: 2
Data Statistics

Variables	Observation	Minimum	Maximum	Mean	Std. Dev.
EF	190	1,25	3,90	2,91	0,50
TA (million person)	190	10,42	89,40	63,26	56,39
EG	190	5324	47492	26608	13389.70
GI	190	4.80	19.24	10.95	3.01
GE	190	-0.67	1.93	0.90	0.71

4. Methodology

The dynamic panel data analysis employed to explore the environmental impact of tourism uses the AMG coefficient estimator. After conducting crucial preliminary assessments encompassing cross-sectional dependence and homogeneity, this section expounds upon the AMG coefficient estimator, a prerequisite for accurate coefficient estimation.

The countries chosen for empirical scrutiny constitute members of the European Union, sharing common economic, social, and environmental policies, except for Russia and Türkiye. Owing to the interdependence among these nations, shared shocks and latent common factors within the panel data configuration may potentially engender unreliable and inconsistent estimations. Consequently, while determining the appropriate tests for analysis, it becomes imperative to ascertain the existence of cross-sectional dependence. This study's temporal dimension (21) surpasses the cross-sectional dimension (10). As a result, for scenarios of this nature, it is advisable to employ the Breusch-Pagan (1980) LM and Pesaran (2004) CD tests, as recommended by Koçak & Uçak (2021). Within this study, the outcomes of the Breusch Pagan (1980) LM and Pesaran (2004) CD tests have been considered in evaluating cross-sectional dependence.

The Breusch-Pagan (1980) LM test scrutinises the null hypothesis, positing an absence of correlation among units. The equation expressing this hypothesis is presented in equation (2), wherein the parameters i and j denote the correlation coefficient between the coefficients of the respective units.

$$LM = T\Sigma_{i=1}^{N-1}\Sigma_{j=i+1}^{N}\hat{\rho}_{ij}^{2} \tag{2}$$

Pesaran's (2004) CD test operates on summating correlation coefficients among the cross-sectional residuals. Equation (3) delineates the formulation of this test.

$$CD = \sqrt{\frac{2T}{N(N-1)}} \Sigma_{i=j}^{N-1} \Sigma_{j=i+1}^{N} \hat{\rho}_{ij} \tag{3}$$

Another preliminary test is to examine whether the slope coefficients are homogeneous. Breitung (2005) argues that slope heterogeneity is critical in selecting appropriate model estimators and can lead to incorrect inferences. This test guides the choice of cointegration test. The Delta (△) tests, devised by Pesaran &Yamagata (2008), assess the presence of homogeneity in the coefficients. The formulated hypotheses are as follows:

$$\tilde{\Delta} = \sqrt{N} \left(\frac{N^{-1} \tilde{S} - k}{\sqrt{2k}} \right) \tag{4}$$

Within Equation (4), the symbol "N" represents the count of cross sections, "$\tilde{S}$" signifies the adjusted Swamy test statistic, and "k" denotes the count of explanatory variables.

$$\tilde{\Delta}_{adj} = \sqrt{N} \left(\frac{N^{-1} \tilde{S} E(\tilde{z}_{it})}{\sqrt{var(\tilde{z}_{it})}} \right) \tag{5}$$

In Equation (5), $E(\tilde{z}_{it}) = k$ ve $var(\tilde{z}_{it}) = \frac{2k(T-k-1)}{(T+1)}$ where , " $\tilde{z}_{it}$" denotes random variables independently distributed across all "i" with finite means and variances (Pesaran & Yamagata, 2008: 32).

The AMG estimator in dynamic panel data analysis possesses several advantageous characteristics. Notably, it circumvents the need for variables to exhibit stationarity levels within the analysis. This implies that the presence of differing levels of stationarity across variables does not hinder the application of the AMG method. Additionally, this estimator effectively accounts for cross-sectional dependence within the series (Yerdelen-Tatoğlu, 2018). Another merit of the AMG method lies in its capacity to rectify outcomes amidst panel heterogeneity and multifactor error terms. Despite its origination as a long-run cointegration estimator tailored for a limited number of units and periods, the AMG estimator produces resilient results (Uzar, 2021: 389). Consequently, the prerequisite for conducting preliminary tests, such as unit root and cointegration tests, is obviated (Cheng & Yao; 2021: 5). Moreover, by enabling separate estimation of country coefficient estimates through the AMG method, distinct policy recommendations for individual countries can be formulated. Collectively, these attributes hold substantial implications for estimation and inference within the realm of macro panel data (Eberhardt & Bond, 2009; Eberhardt, 2012).

The AMG coefficient estimator, notable for incorporating a 'common dynamic effect' into group-specific regressions to account for cross-sectional dependence, is constructed from the period dummy coefficients of a pooled regression in first differences. This construction captures the average path of unobserved common factors across panel groups,

similar to their levels. The augmented regression model captures this relationship well in cases where these unobserved common factors are elements of the group-specific cointegration relationship. (Eberhardt & Bond, 2013: 2). The hypotheses for the two-stage are as follows:

H$_0$: Coefficients are not significant.

H$_1$: Coefficients are significant.

In the first stage, a standard POLS regression is constructed with variables in the first difference by including first-stage dummy variables in the model, as shown in equation (6). Since non-stationary variables and unobservable can seriously bias the estimates in first-difference regressions, the dynamic process is excluded from the first-difference pooled regression. The coefficient of the time dummy variable represented by "$\tilde{u}_t^{\bullet}$" is estimated.

$$\Delta y_{it} = b' \Delta X_{it} + \Sigma_{t=2}^{T} C_t \Delta D_t + e_{it} \implies \tilde{c}_t \equiv \tilde{u}_t^{\bullet} \tag{6}$$

In the second stage, as presented in equation (7), the variable "$\tilde{u}_t^{\bullet}$" is constructed by including it in each group-specific regressions that comprise the cross-sectional unit. These include linear trend terms, which do not capture idiosyncratic processes that disappear linearly over time. The AMG estimates are obtained as the average of the individual β^i (individual country) estimates following the Mean Group approach of Pesaran and Smith (1995).

$$y_{it} = +a_i + b' \Delta X_{it} + c_{it} + d_i \tilde{u}_t^{\bullet} + e_{it} \implies \hat{b}_{AMG} = N^{-1} \Sigma \hat{b}_i \tag{7}$$

5. Findings and Discussion

This section presents cross-section dependency and homogeneity tests and their results. Then, the AMG coefficient estimation analysis findings are given, in which the long-term coefficients are calculated for the panel as a whole and each country. Firstly, the investigation involved the application of the Breusch-Pagan (1980) and Pesaran (2004) cross-section dependence tests to the variables to describe the possible presence of horizontal cross-sectional dependence. The test results show that the null hypothesis is rejected at the 1% significance level, leading to the conclusion of cross-sectional dependence. This evidence of cross-section dependence implies that disturbances or crises within countries in the panel data could impact other countries in the same panel. Based on the outcomes of the homogeneity test, the null hypothesis is rejected, indicating the absence of homogeneity in the panel data slope coefficient. Proceeding from these preliminary assessments, the investigation delved into the long-run coefficients underpinning the relationships within Equation (1), utilising the AMG estimator.

Table: 3
Test Findings

Tests	Cross-Sectional Dependence Test				
	lnEF	lnTG	lnEG	lnGI	LnGE

LM (Breusch-Pagan, 1980)	152.6451*** (0.002)	207.8493 *** (0.000)	289.7389*** (0.000)	226.5631*** (0.001)	173.7688*** (0.000)
CD$_{LM}$ (Pesaran, 2004)	21.6235*** (0.000)	35.782*** (0.000)	43.4529*** (0.000)	39.7641*** (0.003)	26.4472*** (0.000)
	Homogeneity Test				
	LM Statistic				
Delta _tilde (Δ̃)	11.538***(0.000)				
Delta_tilde_adj(Δ̃$_{adj}$)	13.892***(0.000)				

*Notes: Probability (p) values are given in parentheses, and the "***" symbol denotes a 1% significance level.*

According to the AMG-derived long-run coefficient estimations in Table 4, tourism development and economic growth exhibit statistically significant positive environmental impacts. In contrast, green innovation and government efficiency display statistically significant negative environmental influences.

Table: 4
Results for AMG Coefficient Estimators

Countries	Variables			
	lnTD	lnEG	lnGI	lnGE
Panel	0,71***	1,39***	-0,45*	-0,37**
Germany	-0,24**	0,09***	-1,86***	-2,93**
Austria	0,18**	0,12***	0,52	-0,28
France	1,97***	0,23***	-2,32***	1,57**
United Kingdom	0,11***	0,07**	-0,89***	-1,83**
Spain	1,41***	1,26***	0,04	-0,12***
Italy	2,86***	2,13***	-0,95**	0,05
Poland	0,13	3,25*	0,65	-0,28
Türkiye	0,67***	2,76**	-0,71	1,01
Greece	0,16**	2,43***	1,04	0,62**
Russia	0,21***	1,63***	-0,08*	-1,51***

*Note: *, ** and *** signify statistical significance at 10%, 5% and 1%, respectively.*

Specifically, a 1% escalation in tourism development yields a 0.71% rise in the EF, while a similar uptick in economic growth is associated with a 1.39% augmentation in the EF. Conversely, a 1% increase in green innovation corresponds to a 0.45% reduction in the EF, and a 1% improvement in government efficiency leads to a 0.37% decrease in the EF.

Conducting a granular examination via the AMG estimator's disaggregated (country-specific) analysis, the coefficient about tourism development emerges as statistically significant, exerting a positive impact on the EF in Austria, France, the United Kingdom, Spain, Italy, Türkiye, Greece, and Russia. Thus, it can be inferred that tourism in these nations contributes detrimentally to the environment. Conversely, the influence of tourism development in Germany manifests negatively, suggesting a positive environmental effect. Notably, the coefficient for Poland does not reach statistical significance.

The coefficient associated with the economic growth variable is statistically significant across all countries within the panel and positively influences the EF. In essence, economic growth emerges as one of the contributing factors to environmental degradation across the entire panel of countries.

The coefficient of the green innovation variable is statistically significant and negatively impacts the EF in Germany, France, the United Kingdom, Italy, and Russia.

Notably, an upswing in the number of environmental technology patents correlates with a positive effect on the environment within these nations. However, the coefficients in Austria, Spain, Poland, Türkiye, and Greece lack statistical significance.

The variable of government effectiveness yields a statistically significant coefficient in Germany, France, the UK, Spain, Greece, and Russia, signifying a negative impact on the ecological footprint. This implies that successful governmental practices contribute positively to the environment within these countries. However, the coefficient for this variable fails to attain statistical significance in France, Italy, Poland, and Türkiye.

Specifically, in Austria, France, the United Kingdom, Spain, Italy, Türkiye, Greece, and Russia, tourism contributes to an increase in EF, while Germany experiences a decrease in EF due to tourism activities. This finding resonates with Öztürk et al. (2016), Katırcıoğlu (2018), Kongbuamai et al. (2020), Karadağ (2021), Alola et al. (2021), Kutlu & Kutlu (2022), and İlban & Liceli (2022), although diverging from the observations of Guan et al. (2022). Meanwhile, economic growth drives an expansion in the EF across all countries, a pattern reminiscent of Charfeddine & Mrabe (2017), Hassan et al. (2019), and Çakmak & Acar (2022). Furthermore, promoting green innovation reduces the ecological footprint across the panel and within Germany, France, the UK, Italy, and Russia. These outcomes align with the research shared with Ahmad et al. (2021), Javed et al. (2023), and Aydın et al. (2023). Lastly, government effectiveness, symbolising the state's role, contributes to a decrease in EF across the entire panel, specifically within Germany, France, the United Kingdom, Spain, Greece, and Russia. These results are akin to Uzar et al. (2021), in contrast to Yang et al. (2022).

The economic implications of the results obtained are presented below, as appropriate.

The results for the whole panel show that the environmental impact of tourism is lower than that of economic growth. This finding suggests that the negative environmental impacts of tourism development are more accessible to control than economic growth. A 1% increase in economic growth is associated with a 1.39% increase in EF, reflecting the footprint-increasing effect of economic growth. Higher income levels can lead to increased consumption and production, leading to increased depletion of natural resources and environmental impacts. A 1% increase in green innovation corresponds to a 0.45% decrease in EF, indicating that green technologies and environmentally friendly practices can potentially reduce environmental impacts. Green innovation can achieve a positive balance between economic growth and environmental impacts by increasing environmental sustainability. A 1% improvement in government efficiency leads to a 0.37% decrease in EF, indicating that more effective government policies positively impact environmental sustainability. More effective government policies can ensure more effective conservation of natural resources and reduction of environmental impacts.

6. Conclusion and Recommendations

This study examines the influence of tourism on the environment across ten distinct European destinations, which attract more than half of international tourists, spanning the period from 2000 to 2018. The central aim is to discern whether the development of tourism supports EMT. A dynamic panel data model is meticulously constructed to address this, incorporating the environment (measured by EF) as the dependent variable. The explanatory variables encompass tourism (quantified by tourist count), economic advancement (represented by gross domestic product per capita), green innovation (indicated by environmental technology patents), and government efficiency (reflecting state intervention efficacy). As a result of the preliminary tests, it was concluded that there is a cross-section dependence and heterogeneity among the panel countries. Subsequently, the AMG long-run coefficient estimator is tested, and panel-wide and country-specific coefficients are estimated. Empirical outcomes support the EMT within the entire panel, Germany, France, the United Kingdom, and Russia. Conversely, coefficients associated with green innovation and/or government effectiveness do not hold statistical significance in Austria, Spain, Italy, Poland, Türkiye, and Greece, signalling a lack of support for the EMT theory. Consequently, it can be inferred that the conjunction of tourism and economic growth poses a substantial menace to environmental deterioration, whereas the impetus of green innovation and effective governmental policy execution safeguards environmental sustainability.

In light of the findings, policymakers and managers may wish to consider the following recommendations:

- These panel countries need a lot of energy to sustain economic growth. Therefore, the first recommendation is to promote the implementation of green growth, green economy models, and policies on renewable energy and green technologies in all panel countries. Political, economic, and technical cooperation among panel countries to develop and share practices can help reduce negative environmental externalities.
- Secondly, it is suggested that the development of cooperation and implementation processes such as sustainable tourism, green tourism, eco-tourism, and slow tourism, which are on the World Tourism Organization's agenda in the Panel countries, should be identified as a priority policy area. Keeping environmental awareness on the agenda of all tourism stakeholders through bilateral or multilateral agreements, projects, campaigns, and training also contributes to protecting the environment.
- Thirdly, it is suggested that examples of good practices in tourism (benchmarking) and successful policy outcomes should be shared among the panel countries through meetings, symposiums, and congresses. For example, the discussion of the impact of the reservation system, the limitation of the number of daily visits, the entry/exit during certain hours, the environmental tax, the environmental subsidy practices in some tourist areas for the protection of the natural environment can contribute to the creation of strategies to improve the

environmental quality in the panel countries. In addition, creating virtual visit options (VR- virtual reality glasses, AR - augmented reality applications) at a lower cost for tourists who want to benefit from the output of digital technology can reduce the pressure of destruction on the environment.

- The fourth suggestion relates to what policymakers can do for tourism businesses. It suggests encouraging the use of renewable energy and environmentally friendly materials in tourism facilities and businesses, carrying out full waste management audits, supporting green hotels, green kitchens, green tour operators, green transport practices, and green innovation research in tourism businesses through subsidies.

Among the country-specific findings, the following recommendations can be considered:

- In Austria, France, the UK, Spain, Italy, Türkiye, and Greece, sustainable tourism policies should be developed to reduce the impact of environmental degradation, encourage the active participation of local communities, and support investments in environmentally friendly infrastructure and technology. Considering that tourism in Germany positively impacts the environment, it is recommended that environmentally friendly tourism practices be shared at global meetings.
- According to the study's results, due to the positive effects of the GI variable in Germany, France, the United Kingdom, Italy, and Russia, technical agreements on patent sharing on a global basis are recommended to stimulate environmental technology patents in these countries. Appropriate policies and strategies should be determined according to each country's specific conditions and needs. However, promoting green innovation and adopting green technologies will enhance environmental sustainability.
- Given that government effectiveness plays a vital role in reducing environmental impacts in Germany, France, the United Kingdom, Spain, Greece and Russia, environmentally friendly policies should be strengthened, and more comprehensive policies should be adopted. Active public participation and support can increase the success of environmental policies.

This research is on the environment and tourism nexus by including tourism in the EMT with available data from ten selected destinations in the European Region. This is the weakness of the study. For this reason, the theoretical evidence obtained in the study needs to be developed with research objects that include developing countries. Testing this theory with more countries or individual countries with a more extended range of data would be helpful to obtain comparable results. In future studies, investigating the impact of tourism on the environment with more specific pollution indicators (water, air, noise, soil, etc.) and new variables such as tourism income and tourism development index may help to keep the debate on the issue on the agenda and to develop policy recommendations.

References

Abbasi, K.R. et al. (2021), "Economic complexity, tourism, energy prices, and environmental degradation in the top economic complexity countries: fresh panel evidence", *Environmental Science and Pollution Research*, 28, 68717-68731.

Ahmad, F. et al. (2019), "Taking the bad with the good: The nexus between tourism and environmental degradation in the lower middle-income Southeast Asian economies", *Journal of Cleaner Production*, 233, 1240-1249.

Ahmad, M. et al. (2021), "Modelling the dynamic linkages between eco-innovation, urbanization, economic growth and ecological footprints for G7 countries: does financial globalization matter?", *Sustainable Cities and Society*, 70, 102881.

Ahmed, Z. et al. (2022), "The trade-off between energy consumption, economic growth, militarization, and CO2 emissions: does the treadmill of destruction exist in the modern world?", *Environmental Science and Pollution Research*, 29, 18063-18076.

Akbas, Y.E. & F. Lebe (2023), "The effect of poverty and income inequality on CO2 emission based on Environmental Kuznets Curve analysis: Empirical evidence from selected developing countries", *Theoretical and Applied Economics*, 2(635), 103-118.

Alola, A.A. et al. (2021), "Perspectives of globalization and tourism as drivers of ecological footprint in top 10 destination economies", *Environmental Science and Pollution Research*, 28, 31607-31617.

Andereck, K.L. (1993), "The impacts of tourism on natural resources", *Parks & Recreation*, 28(6), 26-86.

Apergis, N. & J.E. Payne (2010), "Renewable energy consumption and economic growth: evidence from a panel of OECD countries", *Energy Policy*, 656-660.

Aydin, M. et al. (2023), "The role of green innovation in achieving environmental sustainability in European Union countries: Testing the environmental Kuznets curve hypothesis", *Gondwana Research*, 118, 105-116.

Ballı, E. (2021), "The nexus between tourism, environmental degradation and economic growth", *Ege Academic Review*, 21(2), 149-161.

Balsalobre-Lorente, D. et al. (2020), "The effects of tourism and globalization over environmental degradation in developed countries", *Environmental Science and Pollution Research*, 27(7), 7130-7144.

Bargaoui, S.A. et al. (2014), "Environmental impact determinants: An empirical analysis based on the STIRPAT model", *Procedia-Social and Behavioral Sciences*, 109, 449-458.

Becken, S. et al. (2020), "Tourism and climate change: Evaluating the extent of policy integration", *Journal of Sustainable Tourism*, 28(10), 1603-1624.

Bilen, K. et al. (2008), "Energy production, consumption, and environmental pollution for sustainable development: A case study in Turkey", *Renewable and Sustainable Energy Reviews*, 12(6), 1529-1561.

Bond, S. & M. Eberhardt (2013), "Accounting for unobserved heterogeneity in panel time series models", *Unpublished Mimeo*, Nuffield College University of Oxford.

Breusch, T.S. & A.R. Pagan (1980), "The Lagrange multiplier test and its applications to model specification in econometrics", *The Review of Economic Studies*, 47(1), 239-253.

Buckley, R. (2011), "Tourism and environment", *Annual Review of Environment and Resources*, 36, 397-416.

Bugden, D. (2022), "Technology, decoupling, and ecological crisis: examining ecological modernization theory through patent data", *Environmental Sociology*, 8(2), 228-241.

Çakmak, E.E. & S. Acar (2022), "The nexus between economic growth, renewable energy and ecological footprint: An empirical evidence from most oil-producing countries", *Journal of Cleaner Production*, 352, 131548.

Çam, O. & C. Çelik (2022), "Aşırı Turizm Kapsamında Turistlere Yönelik Olumsuz İfadeler, Yapılan Eylemler ve Bunların Turizme Yansımalarının Değerlendirilmesi", *Çağ Üniversitesi Sosyal Bilimler Dergisi*, 19(1), 66-84.

Charfeddine, L. & Z. Mrabet (2017), "The impact of economic development and social-political factors on ecological footprint: A panel data analysis for 15 MENA countries", *Renewable and Sustainable Energy Reviews*, 76, 138-154.

Cheng, Y. & X. Yao (2021), "Carbon intensity reduction assessment of renewable energy technology innovation in China: A panel data model with cross-section dependence and slope heterogeneity", *Renewable and Sustainable Energy Reviews*, 135, 110157.

Chu, L.K. (2022), "Determinants of ecological footprint in OCED countries: do environmental-related technologies reduce environmental degradation?", *Environmental Science and Pollution Research*, 29(16), 23779-23793.

Deniz, T. (2019), "Turizm ve Biyoçeşitlilik", *Safran Kültür ve Turizm Araştırmaları Dergisi*, 2(3), 323-339.

Eberhardt, M. & F. Teal (2010), "Productivity analysis in global manufacturing production", *Economics Series Working Papers* 515, University of Oxford, Department of Economics.

Eberhardt, M. & S. Bond (2009), "Cross-section dependence in nonstationary panel models: a novel estimator", *MPRA Paper* 17692, University Library of Munich, Germany.

Fodha, M. & O. Zaghdoud (2010), "Economic growth and pollutant emissions in Tunisia: an empirical analysis of the environmental Kuznets curve", *Energy Policy*, 38(2), 1150-1156.

Global Carbon Project (2022), *Global Carbon Budget*, <https://www.globalcarbonproject.org/carbonbudget/>, 22.04.2023.

Godil, D.I. et al. (2020), "Revisiting the role of tourism and globalization in environmental degradation in China: Fresh insights from the quantile ARDL approach", *Journal of Cleaner Production*, 272, 122906.

Gössling, S. & M.C. Hall (2006), *Tourism and Global Environmental Change*, Taylor & Francis.

Gouldson, A. & J. Murphy (1997), "Ecological modernisation: economic restructuring and the environment", *The Political Quarterly*, 68(5), 74-86.

Grossman, G.M. & A.B. Krueger (1995), "Economic growth and the environment", *The Quarterly Journal of Economics*, 110(2), 353-377.

Guan, C. et al. (2022), "Impact of tourism industry, globalization, and technology innovation on ecological footprints in G-10 countries", *Economic Research-Ekonomska Istraživanja*, 35(1), 6688-6704.

Gulistan, A. et al. (2020), "Dynamic relationship among economic growth, energy, trade openness, tourism, and environmental degradation: fresh global evidence", *Environmental Science and Pollution Research*, 27(12), 13477-13487.

Han, V. et al. (2022), "Türkiye'de Turizm Gelişiminin Çevresel Bozulma Üzerine Etkisinin Değerlendirilmesi", *Fiscaoeconomia*, 6(2), 345-361.

Haseeb, M. & M. Azam (2021), "Dynamic nexus among tourism, corruption, democracy and environmental degradation: a panel data investigation", *Environment, Development and Sustainability*, 23(4), 5557-5575.

Hassan, S.T. (2019), "Linking economic growth and ecological footprint through human capital and biocapacity", *Sustainable Cities and Society*, 47, 101516.

Hillery, M. et al. (2001), "Tourist perception of environmental impact", *Annals of Tourism Research*, 28(4), 853-867.

Holden, A. (2016), *Environment and Tourism*, Routledge.

Huber, J. (1982), *Die verlorene Unschuld der Ökologie: neue Technologien und superindustrielle Entwicklung*, S. Fischer.

İlban, M.O. & M.T. Liceli (2022), "Ekolojik Ayak İzi ve Turizm Büyümesi Panel Nedensellik İlişkisi", *Gastroia: Journal of Gastronomy And Travel Research*, 6(2), 231-241.

Jahanger, A. et al. (2022), "Autocracy, democracy, globalization, and environmental pollution in developing world: fresh evidence from STIRPAT model", *Journal of Public Affairs*, 22(4), e2753.

Jänicke, M. (1985), *Preventive Environmentgal Policy as Ecological Modernisation and Structural Policy*, Berlin: Wissenschaftszentrum, IIUG dp 85-2.

Javed, A. et al. (2023), "The impact of green technology innovation, environmental taxes, and renewable energy consumption on ecological footprint in Italy: Fresh evidence from novel dynamic ARDL simulations", *Technological Forecasting and Social Change*, 191, 122534.

Jaz, N.A.A. et al. (2023), "Does Tourism Lead to Environmental Impact? Cross-National Static and Dynamic Evidence from the Ecological Footprint", *Institutions and Economies*, 15(2), 115-141.

Jebli, M. et al. (2019), "The dynamic linkage between renewable energy, tourism, CO2 emissions, economic growth, foreign direct investment, and trade", *Latin American Economic Review*, 28(1), 1-19.

Karadağ, H. (2021), "Türkiye Ekonomisinde 1990-2016 Döneminde turizm ve çevre ilişkisinin ekonometrik analizi", *Türk Turizm Araştırmaları Dergisi*, 5(1), 164-175.

Katircioglu, S. et al. (2018), "Testing the role of tourism development in ecological footprint quality: evidence from top 10 tourist destinations", *Environmental Science and Pollution Research*, 25, 33611-33619.

Katircioglu, S. et al. (2020), "Estimating the effects of tourism growth on emission pollutants: empirical evidence from a small island, Cyprus", *Air Quality, Atmosphere & Health*, 13, 391-397.

Khan, S.A.R. et al. (2019), "A green ideology in Asian emerging economies: From environmental policy and sustainable development", *Sustainable Development*, 27(6), 1063-1075.

Kirikkaleli, D. et al. (2023), "Does patents on environmental technologies matter for the ecological footprint in the USA? Evidence from the novel Fourier ARDL approach", *Geoscience Frontiers*, 14(4), 101564.

Kitzes, J. et al. (2009), "A research agenda for improving national Ecological Footprint accounts", *Ecological Economics*, 68(7), 1991-2007.

Koçak, E. & O. Uçan (2021), "Yenilenebilir enerji ile istihdam arasındaki ilişki", *Niğde Ömer Halisdemir Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 3(1), 99-112.

Koçak, E. et al. (2020), "The impact of tourism developments on CO2 emissions: An advanced panel data estimation", *Tourism Management Perspectives*, 33, 100611.

Koseoglu, A. et al. (2022), "Green innovation and ecological footprint relationship for a sustainable development: Evidence from top 20 green innovator countries", *Sustainable Development*, 30(5), 976-988.

Kutlu, Ş.Ş. & M. Kutlu (2022), "Turizm Faaliyetlerinin Ekolojik Ayak İzi Üzerine Etkisi: Türkiye Örneği", *Maliye Dergisi*, 182, 233-249.

Lin, S. et al. (2009), "Analysis of the environmental impact of China based on STIRPAT model", *Environmental Impact Assessment Review*, 29(6), 341-347.

Liu, Z. et al. (2022), "Role of tourism development in environmental degradation: A step towards emission reduction", *Journal of Environmental Management*, 303, 114078.

Long, M.A. et al. (2018), "The great recession, the treadmill of production and ecological disorganization: Did the recession decrease toxic releases across US states, 2005-2014?", *Ecological Economics*, 146, 184-192.

Milano, C. et al. (2018), "Overtourism: A growing global problem", *The Conversation*, 18(1), 1-5.

Mol, A.P. & D.A. Sonnenfeld (eds.) (2000), *Ecological modernisation around the world: perspectives and critical debates*, Psychology Press.

Mulali, U. et al. (2022), "Investigating the environmental Kuznets curve (EKC) hypothesis: does government effectiveness matter? Evidence from 170 countries", *Environment, Development and Sustainability*, 24, 12740-12755.

Nathaniel, S.P. et al. (2021), "What drives ecological footprint in top ten tourist destinations? Evidence from advanced panel techniques", *Environmental Science and Pollution Research*, 28(28), 38322-38331.

NOAA National Oceanic and Atmospheric Administration (2022), <https://www.noaa.gov/>, 05.06.2023.

Örnek, İ. & S. Türkmen (2019), "Gelişmiş ve Yükselen Piyasa Ekonomilerinde Çevresel Kuznets Eğrisi Hipotezi'nin Analizi", *Journal of the Cukurova University Institute of Social Sciences*, 28(3), 109-129.

Oyebanji, M.O. et al. (2022), "Patents on environmental technologies and environmental sustainability in Spain", *Sustainability*, 14(11), 6670.

Özcan, B. et al. (2020), "Energy consumption, economic growth and environmental degradation in OECD countries", *Economic Modelling*, 84, 203-213.

Özturk, I. et al. (2016), "Investigating the environmental Kuznets curve hypothesis: the role of tourism and ecological footprint", *Environmental Science and Pollution Research*, 23, 1916-1928.

Pesaran, M.H. & T. Yamagata (2008), "Testing slope homogeneity in large panels", *Journal of Econometrics*, 142(1), 50-93.

Pesaran, M.H. (2004) "General Diagnostic Tests for Cross Section Dependence in Panels" *Cambridge Working Papers in Economics*, No: 435.

Raza, S.A. et al. (2017), "Tourism development and environmental degradation in the United States: evidence from wavelet-based analysis", *Current Issues in Tourism*, 20(16), 1768-1790.

Razzaq, A. et al. (2021), "Asymmetric inter-linkages between green technology innovation and consumption-based carbon emissions in BRICS countries using quantile-on-quantile framework", *Technology in Society*, 66, 101656.

Schnaiberg, A. (1980), *The Environment: From Surplus to Scarcity*, New York: Oxford University Press.

Shahbaz, M. et al. (2021), "A bibliometric analysis and systematic literature review of tourism-environmental degradation nexus", *Environmental Science and Pollution Research*, 28(41), 58241-58257.

Solarin, S.A. (2014), "Tourist arrivals and macroeconomic determinants of CO2 emissions in Malaysia", *Anatolia*, 25(2), 228-241.

Stretesky, P.B. et al. (2013), "Does environmental enforcement slow the treadmill of production? The relationship between large monetary penalties, ecological disorganization and toxic releases within offending corporations", *Journal of Crime and Justice*, 36(2), 233-247.

Sun, Y. et al. (2008), "Pattern of patent-based environmental technology innovation in China", *Technological Forecasting and Social Change*, 75(7), 1032-1042.

Tandoğan, D. & M. Genç (2019), "Türkiye'de Turizm ve Karbondioksit Salımı Arasındaki İlişki: Rals-Engle ve Granger Eşbütünleşme Yaklaşımı", *Anatolia: Turizm Araştırmaları Dergisi*, 30(3), 221-230.

Telfer, D. & R. Sharpley (2008), *Tourism and Development in the Developing World*, London. Routledge.

Turizm Gazetesi (2023), *Fransa da turist sayısı kısıtlamasına gidiyor*, <https://www.turizmgazetesi.com/haber/fransa-da-turist-sayisi-kisitlamasina-gidiyor/85105>, 21.06.2023.

United Nations (1972), *UN Stockholm Environment Declaration*, Stockholm.

UNWTO (2020), *International Tourism Highlights*, <https://www.e-unwto.org/doi/epdf/10.18111/9789284422456>, 05.02.2023.

Uzar, U. (2021), "The relationship between institutional quality and ecological footprint: Is there a connection?", in: *Natural Resources Forum*, 45(4), 380-396; Oxford, UK: Blackwell Publishing Ltd.

Vita, G. et al. (2015), "Revisiting the environmental Kuznets curve hypothesis in a tourism development context", *Environmental Science and Pollution Research*, 22(21), 16652-16663.

Wackernagel, M. & W. Rees (1998), *Our ecological footprint: reducing human impact on the earth* (Vol. 9), New society publishers.

Xepapadeas, A. (2005), "Economic growth and the environment", *Handbook of Environmental Economics*, 3, 1219-1271.

Yang, L. et al. (2022), "Achieving environmental sustainability in Africa: the role of renewable energy consumption, natural resources, and government effectiveness-evidence from symmetric and asymmetric ARDL models", *International Journal of Environmental Research and Public Health*, 19(13), 8038.

Yasmeen, R. et al. (2022), "The nexuses between carbon emissions, agriculture production efficiency, research and development, and government effectiveness: Evidence from major agriculture-producing countries", *Environmental Science and Pollution Research*, 29(34), 52133-52146.

Yerdelen-Tatoğlu, F. (2018), *İleri Panel Veri Analizi*, İstanbul: Beta Basım Yayım Dağıtım.

York, R. et al. (2003), "STIRPAT, IPAT and ImPACT: analytic tools for unpacking the driving forces of environmental impacts", *Ecological Economics*, 46(3), 351-365.

Yurtkuran, S. (2022), "Gelen turist sayısının en fazla olduğu 10 ülkede turizm ile CO2 salımı arasındaki ilişki: panel fourier toda-yamamoto nedensellik analizi", *Erciyes Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, (61), 281-303.

Zaman, K. et al. (2016), "Tourism development, energy consumption and Environmental Kuznets Curve: Trivariate analysis in the panel of developed and developing countries", *Tourism Management*, 54, 275-283.

Zhang, S. & X. Liu (2019), "The roles of international tourism and renewable energy in environment: new evidence from Asian countries", *Renewable Energy*, 139, 385-394.

Zhang, Y. et al. (2019), "Is tourism really affected by logistical operations and environmental degradation? An empirical study from the perspective of Thailand", *Journal of Cleaner Production*, 227, 158-166.

Examining Fitness Centre Members' Perceived Risk, Attitude, and Behavioural Intentions in the Context of Brand Equity during the COVID-19 Pandemic

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COVID-19 Pandemisi Döneminde Fitness Merkezi Üyelerinin Algılanan Risk, Tutum ve Davranışsal Niyetlerinin Marka Denkliği Bağlamında İncelenmesi

Abstract

This study examines the mediating role of fitness centre members' attitudes between perceived risk-behavioural intention and the moderating role of brand equity in the linkage between "perceived risk-behavioural intention" and "perceived risk-attitude-behavioural intention.". Data was collected from 280 fitness club members in Ankara, Türkiye. Proposed hypotheses are tested through PROCESS analyses. The analyses demonstrated support for the hypotheses. Amidst the COVID-19 pandemic, a noticeable decrease in fitness centre memberships is attributed to perceived risks. In this context, this research contributes to the fitness centre literature by exploring the role of brand equity and providing insights for managers.

Keywords	:	Perceived Risk, Brand Equity, Attitude, Behavioural Intention, Fitness Centres.

JEL Classification Codes :   M10, M19, M30, M31.

Öz

Bu çalışma, fitness merkezi üyelerinin tutumlarının algılanan risk-davranışsal niyet arasındaki aracılık rolünü ve marka denkliğinin "algılanan risk-davranışsal niyet" ile "algılanan risk-tutum-davranışsal niyet" arasındaki düzenleyicilik rolünü incelemeyi amaçlamaktadır. Veriler, Ankara (Türkiye)' daki fitness merkezine üye olan 280 kişiden toplanmıştır. Önerilen hipotezler, PROCESS analizi aracılığıyla test edilmiştir. Analizler sonucu hipotezler desteklenmektedir. COVID-19 pandemisinde, fitness merkezi üyeliklerinde belirgin bir azalma olması, algılanan riske bağlanmaktadır. Bu bağlamda, bu araştırma, marka denkliğinin rolünü araştırarak fitness merkezi literatürüne katkıda bulunmakta ve yöneticiler için içgörü sunmaktadır.

Anahtar Sözcükler	:	Algılanan Risk, Marka Denkliği, Tutum, Davranışsal Niyet, Fitness Merkezleri.

1. Introduction

Following the World Health Organization's declaration of COVID-19 as a pandemic on March 11, 2020 (World Health Organization, 2020), fitness centres were among the first businesses to close. Governments worldwide imposed stringent restrictions on citizens and businesses in various industries, including fitness centres, to protect their communities during the pandemic. During the initial lockdown in most countries (e.g., France, Germany, Italy, China, Japan, and Türkiye), fitness centres and sports clubs were required to close to help slow the spread of the virus.

The conditions for fitness centres during the COVID-19 pandemic have been constantly evolving, and the particular limits and regulations in effect may differ by area and local public health conditions. In some instances, these facilities were forced to be shut down, while in others, they were permitted to remain operational with capacity restrictions or other safety measures. For example, in April 2020, fitness centres and sports clubs were allowed to reopen with capacity limits and other safety measures in place, including the requirement to maintain a distance of at least 2 meters between individuals and to limit the number of people in the facilities (Republic of Turkiye Ministry of Health, 2020). As lockdowns were lifted and limitations were loosened in some regions, some fitness centres and sports clubs were permitted to reopen, frequently with capacity restrictions and other safety precautions in place. For example, 90% of fitness centres have reopened, although many ran at reduced capacity in the United Kingdom (Leisure Database, 2020).

ClubIntel polled 2,000 American gym members and found that 54% of respondents had frozen or cancelled their memberships (Davalos, 2021). Even though more than 87% of gyms in the United States reopened in September, 60% of their members didn't return, and 20% quit exercising completely (Davalos, 2021). 75% of consumers surveyed stated that they would return to their pre-pandemic or everyday routines and physical gyms after the pandemic passed, but many also said they would keep using virtual fitness programs (Davalos, 2021). The 2021 IHRSA Global Report reveal that fitness centres lost about $20.4 billion in 2020 compared to the previous year due to the closures and restricted capabilities amid the pandemic in the United States (Kufahl, 2021).

After removing restrictions on fitness centres, whether the members are ready to go to a fitness centre became an unanswered question for the fitness centres. During the COVID-19 pandemic, consumers may perceive several risks when using fitness centres. Consumers may be concerned about contracting the virus while using shared equipment or participating in group fitness classes. Consumers may be concerned about the cleanliness of equipment and facilities, especially if the facility is not enforcing proper cleaning and sanitation measures. Besides these concerns, many fitness centres and sports clubs require long-term contracts or membership fees. Consumers may hesitate to commit to these financial obligations if they are unsure about their ability to use the facilities due to pandemic-related restrictions or closures. In this context, fitness clubs must address the perceived risks to ensure the members' attitudes and behavioural intentions during the

COVID-19 pandemic. The perceived risks associated with the fitness centres will likely alter consumers' attitudes toward sports and fitness services, impacting behavioural intentions. Fitness centres that have reopened within the confines of the restrictions are looking for novel ways to avoid membership declines and protect their customers. The success of fitness centres is dependent on the reduction of associated risks and the enhancement of attitudes toward fitness centres.

Some studies examine the influence of risk perceptions in hospitality (Braje et al., 2022; Kim et al., 2021), retailing (i.e., stores that use the Face Recognition payment method) (Zahira & Kurniawati, 2022), restaurant (Wei et al., 2022), food [i.e., street food (Laohaviraphap & Wetchasart, 2021), locally produced food (Palau-Saumell et al., 2021)], skincare products (Dewi, 2022) industry during COVID-19 pandemic.

Although there are limited studies concerning perceived risk during the COVID-19 pandemic in terms of exercising and or sports in the literature, these studies consider safer sports environments (e.g. hiking) (Wu et al., 2022); outdoor activities in urban parks (Khozaei et al., 2021). Therefore, consumers' perceived risk and dimensions of perceived risk (e.g., physical, time, psychological, social, financial, and performance) during the COVID-19 pandemic are scarce research areas in the sports industry, especially in the fitness centre context.

Companies consistently strive to reduce consumers' perception of risk and mitigate risk by enhancing brand equity (Kirchoff et al., 2019: 144). Strong brand equity might also help to regulate perceived risk and its impact on profitability, sales revenue (Rambocas et al., 2018: 20), other variables such as customer purchase intention (Wang, 2015), attitude (Kirchoff et al., 2019: 139) and their willingness to pay price premiums (Rambocas et al., 2018: 20) by building positive associations with the firm. Brand equity is crucial to attracting and retaining customers in a competitive market like fitness centres. Based on these, brand equity of fitness centres would help members overcome the negative impact of perceived risk towards fitness centres. There are studies on the negative impact of perceived risk on brand equity (Chen & Chang, 2012: 1157; Kirchoff et al., 2019: 144) as well as the reciprocal influence of brand equity on perceived risk (Washington, 2015: 213; Wang, 2015: 558). However, the interaction impact of brand equity with perceived risk is a scarce area of research.

In this context, this study contributes to the literature on sports marketing by shedding light on the effect of brand equity on perceived risk with its relation to the behavioural intention (through attitude) of fitness club members. In this context, brand equity might mitigate the impacts of perceived risk on attitude, which in turn might increase behavioural intentions. Brand equity, one of a company's most valuable intangible assets, is more than a product's name; it is the symbolic meaning brands strive to convey, giving the company a competitive advantage (Vo Minh et al., 2022).

Consequently, this study aims to examine whether the perceived risk influences the formation of attitudes, which in turn influences behavioural intentions, and expand this mediation model considering the role of brand equity in the context of the COVID-19 pandemic and fitness centres. Perceived risks concerning the fitness centres and their impact on attitudes and behavioural intention in the context of brand equity would open sight for the managers of the fitness centres.

2. Conceptual Framework and Hypotheses Development

2.1. Mediator Role of Attitude: Perceived Risk-Attitude-Behavioural Intention Linkage

The concept of perceived risk in customer behaviour, originally used by Bauer (1960 c.f. Choi et al., 2013), results from uncertainty and the emergence of negative ramifications of purchase or non-purchase (Ha, 2002). Stone and Mason (1995) utilise risk as the perceived certainty of a behaviour's associated losses. In addition, a person's level of fear regarding the results of participating in a particular activity is referred to as their perceived risk (Wang et al., 2022). This study adapts the risk classification of Stone & Grønhaug (1993) by considering financial, time, performance, social, psychological and physical risk. Perceived risk can also be an important antecedent in attitudes and behavioural intention in the context of fitness centres.

Attitude is the learned propensity to evaluate a particular object or issue as "good-bad, harmful-beneficial, pleasant-unpleasant, and likeable-dislikeable" (Ajzen, 2001: 28). In other words, attitude is an individual's evaluation of an object, idea, or issue that is generally positive or negative. Accordingly, the risk is a loss-based concept, whereas the attitude includes both the gains and losses related to an outcome (Stone & Mason, 1995: 150). In their seminal article, stone and Mason (1995) found that situation-specific risks predict attitude in the context of a personal computer purchase. Accordingly, when consumers perceive a high risk associated with a product, they are more likely to have a negative attitude towards it. On the other hand, when perceived risk is low, consumers are more likely to have a positive attitude towards the product. For example, when consumers perceive a high level of risk, they may be more sceptical or cautious about the product, which can lead to a negative attitude. In contrast, when consumers perceive a low level of risk, they may be more confident in the product and have a more positive attitude towards it.

In their meta-analysis, Kim and Hunter (1993) found that attitude affects behaviour via its impact on behavioural intentions. Accordingly, attitude is a strong predictor of behavioural intention. Oliver (2010:23) defines intentions as a stated likelihood of engaging in a behaviour. Behavioural intention refers to "the subject's indication of his or her intention or willingness to engage in various behaviours concerning a given person or object" (Kim & Hunter, 1993: 332). For example, if a child has a favourable attitude toward physical activity, he or she is more likely to intend to engage in physical activity (Lee et al., 2020).

Consumers' perceived risk reduces their intention to purchase via the Internet (Kim et al., 2008). The perceived risk of COVID-19 was found to have a significant effect on post-traumatic stress disorder, which in turn negatively influences guests' revisit intention of hotel services such as guest rooms, restaurants, spas, and fitness clubs (Yu et al., 2021). Nagar (2020) found that perceptions of risk and benefit influence attitudes toward gym supplements. Perceived risk also negatively impacts the intention to purchase gym supplements. Moreover, attitude mediates the relationship between risk perception and purchase intention (Nagar, 2020). The attitude was a mediator between affective risk perception and behavioural intention in the intact tourism sector in South Korea (Bae & Chang, 2021). Similarly, belief in the positive outcomes of an action increases the likelihood that the individual will develop a positive attitude toward the action, which in turn raises the probability that the individual will conduct the activity (Wang et al., 2022). In contrast, it could be concluded that when the perceived risk is high in COVID-19, an individual's attitude toward the fitness centre would decrease, lowering the likelihood that the individual would revisit it. Therefore, we expect individuals who perceive a high risk associated with fitness centres to be less likely to have a positive attitude towards these facilities and, as a result, are less likely to engage in the behaviour of joining and using these facilities. On the other hand, individuals who perceive a low level of risk are more likely to have a positive attitude and are more likely to engage in the behaviour of joining and using these facilities. Perceived risk will negatively relate to attitude, subsequently decreasing behavioural intention. Consequently, the following hypothesis is formed.

H1. *Attitude mediates the relationship between perceived risk and behavioural intention.*

2.2. Moderating Role of Brand Equity

When consumers perceive a low level of risk, their attitudes toward fitness centres and the likelihood of revisiting them improve. This relationship can be strengthened through various strategies, such as providing detailed product information, offering money-back guarantees, and building trust (Kaur & Arora, 2020). Besides, brand equity might serve as a moderating element in these relationships. Keller (1993: 2) defines customer-based brand equity as "the differential effect of brand knowledge on consumer response to the brand's marketing." According to the definition of brand equity (Keller, 1993), consumers have a more positive (negative) response to the marketing mix elements of the brand than they do to the same marketing mix element when attributed to a fictitious named or unnamed version of the product, it means the brand has positive (negative) customer-based brand equity.

Brand equity serves as a moderating variable in various relationships. For instance, when it comes to increasing the effect of service recovery satisfaction on behaviour intentions (repatronage intentions and word-of-mouth behaviour), strong brand equity provides an overall advantage over weak brand equity (Huang, 2011). Moreover, brand equity moderates the positive relationship between service quality and customer loyalty (Hur & Kim, 2020). Brand equity mediates between co-creating service recovery with customers and outcome-favourable relationships (Hazée et al., 2017). Although Hazée et al. (2017)

found that co-creating a service recovery makes customers think they got the best solution for the service failure, affecting satisfaction and repurchase plans, low-brand equity companies should co-create service recovery, not ones with high brand equity (Hazée et al., 2017). Restaurants with weak brand equity are more subject to the effects of electronic word of mouth (eWOM) on their financial performance than those with high brand equity (Wang et al., 2021).

Credible signals, such as brands, have been effective indicators of product quality and credibility, mitigating perceived risks and uncertainty (Wang et al., 2022). Accordingly, the low perceived risk might result in high intention to visit fitness centres via their attitudes being favourable due to increased brand equity. Brand equity's high or low might change the strength of the negative impact of perceived risk on behavioural intentions via attitudes.

In this context, this study aims to investigate whether or not the perception of risk reveals similar consequences in terms of attitude and behavioural intentions when brand equity is considered. Overall, fitness centres' managers can use brand equity to reduce the impact of their members' perceived risk on revisit intentions through their attitudes. Therefore, it might be concluded that the negative impact of perceived risk on attitude is stronger among low-equity brands than among high-equity brands. Accordingly, the following hypotheses are proposed:

H2. Brand equity moderates the direct relationship between perceived risk and behavioural intention.

H3. Brand equity moderates the relationship between perceived risk and behavioural intention via attitude.

The proposed model of this study is given in Figure 1.

Figure: 1
Proposed Model
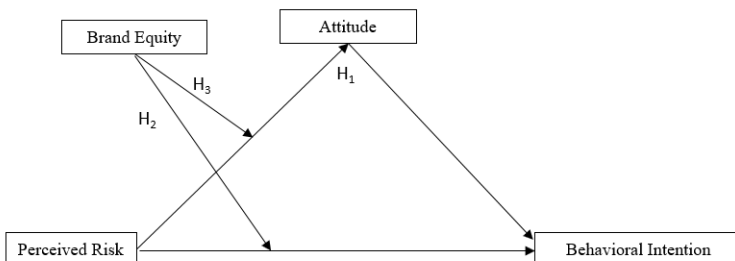
3. Data and Methodology

3.1. Sampling

Data was collected from November 2020 to February 2021. All participants selected the option for voluntary participation after receiving an informed consent document describing the purpose of the research, the anonymity and confidentiality of data usage, and the participant's ability to opt out of the research at any time without any responsibility. Using the convenience sampling method, the data was gathered online from 280 participants aged 18 to 73 who were members of any fitness club in Ankara, Türkiye. The recommended sample size for confirmatory factor analysis (CFA) is between 100 and 200 questionnaires (Hair et al., 2010); the sample size is acceptable for analyses. Table 1 provides details regarding the demographic characteristics of the participants.

Table: 1
Demographic Characteristics of the Sample

Demographic Variables	n	%	Demographic Variables	n	%
Gender			*Education*		
Men	175	62.5	Elementary school	2	.07
Woman	105	37.5	High school	57	20.4
Total	280	100	University	159	56.8
			Graduate	62	22.1
			Total	280	100
Membership term			*Income*		
1-6 month	107	38.2	Very low	12	4.3
7-12 months	100	35.7	Low	22	7.9
13-24 months	31	11.1	Average	197	70.4
25-36 months	18	6.4	High	45	16.1
37-240 months	24	8.6	Very high	4	1.4
Total	280	100	Total	280	100

3.2. Measures

The questionnaire was designed to gather data about consumers' perceived risks, attitudes, overall brand equity, behavioural intention toward their fitness club during COVID-19, and demographic variables with multiple choice and open-ended questions. A five-point Likert-type scale was used for measuring dependent and independent variables, with one indicating "strongly disagree" and 5 "strongly agree". All the scales used in the present study were translated from English into Turkish with back-translation to ensure language equivalence. Perceived risks were measured by using the Stone & Grønhaug (1993) scale. The scale consists of 6 sub-dimensions: physical risk (3 items), time risk (4 items), psychological risk (3 items), social risk (3 items), financial risk (4 items), and performance risk (3 items). Attitude (4 items) was measured using the scale of Cheng, Lam, & Yeung (2006), and brand equity (4 items) was measured using Yoo and Donthu's (2001) scale. Finally, behavioural intention (3 items) was measured using the Venkatesh, Brown, Maruping, and Bala scale.

3.3. Preliminary Analysis

The data were initially examined for missing values and the distribution of variables. There were no missing values, and all the skewness and kurtosis values for both measurement models (perceived risks as an independent variable model and overall brand equity, attitude and behavioural intentions as a dependent variable model) were found to be less than 3.29 in absolute terms (Tabachnick & Fidell, 1996) which indicated that the data were normally distributed. Next, confirmatory factor analyses evaluated each item's hypothesised factor number and contribution to the assessed latent construct. Regarding the five-factor perceived risks measurement model, two items from financial risk and one from time risk were dropped, respectively, as they strongly correlated with items other than their factors and items measuring the same factor. A high correlation (.859) between social and psychological risk dimensions also indicated a multicollinearity problem. Thus, social and psychological risks were combined as in the previous research (e.g. Carroll et al., 2014; Qi et al., 2009), and socio-psychological risk was named in this study. After this arrangement, one item from psycho-social risk dropped due to its being strongly correlated with items other than their factors and items measuring the same factor. Finally, the revised four-factor measurement model demonstrated a good fit ($\chi2 = 244.191$, $df = .94$; $p < .001$; $\chi2/df = 2.598$; SRMR = .036; GFI = .901, TLI = .953, NFI = .942, and CFI = .963; RMSEA = .076). The dependent variable measurement model, which included overall brand equity, attitude, and behavioural intentions, also demonstrated a good fit ($\chi2 = 101.960$, $df = .41$; $p < .001$; $\chi2/df = 2.487$; SRMR = .040; GFI = .936, TLI = .967, NFI = .959, and CFI = .975; RMSEA = .073).

All item loadings for both measurement models were significant (p < .001) and above .50 (Hair et al., 2010), ranging from .711 to .974, as depicted in Appendix 1. The average variance extracted and composite reliability were, respectively, above .50 and .70 (Fornell & Larcker, 1981; Nunnally, 1978), which indicated convergent validity and reliability of the constructs. In addition, the discriminant validity was supported by the fact that all square roots of AVE values were greater than the correlations between constructs (Fornell & Larcker, 1981), as given in Tables 2 and 3, bold and diagonal. The means, standard deviations, correlations between the factors, and the AVE and CR scores are also presented in Tables 2 and 3.

Table: 2
Means, Standard Deviations, Correlations, Average Variance Extracted and Composite Reliability of the Variables

Variables	Mean	S.D.	1	2	3	AVE	CR
1. Perceived Risk	1.93	.94	**.84**			.70	.97
2. Attitude	4.33	.85	-,363**	**.87**		.76	.93
3. Brand Equity	4.30	.83	-,143**	,310**	**.83**	.69	.90
4. Behavioural Intention	4.24	.94	-,249**	,420**	,285**	.83	.94

S.D.: Standard Deviation
AVE: Average Variance Extracted; CR: Composite Reliability
*** p < .01; * p < .05*
Entries in bold on the diagonal: The square roots of the AVE values.

Table: 3

Means, Standard Deviations, Correlations, Average Variance Extracted and Composite Reliability of the Variables Considering the Dimensions of Perceived Risk

Variables	Mean	S.D.	1	2	3	4	5	6	7	AVE	CR
1. Physical Risk	2.29	1.23	**.85**							.72	.88
2. Financial Risk	1.78	1.11	,445**	**.88**						.78	.88
3. Time Risk	1.84	1.06	,572**	,660**	**.86**					.75	.90
4. Psycho-social Risk	1.74	1.05	,614**	,652**	,739**	**.87**				.75	.94
5. Performance Risk	2.08	1.10	,649**	,615**	,750**	,732**	**.86**			.75	.90
6. Attitude	4.33	.85	-,268**	-,358**	-,211**	-,282**	-,463**	**.87**		.76	.93
7. Brand Equity	4.30	.83	-,064	-,166**	-,119*	-,111	-,178**	,310**	**.83**	.69	.90
8. Behavioural Intention	4.24	.94	-,118*	-,260**	-,184**	-,219**	-,302**	,420**	,285**	.83	.94

S.D.: Standard Deviation
AVE: Average Variance Extracted; CR: Composite Reliability
** p < .01; * p < .05
Entries in bold on the diagonal: The square roots of the AVE values.

3.4. Testing Hypotheses

The study's descriptive statistics and data screening were performed by IBM SPSS 26. Then, confirmatory factor analysis was done using the Amos 24 statistical program to test the structural validity. PROCESS analyses (Hayes, 2017) were conducted to test mediation and moderated mediation effects. The mediation model (Model 4) (Hayes, 2013: 445) was used to investigate the potential role of attitude as a mediator in the relationship between perceived risks and behavioural intention. The moderated mediation model (Model 8) (Hayes, 2013: 448) was utilised to determine whether brand equity moderated the direct relationship between perceived risk and behavioural intention and the indirect relationship between perceived risk and behavioural intentions via attitudes. To evaluate the significance of the direct and indirect effects, 5000 bootstrap samples with 95% confidence intervals (CIs) were used in mediation and moderated mediation tests (Hayes, 2013, 2022). The effect is statistically significant when the upper or lower 95% CI does not contain zero (Preacher & Hayes, 2008).

Table: 4

The Mediating Role of Attitude in the Relationship between Perceived Risk and Behavioural Intention

	Bootstrapped CI 95%									
Direct effects	Model 1 (Attitude) $R^2 = .144$*** F (1 , 278)= 46.802					Model 2 (Behavioural intention) $R^2 = .188$*** F (4 , 275)= 20.303				
	b	SE	t	LLCI	ULCI	b	SE	t	LLCI	ULCI
Perceived Risk	-.346***	.05	-6.841	-.446	-.246	-.113	.24	-2.669	-1.131	-.171
Attitude						.418***	.06	6.454	.291	.545
Bootstrapping results for the conditional indirect effect										
	Effect			Boot SE			Boot LL		Boot UL	
Perceived Risk- Attitude - Behavioural Intention	-.145			.03			-.223		-.080	

b = Unstandardized regression coefficients
LLCI: Lower-Level Confidence Interval; ULCI = Upper-Level Confidence Interval
Bootstrap sample size = 5,000
*** p < .001

Firstly, the mediator role of attitude on the perceived risk and behavioural intention relationship was evaluated. The results given in Table 4 showed the significant indirect relationship between perceived risk [indirect effect *b* = -.145, Boot SE = .03, (%95 LLCI,

ULCI) = (-.223, -.080); R^2=.188; F (4, 275) = 20.303] and behavioural intention through attitude. Consequently, the H1 hypothesis is supported.

The dimensions of perceived risk (i.e., physical, financial, time, psycho-social, and performance) are also investigated to comprehend better the role of attitude mediating between perceived risk and behavioural intention. According to the findings given in Table 5, each of the perceived risk dimension, such as *physical risk* [indirect effect b = -.085, SE = .02, (%95 LLCI, ULCI) = (-.137, -.041); R^2=.177; F (2, 277) = 29.751], *financial risk* [indirect effect: b = -113, SE = .03, (%95 LLCI, ULCI) = (-.184, -.066); R^2=.191; F (1, 277) = 32.618], *time risk* [indirect effect: b = -.087, SE = .03, (%95 LLCI, ULCI) = (-.152, -.034); R^2=.186; F (2, 277) = 31.705], *psycho-social risk* [indirect effect b = -.099, SE = .03, (%95 LLCI, ULCI) = (-.174, -.048); R^2=.188; F (2, 277) = 32.011], and *performance risk* [indirect effect: b = -.141, SE = .03, (%95 LLCI, ULCI) = (-.211, -.077); R^2=.192; F (2, 277) = 32.818] and behavioural intention are mediated by attitude.

Table: 5
The Attitude's Mediating Effect on the Dimensions of Perceived Risk-Behavioural Intention Relationships

	b	SE	t	LLCI	ULCI	R^2 F (d.f.1 ,df2)
Model 1 (IV: Attitude)						
Physical risk	-.184***	.04	-4.63	-.262	-.106	R^2=.072*** F(1, 278) =21.462
Model 2 (IV: Behavioural intention)						
Attitude	.463***	.06	7.40	.370	.587	R^2=.177***
Physical risk	-005	.04	-.10	-.089	.080	F(2, 277) =29.751
Bootstrapping results in the indirect effect	-.085	.02		-.137	-.041	
Model 1 (IV: Attitude)						
Financial risk	-.273***	.04	-6.40	-.36	-.19	R^2=.128*** F(1,278)= 40.939
Model 2 (IV: Behavioural intention)						
Attitude	.415***	.06	6.48	-.289	-.541	R^2=.191***
Financial risk	-.106**	.04	-2.17	-.202	-.010	F(1,277)= 32.618
Bootstrapping results in the indirect effect	-.113	.03		-.184	-.056	
Model 1 (IV: Attitude)						
Time risk	-.198	.04	-3.59	-.26	-.08	R^2=.055*** F(1, 278) = 16.103
Model 2 (IV: Behavioural intention)						
Attitude	.439***	.06	7.12	.318	.561	R^2=.186***
Time risk	-.094	.05	-1.79	-197	.009	F(2, 277) = 31.705
Bootstrapping results in the indirect effect	-.087	.03		-.152	-.034	
Model 1 (IV: Attitude)						
Psycho-social risk	-.229***	.047	-4.90	-.320	.-137	R^2=.079*** F(1, 278) =24.006
Model 2 (IV: Behavioural intention)						
Attitude	.431***	.06	6.90	.308	.554	R^2=.188***
Socio-psychological risk	-.098	.05	-1.93	-.197	.002	F(2, 277) =32.011
Bootstrapping results in the indirect effect	-.099	.03		-.174	-.048	
Model 1 (IV: Attitude)						
Performance risk	-.358***	.04	-8.70	-.438	-.277	R^2=.214*** F(1, 278) =75.766
Model 2 (IV: Behavioural intention)						
Attitude	.395***	.06	5.85	.262	.528	R^2=.192***
Performance risk	-.117*	.05	-2.25	-.220	-.015	F(2, 277) =32.818
Bootstrapping results in the indirect effect	-.141	.03		-.211	-.077	

b = Unstandardized regression coefficients
LLCI = Lower-Level Confidence Interval; ULCI = Upper-Level Confidence Interval; IV: Independent variable
Bootstrap sample size = 5,000
*** p < .001; * p < .05

Next, through the moderated mediation model (Model 8) (Hayes, 2013), the *conditional effect of brand equity* is examined in the *direct* relationship between perceived risk and behavioural intention (H2) and the *indirect* relationship between perceived risk and behavioural intention via attitude (H3). Whether high compared with low levels of brand equity weakens the negative association was also tested. These were tested at three values of brand equity: low (at 1 SD below the mean), medium (at the mean), and high (at 1 SD above the mean).

The PROCESS analysis (Model 8) revealed *conditional effect of brand equity* in the *direct* relationship between perceived risk and behavioural intention [brand equity*behavioural intention b = .131, SE: .05; t: 2.37; p < .01, (%95 LLCI, ULCI) = (.023, .240); R^2=.229; F (4, 275)=20.379] [ΔR^2 = .016; F (1, 275) = 5.65)]. At low levels of brand equity, the negative direct effect of perceived risk on behavioural intention is significant [Brand equity $_{low}$; b = -.216; (%95 LLCI, ULCI): (-.362, -.070)]. When brand equity increases, however, the negative direct effect of perceived risk on behavioural intention becomes insignificant (Brand equity $_{medium}$; (%95 LLCI, ULCI): (-.221, -.007); Brand equity $_{high}$; (%95 LLCI, ULCI): (-.152, .121)]. Accordingly, H2. is supported. Moreover, the analysis revealed *the conditional effect of brand equity* in the *direct* relationship between perceived risk and *attitude*. High compared with low levels of brand equity weakened the negative association. At low levels of brand equity, the negative impact of perceived risk on attitude toward fitness centres is high [Brand equity $_{low}$; b = -.437; 95% (LLCI, ULCI) : (-.556, -.317)]. When brand equity increases, the negative effect of perceived risk on attitude diminishes [Brand equity $_{medium}$: b = -.298; 95% (LLCI, ULCI): -.393, -.202 ; Brand equity $_{high}$: b = -.182; 95% (LLCI, ULCI): (-.301, -.062)].

The analysis *revealed the conditional effect of brand equity* in the *indirect relationship* between perceived risk and behavioural intention via the mediating role of attitude [*Index of Moderated Mediation*: .055; (Boot LLCI, Boot ULCI) = (.012, .100)]. High compared to low levels of brand equity weakened the negative association. At low levels of brand equity, the negative impact of perceived risk on behavioural intention is high through attitude toward fitness centres [Brand equity $_{low}$; b = -.145; (95% LLCI, ULCI) : (-.223, -.065)]. When brand equity increases, the negative effect of perceived risk on behavioural intention as mediated through attitude declines [Brand equity $_{medium}$: b = -.099; 95% (LLCI, ULCI): -.159, -.045 ; Brand equity $_{high}$: b = -.060; 95% (LLCI, ULCI): (-.123, -.019)]. Therefore, H3 is supported. The results regarding the conditional direct and indirect effects in the context of perceived risk, attitude, behavioural intention, and brand equity are presented in Table 6.

Table: 6

Results of Conditional Direct and Indirect Analyses: Perceived Risk-Attitude-Behavioural Intention (Brand Equity Moderator)

Direct effects	Bootstrapped CI 95%									
	Model 1 (Attitude) $R^2 = .242$ $F(3, 276) = 29.363$					Model 2 (Behavioural intention) $R^2 = .229$ $F(4, 275) = 20.379$				
	b	SE	t	LLCI	ULCI	b	SE	t	LLCI	ULCI
Perceived Risk	-.298***	.04	-6.14	-.393	-.202	-.107	.05	-1.85	-.221	.007
Brand equity	.247***	.05	4.55	.140	.354	.184**	.06	2.93	.061	.308
Attitude						.331***	.06	4.91	.198	.463
Perceived Risk * Brand equity	.167**	.04	3.45	.072	.262	.131**	.05	2.37	.023	.240
	$\Delta R^2 = 0.033; F(1, 276) = 11.957$					$\Delta R2 = 0.016; F(1, 275) = 5.65$				
The conditional direct effects (Perceived Risk - Attitude - Behavioural Intention Relationships: Brand Equity Moderator)										
	b	SE	t	LLCI	ULCI	b	SE	t	LLCI	ULCI
Low level of Brand Equity (-1 SD)	-.437***	.06	-7.19	-.556	-.317	-.216**	.07	-2.92	-.362	-.070
Medium level of Brand Equity (Mean)	-.298***	.04	-6.147	-.393	-.202	-.107	.05	-1.85	-.221	.007
High level of Brand Equity (+1 SD)	-.182**	.06	-2.97	-.301	-.062	-.015	.06	-.22	-.152	.121
Bootstrapping results for the conditional indirect effect [Perceived Risk - Attitude - Behavioural Intention (Brand Equity Moderator)]										
	Index of Moderated Mediation		Boot SE		Boot LLCI		Boot ULCI			
Brand Equity	.055		.02		.012		.100			
	Effect									
Low level of Brand Equity (-1 SD)	-.145		.04		-.223		-.065			
Medium level of Brand Equity (Mean)	-.099		.03		-.159		-.045			
High level of Brand Equity (+1 SD)	-.060		.02		-.123		-.019			

b = Unstandardized regression coefficients
LLCI: Lower-Level Confidence Interval; LCI = Upper-Level Confidence Interval
Bootstrap sample size = 5,000; ΔR^2 : R^2 Change
*** p < .001; ** p < .01; * p < .05

Further understanding of the relationship between these concepts necessitates an examination of the *perceived risk dimensions*. The influence of the interaction term between *physical risk* and brand equity on behavioural intention (b = .126, SE: .04; t: 2.81; p < .01, (%95 LLCI, ULCI) = (.040, .224); R^2=.226; $F(4, 275)$=20.038)], which suggested that brand equity moderates the direct negative effect of physical risk on behavioural intentions [ΔR^2 = .022; $F(1, 275)$ = 7.917]. At low levels of brand equity, the negative impact of physical risk on attitude toward fitness centres is high [Brand equity$_{low}$: b = -.130; SE: .06; t: -2.152; p < .05; (95% Confidence Interval LL, UL) = (-.249, -.011)]. When brand equity increases, the negative effect of physical risk on attitude becomes insignificant [(Brand equity$_{medium}$: (95% Confidence Interval LL, UL) = (-.1034, .062); (Brand equity$_{high}$: (95% Confidence Interval LL, UL) = (-.028, .171)]. Furthermore, the influence of the interaction term *physical risk* and brand equity on attitude is significant (b = .176, SE: .04; t: 4.25; p < .001, CI [.095, .258]; (R^2=.210; $F(3, 276)$=24.445), which suggested that brand equity moderates the direct negative effect of physical risk on attitude toward fitness centres [ΔR^2= .052; $F(1, 276)$=18,139]. The analysis *revealed the conditional effect of brand equity* in the *indirect relationship* between physical risk and behavioural intention via the mediating role of attitude was significant [*Index of Moderated Mediation*: *.063*, BootSE: .02; (Boot LLCI, Boot ULCI) = (.020, .110)] as given in Table 7. Similarly, the *conditional indirect effect* of physical risk on behavioural intention via attitude was significant at low and medium brand equity which also diminished the mediation effect [Brand equity $_{low}$; b = -.116; (95% LLCI, ULCI) = (-.178, -.055); Brand equity $_{medium}$: b = -.064; 95% (LLCI, ULCI): -.097, -.032], however, the at high brand equity mediation relationship was not significant [Brand equity $_{high}$: b = -.020; (95% LLCI, ULCI) = (-.049, -.014)].

Table: 7

Results of Conditional Direct and Indirect Analyses: Physical Risk-Attitude-Behavioural Intention (Brand Equity Moderator)

	Bootstrapped CI 95%									
Direct effects	Model 1 (Attitude) $(R^2 = .210)$ $F (3 , 276)= 24.445$					Model 2 (Behavioural intention) $(R^2 = .226)$ $F (4 , 275)= 20.038$				
	b	*SE*	*t*	*LL*	*UL*	*b*	*SE*	*t*	*LL*	*UL*
Physical Risk	-.178***	.37	-4.83	-.521	-.106	-.021	.42	-.48	-.104	.062
Brand equity	.307***	.05	5.62	-.200	.415	.063	.06	3.35	.088	.337
Attitude						.213**	.06	5.41	.227	.487
Physical Risk * Brand equity	.176***	.04	4.25	.095	.258	.126**	.04	2.81	.040	.224
	$\Delta R^2 =.052; F (1 , 276)= 18.139$					$\Delta R^2 ==.022; F (1 , 275)= 7.917$				
The conditional direct effects: Brand Equity Moderator										
	b	*SE*	*t*	*LL*	*UL*	*b*	*SE*	*t*	*LL*	*UL*
Low level of Brand Equity (-1 SD)	-.325***	.05	-6.29	-.427	-.224	-.130**	.06	-2.15	-.250	-.011
Medium level of Brand Equity (Mean)	-.178***	.03	-4.83	-.251	-.106	-.021	.04	-.48	-.104	.062
High level of Brand Equity (+1 SD)	-.055	.04	-1.20	-.146	.035	.071	.05	1.41	-.028	.171
Bootstrapping results for the conditional indirect effect: Physical Risk- Attitude - Behavioural Intention (Brand Equity Moderator)										
	Index of Moderated Mediation		*Boot SE*		*Boot LL*		*Boot UL*			
Brand Equity	.063		.02		.020		.110			
	Effect									
Low level of Brand Equity (-1 SD)	-.116		.032		-.178		-.055			
Medium level of Brand Equity (Mean)	-.064		.017		-.097		-.032			
High level of Brand Equity (+1 SD)	-.020		.016		-.049		.014			

b = Unstandardized regression coefficients
LLCI = Lower-Level Confidence Interval; ULCI = Upper-Level Confidence Interval
Bootstrap sample size = 5,000; ΔR^2 : R^2 Change
*** p < .001; ** p < .01; * p < .05

The *direct* impact of the *interaction term financial risk* and brand equity on behavioural intention was insignificant [(%95 LLCI, ULCI): (-.016, .178)], suggesting that brand equity does not moderate the *direct* negative effect of financial risk on behavioural intention. In contrast, the impact of the *interaction term* between *financial risk* and brand equity on attitude was significant [$b = .126$, SE: .041; t: 3.04; $p < .01$; (LLCI, ULCI): (.028, .202); R^2= .219, F (3, 276) = 25.835)] suggested that brand equity moderate the direct negative effect of financial risk on attitude toward fitness centres [$\Delta R^2 = 0.026$; F (1, 276) = 9.260]. At low levels of brand equity, the negative impact of financial risk on attitude toward fitness centres is high (b = -.366; SE: .05; t: -6.44; p < .001; 95% Confidence Interval LL, UL: -.478, -.255). When brand equity increases, the negative effect of financial risk on attitude diminishes [(Brand equity_{medium}: b = -.271; SE: .04; t: -6.23; p < .001; 95% Confidence Interval LL, UL: -.356, -.185); (Brand equity_{high}: b = -.190; SE: .05; t: -3.56; p < .001; 95% Confidence Interval LL, UL: -.302, -.064)]. Moreover, the conditional effect of brand equity in the *indirect* relationship between financial risk and behavioural intention via the mediating role of attitude was significant [*Index of moderated mediation:* 0.038; Boot SE: .02; (%95 LLCI, ULCI): (-.014, .072)]. Thus, brand equity did not moderate the indirect relationship between financial risk and behavioural intention through the mediating role of attitude. As a summary, the analysis revealed that a) brand equity is not a significant moderating variable in the direct relationship between *financial risk and behavioural intention, and b) the index of moderated mediation is insignificant.*

In such a case, Hayes (2022:480) recommends pruning the model and changing Model 8 to Model 7. The PROCESS analysis (Model 7) revealed that brand equity moderates

the *direct* relationship between financial risk and attitude [financial risk*brand equity b = .125; S.E. = 0.4; t = 3.04; p < .01; (%95 LLCI, ULCI) = (.044, .207)] [R^2 = .219; F (3, 276)= 25.835]. However, when the mediating role of attitude between financial risk and behavioural intention is considered, the moderating role of brand equity is insignificant, as given in Table 9 [Index of moderated mediation = .052; Boot S.E. = 0.2; (%95 Boot LLCI, ULCI) = (-.0002, .0943)]. Consequently, there is just a mediating role of attitude between financial risk and behavioural intention, as given in Table 5.

The results of the PROCESS analysis for time risk and psycho-social risk resemble each other, which are explained as follows: The *direct* impact of the *time risk*brand equity interaction term* on behavioural intention was insignificant [b = .101, SE: .05; t: 1.77; p > .05; (LLCI, ULCI): (-.011, .213)] suggested that brand equity does not moderate the *direct* negative effect of time risk on behavioural intention. The *direct* impact of the interaction term, time risk *brand equity, on attitude (b = .194, SE: .051; t: 3.77; p < .001; CI [.028, .202]) is significant. Brand equity moderated the *indirect* relationship between time risk and behavioural intention via attitude [Index of moderated mediation: .069, BootSE: .026; (%95 LLCI, ULCI): (.017, .123)] was significant. The *conditional indirect effect* of time risk on behavioural intention via attitude was significant at low and medium brand equity, which also diminished the mediation effect [Brand equity low : b = -.115; SE: .03, (95% LLCI, ULCI) = (-.183, -.047); Brand equity medium : b = -.057, SE: .01, (95% LLCI, ULCI) = (-.096, -.021)]. However, the at-high brand equity mediation relationship was not significant [Brand equity high: (95% (LLCI, ULCI) = (-.053, -.032)].

The moderating role of brand equity in the direct relationship between psycho-social risk and behavioural intention is *insignificant* [b = .090, SE: .04; t: 1.83; p > .05; (%95 LLCI, ULCI): (-.006, .187)], which suggested that brand equity has no moderating role in the direct negative effect of psycho-social risk on behavioural intention. The direct influence of the interaction term, psycho-social risk*brand equity, on attitude was significant [b = .140, SE: .04; t: 3.14; p < .01; (%95 LLCI, ULCI): (.052, .228); R^2= .187, F (3, 276) = 21.219)], which suggested that brand equity moderate the direct negative effect of psycho-social risk on attitude toward fitness centres [ΔR^2 = .029; F (1, 276)=9,865)]. Moreover, the index of moderated mediation was significant (Index: .049, BootSE: .02; [LLCI, ULCI]: [.002, .095]), which suggested that brand equity moderated the indirect relationship between psycho-social risk and behavioural intention via attitude was significant. The *conditional indirect effect* of psycho-social risk on behavioural intention via attitude was significant at a low level of brand equity [Brand equity low : b = -.165; SE: .06, (95% LLCI, ULCI) = (-.289, -.041)]. However, the medium and high levels of brand equity mediation relationship were not significant [Brand equity medium : (95% LLCI, ULCI) = (-.188, .007)]; Brand equity high: (95% (LLCI, ULCI) = (-.148, .093)].

In summary, the pruning process is utilised based on the insignificant moderating impact of brand equity on the direct impact of time risk/psycho-social risk on behavioural intention (Hayes, 2022: 480). In this sense, instead of PROCESS analysis Model 8, Model

7 or first-stage moderated mediation analysis (Hayes & Rockwood, 2017: 47) is conducted for time and psycho-social risk.

The PROCESS (Model 7) or first stage moderated mediation analysis (Hayes & Rockwood, 2017: 47) revealed that brand equity moderates the *direct* relationship between time risk and attitude [time risk*brand equity b = .194; S.E. = .05; t = 3.77; p < .01; (%95 LLCI, ULCI) = (.092, .295)] [R^2 = .175; F (3 , 276) = 19.622]. As brand equity increases, the impact of time risk on attitude decreases [Brand equity $_{low}$: b = -.320; S.E. = .06; t = -5.13; p < .001 (%95 LLCI, ULCI) = (-.443, -.197); Brand equity $_{medium}$: b = -.159; S.E. = .04; t = -3.41; p < .001 (%95 LLCI, ULCI) = -.251, -.067]. However, at a high brand equity level, the relationship was insignificant [(95% LLCI, ULCI) = (-.141, .093)]. When the mediating role of attitude between time risk and behavioural intention is considered, brand equity is a significant first-stage moderator, as given in Table 7 [Index of moderated mediation = .085; Boot S.E. = 0.3; (%95 Boot LLCI, ULCI) = (.018, .144)]. The first stage, moderating the role of brand equity in the indirect effect of physical risk on behavioural intention via attitude, was significant. As brand equity increases, the mediation impact decreases [Brand equity $_{low}$; b = -.140; 95% (LLCI, ULCI) : (-.216, -.059); Brand equity $_{medium}$: b = -.070; 95% (LLCI, ULCI): -.113, -.027]. However, the at-high brand equity mediation relationship was not significant [(95% LLCI, ULCI) = (-.060, .037)].

Table: 7
Results of Conditional Direct and Indirect Analyses: Time Risk-Attitude-Behavioural Intention (Brand Equity First Stage Moderator)

	Bootstrapped CI 95%									
Direct effects	Model 1 (Attitude) (R^2 = .175; F (3 , 276)= 19.622 ΔR^2 = 0.042; F (1 , 276)= 14.243					Model 2 (Behavioural intention) R^2 = .186 F (2, 277)= 31.705				
	b	SE	t	LL	UL	b	SE	t	LL	UL
Time Risk	-.994***	.22	-4.42	-1.436	-.551	-.093	.05	-1.79	-..019	.009
Brand equity	.088	.11	.76	-.313	.137					
Attitude						.439***	.06	7.12	.317	.560
Time Risk * Brand equity	.194***	.05	3.77	.092	.295	.100	.05	1.77	-.011	.212
Bootstrapping results for the conditional indirect effect: Time Risk- Attitude - Behavioural Intention (Brand Equity First Stage Moderator)										
	Index of Moderated Mediation			Boot SE		Boot LL			Boot UL	
Brand Equity	.085			.03		.018			.144	
	Effect									
Low level of Brand Equity (-1 SD)	-.140			.03		-.216			-.059	
Medium level of Brand Equity (Mean)	-.070			.02		-.113			-.027	
High level of Brand Equity (+1 SD)	-.010			.02		-.060			.037	

b = Unstandardized regression coefficients
LLCI : Lower-Level Confidence Interval; ULCI : Upper-Level Confidence Interval
Bootstrap sample size = 5,000; ΔR^2 : R^2 Change
*** p < .001; ** p < .01; * p < .05

The PROCESS (Model 7) or first stage moderated mediation analysis (Hayes & Rockwood, 2017: 47) revealed that brand equity moderates the *direct* relationship between psycho-social risk and attitude [psycho-social risk*brand equity b = .140; S.E. = .04; t = 3.14; p < .01; (%95 LLCI, ULCI) = (.052, .227)] [R^2 = .187; F (3 , 276) = 21.219]. At low levels of brand equity, the negative impact of psycho-social risk on attitude toward fitness centres is high (Brand equity$_{low}$ b = -.307; SE: .05; t: -3.259; p < .01; 95% Confidence

Interval LL, UL: -.415, -.198). When brand equity increases and becomes medium, the negative effect of performance risk on behavioural intentions diminishes [(Brand equity$_{medium}$: b = -.190; SE: .04; t: -4.28; p < .05; (95% Confidence Interval LL, UL) = (-.278, -.103). In contrast, as brand equity becomes higher, the negative effect of performance risk on behavioural intention becomes insignificant [(95% Confidence Interval LL, UL) = (-.204, .018)]. In the context of the mediating role of attitude between psycho-social risk and behavioural intention, brand equity is a significant first-stage moderator as given in Table 8 [Index of moderated mediation = .060; Boot S.E. = 0.2; (%95 Boot LLCI, ULCI) = (.003, .112)]. As brand equity increases, the mediation impact decreases [Brand equity $_{low}$; b = -.132; 95% (LLCI, ULCI) : (-.202, -.059); Brand equity $_{medium}$: b = -.082; (95% LLCI, ULCI) = (-.128, -.042); Brand equity $_{high}$: b = -.040; (95% LLCI, ULCI) = (-.0932, -.0008)].

Table: 8
Results of Conditional Direct and Indirect Analyses: Psycho-social Risk-Attitude-Behavioural Intention (Brand Equity First Stage Moderator)

Direct effects	Bootstrapped CI 95%									
	Model 1 (Attitude) $R^2 = .187$; F (3 , 276)= 21.219 $\Delta R^2 = 0.029$; F (1 , 276)= 9.864					Model 2 (Behavioural intention) $R^2 = .187$ F (2, 277)= 32.010				
	b	SE	t	LL	UL	b	SE	t	LL	UL
Psycho-social Risk	-.793***	.19	-4.11	-1.173	-.413	-.097	.05	-1.93	-.197	.001
Brand equity	.024	.10	.24	-.174	.222					
Attitude						.431***	.06	6.90	.308	.554
Psycho-social Risk * Brand equity	.140**	.04	3.14	.052	.227					
Bootstrapping results for the conditional indirect effect: Psycho-social Risk- Attitude - Behavioural Intention (Brand Equity First Stage Moderator)										
	Index of Moderated Mediation				Boot SE		Boot LL		Boot UL	
Brand Equity	.060				.02		.003		.112	
	Effect									
Low level of Brand Equity (-1 SD)	-.132				.03		-.2027		-.0596	
Medium level of Brand Equity (Mean)	-.082				.02		-.1281		-.0424	
High level of Brand Equity (+1 SD)	-.040				.02		-.0932		-.0008	

b = Unstandardized regression coefficients
LLCI = Lower-Level Confidence Interval, ULCI = Upper-Level Confidence Interval
Bootstrap sample size = 5,000; ΔR^2: R^2 Change
*** p < .001; ** p < .01; * p < .05

The interaction term between performance risk and brand equity on behavioural intention was significant [b = -.122, SE: .05; t: 2.46; p < .05, (%95 LLCI, ULCI) = (.024, -.223)] [(R^2=.233; F (4, 275)=20.934] which suggested that brand equity moderate the direct negative effect of performance risk on behavioural intention of the members [$\Delta R^2 = .016$; F (1, 275) = 6.056)]. At low levels of brand equity, the negative impact of performance risk on attitude toward fitness centres is high (Brand equity$_{low}$ b = -.220; SE: .06; t: -3.259; p < .01; 95% Confidence Interval LL, UL: -.353, -.087). When brand equity increases, the negative effect of performance risk on behavioural intentions diminishes [(Brand equity$_{medium}$: b = -.117; SE: .05; t: -2.29; p < .05; 95% Confidence Interval LL, UL: -.217, -.016). However, when brand equity is high, the direct impact of performance risk on behavioural intention is insignificant [(95% Confidence Interval LL, UL) = (-.149, .088)]. The impact of the interaction term between performance risk and brand equity on attitude was significant [b = .108, SE: .04; t: 2.46; p < .05, (%95 LLCI, ULCI) = (.022, .193); (R^2=.284; F (3, 276)=36.435] which suggested that brand equity moderate the direct negative

effect of performance risk on attitude toward fitness centres [$\Delta R^2 = .016$; F (1, 276)=6.097)]. At low levels of brand equity, the negative impact of performance risk on attitude toward fitness centres is high (b = -.413; SE: .05; t: -7.719; p < .001; 95% Confidence Interval LL, UL: -.518, -.308). When brand equity increases, the negative effect of performance risk on attitude diminishes [(Brand equity$_{medium}$: b = -.323; SE: .04; t: -8.08; p < .001; 95% Confidence Interval LL, UL: -.402, -.245); (Brand equity$_{high}$: b = -.248; SE: .05; t: -4.90; p < .001; 95% Confidence Interval LL, UL: -.348, -.149)]. However, the conditional effect of brand equity in the indirect relationship between performance risk and behavioural intention via the mediating role of attitude (Index of moderated mediation [(%95 LLCI, ULCI) = (-.016, .066)] was insignificant. Accordingly, brand equity did not moderate the indirect relationship between performance risk and behavioural intention through the mediating role of attitude. Thus, attitude mediates the direct relationship between performance risk and behavioural intention, as given in Table 5. In this context, a summary of the results is shown in Table 9 and Table 10.

Table: 9
The Moderating Role of Brand Equity in the Direct and Indirect Relationships Between Perceived Risk Dimensions and Behavioural Intention

Direct Relationships	Perceived Risk	Physical Risk	Time Risk	Psycho-social	Financial Risk	Performance Risk
Brand Equity (Moderator)	✓	✓	X^{++}	X^{++}	X^{+}	✓
Low	✓	✓	N/A	N/A	N/A	✓
Medium	*X*	*X*	N/A	N/A	N/A	✓
High	*X*	*X*	N/A	N/A	N/A	*X*
Indirect Relationships (via Attitude)						
Brand Equity (Moderator)	✓	✓	✓	✓	X^{+}	X^{+}
Low	✓	✓	✓	✓	N/A	N/A
Medium	✓	✓	✓	*X*	N/A	N/A
High	✓	*X*	*X*	*X*	N/A	N/A

Notes: ✔ : Significant, X : Insignificant; N/A: Not applicable
$^{+}$: *Due to this insignificance, Model 4 is valid.*
$^{++}$: *Due to this insignificance, the model is pruned, and a PROCESS analysis of Model 7 is conducted.*

Table: 10
Summary of the Results of the Analyses

	Model Support for Hypotheses in the Context of Perceived Risk and Dimensions of Perceived Risk																	
	Perceived Risk			Physical Risk			Time Risk			Psycho-social Risk			Financial Risk			Performance Risk		
	Model 4	Model 8	Model 7	Model 4	Model 8	Model 7	Model 4	Model 8	Model 7	Model 4	Model 8	Model 7	Model 4	Model 8	Model 7	Model 4	Model 8	Model 7
H1. Attitude mediates the relationship between perceived risk and behavioural intention.	✓			✓			✓			✓			✓			✓		
H2. Brand equity moderates the direct relationship between perceived risk and behavioural intention.		✓			✓			✓			✓			✓			✓	
H3. Brand equity moderates the indirect relationship between perceived risk and behavioural intention via attitude.		✓			✓			*X*			*X*			*X*			*X*	
Other Findings^{+}																		
The first stage, moderated mediation, is significant for the moderation role of brand equity in the indirect relationship between perceived risk and behavioural intention.							X^{+}	✓		X^{+}	✓		X^{+}	*X*		X^{+}	*X*	

Model 4: Mediation Model; Model 8: Moderated Mediation Model; Model 7: First Stage Moderated Mediation Model
$^{+}$ *Pruning Model 8, conducting Model 7.*

4. Conclusion Discussion, and Managerial Implications

The findings supported the mediation, which proposed that the attitude was a mediator between how they perceived the risk and how they intended to behave. Perceived risk of fitness club members negatively affects their attitude toward fitness centres, decreasing their intention to visit them. In contrast, when members perceive less risk, their attitude toward visiting fitness centres will be more favourable, and they will be more likely to visit fitness centres. Accordingly, the managers need to consider the unfavourable effect of perceived risk on the members' attitudes and, consequently, their intentions to go to the fitness centres.

Understanding risk dimensions is also essential for comprehending its effects, the source of information sought, and the length of the decision-making process (Laroche et al., 2004). Examining the perceived risk dimensions, which in this context include physical, time, psycho-social, financial, and performance risks, is a crucial finding of this research that is incorporated into the proposed model. This model is also supported for each perceived risk dimension (physical, time, psycho-social, financial, and performance). They all negatively influence attitude, decreasing the members' behavioural intentions. When members perceive less physical, time, psycho-social, financial, and performance risks, they will have a more positive attitude toward attending fitness centres. They will, therefore, be more likely to have the intention or make plans to use the facilities. Existing literature supports the importance of risks in projecting consumer behaviour (Kim et al., 2021). This finding complies with the study of Braje et al. (2022), which demonstrated the mediating role of attitude between perceived risk and repurchase intention for short-term rentals. Palau-Saumell et al. (2021) identify the impact of perceived risk on attitude, which influences consumers' purchase intentions for locally produced goods. This finding is also consistent with the study of Zahira and Kurniawati (2022), who also identified the influence of consumers' perceived personal risk on consumer attitudes toward the Face Recognition payment method, which in turn influences satisfaction and repeat purchases at stores that use the Face Recognition payment method.

This research also revealed that brand equity moderates the mediation relationship (perceived risk-attitude-behavioural intention) by diminishing the perceived risk's negative impact on behavioural intention and attitude. Brand equity moderates perceived risk-attitude-behavioural intention linkage by reducing the negative impact of fitness club members' perceived risk on behavioural intentions and attitudes. When a fitness centre's brand equity is strong, the negative effect of perceived risk on behavioural intention as mediated through attitude declines. As the brand equity weakens, this negative impact is high through attitude toward fitness centres. Brand equity mitigates the perceived risk's negative effect on fitness club members' attitudes and subsequent behavioural intentions. Since the impact of perceived risk on attitudes and, consequently, behavioural intention is mitigated when brand equity is high, brand equity might be regarded as insurance in the perception of the risk-attitude-behavioural intention relationship. While the model in this study is not widely researched, the findings may align with existing literature in terms of

mitigating the adverse effects of certain variables on consumer perceptions and behaviour. For example, Hur and Kim (2020) find that when brand equity rises, the link between perceived corporate hypocrisy (i.e. misrepresenting the company's true nature) and aggressive customer behaviour weakens. Furthermore, Huang (2011) identified that brand equity moderates the impact of service recovery satisfaction on behavioural intentions. In another study examining the restaurant sector, restaurants with low brand equity are more vulnerable to the impact of electronic word of mouth (eWOM) on their financial success compared to those with strong brand equity (Wang et al., 2021). Wang et al. (2022) emphasise brands as reliable indications of product quality and credibility, reducing perceived risks and uncertainty. In other words, strong brand equity provides an advantage over weak brands (Huang, 2011).

Although the related hypothesis (H3) is supported, concerning the other findings, or the "dimensions of perceived risk," there are controversial results. The "physical risk" dimension of the perceived risk also supports the conclusion that brand equity moderates the perceived risk-attitude-behavioural intention relationship. Physical risks related to safety concerns (Stone & Grønhaug, 1993; Stone & Mason, 1995), such as spreading and receiving the virus, will result in a negative attitude toward the fitness centres, discouraging members from using them. When brand equity increases or members perceive brand distinctions, the mediation relationship regarding physical risk weakens. Hence, perceived physical risk is less likely to affect attitude and behaviour intentions due to brand equity negatively.

Brand equity perceptions of the fitness centres moderate the mediation relationship of "time risk - attitude - behavioural intention" and "psycho-social risk - attitude - behavioural intention" by diminishing the negative effect of "time risk/psycho-social risk" on the "attitudes" of the members. However, brand equity has no moderating effect on the direct negative effect of time risk or psycho-social risk on the members' behavioural intentions, or brand equity does not moderate the relationship between "time risk-behavioural intention" and "psycho-social risk-behavioural intention". In other words, when the members perceive using a fitness centre's services as a waste of time, a source of time pressure, or an inefficient use of time (Stone & Grnhaug, 1993), the attitudes of fitness centre members would be negatively impacted. In such a case, time risk indirectly influences members' behavioural intention through attitude. Similarly, when members feel psychological discomfort, anxiety, and tension with the disapproval of their social environment (i.e. others not finding visiting a fitness centre logical or as a show off) (Stone & Grønhaug, 1993) during the COVID-19 pandemic, their attitudes would be directly negatively affected. This psycho-social risk impacts behavioural intention through unfavourable attitudes of the members. When members perceive distinctions among brands or strong brand equity, the negative impact of time risk and psycho-social risk on behavioural intention as mediated through attitude declines. As the brand equity weakens, the negative impact of time risk or psycho-social on behavioural intention is high through attitude toward fitness centres. It is indirectly impactful because the time or psycho-social risk negatively influences attitudes and subsequent intentions of attending the fitness club. Due to reducing the negative impact of time risk or psycho-social risk on attitudes and

behavioural intentions, when members' perceptions about the fitness club's brand equity are strong, brand equity might be regarded as a strategic investment tool. Managers can offer members with a high perception of time risk unique, flexible schedules. For members who perceive a high psycho-social risk, it is possible to invite influential individuals (e.g., family members and close friends) to the fitness centre, which could help reduce psychological discomfort, anxiety, and tension.

Our study also revealed that "brand equity" has no "moderating effect" or differentiating capacity on the negative relationship between members' financial risk and behavioural intentions, financial risk and attitude, or the mediation model (financial risk-attitude-behavioural intention linkage). For the financial risk dimension of the perceived risk, brand equity has no conditional impact in this respect. More specifically, when the negative impact of financial risk on behavioural intention is considered, brand equity has no moderating role. There is only a mediating role of attitude between financial risk and behavioural intention. Therefore, considering the mediating role of attitude, what is crucial for members who perceive financial risk is not brand equity. Consequently, it is unsuitable to send messages concerning the symbolic meaning of the brand to those members. For fitness centre members who perceive high financial risk or a price-related issue (Stone & Mason, 1995), offering a money-back guarantee may be more effective than emphasising the fitness centre's brand name or symbolic significance.

Lastly, a similar finding was found for performance risk. Brand equity is not impactful or vital in performance risk-attitude-behavioural intention linkage. It is crucial that just as members' perceptions of performance risk rise, attitudes toward the fitness centre deteriorate, reducing the likelihood of their members' intentions to go to the fitness centre. For members who perceive a high level of performance risk, fitness centre staff may emphasise the critical aspects of service quality that are regarded as performance risk issues (Stone & Mason, 1995), which might have an influence on the reduction of the performance risk and positively influence their attitudes and subsequent behavioural intentions "instead of emphasising brand equity.". For example, they can provide information (visual, verbal, and experiential) about the qualifications and experience of their staff, the safety features of their equipment, and the physical atmosphere of the fitness centre. Thus, marketing communications tools or promotional messages can be utilised to address consumers' feelings of vulnerability resulting from their perception of risk (Milaković, 2021). By reducing perceived performance risk, marketers and managers can help create a more favourable attitude towards their facilities and increase the likelihood that individuals will join and use them regularly. By decreasing the perceived performance risk, managers may help members develop a more positive attitude toward their fitness centre and its facilities, thereby increasing the likelihood that individuals will join and utilise them.

5. Limitations and Recommendations for Future Research

Data from the members of the fitness centres were collected during the COVID-19 pandemic. The World Health Organization (WHO) has issued an announcement on its

website that the 31st of December 2022 will mark the end of global COVID-19 Public Health and Social Measures (PHSM) monitoring data updates (World Health Organization, 2022). This may indicate that the end of the COVID-19 pandemic is in sight. Nevertheless, it is anticipated that there may be other pandemics in the future (Smith, 2021). According to Professor Máire Connolly, who is in charge of the EU-funded PANDEM-2 project, the next pandemic will be caused by a new strain or virus of influenza, as described in Horizon, The European Union Research & Innovation magazine (Smith, 2021).

Thus, conducting more research in this area, including comparisons of different specialisation areas of fitness clubs and other countries, is important. Various factors influence the behavioural intentions of the members of the fitness clubs that the model of our study has not covered, and further studies might cover the influence of other variables such as crowd, gender, age, involvement, personality, and service quality. Further studies could explore additional platforms for fitness activities, such as social media, as well as consider various factors like attributes of YouTube channels and YouTubers (Kim, 2022: 11), personal factors (Ong et al., 2022: 11; Samritpricha & Vongurai, 2022: 75), and social factors (Samritpricha & Vongurai, 2022: 75). Future research could also enhance this study by using data collected through in-depth interviews.

References

Ajzen, I. (2001), "Nature and Operation of Attitudes", *Annual Review of Psychology*, 52(1), 27-58.

Bae, S.Y. & P.-J. Chang (2021), "The effect of coronavirus disease-19 (COVID-19) risk perception on behavioural intention towards 'untact' tourism in South Korea during the first wave of the pandemic", *Current Issues in Tourism*, 24(7), 1017-1035.

Braje, I.N. et al. (2022), "The changing determinants of tourists' repurchase intention: the case of short-term rentals during the COVID-19 pandemic", *International Journal of Contemporary Hospitality Management*, 34(1), 159-183.

Carroll, M.S. et al. (2014), "A multidimensional model of perceived risk in spectator sport", *International Journal of Sport Management and Marketing*, 24(1), 80-95.

Chen, Y.-S & C.-H. Chang (2012), "The influences of green perceived quality and green brand awareness on green brand equity: The mediation effect of green perceived risk", in: *Proceedings of PICMET '12: Technology Management for Emerging Technologies*, Vancouver, BC, Canada, 1152-1159.

Cheng, T.C.E. et al. (2006), "Adoption of internet banking: An empirical study in Hong Kong", *Decision Support Systems*, 42(3), 1558-1572.

Choi, J. et al. (2013), "The Effects of Consumers' Perceived Risk and Benefit on Attitude and Behavioral Intention: A Study of Street Food", *Journal of Travel & Tourism Marketing*, 30(3), 222-237.

Davalos, J. (2021), "How Covid-19 has Permanently Changed the Fitness Industry", *Bloomberg*, <https://www.bloomberg.com/news/articles/2021-01-19/fitness-industry-may-never-return-to-its-old-ways-after-covid-19>, 24.02.2024.

Dewi, H.A. (2022), "Changes in Consumer Behaviour of Skincare Repurchasing During COVID-19 Pandemic", *Asian Journal of Research in Business and Management*, 4(3), 40-54.

Fornell, C. & D.F. Larcker (1981), "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error", *Journal of Marketing Research*, 18(1), 39-50.

Ha, H.-Y. (2002), "The Effects of Consumer Risk Perception on Pre-purchase Information in Online Auctions: Brand, Word-of-Mouth, and Customized Information", *Journal of Computer-Mediated Communication*, 8(1), JCMC813.

Hair, J.F. et al. (2010), *Multivariate Data Analysis: A Global Perspective*, Pearson Prentice Hall.

Hayes, A.F. & N.J. Rockwood (2017), "Regression-based statistical mediation and moderation analysis in clinical research: Observations, recommendations, and implementation", *Behaviour Research and Therapy*, 98, 39-57.

Hayes, A.F. (2013), *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*, Guilford Press.

Hayes, A.F. (2017), *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*, Guilford publications.

Hayes, A.F. (2022), *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach*, The Guilford Press.

Hazée, S. et al. (2017), "Co-creating service recovery after service failure: The role of brand equity", *Journal of Business Research*, 74, 101-109.

Huang, M. (2011), "Re-examining the effect of service recovery: the moderating role of brand equity", *Journal of Services Marketing*, 25(7), 509-516.

Hur, W.-M. & Y. Kim (2020), "Customer reactions to bank hypocrisy: the moderating role of customer-company identification and brand equity", *International Journal of Bank Marketing*, 38(7), 1553-1574.

Kaur, S. & S. Arora (2020), "Role of perceived risk in online banking and its impact on behavioral intention: trust as a moderator", *Journal of Asia Business Studies*, 15(1), 1-30.

Keller, K.L. (1993), "Conceptualizing, Measuring, and Managing Customer-Based Brand Equity", *Journal of Marketing*, 57(1), 1-22.

Khozaei, F. et al. (2021), "The impact of perceived risk and disease prevention efficiency on outdoor activities and avoidance behaviors in the urban parks during COVID-19 pandemic", *Journal of Facilities Management*, 19(5), 553-568.

Kim, D.J. et al. (2008), "A trust-based consumer decision-making model in electronic commerce: The role of trust, perceived risk, and their antecedents", *Decision Support Systems*, 44(2), 544-564.

Kim, J.J. et al. (2021), "The impact of hotel attributes, well-being perception, and attitudes on brand loyalty: Examining the moderating role of COVID-19 pandemic", *Journal of Retailing and Consumer Services*, 62, 102634.

Kim, M. (2022), "How can I Be as attractive as a Fitness YouTuber in the era of COVID-19? The impact of digital attributes on flow experience, satisfaction, and behavioral intention", *Journal of Retailing and Consumer Services*, 64, 102778.

Kim, M.-S. & J.E. Hunter (1993), "Relationships Among Attitudes, Behavioral Intentions, and Behavior: A Meta-Analysis of Past Research, Part 2", *Communication Research*, 20(3), 331-364.

Kirchoff, J.F. et al. (2019), "The impact of functional integration on perceived risk and consumer-based brand equity", *Journal of Strategic Marketing*, 27(2), 136-150.

Kufahl, P. (2021), "U.S. Fitness Industry Lost $20.4 Billion in 2020, Comeback on Horizon", *Per IHRSA Report*, Club Industry, <https://www.clubindustry.com/industry-news/us-fitness-industry-lost-204-billion-2020-comeback-horizon-ihrsa-report>, 24.02.2024.

Kursan-Milaković, I. (2021), "Purchase experience during the COVID-19 pandemic and social cognitive theory: The relevance of consumer vulnerability, resilience, and adaptabilty for purchase satisfaction and repurchase", *International Journal of Consumer Studies*, 45(6), 1425-1442.

Laohaviraphap, T. & P. Wetchasart (2021), "The effect of risk and image on repurchase intention of street food in the Covid-19 era", *International Journal of Social Science Research*, 3(2), 34-43.

Laroche, M. et al. (2004), "Exploring How Intangibility Affects Perceived Risk", *Journal of Service Research*, 6(4), 373-389.

Lee, P.-H. et al. (2020), "Predicting Exercise Intentions and Behaviors of Taiwanese Children in a Longitudinal Sample", *Journal of Pediatric Nursing*, 51, e50-e56.

Leisure Database (2020), *COVID-19 Impact on the UK Health Club Industry*, <https://www.leisuredb.com/covid-19-impact-on-the-uk-health-club-industry>, 20.03.2022.

Nagar, K. (2020), "An Examination of Gym Supplement Choice: Using the Modified Theory of Planned Behaviour", *Journal of Food Products Marketing*, 26(7), 499-520.

Nunnally, J.C. (1978), *Psychometric Theory*: McGraw Hill.

Oliver, R.L. (2010), "Consumer Satisfaction A Behavioral perspective", in: *Wiley International Encyclopedia of Marketing*: Taylor & Francis.

Ong, A.K.S. et al. (2022), "Investigating factors affecting behavioral intention among Gym-Goers to visit fitness centers during the COVID-19 pandemic: Integrating physical activity maintenance theory and social cognitive theory", *Sustainability*, 14(19), 12020.

Palau-Saumell, R. et al. (2021), "The impact of the perceived risk of COVID-19 on consumers' attitude and behavior toward locally produced food", *British Food Journal*, 123(13), 281-301.

Preacher, K.J. & A.F. Hayes (2008), "Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models", *Behavior Research Methods*, 40(3), 879-891.

Qi, C.X. et al. (2009), "Perceptions of Risk and Travel Intentions: The Case of China and the Beijing Olympic Games", *Journal of Sport & Tourism*, 14(1), 43-67.

Rambocas, M. et al. (2018), "Brand equity and customer behavioral intentions: a mediated moderated model", *International Journal of Bank Marketing*, 36(1), 19-40.

Republic of Turkiye Ministry of Health (2020), *Controlled Social Life Study Guide*, Ministry of Health Guide for Sports Centers, Controlled Social Life Study Guide, <https://covid19.saglik.gov.tr/Eklenti/38063/0/covid-19sporsalonlarivespormerkezleriicinkshcalismarehberiafis50x70pdf.pdf?_tag1=43064C902D26F650DA11DABC259CAB322EEE1203>, 24.02.2024.

Samritpricha, P. & R. Vongurai (2022), "Determinants of Thai Individuals Behavioral Intention towards Online Fitness Program on YouTube during COVID-19 Pandemic", *Journal of Community Development Research (Humanities and Social Sciences)*, 15(2), 71-84.

Smith, J. (2021), "Q&A: Future pandemics are inevitable, but we can reduce the risk", *Horizon*, <https://ec.europa.eu/research-and-innovation/en/horizon-magazine/qa-future-pandemics-are-inevitable-we-can-reduce-risk>, 24.02.2024.

Stone, R.N. & J.B. Mason (1995), "Attitude and Risk: Exploring the Relationship", *Psychology & Marketing*, 12(2), 135-153.

Stone, R.N. & K. Grønhaug (1993), "Perceived Risk: Further Considerations for the Marketing Discipline", *European Journal of Marketing*, 27(3), 39-50.

Tabachnick, B.G. & L.S. Fidell (1996), *Using multivariate statistics*, HarperCollins.

Venkatesh, V. et al. (2008), "Predicting different conceptualizations of system USE: The competing roles of behavioral intention, facilitating conditions, and behavioral expectation", *MIS Quarterly: Management Information Systems*, 32(3), 483-502.

Vo Minh, S. et al. (2022), "The role of social brand engagement on brand equity and purchase intention for fashion brands", *Cogent Business & Management*, 9(1), 2143308.

Wang, E.S.-.-T. (2015), "Effect of food service-brand equity on consumer-perceived food value, physical risk, and brand preference", *British Food Journal*, 117(2), 553-564.

Wang, L.-H. et al. (2022), "Tourists' travel intention: revisiting the TPB model with age and perceived risk as moderator and attitude as mediator", *Tourism Review*, 77(3), 877-896.

Wang, Y. et al. (2021), "The financial impact of online customer reviews in the restaurant industry: A moderating effect of brand equity", *International Journal of Hospitality Management*, 95, 102895.

Washington, M. et al. (2015), "Students' perceived risk and investment intention: the effect of brand equity", *Management & Marketing*, 10(3), 553-564.

Wei, C. et al. (2022), "COVID-19 preventive measures and restaurant customers' intention to dine out: the role of brand trust and perceived risk", *Service Business*, 16(3), 581-600.

World Health Organization (2020), *Director-General's opening remarks at the media briefing on COVID-19*, <https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020>, 10.01.2022.

World Health Organization (2022), *The COVID-19 Public Health and Social Measures (PHSM) data visualization on the Measures tab*, <https://covid19.who.int/measures>, 10.01.2022.

Wu, Y. et al. (2022), "Influence of COVID-19 Crisis on Motivation and Hiking Intention of Gen Z in China: Perceived Risk and Coping Appraisal as Moderators", *International Journal of Environmental Research and Public Health*, 19(8), 4612.

Yoo, B. & N. Donthu (2001), "Developing and validating a multidimensional consumer-based brand equity scale", *Journal of Business Research*, 52(1), 1-14.

Yu, J. et al. (2021), "Understanding the influence of the perceived risk of the coronavirus disease (COVID-19) on the post-traumatic stress disorder and revisit intention of hotel guests", *Journal of Hospitality and Tourism Management*, 46, 327-335.

Zahira, N.A. & K. Kurniawati (2022), "Predict Repurchase Intention Via E-satisfaction as a Mediator Against Consumer Attitudes in Use Face Recognition Payment", *Journal of Digital Marketing and Halal Industry*, 4(1), 17-34.

APPENDIX: 1
Factor Loading of the Variables' Items

Factors / *Items*	β
Financial risk	
Fin1	.79***
Fin2[a]	.97***
Time risk	
Time1	.87***
Time2	.82***
Time3[a]	.90***
Performance risk	
Per1	.80***
Per2	.89***
Per3[a]	.90***
Psycho-social risk	
Soc1	.76***
Soc3[a]	.75***
Psyc1	.94***
Psyc2	.92***
Psyc3	.94***
Physical risk	
Phy1	.91***
Phy2	.90***
Phy3[a]	.71***
Attitude	
Att1[a]	.84***
Att2	.97***
Att3	.86***
Att4	.80***
Overall brand equity	
Eqt1[a]	.83***
Eqt2	.94***
Eqt3	.77***
Eqt4	.77***
Behavioural intention	
Beh1[a]	.91***
Beh2	.93***
Beh3	.90***

[a] = *factor loadings were fixed to the value of 1.0. β = standardized regression weights.*
*** = *P<.001*

Validity of Capital Structure Theories in the Shipping Industry: An Application on U.S. Equity Markets

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Denizcilik Sektöründe Sermaye Yapısı Teorilerinin Geçerliliğinin Test Edilmesi: ABD Borsaları Üzerine Bir Uygulama

Abstract

This paper analyses the financial factors that affect the capital structure decisions of 29 shipping companies in the U.S. equity markets. The study focuses on the impact of International Maritime Organization (IMO) regulations and new initiatives. The results show that leverage has a negative impact on profitability and size, in contrast to tangibility. It is also confirmed that the decisions of shipping companies regarding capital structure align with the pecking order theory of capital structure.

Keywords : Capital Structure, Shipping Industry, Panel Data, Pecking Order Theory, U.S. Equity Markets.

JEL Classification Codes : G15, G32, C33.

Öz

Bu çalışmada, IMO'nun regülasyonlarının ve yeni girişimlerinin etkisine ve sermaye yapısı teorilerinin geçerliliğine odaklanarak, ABD'de listelenen 29 denizcilik şirketinin sermaye yapısı kararlarını etkileyen finansal faktörleri incelenmektir. Elde edilen sonuçlar, sabit varlık oranının aksine, karlılık ve işletme büyüklüğü faktörlerinin ABD borsalarında işlem gören denizcilik şirketlerinin sermaye yapıları üzerinde negatif bir etkiye sahip olduğunu göstermektedir. Ayrıca, denizcilik şirketlerinin sermaye yapısı kararlarının finansman hiyerarşisi teorisi ile uyumlu olduğu da teyit edilmiştir.

Anahtar Sözcükler : Sermaye Yapısı, Denizcilik Sektörü, Panel Veri, Finansman Hiyerarşisi Teorisi, ABD Borsaları.

1. Introduction

Despite its slowing growth rate, global trade surged to a record-breaking $7.7 trillion in the first quarter of 2022 (UNCTAD, 2022). Maritime transportation facilitates approximately 90% of these economic activities, enhancing efficiency, cost-affordability, and convenience. However, despite the ships' highly valuable assets equipped with cutting-edge technology, their construction costs surpassed 200 million dollars (ICS, 2022). Additionally, shipping companies are characterised by a significant need for capital investment, and their substantial reliance on loans makes them vulnerable to financial risks arising from volatility in earnings. Albertijn et al. (2011) consistently referred to the Clarksea freight rate index, which decreased from its highest point of 47,567 in 2007 to a low of 8,010 in April 2009, as proof of the shipping industry's fluctuations during the global financial crisis. Even though the market is volatile, merchant ship freight rates produce about $500 billion U.S. annually, providing great prospects for profitability (ICS, 2022).

Nevertheless, from 2010 to 2023, the International Maritime Organization (IMO) enforced stricter environmental regulations, such as reducing sulphur oxide (SOx) emissions by 80% by 2023 and nitrogen oxide (NOx) emissions by 75% by 2020. These regulations lead to large shipping companies pursuing growth strategies through asset acquisitions, joint ventures, and mergers. For example, Mediterranean Shipping Company (MSC) acquired Hamburg Süd in 2021 to strengthen its position in the South American market. 2017, CMA CGM and Hapag-Lloyd formed Ocean Network Express (ONE) to create a more efficient network (Hapag-Llyod, 2021). Also, the demand for LNG-powered vessels surged during the mid-2010s, and the shipping industry has experienced a rise in LNG consumption since 2015. This led to LNG ship conversions and improved port infrastructure, with new LNG ship orders affecting the maritime industry from 2010 to 2023. Hence, the industry's energy strategies and capital structures had to adapt to the increasing demand for LNG-powered vessels, shifts in renewable energy sources, and the fall in oil prices.

On the other hand, large fluctuations in revenues, cash flows, and asset prices affect the conventional financial techniques of shipping companies, including capital structure and financing options. Market inefficiencies, such as taxes, distress costs, and asymmetric information, may affect the assessment of a company's financing choices. Drobetz et al. (2013) found that shipping companies' access to global capital markets raises new questions about how they make capital structure decisions. Indeed, the long-term success of many companies depends on their ability to access capital. Historically, banks have provided up to 75% of the industry's external financing, with bonds and public equity contributing only 5%. Shipping bonds offer more flexible maturities than shipping bank loans, which generally have variable interest rates and require financial collateral (Alexandridis et al., 2018). Therefore, the shipping industry is issuing increasing amounts of public debt due to several circumstances, including the transition of many shipping companies from family-owned to corporate entities. This transformation has improved their access to the debt capital markets. It has also led them to private equity investments, bond sales, and other forms of financing,

in addition to traditional bank loans, to diversify construction and renovation projects and to comply with IMO rules when oil prices are low.

However, a thorough investigation of decisions regarding capital structures in the shipping industry requires a drill-down investigation of a particular market segment. This paper examined the capital structures of shipping companies publicly traded on the U.S. equity markets, namely the New York Stock Exchange (NYSE) and the National Association of Securities Dealers Automated Quotations (NASDAQ). These markets are the largest and most liquid financial markets globally, and many shipping companies from various countries list their shares there to increase liquidity and benefit from the transparency and regulatory standards of these markets, including oversight by the Securities and Exchange Commission (SEC). Additionally, New York is emerging as the world's leading equity market for maritime stocks in terms of the number of stocks listed and the market capitalisation of maritime finance and legal companies. London, Tokyo, Oslo, and Paris follow New York. Equity investors prioritise the health of a company's balance sheet when evaluating investment opportunities. A company's capital structure is critical to determining its investment grade. A company's sound use of debt and equity indicates a strong balance sheet, contributing to higher market valuation earnings growth and stakeholder returns.

Figure: 1
Market Value and Number of Listed Maritime Companies on Local Stock Exchange
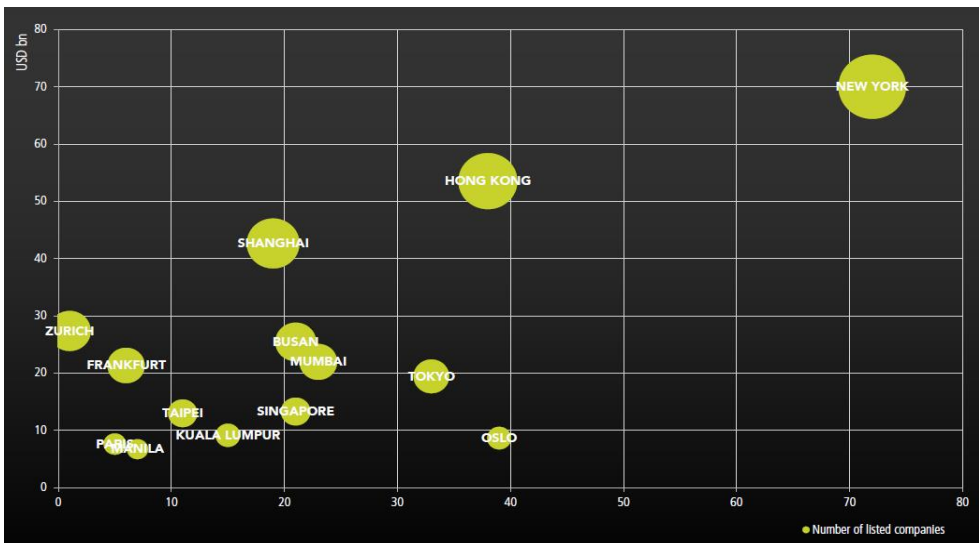
Source(s): A Menon Economics and DNV Publication "The Leading Maritime Cities of the World 2O22, <https://www.menon.no/wp-content/uploads/Maritime-cities-2022_13-oppdatert.pdf>, 11.09.2022.

Furthermore, financial markets enable shipping companies to grow and generate value. Still, they also provide a channel to obtain the funds needed to support new investment

projects and sustain long-term growth opportunities. Syriopoulos (2010) highlighted the importance of fast and cost-effective. They expedited access to capital financing to maintain a flexible capital structure composition, enhance competitiveness, ensure uninterrupted operations, and promote sustainable growth, particularly in the shipping industry. There is a growing trend among shipping companies seeking funding from the global financial markets to support their ambitious investment plans. This is achieved through methods such as equity financing or debt issuance. Optimising the capital structure of shipping companies is not solely about cost minimisation. Rather, it involves achieving a delicate balance between risk, return, and long-term growth. It is crucial to comprehensively understand the industry's unique challenges and opportunities to make informed decisions that promote financial stability and sustainable growth.

This paper investigates the financial factors affecting capital structure decisions and the validity of capital theories for U.S.-listed shipping companies, focusing on IMO deregulations and new initiatives. The study adds to the existing literature by examining the dynamic aspects of capital structure decisions and testing the validity of capital structure theories in the shipping industry. The remaining sections of this study enhance what has already been written to find out the industry-specific factors that affect how shipping companies listed on U.S. equity markets choose their capital structure, with a focus on the deregulations and new initiatives put in place by the IMO, which are structured as follows: The next section offers a thorough examination of prior concepts and theories on organisations' decisions regarding their capital structure. The paper also introduces the leading indicators utilised to assess capital structure. These indicators are included as independent variables in the hypothesis specification. Section 3 provides a comprehensive overview of the study's methodology and model. It contains detailed information on the sample and data collection processes and gives specific definitions of the variables utilised in the hypothesis. Section 4 requires a detailed account of the statistical analysis and the resulting empirical findings. The concluding part of the paper discusses the research's findings and conclusions.

2. Theoretical Background and Proxies for the Determinants of the Capital Structure

2.1. The Theoretical Framework

Franco Modigliani and Merton Miller (MM), who developed the principle of capital structure irrelevance in 1958, contend that a company's overall value is unaffected by its capital structure. According to this principle, the weighted average cost of capital (WACC) remains constant regardless of a company's debt-to-equity ratio or capital structure under certain conditions. In 1963, MM revised their theory to include the tax shield effect, which states that debt affects a company's value. They suggested that a company's ability to generate cash from its assets can serve as a measure of its value. They argue that debt, an expense that can be deducted from taxes, affects the valuation of the company receiving the loan. Tax savings resulting from interest deductions can equal net income from the

company's assets, resulting in a gain in value for a leveraged company. While not a definitive explanation, this highlights the challenges of financing transactions.

In contrast, the trade-off theory significantly contributes to the theory by incorporating more important aspects, such as the cost of financial distress. This theory asserts that a company's optimal capital structure is achieved when the benefits and costs of debt are in equilibrium. Therefore, when a company's debt exceeds a certain threshold, the bankruptcy cost increases even though the company's value decreases (Baxter, 1967; Kraus & Litzenberger, 1973; Scott, 1976). In addition, from the agency perspective of Jensen and Meckling (1976), there are conflicts of interest between shareholders, managers, and major debt financing providers (creditors and bondholders), as each of these groups has its own interests and objectives. Hence, companies must assess the agency costs associated with debt, which stem from the issues of underinvestment (Myers, 1977) and asset substitution (Jensen & Meckling, 1976), about the agency costs linked with equity, which originate from the problem of free cash flow (Drobetz et al., 2013).

The pecking order theory, originally put forth by Donaldson in 1961 and revised by Myers and Majluf in 1984, contends that there is no perfect leverage ratio. This is because, unlike other theories, the pecking order model suggests that companies hold to a financing hierarchy and prioritise their sources of financing (from internal financing to equity) based on the cost of the funding, using equity as the last option when they require capital. In other words, companies typically rely primarily on internal funds. Thus, companies do not turn to the capital markets only when their retained earnings are depleted, and they mainly use debt instead of equity.

However, capital structure theories offer a framework for understanding operational situations. Still, thorough evaluations are necessary to consider industry-specific factors, and each sector's unique characteristics and financial requirements impact capital structure decisions. This paper investigates the financial factors affecting capital structure decisions and the validity of capital theories for U.S.-listed shipping companies, focusing on IMO deregulations and new initiatives. It aims to enhance understanding of operational situations in the shipping industry by analysing the dynamic components of capital structure decisions and assessing the validity of capital structure theories. The following section presents the key factors affecting capital structure decisions that have been identified through a literature review.

2.2. Proxies for the Determinants of the Capital Structure and Literature Review

Since Myers (1984) highlighted the enigma of capital structure determination by posing the question, "How do firms make capital structure decisions?" numerous studies also have been undertaken in the current amount of finance literature to ascertain the determinants influencing the capital structure of companies across various industries and countries (Maksimovic, 1988; Harris & Raviv, 1991; Huang & Song, 2006; Berk et al., 2010;

Hovakimian et al., 2012; Güner, 2016; Yildirim et al., 2018; Dang et al., 2019; Ramli et al., 2019; Sari & Sedana, 2020; Yıldırım & Çelik, 2020; Chen et al., 2021). However, the lack of research on the shipping industry is evident (Arvanitis et al., 2012; Drobetz et al., 2013; Merika et al., 2015; Paun & Topan, 2016; Kotcharin & Maneenop, 2017; Aarland & Fidjeland, 2018; Cantero-Sáiz et al., 2019; Lykseth, 2022; Majid & Gandakusuma, 2023). The findings of these studies show that profitability, tangibility, size, non-debt tax shield, growth potential, and volatility are important and widely accepted determinants.

2.2.1. Profitability

Profitability is crucial for a company's ability to generate revenue, cover operating costs, and allocate resources for growth, with return on assets (ROA) being significant in capital-intensive industries like shipping, which heavily rely on tangible assets. Despite several studies being undertaken since the seminal paper of Modigliani and Miller (1958), a consensus regarding the association between profitability and capital structure has yet to be reached. However, Kraus and Litzenberger (1973), with their trade-off theory of capital structure, argue that a company's ideal capital structure occurs when the advantages and disadvantages of debt are balanced. Although debt can lead to bankruptcy due to the tax deductibility of interest, the reduction of free cash flow, and agency conflicts between stockholders and bondholders, Fama and French (2002) found a positive relationship between leverage and profitability. In addition, Jensen and Meckling (1976), Easterbrook (1984), and Jensen (1986) discuss the disciplinary function of leverage and argue that profitable companies use high leverage to reduce agency conflicts. This proposal aligns with Ross' (1977) signalling hypothesis, which posits that managers may employ increased leverage to express a positive outlook for the company (Drobetz & Wanzenried, 2006).

Contrary to previous theories, Myers and Majluf (1984) emphasise the pecking order theory of capital structure, which challenges the notion of an optimal leverage ratio and instead posits a hierarchical structure for determining financing options based on the level of information asymmetry. According to this theory, a company will initially use internal funds, debt, and equity if it needs financial resources. In addition, Titman and Wessels (1988) contend that profitability is a major factor in the capital structure because it indicates the amount of retainable earnings. Consequently, Fama and French (2002) propose that, within a basic pecking order model, with the investment level remaining constant, leverage would have a negative relationship with profitability. This assumption is supported by numerous empirical studies (Titman & Wessels, 1988; Rajan & Zingales, 1995; Frank & Goyal, 2009; Drobetz et al., 2013; Nenu et al., 2018; Moradi & Paulet, 2019; Chen et al. 2021).

Furthermore, Merika et al. (2015) studied 117 global shipping companies to understand how economic cycles (expansion, peak, and trough) affect capital structure and ownership concentration. They found that profitability negatively impacts leverage in all stages, except for peak, supporting the pecking order theory and suggesting that profitability negatively impacts the company's leverage. In their study, Kotcharin and Maneenop (2017)

also examined the determinants of capital structure decisions and the impact of family company structure on decision-making in Thai sea and coastal freight water transport companies. The hypotheses were investigated using the panel data methodology on a sample panel of 77 non-listed companies. The findings show a direct correlation between tangibility, operating leverage, and size and capital structure, but profitability exhibits an inverse relationship. Family-owned shipping companies observe a comparable conclusion to all the data, except for a reversal in the sign of operating leverage. The study's empirical findings provide a blend of explanations supporting and refuting the trade-off and pecking order theories.

The literature review reveals that there is no consensus on the existence and direction of the relationship between leverage and profitability. Different capital structure theories have different effects on various industries. Therefore, this study investigates the relationship between leverage and profitability in the shipping industry and employs ROA, the ratio of net income to total assets, to represent profitability in the analysis.

2.2.2. Tangibility

Property, plant, and equipment (PP&E), or fixed assets, also known as tangible assets, are essential to a company's operations and have a measurable value. As a result, creditors and lenders consider tangible assets to be a guarantee against default risk because they can be used as collateral. This study uses the net tangible assets ratio to total assets to measure tangibility. Moreover, organisations with high tangible assets like ships can use these assets as collateral for loans, enhancing their borrowing capacity and enabling lower costs for cash generation. Fixed assets are essential for operational efficiency, resulting in cost savings and improved efficiency compared to chartered vessels. The trade-off theory of capital structure suggests that a higher ratio of fixed assets to total assets can mitigate the costs of financial distress and prevent excessive losses in the event of insolvency. Many empirical studies also support this hypothesis (Baker & Wurgler, 2002; Huang & Song, 2006; Frank & Goyal, 2009; Drobetz et al., 2013; Paun & Topan, 2016; Moradi & Paulet, 2019; Chen et al., 2021). Thus, the trade-off theory expects a positive relationship between tangibility and leverage. However, the expected relationship between leverage and tangibility in pecking order theory is intricate and dependent on various factors. Although high tangibility may facilitate debt access, companies still balance this with adherence to the pecking order preference for internal financing and consider growth opportunities, profitability, and market conditions. Majid and Gandakusuma (2023) investigated the influence of macroeconomic factors on capital structure decisions in the Indonesian maritime industry. They analysed data from 23 publicly traded companies and found that tangible assets positively affect financial leverage. The study also revealed a significant inverse relationship between profitability and company leverage, supporting the pecking order theory and suggesting highly profitable companies prioritise low leverage and prefer internal finance over external sources.

On the other hand, this study explores the relationship between leverage and tangibility in the shipping industry, utilising the net value of property, plants, and equipment to demonstrate tangibility in the total asset value.

2.2.3. Size

The size of a company, mainly shipping companies, is a crucial factor in its operations. The total value of a company's assets is often used as a benchmark, and larger companies can leverage economies of scale to secure better deals with suppliers, optimise transportation routes, and spread fixed costs over a larger volume of goods. This strengthens the influence of freight forwarders, potentially resulting in lower prices and terms. Syriopoulos et al. (2018) examined the capital structures of 50 shipping companies, focusing on loan capital, the primary form of external financing in the industry. They used dynamic panel data from 2006 to 2016 and tested various ratios and indicators to assess the importance of capital structure decisions on financial resources. The results showed that factors such as asset structure, firm size, growth opportunities, profitability, and debt-related risk significantly influence the optimal selection of capital structure. The relationship between company size and leverage is also ambiguous from the different perspectives of capital structure theories. According to Titman and Wessels (1988), large companies are typically more diversified and less likely to declare bankruptcy because they have easy access to capital markets. They also borrow at favourable interest rates to obtain a higher credit rating for their debt issues (Ferri and Jones, 1979; Ozkan, 2001). Moreover, the trade-off theory predicts a positive sign in the relationship between leverage and size, and numerous empirical studies have found a positive correlation between leverage and size (Booth et al., 2001; Rajan & Zingales, 1995; Huang & Song, 2006; Ibhagui & Olokoyo, 2018; Moradi & Paulet, 2019; Dinlersoz et al. 2019), and this suggests that the trade-off theory predicts a positive sign in the relationship between leverage and company size, with many empirical studies supporting this conclusion.

Alternatively, the pecking order theory suggests that a company's size can indicate information asymmetry between insiders and capital markets (Drobetz et al., 2013), as larger firms tend to have more equity than debt and less leverage, implying an inverse relationship between company size and leverage. Consequently, given the findings of previous studies, the relationship between size and leverage is examined by taking the natural logarithm of the total assets of the companies under study. In econometric analysis, one of the main reasons for taking the natural logarithm of a series is to express the change in the series proportionally, allowing for a better understanding of how the series has changed over time. Thus, the total asset growth logarithm reflects the relative changes in the company's asset growth. This enables more precise comparisons of company growth rates and provides an appropriate measure for evaluating elasticity.

2.2.4. Non-Debt Tax Shields

Understanding industry volatility helps companies make informed decisions about investments, financing, and risk mitigation. The shipping industry is influenced by factors like crude oil prices, the global economy, freight rates, natural disasters, and regulations, which can create ambiguities about revenues and financial performance. Therefore, shipping companies and investors prioritise market volatility and risk management strategies. Cantero-Sáiz et al. (2019) investigated the financial crisis's impact on Spanish shipping companies' capital structure using trade-off and pecking order theories. The study's analysis of 1,805 observations from 2001 to 2015 revealed that liquidity, profitability, non-debt tax shields, and tangible assets all impacted leverage. Empirical studies confirm the inverse relationship between leverage and non-debt tax shields (NDTS). According to DeAngelo and Masulis (1980), non-debt tax shields are tax deductions for depreciation and investment tax credits, as well as substitutes for the tax benefits of debt financing. Therefore, a company with a larger non-debt tax shield is expected to use less debt. Similarly, Kim et al. (2006) and Rajagopal (2010) find that leverage negatively correlates with the non-debt tax shield. On the other hand, in contrast to the De Angelo and Masulis (1980) study, Bradley et al. (1984) find that debt is positively correlated with the non-debt tax shield represented by depreciation and investment tax credits. However, Minton and Wruck (2001) suggest that non-debt tax shields may have a positive relationship with debt conservatism due to their association with companies that invest more. Hence, despite the controversial findings, the ratio of depreciation and amortisation to total assets, a proxy for non-debt tax shields, is used to test the relationship between tax deductibility and the leverage of shipping companies.

2.2.5. Growth Opportunities

The agency model suggests a negative relationship between growth opportunities and leverage, while the pecking order theory suggests a positive relationship due to the disciplinary effect of leverage on managerial opportunism. Berger and Patti (2006) found that high leverage ratios reduce external equity agency costs and increase company value by forcing managers to maximise shareholder wealth. In addition, Jensen and Meckling (1976) noted that leverage nonlinearly impacts total agency costs. Low leverage increases incentives and reduces total agency costs by lowering external equity costs.

Conversely, the pecking order hypothesis posits that companies with more potential for growth are likely to exhibit higher levels of debt. Based on asymmetric information, this theory suggests that managers use a hierarchical approach to finance, initially using retained profits but prioritising debt over equity when seeking more funding (Kayo & Kimura 2011). The impact of growth on leverage has contradictory theoretical predictions. Aarland and Fidjeland (2018) analysed the factors influencing capital structure decisions, the relationship between capital structure and firm performance, and the speed of change for 115 shipping companies from 1996 to 2016. The findings revealed that financial leverage is countercyclical, and tangibility, profitability, and asset risk are shipping companies' most critical firm-specific factors. Lykseth (2022) also studied the capital structure decisions of

publicly traded bulk, LNG, and container companies listed on the New York Stock Exchange between 2000 and 2021. He developed seven propositions and predictions from the pecking order, trade-off, and market conditions models through qualitative and statistical analysis. The pecking order model reflects the capital structure choices of shipping companies in three segments, while the trade-off theory predicts a target mix of short- and long-term debt. Container companies issued equity when their leverage ratio was above the target ratio. Studies have shown a significant inverse relationship between growth and leverage (Kim et al., 2006; Eriotis et al., 2007; De Jong et al., 2008; Paun & Topan, 2016; Yeo, 2016; Moradi & Paulet, 2019), while others show a positive correlation (Fama & French, 2002; Hall et al., 2004; Chen & Zhao, 2006; Yang et al., 2022). In this paper, the proxy for growth opportunities is the ratio of the company's total market value (debt plus equity market value) to the net book value of equity (total assets minus total liabilities).

2.2.6. Volatility

The cyclical nature and sensitivity to changes in the shipping industry's global economy impact its capital structure. Economic growth increases demand for shipping containers, resulting in higher freight rates. Conversely, economic recessions cause a decrease in demand, leading to an oversupply of vessels and a decline in rates. Geopolitical crises, trade conflicts, and economic constraints can disrupt global product and service flows, causing instability in certain regions. Shipbuilding industry volatility can result from mismatches between supply and demand, often due to lengthy construction processes. Fixed costs, such as crew wages, fuel, maintenance, and insurance, also impact shipping companies. During periods of low cargo volumes, fixed costs increase, leading to lower revenues and increased volatility. The potential decline in a company's market value due to earnings fluctuations is recognised as volatility or business risk and is used as a proxy for financial distress. It is also expected to be negatively correlated with leverage. Albertijn et al. (2011) found that the highest risk for a shipping firm is the volatility of earnings or freight rates. In this context, companies may be forced to issue debt or equity because stockholders and lenders are unwilling to invest in a company with high default and bankruptcy risks and volatile earnings. This study's standard deviation of earnings before interest and taxes was scaled by total assets to measure volatility.

3. Methodology and Variables

3.1. Data and the Panel Regression Model

Table 1 presents variables from a literature review of 29 shipping companies listed on the U.S. equity markets (NYSE and Nasdaq), obtained from their websites and Yahoo Finance terminals, covering an annual data set from 2010 to 2021. When conducting panel data analysis, it is recommended to have a greater time dimension if the number of cross-sections is limited. Therefore, to obtain precise results, the study was specifically designed to use data from 2010-2021, including IMO deregulations, as shipping companies listed on

equity markets were limited in availability. This approach allows for analysing a substantial number of cross-sections, ensuring continuity.

Table: 1
Definitions of Variables

Variables	Symbol	Definitions
Dependent variable		
Leverage	LEV	Total liabilities to total assets
Explanatory variables		
Profitability	ROA	The ratio of return on assets
Tangibility	FXAS	The ratio of property, plants, and equipment (net) to total assets
Size	SIZE	Natural logarithms of total assets
Non-Debt Tax Shield	NDTS	Depreciation and amortisation divided by total assets
Growth	MBV	The ratio of market to book value (market capitalisation to net book value)
Volatility	VOL	Standard deviation of EBIT to total assets

Panel data analysis is often used to estimate linear regression equations (1).

$$y_{it} = \alpha + \beta x_{it} + \varepsilon_{it} \ (\varepsilon_{it} = \mu_i + \lambda_t + \nu_{it}) \tag{1}$$

The variable μ_i represents an individual effect, while λ_t represents an unobservable time effect. The term ν_{it} represents the residual stochastic disturbance. Equation (2) is formulated to estimate the capital structure model.

$$LEV_{it} = \alpha + \beta_1 ROA_{it} + \beta_2 FXAS_{it} + \beta_3 SIZE_{it} + \beta_4 NDTS_{it} + \beta_5 MBV_{it} + \beta_6 VOL_{it} + \varepsilon_{it} \tag{2}$$

Where LEV_{it} is the ratio of total liabilities to total assets for company *i* at time *t* (Frank & Goyal, 2009; Arvanitis et al., 2012; Yang et al., 2022); ROA_{it} is the ratio of return on assets (Paun & Topan, 2016); $FXAS_{it}$ is the ratio of net property, plants, and equipment to total assets (Frank & Goyal, 2009; Drobetz et al., 2013; Merika et al., 2015; Yang et al., 2022). $SIZE_{it}$ is the natural logarithms of total assets (Rajagopal, 2010; Drobetz et al., 2013; Yeo, 2016; Moradi & Paulet, 2019; Chen et al., 2021); $NDTS_{it}$ is the ratio of depreciation to total assets (Rajagopal, 2010; Paun & Topan, 2016; Moradi & Paulet, 2019); MBV_{it} is the ratio of market value to book value of equity (Booth et al. 2001; Frank & Goyal 2009; Harris & Roark 2019); VOL_{it} is the standard deviation of EBIT to total assets (Frank & Goyal 2009; Drobetz et al. 2013).

Table 2 displays the descriptive statistics for all variables, including the number of company-year observations (Obs.), mean, standard deviation (SD), median, minimum (Min), and maximum (Max) values. Table 3 displays correlation coefficients indicating a clear negative correlation between all variables and leverage, in contrast to the non-debt tax shield.

Table: 2
Descriptive Statistics

Variables	Obs.	Mean	Std. Deviation	Median	Min.	Max.
LEV	348	0,714	1,214	0,548	0,014	14,124
ROA	348	−1,547	138,030	-0,085	-370,780	2458,630
FXAS	348	0,725	0,237	0,812	0,000	0,978
SIZE	348	7,176	1,991	7,190	1,065	14,973
NDTS	348	0,105	0,403	0,043	0,000	5,552
MVBV	348	149,063	2377,504	0,476	−52,830	44263,34
VOL	348	30,854	256,869	1,344	0,000	2769,285

Table: 3
Correlation Matrix

	LEV	ROA	FXAS	SIZE	NDTS	MBV	VOL
LEV	1 -----						
ROA	-0,27 (0,000)	1 -----					
FXAS	-0,34 (0,000)	-0,07 (0,219)	1 -----				
SIZE	-0,39 (0,000)	-0,03 (0,542)	-0,25 (0,000)	1 -----			
NDTS	0,85 (0,000)	-0,25 (0,000)	-0,27 (0,000)	-0,36 (0,000)	1 -----		
MBV	-0,01 (0,925)	0,00 (0,983)	0,02 (0,690)	0,01 (0,893)	-0,01 (0,832)	1 -----	
VOL	-0,02 (0,685)	-0,02 (0,694)	0,04 (0,495)	-0,04 (0,408)	-0,01 (0,000)	-0,01 (0,890)	1 -----

Numbers in italics below the coefficients indicate p-values.

Financial econometric research should employ panel data methodology to consider cross-sectional simultaneously and time-series components, avoid cross-sectional dependence, maintain stationarity, and avoid challenges like heteroscedasticity, multicollinearity, or autocorrelation, with multicollinearity being the initial assessment step.

Ragnar Frisch introduced the term multicollinearity to describe the linear relationship between explanatory variables in a regression model. This can lead to estimation errors in research using time and cross-sectional series. When analysing panel data, it is crucial to note that the coefficients of variables may be biased if they have minimal impact on the regressor and exhibit a high degree of correlation. To reduce bias, independent variables strongly associated with the variance inflation factor (VIF) should be eliminated. Although multicollinearity is often not a major concern in panel data analysis, conducting correlation matrix or variance inflation factor (VIF) tests is recommended to ensure the absence of problematic multicollinearity. This paper uses the VIF approach to identify potential factors leading to multicollinearity.

Panel regression models require each variable's time series to exhibit stationarity. An autoregressive model is represented by Equation (3), and a time series is stationary if the absolute value of the parameter ρ is less than one or non-stationary if it equals 1.

$$y_t = \rho y_{t-1} + v_t \tag{3}$$

Panel data often shows cross-sectional dependence, making unit root tests more reliable for model selection and estimation. As Nelson and Plosser (1982) hypothesised, a sizable portion of time series data exhibits non-stationarity and follows a random walk pattern. Incorporating this type of data into a model can lead to misleading results. Therefore, it's crucial to determine if variables have a unit root to determine their stationarity in the data set. Additionally, the analysis of cross-sectional dependency significantly impacts the choice of test for unit root tests. Tugcu (2018) proposed a framework that includes two generations of testing for performing panel unit root tests.

Table: 4
Pesaran (2004) CD Test

Variables	Average correlation coefficients & Pesaran (2004) CD test			
	CD-test	p-value	corr.	abs (corr.)
LEV	1.52	0.130*	0.022	0.394
ROA	2.45	0.014	0.035	0.303
FXAS	1.36	0.173*	0.020	0.320
SIZE	1.59	0.112*	0.023	0.485
NDTS	1.94	0.053*	0.028	0.316
MBV	5.59	0.000	0.080	0.340
VOL	6.20	0.000	0.089	0.359

* Under the null hypothesis of cross-section independence CD ~ N (0,1) ˜ at 5% level.

Baltagi (2009) suggests that second-generation unit root tests should be applied when there is evidence or a strong suspicion of cross-sectional dependence (CSD) in panel data analysis. The Pesaran (2004) CD Test results in Table 4 show that ROA, MBV, and VOL have cross-sectional dependence. Thus, Pesaran's second-generation unit root tests (2003) are performed to test the stationary of these series and series that have their unit root transformed into stationary through first differencing.

However, when there is no cross-sectional dependence in a time series, the Augmented Dickey-Fuller (ADF) Test, Phillips-Perron (PP) Test, Im-Pesaran-Shin (IPS) Test, and Levin Lin Chu (LLC) Test could be applied. If cross-sectional dependency is present, the units can be categorised into homogeneous and heterogeneous groups, and the choice of the first unit root test depends on them. The Delta test can identify the homogeneity of a time series without cross-sectional interdependence, even when cross-sectional dependency is ignored. Therefore, the Delta test proposed by Pesaran and Yamagata (2008) was conducted, and the results are shown in Table 5.

Table: 5
Delta Test

Variables	Homogeneity Test			
	Delta	p-value	adj. Delta	p-value
LEV	3,960	0,000*	4,573	0,000*
FXAS	2,419	0,008*	2,793	0,003*
SIZE	2,831	0,002*	3,269	0,001*
NDTS	2,336	0,010*	2,698	0,003*

* Series are heterogeneous.

Table 5 presents the test results and confirms the series' heterogeneity. On the other hand, IPS is generally preferred if there is significant heterogeneity in autoregressive

parameters. However, if heterogeneity is less pronounced, LLC is more suitable. Thus, various unit root tests (LLC, IPS, ADF, and PP) are utilised to verify stationarity in non-cross-sectional dependent series like LEV, FXAS, SIZE, and NDTS, and the variables that exhibit unit roots except for NDTS are transformed into first differences to provide the stationary. Table 6 displays the results of the unit root tests.

Table: 6
The Results of the Unit Root Tests

	Im, Pesaran, and Shin (IPS) constant		Im, Pesaran, and Shin (IPS) constant & trend	
Variables	**statistics**	**p-value**	**statistics**	**p-value**
LEV	-9.1096	0.0000*	-4.9216	0,0000***
FXAS	-9.9996	0.0000*	-5.7254	0.0000***
SIZE	-6.7925	0.0000*	-3.5044	0.0002***
NDTS	-2.67453	0.0000*	-1.9289	0.0269****
	Levin, Lin & Chu (LLC) constant		**Levin, Lin & Chu (LLC) constant & trend**	
Variables	**statistics**	**p-value**	**statistics**	**p-value**
LEV	-14,3229	0,0000*	-14,6465	0,0000***
FXAS	-17.4570	0.0000*	-16.7171	0.0000***
SIZE	-10.6597	0.0000*	-10.4396	0.0000***
NDTS	-5.50330	0.0000*	-8.26096	0.0000***
	Augmented Dickey-Fuller (ADF) constant		**Augmented Dickey-Fuller (ADF) constant & trend**	
Variables	**statistics**	**p-value**	**statistics**	**p-value**
LEV	182,509	0,0000*	130,131	0,0000***
FXAS	199.054	0.0000*	149.766	0.0000***
SIZE	144.402	0.0000*	118.888	0.0000***
NDTS	87.6164	0.0072*	80.8115	0.0255****
	Phillips-Perron (PP) constant		**Phillips-Perron (PP) constant & trend**	
Variables	**statistics**	**p-value**	**statistics**	**p-value**
LEV	204,872	0,0000*	206,908	0,0000***
FXAS	237.780	0,0000*	209.889	0,0000***
SIZE	148.516	0.0000*	136.885	0.0000***
NDTS	97.3106	0.0009*	88.4920	0.0061***

* Statistical significance at 1% level.
** Statistical significance at 5% level.
*** Statistical significance at 1% level included time trend.
**** Statistical significance at 5% level included time trend.

After confirming that all series are stationary, the Hausman test determines whether a fixed or random effect is appropriate for a panel model. If the Hausman test accepts the null hypothesis that the random effect is valid, then the random effect is more appropriate for the model; if the null hypothesis is rejected, then the fixed effect is more appropriate. The results show that the null hypothesis is rejected (p-value = 0.000), indicating the fixed effect is more appropriate.

4. Empirical Results

The diagnostic tests of the fixed effects model revealed two problems: heteroscedasticity and serial correlation. The modified Wald test statistic showed chi2 (29) = 2.8 e + 05, with a probability value of 0.0000, and the Wooldridge test statistic showed F (1,28) = 13.53, with a probability value of 0.0010. The model was re-evaluated using the Feasible Generalized Least Squares (FGLS) estimator to address these issues. The FGLS estimator can handle heteroskedasticity and autocorrelation, making it potentially more efficient for large N and small T panels than other estimators like Beck and Katz's (1995) PCSEs (Wooldridge, 2002: 178).

The results of the panel regressions for the model are presented in Table 7. According to the pecking order theory, it is a well-established practice for companies to prioritise financing their activities through retained earnings, loans, and capital issuance (Myers, 1984; Myers & Majluf, 1984). Prudent companies are cautious about using retained earnings for investment, confirming a negative relationship between profitability and leverage. The model shows a positive and statistically significant relationship between fixed assets and total assets and the leverage ratio, which aligns with the pecking order theory and trade-off theories of capital structure. The results also show a negative correlation between size and leverage, with larger companies mitigating knowledge asymmetry between insiders and capital markets. This suggests that larger companies provide more information to outside investors, reducing adverse selection costs through equity issuance. The pecking order theory suggests that U.S.-listed shipping companies prefer internal funds over external funds and debt financing over equity financing, supporting the pecking order hypothesis. Overall, the results lend credence to the pecking order hypothesis.

Table: 7
Results of Panel Regression

Dependent Variable: LEV				
	[Coefficient]	[Std.Error]	[t Statistics]	[p-value]
ROA	-0,000766	7,58E-05	-10,10317	0,0000*
FXAS	0,215245	0,059422	3,622320	0,0003*
SIZE	-0,119817	0,025860	-4,633290	0,0000*
NDTS	0,020571	0,086946	0,236592	0,8131
MBV	8,65E-07	4,23E-06	0,204586	0,8380
VOL	-1,57E-05	4,18E-05	-0,374373	0,7084
Observations	319	319	319	319
Adj. R^2				0,2791
Durbin-Watson stat.				2,0651

The model was applied with a fixed effect according to the Hausman Test.
* Statistical significance at 1% level.

5. Concluding Remarks

This paper investigates the financial factors influencing capital structure decisions for 29 shipping companies listed on U.S. equity markets, focusing on the impact of IMO deregulations and stricter environmental regulations such as reducing sulphur oxide (SOx) emissions by 80% by 2023 and nitrogen oxide (NOx) emissions by 75% by 2020. These regulations have led to LNG ship conversions and improved port infrastructure, affecting the shipping industry from 2010 to 2023. Therefore, the industry's energy strategies and capital structures have had to adapt to the growing demand for LNG-powered vessels and changes in renewable energy sources. However, notwithstanding the surge in loans granted to the shipping industry since the 2008 financial crisis, the impacts of the pandemic and the following global price hikes have compelled companies to pursue additional resources. Consequently, shipping companies seek capital from established financial markets, such as the NYSE, to improve their financial stability and take advantage of organisations' transparency and regulatory standards, such as the SEC. Considering these developments, I discussed the potential impacts of the pandemic, inflation, and environmental regulations on

shipping companies' capital structure decisions, the factors influencing these decisions, and the validity of capital structure theories in the shipping industry.

The panel data analysis in Table 7 indicates that profitability has a statistically significant and negative impact on leverage. This finding provides empirical support for the validity of the pecking order hypothesis in the context of shipping companies listed on the U.S. equity markets. This theory suggests that companies with higher profitability tend to have lower leverage. They prioritise using retained earnings and minimise their reliance on external financing. However, these companies typically favour debt over equity if external funding is necessary. This finding is not unexpected. Because shipping companies are often affected by fluctuations in the global economy, they make their operations cyclical, and retained earnings, which are a form of internal financing, offer a stable and dependable source of funds not subject to external market conditions. Hence, this negative result is in line with the findings of previous research by Huang and Song (2006), Frank and Goyal (2009), Lemmon and Zender (2010), Syriopoulos and Tsatsaronis (2012), Drobetz et al. (2013), Paun and Topan (2016), Syriopoulos et al. (2018), Aarland and Fidjeland (2018), Cantero-Sáiz et al. (2019), Yang et al. (2022) and Majid and Gandakusuma (2023).

In addition, size, another key determinant in the decision to adopt a capital structure, not only in shipping but in all industries, also negatively impacts leverage. The acquisition of ships and similar assets, particularly in the shipping industry, significantly impacts the increase in total assets or revenues, a prominent measure of size. This is often referred to as fleet augmentation, representing an increase in the company's size. Therefore, when a shipping company is substantial, it can benefit from economies of scale by securing more favourable agreements with suppliers, optimising transportation routes, and distributing fixed costs across larger cargo. On the other hand, the trade-off theory of capital structure suggests that the relationship between size and leverage is ambiguous. It indicates that debt is an optimal capital structure that balances tax benefits with financial distress costs and risks. However, achieving this balance depends on larger companies' access to capital markets and potential cost benefits from economies of scale. Previous studies have found a positive correlation between leverage and size in the capital structure of shipping companies (Drobetz et al., 2013; Merika et al., 2015; Kotcharin & Maneenop, 2017; Aarland & Fidjeland, 2018; Lykset, 2022). However, this study confirms the validity of the pecking order theory, which is consistent with a limited number of studies (Arvenitis et al., 2012; Yang et al., 2022).

Contrary to size and profitability, the study found a negative correlation between tangibility and leverage in shipping companies, indicating a preference for internal funds over external funds due to industry cyclicality and earnings volatility. This suggests that tangible collateral reduces access to loans and costs, confirming the pecking order theory, where retained earnings are preferred over external funds.

In conclusion, the capital structure of shipping companies is a complex interplay of financial theories and industry-specific dynamics. According to the pecking order theory,

shipping companies exhibit a negative relationship between profitability and size with leverage due to considerations of information asymmetry and signalling effects. Larger and more profitable companies prefer residual earnings and are cautious about external debt, which aligns with the theory's predictions. Finally, tangibility seems to be an essential factor, and it positively correlates with leverage. Because, particularly for the shipping industry, it serves as valuable collateral, enabling the acquisition of external debt financing and aligning with the pecking order theory's inclination for debt rather than equity when external funds are needed. The signs of the other variables, namely non-debt tax shield, market-to-book value (a measure of growth potential), and volatility, are consistent with capital structure theories. However, these variables are not statistically significant.

Future research could investigate the variations in these relationships among different shipping industry sub-sectors, such as dry bulk, tankers, and container ships. Additionally, exploring the effects of digitalisation and geopolitical changes on capital structure choices could provide valuable insights.

References

Aarland, A. & A. Fidjeland (2018), "Capital Structure Decisions, Speed of Adjustment and Firm Performance of Listed Shipping Companies: New Empirical Evidence", *Masters' Thesis*, NTNU Trondheim Business School.

Albertijn, S. et al. (2011), "Financing Shipping Companies and Shipping Operations: A Risk-Management Perspective", *The Journal of Applied Corporate Finance*, 23(4), 70-82.

Alexandridis, G. et al. (2018), "A Survey of Shipping Finance Research: Setting the Future Research Agenda", *Transportation Research Part E: Logistics and Transportation Review*, 115, 164-212.

Arvenitis, S.H. et al. (2012), "Dynamic Approach of Capital Structure of European Shipping Companies", *International Journal of Economic Sciences and Applied Research*, 5(3), 33-63.

Baker, M. & J. Wurgler (2002), "Market Timing and Capital Structure", *The Journal of Finance*, 57(1), 1-32.

Baltagi, B.H. (2009), *Econometric Analysis of Panel Data*, Chichester, England: John Wiley & Sons.

Baxter, N.D. (1967), "Leverage, Risk of Ruin and the Cost of Capital", *The Journal of Finance*, 22(3), 395-403.

Berger, A.N. & E.B. di Patti, (2006), "Capital Structure and Firm Performance: A New Approach to Testing Agency Theory and An Application to the Banking Industry", *Journal of Banking & Finance*, 30(4), 1065-1102.

Berk, J.B. et al. (2010), "Human Capital, Bankruptcy, and Capital Structure", *The Journal of Finance*, 65(3), 891-926.

Booth, L. et al. (2001), "Capital Structures in Developing Countries", *The Journal of Finance*, 56(1), 87-130.

Bradley, M. et al. (1984), "On the Existence of an Optimal Capital Structure: Theory and Evidence", *The Journal of Finance*, 39(3), 857-878.

Cantero-Sáiz, M. et al. (2019), "Financial Crisis and Determinants of the Capital Structure of Spanish Maritime Transport Firms", *Journal of Maritime Research*, XVI(II), 78-86.

Chen, L. & X.S.W. Zhao (2006), "On the Relation between the Market-to-Book Ratio, Growth Opportunity, and Leverage Ratio", *Finance Research Letters*, 3(4), 253-266.

Chen, Y. et al. (2021), "Determinants of Leverage in Emerging Markets: Empirical Evidence", *International Journal of Economics and Financial Issues*, 11(2), 40-46.

Dang, H.N. et al. (2019), "Study the Impact of Growth, Firm Size, Capital Structure, and Profitability on Enterprise Value: Evidence of Enterprises in Vietnam", *The Journal of Corporate Accounting & Finance*, 30(1), 144-160.

De Jong, A. et al. (2008), "Capital Structure around the World: The Roles of Firm- and Country-Specific Determinants", *Journal of Banking & Finance*, 32(9), 1954-1969.

DeAngelo, H. & R.W. Masulis (1980), "Optimal Capital Structure under Corporate and Personal Taxation", *Journal of Financial Economics*, 8(1), 3-29.

Dinlersoz, E. et al. (2019), "Leverage over the Life Cycle, Firm Growth and Aggregate Fluctuations", *Working Paper*, 25226, National Bureau of Economic Research, Cambridge.

Drobetz, W. & G. Wanzenried (2006), "What Determines the Speed of Adjustment to the Target Capital Structure?", *Applied Financial Economics*, 16(13), 941-958.

Drobetz, W. et al. (2013), "Capital Structure Decisions of Globally - Listed Shipping Companies", *Transportation Research Part E*, 52, 49-76.

Easterbrook, F.H. (1984), "Two Agency-Cost Explanations of Dividends", *The American Economic Review*, 74(4), 650-659.

Eriotis, N. et al. (2007), "How Firm Characteristics Affect Capital Structure: An Empirical Study", *Managerial Finance*, 33(5), 321-331.

Fama, E.F. & K.R. French (2002), "Testing Trade-Off and Pecking Order Predictions about Dividends and Debt", *The Review of Financial Studies*, 15(1), 1-33.

Ferri, M.G. & W.H. Jones (1979), "Determinants of Financial Structure: A New Methodological Approach", *The Journal of Finance*, 34(3), 631-644.

Frank, M.Z. & V.K. Goyal (2009), "Capital Structure Decisions: Which Factors Are Reliably Important?", *Financial Management*, 38(1), 1-37.

Güner, A. (2016), "The Determinants of Capital Structure Decisions: New Evidence from Turkish Companies", *Procedia Economics and Finance*, 38, 84-89.

Hall, G.C. et al. (2004), "Determinants of the Capital Structures of European SMEs", *Journal of Business Finance & Accounting*, 31(5-6), 711-728.

Hapag-Lloyd (2021), *Annual Report*, <https://www.hapaglloyd.com/content/dam/website/downloads/ir/HLAG_Annual_Report_FY2021.pdf>, 05.01.2024.

Harris, C. & S. Roark (2019), "Cash Flow Risk and Capital Structure Decisions", *Finance Research Letters*, 29, 393-397.

Harris, M. & A. Raviv (1991), "The Theory of Capital Structure", *The Journal of Finance*, 46(1), 297-355.

Hovakimian, A. et al. (2012), "Are Corporate Default Probabilities Consistent with the Static Trade-Off Theory?", *The Review of Financial Studies*, 25(2), 315-340.

Huang, G. & F.M. Song (2006), "The Determinants of Capital Structure: Evidence from China", *China Economic Review*, 17(1), 14-36.

Ibhagui, O.W. & F.O. Olokoyo (2018), "Leverage and Firm Performance: New Evidence on the Role of Firm Size", *North American Journal of Economics and Finance*, 45, 57-82.

Im, K.S. et al. (2003), "Testing for Unit Roots in Heterogeneous Panels", *Journal of Econometrics*, 115(1), 53-74.

International Chamber of Shipping (2022), <https://www.ics-shipping.org/shipping-fact/shipping-and-world-trade-global-supply-and-demand-for-seafarers/>, 29.11.2022.

Jensen, M.C. & R.W.H. Meckling (1976), "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure", *Journal of Financial Economics*, 3(4), 305-360.

Jensen, M.C. (1986), "Agency Cost of Free Cash Flow, Corporate Finance, and Takeovers", *American Economic Review*, 76(2), 323-329.

Kayo, E.K. & H. Kimura (2011), "Hierarchical Determinants of Capital Structure", *Journal of Banking & Finances*, 35(2), 358-371.

Kim, H. et al. (2006), "Dynamics of Capital Structure: The Case of Korean Listed Manufacturing Companies", *Asian Economic Journal*, 20(3), 275-302.

Kotcharin, S. & S. Maneenop (2017), "Understanding the Capital Structure of Thai Companies in the Shipping Sector", *Working Paper*, 2001-6, Thammasat Business School, Thammasat University, Bangkok, Thailand.

Kraus, A. & R.H. Litzenberger (1973), "A State-Preference Model of Optimal Financial Leverage", *The Journal of Finance*, 28(4), 911-922.

Lemmon, M.L. & J.F. Zender (2010), "Debt Capacity and Tests of Capital Structure Theories", *The Journal of Financial and Quantitative Analysis*, 45(5), 1161-1187.

Levin, A. et al. (2002), "Unit Root Tests in Panel Data: Asymptotic and Finite-Sample Properties", *Journal of Econometrics*, 108(1), 1-24.

Lykseth, B.S. (2022), "Capital Structure Choices in the Shipping Industry An Analysis of Bulk, LNG, Container Shipping Firms", *Masters' Thesis*, Copenhagen Business School.

Majid, N.H.S. & I. Gandakusuma (2023), "How Maritime Connectivity and Crude Oil Price Determine Capital Structure of Maritime Industry in Indonesia", *Proceedings of the 7th Global Conference on Business, Management, and Entrepreneurship (GCBME 2022)*, <https://www.atlantis-press.com/proceedings/gcbme-22/125991972>, 16.12.2023.

Maksimovic, V. (1988), "Capital Structure in Repeated Oligopolies", *The Rand Journal of Economics*, 19(3), 389-407.

Menon Economics and DNV Publication (2022), *The Leading Maritime Cities of the World*, <https://www.menon.no/wp-content/uploads/Maritime-cities-2022_13-oppdatert.pdf>, 11.09.2022.

Merika, A. et al. (2015), "The Relationship between Business Cycles and Capital Structure Choice: The Case of the International Shipping Industry", *The Journal of Economic Asymmetries*, 12, 92-99.

Minton, B.A. & K.H. Wruck (2001), "Financial Conservatism: Evidence on Capital Structure from Low Leverage Firms", *Working Paper*, 2001-6, Fisher College of Business, Columbus, Ohio.

Modigliani, F. & M.H. Miller (1958), "The Cost of Capital, Corporation Finance and The Theory of Investment", *The American Economic Review*, 48(3), 261-297.

Modigliani, F. & M.H. Miller (1963), "Corporate Income Taxes and the Cost of Capital: A Correction", *The American Economic Review*, 53(3), 433-443.

Moradi, A. & E. Paulet (2019), "The Firm-Specific Determinants of Capital Structure - An Empirical Analysis of Firms Before and During the Euro Crisis", *Research in International Business and Finance*, 47, 150-161.

Myers, S.C. & N.S. Majluf (1984), "Corporate Financing and Investment Decisions When Firms Have Information that Investors Do Not Have", *Journal of Financial Economics*, 13(2), 187-221.

Myers, S.C. (1977), "Determinants of Corporate Borrowing", *Journal of Financial Economics*, 5(2), 147-175.

Myers, S.C. (1984), "Capital Structure Puzzle", *The Journal of Finance*, 39(3), 575-592.

Myers, S.C. (2001), "Capital Structure", *The Journal of Economic Perspectives*, 15(2), 81-102.

Nelson, C.R. & C.R. Plosser (1982), "Trends and Random Walks in Macroeconomic Time Series: Some Evidence and Implications", *Journal of Monetary Economics*, 10(2), 139-162.

Nenu, E.A. et al. (2018), "The Impact of Capital Structure on Risk and Firm Performance: Empirical Evidence for the Bucharest Stock Exchange Listed Companies", *International Journal of Financial Studies*, 6(2), 1-29.

Ozkan, A. (2001), "Determinants of Capital Structure and Adjustment to Long Run Target: Evidence from UK Company Panel Data", *Journal of Business Finance & Accounting*, 28(1-2), 175-198.

Paun, C. & M.V. Topan (2016), "Capital Structure in the Global Shipping Industry", *Panoeconomicus*, 63(3), 359-384.

Pesaran, M. & T. Yamagata (2008), "Testing Slope Homogeneity in Large Panels", *Journal of Econometrics*, 142(1), 50-93.

Pesaran, M.H. (2004), "General Diagnostic Tests for Cross Section Dependence in Panels", *IZA Discussion Paper*, 1240, The Institute for the Study of Labor Discussion Paper Series.

Rajagopal, S. (2010), "The Portability of Capital Structure Theory: Do Traditional Models Fit in An Emerging Economy?", *Journal of Finance and Accountancy*, 5, 1-17.

Rajan, R.G. & L. Zingales (1995), "What Do We Know about Capital Structure? Some Evidence from International Data", *The Journal of Finance*, 50(5), 1421-1460.

Ramli, N.A. et al. (2019), "Determinants of Capital Structure and Firm Financial Performance-A PLS-SEM Approach: Evidence from Malaysia and Indonesia", *The Quarterly Review of Economics and Finance*, 71, 148-160.

Ross, S.A. (1977), "The Determination of Financial Structure: The Incentive Signaling Approach", *The Bell Journal of Economics*, 8(1), 23-40.

Sari, I.A.G.D.M. & I.B.P. Sedana (2020), "Profitability and Liquidity on Firm Value and Capital Structure as Intervening Variable", *International Research Journal of Management, IT and Social Sciences*, 7(1), 116-127.

Scott, J.H. Jr. (1976), "A Theory of Optimal Capital Structure", *The Bell Journal of Economics*, 7(1), 33-54.

Syriopoulos, T. & M. Tsatsaronis (2012), "Corporate Governance Mechanisms and Financial Performance: CEO Duality in Shipping Firms", *Eurasian Business Review*, 2(1), 1-30.

Syriopoulos, T. (2010), "Shipping Finance and International Capital Markets", in: C. Grammenos (ed.), *The Handbook of Maritime Economics and Business* (1-37), Lloyd's List London: British Library Cataloguing in Publication Data.

Syriopoulos, T. et al. (2018), "Capital Structure Determinants According to Risk Periods in Shipping Companies", *International Conference on Business & Economics of the Hellenic Open University*, <http://hdl.handle.net/11610/21042>, 17.12.2023.

Titman, S. & R. Wessels (1988), "The Determinants of Capital Structure Choice", *The Journal of Finance*, 43(1), 1-19.

Tugcu, C.T. (2018), "Panel Data Analysis in the Energy-Growth Nexus (EGN)", in: A.N. Menegaki (ed.), *The Economics and Econometrics of the Energy-Growth Nexus* (255-271), New York: Elsevier.

UNCTAD (2021), *Review of Maritime Transport 2021*, <https://unctad.org/system/files/official-document/rmt2021_en_0.pdf>, 29.12.2022.

UNCTAD (2022) *United Nations Conference on Trade and Development*, <https://unctad.org/news/global-trade-hits-record-77-trillion-first-quarter-2022>, 29.12.2022.

Wooldridge, J.M. (2002), *Econometric Analysis of Cross Section and Panel Data*, London: The MIT Press.

Yang, H. et al. (2022), "A Comparative Study of the Determinants of Capital Structure in Shipping Companies: The Case of Korea and Greece", *Maritime Policy & Management*, 49(4), 528-539.

Yeo, H. (2016), "Solvency and Liquidity in Shipping Companies", *The Asian Journal of Shipping and Logistics*, 32(4), 235-241.

Yıldırım, D. & A.K. Çelik (2020), "Testing the Pecking Order Theory of Capital Structure: Evidence from Turkey Using Panel Quantile Regression Approach", *Borsa Istanbul Review*, 21(4), 317-331.

Yildirim, R. et al. (2018), "Determinants of Capital Structure: Evidence from Shari'ah Compliant and Non-Compliant Firms", *Pacific-Basin Finance Journal*, 51, 198-219.

The Link Between Trade Openness, Economic Growth, Energy Use and Carbon Emissions: Analysis with a Conceptual Model Proposal[1]

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Ticari Açıklık, Ekonomik Büyüme, Enerji Kullanımı ve Karbon Emisyonları Arasındaki İlişki: Kavramsal Bir Model Önerisi ile Analiz[2]

Abstract

This study examines the relationship between trade openness, economic growth, energy consumption and carbon emissions (CO2) with Structural Equation Modelling (SEM) by offering a model proposal. In this context, a path analysis was carried out with SEM using the 2000-2020 period data of 83 developed and developing countries to examine the direct and indirect effects between the variables. The study's findings show that trade openness directly and significantly affects economic growth, energy consumption and CO2. When the indirect effects are examined, it has been determined that economic growth and energy consumption mediate the relationship between trade openness and CO2, and energy consumption mediates the relationship between economic growth and CO2.

Keywords : Energy Consumption, Economic Development, Trade Openness, Carbon Emissions, Structural Equation Modelling.

JEL Classification Codes : C00, F43, F49, Q43.

Öz

Bu çalışmanın amacı, ticari açıklık, ekonomik büyüme, enerji tüketimi ve karbon emisyonları (CO2) arasındaki ilişkiyi bir model önerisi sunarak Yapısal Eşitlik Modellemesi (YEM) ile incelemektir. Bu kapsamda, değişkenler arasındaki doğrudan ve dolaylı etkileri incelemek üzere gelişmiş ve gelişmekte olan 83 ülkenin 2000-2020 dönem verileri kullanılarak YEM ile yol analizi gerçekleştirilmiştir. Araştırmanın bulguları, ticari açıklığın ekonomik büyüme, enerji tüketimi ve CO2 üzerinde doğrudan pozitif ve anlamlı bir etkisi olduğunu göstermektedir. Dolaylı etkiler incelendiğinde ise ekonomik büyüme ve enerji tüketiminin ticari açıklık ile CO2 arasındaki ilişkide, enerji tüketimin ise ekonomik büyüme ile CO2 arasındaki ilişkide aracılık ettikleri tespit edilmiştir.

Anahtar Sözcükler : Enerji Tüketimi, Ekonomik Kalkınma, Ticari Açıklık, Karbon Emisyonları, Yapısal Eşitlik Modellemesi.

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1. Introduction

The need for energy is steadily rising due to industrial development, fast population rise, technological development, urbanisation, and expansion of business operations (Nasreen & Anwar, 2014; Yang et al., 2022). In line with this trend, traditional theories suggest that trade openness and economic growth contribute to the increase in energy consumption, as trade volumes and Gross Domestic Product (GDP) impact energy consumption (Zeeshan et al., 2022).

International trade has increased dramatically since the General Agreement on Tariffs and Trade (GATT) was established, which has resulted in trade liberalisation. Global trade has been facilitated by the World Trade Organization (WTO), which finally succeeded GATT. In the field of trade economics, Adam Smith's theory of absolute advantage and David Ricardo's theory of comparative advantage have shown that trade is reciprocal and that growing nations with sound economic policies benefit from reciprocal trade (Sun et al., 2019). The Industrial Revolution ushered in a time of widespread, quick economic success and gave rise to one of the most urgent issues of our day: climate change and global warming. The shift of the global economy from organic economies dependent on human and animal power to inorganic economies dependent on fossil fuels was one of the principal effects of the Industrial Revolution. Fossil fuel use has altered the carbon makeup of the atmosphere, increasing heat absorption. Climate change and global warming have been exacerbated by this mechanism (Kasman & Duman, 2015). Rising sea levels and increased global temperatures are only two examples of how climate change presents itself in the real world. Pollutant emissions, particularly carbon emissions from burning and using fossil fuels, are blamed for temperature increases. In addition to harming the planet, carbon emissions also endanger economic growth (Alola et al., 2019: 309; Omri & Saadaoui, 2023).

Global warming is the main factor causing climate change, and greenhouse gas emissions are the leading cause of global warming (Gozgor, 2017). In recent years, the growing threat posed by global warming and climate change has emerged as one of the leading global concerns. Since the 1990s, much research has been done on how global warming affects the international economy. Through intergovernmental and legally binding agreements, international organisations like the United Nations work to reduce the harmful effects of global warming (Halilcioglu, 2009). The massive increase in carbon dioxide (CO2) emissions around the globe is what is primarily driving people's heightened interest in global warming and climate change. Since CO2 is believed to be the primary greenhouse gas source contributing to global warming, governments must regulate it. The 1997 Kyoto Protocol aims to lower greenhouse gas emissions contributing to climate change and global warming in this context (Ajmi et al., 2015). Governments have set CO2 reduction goals under the Kyoto Protocol to tackle climate change. The carbon emission trading (CET) system is one of the critical policy tools that has been put into place in Europe since January 2005. According to this system, businesses, particularly industries, must own CO2 emission licenses (Chappin & Dijkema, 2009).

The immediate deployment of energy regulation measures is required because many of these greenhouse gas emissions now come from emerging nations (Magazzino et al., 2021). Fossil fuel energy is the most widely used component globally, and it is essential for maintaining the development of nations. However, the proliferation of energy-consuming activities in developed and developing countries and waste in affluent countries raises significant concerns. These concerns primarily revolve around the depletion of energy resources, particularly oil, and the associated problems of rapidly increasing greenhouse gas emissions, such as CO2 and methane, contributing to global warming. The effective management and usage of renewable energy sources are necessary due to the worldwide nature of energy concerns (Sebri & Ben-Salha, 2018). Due to its advantages for the environment and general well-being, renewable energy is recognised as a significant energy source. It is a sustainable source that can increase energy security and lessen a nation's reliance on fossil fuels (Al-Mulali et al., 2015). Renewable energy is crucial to address the issues facing the globe today, such as climate change, energy security, and access to clean and inexpensive energy.

In terms of costs, the relationship between economic growth and energy consumption is significantly influenced by technical advancements. In economic theory, prices are considered a measure of scarcity, so the cost of a relatively scarce factor is expected to be higher. With the rapid increase in energy prices since the 1970s, technologies that consume less energy have been developed. Therefore, when examining the relationships between energy consumption and economic growth, it is necessary to include energy prices as an efficiency variable (Şengül & Tuncer, 2006). It is known that trade liberalisation boosts local output, which raises energy consumption (Cole, 2006; Topcu & Payne, 2018). Trade considerably boosts economic activity, but it also poses serious environmental risks since it causes a rise in pollutant emissions that have a negative impact on human health (Akbar et al., 2020). Trade liberalisation causes emissions in low-income economies, and there is a link between trade openness and CO2 emissions. However, the least developed nations produce less environmental deterioration than industrialised nations. However, these nations pose the highest environmental risks due to inadequate living circumstances, poor infrastructure, and a lack of systems for catastrophe prediction and control. To develop their infrastructure, adapt to changing climatic conditions, and increase their disaster management, prediction, and mitigation systems, low-income economies predominantly dependent on an agricultural economy need special attention and technology subsidies (Shahbaz et al., 2017).

In recent years, trade and environmental relations have become a topic frequently debated between advocates and opponents of trade globalisation (Ibrahim & Law, 2016). In his study, Sadorsky (2011) emphasises that trade activities can affect energy consumption differently. Firstly, the distribution process from one country to another requires a transportation network, which requires fuel energy. On the other hand, producing durable goods such as cars, air conditioners, and refrigerators also consumes significant energy. Increases in the quantity and trade of such products lead to a rise in energy demand and consumption (Sadorsky, 2011). The environment is impacted by free trade through

economic expansion. Due to the scale effect of increased energy consumption, economic expansion often has a negative environmental impact in the early phases of development. Early in development, economic expansion is prioritised over pollution control, leading to more economic activity and energy consumption, enhancing the likelihood of increased pollution emissions (Mahmood et al., 2019). As a result, increasing international trade expands the economy's growth potential by providing access to new markets. An economy in the process of growth may need more energy resources. If energy is obtained from fossil fuels, carbon emissions may increase, which may cause environmental problems such as climate change.

This study investigates the connection between trade openness, economic growth, energy use, and CO2 emissions. In this regard, a model suggestion is made, and analysis is done using Structural Equation Modelling (SEM) with data from 83 developed and developing nations between 2000 and 2020. This study is expected to guide policymakers in developing and implementing environmentally friendly strategies and provide important information that can be used to evaluate environmental risks for researchers, investors and the business world. SEM is a powerful statistical method to assess and model complex relationships between variables. SEM provides a flexible framework for examining causal relationships between variables in more detail than traditional statistical methods. Therefore, this study takes a comprehensive approach to understand more deeply the relationships between trade openness, economic growth, energy consumption and CO2 emissions by using structural equation modelling. In this respect, the method used within the scope of the study distinguishes the study from other studies in the literature. It makes it possible to address these complex relationships more systematically and in integrity. This study is crucial for examining the interactions between variables inside a single model from an integrated perspective. This study consists of four sections. After the introduction, the second section includes a literature review and summarises the studies on the subject. In the third section, the econometric method and analysis section is included. First, the technique used in the study is introduced, and then the necessary analyses are made. Finally, in the fourth section, the conclusion is included, and the importance of the study, main findings and recommendations are summarised.

2. Literature Review

Trade openness affects the economy in various ways, affecting energy use, CO2 emissions, and economic growth. Researchers and decision-makers have long focused on the links between trade openness, economic growth, and energy use. Numerous authors have used a variety of techniques utilising various periods for various countries to determine the direction of causality between these factors (Şengül & Tuncer, 2006; Halilcioglu, 2009; Hossain, 2011; Naranpanaw, 2011; Nasreen & Anwar, 2014; Bozkurt & Okumuş, 2015; Kyophilavong et al., 2015; Kesgingöz & Karamelikli, 2015; Ajmi et al., 2015; Bhattacharya et al., 2016; Shahbaz et al., 2017; Cetin et al., 2018; Ansari et al., 2019; Akbar et al., 2020; Khan et al., 2021; Zeeshan et al., 2022; Rahman & Alam, 2022; Ntiamoah et al., 2023;

Adebayo et al., 2023). The empirical findings on these interactions, however, are not clear. In this section, a summary of related studies is given.

Şengül and Tuncer (2006) examined the causal relationships between commercial energy consumption, real energy price index and economic growth using Türkiye's 1960-2000 period data using the VAR method. When the study's findings were examined, a one-way causality relationship was found between commercial energy consumption and economic growth, while a two-way causality relationship was found between real energy prices and economic growth.

Halilcioglu (2009) examined the causal relationships between carbon emissions, energy consumption, income and foreign trade using Türkiye's 1960-2005 data with a cointegration analysis and bounds test approach. Research findings show that there are two types of long-term relationships between variables. In the first form of the long-term relationship, carbon emissions are determined by energy consumption, income and foreign trade; in the second long-run relationship, income is determined by carbon emissions, energy consumption and foreign exchange.

Hossain (2011) analyses the dynamics between carbon emissions, energy consumption, economic growth, trade openness and urbanisation using 1971-2007 data for industrialising countries (Brazil, China, India, Malaysia, Mexico, Philippines, South Africa, Thailand and Türkiye). They examined causal relationships with panel causality and cointegration tests. Granger causality test results support no evidence of a long-term causality relationship but a unidirectional short-term causality relationship from economic growth and trade openness to carbon dioxide emissions, economic growth to energy consumption, and trade openness to the economy.

Naranpanaw (2011) examined the relationship between trade openness and carbon emissions in Sri Lanka using the ARDL bound test and data from 1960-2006. The results show no long-term causality between trade openness and carbon emissions but a short-term relationship.

Nasreen and Anwar (2014) examined the causal relationship between economic growth, trade openness, and energy consumption using panel cointegration analysis and data from 15 Asian countries from 1980 to 2011. Empirical findings show that economic growth and trade openness positively impact energy consumption. The Granger causality analysis also indicates a bidirectional causality relationship between economic growth and energy consumption, trade openness and energy consumption.

Ajmi et al. (2015) examined the relationships between energy consumption, carbon dioxide (CO_2) emissions and GDP in G7 countries with the Granger causality test using 1960-2010 period data. The study's findings show that there is bidirectional causality between GDP and energy consumption for Japan, unidirectional causality from GDP to energy consumption for Italy, and unidirectional causality from energy consumption to GDP

for Canada. Additionally, the results show a bidirectional causality between energy consumption and CO2 emissions for the USA and a unidirectional causality from energy consumption to CO2 emissions for France.

Shahbaz et al. (2017) examined the relationship between trade openness and CO2 emissions for three groups of 105 low, middle, and high-income countries using Pedroni (1999) and Westerlund panel cointegration tests. Panel causality results show a bidirectional relationship between trade openness and carbon emissions in middle-income countries, but trade openness causes CO2 emissions in low- and high-income countries.

Cetin et al. (2018) examined the effects of economic growth, energy consumption, trade openness and financial development on carbon emissions using Türkiye's 1960-2013 period data with cointegration analysis. The findings reveal a long-term relationship between economic growth, energy consumption, trade openness, financial development and per capita carbon emissions. The Granger causality analysis also shows a long-term unidirectional causality from economic growth, energy consumption, trade openness, and financial development to carbon emissions.

Ansari et al. (2019), in their study, the effects of international trade, economic growth and energy consumption on carbon emissions in the USA, Japan, Canada, Iran, Saudi Arabia, England, Australia, Italy, France and Spain, which are among the countries that emit the most carbon emissions, 1971-2013. It was examined using panel cointegration and causality tests using period data. The research findings reveal a long-term relationship between carbon emissions and their determinants, with energy consumption being the primary determinant of carbon emissions.

In their study, Akbar et al. (2020) used data from 1991-2018 to examine the relationship between trade liberalisation, energy consumption, CO2 emissions, and health expenditures in Southeast Asian countries with SEM. Empirical results reveal a relationship between trade openness, energy consumption, CO2 emissions and healthcare expenditure in Southeast Asian countries. CO2 emissions have a direct impact on healthcare expenditures. It was concluded that trade and energy consumption indirectly affect the increase in health expenditures. It has been determined that energy consumption mediates all indirect effects.

Khan et al. (2021) examined the relationship between economic development, financial development, trade openness, energy use and carbon emissions in Bangladesh using the 1980-2016 autoregressive distributed lag bounds test method. The research findings reveal that energy use significantly impacts carbon emissions in both the short term and long term. The effect of economic development is among the findings that it substantially affects the long term, but there is no effect in the short term. Trade openness and financial development factors are equally negative and insignificant in the short and long term.

Zeeshan et al. (2022) examined the relationship between trade liberalisation, CO2 emissions, energy consumption and economic growth comparatively for Southeast Asian and Latin American countries with SEM using 1991-2018 data. The study shows that trade positively and statistically significantly impacts energy consumption, CO2 emissions and economic growth in Southeast Asian countries. In Latin American countries, while trade has an insignificant effect on energy consumption, a positive and statistically significant impact has been detected on CO2 emissions and economic growth.

Ntiamoah et al. (2023) examined the effects of carbon emissions, economic growth, population growth, trade openness and agricultural employment on the food security of East African countries using the 1990-2020 period with panel data analysis. The findings show that their variables have long-run equilibrium links. It has been found that the increase in CO2 emissions increases food security in East Africa in the long term, and long-term food security is positively affected by economic expansion, population growth, trade openness and employment in agriculture.

When the literature is generally evaluated, it can be seen that various studies use relevant variables and that traditional analysis techniques are used in most of these studies. Although the analysis findings vary, the general conclusion reached in these studies is that these variables have a positive and significant relationship.

3. Econometric Method and Analysis

3.1. Structural Equation Modelling and Hypotheses

SEM is a tool for analysing complicated relationships among several constructs that are increasingly chosen for idea and theory building in management (Lei & Wu, 2007; Mia et al., 2019; Singh & Ahuja, 2020). Path analysis serves as the ancestor of SEM. Due to the inclusion of simultaneous estimates of several multiple regression models or equations, path analysis is seen as an extension of multiple regression analysis. This technique makes it possible to more directly and effectively model indirect effects, indirect mediation, and other intricate interactions between variables (Lei & Wu, 2007). Therefore, SEM is an advanced multivariate analysis technique that may examine intricate causal links between several variables.

SEM and path analysis were performed in this study using data from 83 developing and developed nations from 2000 to 2020. When the databases are examined, it is determined that the last updated common data regarding the variables is from 2020 (while the previously updated data on energy consumption and carbon emissions is from 2020, the last updated data on trade openness and economic growth from 2022). On the other hand, 47 of the 83 countries included in the study are in the developed country category, while 35 are in the developing country category. Considering developed and developing countries in the same sample within the scope of the analysis provides the opportunity to analyse and understand how they behave under similar conditions in the same period. The most significant advantage of this approach is that it reveals the relations between countries with different

economic structures in similar examples in more detail. IBM SPSS Statistics 28 and IBM SPSS Amos 28 software were used for the analyses. The proposed model of the study is illustrated in Figure 1.

Figure: 1
Proposed Model of the Study
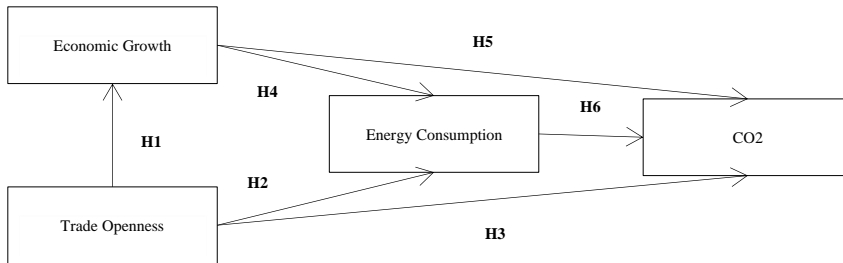
The hypotheses of the proposed model in the study are as follows:

H1: Trade openness has a positive effect on economic growth.

H2: Trade openness has a positive effect on energy consumption.

H3: Trade openness has a positive effect on CO2 emissions.

H4: Economic growth has a positive effect on energy consumption.

H5: Economic growth has a positive effect on CO2 emissions.

H6: Energy consumption has a positive effect on CO2 emissions.

3.2. Analysis and Findings

This section includes the necessary analyses and findings made within the study's scope. Firstly, information about the variables discussed in the survey is included. The information regarding the variables is presented in Table 1.

Table: 1
Data Set of the Study

Variable Name	Variable Description	Source
Trade Openness	Trade (% GDP)	World Bank
Economic Growth	GDP Per Capita	World Bank
Energy Consumption	Oil equivalent energy consumption per capita	World Bank - Our World in Data
CO2	CO2 carbon emissions per capita (metric tons)	World Bank - Our World in Data

Then, descriptive statistics and correlation analysis findings are included. A correlation analysis was conducted while keeping the investigation's parameters in mind.

Correlation analysis, a statistical method, assesses a potential linear link between variables. It shows the strength and direction of the relationship between the variables and varies from +1 to -1 (Mukaka, 2012). The descriptive statistics and outcomes of the correlation analysis of the study's variables are displayed in Table 2 as follows.

Table: 2
Descriptive Statistics and Correlation Analysis

Descriptive Statistics					
Variables	Observation	Mean	Standard Deviation	Min	Max
Trade Openness	1421	92.30	56.73	19.56	437.33
Economic Growth	1428	18962.78	11789.27	157.18	113679
Energy Consumption	1314	3141.49	2322.66	141.35	20420.6
CO2	1390	6.67	6.12	.2	47.65
Correlation Analysis					
Variables	Trade Openness	Economic Growth	Energy Consumption	CO2	
Trade Openness	1.00				
Economic Growth	0.55	1.00			
Energy Consumption	0.57	0.59	1.00		
CO2	0.61	0.29	0.71	1.00	

When Table 2 is examined, it is seen that the number of observations, mean, standard deviation, min and max value information of the variables are included. Upon reviewing the results of the correlation analysis in Table 2, it can be observed that trade openness has a positive correlation of 0.55 with economic growth, 0.57 with energy consumption, and 0.61 with CO_2. The highest correlation value is 0.71 between energy consumption and CO_2. The hypothesis test results of the proposed model conducted after the correlation analysis are presented in Table 3, as shown below.

Table: 3
Hypothesis Results of the Proposed Model

H. Number	Hypotheses	Standard β	P	Accept/Reject
H1	Trade Openness > Economic Growth	.525	***	Supported
H2	Trade Openness > Energy Consumption	.395	***	Supported
H3	Trade Openness > CO2	.286	***	Supported
H4	Economic Growth > Energy Consumption	.523	***	Supported
H5	Economic Growth > CO2	.015	.484	Unsupported
H6	Energy Consumption > CO2	.610	***	Supported

When examining Table 3, it can be observed that out of the six hypotheses, five were supported, while the hypothesis (H5) regarding the positive impact of economic growth on CO_2 was not supported. In structural equation models, hypotheses not supported by the data are excluded, leading to a redefinition of the model. This deduction allows the model to become more accurate and effective. This study's analysis was continued based on the accepted model shown in Figure 2 after excluding the unsupported hypothesis (H5) from the model.

Figure: 2
Accepted Model of the Research
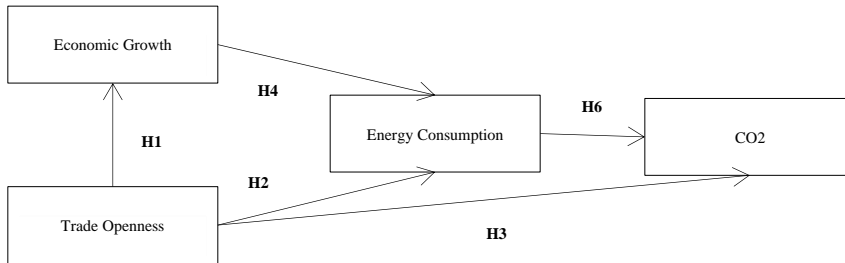
SEM aims to enable researchers to understand the theory and develop the most appropriate model based on the theory. Furthermore, the test results are more accurately represented by the model's goodness-of-fit, which involves comparing fit indices and constructing the initial structural model based on the theory (Mia et al., 2019). Goodness-of-fit tests in SEM provide various indices concerning the compatibility of the collected data with the model. The most commonly used index in SEM programs, referred to as the initial fit index, is the chi-square ($\chi 2$) test, which indicates the level of compatibility between the model and the data (Meydan & Şeşen, 2015; Scaini et al., 2022). A value less than 3 indicates excellent fit, while a value between 3 and 5 indicates acceptable fit (Gürbüz, 2019). Upon reviewing the literature, I found that other frequently used indices for assessing model fit are CFI, NFI, and RMSEA. CFI and NFI are comparative fit indices, and values close to or equal to 1 indicate excellent fit, while values close to 0 indicate poor fit (Talwar et al., 2016). RMSEA is an index demonstrating the model's fit to the sample (Tanaka et al., 2017). Table 4 presents these indices' fit ranges and the accepted model's goodness-of-fit values.

Table: 4
Goodness of Fit Values of the Accepted Model

Good Fit Indices	Accepted Compliance Range	Model Fit Value
$\chi 2$/sd (CMIN/DF)	≤ 5	3.27
CFI	.90≤CFI≤1.00	0.98
NFI	.90≤NFI≤1.00	0.99
RMSEA	.00≤RMSA≤.08	0.05

The model fit index values in Table 4 fall within the accepted range. After checking the goodness-of-fit values, the accepted model was used for path analysis. The total, direct, and indirect effects among the variables are presented in Table 5 due to the path analysis.

Table: 5
Total, Direct and Indirect Effects Between Variables in the Accepted Model

Standardised Total Effects			
Variables	Trade Openness	Economic Growth	Energy Consumption
Economic Growth	0.52	0	0
Energy Consumption	0.67	0.52	0

CO2	0.70	0.32	0.62
Standardised Direct Effects			
Variables	Trade Openness	Economic Growth	Energy Consumption
Economic Growth	0.52	0	0
Energy Consumption	0.39	0.52	0
CO2	0.29	0	0.62
Standardised Indirect Effects			
Variables	Trade Openness	Economic Growth	Energy Consumption
Economic Growth	0	0	0
Energy Consumption	0.28	0	0
CO2	0.41	0.32	0

Table 5 shows that trade openness has an overall impact on economic growth, energy consumption, and CO2 of 0.52, 0.67, and 0.70, respectively. Regarding the direct effects, trade openness has a 0.52 impact on economic growth, a 0.39 impact on energy use, and a 0.29 impact on CO2. Trade openness indirectly affects energy consumption and CO2 emissions of 0.28 and 0.41, respectively.

According to the findings, nations that are more open to trade tend to use more energy and emit more CO2 to create and export more goods and services. This is due to the expectation that increased trade openness will boost factors like transportation and industrial activity, directly raising demand for and consumption of energy-intensive items. Research on indirect impacts shows that trade openness can impact economic growth, affecting energy use and CO2 emissions. Countries experiencing economic expansion typically consume more energy, increasing CO2 emissions. Therefore, the relationship between economic growth and CO2 emissions can be considered driven by energy use.

4. Conclusion

With increased international trade and easier access to new markets, businesses can operate globally and reach a wider audience. On the other hand, when a nation specialises in producing a particular good or service, efficiency increases. This, in turn, enhances productivity and spurs economic expansion. Trade and economic expansion, however, can cause a rise in energy use. Carbon dioxide and other greenhouse gases are emitted due to processes like burning fossil fuels for energy. By raising the air's temperature, these greenhouse gases contribute to major environmental issues, including climate change.

This study examines the relationship between trade openness, economic growth, energy consumption, and CO2 emissions in 83 developed and developing countries using the SEM method with data from 2000-2020. An important feature of SEM is that it examines the relationships between variables in an integrated way. This is where SEM differs from other statistical analysis methods. SEM can handle correlations, causal relationships and indirect effects between variables within the same model. In this way, a more comprehensive analysis can be performed to explain interrelated variables' interactions and complex relationships. Six hypotheses are examined in this case, and a sample proposal is put out. Based on the proposed model's path analysis findings, one hypothesis (H5) is deemed unsupported and is eliminated from the study, leaving the remaining five up for discussion. When the findings of the study are evaluated in general, it is seen that they are compatible

with the literature. Since SEM is a confirmatory method, not an exploratory one, it is expected that the model hypotheses created based on the literature will be accepted. The analysis results show that trade openness generally affects economic growth, energy use, and CO_2 emissions of 0.52, 0.67, and 0.70, respectively. Additionally, the data show that trade openness indirectly affects energy use and CO_2 emissions, with coefficients of 0.28 and 0.41, respectively. These coefficients show the direction and strength of the relationships between the relevant variables. In other words, the positive coefficient between trade openness and economic growth is 0.52, indicating that the increase in trade openness positively affects economic growth. Indirect effect coefficients show the effect of mediator variables on dependent variables through the impact of other independent variables.

The increase in production and transportation of goods and services and increased trade impact energy consumption. Since manufacturing and transportation activities frequently require a lot of energy, increased trade may result in higher energy demands. This entails increased energy resource use and CO_2 emissions from electricity production. These results emphasise the necessity of integrating trade and energy policies and considering how trade policies may affect energy use and CO_2 emissions. The results suggest that trade openness can significantly impact energy consumption and CO_2 emissions, highlighting the need for policymakers to consider these effects when designing trade and energy policies. Promoting renewable energy sources and energy efficiency, in particular, is anticipated to help reduce the detrimental environmental impact of growing commerce and economic growth. Incentives and investments for sustainable energy resources, as well as raising awareness in society by conducting training and awareness programs on environmental impacts, may be strategic steps to be taken at this point. On the other hand, the limitation of this study is that the latest common data for the countries discussed is from 2020. For future studies, it is recommended that researchers make comparisons by performing analyses over a more comprehensive period and for different country groups.

References

Adebayo, T.S. et al. (2023), "Interaction Among Geopolitical Risk, Trade Openness, Economic Growth, Carbon Emissions and Its Implication on Climate Change in India", *Energy & Environment*, 34(5), 1305-1326.

Ajmi, A.N. et al. (2015), "On the Relationships Between CO2 Emissions, Energy Consumption and Income: The Importance of Time Variation", *Energy Economics*, 49, 629-638.

Akbar, A. et al. (2020), "Unraveling the Dynamic Nexus Between Trade Liberalization, Energy Consumption, CO2 Emissions, and Health Expenditure in Southeast Asian Countries", *Risk Management and Healthcare Policy*, 5(13), 1915-1927.

Al-Mulali, U. et al. (2015), "The Influence of Economic Growth, Urbanization, Trade Openness, Financial Development, and Renewable Energy on Pollution in Europe", *Natural Hazards*, 79, 621-644.

Alola, A.A. et al. (2019), "The Role of Renewable Energy, Immigration and Real Income in Environmental Sustainability Target. Evidence From Europe Largest States", *Science of The Total Environment*, 674, 307-315.

Ansari, M. A. et al. (2019), "Does Trade Openness Affects Global Carbon Dioxide Emissions: Evidence from the Top CO2 Emitters", *Management of Environmental Quality: An International Journal*, 31(1), 32-53.

Bhattacharya, M. et al. (2016), "The Effect of Renewable Energy Consumption on Economic Growth: Evidence from Top 38 Countries", *Applied Energy*, 162, 733-741.

Bozkurt, C. & İ. Okumuş (2015), "Türkiye'de Ekonomik Büyüme, Enerji Tüketimi, Ticari Serbestleşme ve Nüfus Yoğunluğunun CO2 Emisyonu Üzerindeki Etkileri: Yapısal Kırılmalı Eşbütünleşme Analizi", *Mustafa Kemal Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 12(32), 23-35.

Cetin, M. et al. (2018), "The Impact of Economic Growth, Energy Consumption, Trade Openness, and Financial Development on Carbon Emissions: Empirical Evidence from Turkey", *Environmental Science and Pollution Research*, 25(36), 36589-36603.

Chappin, E.J.L. & G.P.J. Dijkema (2009), "On the Impact of CO2 Emission-Trading on Power Generation Emissions", *Technological Forecasting and Social Change*, 76(3), 358-370.

Cole, M.A. (2006), "Does Trade Liberalization Increase National Energy Use?", *Economics Letters*, 92(1), 108-112.

Gozgor, G. (2017), "Does Trade Matter for Carbon Emissions in OECD Countries? Evidence from a New Trade Openness Measure", *Environmental Science and Pollution Research*, 24(36), 27813-27821.

Gürbüz, S. (2019), *AMOS ile Yapısal Eşitlik Modellemesi*, Ankara: Seçkin Yayıncılık.

Halicioglu, F. (2009), "An Econometric Study of CO2 Emissions, Energy Consumption, Income and Foreign Trade in Turkey", *Energy Policy*, 37(3), 1156-1164.

Hossain, M.S. (2011), "Panel Estimation for CO2 Emissions, Energy Consumption, Economic Growth, Trade Openness and Urbanization of Newly Industrialized Countries", *Energy Policy*, 39(11), 6991-6999.

Ibrahim, M.H. & S.H. Law (2016), "Institutional Quality and CO2 Emission-Trade Relations: Evidence from Sub-Saharan Africa", *South African Journal of Economics*, 84(2), 323-340.

Kasman, A. & Y.S. Duman (2015), "CO2 Emissions, Economic Growth, Energy Consumption, Trade and Urbanization in New EU Member and Candidate Countries: A Panel Data Analysis", *Economic Modelling*, 44, 97-103.

Kesgingöz, H. & H. Karamelikli (2015), "Dış Ticaret-Enerji Tüketimi ve Ekonomik Büyümenin CO2 Emisyonu Üzerine Etkisi", *Kastamonu Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 9(3), 7-17.

Khan, A.G. et al. (2021), "Do Financial Development, Trade Openness, Economic Development, and Energy Consumption Affect Carbon Emissions For an Emerging Country?", *Environmental Science and Pollution Research*, 28, 42150-42160.

Kyophilavong, P. et al. (2015), "The Energy-Growth Nexus in Thailand: Does Trade Openness Boost Up Energy Consumption?", *Renewable and Sustainable Energy Reviews*, 46, 265-274.

Lei, P.W. & Q. Wu (2007), "Introduction to Structural Equation Modeling: Issues and Practical Considerations", *Educational Measurement: Issues and Practice*, 26(3), 33-43.

Magazzino, C. et al. (2021), "A Machine Learning Approach on the Relationship Among Solar and Wind Energy Production, Coal Consumption, GDP, and CO2 Emissions", *Renewable Energy*, 167, 99-115.

Mahmood, H. et al. (2019), "Trade openness and CO2 emissions: Evidence from Tunisia", *Sustainability*, 11(12), 3295.

Meydan, C.H. & H. Şeşen (2015), *Yapısal Eşitlik Modellemesi Amos Uygulamaları*, Ankara: Detay Yayıncılık.

Mia, M.M. et al. (2019), "Covariance Based-Structural Equation Modeling (CB-SEM) Using AMOS in Management Research", *Journal of Business and Management*, 21(1), 56-61.

Mukaka, M.M. (2012), "A Guide to Appropriate Use of Correlation Coefficient in Medical Research", *Malawi Medical Journal*, 24(3), 69-71.

Naranpanawa, A. (2011), "Does Trade Openness Promote Carbon Emissions? Empirical Evidence from Sri Lanka", *The Empirical Economics Letters*, 10(10), 973-986.

Nasreen, S. & S. Anwar (2014), "Causal Relationship Between Trade Openness, Economic Growth and Energy Consumption: A Panel Data Analysis of Asian Countries", *Energy Policy*, 69, 82-91.

Ntiamoah, E.B. et al. (2023), "How Do Carbon Emissions, Economic Growth, Population Growth, Trade Openness And Employment Influence Food Security? Recent Evidence from the East Africa", *Environmental Science and Pollution Research*, 30(18), 1-17.

Omri, E. & H. Saadaoui (2023), "An Empirical Investigation of the Relationships Between Nuclear Energy, Economic Growth, Trade Openness, Fossil Fuels, and Carbon Emissions in France: Fresh Evidence Using Asymmetric Cointegration", *Environmental Science and Pollution Research*, 30(5), 13224-13245.

Our World in Data (2023), < https://ourworldindata.org>, 10.02.2023.

Rahman, M.M. & K. Alam (2022), "CO2 Emissions in Asia-Pacific Region: Do Energy Use, Economic Growth, Financial Development and International Trade Have Detrimental Effects?", *Sustainability*, 14(9), 5420.

Sadorsky, P. (2011), "Trade and Energy Consumption in the Middle East", *Energy Economics*, 33(5), 739-749.

Scaini, S. et al. (2022), "A Cross-Validation of the Anger Cognitions Scale-Revised: Cognitions and Anger in an Italian Adolescent Sample", *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, 40(2), 278-294.

Sebri, M. & O. Ben-Salha (2014), "On the Causal Dynamics Between Economic Growth, Renewable Energy Consumption, CO2 Emissions and Trade Openness: Fresh Evidence from BRICS Countries", *Renewable and Sustainable Energy Reviews*, 39, 14-23.

Şengül, S. & İ. Tuncer (2006), "Türkiye'de Enerji Tüketimi ve Ekonomik Büyüme: 1960-2000", *İktisat İşletme ve Finans*, 21(242), 69-80.

Shahbaz, M. et al. (2017), "Trade Openness-Carbon Emissions Nexus: The Importance of Turning Points of Trade Openness for Country Panels", *Energy Economics*, 61, 221-232.

Singh, K. & I.S. Ahuja (2020), "Structural Equation Modelling of Transfusion Of TQM-TPM Model for Indian Manufacturing Industries", *International Journal of Management Practice*, 13(1), 47-73.

Sun, H. et al. (2019), "Trade Openness and Carbon Emissions: Evidence from Belt and Road
Countries", *Sustainability*, 11(9), 2682.

Talwar, P. et al. (2016), "The Goodness-of-fit of DASS-21 Models Among University Students",
Malays J Public Health Med, 16(3), 219-26.

Tanaka, Y. et al. (2017), "Uncovering the Influence of Social Skills and Psychosociological Factors
on Pain Sensitivity Using Structural Equation Modeling", *Journal of Pain Research*,
(10), 2223-2231.

Topcu, M. & J.E. Payne (2018), "Further Evidence on the Trade-Energy Consumption Nexus in
OECD Countries", *Energy Policy*, 117, 160-165.

World Bank (2023), <https://data.worldbank.org/>, 10.02.2023.

Yang, X. et al. (2022), "The Impact of Renewable Energy Consumption, Trade Openness, CO2
Emissions, Income Inequality, on Economic Growth", *Energy Strategy Reviews*, 44,
101003.

Zeeshan, M. et al. (2022), "Comparative Analysis of Trade Liberalization, CO2 Emissions, Energy
Consumption and Economic Growth in Southeast Asian And Latin American Regions: A
Structural Equation Modeling Approach", *Frontiers in Environmental Science*, 79, 1-12.

Annex: 1
Countries Included in the Analysis

Algeria	El Salvador	Kyrgyz Republic	Romania
Angola	Estonia	Latvia	Saudi Arabia
Australia	Finland	Lebanon	Senegal
Austria	France	Lithuania	Singapore
Bahrain	Germany	Luxembourg	Slovak Republic
Bangladesh	Ghana	Malta	Slovenia
Belgium	Greece	Mongolia	Spain
Benin	Haiti	Morocco	Sri Lanka
Bolivia	Honduras	Nepal	Sweden
Brunei Darussalam	Hungary	Netherlands	Switzerland
Cambodia	Iceland	New Zealand	Tajikistan
Cameroon	India	Nicaragua	Tunisia
Canada	Indonesia	Nigeria	Ukraine
Chile	Iran, Islamic Rep.	Norway	United Arab Emirates
Congo, Rep.	Ireland	Oman	United Kingdom
Cote d'Ivoire	Israel	Pakistan	United States
Croatia	Italy	Panama	Uruguay
Cyprus	Japan	Philippines	Uzbekistan
Czechia	Kenya	Poland	Vietnam
Denmark	Korea, Rep.	Portugal	Zimbabwe
Egypt, Arab Rep.	Kuwait	Qatar	

Oğuz, S. (2024), "The Link Between Trade Openness, Economic Growth, Energy Use and Carbon Emissions: Analysis with a Conceptual Model Proposal", *Sosyoekonomi*, 32(60), 181-195.

From Classical Political Economics to Neoclassical (Mainstream) Economics: The Ideological Reproduction and Depoliticization Process of Economics

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Klasik Politik İktisattan Neoklasik (Ana Akım) İktisada: İktisadın İdeolojik Yeniden Üretimi ve Depolitizasyon Süreci

Abstract

The first school of thought that allowed economics to be treated as a separate discipline was classical economics, known as classical political economy. Classical economics is described as the science of distribution. However, the extent to which science prioritises distributional dynamics is debatable. On the other hand, after the marginalist revolution in the 1870s, the birth of neoclassical economics led to the separation of economics from social sciences. Pure economic logic has separated the economy from society, politics, and all kinds of social factors and put it into positive sciences that operate with an autonomous mechanism within itself. In this way, it is thought that it is aimed to exclude the secrets that can question the structural depth and distribution dynamics of the capitalist system. In all these contexts, the ideological-based reproduction and depoliticisation process of classical and neoclassical economics will be discussed within a historical materialist framework. Thus, it is thought that it will be possible to reveal the theoretical and ideological realities behind the visible faces of classical economics, characterised as classical political economy and neoclassical economics, known as mainstream economics.

Keywords   :   Classical Political Economy, Neoclassical Economics, Capitalism, Marginalism, Distribution.

JEL Classification Codes :   B1, B12, B13.

Öz

İktisadın ayrı bir disiplin olarak ele alınmasını sağlayan ilk düşünce okulu klasik politik ekonomi olarak bilinen klasik iktisattır. Klasik iktisat bölüşümün bilimi olarak tanımlanır. Ancak bilimin bölüşümsel dinamiklere ne ölçüde öncelik verdiği tartışmalı bir konu olduğu düşünülmektedir. Öte yandan 1870'lerdeki marjinalist devrimin ardından neoklasik iktisadın doğuşu, iktisadın sosyal bilimlerden kopuşuna yol açmıştır. Saf ekonomik mantık, ekonomiyi toplumdan, siyasetten ve her türlü toplumsal faktörden ayırarak kendi içinde özerk bir mekanizmayla çalışan pozitif bilimlerin içine yerleştirmiştir. Böylelikle kapitalist sistemin yapısal derinliğini ve dağılım dinamiklerini sorgulayabilecek sırların dışlanmasının amaçlandığı düşünülmektedir. Tüm bu bağlamlarda klasik ve neoklasik iktisadın ideolojik temelli yeniden üretim ve depolitizasyon süreci tarihsel materyalist bir çerçevede ele alınacaktır. Böylelikle, klasik ekonomi politik olarak nitelendirilen klasik iktisadın ve ana akım iktisat olarak bilinen neoklasik iktisadın görünen yüzlerinin ardındaki kuramsal ve ideolojik gerçekliklerin açığa çıkarılmasının mümkün olabileceği düşünülmektedir.

Anahtar Sözcükler   :   Klasik Politik Ekonomi, Neoklasik İktisat, Kapitalizm, Marjinalizm, Bölüşüm.

1. Introduction

Since its emergence, economic thought has been constantly evolving, transforming, and developing as a requirement of dialectics. The power of thought reflects the power of the social classes (dominant classes) represented by the thought on the ideological plan. It is thought that reflecting the power and interests of the dominant classes on the ideological plan determines the power of economic thought.

Although the birth of economics as a systematic discipline was based in the 18th century, the history of economics reaches a much earlier point. In the era dominated by Ancient Greece and Rome, economics made some progress in law, politics, history, and philosophy and attracted the attention of thinkers related to state administration. The rise of trade in the modern era has partially developed economic thought. However, the economic views put forward until the 18th century remained incomplete, limited, and passive ideas that could not be separated from the content of other sciences, far from concrete reality.

Scottish ethics professor Adam Smith's book, *The Wealth of Nations*, published in 1776, realised the acceptance of economics as a science. The source of ideas that constitute the theoretical framework of the book Economics is based on liberalism and natural order philosophy. Classical economists, such as Smith and later David Ricardo, coined the term political economy instead of economics. They used the idiom in their works to investigate normative issues with social extensions, such as the source of wealth accumulation or the distribution among the classes participating in the production process. However, the views of classical economics on distribution seem open to debate. It can be argued that classical political economy also creates some assumptions that answer how capitalism would consolidate its place as a system. The most prominent assumptions are economic liberalism, the natural order, and the invisible hand. It is thought that the assumptions take the form of an attack on the individual's freedom, let alone ensure individual freedom. In addition, the fact that man is a social being is denied. In this context, the problem of whether classical political economy is the science of distribution may become apparent.

The marginalist revolution in the 1870s gave birth to neoclassical economic thought (mainstream economics), giving it momentum. With the birth of neoclassical economics, economics has entered into a qualitative and quantitative trajectory change. Thus, economics has started to develop from a science that stems from analysing historical processes and whose laws consist of a process of temporal and spatial tendencies to a science with definite and universal laws. In addition, economics has been completely freed from concepts such as class and distribution and has turned into a bourgeois science that strengthens the capitalist system with some ideological presuppositions. Economic thought acted following the requirements rather than the facts. The pure economic logic initiated by the marginalists has separated the economy from society, politics, and all kinds of social factors and introduced it into positive sciences that operate with an autonomous mechanism within itself. By neglecting human behaviour's history, complexity, and dialectic dimension, an individual type called *homoeconomicus*, claimed to be universal and always rational, has been formed.

The concept, which corresponds to a supra-historical universal human being, further strengthened the sharp dichotomy between economics and politics.

The study aims to scrutinise the theoretical approaches of classical and neoclassical economics and to carry the existing hypothetical knowledge about these two economic schools to a different level with a unique method. The fundamental question in this context is: *How genuine was the claim of economics about distribution, or could it protect this claim?* Since it is thought that this claim cannot be protected in the study context, it can be argued that economics is reproduced in the axis of the historical process on the ideological and depolitical ground that hides the distribution issue. In this regard, the study is based on evaluating the ideological-based reproduction and depoliticisation process of economics in the context of classical and neoclassical economic thought. The schools of thought in question have been chronologically assessed in the context of the problem from a modern, contemporary, and rationalist point of view. It is thought that the study may be helpful in simultaneously evaluating both the evolution of economic thought and the events that are the subject of economic history and revealing the background of the evolution in thought. The failure to achieve the predicted social and economic results on the foundations of mainstream economics shows that there are black holes that need explanation in the assumptions on which the theories are based and in theoretical analysis. It is foreseen that the study can contribute to the literature in the context of illuminating these black holes.

2. Foundations of The Birth of Economics as A Systematic Discipline

It is accepted that the foundations of the emergence of economics as a systematic discipline began with Adam Smith's 1776 book, *The Wealth of Nations*. However, the beginning of economic life is traced back to the existence of human beings and their struggle for survival. It is known that the great thinkers who lived in the first age had various views on economic life (Aktan, 2021: 96). These include Xenophon (430-354 BC), Plato (427-437 BC), and Aristotle (384-322 BC), who lived during the Ancient Greek era. In addition, there are some names such as Thomas Aquinas (1226-1274), Nicole Oresme (1320-1382), one of the leading thinkers of the Scholastic age, and Ibn-i Khaldun (1332-1406), and Ghazali (1058-1111) who lived in the Islamic geography (Landreth & Colander, 2002: 27).

On the one hand, Geographical Discoveries made the world begin to be recognised; on the other hand, critical scientific revolutions that emerged after the Renaissance and Reformation (such as astronomical physics under the leadership of Copernicus, Galileo, and Newton) took place. In addition, the concept of the free individual, whose mature form would be characterised by Enlightenment thought, emerged in philosophy. The modern period laid the groundwork for the emergence of economics as a separate discipline. In the words of Immanuel Kant (1724-1804), the Enlightenment was the beginning of one's use of reason. In other words, it is using one's mind in thinking and evaluation (Schmidt, 1992: 77). The guides were the religion, tradition, and customs present in the earlier tradition of thinking. In this new culture-oriented tradition, influencing and illuminating life with the

knowledge gained has been the fundamental principle beyond just knowing in the theoretical plan.

All these developments formed the basis of the collapse of the feudal order. Self-sufficient closed agricultural economies have begun to dissolve in this process, and the framework of the economy has expanded. Inter-regional relations increased, national languages were born with the combination of regional languages and Latin, and national states replaced feudal states[1]. At this point, the bourgeoisie, which rose as a class with its changing position in the balance of power, transformed its reactive liberalism as a manipulation tool that would provide legitimacy for new naturality. All these developments formed the dawn of classical political economy (Screpanti & Zamagni, 2005: 44).

3. Classical Political Economy as A Genealogy of Classical Liberalism: From the Philosophy of Enlightenment to The Natural Order

With the publication of The Wealth of Nations in 1776 by Adam Smith, who is described as the first academic economist, it is accepted that economics was born as a separate discipline (Roll, 1952: 148). Adam Smith is a name that is considered not only the founding father of political economy or the starting point of the history of economic thought but also the founder of a system that sought to combine virtue, morality, political economy, and law in a harmonious integrity (Formaini, 2002: 3-4). In this respect, discussing political economy within Smith's thought framework is essential. In this way, the political economy context of the Scottish Enlightenment in the late 18th century is made understandable, and its reflections in the 19th and 20th centuries can be observed[2]. Adam Smith's book undoubtedly heralded the historical end of mercantilism and, in a way, became the Bible of market-oriented economists (Waterman, 2002). As a guide, *The Wealth of Nations* presented the reader with the philosophy, politics, and economic world through Smith's intelligent,

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[1] *The main feature of this struggle was the freedom of movement of the newly developing bourgeoisie, especially the merchants. In Europe at that time, there were statelets, not states. At the head of each statism was a prince or king. In addition, there was a church authority to which the prince and king were subordinate. Churches were also affiliated with the Papacy. In such a structure, the merchant, who was in trouble selling goods, was limited by the taxes imposed by the king. However, the king was also limited by the tax he had to pay the church. Churches had to pay taxes to the pope. This division of authority led to a remarkable transformation in Europe. The first started with the freedom struggle against the church, and the second was against the kings. Liberalism, as used here, was the freedom movement. Therefore, liberalism in Western societies meant the liberation of society from feudal lord authorities such as princes and kings or religious authorities such as the church and pope.*

[2] *Perhaps the most critical historical element that affected the age in which Adam Smith lived was the period called the Enlightenment, which roughly spanned the period between 1688 and 1800, and the ideas developed by the thinkers of this period, which were constructed in the exact opposite direction of the ideas of the Middle Ages. The ideas included demolishing all beliefs, dogmas, traditions, and principles that lead people to immaturity and placing people and the human mind at the centre instead. For this reason, there was the destruction of the past and the establishment of a set of ontological, epistemic, and ethical principles. New principles showed themselves in understanding rationalism, scientism, progressivism, and liberalism (Cevizci, 2009: 10-36).*

sceptical, optimistic eyes. The Industrial and French Revolutions had just exploded[3]. Also, as mentioned in the previous section, the liberation of mind and thought, which has accumulated and developed since the Renaissance and the Age of Enlightenment, created liberalism, capitalism's central ideology. Newton is also a scientist who significantly influenced the development of economics in terms of his influence on the history of economic thought. Newtonian physics has a special place in the emergence of economics (Birner, 2002). Newtonian physics expresses the existence of an order that operates spontaneously outside of human will in nature. In this sense, Smith, on the axis of classical economic liberal ideas, dealt with Newton's understanding of nature in a legal system and described society as a community of individuals pursuing their interests in the context of an economic order operating with the laws of supply and demand, in this context, he introduced the concepts of the invisible hand and homoeconomicus (Kaya, 2019: 84-95).

In those years, the concept of *political economy, which has a very close connection with ethics and philosophy, was used, not economics as it i*s today. Adam Smith taught moral philosophy at Glasgow University, where he graduated in those years. All political economy writers of that period, such as Adam Smith, David Hume, Jean Baptiste Say, John Stuart Mill, and Thomas Malthus, considered economics a branch of philosophy (metaphysics, axiology, ethics, etc.) (Samuelson, 1978). The definition of political economy by Gamble et al. is thought to be illuminating for the study:

> "Political economy has many different meanings and is not just a single point of view; it is a field of research. It deals with the issue of how political and economic systems work. The starting point is that social orders and the institutions that compose them must be analysed analytically as complex wholes rather than separate parts to understand the interrelationships between economic and political aspects and, second, to understand the broader political and economic framework of a given institution" (Gamble et al., 2000: 2).

Political economy is about the interaction of political and economic processes in a society; it refers to the distribution of power and wealth among different groups and

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[3] *The classical political economy developed and flourished while trying to discover and understand the social and political consequences of the radical economic and political transformations that occurred first with the spread of markets and then with the French and Industrial Revolutions. Since the political economy developed during commercial and industrial capitalism, the main object of investigation is the mass production brought by trade and industry and the distribution problems of this mass production between classes. It is not difficult to seek answers to relevant questions within the framework of political economy, which has a wide area of investigation, such as the role of trade and industry in increasing production, consumption, distribution, class, law, institutions, and human nature. Because political economy is directly the outcome of this process. The expansion of factories and the resulting division of labour has significantly increased productivity. The acceleration of production and the growth of its scale led to an increase in profits, and as a result, the distribution of wealth and power in society changed. Researching and explaining the interrelationships between the political and economic dynamics of production, reproduction, power and wealth distribution, and social change has become an urgent need to be met. These factors paved the way for the development and flourishing of political economy (Clift, 2019: 21).*

individuals and the processes that create, maintain, and transform these relationships over time (Collinson, 2003: 15). Political economy theories have examined a country's production, consumption, and distribution of goods and services and their management processes. In other words, political economy studies the social system of production. The social system of production is the total of the relations of production between people at every stage of social development.

3.1. The Partial Beginning of the Ontological Sleep of Economics: The Invisible Hand Fallacy

Adam Smith introduced the invisible hand theory in his book *The Wealth of Nations*. Through theory, he claims that the economic activities people will follow while thinking about their interests would create a general economic balance in society. In Adam Smith's philosophy, economic relations were embedded within the comprehensive social theory (Clarke, 1991: 12-15). Smith said, "A butcher or baker you are waiting for dinner is not doing you any favours thinks of his interests", claiming that a person who wants to improve his interests significantly benefits society (Smith, 2016). According to Smith, free markets are governed by the invisible hand that effectively distributes resources. However, to be effective in the market, the invisible hand had to be left alone without any intervention. For this reason, the classical economists' call for laissez-faire also calls for the depoliticisation of production and welfare[4] (Smith, 1937: 18). According to Smith (1997: 26), the butcher does his job to get satisfied customers, that is, to make money, not out of magnanimity. The baker produces bread, brewer's beer, and candlesticks not to please people but to earn money. If the bread, the beer, and the candle are good, people will buy them. The baker, brewer, and candle maker produce good goods to sell. It is not because they care about serving people delicious bread, quality beer, and proper candles. These are not the driving forces; it is self-interest. Everyone would work for their benefit, and society would get the needed goods. Everyone's self-interest would harmonise the whole without anyone having to think about the whole.

In economic life, everything should be left to the invisible hand. In Smith's distribution theory, there is no room for improving poverty and income distribution injustices by balancing market forces through legislation. In this context, political governments make mistakes when favouring the rich with official charters and monopoly privileges and legislating to protect the poor. In this respect, laws enacted to protect people

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[4] *Some economists believe that Adam Smith developed the concept of the invisible hand from the work "The Fable of the Bees" (1714) by Bernard Mandeville (1670-1733), a Dutch psychiatrist and pamphletist. In the first edition, Mandeville describes how a well-to-do beehive was quickly impoverished and destroyed after it had decided on honesty and returned to a moral society. In the more popular second edition, Mandeville describes a prosperous society where all citizens have renounced their luxuries and disarmament. The result is a depression in which the commercial and housing sectors collapse (Skousen, 2005: 35). Mandeville concludes that private habits such as greed, avarice, and luxury lead to the public benefits of abundant wealth, and once evil is over, society is corrupted if not wholly destroyed. It is clear that, according to Mandeville's notorious paradox, self-interest leads to social benefit (Skousen, 2005: 35).*

experiencing poverty cause more harm than good because they limit labour mobility and slow economic development. Smith believes that natural wages will ensure economic balance and that the market's invisible hand will benefit everyone. Individual decision-makers acting as homoeconomicus engage in economic activity for themselves and contribute to others.

In his book *The Theory of Moral Sentiments*, Smith expressed his view that the invisible hand and the invisible hand are the primary mechanism for achieving a fair distribution:

> "The rich buy only the best and most beautiful produce. What the rich consume is only slightly more than what the poor consume. However, since the rich are selfish and greedy, they use the labour of thousands of people working under them for the sake of their comfort to satisfy their own futile and inexhaustible desires and divide everything produced between themselves and the poor. The rich distribute everything among people in the same way, thanks to an invisible hand, and without knowing it, and while doing this, they do not aim to progress the society and ensure that all of them are fed while the species multiply" (Smith, 2018: 267-268).

The invisible hand has been considered as the institutional guarantee of social balance. On the other hand, the invisible hand not only made a favourable reference to the increase in national income and the welfare of others through production by individuals but also, by adapting it to the concept of distribution, referred to the spontaneous and fair distribution of scarce resources as a result of everyone following their interests in consumption (Özel, 2009: 47-49).

In the first half of the 19th century, *Smith's The Wealth of Nations* became a destination for many academics and professionals. In Britain in the 19th century, the slogan of laissez-faire, whose main principles were formulated by Smith and glorified as an ideal by classical liberalism, became a state policy. The institutionalisation of the market economy in Britain was possible with three laws (Carlson, 2006: 32-39). The Poor Law Amendment Act of 1834, which made labour a commodity[5]; the Bank Charter Act of 1844 commodified money by establishing the gold standard; the Abolition of the Corn Laws in 1846 introduced the principle of free trade and completed the commodification of land (Sievers, 1968: 319). The final point in politics was Robert Peel's repeal of the Corn Law 1846 (Irwin, 1989: 43-55).

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[5] *The threat of hunger was the central dynamic that motivated people to sell their labour power in the market. Capitalism put people at its centre in every sense: dismantling non-market safeguards and replacing them with the threat of hunger, with markets breaking up social structures to segregate the labour element. In this period, as said in the 1834 Poor Law Amendment Act, just as labour was the source of wealth, poverty was also considered the source of labour (Westra, 2018).*

According to Smith, as long as the market operates with the principle of freedom, a natural or reasonable price would benefit both the seller and the buyer. That is, the beneficial results of the competition will not necessarily be shared unequally among each other, but on the contrary, the competition would bring reciprocal gain (Herzog, 2014: 867). It is thought that the economic game liberals determine in this way would end with the reciprocal enrichment of individuals and countries in the long run. If market liberalisation is to ensure simultaneous reciprocal and correlated enrichment for all European countries, the market must be further expanded and developed to include the whole world. The world will become a European market where European products are exchanged. However, what will the fate of the world's economy be outside Europe? Or will the distribution of resources there be fair? Inquiries on this issue seem to be in the background.

3.2. Overview of the Classical Political Economy Theoreticians and Their Thoughts on Distribution & Karl Marx's Criticisms on This Subject

Adam Smith characterised political economy sometimes as the reason for the Wealth of Nations and sometimes as the branch of science of legislation (Groenewegen, 1969). According to Smith, political economy, when considered as a branch of science related to a politician or legislator, pursues two purposes: The first is to provide abundant income or livelihood to the people, or more accurately, to enable them to provide such income or livelihood for themselves (Smith, 2018: 139). The second is to surround the state or society with an income sufficient for public services. The political economy aims to make the people and the ruler rich (Smith, 2013: 455).

Classical political economy essentially deals with the problem of how it is possible to increase society's wealth. This is the main reason they see the distribution phenomenon as very important. In this context, since the increase in wealth, that is, economic development is possible with capital accumulation, they aimed to explain the distribution of the product obtained in society between classes and the factors affecting this. They also aimed to reveal the resources that make continuous development possible and the factors on which these resources depend. Concepts such as market institution, personal interest, division of labour, and freedom lie at the basis of a country's wealth. In this stage, where the division of labour occurs in society and large-scale production is possible, wealth is created that cannot be compared to previous social stages (Skinner, 1990).

Smith defined political economy as a synthesis of efforts to prevent poverty. At least he saw it as a point of departure for studying nations' wealth and causes. The first two paragraphs of the Wealth of Nations point to the causes of wealth and poverty. Although Smith talked about the benefits of a free market economy, liberal economies were caught in the swirl of poverty. People experiencing poverty could not meet their basic needs and suffered from social isolation. At the time of the First Industrial Revolution in Western Europe, many people were forced to live in poverty without social security. When the doctrine identified with the slogan of laissez-faire dominated, the social and economic rights and freedoms of a large segment of people were trampled on who were burdened by

industrialisation under the mask of individual interest and freedom. With the Industrial Revolution, the need for labour for the industry increased, and the process of turning labour into a commodity inevitably started and gradually accelerated. People are no longer independent producers. They have almost turned into commodities that earn wages. In this transformation, the state also played an active role in accelerating the process of removing the producer from the means of production and determining the necessary institutional framework for this while fuelling the labour market's competition among the wage earners. The best-known examples are the D'Allarde Law (1791), which liberalised the sale of labour power and abolished guilds, and the Le Chapelier Law (1791), which aimed to promote competition among workers and, therefore, prohibited professional association (Lafferty, 2022: 1-20). Practices in Western Europe, especially in Britain and France, show that workers, in other words, the social class that does not own the means of production, are deprived of social security. These situations result from the distribution of the means of production among people, in other words, the distribution. Although Smith developed some discourses about distribution[6], he did not seem to say much about the justice of distribution and how it should be distributed equally among different social classes (Baum, 1992; Nimura, 2016). He believed the market would naturally solve this distribution problem among the three social classes of landowners, capitalists, and workers. The core of Smith's

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[6]   *The first scientific school that focused on distribution was accepted as the Physiocrats. The Economic Table, created by François Quesnay, one of the leading representatives of physiocracy, shows the distribution of the agricultural products created between classes. Classical economists, also influenced by the Physiocrats, accepted the importance of income distribution and tried to analyse the distribution phenomenon from an economic perspective (Alkin, 1992: 145). Several Physiocrats also influenced Adam Smith. Although Smith was not a physicist, he described Quesnay as the best physicist and the most valuable person one could meet in any country (Skinner, 2003: 100). However, Smith explained that the source of a nation's wealth was production and that the perspectives of physiocracy and mercantilism were therefore insufficient to explain everything (Myers, 1976: 567). Smith took his views on individuals' self-interest from the physiocrats. While the physiocrats stated that individuals would know their interests better than the state and act, accordingly, following the law of nature, they seemed to have based all their views on the economy on personal interest (Morrow, 1927: 330). On the other hand, Smith's ability to make pure economic analyses was partly influenced by A. R. Turgot, one of the leading physiocrats. Turgot explained Smith's arguments on the division of labour in his book Reflections on the Formation and Distribution of Wealth (Groenewegen, 1969). The point that the author drew attention to in this context was that he stated that increased productivity with the division of labour, the harmony of the mutual changes in people's needs, and meeting mutual needs kept the society together. In his book, Turgot divided the society into farmers, landowners, and artisans supported by the agricultural sector. In addition to this traditional division, Turgot moved his analysis beyond F. Quesnay by emphasising the role of capital and distinguishing between entrepreneurs, wage labour, and their income (Skinner, 2003: 101). In all these contexts, Smith undoubtedly gained much theoretically from the Physiocrats. The definition of natural order made by Mercier de la Riviere, another important representative of Physiocratic thought, in his book L'ordre Natural (Natural Order), can be considered as another proof that physiocracy was influenced by the popular thoughts of the period and reflected this influence on Adam Smith. On this subject, Mercier de la Riviere said: "Social order is not the product of a human being; on the contrary, it is an order established by the author of all nature, as in other areas of the physical order" (Cited in Welch, 1984: 200). It was determined that the three unshakable elements that Adam Smith put forward for the economic universe in The Wealth of Nations were freedom, competition, and self-interest (Skousen, 2007: 50).*

analysis in his works is based on scholastic and natural law philosophers (Schumpeter, 1972: 155-160).

With David Ricardo, income distribution between social classes came to the fore in more detail (Smith, 2016: xxi). Ricardo continues Smith's principles of political economy and distribution. In what proportion of the value of a well-produced product sold at a specific price will different factors, such as capital or labour, take part in producing this good? In the preface of the work, Ricardo (1817) emphasised that the main problem of political economy was the distribution relations between the workers, capitalists, and landlords, which Smith explained as the basic classes of capitalist society, and he portrayed these relations as a natural phenomenon valid at every stage of history:

> "The products of the earth are divided between three classes in society: the owners of the land necessary for the cultivation of the earth, the owners of capital, and the labourers who work the earth with their labour. At different stages of society, the distribution of the total production from the earth, such as rent, profit, and wage, will be different among these three different classes. Rent, profit, and wages depend primarily on the actual productivity of the land, the accumulation of capital and population, and the ingenuity, creativity, and tools used in agriculture. Determining the laws regulating this distribution is the main problem of political economy" (Ricardo, 1997: 23).

Ricardo's starting point is that Smith failed to clarify the relationship between growth and distribution. As the title of his book reveals, Smith researched how to increase general wealth in capitalist society, in other words, how to achieve growth in today's world. Smith investigated the effect of distribution on growth but did not focus on the impact of growth on distribution. Ricardo's starting point is Smith's inability to explain the relationship between growth and distribution. For Ricardo, investigating the relationship between distribution and growth is the primary purpose of political economy. He also stated his research program in this context in the book's preface he wrote above. In other words, examining the distribution dynamically within the growth process is the main problem of the Ricardian political economy. There is no concept of factor of production in Ricardo; the main ideas he focuses on are classes and economic surplus. The shares of each class under the names of rent, profit, and wage differ according to the societies. This class structure consists of workers, capitalists, and landlords. Ricardo spoke of a model of economic thought shaped according to the roles of these classes in the economic process. However, Ricardo also illuminated his model within the framework of ideological assumptions based on the class structure of capitalism. He acted from the idea that there would be no social differences and power relations in an environment where the free market is in question and that the economy guided by the free market is equal and fair (Mihalyi & Szelenyi, 2019: 28-30). Marx included the criticism of political economy for the first time in his Economic and Philosophical Manuscripts, which he wrote in 1844 but was published only in 1932:

"Political economy departs from the reality of the private property. This does not explain the truth. It does not understand the laws from which it arrives; it does not show how they follow the nature of private property but assumes what it is supposed to explain. We must now grasp the fundamental relationship between private property, greed, the separation between labour, capital, and land, this whole system of alienation, and the monetary system" (Marx, 1964: 106).

Although Marx criticised the main views of classical political economy in certain respects, there is no doubt that classical political economists, especially Smith and Ricardo, inspired him on fundamental issues[7]. The idea of value, the antagonistic relations between the class view of income distribution and wages and profits, the relationship between alienation and property, and the realities of the existence of state institutions constituted an essential part of Adam Smith's findings, which inspired him during the construction of Marxist economics (Pack, 2013: 523-538). According to Smith, the three elements that make up the price of good are wage, rent, and profit. By showing that the annual labour of society turns into these three elements, he formed the principal basis of his views on income distribution from a macro perspective:

"Just as the price or exchange value of each commodity, taken separately, is converted into one, or the other, or all of these three parts, so the price of all the commodities, which constitute the whole product of the annual labour of each country, necessarily turns into these same three parts, taken altogether. It must be distributed among the various people living in that country, either as the wages of their labour, the profit of their assets, or the rent of their lands" (Smith, 1937: 52).

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[7] *When his work titled Contribution to the Critique of Political Economy is examined, it is seen that Marx tries to explain the phenomenon of distribution through the phenomenon of class. Marx divided the classes into three classes: capital owner, land ownership, and wage labour, and focused more on capitalist circulation, commodity, and money. He found the three-volume work called Capital with a chapter titled Classes, which Marx did not have the opportunity to finish and which started by following Smith and Ricardo's categorisations of classes. In his answer to what determines classes, Marx rejected the approach of income and income sources, which emerged as the first striking factor. Giving examples from various occupational groups and their incomes, Marx argued that the differentiation of income sources would not lead to separate classes and focused on the material conditions of class formation (Öngen, 2002: 18). The concept of class in Marx's analysis is also defined within the framework of social production relations. Classes have existed in every period of history and continue to exist in different forms in the capitalist formation. Explaining production in capitalist organisation as the production of surplus value, Marx argues that the classes in this phase are determined according to their place in the production of surplus value. The essence of surplus value production is that workers cannot own what they produce. Workers have become commodities that can be purchased on the market and are prevented from owning what they produce. In the case of capitalist society, the relationship between wage labour and capital must be taken into account. A relational class approach is fundamental to understanding the functioning of the capitalist system (Bassiry & Jones, 1993: 622). In all these contexts, according to Marx, unlike classical political and economic thinkers, the differentiation of income sources and the classes formed in this context is insufficient to explain the phenomenon of unfair distribution. Concepts such as the antagonistic relationship between labour and capital, exploitation, and surplus value are essential in explaining the phenomenon of unfair distribution.*

However, Smith could not clarify the processes by which land and capital accumulated in the hands of some people. This gap opened a door for Marxist economics to historicise exploitation. The analysis of capitalist dynamics and the internal contradictions of capitalism, which the classical and neoclassical understanding of economics covered up, could not explain, and could not predict, were systematically constructed step by step by Marx in Capital. It can be said that both Adam Smith in *The Wealth of Nations* and Marx in Capital tried to reveal the basic functioning mechanisms of the capitalist mode of production (Satlıgan et al., 2012: 10). Adam Smith and David Ricardo's labour theory of value has long been a vital theoretical tool in the hands of Marxists to criticise the essence of capitalism based on labour exploitation (Satlıgan et al., 2012: 10-11).

According to Smith, just as every good has a natural and market price, labour bought and sold in the market like a commodity should also have a natural market price. This view also has been criticised by Marx himself and Marxist economists. The antagonistic relationship between labour and capital constitutes the main crux of Marx's theory of value. At this point, classical political economy has failed and has not achieved an authentic and holistic analysis of the capitalist mode of production. To understand the exchange process in the capitalist system, the production process and relations underlying this process must be examined first. In addition, Karl Marx started from the idea that Smith and Ricardo's labour theory of value, which stated that all production belongs to labour, could not explain some facts. The fact that landowners and capitalists take a share of this production means that Marx evaluated labour exploitation as one of the facts that classical economics could not explain or did not want to explain.

Smith's labour theory of value states that the value of a good derives from labour, and therefore, the exchange rates between goods during the exchange will be according to the labour spent on those goods. However, in this case, it will be necessary to reduce the value of all produced goods to labour, ignore the income of capital, land, and entrepreneurs, or accept it as a kind of exploitation income. Smith's approach would later be used harshly, especially by socialist and Marxist economists, and would form the other basis of the criticism of exploitation directed at the liberal economy. The first is to question why and for what reason the capital owner gets a share from production, even though the entire production value belongs to labour. It is claimed that the sales value of a good is divided between wages and profits after inputs are removed, forming the basis of the antagonistic relationship between workers and capitalists who earn these two incomes and that capitalists suppress wages as much as possible to increase their income. Moreover, it should be noted that in such a division, the distinction between workers and capital owners presents the class antagonism that arises due to class polarisation in society to Marxist economists as a given. Ricardo also argued that the value of goods is determined by the amount of labour required for their production, and this formed the basis of Karl Marx's labour theory of value. However, Ricardo could not discover surplus value or separate profit from surplus value. Therefore, according to Marx, Ricardo could not overcome the bourgeois point of view (Savran, 2012: 67). This is the reason for the blindness of classical political economy, despite all its greatness, and Ricardo, one of its most important representatives. This is why Marx

said that classical political economy, with Ricardo, had reached the limits beyond which bourgeois economics could not go (Savran, 2012: 67). The primary purpose of Marxist value theory is to explain the relationship between labour and exploitation in capitalism:

> "Value theory allows us to analyse capitalist exploitation in a way that overcomes the fragmentation that arises from the experience of this exploitation. It enables us to understand capitalist exploitation as a contradictory process ravaged by crises subject to constant change. It enables us to understand how the process of exploitation works and the possibility of action that will end it" (Elson, 1979: 171).

The relationship between wage labour and capital determines the entire character of the mode of production. The second thing that notably marks capitalist production is the production of surplus value as the direct aim and determining motive of production. Capital essentially produces capital and can do so only insofar as it produces surplus value (Marx, 1981: 1019-1020). In other words, "The capitalist production process, therefore, appears as a holistic process in which all its elements are related, a process that not only produces commodities, surplus value, but also the capital relationship itself, the relationship between the capitalist on one side and the wage worker on the other." (Marx, 1976: 764).

In this context, Marxist value theory is not focused only on exchange and distribution, like the labour theory of value in classical political economy, but a theory that sheds light on the class relations underlying a commodity-producing society. The theory of value developed by Marx also reveals that capitalism is only one of the forms of exploitative class society, a historical explanation of the transition from pre-capitalist society to capitalist society, a theory of the concrete functioning of the capitalist economy, and why others explain the functioning of the capitalist economy within an alternative theoretical framework (Milios, 2000: 285-294). In Marx's analysis, income or wealth does not explain distributive inequality. Inequality is presented within the framework of the unequal relationship of two factors of production, labour and capital, in other words, in the context of the conflict between the worker and the bourgeois class. This unequal distribution relationship between capital and labour is related to the production of surplus value and its appropriation.

Classical political economy is fixated on the appearance of economic relations and thus feels good. From Marx's perspective, economic ties and the distribution phenomenon can only be understood by looking at the true nature of capitalist society, that is, social classes (Milios, 2000: 283-302). In Marx's analysis, exploitation is the central process that defines class relations. One class gains an advantage at the expense of another class. Classical political economy is far from explaining this issue. To explain the phenomenon of distribution and get to the foundations of the phenomenon, Marx, following the tradition of classical political economy, conducted a comprehensive and robust analysis of social classes and the conflicts between these classes. The most fundamental element that distinguishes Marxist class analysis from other class analyses is the mechanism of exploitation, and an

exploitation-centred class analysis offers theoretically powerful tools for examining many issues in contemporary capitalist society (Wright, 2005: 1-26).

3.3. Is Classical Economics Genuinely the Science of Distribution in All Aspects? Discussion Over a Misconception

The issue of distribution is a crucial issue for the economy. Why are some people rich while others are poor, and is that fair? According to the approach of classical economics, economics mainly tended to explain long-term capital accumulation, production, and the distribution of production among social classes (Hollis & Nell, 1975: 19). However, although classical economics focused on distribution, did it focus on the distributional dynamics formed by the inequality structure of the capitalist system? Did they dwell on the unequal distribution? Or have they accepted this situation as inherent in the capitalist system? In the theories of classical economists such as Smith and Ricardo, the concepts of labour-value and labour-time were highlighted as the only factor that creates value. However, how the capitalist could claim the product of labour and own the profits alone could not be demonstrated sociologically satisfactorily. Moreover, while the capitalist class was getting more prosperous step by step, the income differences between them and the labourers increased, and the balance of political power changed in favour of the capitalists in this process. However, there was no satisfactory answer to all these issues.

Smith and Ricardo were also aware that there was a distribution problem in the market, that there were different classes, and that the social product was not shared equally. However, they have not been able to demonstrate that the source of this is surplus value (capitalist exploitation); in other words, the phenomenon of exploitation lies based on the unequal relationship between labour and capital. That is why, despite all their good thoughts and intentions, they have not been able to take a determined stance against economic inequalities and offer a permanent solution. In a sense, Marx carried out the analysis of the capitalist mode of production by starting from the point where classical political economy stopped due to its internal limits and took the theoretical approach of this school to its logical conclusion and expanded it (Savran, 2022: 75). According to Marx the theoretical framework of classical economics is valid (labour theory of value, struggle for distribution between classes). However, some of the conclusions reached within this theoretical framework are wrong. Marx attempted to correct these mistakes by criticising them (Savran, 2022: 75). The fundamental problem of political economy is the formation of the value of goods and the distribution of the social product between classes. However, political economy, which investigates the determination of value and distribution categories of profit, rent, and wage, treats them as given without thinking at all about the nature of these categories themselves:

> "(Classical political) economists have a bizarre method. For them, there are only two types of institutions: artificial institutions and natural institutions. The institutions of feudalism are artificial; those of the bourgeoisie are natural institutions. In this respect, they are like theologians who recognise two types:

For them, all religions other than their own are a fabrication of men, but their religion is a commandment of God. In other words, history has existed, but it no longer exists. Our view is fundamentally different from that of economists, who, because they are trapped in the capitalist system, can see how production is produced within capitalist relations but cannot understand how this relation is produced and simultaneously creates the material conditions for its dissolution. Unlike them, we have seen both how capital produces and how it is produced" (Marx, 1978: 115; Savran, 2022: 78-80).

According to Marx, political economy is related to bourgeois ideology. Despite all its scientific and political economy, it cannot reach the essential social relations of capitalist society because it is confined within the boundaries of bourgeois ideology, and it tries to understand the world from the point of view of this ideology. In Marx's words, "Classical political economy approaches the real nature of the problems by bumping left and right in the dark, but it can never express this quality in a conscious formula. He can't do this as long as he remains in his bourgeois skin (Cited in Savran, 2022: 84-85).

It is impossible not to point out that Marx's ideas are in a dialectical relationship with the works of the economists before him (especially Smith and Ricardo). However, while classical political economy analysed the capitalist society, it accepted the categories valid in this society (value, price, profit, wage, rent) as data and never questioned them. The reason for this is that political economists treat the categories of capitalist society as natural forms, not as social forms belonging to a historically determined, temporary mode of production. Thus, these forms become general, unchanging, and universally valid forms. Therefore, the question of under what historical conditions they will emerge and exist is necessarily excluded from the field of research (Savran, 2022: 93). In Engels' words, where classical political economists saw a solution and positivity, Marx himself saw nothing but a problem (Savran, 2022: 93). According to Marx, "political economy has analysed value and its magnitude, albeit inadequately, and discovered what lies beneath these forms. However, he has never asked the question of why labour is represented in value and labour time in the size of the value of the product, in other words, the emergence of surplus value, and more importantly, the question into whose pockets the surplus value goes" (Savran, 2022: 101-102). However, despite everything, according to Marx, Smith, and Ricardo, especially Ricardo was interpreted as the last representative of political economy:

"Ricardo, the last great representative of classical political economy, naively mistook the contradiction of class interests, wage and profit, profit and rent, for a social law of nature, and finally made this contradiction the starting point of his research. Nevertheless, with this contribution, bourgeois economic science had reached limits beyond which it could not go" (Marx, 1954: 85).

The text above is the preface written by Sungur Savran for the Turkish translation of the masterpiece of David Ricardo, one of the two great geniuses of classical political economy, along with Adam Smith, Political Economy and Principles of Taxation, first

published in 1997. According to Marx, Ricardo is the most outstanding representative of classical political economy and the last great representative. After Ricardo, the science of economics gradually separated from the horizon and depth of classical political economy. It turned first to an approach that Marx called *vulgar economics* and then to neoclassical economics, which can be considered a formalised, systematised version of this approach, drowned in mathematical models. Marx also emphasised that vulgar economics was consciously constructed as a field that sought to provide plausible explanations for the most glaring phenomena in the daily practices of the bourgeoisie (Kurz, 2022: 18).

4. Neoclassical Economics and Its Methodological Framework in The Context of The Atomization of Social Theory and The Rejection of Political Economy

By the 1870s, many economists thought that classical economics was outdated. William Stanley Jevons described the state of economics as a complete mess in 1879 (Jevons, 1879: 40). Economics overcame this with the Marginalist revolution. The marginalist revolution will be the architect of the closing of an era by heavily criticising the Smithian political economy. While building the foundations of neoclassical economics, it opened the doors of a radical transformation that would take place in economics. The transition from the 18th century to the 19th century saw the development of more modern theories in physics instead of Newtonian physics (Zafirovski, 1999: 45). This caused the name of science to be changed from *Political Economy*, which evokes social science, to *Economics*, which is similar to natural sciences[8]. The name economics instead of political economy started with the publication of Alfred Marshall's book *Principles of Economics* in 1890[9] (Groenewegen, 1991).

While the basic assumption of classical political economy is based on the historical process of capital accumulation in the capitalist economy and the associated distribution of industrial production between classes, neoclassical economics mainly focuses on static equilibrium analysis (Peters et al., 2002). In neoclassical economics, the focus is now on the

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[8] *Economics, commonly called Political Economy in the 17th century and especially in the 18th century, was considered a sub-branch of moral philosophy at that time. In the late 17th century and especially in the 18th century, the title of the work of almost every writer or thinker who wrote a book or article on economics or economic activities was not Economics but Political Economy. We know that many thinkers such as Thomas Malthus (Principles of Political Economy Considered with a View to their practical application, 1798), David Ricardo (Principles of Political Economy and Taxation), Jean Baptiste Say (Principles of Political Economy and Taxation), John Stuart Mill (The Principles of Political Economy, 1848) named their books Political Economy (Hutchison, 1988). Political Economy, which was considered a moral science, later parted ways with metaphysics and had a divorce.*

[9] *Marshall adopted the word economics instead of political economy. We encounter the phrase economics in Alfred Marshall's book The Economics of Industry, which he wrote with his wife in 1879. While noting that Marshall's economics is a science, he especially underlines the word political: "Political interests usually mean the interests of only one part or parts of the nation. Therefore, we can leave the political economy and talk simply about economic science, or simply economics" (Marshall & Marshall, 1879: 2). As it was very clearly stated on the first page of the first chapter of Alfred Marshall's famous work, the subject of economics is the welfare of individuals or groups of individuals (Marshall, 1959: 1).*

technical analysis of economic phenomena. Intensive mathematical formulations of supply and demand that enable price change are presented (Turpin, 2011: 10-11). Therefore, while the political economy should be seen as a broad social study, economics has been accepted as a pessimistic science stripped of the political economy's social and historical context (Milonakis & Fine, 2009). Neoclassical economics's birth, covering 1871-1874, is based on the marginalist revolution led by William Stanley Jevons, Carl Menger, and Leon Walras (Mirowski, 1984: 361-379). Furthermore, the positivist spirit, revived by names such as Thomas Kuhn and Karl Popper, started to dominate economics. Popper states that scientific theories should be seen as hypotheses that must be tested empirically[10] (Kök & Çetin, 2021: 44).

4.1. From the Labor Theory of Value to the Utility Theory of Value: Economics' Claim to Be the Science of Utility

The concept of labour value in the classical school has left its place for the idea of utility value in neoclassical economics (Zafirovski, 2018). The value of something is the amount that individuals are willing to pay for the last unit consumed[11]. While classical

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[10] *Popper pioneered the spread of positivist methods in economics. In this direction, natural sciences such as physics and astronomy, which the science of economics has taken as an example since the 1870s, have also been defined as positive sciences. Objective observation and measurement, definition, classification, and explanation are essential in fields related to positive science. In other words, events and phenomena that are not affected by people's feelings, behaviours, or expectations, independent of subjective human thoughts, and occur according to the laws of nature are known as the field of interest of positive science. For example, utterly independent of subjective evaluations, the seasons change, the sun produces energy, there is gravity in the universe, and the earth revolves around the sun. All these events occur according to non-subjective laws that most people can understand and explain and therefore qualify as objective realities (Sunar, 1999: 25). The situation is very different in fields such as economics, politics, and sociology compared to natural sciences. Although neoclassical economic ideology suggests otherwise, economic phenomena do not have universal validity as in natural sciences. First, interpersonal relations are subjective, and there are too many independent variables to be controlled in determining these relations. Regarding human relations, it is possible to talk about behavioural tendencies, not universal laws, as in positive sciences. Since economics is a science that studies people's economic behaviour, it does not seem possible to put it in the category of positive science in methodological and epistemological contexts. When the Popperian approach is adopted, economics can be defined as falsifiable rules or predictions. However, this situation includes efforts to refute the history of economics on the axis of some tautological definitions and theories (Blaug, 1995: 697).*

[11] *Neoclassical theory links exchange value to the benefits people expect from consuming a good. In this respect, it establishes a link between market exchange value and subjective use value. Neoclassical theory starts from a fundamental observation. It relates the amount of money people are willing to pay for goods to the benefit they expect to receive from each additional unit of that good. Thus, the concept of marginal utility, which reflects the expected utility from the consumption of each additional unit, enters the economy. The additional or marginal utility provided by the last additional unit consumed is particularly important regarding exchange value. The neoclassical school generates demand curves from the concept of utility maximisation. Neoclassical economics advocates argued that the source of exchange value is not labour. However, utility or use value claims that the marginal utility principle is sufficient to determine exchange value in perfectly competitive markets. According to Jevons (1879), the reason why diamonds are valuable is that consumers benefit from diamonds. To take advantage of this benefit, they work hard to extract the diamonds from the depths of the earth. However, according to the classical economist Ricardo, the opinion that diamonds are valuable is dominant because more effort is spent in extracting the diamond.*

political economy tried to analyse the distribution phenomenon with the labour theory of value, neoclassical economics dealt with the phenomenon of distribution as a problem in the form of pricing of production factors within the framework of the utility value theory. Within the scope of marginalist analysis, they tended to explain the price formation of production factors in the market. They tried to determine how much production factors should be shared from the output (Clift, 2019: 104).

Marginalism is one of the most influential veins of economic thought. It makes several assumptions about perfectly functioning, competitive markets and ceteris paribus assumptions (Table 1). When examining an economic phenomenon, ceteris paribus, which means *all other things equal* in Latin, assumes that a certain one of the variables has changed while the other variables remain constant. While this assumption makes it easy for economics to form theory and analysis, it brings a simplifying logic that causes the analysis to break from reality (Solow, 1985: 328). It takes constant political, social, historical, institutional, and cultural factors to keep research on economic phenomena analytically separate. Holding everything else constant has excluded any analysis of the dynamic evolution of capitalism or the comparative institutional analysis of social relations of production. The ceteris paribus assumption caused a break from economic reality by denying simple and unrepeatable historical events (Buchanan, 1958: 260). Hutchison set aside economic propositions containing undefined Ceteris paribus clauses as tautologies (1938: 63-64). They are empirical claims about the real world that cannot be tested.

Table: 1
Basic Assumptions of Marginalist Economy

- Economics should focus on studying the relationships between individual goals and given means of production and how choices are made under conditions of scarcity.
- Utility maximisation is the only economic problem that needs to be addressed to the exclusion of all other issues.
- The value is determined purely subjectively.
- Ceteris paribus or all else remaining the same, all historical, institutional, political, and social factors will be kept constant in line with simplified analysis tools; economics and politics are separate.
- Individuals who calculate utility maximisation by having complete information are rational.
- Markets are perfectly competitive markets that successfully allocate resources and reach equilibrium by equalising supply and demand.

Source: Clift, 2019: 104.

British economist William Stanley Jevons, one of the founders of marginal utility theory, states in his 1871 work: "Our working class, whose numbers are growing and developing their organisational power, can be directed to halt the development of our political and economic freedom. In that case, we must develop a theory that reveals that labour does not create value in any way" (Hançerlioğlu, 1999: 486-487). Purging the nature of capitalism from economics is the primary goal. At the ideological level, the link between the economic field and the socio-political fields has been tried to be broken in a very consistent way.

In neoclassical economics, there is a claim that the principles of economics are independent of place and time and that they are universal. In other words, the basic principles of economics are independent of social relations (Henry, 2009). In the universal framework, all societies obey the natural laws of the capitalist system. Different societies are subject to

the same natural laws. Perhaps the most assertive statements on this subject belong to Jevons (1871): "General laws are the same in all ages," "Economy is the calculus of pleasure and pain," "Economics is the theory of utility and self-interest machine" (Cited in Henry, 2009: 31). L. Robbins (1932) also emphasises that "all generalisations of the theory of value are valid in the communist society." In short, scarcity, cost, preferences, and opportunities are universal. For example, even income distribution, which is accepted as not having a universal principle in Mill, has a natural law, according to J.B. Clark (Clark, 1894).

4.2. Purification of Economics from the Class Concept: Legitimizing Existing Power Relations in Society

One of the most essential features of the neoclassical distribution theory is that it deals with economic phenomena independently of social relations and structures. The basic assumption, in theory, is that profit and wage are scarce prices of capital and labour. In cases where equilibrium is achieved[12], the factors earn income according to the marginal contribution they provide. The neoclassical theory states that each productive input, labour, land, and capital, is rewarded equal to its marginal productivity in wages, rent, and profit. What does this mean? As long as markets are competitive, workers, landlords, and capitalists deserve what they get. Each receives a reward in total proportion to their contribution to production[13]. They get a share of production as much as they deserve, that is, as much as their marginal productivity. For example, the exchange value of labour is directly proportional to its production contribution (Luna, 2016: 69). What does it mean for the wage to be equal to the marginal product of labour? The theory says that the worker is paid for what he produces. Then, the claim that the worker is exploited will fail because the essence of exploitation is the appropriation by the capitalist of some of what the worker produces with his labour. Its value for the capitalist class comes from the fact that it confuses people and hides the true nature of exploitation, as seen in a Marxist analysis of the production process. Some bourgeois economists glibly said that this theory of marginal productivity reveals that the worker receives a wage corresponding to what he produces. However, none of these reflect the reality regarding the distribution issue. If labour were genuinely paid in full for the value it created, capital and landowners should not receive any share of the production process. While there are perfect competition conditions in the goods and factor markets since each factor will get a share of the total production exactly as its contribution

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[12] *General equilibrium analyses are another science fiction aspect of neoclassical ideology. It is illogical and contrary to the essence of economic realities to think that there can be a balance for economies where technological innovations are constantly taking place and change is an undeniable reality and trying to reach a place with balance analysis. General equilibrium analyses mainly served to hide the exploitation rate in the market price formation.*

[13] *Any thought that capitalists or landlords exploited their workers and tenants and gave them an unequal advantage was erased. This looks beautiful on paper, but something seems wrong when applied. Suppose we consider the case of landowners of European descent in Zimbabwe. They comprise 10% of the population and own 90% of the land. According to neoclassical theory, they deserve the rent and profit they obtain from the land and capital they contribute to production. How did they get this land? Property rights to land have been acquired in almost the same way at different times in history: expropriation accompanied by coercion.*

to production, there is no question of any disorder or distortion in the resource distribution, which ensures the realisation of the market balance in general and, thus, effective resource allocation. It is to make people accept that the existing system offers equal or close to equal conditions for everyone; that is, it is a game of equal luck in terms of results.

The transformation from classical political economy to economic science was discussed by Karl Polanyi (1944: 57) as the emergence of disembedded economics. The state of the disembedded economy is the process of independence of the economy from society. This has been realised with the belief in the market's ability to regulate itself. However, according to Polanyi, this situation is economic determinism. Economic determinism is based on the economic fallacy, the erroneous identification between human and market economies (Becchio & Leghissa, 2016: 127). Instead of the economic system being embedded in social relations, social relations are now embedded in the economic system (Polanyi, 1944: 57). Ayşe Buğra also argues, "The prerequisite for economics to become an autonomous discipline separated from the whole of social thought is the conceptualisation of an economic field that is separated from the whole of society" (Cited in İnsel, 2012: 53). It is impossible not to agree with these views.

4.3. Fictional Actor of Neoclassical Economics (*Homoeconomicus)* and the Neglection of the Historical Dialectical Dimension of the Human Behaviour

Just as Newton described the motion of matter, economists began by describing human behaviour. In economics, a law was needed to replace Newton's law of gravity. The law of self-interest became one of the fundamental laws of economics, like the law of gravity of physics. Neoclassical economic thought was heavily influenced by the problem of reducing social elements to the economic structure, as Polanyi (1944) states, or by the rationality culture of positivist science, which paved the way for man to dominate man and nature, as Habermas stated (Diez & Steans, 2005: 129).

Marginalism is attached to a unique methodological individualism that depends on utility maximisation or what other social sciences call rational choice. Here, homoeconomicus is based on the assumption of a rational individual pursuing utility maximisation with an endless appetite. Rational individuals, called homoeconomicus, make their decisions with pure individuality, in line with their self-interest, and based on interest calculations (Todaro & Smith, 2011: 7). As such, it describes an egoist and hedonist person who only thinks of his interests. "Neoclassical economics emphasises individual behaviour and says that this behaviour is motivated by the individual's rational self-interest. As the neoclassical economists theorised, the economy is the ultimate collective product of individuals maximising their material interests" (Wolff and Resnick, 1987: 7). The essential feature of homoeconomicus is that it is not a social entity; in this respect, it is described as atomistic. In other words, homoeconomicus is an individual design isolated from values, culture, and emotions. It is not the society and the objective conditions in the society that determine the economic behaviour of individuals to be in a pattern, but the assumed psychological attitude of the individual (Divitçioğlu, 1982: 4).

The neoclassical economic theory defines the meaning of all social and economic phenomena that it tries to understand, starting from the individual behaviour of getting the most. For example, before people commit a crime, they calculate some of the costs, such as incarceration, and the payoff, such as proceeds from theft. In this framework, crime will also decrease if the cost increases, for example, if the prison sentence or benefits decrease. In the words of Thorstein Veblen (1898: 389-390), the father of institutionalism, the vast majority of economic theories, both at the macro and micro level, are based on the calculator that measures these pleasures and pains. Thus, the science of economics started to move towards creating a mechanical and artificial world entire of interrelated robots (Lucas, 1988: 5).

The existence of a single principle of rationality that can be shared at all times and under every possible circumstance has proven impossible. The first actual frontal attack came in 1979 from two Israeli researchers, Daniel Kahneman and Amos Tversky. Contrary to economists' claims, they have shown that our decisions are not objective and rational. In his welfare theory, Daniel Kahneman proved that individuals systematically deviate from rationality in the face of risk and uncertainty[14] (Kahneman & Tversky, 1979: 263). Kahneman argues that economics should put itself in close relations with sciences such as politics, psychology, sociology, and anthropology instead of natural sciences (Altunöz, 2020: 70).

Humans, one of the crucial elements of economics, should not be modelled statically but because of dynamic processes created by many observations. It is impossible to observe human behaviour empirically. The problem is that economics is a very different science from physics. Laws could not be formulated for the economy as one could formulate the laws of energy and matter. The same experiment can be repeated in physics, and the same result can be reached each time. If you let go of the apple, it will fall to the ground; this is not so in economics. The American physicist Murray-Gell-Mann once said: "Can you imagine how difficult physics would be if electrons could think? The market comprises people; people can think and feel." Those who set out to make rational thinking dominate society produced superstition at a level never seen before (Başkaya, 1997: 40). Of course, understandably, the ruling class and its spokespeople distort some facts to hide their oppression and exploitation (Başkaya, 1997: 41). "All these situations, in Marx's words, are directly related to the fact that vulgar (neoclassical) economists and bourgeois production agents, to legitimise the

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[14] *According to Kahneman, human behaviour is not always optimal. Especially in environments of uncertainty and risk, human behaviour can be irrational and non-optimal results can occur. It is rational behaviour for a stock market investor to sell the stock he bought for $50, thinking it has gained enough value when it rises to $70. On the other hand, it is an irrational move for an investor who buys the same stock for $90 to act shy about selling it even though he knows that it is overvalued when it is at the level of 70 dollars (Altunöz, 2020: 70). In short, Kahneman and Tversky (1979: 272) try to prove that in situations such as risk avoidance or overconfidence, human behaviour is not rational, and this situation leads to non-optimal results. Man is a psychological being rather than an economic being. Therefore, expressing the behaviour in a specific formulation is impossible.*

economic world that suits them, systematise the comfortable and shallow concepts they can offer in this context, and declare them as eternal truths" (Savran, 2012: 56-57).

5. Conclusion

The study has acted on the problem of discussing the ideological-based reproduction and depoliticisation process of economics. The discipline, which evolved from political economy to economics during history, first rejected history from a methodological point of view. Approaching the natural sciences of economics as a science, adopting the method of physics as a guide, provided technical progress in the direction of theoretical perfection in economics and enabled the production of economic knowledge that is independent of society, history, and, therefore people, devoid of the possibilities of political economy. In other words, in static approaches that limit the field of economics to the market, economic knowledge is produced in a non-historical area with the a priori method. However, because the field of economics is not independent of production relations and, more generally, social relations, it can be said that it has a very dynamic and complex structure.

The classical political economy school formed the main skeleton of many economics schools, called new economics schools today. It formed the basis for economics to be considered a separate science. The process began with Adam Smith's *The Wealth of Nations*. Influenced by the critical mind of Enlightenment thought and the understanding of natural order, Smith tried to reveal the causes of a nation's wealth and its natural laws determining the relations of production and distribution. In classical political economy, there is a Smithian optimism that believes that everyone pursues his self-interest as a rational being. Thus, the market will be operated by an invisible hand in a way that will benefit everyone. However, it is possible to argue that no one saw the invisible hand, but some people saw many formal or informal hands trying to regulate the market for their benefit. If the state or authority does not regulate the market, those monopolising production or consumption will go to regulation. It does not seem possible to believe in the existence of the invisible hand without seeing this inevitable fact. Classical political economy claims that an invisible hand in the market continuously balances the market. In these contexts, it is thought that classical economics prepares the theoretical ground for the market society and economy discourses of capitalist liberal utopia.

Moreover, in this market, there are human types called *homoeconomicus*, who pursue their interests and serve the interests of society without realising it. In this way, there is a chance to realise a fair distribution. Classical political economy, which claims to be the science of distribution, does not seem to be sufficiently preoccupied with the principle of unjust distribution arising from social power relations. Many ideas put forward by classical political economy thinkers can be considered creeds invented by interest groups that regulate the market in this respect. In this context, it is impossible not to remember the words of Ahmet Güner Sayar, "Every source of information has its unique person with differences in colour and tone from one to the other, and there is a norm established for each set of information" (Sayar, 2005: 184-185).

Since the marginalist revolution at the end of the nineteenth century and its break with classical political economy, economics has begun to use different methods, which was the first of many steps towards narrowing the subject and method of economics. The emphasis on the manipulative, transhistorical individual (whether household, firm, or nation) that expresses itself through concrete, calculable, optimising activities through market transactions has taken historical, political, and social issues out of the big picture. The labour theory of value was uprooted and replaced by the utility theory. It has liquidated any revolutionary economics content, leaving it to a shallow, superficial analytical method ideally suited to capital needs.

Neoclassical economics is a project designed to eliminate the extent of exploitation and distribution relations. Başkaya (1997: 16) states, "The ruling classes in every class society produce legends and superstitions to hide exploitation, legitimise exploitation and oppression, and accept the immutability of the existing order. The continuation of the established order depends on the continuation of the ideological blur and the domination of superstitions". It is inevitable in the capitalist economy that unequal and class-based income distribution is a determining factor in consumption and investment. However, neoclassical economics deftly abstracted capitalism from class relations. Lowenberg's (1990: 619) definition of economics in the instrumental sense, which he refers to as the use of economics to serve the ends of those who hold power in the system rather than to understand or improve the economic system, makes this situation more evident.

In a system where the capitalist economic system dominates the means of production and exchange, life's material and distributional aspects are full of contradictions. However, as long as this order has sustainable qualities, the mentioned contradictions will seem reasonable to people. Economic thought also played an essential role in this context. Distributional problems and the material and class contradictions on this axis are consistent on a moral and intellectual level, thanks to ideologies. Classical political economy has achieved this unintentionally, while neoclassical economics has achieved this through a conscious process with grounded assumptions. These developments inevitably remind us of the following pithy statements of Marx and Engels: "The dominant thinkers of every age have always been the ideas of the ruling classes of that age" (Marx & Engels, 1845: 26). Here, the dominant ideas should be evaluated as the dominant ideology.

In this context, the necessity of an economic thought that includes the dialectical unity of politics and economy is holistic, emphasises historicity, and considers the class and distributional contradictions in capitalist society is evident. It is thought that an economic thought that believes that the forms specific to capitalism are not necessarily insurmountable forms without alternatives and that other forms are also possible can offer conceptual tools that will allow a more comprehensive and in-depth analysis of distribution.

References

Aktan, C.A. (2021), *İktisat nereye gidiyor?*, Ankara: Astana.

Alkin, E. (1992), *İktisat*, İstanbul: Filiz.

Altunöz, U. (2020), *Neoklasik İktisadın Eleştirisi: Post-Otistik İktisat*, Ankara: Seçkin.

Başkaya, F. (1997), *Paradigmanın İflası: Resmi İdeolojinin Eleştirisine Giriş*, İstanbul: Doz.

Bassiry, G.R. & M. Jones (1993), "Adam Smith and the ethics of contemporary capitalism", *Journal of Business Ethics*, 12, 621-627.

Baum, S. (1992), "Poverty, inequality, and the role of government: what would Adam Smith say?", *Eastern Economic Journal*, 18(2), 143-156.

Becchio, G. & G. Leghissa (2016), *The Origins of Neoliberalism: Insights from economics and philosophy*, Taylor & Francis.

Birner, J. (2002), "A Conservative Approach to Progress in Economics", in: S. Boehm et al., (eds.), *Is There Progress in Economics* (65-88), Edward Elgar Publishing Limited, Cheltenham.

Blaug, M. (1995), *Economic Theory in Retrospect*, Cambridge University Press, New York.

Buchanan, J.M. (1958), "Ceteris paribus: Some notes on methodology", *Southern Economic Journal*, 24(3), 259-270.

Carlson, A. (2006), "The problem of Karl Polanyi", *The Intercollegiate Review*, 41(1), 32-39.

Cevizci, A. (2009), *Felsefe Tarihi*, Say Publications.

Clark, J.B. (1894), "A universal law of economic variation", *The Quarterly Journal of Economics*, 8(3), 261-279.

Clarke, S. (1991), *Marx, Marginalism and Modern Sociology*, London: Macmillan Academic and Professional.

Clift, B. (2019), *Karşılaştırmalı Siyasal Ekonomi: Devletler, Piyasalar ve Küresel Kapitalizm*, (Çev. E. Soğancılar), İstanbul: Koç University Publications.

Collinson, S. (2003), *Power, Livelihoods and Conflict: Case Studies in Political Economy Analysis for Humanitarian Action*, London: Humanitarian Policy Group, Overseas Development Institute.

Diez, T. & J. Steans (2005), "A useful dialogue? Habermas and International Relations", *Review of International Studies*, 31(1), 127-140.

Divitçioğlu, S. (1982), *Üretim, Değer ve Bölüşüm*, Kırklareli: Sermet.

Elson, D. (1979) "The value theory of labour", in: D. Elson (ed.), *Value: The Representation of Labour in Capitalism* (115-180), London: CSE Books.

Formaini, R.L. (2002), "Adam Smith Capitalisms's Prophet", *Federal Reserve Bank of Dallas*, 7(1), 1-4.

Gamble, A. et al. (2000), "Introduction: The Political Economy of the Company", in: J. Parkinson et al. (eds.), *The Political Economy of the Company* (1-20), Oxford: Hart.

Groenewegen, P. (1991), "Political Economy and Economics", in: *The World of Economics* (556-562), London: Palgrave Macmillan UK.

Groenewegen, P.D. (1969), "Turgot and Adam Smith", *Scottish Journal of Political Economy*, 16, 271-287.

Hançerlioğlu, O. (1999), *Ekonomi Sözlüğü*, İstanbul: Remzi.

Henderson, J.P. (1977), "Adam Smith, Ricardo and Economic Theory", *Centennial Review*, 21(2), 118-139.

Henry, J.F. (2009), "The illusion of the epoch: neoclassical economics as a case study", *Studi e Note di Economia*, 14(1), 27-44.

Herzog, L. (2014), "Adam Smith on markets and justice", *Philosophy Compass*, 9(12), 864-875.

Hollis, M. & E.J. Nell (1975), *Rational Economic Man: A Philosophical Critique of Neoclassical Economics*, Cambridge University Press. New York.

Hutchison, T. (1938), *The Significance and Basic Postulates of Economic Theory*, London: Macmillan.

Hutchison, T. (1988), *Before Adam Smith: The Emergence of Political Economy, 1662-1776*, Oxford: Basil Blackwell.

İnsel, A. (2012), *İktisat İdeolojisinin Eleştirisi*, İstanbul: Birikim.

Irwin, D.A. (1989), "Political economy and Peel's repeal of the Corn Laws", *Economics & Politics*, 1(1), 41-59.

Jevons, W.S. (1879), *The Theory of Political Economy*, Macmillan.

Kahneman, D. & A. Tversky (1979), "Prospect Theory: An Analysis of Decision Under Risk", *Econometrica*, 47, 263-291.

Kaya, İ.T. (2019), "Aydınlanma Rasyonalizminin Neoklasik Ekonomiye Yansımaları", *Anadolu Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 20(1), 84-95.

Kök, R. & M. Çetin (2019), *İktisat Metodolojisi ve Bölüşüm Ahlakı*, Ankara: Nobel.

Kuhn, T.S. (1970), *The Structure of Scientific Revolutions*, The University of Chicago Press, Chicago.

Kurz, H.D. (2022), "Classical Political Economy", in: *The Palgrave Handbook of the History of Human Sciences* (1-28), Singapore: Springer Singapore.

Lafferty, G. (2022), "Labour history and the neoliberal era: Context and conceptualisation", *Labour History*, (122), 1-20.

Landreth, H. & D. Colander (2002), *History of Economic Thought*, Boston: Houghton Mifflin Company.

Lowenberg, A. (1990) "Neoclassical economics as a theory of politics and institutions", *Cato Journal*, 9, 619-639.

Lucas, R. (1988), "On the mechanics of economic development", *Journal of Monetary Economics*, 22(1), 3-42.

Luna, V.M.I. (2016), "The persistence of poverty in capitalist countries", *Economía Informa*, 400, 67-82.

Marshall, A. & M.P. Marshall (1879), *Economics of Industry*, London: Macmillan.

Marshall, A. (1959), *Principles of Economics*, London: Macmillan & Co.

Marx, K. & F. Engels (1845), *The German Ideology*, Moscow, RU: David Riazanov.

Marx, K. (1954), *Capital. A Critique of Political Economy, vol. I*, Moscow: Progress Publishers.

Marx, K. (1964), *The Economic & Philosophic Manuscripts of 1844*, (Trs. M. Milligan), New York: International Publishers.

Marx, K. (1976), *Capital: A Critique of Political Economy vol. I* (Trs. B. Fowkes), London: Penguin Books.

Marx, K. (1978), *The Poverty of Philosophy*, Peking: Foreign Languages Press.

Marx, K. (1981), *Capital, vol. 3*. (Trs. D. Fernbach from the German edition of 1894), Harmondsworth: Pelican.

Mihályi, P. & I. Szelényi (2019), *Rent-seekers, profits, wages and inequality*, Springer International Publishing.

Milios, J. (2000), "Social Classes in Classical and Marxist Political Economy", *American Journal of Economics and Sociology*, 59(2), 283-302.

Milonakis, D. & B. Fine (2009), *From political economy to economics: Method, the social and the historical in the evolution of economic theory*, Routledge.

Mirowski, P. (1984), "Physics and the 'marginalist revolution'", *Cambridge Journal of Economics*, 8(4), 361-379.

Morrow, G.R. (1927), "Adam Smith: moralist and philosopher", *Journal of Political Economy*, 35(3), 321-342.

Myers, M.L. (1976), "Adam Smith's concept of equilibrium", *Journal of Economic Issues*, 10(3), 560-575.

Nimura, S. (2016), "Adam Smith: Egalitarian or anti-egalitarian? His responses to Hume and Rousseau's critiques of inequality", *International Journal of Social Economics*, 43(9), 888-903.

Öngen, T. (2002), "Marx ve sınıf", *Praksis*, 8, 9-28.

Özel, H. (2009), "İktisat ve sosyal teoride "Görünmez El" eğretilmesi", *Amme İdaresi Dergisi*, 42(2), 45-65.

Pack, S. (2013), "Adam Smith and Marx", in: Chr. Berry, M. et al. (eds.), *The Oxford Handbook of Adam Smith* (523-538), Oxford, Oxford University Press.

Peters, J. et al. (2002), "Economic transition as a crisis of vision: Classical versus neoclassical theories of general equilibrium", *Eastern Economic Journal*, 28(2), 217-240.

Polanyi, K. (1944), *The Great Transformation*, Boston: Beacon Press.

Ricardo, D. (1817), "On the Principles of Political Economy and Taxation", Available online at the *Library of Economics and Liberty*, <http://www .econlib.org/library/Ricardo/ricP.html>, July 23, 2023.

Ricardo, D. (1997), *Ekonomi Politiğin İlkeleri ve Vergilendirme*, (Çev. T. Ertan), İstanbul: Belge.

Robbins, L. (1932), "The nature and significance of economic science", *The Philosophy of Economics: An Anthology*, 1, 73-99.

Roll, E. (1952), *A History of Economic Thought*, New York: Prentice-Hall.

Samuelson, P.A. (1978), "The canonical classical model of political economy", *Journal of Economic Literature*, 16(4), 1415-1434.

Satlıgan, N. et al. (2012), *Kapital'in İzinde*, İstanbul: Yordam.

Savran, S. (2012), "Ricardo'nun Dehası ve Körlüğü", in: N. Satlıgan et al. (eds.), *Kapital'in İzinde*, İstanbul: Yordam.

Savran, S. (2022), *Marksistler Cilt 1: Teori-Pratik Birliğine Doğru*, İstanbul: Yordam.

Sayar, A.G. (2005), *İktisat Metodolojisi ve Düşünce Tarihi Yazıları*, İstanbul: Ötüken.

Schmidt, J. (1992), "What Enlightenment Was: How Moses Mendelssohn and Immanuel Kant Answered the Berlinische Monatsschrift", *Journal of the History of Philosophy*, 30(1), 77-101.

Schumpeter, J.A. (1972), *Imperialism and Social Classes: Two Essays*, Ludwig von Mises Institute.

Screpanti, E. & S. Zamagni (2005), *An Outline of The History of Economic Thought*, OUP Oxford.

Sievers, A.M. (1968), *Has Market Capitalism Collapsed? A Critique of Karl Polanyi's New Economics*, Columbia University Press.

Skinner, A. (1990), "The Shaping of Political Economy in the Enlightenment", *Scottish Journal of Political Economy*, 37(2), 145-65.

Skinner, A.S. (2003), "Adam Smith (1723-1790): Theories of political economy", in: W.J. Samuels et al. (eds.), *A Companion to The History of Economic Thought* (94-111), Oxford: Blackwell Publishing.

Skousen, M. (2005), *Modern İktisadın İnşası: Büyük Düşünürlerin Hayatları ve Fikirleri*, İstanbul: Adres.

Skousen, M. (2007), *The Big Three in Economics: Adam Smith, Karl Marx, John Maynard Keynes*, New York: ME Sharpe.

Smith, A. (1937), *The Wealth of Nations*, New York: Modern Library.

Smith, A. (2016), *Milletlerin Zenginliği*, (Çev. H. Derin) İstanbul: İş Bank Publications.

Smith, A. (2018), *Ahlaki Duygular Kuramı*, (Çev. D. Kızılay), İstanbul: Pinhan.

Solow, R.M. (1985), "Economic history and economics", *The American Economic Review*, 75(2), 328-331.

Sunar, İ. (1999), *Düşün ve Toplum*, Bilim-Felsefe Politika Serisi / 8. Doruk Yayınları, Ankara.

Todaro, M.P. & S.C. Smith (2011), *Economic Development*, UK: Pearson Education Limited.

Turpin, P. (2011), *The Moral Rhetoric of Political Economy: Justice and Modern Economic Thought*, Routledge.

Veblen, T. (1898), "Why is economics not an evolutionary science?", *The Quarterly Journal of Economics*, 12(4), 373-397.

Waterman, A.M. (2002), "Economics as theology: Adam Smith's wealth of nations", *Southern Economic Journal*, 68(4), 907-921.

Welch, C. (1984), *Liberty and Utility: The French Idéologues and The Transformation of Liberalism*, New York: Columbia University Press.

Westra, R. (2018), "A theoretical note on commodification of labour power in China and the global putting-out system", *Journal of Contemporary Asia*, 48(1), 159-171.

Wolff, R.D. & S.A. Resnick (1987), *Marxian versus Neoclassical*, The Johns Hopkins University Press.

Wright, E.O. (2005), "Foundations of a neo-Marxist class analysis", in: E.O. Wright (ed.), *Approaches to Class Analysis* (1-26), Cambridge, UK: Cambridge University Press.

Zafirovski, M. (1999), "How 'neo-classical' is neoclassical economics? With special reference to value theory", *History of Economics Review*, 29(1), 45-69.

Zafirovski, M. (2018), "Rational choice theory or pretense? The claims, equivalences, and analogies of the 'Economic approach to human behavior'", *Sociological Spectrum*, 38(3), 194-222.

Sarı-Aksakal, B. (2024), "From Classical Political Economics to Neoclassical (Mainstream) Economics: The Ideological Reproduction and Depoliticization Process of Economics", *Sosyoekonomi*, 32(60), 197-223.

The Role of Work Stress in The Effect of Social Comparison on Social Anxiety: A Study on Aviation Industry Employees

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Sosyal Karşılaştırmanın Sosyal Kaygı Üzerindeki Etkisinde İş Stresinin Aracılık Rolü: Havacılık Sektörü Çalışanlarına Yönelik Bir Araştırma

Abstract

The aim of the research conducted in the aviation sector is to measure how effective stress is and whether it mediates social anxiety caused by the perception of social comparison experienced by individuals working in organisations. The research sample consists of ground service personnel working in the aviation sector in the Marmara Region. The study's findings revealed that social comparison and job stress significantly predicted social anxiety and that job stress had a mediating role. This study, conducted in the aviation sector, can be used to improve individuals' experiences in business life.

Keywords   :   Social Comparison, Social Anxiety, Work Stress, Mediation.

JEL Classification Codes :   M10, M19.

Öz

Havacılık sektöründe yapılan araştırmanın amacı, örgütlerde çalışan bireylerin yaşamış oldukları sosyal karşılaştırma algısı ile meydana gelen sosyal kaygıda stresin ne derece etkili olduğunu ve aracılık edip etmediğini ölçmektir. Araştırmanın örneklemini, Marmara Bölgesi'nde havacılık sektöründe çalışan yer hizmeti personeli oluşturmaktadır. Çalışmanın bulguları sosyal karşılaştırmanın ve iş stresinin sosyal kaygıyı anlamlı olarak yordadığını ve iş stresinin aracı rolü olduğunu ortaya koymuştur. Havacılık sektöründe yapılan bu çalışma bireylerin iş yaşamındaki deneyimlerini geliştirmek için kullanılabilir.

Anahtar Sözcükler   :   Sosyal Karşılaştırma, Sosyal Kaygı, İş Stresi, Aracılık.

1. Introduction

Social comparison is a central concept for societies' welfare levels and individuals' self-improvement. Individuals also determine their social position by comparing themselves with their social comparison. People support the progress of humanity with the desire to be more successful. Social comparison is a concept that evaluates human progress. It states that without objective criteria, we compare ourselves with others from different points of view to know where we stand (Festinger, 1954). Due to sociocultural body image and irregular eating habits, women may develop body dissatisfaction if they constantly compare their appearance with that of others. Studies have shown that women regularly compare themselves to others and change their appearance (Leahey et al., 2007). Social comparison theory was introduced to the psychosocial literature by Festinger (1954). Self-evaluation shows that people can effectively evaluate others and receive and shape feedback. According to Festinger (1954), human nature is programmed to assess itself. In the search for meaningfulness, one's abilities and ideas are under constant scrutiny. One must first look for objective criteria to evaluate the validity of talents and ideas. If there are no criteria, one can find an answer by comparing oneself to others. Due to the competitive nature of the aviation industry, it is expected that this environment will reflect social comparison and social anxiety in employees. Therefore, the anxiety and comparison levels of individuals working in this sector where stress is intense will also increase.

The problems people have when they compare themselves with others are very different. Many things can be compared: Education, appearance, ability, spirituality, lifestyle, mood, destiny, interests, job performance, etc. (Festinger, 1954; Greenberg et al., 2007; Kruglanski & Mayseless, 1990: 204; Locke & Nekic, 2000: 865). People regularly compare themselves to others, whether they want to or not. For example, someone who works as a model might fear being overweight and tend to compare their appearance. The effects of social comparison on the individual, competition among work colleagues and concern about performance cause social anxiety. The social anxiety they experience causes individuals to question their professional abilities. As a result of the social comparisons they experience, work stress arises.

When individuals open up to the world, they must communicate with the people around them and get involved in organisations instead of just fulfilling their duties. Learning and adapting to the rules of the environment play an important role in people coping with the psychological and physiological difficulties encountered in a new environment. Exposure to various stressors is inevitable, especially in the work environment. These stressors can come from multiple sources, such as workload, time pressure, performance expectations, and competition. People may react differently to different events; although some work harder under stress, this can lead to physical and psychological problems. The causes of work-related stress can be physical or psychological. While physical causes include an intense work schedule, poor work organisation, and hazardous working conditions, psychological causes are due to the person's work-related thought processes, mood, and perceptions. Stress affects not only physical and mental health but also the

individual. It can also positively or negatively affect the individual's attitude and daily behaviour. It is not always considered a negative factor in stressful situations; mild stress can stimulate and motivate the person. However, as the level of stress increases, the psychological, physical and behavioural problems of the individual also increase (Densley et al., 1994; Eryılmaz, 2009). Balancing workloads, setting appropriate and realistic performance expectations, addressing employee needs, supporting and creating a safe work environment, and providing resources for stress management can increase employee motivation and reduce the negative effects of work (Siegrist & Rode, 2006: 86). Providing resources for employees through stress management and increasing employee motivation will lessen the negative consequences of work.

Entering a new environment occurs at different times and may require overcoming psychological and physiological challenges. First, various tensions in the workplace are unavoidable. The sources of stress related to personal characteristics depend on individual factors. The level of anxiety is the tolerance for uncertainty, excitement in business, emptiness, disappointments and high interest in work. Family problems, commuting, midlife illnesses, and financial problems affect the individual's social life (İlgar, 2001). Work life can be stressful. Therefore, many people struggle with anxiety caused by stress at work.

People with social anxiety do not want to over-communicate. They speak less often and more briefly, are less extroverted than they are, and sometimes withdraw from social relationships. Sufferers also have a history of anxiety due to non-social factors. Such social environments have little effect on them. When people suffer from social anxiety, it is mutual. Instead of making a better impression on others, they are content to maintain their current social image. They want to have a more superficial relationship with others. Social anxiety is a complex social responsibility. It can be difficult for people to identify the aspects of social anxiety they experience because many factors influence social anxiety. This situation reduces anxiety and causes stress when they compare themselves and their characteristics to the social environment.

Human labour is important in the aviation industry; therefore, this study aims to motivate individuals by revealing their negative emotional tendencies in business. The study's significance is that it sheds light on the industry and prompts managers to offer practical strategies such as staff training and workplace policies. In this way, work efficiency can be maintained at a high level, and employee satisfaction can be increased.

Social comparison theory states that social comparison and social anxiety decrease individuals' enjoyment of life and increase their stress levels. Therefore, the anxiety level of individuals who make comparisons increases, and it is known that work stress mediates this.

2. Literature Review

2.1. Social Comparison

In the 1950s, social comparison theory, which explains the ability to self-evaluate, emerged as a concept that allowed individuals to describe their self-concept. According to Festinger (1954), a universal theory is needed for individuals to evaluate their existing abilities. Regardless of an individual's abilities, misjudging their abilities often leads to negative consequences. Therefore, these assessments should be as accurate, objective, and factual as possible. This is because when making assessments, people look for physical standards and try to do so using non-social criteria. However, it is not always possible to obtain objective information.

According to Festinger (1954), people judge their thoughts and abilities. They select others who are like them for comparison. This comparison attempts to create the most accurate and objective assessment for everyone. My personal goal is to make a correct and valid assessment. Similarly, when a person's personality is very different, statements can be made about the accuracy of that person's view. The most logical solution here is personal beliefs or abilities. Festinger believes comparative bias in talent maps may be cultural because some communities, such as Native American communities, rely heavily on individual accomplishments, such as continuous improvement work.

2.2. Social Anxiety

Humans are social beings. Therefore, humans interact with other humans in society. If they can establish good relationships, they can live their lives meaningfully. Interaction and communication with other people are possible for various reasons. Those who have language difficulties, those who have difficulty expressing themselves, and those who suffer from social anxiety may find that social problems become a problem and increase their anxiety level (Sungur, 2000). This is referred to as social anxiety disorder. Social anxiety in society can be defined as the unwillingness to be a part of and participate in society. (Hamarta & Baltacı, 2013: 234).

Intentional anxiety, stress, discomfort, and fear should be avoided in social situations where others criticise them negatively. Social anxiety has become a disease characterised by fear (Watson & Friends, 1969). Social anxiety is a very persistent disorder that occurs during adolescence. Social anxiety affects the quality of life and functioning of those affected. They also have serious problems at work, in their families, and social lives.

Participating in an important or intimidating social activity triggers a normal anxiety response in the individual. Anxiety is born in the individual and begins and lasts throughout life. However, the level here is health. A certain level of fear of success: it has positive qualities such as work and self-improvement. However, excessive fear can prevent people from pursuing their lives. For people to continue their lives under these conditions, it is necessary to take some precautions. In this regard, anxiety is effective when it motivates

individuals to a certain extent, but excessive anxiety has a negative effect on people's lives (Eren, 2006).

2.3. Work Stress

For many people who fear death, stress is a part of their lives, especially in and around the workplace. Stress is a big problem because most people spend a lot of time in a work environment. Work-related stress and frustration can have lasting and significant adverse effects on your business. Long-term stress and dissatisfaction in the workplace can have serious consequences, including poor job performance. For this reason, stress management and job satisfaction are important issues that companies need to address in depth.

According to Beehr and Franz, the concept of work stress can be divided into four different categories. First, the health approach focuses on treating stress in the physical environment and aims to treat people with stress injuries that lead to stress and physical exertion. Second, the clinical counselling/psychology approach focuses on the psychological stress of the work environment and its psychological effects, such as depression and anxiety. Third, technical psychology examines the stressors and performance of employees in the workplace's physical environment. Finally, the organisational psychology approach focuses on resolving workplace stress through minor changes in an employee's organisational environment. Workplace stress can be defined as the emotional reaction that occurs when the job demands do not match the employee's needs, abilities, and resources. Another definition is that workplace stress is activating an employee's energy in conflict with organisational or job expectations (Beehr et al., 2002: 10; Malik, 2011: 3065; Atılgan and Dengizler, 2007: 64).

If there is no stress at work, the person loses his will to fight, and his work performance decreases. However, when the stress level increases, performance also decreases. However, when stress at work reaches a critical level, individuals find it difficult to make decisions, leading to negative consequences and adverse effects such as psychological and physical damage. Therefore, stress management is critical in the corporate environment (Yılmaz & Ekici, 2003: 3). For this reason, it is important to reduce and control stress in the work environment so that it has a positive impact on both the organisation and the employees (Rowshan, 2000).

Factors such as workload, job insecurity, lack of support, and insecure roles increase work stress (Leka & Jain, 2010). High workload and unrealistic job demands can lead to stress and burnout, but fear of losing one's job can also cause stress and anxiety. Lack of support from colleagues, supervisors, and the company can also increase work stress. Valid job descriptions should be clarified, and tasks should be defined to reduce workplace stress and anxiety. In today's world, most people's physical or mental ailments are stress-related. People who work hard, strive to achieve their goals and meet their expectations live their daily lives in tension, anxiety, conflict and anger. The fact that the sources of stress are diverse means that stress has different consequences for each person. In recent years,

workplace stress has become a significant and serious problem for many workers in the intense and demanding work environment. However, uncontrolled workplace stress has negative effects on physical and mental health. Therefore, understanding the causes and consequences of work stress and implementing effective stress management strategies can reduce the risk of employee burnout and increase well-being in the workplace.

2.4. Relations Between Concepts

People with social anxiety tend to interpret social feedback negatively and self-critically (Morrison & Heimberg, 2013). Overall, social comparison is important in reinforcing and maintaining social anxiety. By examining the relationship between these two elements, it is possible to determine the extent to which social comparison influences social anxiety and the impact that the tendency toward social comparison has on the level of social anxiety.

Social comparison theory emerged in the 1950s as a theory trying to understand the phenomenon of individual self-esteem. According to Festinger (1954), people have an innate need to evaluate their ideas and abilities. These evaluations should be objective; otherwise, they will have negative consequences. Whenever possible, they try to base their judgements on non-social criteria. However, it is not always possible to obtain objective information. Without objective standards, people get the information they need by comparing their views and abilities with those of others. This process is called the social comparison process, and the resulting knowledge is called social comparison knowledge (Festinger, 1954).

Social comparison refers to the tendency to compare oneself with others regarding traits or characteristics such as attractiveness, intelligence, and performance. Social anxiety, on the other hand, is identified with persistent excessive fear or anxiety when individuals are evaluated or scrutinised by others. People are more likely to be affected by social anxiety when compared to others who are more successful (Fardouly et al., 2015). The first hypothesis formed according to the studies and literature reviews is as follows;

H1: Social comparison affects social anxiety.

According to social comparison theorists, it is stressful for individuals to compare themselves with others and see themselves in a lower position, which negatively affects the individual. If there is social anxiety and social comparison in individuals, stress levels increase with less enjoyment of life and more disturbing behaviour. (Gastorf & Suls, 1978; Pleban & Tesser, 1981; Pyszczynski et al., 1985, Major et al., 1993; Kink & Gump, 1997; Tyler & Feldman, 2005, İçağası, 2022). The second hypothesis formed according to the studies and literature reviews is as follows;

H2: Work stress mediates the effect of social comparison on social anxiety.

Social comparisons increase the comparison level between individuals, colleagues, or institutions and affect work stress. When people make social comparisons, they perceive

themselves as competitors concerning the tasks and promotions of others. When people who want to succeed professionally compare their friends' work performance with their own, their stress levels increase. Such a situation increases the feeling of competition and creates pressure, anxiety, and restlessness in the person. At the same time, social comparison generates feelings of jealousy, anger, and frustration. Thus, increasing job dissatisfaction negatively affects work motivation and increases work stress (Wong & Law, 2002). Social anxiety can lead to avoidance of social situations, including work tasks and interactions with colleagues and supervisors. Avoiding work tasks and communication decreases job performance, reduces job satisfaction, and increases work stress (Aderka et al., 2012). People who suffer from social anxiety perceive feedback as more negative and critical than intended, so their colleagues and supervisors criticise them more harshly. They feel they are being judged somehow (Morrison & Heimberg, 2013). This increases work stress and decreases job satisfaction. People with severe social anxiety experience stress at work, such as meeting deadlines or managing the demands of teamwork. This situation negatively impacts communication and decision-making problems (Glazier et al., 2018).

H3: Workload mediates the effect of social comparison on social anxiety.

H4: Skill utilisation mediates the effect of social comparison on social anxiety.

H5: Freedom of decision mediates the effect of social comparison on social anxiety.

H6: Social support mediates the effect of social comparison on social anxiety.

3. Methodology

3.1. Research and The Model

The primary significance of this research is to contribute to the literature by shedding light on the processes and concepts of social comparison in work stress and its impact on social anxiety, which have not yet been explored. It also aims to empirically examine whether work stress affects workers' social anxiety levels by examining the dimensions of workload, decision latitude, skill utilisation, and social support for each dimension separately. One of the study's objectives is to show that workers' emotions are at the forefront of business relationships and how they affect work stress in emotionally charged industries. Therefore, this quantitative study aims to find out how the level of social anxiety of workers in general is affected and how the four dimensions of work stress affect the social anxiety of workers;

3.2. Purpose and Scope of the Study

The study aims to determine whether social comparison mediates social anxiety in the aviation sector and how it affects individuals' work behaviour. The first research question was created to investigate whether social comparison affects individuals' social anxiety levels. The second research question is whether there is a mediating effect of work stress on the level of social anxiety that individuals experience when comparing themselves to others.

Figure: 1
Research Model
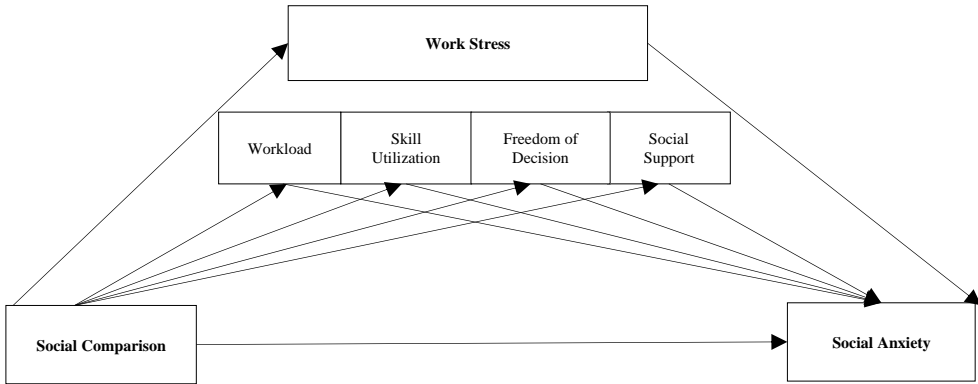
3.3. Data Collection and Analysis

This study aims to measure the mediating role of work stress in the effect of social comparison on social anxiety. The random sampling method was used as the sampling procedure. The prepared questionnaire was sent online to the people currently working at the airports in Turkey. The study was conducted by distributing the questionnaire to 400 people. Consequently, the final sample of the study was 400 people (194 (48.5%) women and 206 (51.5%) men.

Participants were asked 46 questions consisting of three different scales and demographic questions. All questions except the demographic questions were asked on a 5-point Likert scale (1: "strongly disagree", 5: "strongly agree").

3.3.1. Social Comparison Scale

The social comparison scale, the study's dependent variable, was translated into Turkish by Teközel (2000). It consists of 11 questions.

3.3.2. Social Anxiety Scale

The social anxiety scale, which is the outcome variable of the study, was adapted into Turkish by Avcıkurt, C. and Göker, S. (2022). The scale consists of a total of 20 questions.

3.3.3. Work Stress Scale

In all studies where the "work stress" scale, which is the mediating variable of the study, is measured quantitatively, the "work stress" scale developed by Karasek et al. (2000) and translated into Turkish by Demiral et al. (2007) was used in our country. It consisted of a total of 17 questions.

3.4. Data Analysis

First, descriptive statistics and correlations between variables are tested. Then, the PROCESS Macro (Model 4) developed by Hayes et al. (2017) was used to test mediation models. AMOS for confirmatory factor analysis, Programme 21, was used. The bootstrapping method obtained 95% confidence interval outputs based on large data sets recovered from the original data. This method allows regression equation modelling (Hayes et al., 2013: 2).

The SPSS 20.0 package analysis program and the Amos23 program were used to analyse the research data, and the SEM statistical analysis method was applied. First, statistical data expressing the demographic characteristics of the employees participating in the research were presented. Then, Cronbach's Alpha values were utilised for the reliability analysis of the study.

The Cronbach alpha value determined for all scale items reflects the reliability of the survey in the study. The generally accepted value is between 0.70 and 1 (Özdamar, 2004). The reliability values of the questionnaire scales are given in Table 1. It is seen that the statements in the scales have values between 0.70 and 0.92 with a margin of error of 0.05 in the 95% confidence interval.

Table: 1
Reliability Analysis Results of the Scales

Scales	Cronbach's Alpha Values
Work Stress	0.706
Workload	0,843
Skill Utilization	0,706
Freedom of Decision	0,702
Social Support	0,874
Social Comparison	0.829
Social Anxiety	0.921

4. Results

4.1. Confirmatory Factor Analysis

The confirmatory factor analysis conducted for the "work stress" scale in the study confirmed the existence of four sub-dimensions: workload, use of skills, decision latitude, and social support, and it demonstrated the scale's construct validity.

Table: 2
Confirmatory Factor Analysis Results

Fit Indexes	RMSEA	NFI	CFI	GFI	AGFI	IFI	RFI	$X^{2/df}$
Values	0.05	0.94	0.94	0.93	0.91	0.96	0.93	2.28

The analysis of the results of the confirmatory factor analysis shows that the degree of freedom (x2/sd) is less than 3 (2.28). Therefore, it can be said that the result of the first goodness-of-fit statistic is reasonable. Furthermore, the "GFI" value of 0.93 is acceptable.

The "RMSEA" value is 0.05 and is at an acceptable level with a confidence interval of 90%. Furthermore, the values "NFI" 0.94, "CFI" 0.93, "GFI" 0.93, "AGFI" 0.91, "IFI" 0.96, and "RFI" 0.93 were found acceptable.

4.2. Correlation Analysis Results

Table 3 shows the means, standard deviations, and correlation results of all variables in the current study.

Table: 3
Correlation Analysis Results

Variables	Mean	S.D.	1	2	3	4	5	6	7
1. Work Stress	3.37	0.34	1						
2. Workload	3.12	0.39	0.479**	1					
3. Skill Utilization	3.30	0.46	0.699**	0.308**	1				
4. Freedom of Decision	3.61	0.92	0.571**	0.047**	0.295**	1			
5. Social Support	3.53	0.56	0.779**	0.059**	0.337**	0.269**	1		
6. Social Comparison	3.41	0.68	0.322**	0.168**	0.225**	0.243**	0.210**	1	
7. Social Anxiety	3.51	0.66	0.488**	0.005**	0.340**	0.543**	0.378**	0.603**	1

*Notes: S.D. = Standard Deviation, N = 400, ** p < 0.01.*

The correlation analysis results show a significant positive relationship between social comparison and social anxiety and work stress [r=0.603, p < 0.01; r=0.322, p < 0.01]. There is also a significant positive relationship between the sub-dimensions of work stress and social comparison [r=0.168, p < 0.01; r=0.225, p < 0.01; r=0.243, p < 0.01; r=0.210, p < 0.01]. Furthermore, there is a significant positive relationship between the sub-dimensions of work stress and social anxiety [r=0.005, p < 0.01; r=0.340 p < 0.01; r=0.543 p < 0.01; r=0.378 p < 0.01].

4.3. Hypothesis Results

Table 4 presents the results of the current study, which sought to identify the mediating role of work stress in the relationship between social comparison and social anxiety.

Table: 4
Results of The Mediation Analysis of Work Stress

	Model 1 (SA)		Model 2 (WS)		Model 3 (SA)	
	B	T	B	T	B	T
Social Comparison	0.59***	15.09	0.16***	6.77	0.48***	12.79
Work Stress	-	-	-	-	0.62***	8.42
R^2		0.36		0.10		0.46
F		227.99		45.91		169.59

Notes: N = 400, SA = Social Anxiety, WS = Work Stress, *** p < 0.001.

In this table, three different sub-models were created by our model (Table 4). In model 1, the effects of social comparison on social anxiety were analysed. According to this, the impact of social comparison on social anxiety is positive (b = .59, p <.001). In model 2, the effect of social comparison on work stress was analysed. The impact of social comparison on work stress was also positive (b = .16, p <.001). Finally, Model 3 examined

the effect of social comparison and work stress on social anxiety. Social comparison (b = .48, p <.001) and work stress (b = .62, p <.001) had a positive effect on social anxiety.

Figure: 2
The Mediator Role of Work Stress in the Effect of Social Comparison on Social Anxiety
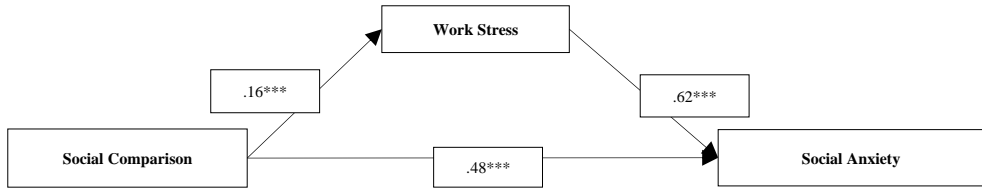
*** p < 0.001.

Table: 5
Direct and Indirect Effects of Social Comparison on Social Anxiety

The Total Effect of Social Comparison on Social Anxiety				Unstand.	SE	LLCI	ULCI
				0.5920	0.0392	0.5150	0.6691
Direct Effects of Social Comparison on Social Anxiety							
				0.4885	0.0382	0.4135	0.5636
Indirect Effects of Social Comparison on Social Anxiety							
Independent		**Mediating**		**Dependent**	**Unstand.**	**SE**	**LLCI**	**ULCI**
Social Comparison	>	Work Stress	>	Social Anxiety	0.1035	0.0263	0.0577	0.1626

As shown in Table 5, the mediating effect of work stress was statistically significant.

Table: 6
Testing The Mediation Effect of Occupational Stress Sub-Dimensions on The Impact of Social Comparison on Social Anxiety

	Model 1 (SA)		Model 2 (WL)		Model 3 (SA)	
	B	**T**	**B**	**T**	**B**	**T**
SC	0.59***	15.09	0.09***	3.40	0.61***	15.46
WL	-	-	-	-	0.18***	2.73
R²	0.36		0.02		0.37	
F	227.99		11.61		119.59	
	Model 1 (SA)		Model 2 (SU)		Model 3 (SA)	
	B	**T**	**B**	**T**	**B**	**T**
SC	0.59***	15.09	0.15***	4.60	0.54***	14.00
SU	-	-	-	-	0.30***	5.43
R²	0.36		0.05		0.40	
F	227.99		21.20		136.90	
	Model 1 (SA)		Model 2 (FD)		Model 3 (SA)	
	B	**T**	**B**	**T**	**B**	**T**
SC	0.59***	15.09	0.32***	4.98	0.49***	14.15
FD	-	-	-	-	0.30***	11.88
R²	0.60		0.05		0.53	
F	227.99		24.87		224.80	
	Model 1 (SA)		Model 2 (SD)		Model 3 (SA)	
	B	**T**	**B**	**T**	**B**	**T**
SC	0.59***	15.09	0.17***	4.28	0.53***	14.15
SS	-	-	-	-	0.31***	6.77
R²	0.36		0.04		0.43	
F	227.99		18.36		149.85	

Notes: N = 400, SC = Social Comparison, SA = Social Anxiety, WL = Workload, SU = Skill Utilization, FD = Freedom of Decision, SS = Social Support, *** p < 0.001.

The results of the analysis regarding the mediating role of the sub-dimensions of work stress in the relationship between social comparison and social anxiety are presented in Table 6. The effects of social comparison on social anxiety were analysed in Model 1. According to this, the impact of social comparison on social anxiety is positive. In Model 2, the impact of social comparison on the sub-dimensions of workload was analysed. The effects of social comparison on work stress (b = 0.09, p < 0.001), skill utilisation (b = 0.15, p < 0.001), decision latitude (b = 0.32, p < 0.001) and social support (b = 0.17, p < 0.001) were also positive. Finally, social comparison and the sub-dimensions of work stress positively affected social anxiety (model 3). Consequently, social comparison and work stress sub-dimensions had a positive impact on social anxiety.

Table: 7
Direct and Indirect Effects of Social Comparison on Social Anxiety

Independent		Mediator		Dependant	Unstand.	SE	LLCI	ULCI
SC	>	WL	>	SA	0.0182	0.0088	0.0377	0.0035
SC	>	SU	>	SA	0.0475	0.0169	0.0197	0.0846
SC	>	FD	>	SA	0.1002	0.0250	0.0550	0.1529
SC	>	SS	>	SA	0.0552	0.0197	0.0217	0.0989

*Notes: N = 400, SC = Social Comparison, SA = Social Anxiety, WL = Workload, SU = Skill Utilization, FD = Freedom of Decision, SS = Social Support, *** p < 0.001.*

As shown in Table 7, the mediation effect of the sub-dimensions of work stress was statistically significant.

Figure: 3
The Mediating Role of Work Stress Subscales in the Effect of Social Comparison on Social Anxiety

*** p < 0.001.
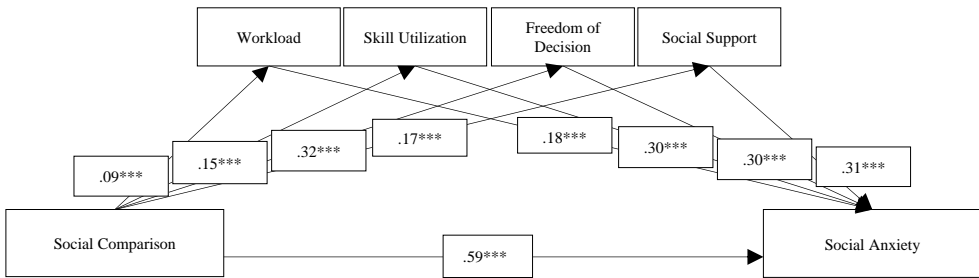
Tablo: 8
Hypotheses Result

Hypotheses	Mediator	Outcome
H1: SC → SA	-	Accepted
H2: SC→ WS → SA	WS	Accepted
H3: SC→WL→SA	WL	Accepted
H4: SC→ SU → SA	SU	Accepted
H5: SC→ FD → SA	FD	Accepted
H6: SC→ SS → SA	SS	Accepted

Notes: N = 400, SC = Social Comparison, SA = Social Anxiety, WS = Work Stress, WL = Workload, SU = Skill Utilization, FD = Freedom of Decision, SS = Social Support.

Table 8 shows the results of the hypotheses. According to the table, H1, H2, H3, H4, H5 and H6 are accepted.

5. Concluding Remarks

This study aims to show the consequences of stress due to social comparison and social anxiety in working life. To this end, a correlation analysis between variables was first performed. To this end, a correlation analysis between variables was first conducted. As a result of this analysis, significant relationships were found between the variables "social comparison", "social anxiety", and "stress at work".

The correlation analysis showed a positive and significant relationship between social comparison and the sub-dimensions of work stress, such as workload, competence use, decision latitude and social support. This result shows that it is consistent with previous studies. For example, a study by Buunk et al. (1994) examined the role of social comparison processes in the relationship between occupational stress and mental illness. The results showed that as work stress increases, so do social comparison processes and that these processes are associated with mental health problems. In their study, Neale et al. (1991) examined the relationship between social comparison processes and occupational stress in paramedics. The results indicate that social comparison positively correlates with occupational stress, but social support moderates this relationship. Another study by Michinov (2005) examined the relationship between work stress and social comparison processes in administrative employees. The results showed that social comparison positively correlates with work stress and influences job satisfaction.

The study also found a positive and significant relationship between work stress and its sub-dimensions and social anxiety. According to a study by Eng, Coles, Heimberg, and Safrend (2005), individuals with social anxiety have adverse effects on their social performance and activities, which affects life satisfaction. In addition, Diener, Eid, and Larsen (2008) state that the satisfaction people derive from life events, especially those they enjoy, is interpreted individually, influencing life satisfaction. Events such as relationships, health, work life, activities, and leisure are defined as events that individuals enjoy. Satisfaction of the need for social relationships is considered an indicator of life satisfaction. However, social anxiety interferes with the comfort one desires in social relationships. Therefore, life satisfaction and social anxiety influence each other (Ledley & Heimberg, 2006).

Another important finding is a positive and significant relationship between social comparison and social anxiety. In one study, it was found that individuals with social anxiety focus more on negative outcomes when they compare themselves to others in the process of social comparison and, therefore, see themselves as having a lower social status (Gibbons & Buunk, 1999). In another study, it was found that individuals with social anxiety make more comparisons and that these comparisons usually lead to negative outcomes (Suls et al., 2002). In another study, individuals with high levels of social anxiety were found to

experience more shame and guilt because of negative comparisons, which in turn led to more social anxiety (Turk et al., 2005).

In a meta-analysis, it was found that people with social anxiety tend to compare themselves to others and that this process increases their social anxiety (Buhrmester & Prager, 1995). According to Festinger's (1954) social comparison theory, people determine a certain social status by comparing themselves to others and evaluating themselves based on that social status. This theory is often used to explain the processes underlying social anxiety. In another study, it was observed that people with social anxiety experience more stress during social interactions and, therefore, enjoy social interactions less (Mansell & Clark, 1999).

Considering the mediation analyses conducted by the study's primary objective, occupational stress mediated the effect of social comparison on social anxiety. In addition, the current study found that the sub-dimensions of occupational stress mediated the impact of social comparison on social anxiety.

This study examines the mediating role of work stress in the effect of social comparison on social anxiety and targets workers in the aviation industry. This study represents a theoretical contribution to the literature, as many previous studies have focused on the effect of social comparison on social anxiety. Still, this study identified the mediating effect of work stress on this relationship.

The study results show that social comparison mediates work stress and social anxiety. In other words, social comparison increases work stress by increasing social anxiety. These findings suggest that work stress is a factor that influences the relationship between social comparison and social anxiety. This study also provides a unique perspective for understanding the relationship between work stress and social anxiety in the aviation industry due to this group of workers. Therefore, this study also contributes to developing stress reduction strategies for aviation workers. Limitations of the study: the generalizability of the results is limited because the data were only collected from workers in the aviation industry.

This study used cross-sectional data to determine the mediating effect of the relationship between work stress and social anxiety. Therefore, causality could not be conclusively established. In a study that examined the mediating role of work stress on the effect of social comparison on social anxiety, only one scale was used. Therefore, the influence of other factors (personality traits, workload, job satisfaction, etc.) may be necessary. In this study, only social comparisons with peers were considered. However, other social comparisons may also influence social anxiety (e.g., family members, friends, community, etc.). Finally, this study only examined the effect of social comparison on the relationship between work stress and social anxiety. However, it should be noted that other factors may also influence this relationship (emotional intelligence, self-confidence, emotional exhaustion, etc.).

References

Aderka, I.M. et al. (2012), "Functional impairment in social anxiety disorder", *Journal of Anxiety Disorders*, 26(3), 393-400.

Atılgan, T. & İ. Dengizler (2007), "Hazır giyim sektöründe örgütsel stres üzerine bir araştırma", *Dokuz Eylül Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 9(2), 62-93.

Baltacı, Ö. & E. Hamarta (2013), "Üniversite öğrencilerinin sosyal kaygı, sosyal destek ve problem çözme yaklaşımları arasındaki ilişkiyi inceleme", *Eğitim ve Bilim*, 38(167), 226-140.

Beehr, T.A. & T.M. Franz (1987), "The current debate about the meaning of job stress", *Journal of Organizational Behavior Management*, 8(2), 5-18.

Beehr, T.A. & M.P. O'Driscoll (2002), "Organizationally targeted interventions aimed at reducing workplace stress", in: C. Thomas & M. Hersen (eds.), *Handbook of Mental Health in The Workplace* (103-119), Thousand Oaks, CA: Sage Publications.

Buhrmester, D. & K. Prager (1995), *Patterns and functions of self-disclosure during childhood and adolescence*, Cambridge University Press.

Densley, R.J. et al. (1994), "Multiple stress ageing of solid-dielectric extruded dry-cured insulation systems for power transmission cables", *IEEE Transactions on Power Delivery*, 9(1), 559-571.

Diener, E. et al. (2008), *The science of subjective well-being*, The Guilford Press: New York London.

Eng, W. et al. (2005), "Domains of life satisfaction in social anxiety disorder: Relation to symptoms and response to cognitive-behavioral therapy", *Journal of Anxiety Disorders*, 19(2), 143-156.

Eryılmaz, A. (2009), "Ergenlik Döneminde Stres ve Başa Çıkma", *Van Yüzüncü Yıl Üniversitesi Eğitim Fakültesi Dergisi*, 6(2), 20-37.

Fardouly, J. et al. (2015), "Social comparisons on social media: The impact of Facebook on young women's body image concerns and mood", *Body Image*, 13, 38-45.

Festinger, L. (1954), "A theory of social comparison processes", *Human Relations*, 7(2), 117-140.

Gastorf, J.W. & J. Suls (1978), "Performance evaluation via social comparison: performance similarity versus related-attribute similarity", *Social Psychology*, 41, 297-305.

Glazier, B.L. & L.E. Alden (2019), "Social anxiety disorder and memory for positive feedback", *Journal of Abnormal Psychology*, 128(3), 228-233.

Gibbons, F.X. & B.P. Buunk (1999), "Individual differences in social comparison: development of a scale of social comparison orientation", *Journal of Personality and Social Psychology*, 76(1), 129-142.

Gümüş, A.E. (2006), *Sosyal Kaygı ile Başa Çıkma*, Nobel Yayın Dağıtım.

Greenberg, J. et al. (2007), "Social comparison processes in organizations", *Organizational Behavior and Human Decision Processes*, 102(1), 22-41.

İçağası, B. (2022), "Two sides of the same coin: the impact of social comparison on social anxiety through cognitive biases", *Yüksek Lisans Tezi*, İzmir Ekonomi Üniversitesi.

Kulik, J.A. & B.B. Gump (1997), "Affective reactions to social comparison: The effects of relative performance and related attributes information about another person", *Personality and Social Psychology Bulletin*, 23(5), 452-468.

Kruglanski, A.W. & O. Mayseless (1990), "Classic and current social comparison research: Expanding the perspective", *Psychological Bulletin*, 108(2), 195.

Leahey, T.M. et al. (2007), "The frequency, nature, and effects of naturally occurring appearance-focused social comparisons", *Behavior Therapy*, 38(2), 132-143.

Ledley, D.R. & R.G. Heimberg (2006), "Cognitive vulnerability to social anxiety", *Journal of Social and Clinical Psychology*, 25(7), 755-778.

Leka, S. & A. Jain (2010), *Health impact of psychosocial hazards at work: an overview*, World Health Organization.

Locke, K.D. & J.C. Nekich (2000), "Agency and communion in naturalistic social comparison", *Personality and Social Psychology Bulletin*, 26(7), 864-874.

Major, B. et al. (1993), "In-group versus out-group comparisons and self-esteem", *Personality & Social Psychology Bulletin*, 19(6), 711-721.

Malik, N. (2011), "Quetta City'de özel ve kamu bankaları çalışanlarının yaşadıkları mesleki stres üzerine bir araştırma", *Afrika İşletme Yönetimi Dergisi*, 5(8), 3063-3070.

Mansell, W. & D.M. Clark (1999), "How do I appear to others? Social anxiety and processing of the observable self", *Behaviour Research and Therapy*, 37(5), 419-434.

Michinov, N. (2005), "Social comparison, perceived control, and occupational burnout", *Applied Psychology*, 54(1), 99-118.

Morrison, A.S. & R.G. Heimberg (2013), "Social anxiety and social anxiety disorder", *Annual Review of Clinical Psychology*, 9, 249-274.

Neale, A.V. (1991), "Work stress in emergency medical technicians", *Journal of Occupational Medicine*, 991-997.

Özdamar, K. (2004), *Paket Programlar ile İstatiksel Veri Analizi-1*, Eskişehir: Kaan Kitabevi.

Pleban, R. & A. Tesser (1981), "The effects of relevance and quality of another's performance on interpersonal closeness", *Social Psychology Quarterly*, 44, 278-285.

Pyszczynski, T. et al. (1985), "Social comparison after success and failure: Biased search for information consistent with a self-serving conclusion", *Journal of Experimental Social Psychology*, 21(2), 195-211.

Rowshan, A. (2000), *Stres Yönetimi: Hayatınızın Sorumluluğunu Almak İçin Stresi Nasıl Yönetebilirsiniz*, Sistem Yayıncılık.

Suls, J. et al. (2002), "Social comparison: Why, with whom, and with what effect?", *Current Directions in Psychological Science*, 11(5), 159-163.

Sungur, M.Z. (2000), "Bilişsel-davranışçı yaklaşımlar ve sosyal fobi", *Klinik Psikiyatri Dergisi*, 3(2), 27-32.

Turk-Browne, N.B. et al. (2005), "The Automaticity of Visual Statistical Learning", *Journal of Experimental Psychology: General*, 134(4), 552-564.

Tyler, J.M. & R.S. Feldman (2005), "Deflecting threat to one's image: Dissembling personal information as a self-presentation strategy", *Basic and Applied Social Psychology*, 27(4), 371-378.

Watson, D. & R. Friend (1969), "Measurement of social-evaluative anxiety", *Journal of Consulting and Clinical Psychology*, 33(4), 448-457.

Wong, C.S. & K.S. Law (2002), "The effects of leader and follower emotional intelligence on performance and attitude: An exploratory study", *The Leadership Quarterly*, 13(3), 243-274.

Wood, J.V. et al. (2009), "Positive self-statements: Power for some, peril for others", *Psychological Science*, 20(7), 860-866.

Yeniçıktı, N.T. (2010), "Halkla ilişkiler sürecinde sosyal kaygı düzeylerinin sosyal sorumluluk projeleri ile giderilmesi", *Yüksek Lisans Tezi*, Selçuk Üniversitesi, Sosyal Bilimler Enstitüsü, Halkla İlişkiler ve Tanıtım ABD.

Yılmaz, A. & S. Ekici (2003), "Örgütsel yaşamda stresin kamu çalışanlarının performansına etkileri üzerine bir araştırma", *Yönetim ve Ekonomi*, 10(2), 1-20.

Do ESG Ratings Affect Stock Prices? The Case of Developed and Emerging Stock Markets

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ESG Reytingleri Hisse Fiyatlarını Etkiler Mi? Gelişmiş ve Gelişen Hisse Senedi Piyasaları Örneği

Abstract

This paper examines the role of ESG ratings on stock returns. The sample covers 347 companies from 2010 to 2022 from advanced and emerging stock markets. Return on assets, debt to equity, price-to-book ratio, and price-to-earnings ratio were used as control variables, and panel regression analysis was employed. Results revealed that ESG rating and return on assets statistically positively influence stock market performance. When the components of ESG were tested individually, it was observed that E (environmental) and S (social) ratings positively affect the stock prices. However, no significant relationship was found between G (corporate governance) rating and returns. These findings indicate the importance of investing in stocks and prioritising environmental, social, and governmental concerns regarding portfolio selection decisions. Findings also provide new sights and show that firms, especially in emerging markets, might enhance their market values by paying attention to ESG practices.

Keywords : ESG, Sustainability, Stock Market, Portfolio Management, Panel Data Analysis.

JEL Classification Codes : C33, G11, G34, M14.

Öz

Bu çalışmada, ESG skorlarının hisse senedi getirileri üzerindeki rolü araştırılmaktadır. Gelişmiş ve gelişen hisse senedi piyasasından toplam 347 şirketin 2010-2022 dönemi verileri kullanılmıştır. Aktif kârlılığı, kaldıraç oranı, piyasa değeri / defter değeri ve fiyat / kazanç oranları kontrol değişkenleri olarak belirlenmiş ve panel regresyon analizi uygulanmıştır. Sonuçlar, ESG skorunun ve aktif kârlılığının hisse senedi piyasası performansını istatistiksel olarak anlamlı ve pozitif etkilediklerini ortaya koymuştur. ESG bileşenleri ayrı ayrı test edildiklerinde, E (çevresel) ve S (sosyal) skorlarının hisse fiyatları üzerinde olumlu etkilerinin bulunduğu fakat G (kurumsal yönetişim) skoru ile getiriler arasında anlamlı bir ilişkinin olmadığı gözlemlenmiştir. Sağlanan sonuçlar, yatırımcıların çevresel, sosyal ve yönetişim faaliyetlerine değer veren şirketlerin hisselerine yatırım yaparak portföy performanslarını artırabileceklerini işaret ederken, özellikle gelişen piyasalardaki şirketlerin ESG uygulamalarını ön planda tutarak piyasa değerlerini yükseltebileceklerini göstermektedir.

Anahtar Sözcükler : ESG, Sürdürülebilirlik, Hisse Senedi Piyasası, Portföy Yönetimi, Panel Veri Analizi.

1. Introduction

Global warming, climate change, air pollution, and waste management have started to drive the global agenda in recent years. This has increased "socially responsible investment" for countries and firms. Furthermore, concepts called "green economy" and "green finance" by academic communities have certainly come to the fore, and those concepts can be considered to be an intersection between the fields of economics and finance. While governments establish policies to achieve sustainable development through renewable energy transition, greenhouse - gas emission reduction and more efficient use of available resources, companies likewise invest more in environmental issues. In addition, firms have broadened the scope of their activities related to social equality, employee-human rights and corporate governance. They attempt to inform regulators, legislators, and investors transparently through sustainability reporting practices. Non-financial information disclosures regarding environmental, social and governance issues improve stakeholder communication.

The main research focus of green finance (or, in other words, sustainable finance) is the relationship between corporate sustainable performance and financial performance (Drempetic et al., 2020: 333). It is thought that integrating sustainability into business and management strategies is a tool to meet stakeholders' environmental and social expectations (Lokuwaduge & Heenetigala, 2017: 438). While only 20 companies issued sustainability reports in the 1990s, this number has increased to nearly 9000 as of 2016 (Amel-Zadeh & Serafeim, 2018: 87).

Socially responsible investing, also known as sustainable or ethical investing, includes non-financial factors, like environmental, social and corporate governance issues, in the decision-making processes (Dorfleitner et al., 2015: 451). Herein, the ESG rating of a firm is one of the key indicators to monitor and evaluate companies' social responsibility and sustainability activities. ESG ratings inform decision-makers about how companies manage sustainability risks and opportunities (Serafeim & Yoon, 2023: 1505). For investors, these scores can be a valuable tool to assess whether environmental and ethical issues have been given due importance. ESG factors are considered non-financial performance indicators and are associated with corporate governance, corporate social responsibility and business ethics (Kim & Li, 2021: 1). ESG ratings are divided into three sub-categories, namely, E (environmental) pillar score, S (social) pillar score and G (corporate governance) pillar score. Data providers from various sources, such as annual reports, sustainability reports and websites, calculate these ratings. Firstly, environmental, social and corporate governance scores are computed separately for each firm under evaluation. The total ESG rating is then calculated by averaging these pillars. While the environmental pillar focuses on resource use, emissions, environmentally friendly innovative products and waste management practices, the social pillar examines the firm's attitudes toward labour and human rights. The corporate governance pillar discusses issues related to ownership structure, board of directors' composition and general management policies (Refinitiv, 2022).

The growing number of market participants integrate ESG practices into the valuation models, and institutional investors, especially in developed markets, consider the firms' ESG profiles when constructing a portfolio (Feng et al., 2022). The capitalisation of ESG-focused portfolios in significant stock market indices exceeded 30 trillion US dollars as of 2019 (Broadstock et al., 2021: 1). According to the report published by the Wall Street Journal on June 24, 2019, investors have become more meticulous with stock selection, and they tend to increase the portfolio weight of the stocks that strongly attach importance to environmental - social issues (Díaz et al., 2021: 1). Pension funds and asset managers also pay attention to the companies' ESG practices when making investment decisions (Kim & Li, 2021: 1).

The main premise of the idea that ESG ratings can positively affect the stock market performance is the cost of capital model. Socially responsible investing can be perceived as increased transparency and enhancing corporate governance policies, and thus can decrease a firm's cost of capital (Buallay, 2019: 100). In response to pressure from regulatory authorities, non-governmental organisations and other stakeholders, many firms try to comply with environmental, social and other regulations and provide a clear and broader picture of the corporate social responsibility activities (Alareeni & Hamdan, 2020: 1409-1410). In other respects, resource allocation inefficiency may negatively impact profit margin and firms' operational activity, leading to decreased efficiency and a decline in firm value and stock price. For example, firms' effective environmental and air pollution policies positively affect stakeholders' perceptions. Still, the inefficient use of organisational resources allocated to corporate sustainability activities might negatively affect firm value. Increasing demand for sustainable products opens up new opportunities for companies or pushes firms to operate under harsh competitive conditions. Some incidents that happened in the past have shown that mismanagement of corporate social responsibility activities may have profound financial implications. The 2015 Volkswagen emissions scandal, which caused firm's share to lose 18% of its value, is a striking example of how the risks above may influence firm financial performance (La Torre et al., 2020: 1). Other examples include the Deepwater Horizon oil spill in 2010, which caused BP's stock price to drop more than 50% and the Fukushima Nuclear Disaster in 2011, which has wiped out 80% of TEPCO's market capitalisation (Capelle-Blancard & Petit, 2019: 543).

Since it can potentially affect the financial performance of firms and market stock price, sustainability reporting and publishing information to affect investor behaviours and perceptions are vital, making it necessary to investigate the relationship between ESG ratings and stock returns. The current paper explores ESG ratings' impact on stock performance with this purpose in mind. We use annual panel data of 347 firms listed in advanced and emerging stock markets from 2010:04 (April 2010) to 2022:04 (April 2022). The control variables include return on assets (ROA), debt to equity, price-to-book ratio (P/B) and price-to-earnings ratio (P/E). This paper contributes to existing literature in many ways. First, the findings of prior studies are extended using a large data set consisting of firms traded on developed and developing stock markets. Second, we provide evidence on whether the effect of ESG performance on stock price differs across market groups. Lastly, our empirical

results will help decision-makers, regulators, investors, and researchers understand the link between ESG scores and stock returns and learn more about ESG practices.

The first section is an introduction, and the rest of the paper is arranged as follows: Section two presents the literature review and develops hypotheses. Section three describes the data set and variables, while section four details the empirical results. Finally, section five provides conclusions and gives policy recommendations, limitations, and the scope for future research.

2. Related Literature and Hypotheses Development

The growing interest shown by stakeholders in corporate sustainability and corporate social responsibility activities has increased the number of empirical studies that focus on the relations between ESG ratings, firm value and stock market performance. The literature review demonstrates that studies report contradictory results about the relationship between ESG scores and stock returns. For instance, Deng & Cheng (2019), using data from China over 2015Q2-2019Q1, examined the connection between ESG ratings and stock performance by running panel regression and stated that ESG ratings positively affect stock returns. The authors also emphasised that the shares of private sector companies are more affected by the ESG ratings than those of public sector companies. Another study in China found that portfolios constructed with high ESG stocks outperform low ESG portfolios. Moreover, stocks with high ESG scores have better resilience in times of crisis, such as COVID-19 (Broadstock et al., 2021). In a similar study, Díaz et al. (2021) investigated the relationship between ESG ratings and stock performances in COVID-19. They revealed that high ESG-rated stocks provide returns higher than the benchmark index. Therefore, they concluded that ESG scores are of great importance during periods of crisis when volatile conditions prevail in the markets. Supporting these results, Engelhardt et al. (2021) analysed a unique data set of 1452 firms from 16 European countries and reported that high ESG stocks are less volatile and have higher returns. Using data from 235 banks over the period 2007-2016, Buallay (2019) show the positive impact of ESG ratings on the market value of firms. Azmi et al. (2021) also examined a sample of 251 banks from 2011 to 2017 from 44 emerging markets. They indicated that there is a non-linear relationship between ESG practices and the value of banks. On the contrary, based on firm-level data from 2003 to 2020, Luo (2022) claimed that stocks with low ESG scores earn higher returns than high ESG-rated stocks in the UK. According to Keçeli & Çankaya (2020), no statistically significant relation exists between ESG scores and stock market performance. Similar results were obtained by Halbritter & Dorfleitner (2015). The authors examined the relationship between ESG ratings and financial performance in the USA and found no significant differences in returns between high ESG portfolios and low ESG portfolios. La Torre et al. (2020) analysed the companies listed on the Eurostoxx50 index for 2010-2018 and suggested that stock returns were limitedly affected by ESG indicators. Investors are increasingly interested in social responsibility and corporate sustainability reporting. Some studies indicate a positive relationship between ESG ratings and stock prices. They also claim that investors attach importance to the effectiveness of these activities. So, based on the related

studies (Buallay, 2019; Deng & Cheng, 2019; Díaz et al., 2021), we test the following hypotheses:

H₁: *There is a positive relationship between stock returns and ESG ratings.*

H₂: *A positive relationship exists between stock returns and environmental (E) ratings.*

H₃: *A positive relationship exists between stock returns and social (S) ratings.*

H₄: *A positive relationship exists between stock returns and corporate governance (G) ratings.*

Most studies discuss ESG ratings' effects on firm financial performance. One line of research, El Khoury et al. (2023) examined the relationship between ESG scores and bank performance in the Middle East, North Africa and Türkiye. The researchers analysed the data of 46 banks and observed a positive relationship between ESG ratings and financial performance. Therewithal, they reported that the costs of ESG investments outweigh its benefits after a certain level. Kim & Li (2021) found similar results and claimed that ESG variables positively affect profitability and credit rating. A recent study by Mohammad & Wasiuzzaman (2021) focused on the impact of ESG reporting on firm performance using a dataset of 661 Malaysian firms from 2012 to 2017. It showed that ESG practices and disclosures enable more efficient use of a firm's resources and enhance firm performance. While Alareeni & Hamdan (2020) analysed companies listed on the S&P 500 index between 2009 and 2018 to reveal the positive influence of ESG ratings on firm performance, Şişman & Çankaya (2021) used the data of 26 firms for the period 2010-2017 and provided evidence that relation among ESG ratings and ROA is positive. These results align with Çetenak et al. (2022), who concluded that ESG scores positively impact ROE and Tobin's Q ratio. Shakil (2021) discussed the effects of ESG factors on firms' financial risks and suggested that a negative relationship exists between ESG performance and total risk. Eliwa et al. (2021) studied the connection between the cost of debt and ESG performance for firms in 15 European countries from 2005 to 2016. They indicated that lenders reward firms' good practices in ESG in terms of a lower cost of debt financing. In contrast to the abovementioned studies, Duque-Grisales & Aguilera-Caracuel (2021) found a statistically significant negative association between ESG scores and the financial performance of companies.

After that, many studies shed light on the effects of ESG news on companies. Capelle-Blancard & Petit (2019), for instance, argued that negative news negatively affected the firm market value. However, positive announcements do not influence the stock price. Similarly, Shanaev & Ghimire (2022) examined the impact of ESG rating updates on stock returns for 658 firms in the USA and reported that ESG rating upgrades yield abnormal returns of 0.5% per month while downgrades lead to negative abnormal returns. Some papers have also examined the ESG scores data providers offer. Dorfleitner et al. (2015) compared the ESG ratings of firms calculated by three major rating agencies for 2002-2012 and documented that both definitions of corporate social responsibility and ESG scores differ significantly. They also highlight that large companies are likelier to achieve higher ESG scores. Brandon

et al. (2021) analysed the data of firms listed on the S&P 500 index from 2010 to 2017. According to the authors, higher ESG rating disagreement is related to higher stock returns. On the other side, Drempetic et al. (2020) have looked at the impact of firm size in calculating a company's ESG rating. They emphasised that ESG scores are positively affected by size. Further, large-scale companies can allocate more resources to disclose their corporate social responsibility activities and thus receive higher ESG ratings than smaller firms. Finally, the only study investigating the relationship between ESG ratings and stock price crash risk is Feng et al. (2022). Using data from Chinese firms from 2009 to 2020, the authors discovered a statistically significant negative relationship between these two variables.

As seen from the abovementioned literature, only a few studies have examined the impact of ESG ratings on stock market performance. These were generally conducted using data from a single stock exchange. Hence, in the current study, we have used panel data from developed and emerging stock markets to lessen the gap in the extant literature. The following section describes the entire data set.

3. Data and Methodology

347 companies traded in benchmark indices of developed and developing stock markets were analysed over a period spanning from April 2010 to April 2022. Data availability was important in determining the study period, and the companies included. Moreover, the aim was to maximise the number of observations in the analyses. We have employed regressions using an unbalanced panel dataset due to the lack of data from different companies. The indices adopted in the study are shown in Table 1.

Table: 1
Firm Distribution across Indices

Country	Index	No of Companies	Country	Index	No of companies
Brazil	BOVESPA	37	Russia	MOEX	19
China	SSE100	15	South Korea	KRX100	51
France	CAC40	37	Türkiye	BIST100	22
Germany	DAX40	29	UK	FTSE100	74
India	NIFTY50	35	USA	DJIA	28

The companies' ESG ratings were considered the independent variable, and stock returns were the dependent variable. All analyses were performed based on the annual data. ESG data providers such as Thomson Reuters, Sustainalytics, MSCI and Bloomberg exist. The data used in this research were obtained from the Thomson Reuters (Refinitiv Eikon) database. Stock returns are calculated daily and then annualised, considering the number of trading days in the year. The control variables are the return on assets, debt to equity, price-to-book ratio and price-to-earnings ratio of the firms. All variables are described in Table 2.

Table: 2
Variables

Variables	Description
ESG	Numerical score that assesses environmental, social and governance performance of a firm
E	Numerical score that assesses the environmental performance of a firm
S	Numerical score that measures the social performance of a firm
G	Numerical score related to governance performance of a firm
AAR	Annualised average daily stock return
ROA	Net profit / Average total assets
LEV	Debt / Equity
P/B	Market capitalisation / Book value of equity
P/E	Share price / Earnings per share

Table 3 presents the variables' descriptives. Accordingly, the mean values of both ESG ratings and their subdimensions vary between 60 and 65. During the study period, the average stock return was 19.95%, the return on assets was 6.7%, the leverage ratio was 1.11, and the average price-to-book ratio was 3.31. Lastly, the companies' price-to-earnings ratio was 25.58.

Table: 3
Descriptive Statistics

Variables	Obs.	Mean	Std. dev.	Min.	Max.	Skewness	Kurtosis
ESG	3754	63.48244	19.38465	1.4300	95.4200	-0.7583338	3.036987
E	3754	62.94572	24.31337	0.0000	99.2300	-0.7754142	2.873069
S	3754	65.24869	22.82329	0.3700	98.5500	-0.7841889	2.855582
G	3754	61.56037	21.67921	1.0900	98.5600	-0.4329503	2.278829
AAR	3754	0.199614	0.380775	-0.7396	7.462849	3.797908	48.51944
ROA	3754	0.067012	0.067630	-0.0469	140.6120	8.607728	230.8764
LEV	3754	1.116068	1.889614	0.0000	52.9100	12.50169	274.4678
P/B	3754	3.325808	10.58299	0.1100	540.0126	37.12949	1790.888
P/E	3754	25.58156	81.99717	1.0227	3127.243	21.28249	639.1498

The panel regression method examined the relationship between ESG ratings and stock returns. The equations for the models are given below.

$$AAR_{it} = \beta_0 + \beta_1 \, ESG_{it} + \beta_2 \, ROA_{it} + \beta_3 \, LEV_{it} + \beta_4 \, P/B_{it} + \beta_5 \, P/E_{it} + \varepsilon_{it} \tag{1}$$

$$AAR_{it} = \beta_0 + \beta_1 \, E_{it} + \beta_2 \, ROA_{it} + \beta_3 \, LEV_{it} + \beta_4 \, P/B_{it} + \beta_5 \, P/E_{it} + \varepsilon_{it} \tag{2}$$

$$AAR_{it} = \beta_0 + \beta_1 \, S_{it} + \beta_2 \, ROA_{it} + \beta_3 \, LEV_{it} + \beta_4 \, P/B_{it} + \beta_5 \, P/E_{it} + \varepsilon_{it} \tag{3}$$

$$AAR_{it} = \beta_0 + \beta_1 \, G_{it} + \beta_2 \, ROA_{it} + \beta_3 \, LEV_{it} + \beta_4 \, P/B_{it} + \beta_5 \, P/E_{it} + \varepsilon_{it} \tag{4}$$

where AAR_{it} is the average stock return. ESG_{it} is the firm's overall ESG score. E_{it} is the firm's environmental score. S_{it} refers to a firm's social score. G_{it} shows the firm's corporate governance score. ROA_{it} represents a return on assets, and LEV_{it} is the firm's leverage ratio. P/B_{it} is the price-to-book ratio. P/E_{it} is the price-to-earnings ratio. Finally, ε_{it} shows an error term.

4. Findings

We applied the Shapiro-Wilk (1965) test for normality. The results, as expected, indicate that variables do not follow a normal distribution, so Spearman coefficients were used in the analysis. The correlation matrix is shown in Table 4.

Table: 4
Correlations

	AAR	ESG	E	S	G	ROA	LEV	P/B	P/E
AAR	1.000								
ESG	-0.054**	1.000							
E	-0.051**	0.797**	1.000						
S	-0.041*	0.871**	0.665**	1.000					
G	-0.040*	0.702**	0.370**	0.448**	1.000				
ROA	0.165**	-0.093**	-0.185**	-0.074**	-0.060**	1.000			
LEV	-0.030	0.144**	0.168**	0.138**	0.080**	-0.400**	1.000		
P/B	0.232**	-0.028	-0.141**	-0.012	0.047**	0.516**	-0.024	1.000	
P/E	0.123 **	0.012	-0.087 **	0.029	0.051 **	-0.053 **	-0.090 **	0.566 **	1.000

*Note: ** and * denote significance at 1% and 5%, respectively.*

According to the correlation coefficients, a negative correlation between stock returns and ESG indicators is observed. In other words, returns and these variables move in the opposite direction. However, positive correlations appear between AAR, ROA, and P/B and P/E. Unsurprisingly, there were enormously significant positive correlations between ESG rating and its sub-categories. It can also be seen that the correlation between ESG rating and leverage ratio is statistically significant at the $p < 0.01$ level. On the other hand, all ESG indicators show negative correlations with ROA. Another salient result in the table above is that while environmental and social ratings negatively correlate with the price-to-book ratio, corporate governance ratings exhibit a significantly positive correlation. Herein, it would be appropriate to state that the correlation does not always imply causation. Therefore, additional tests should be performed to determine whether the variables significantly impact each other. To this end, panel regressions were carried out to continue the study.

The presence of cross-sectional dependence, heteroscedasticity, and autocorrelation problems must first be checked to estimate with panel regression models. Pesaran's (2004) CD test was applied for cross-sectional dependence (Table 5). Considering the p-values, the null hypothesis was rejected for all variables, and hypothesis H1 was accepted ($p = 0.000$), meaning there is a correlation across cross-sections.

Table: 5
Cross-Sectional Dependence Results

Variables	CD-test Statistics	p-value
AAR	71.677	0.000
ESG	265.094	0.000
E	97.568	0.000
S	247.657	0.000
G	101.534	0.000
ROA	64.35	0.000
LEV	20.023	0.000
P/B	26.997	0.000
P/E	64.74	0.000

When analysing panel data, heteroscedasticity, autocorrelation, and cross-sectional dependence should always be investigated. The existence of heteroscedasticity was assessed using the Modified Wald test. Table 6 illustrates the test results. Findings indicate the rejection of null hypotheses of no heteroscedasticity at the 1% significance level. Thus, it is concluded that heteroscedasticity exists in all models.

Table: 6
Heteroscedasticity Results

Model	Test Statistic	p-value
Model I	27086.27	0.0000
Model II	28057.50	0.0000
Model III	27480.82	0.0000
Model IV	28047.44	0.0000

Wooldridge's (2002) test was employed to detect the presence of autocorrelation in the models. As reported in Table 7, the null hypothesis of no autocorrelation was rejected at a 5% significance level.

Table: 7
Wooldridge Test for Serial Correlation

Model	Test Statistic	Prob > F
Model I	6.185	0.0134
Model II	6.239	0.0130
Model III	6.116	0.0139
Model IV	6.155	0.0136

Four different regression equations were estimated in the study. Hausman's (1978) test, F-test and Breusch-Pagan's (1980) LM test were applied to decide which panel regression model should be used. ESG rating is adopted as the independent variable in the first model, (E) rating is adopted as the independent variable in the second model, social (S) rating is adopted as the independent variable in the third model and corporate governance (G) rating is adopted as the independent variable in the last model. Results are shown in Table 8.

Table: 8
Selection of the Most Appropriate Method

Model	Test	Test Statistic	p-value
Model I	Hausman	78.32	Prob > chi2 = 0.0000
	F-test	1.39	Prob > F = 0.0000
	Breusch-Pagan LM	7.82	Prob > chibar2 = 0.0026
Model II	Hausman	87.11	Prob > chi2 = 0.0000
	F-test	1.44	Prob > F = 0.0000
	Breusch-Pagan LM	9.50	Prob > chibar2 = 0.0010
Model III	Hausman	77.68	Prob > chi2 = 0.0000
	F-test	1.40	Prob > F = 0.0000
	Breusch-Pagan LM	8.56	Prob > chibar2 = 0.0017
Model IV	Hausman	61.36	Prob > chi2 = 0.0000
	F-test	1.39	Prob > F = 0.0000
	Breusch-Pagan LM	10.05	Prob > chibar2 = 0.0008

As presented in the table above, the p-values of the Hausman and F-test were determined to be less than 0.05; hence, "fixed effects estimation" was adopted for all models. Results of the fixed-effects models with robust standard errors are shown in Table 9.

Table: 9
Panel Regression Results (Fixed Effect): Full Sample

	MODEL I	MODEL II	MODEL III	MODEL IV
ESG	0.0011* (2.04)			
E		0.0016** (3.34)		
S			0.0010* (2.11)	
G				0.0002 (0.57)
ROA	2.1037** (3.32)	2.0984** (3.32)	2.1050** (3.33)	2.1071** (3.30)
LEV	-0.0050 (-0.82)	-0.0056 (-0.88)	-0.0050 (-0.80)	-0.0044 (-0.74)
P/B	0.0012 (1.08)	0.0013 (1.15)	0.0012 (1.07)	0.0012 (1.07)
P/E	0.0001 (1.75)	0.0001 (1.75)	0.0001 (1.75)	0.0001 (1.77)
Constant	-0.0204 (-0.30)	-0.0477 (-0.78)	-0.0101 (-0.16)	0.0390 (0.67)
R^2	7.80%	8.00%	7.81%	7.70%
No. of obs.	3754	3754	3754	3754
No. of groups	347	347	347	347
F-stat	3.23**	4.25**	3.23**	3.15**

Note: ** and * denote significance at 1% and 5%, respectively. t-statistics are shown in the parentheses below each coefficient.

The results, summarised in Table 9, claim that ESG ratings have a statistically significantly positive effect on stock returns ($p < 0.05$). A unitary increase in ESG score leads to 0.001 increase in stock returns, while a unitary rise in return on assets brings about a 2.1 increase in stock returns. No statistically significant relationships were detected between other variables and stock market performance.

Considering the second model, in which environmental (E) rating is taken as the independent variable, it is observed that an increase in environmental score positively affects stock returns ($p < 0.01$). Like the first model, return on assets positively influences stock market returns ($p < 0.01$). In the third model, it is determined that social (S) rating ($p < 0.05$) and return on assets ($p < 0.01$) have a significant impact on stock returns. According to the last model, unlike environmental and social factors, it is noteworthy that the corporate governance factor has no significant influence on stock returns ($p > 0.05$). On the other side, however, results confirm a positive relationship between return on assets and stock returns at a 1% significance level.

In the following section, firms traded in developed and emerging stock exchanges were analysed separately to investigate whether the impact of ESG ratings on stock returns differed by stock markets. The regression results based on a panel of 219 firms are reported (Table 10). Referring to the Breusch-Pagan LM and F-test, pooled OLS was the most appropriate model for estimating regression.

Table: 10
Panel Regression Results (Pooled OLS): Developed Indices

	MODEL I	MODEL II	MODEL III	MODEL IV
ESG	-0.0019** (-4.78)			
E		-0.0011** (-3.42)		
S			-0.0014** (-4.10)	
G				-0.0013** (-4.49)
ROA	0.6764** (5.29)	0.6593** (5.15)	0.6959** (5.41)	0.6978** (5.40)
LEV	-0.0120* (-2.35)	-0.0125* (-2.46)	-0.0118* (-2.33)	-0.0129* (-2.55)
P/B	0.0018 (1.89)	0.0018 (1.92)	0.0018 (1.87)	0.0019 (1.95)
P/E	0.0001 (1.38)	0.0001 (1.35)	0.0001 (1.41)	0.0001 (1.27)
Constant	0.2673** (8.60)	0.2157** (7.86)	0.2313** (8.43)	0.2208** (9.20)
R^2	3.60%	3.05%	3.27%	3.13%
No. of obs.	2350	2350	2350	2350
No. of groups	219	219	219	219
F-stat	15.43**	13.24**	14.27**	15.38**
Hausman (Prob > chi2)	0.6438	0.2662	0.4369	0.5764
Wooldridge (Prob > F)	0.7969	0.7951	0.7997	0.7998
Wald (Prob > chi2)	0.0000	0.0000	0.000	0.0000

*Note: ** and * denote significance at the 1% and 5%, respectively. t-statistics are shown in parentheses below each coefficient.*

As the table above summarises, a negative relation exists between ESG ratings and stock returns ($p < 0.01$). One unit increase in ESG rating lowers the stock returns by 0.001. Along with this finding, leverage ratio also has a negative impact on stock market returns ($p < 0.05$). On the contrary, a positive relationship is found between return on assets and returns ($p < 0.01$). The estimated coefficients for P/B and P/E are not statistically significant ($p > 0.05$).

While all sub-dimensions of ESG are negatively related to stock returns ($p < 0.01$), ROA has a positive effect at the 1% significance level. The P/B ratio was found to be statistically insignificant in all models. These results reveal that ESG ratings, ROA and leverage ratio play a crucial role in the stock performance of firms traded in advanced stock markets.

Table 11 illustrates the outputs obtained by applying fixed-effects regressions to panel data of 128 firms listed on emerging stock markets.

Table: 11
Panel Regression Results (Fixed Effect): Emerging Indices

	MODEL I	MODEL II	MODEL III	MODEL IV
ESG	0.0029** (3.72)			
E		0.0026** (3.88)		
S			0.0022** (3.42)	
G				0.0015* (2.16)
ROA	2.4770** (4.36)	2.4769** (4.33)	2.4795** (4.37)	2.4915** (4.35)
LEV	-0.0050 (-0.68)	-0.0057 (-0.75)	-0.0052 (-0.67)	-0.0037 (-0.55)
P/B	0.0093 (1.12)	0.0093 (1.10)	0.0093 (1.10)	0.0094 (1.14)
P/E	0.0002 (1.13)	0.0002 (1.12)	0.0002 (1.14)	0.0002 (1.18)
Constant	-0.1303 (-1.84)	-0.1075 (-1.65)	-0.0951 (-1.42)	-0.0565 (-0.88)
R^2	16.17%	16.33%	16.09%	15.72%
No. of obs.	1404	1404	1404	1404
No. of groups	128	128	128	128
F-stat	6.19**	6.34**	5.73**	6.26**
Hausman (Prob > chi2)	0.0000	0.0000	0.0000	0.0000
Wooldridge (Prob > F)	0.2940	0.3227	0.2932	0.2987
Wald (Prob > chi2)	0.0000	0.0000	0.0000	0.0000

*Note: ** and * denote significance at the 1% and 5%, respectively. t-statistics are shown in parentheses below each coefficient.*

For Model I, the ESG rating was adopted as the independent variable. Results indicate that ESG rating positively correlates with stock returns ($p < 0.01$). The second model specification in Table 11 shows that the relationship between environmental rating and returns is positive and statistically significant ($p < 0.01$). Social performance is also essential in predicting stock returns, as shown in Model III. Finally, a positive relation between corporate governance rating and stock market performance at a 5% level is confirmed. These findings do not coincide with the results of the previous analyses that found a negative relationship between ESG ratings and returns. Lastly, ROA has a positive impact on stock returns ($p < 0.01$), while leverage does not affect the share price ($p > 0.05$).

Next, following Azmi et al. (2021), Deng & Cheng (2019), and Eliwa et al. (2021), we applied a two-step system generalised method of moments (2S-GMM) developed by Blundell & Bond (1998) to address endogeneity concerns. Results are presented in Table 12. Our findings are consistent with those in Tables 9, 10 and 11. A firm's ESG rating positively impacts stock market performance over the full sample ($p < 0.05$). Return on assets and price-to-earnings ratio also positively affect the share price ($p < 0.01$). The second column of the table provides evidence for a significant and negative influence of ESG and leverage on stock returns. Returns are positively affected by return on assets, price-to-book, and price-to-earnings, in contrast to the findings above. For emerging stock markets, ESG scores and ROA coefficients are significantly positive at the 5% level, meaning that a one-unit increase in ESG and ROA leads to 0.001 and 1.8299 increase in stock returns, respectively.

Table: 12
Endogeneity Tests

	Full Sample	Advanced Stock Markets	Emerging Stock Markets
ESG	0.0010*	-0.0020**	0.0014*
ROA	1.8967**	0.7356**	1.8299*
LEV	0.0059	-0.0236**	0.0112
P/B	-0.0000	0.0024*	0.0068
P/E	0.0004**	0.0003*	0.0001
Constant	0.1306**	0.2753**	0.0099
No. of obs.	3467	2164	1303
No. of groups	347	219	128
Wald chi2	70.95	94.82	37.27
Prob > chi2	0.000	0.0000	0.0000
Hansen statistic	56.31	11.97	5.41
Estimator	2S-GMM	2S-GMM	2S-GMM

Note: ** and * denote significance at 1% and 5%, respectively.

To sum up, it can be argued that ESG practices predict stock returns positively. Environmental and social ratings play a crucial role in determining the performance of stocks. However, no significant relationship is found between corporate governance factors and stock returns for the entire sample. Even though ESG ratings have little impact on stock market performance, effective management of issues such as waste reduction, carbon emissions, clean energy, recyclable materials and human-employee rights is essential for companies. Thus, the share price can be increased by creating value in the eyes of investors.

5. Concluding Remarks

ESG ratings generally cover environmental, social, and corporate governance activities and assess the firms based on their perspectives. Worldwide, there is an increasing interest in environmental and social issues. Therefore, ESG scores offered by different data providers have become indicators that many stakeholders, especially investors and portfolio-asset managers, have started to follow with interest. While investors examine whether ESG ratings significantly influence stock returns, firms try increasing management transparency by disclosing non-financial and financial information to market stakeholders. Therefore, the interaction of firms with their environment will increase, and this situation will positively impact financial performance.

The possible effects of ESG ratings on stock returns were investigated using a large data set covering 347 firms listed on various stock markets. The resulting data set spans the period from 2010 to 2022. ROA, leverage ratio, P/B and P/E are used as control variables. The panel data analysis showed that ESG ratings positively influence stock returns (p < 0.05). Accordingly, a 1% increase in ESG scores causes a 0.001 increase in stock returns. This finding aligns with previous studies' findings (Buallay, 2019; Deng & Cheng, 2019; Broadstock et al., 2021; Díaz et al., 2021; Engelhardt et al., 2021). Furthermore, ROA is associated positively with stock market performance, but no relationship was observed between leverage, P/B and P/E with stock returns (p > 0.05). While environmental (E) and social (S) ratings positively affect stock returns, the corporate governance (G) score has no impact on the share price. All models detected other variables as insignificant (p < 0.05).

The full sample is then divided into two groups, and each of the subgroups is analysed individually. Based on the results of the regressions, it was determined that stocks in developed indices are negatively related to ESG ratings (p < 0.01). On the contrary, ESG scores have a statistically significant positive impact (p < 0.01) on returns in emerging stock markets. One can claim that firms traded in advanced markets place more importance on ESG activities and corporate social responsibility reporting. At the same time, investors think long-term and sacrifice stock returns for companies that embrace corporate sustainability practices. On the other hand, firms in emerging stock markets may lag firms in developed stock markets in sustainable activities. Therefore, ESG standards may not be a critical issue for investors in emerging stock markets. Further, results indicate a positive relation between ROA and returns for both subgroups, while leverage ratio is negatively associated with stock returns of developed indices. Lastly, P/B and P/E do not significantly affect stock price.

The findings will help firms, investors, policymakers, and regulators evaluate the current situation and conclude. To improve their corporate reputation, firms can advertise their socially responsible activities and investments and publish regular reports concerning these activities. In this way, firms can optimise their business processes and create a healthier organisational structure in the long run. Developing an effective strategy for ESG as part of the business strategies can reduce corporate financial risk due to positive investor reaction to the integration of robust sustainability principles and policies (Shakil, 2021: 6). From the standpoint of investors, stocks that attach importance to sustainable investments can be picked to reap higher portfolio returns. Also, this situation may lead other firms to socially responsible investments. Considering the importance of environmentally sustainable projects for countries, direct cash subsidies and tax incentives can be developed by regulators and legislators (Deng & Cheng, 2019: 10). In addition, the authorities may mandate reporting requirements and standards regarding sustainability and corporate governance practices. At the same time, there may be regulations on the methodologies and approaches used by different rating providers in the table. Without standards, the firms' reporting formats and contents and the data type may differ depending on organisational structure. Reports published by companies can be interpreted differently by various data providers, and thence, ESG scores of firms may not be consistent. Dorfleitner et al. (2015) and Brandon et al. (2021) suggest that disagreement between ESG ratings may affect financial and stock market performance differently. Our results also argue that the environmental pillar positively impacts stock returns. In this sense, firms may help to reduce carbon emissions and air pollution in the long term by increasing their investments in environmentally friendly technologies to achieve a greener world.

Finally, this study has some limitations. ESG data were gathered only from the Thomson Reuters database. The findings of the current paper can be extended by using data sets from different data providers. Moreover, 347 firms from developed and emerging stock markets were included in the study. Therefore, a more comprehensive sample can be used for future research, and analyses can be conducted at longer intervals with the increased availability of ESG data. It can also be examined whether firms' different reporting formats

affect stock performance. Investigating the relationship and interaction among the sub-categories of ESG ratings might be another exciting research topic.

References

Alareeni, B.A. & A. Hamdan (2020), "ESG Impact on Performance of US S&P 500-listed Firms", *Corporate Governance*, 20(7), 1409-1428.

Amel-Zadeh, A. & G. Serafeim (2018), "Why and How Investors Use ESG Information: Evidence from a Global Survey", *Financial Analysts Journal*, 74(3), 87-103.

Azmi, W. et al. (2021), "ESG Activities and Banking Performance: International Evidence from Emerging Economies", *Journal of International Financial Markets, Institutions & Money*, 70, 101277.

Blundell, R. & S. Bond (1998), "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models", *Journal of Econometrics*, 87(1), 115-143.

Brandon, R.G. et al. (2021), "ESG Rating Disagreement and Stock Returns", *Financial Analysts Journal*, 77(4), 104-127.

Breusch, T.S. & A.R. Pagan (1980), "The Lagrange Multiplier Test and Its Applications to Model Specification in Econometrics", *The Review of Economic Studies*, 47(1), 239-253.

Broadstock, D.C. et al. (2021), "The Role of ESG Performance during Times of Financial Crisis: Evidence from COVID-19 in China", *Finance Research Letters*, 38, 101716.

Buallay, A. (2019), "Is Sustainability Reporting (ESG) Associated with Performance? Evidence from the European Banking Sector", *Management of Environmental Quality*, 30(1), 98-115.

Capelle-Blancard, G. & A. Petit (2019), "Every Little Helps? ESG News and Stock Market Reaction", *Journal of Business Ethics*, 157, 543-565.

Çetenak, E.H. et al. (2022), "ESG (Çevresel, Sosyal ve Kurumsal Yönetim) Skorunun Firma Performansına Etkisi: Türk Bankacılık Sektörü Örneği", *EÜ İİBF Dergisi*, 63, 75-82.

Deng, X. & X. Cheng (2019), "Can ESG Indices Improve the Enterprises' Stock Market Performance? - An Empirical Study from China", *Sustainability*, 11(17), 1-13.

Díaz, V. et al. (2021), "Reconsidering Systematic Factors during the Covid-19 Pandemic - The Rising Importance of ESG", *Finance Research Letters*, 38, 101870.

Dorfleitner, G. et al. (2015), "Measuring the Level and Risk of Corporate Responsibility - An Empirical Comparison of Different ESG Rating Approaches", *Journal of Asset Management,* 16, 450-466.

Drempetic, S. et al. (2020), "The Influence of Firm Size on the ESG Score: Corporate Sustainability Ratings Under Review", *Journal of Business Ethics,* 167, 333-360.

Duque-Grisales, E. & J. Aguilera-Caracuel (2021), "Environmental, Social and Governance (ESG) Scores and Financial Performance of Multilatinas: Moderating Effects of Geographic International Diversification and Financial Slack", *Journal of Business Ethics*, 168, 315-334.

El Khoury, R. et al. (2023), "ESG and Financial Performance of Banks in the MENAT Region: Concavity-Convexity Patterns", *Journal of Sustainable Finance & Investment*, 13(1), 406-430.

Eliwa, Y. et al. (2021), "ESG Practices and the Cost of Debt: Evidence from EU Countries", *Critical Perspectives on Accounting*, 79, 102097.

Engelhardt, N. et al. (2021), "ESG Ratings and Stock Performance during the COVID-19 Crisis", *Sustainability*, 13(13), 7133.

Feng, J. et al. (2022), "ESG Rating and Stock Price Crash Risk: Evidence from China", *Finance Research Letters*, 46, 102476.

Halbritter, G. & G. Dorfleitner (2015), "The Wages of Social Responsibility - Where Are They? A Critical Review of ESG Investing", *Review of Financial Economics*, 26, 25-35.

Hausman, J.A. (1978), "Specification Tests in Econometrics", *Econometrica*, 46(6), 1251-1271.

Keçeli, B. & S. Çankaya (2020), "ESG ve Finansal Verilerin Pay Değerine Etkisi: Kuzey ve Latin Avrupa Ülkeleri Üzerine Bir Çalışma", *İstanbul Ticaret Üniversitesi Girişimcilik Dergisi*, 4(7), 31-49.

Kim, S. & Z. Li (2021), "Understanding the Impact of ESG Practices in Corporate Finance", *Sustainability*, 13(7), 3746.

La Torre, M. et al. (2020), "Does the ESG Index Affect Stock Return? Evidence from the Eurostoxx50", *Sustainability*, 12(16), 6387.

Lokuwaduge, C.S.D.S. & K. Heenetigala (2017), "Integrating Environmental, Social and Governance (ESG) Disclosure for a Sustainable Development: An Australian Study", *Business Strategy and the Environment*, 26(4), 438-450.

Luo, D. (2022), "ESG, Liquidity, and Stock Returns", *Journal of International Financial Markets, Institutions & Money*, 78, 101526.

Mohammad, W.M.W. & S. Wasiuzzaman (2021), "Environmental, Social and Governance (ESG) Disclosure, Competitive Advantage and Performance of Firms in Malaysia", *Cleaner Environmental Systems*, 2, 100015.

Pesaran, M.H. (2004), "General Diagnostic Tests for Cross Section Dependence in Panels", *IZA Discussion Paper Series*, No: 1240.

Refinitiv (2022), *Environmental, Social and Governance Scores from Refinitiv*, <https://www.lseg.com/content/dam/marketing/en_us/documents/methodology/refinitiv-esg-scores-methodology.pdf>, 25.05.2023.

Serafeim, G. & A. Yoon (2023), "Stock Price Reactions to ESG News: The Role of ESG Ratings and Disagreement", *Review of Accounting Studies*, 28, 1500-1530.

Shakil, M.H. (2021), "Environmental, Social and Governance Performance and Financial Risk: Moderating Role of ESG Controversies and Board Gender Diversity", *Resources Policy*, 72, 102144.

Shanaev, S. & B. Ghimire (2022), "When ESG Meets AAA: The Effect of ESG Rating Changes on Stock Returns", *Finance Research Letters*, 46(A), 102302.

Shapiro, S.S. & M.B. Wilk (1965), "An Analysis of Variance Test for Normality (Complete Samples)", *Biometrika*, 52(3/4), 591-611.

Şişman, M.E. & S. Çankaya (2021), "Çevresel, Sosyal ve Kurumsal Yönetişim (ESG) Verilerinin Firmaların Finansal Performansına Etkisi: Hava Yolu Sektörü Üzerine Bir Çalışma", *Çukurova Üniversitesi İİBF Dergisi*, 25(1), 73-91.

Wooldridge, J.M. (2002), *Econometric Analysis of Cross Section and Panel Data*, Cambridge, MA: MIT Press.

Bilateral J-Curve Between Türkiye and Its Major Non-EU Trading Partners: Evidence from Both Linear and Non-Linear Approach

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Türkiye ve AB-Dışı Başlıca Ticaret Ortakları Arasındaki J Eğrisi Etkisi: Doğrusal ve Doğrusal Olmayan ARDL Yaklaşımından Kanıtlar

Abstract

This research analysed the bilateral J-curve phenomenon in the Turkish economy. For this purpose, we applied both the linear and non-linear Autoregressive Distributed Lag (NARDL) co-integration methods, in addition to the asymmetric Toda-Yamamoto causality test, to examine whether the impact of Turkish lira appreciations differs from that of lira depreciation. The findings from the linear model indicate statistically significant coefficients for the long term, and J-curve effects were observed in the case of two countries: Russia and the UAE. This suggests that when the Turkish lira depreciates, it positively affects Turkey's trade balance with these partners; however, lira appreciations have a negative impact. In contrast, the non-linear model provides more evidence, with the results revealing that asymmetry cannot be ignored, as the positive and negative variables exhibit differences in signs, magnitudes, and levels of significance. We found the J-curve effect for only three countries (India, USA, and UAE) out of seven partners in this model. Third, the lira evaluation between the short and long run affected the external balance. Furthermore, the long-run error correction mechanisms converge to steady-state equilibrium faster. Lastly, there is a unidirectional or bilateral linkage between the FX rate and the external deficit for these four partners. Therefore, exchange rate policies are a determinant that should be considered in relationships with certain trading partners.

Keywords	:	J-Curve, Trade balance, Exchange rate, Asymmetry effects, Nonlinear ARDL.
JEL Classification Codes	:	F14, F31, F32, C22.

Öz

Bu çalışmada Türkiye ekonomisi için J Eğrisi hipotezi analiz edilmiştir. Bu kapsamda, Türk lirasında meydana gelen devalüasyonların, revalüasyonlardan istatistiki olarak farklı olup olmadığı, Asimetrik Toda-Yamamoto nedensellik testine ek olarak doğrusal ve doğrusal olmayan ARDL eş bütünleşme yöntemi ile de incelenmiştir. Doğrusal modelden elde edilen sonuçlara göre J eğrisi etkisi sadece Rusya ve BAE için tespit edilmiştir ve elde edilen uzun dönem katsayıları istatistiksel olarak anlamlıdır. Bu sonuçlara göre Türk lirasının değer kaybetmesi, söz konusu partnerlerle ticarette dengeyi olumlu etkilemekte ancak Türk lirasının değerlendiği durumlarda negatif etki ortaya çıkmaktadır. Buna mukabil, kur değişkeninde ait pozitif ve negatif değişkenler, işaret, katsayı büyüklüğü ve istatistiki önem seviyesi olarak farklılık gösterdiği için asimetrik ilişki reddedilememekte ve bu bağlamda doğrusal olmayan model daha fazla kanıt sunmaktadır. Bu yöntemde J Eğrisi etkisi yedi partnerin üçünde (Hindistan, ABD ve BAE) gözlemlenmiştir. Üçüncü olarak, kısa ve uzun dönem arasında Türk lirasında oluşan değerlenme, ticaret dengesini etkilemektedir. Ayrıca, hata düzeltme parametresi, uzun dönemde, kısa döneme göre denge durumuna

daha hızlı dönüldüğüne işaret etmektedir. Son olarak, kur değişkeni ile ticaret dengesi arasında, yukarıda bahsedilen dört ticaret partneri özelinde nedensellik ilişkisine dair kanıtlar sunmaktadır. Dolayısıyla belli ticari partnerlerle olan ilişkilerde kur politikalarının dikkate alınması gereken bir belirleyici olduğu söylenebilir.

Anahtar Sözcükler : J Eğrisi, Ticaret Dengesi, Döviz Kurları, Asimetrik Etki, Doğrusal Olmayan ARDL.

1. Introduction

Today, world economies are closer than ever before due to financial globalisation and economic integration. Since the mid-1980s, relaxed capital controls, reduced trade barriers (lowering of barriers has led to increased international trade and investment) and advancements in technology (made it easier for investors to access global markets and trade currencies and assets instantaneously) have enhanced interaction between exchange rates, international assets, and currency movements. Therefore, exchange rate policies now have closer ties to a country's macroeconomic indicators, including economic growth, inflation, and the balance of payments (Frieden, 2008: 344-345). Economists now understand how important exchange rates are for balancing trade deficits. Since the advent of the current floating exchange rates in 1973, exchange rates have mainly been determined by supply and demand forces instead of government intervention. This has made trade performance more dependent on exchange rate fluctuations. Money moves freely now, and in turn, it directly affects how much a country imports and exports (Ceyhan & Gürsoy, 2021: 1171).

As the relationship between exchange rates and the trade balance strengthens, theoretical debates on exchange rate systems and flexibility have also intensified. Various exchange rate management systems, including floating exchange rates, pegged exchange rates, managed float systems, fixed regimes, and currency boards, have been subjects of this debate. At the exchange rate level that maintains market balance, total foreign exchange earnings are equal to total foreign exchange expenditures, thus ensuring equilibrium in the balance of payments. In the case of any deficit or surplus, it reacts accordingly. When balance is restored at a new equilibrium level, the supply and demand for foreign exchange are again equalised, and external balance is restored once more (Seyidoğlu, 2013: 464). Suppose exchange rates are not allowed to adjust adequately. In that case, it may lead to persistent trade imbalance, market distortions (distorted market signals and misallocation of resources), loss of competitiveness for domestic industries, speculative pressures on the market, and pressure on foreign reserves. Thus, implementing a fair exchange rate policy aligning the domestic currency with its actual value is pivotal in fostering external equilibrium and attaining economic stability. It might be used as a benchmark for a long-term equilibrium level to stabilise currency markets (Aries et al., 2006: 51-53). A fair exchange rate policy that sets the domestic currency at its actual value accurately reflects a country's economic fundamentals, such as productivity, inflation rate, and external balance. In such a policy, the exchange rate is determined by market forces without significant government or central bank intervention to manipulate its value artificially. This allows the

currency to find its equilibrium level based on supply and demand in the foreign exchange market (Bayoumi et al., 2005: 9, Quirk, 1990: 115-117).

In addition to exchange rate policy, we can arrange a set of strategies, including expenditure-reduction policies, fiscal or monetary tightening, expenditure-shifting policies, and currency devaluation or depreciation. Among them, currency fluctuations facilitate the attainment of external balance adjustments by responding to the supply and demand dynamics within the exchange market. When a country experiences a deficit in exports compared to its imports, there's a decrease in the supply of its domestic currency and an increase in demand for foreign currency, resulting in the depreciation of the local currency. This depreciation leads to changes in relative prices, making foreign goods relatively more expensive and domestic goods more affordable, thus incentivising consumers to switch their spending towards domestic products. As a result, a depreciation of a country's currency provides an advantage to its exports, bolstering the country's external balance. Conversely, an appreciation in nominal exchange rates elevates the cost of a nation's goods and services, making imports more attractive. This shift could reduce exports, increase imports, and weaken the country's external balance. Consequently, exchange rates have a significant influence on trade patterns, and we need to adopt a sustainable trade and exchange rate policy on a long-term basis. (Ahn et al., 2017: 2; Aytac, 2016: 116). Türkiye, as a developing country, faces structural challenges, including unfavourable terms of trade, excess reliance on imported inputs or raw materials for domestic production, limited total factor productivity, low rates of saving and investment, inefficient technological progress, an undesirable composition of foreign trade, inadequate capacity to manufacture its products efficiently, and delays in policy adjustments concerning trade dynamics over the short and long term. These factors shed light on why exchange rate policies have limited effects on the trade balance and why there are discrepancies in how the trade balance reacts to currency policies (Kutlu, 2013: 121).

Adopting a floating exchange rate regime means that exchange rates are determined by the interplay of supply and demand forces in the market, without direct intervention from the central bank to peg the currency to a specific value. The J-curve hypothesis suggests that following a currency depreciation, the trade balance may worsen before a long-term improvement occurs. This short-term deterioration is attributed to existing contracts, pricing behaviour, and adjustment lags in trade (Bahmani-Oskee & Kanitpong, 2017: 4668). However, over time, the depreciation is expected to improve the trade balance as exports become more competitive and imports become relatively more expensive. Türkiye's adoption of a floating exchange rate regime makes the connection with the J-curve hypothesis evident. Following the transition to a floating exchange rate, there may be increased volatility in exchange rates and uncertainty in the market. This could lead to a short-term worsening of the trade balance as businesses and consumers adjust to the new exchange rate environment. However, over the long term, the flexibility of a floating exchange rate regime allows for more efficient adjustments in response to changes in external conditions. As the Turkish Lira adjusts to market forces, it may become more competitive, leading to increased export competitiveness and a gradual improvement in the

trade balance. Overall, the Turkish government's adoption of a floating exchange rate regime aligns with the principles of the J-curve hypothesis, suggesting that while there may be short-term challenges, the flexibility the regime provides could contribute to long-term improvements in the trade balance.

Theoretical justifications for currency policies, such as the Marshall-Lerner condition and the J-Curve hypothesis, are pivotal. In fixed exchange rate systems, countries may devalue their currency to boost exports and conserve foreign exchange by reducing imports. This devaluation triggers two effects on trade patterns: the "price effect" initially raises import costs and makes exports appear cheaper to domestic consumers, while the "volume effect" gradually adjusts trade volumes, ultimately improving the trade balance in the long run (Jamilov, 2011: 2). In this manner, we have to consider the ML condition. This hypothesis describes the conditions under which a devaluation or depreciation of a country's currency will improve the trade balance. The ML condition briefly states that $\eta_X + \eta_M > 1$, where η_x is the foreign demand elasticity of exported goods, and η_m is the domestic demand elasticity of foreign goods. To get a trade surplus, the sum of the price elasticities of demand for a country's exports and imports must be greater than 1 (Karluk, 2013: 662-3). However, they may lead to an inverse effect due to delays in economic adjustments, as Magee (1973) and Krueger (1983) discussed. During this period, the limited responsiveness of the demand curve is explained by existing bilateral trade contracts, where goods have already been sold or ordered before the currency devaluation. Additionally, it takes time for domestic producers to adjust to higher prices and increase production. Devaluation increases costs for pre-agreed imports in local currency while export values remain unaffected. Consequently, the decline in export prices only slightly boosts export demand, and the rise in import prices modestly reduces import demand. In the long term, the full impact of the exchange rate change becomes apparent, altering export and import volumes. Price elasticity becomes more evident as new contracts are based on adjusted exchange rates. Over time, lower export prices stimulate demand and reduce imports, improving trade balance. The J-curve graph illustrates an initial decline followed by a subsequent recovery in the trade balance after currency devaluation, indicating a specific period for observing positive effects (Özşahin, 2017: 226; Kılıç et al., 2018: 113-4).

Therefore, examining the relationship between the trade balance and the exchange rate is significant to economic policymakers for several reasons. Firstly, it offers insight for countries considering currency devaluation to enhance exports and stimulate economic growth. Secondly, it helps determine if there's a stable long-term connection between the exchange rate and the trade balance, which informs whether devaluation can effectively improve the trade balance. Thirdly, analysing this relationship sheds light on the short-term and long-term effects of devaluation on the trade balance. Typically, short-term devaluation may worsen the trade balance, but this trend may reverse in the long term, leading to the well-known J-curve phenomenon. To this end, the rest of the paper is structured as follows: Section 2 covers the literature background of the subject and outlines the contributions. Section 3 determines the empirical approach, detailing the data and specifying the models

used in the study, along with the estimation techniques. Section 4 presents the findings from the econometric analysis. Finally, Section 5 concludes the paper with policy advice.

2. Literature Background

The role of exchange rate policy has long been studied in the empirical literature. A significant body of paper has emerged since Magee's 1973 study to investigate the connection between foreign trade balance and currency devaluation. However, empirical findings still need to be clarified. This may stem from different periods and/or methodologies used in the empirical studies and from the use of aggregated data. While some studies support the J-curve pattern and note conflicting indications, particularly in the short- and long-term coefficients of the exchange rate variable "Ln (Real Exchange Rate)" as proposed by Rose & Yellen (1989), others fail to find significant insights from empirical data. Additionally, specific research papers report mixed results regarding bilateral trade relationships. Initial papers investigate the trade balance with aggregated data. These papers combine trade data with the effective exchange rate and income proxy weighted as trading partners' incomes. Among them, Himarios (1989), Rose (1990), and Bahmani-Oskooee & Kutan (2009) analysed the subject in a multi-country framework, and they assert that devaluation causes the trade balance to deteriorate for some countries but improve for others. There are also single-country studies such as Felmingham (1988), Singh (2004), Bahmani-Oskooee & Harvey (2010), and Verheyen (2012) found evidence for the J-curve hypothesis.

Some papers found evidence for the J-curve but used different data sets. Bahmani-Oskooee & Alse (1994), Brada et al. (1997), Boyd et al. (2001), and Hacker & Hatemi-J (2003) focused on the two-country format using the total trade approach. However, total trade data may cause aggregation bias. So, Arora et al. (2003), Bahmani-Oskooee et al. (2006), Halıcıoglu (2008a), Hsing (2009), and Wang et al. (2012) employed bilateral trade data set suggest that real depreciation or devaluation provides more empirical support for improving the external balance in the long run. On the other hand, some papers do not hold any evidence about the J-Curve hypothesis. According to Miles (1979), Krugman & Baldwin (1987), Rose & Yellen (1989), Wilson & Tat (2001), and Halıcıoğlu (2007) real exchange rate does not considerably affect the bilateral balance of trade due to temporal discrepancy (e.g. currency depreciation might improve the trade balance but these improvements would take quite a long time), balancing of opposite forces (e.g. a positive impact of devaluation against one country might be offset by its negative impact against another one), and assuming that effects of exchange rate changes are symmetric.

The direction of the trade balance can be affected by differences, such as the products included in the trade basket. In this regard, Doroodian et al. (1999), Baek (2006), and Bahmani-Oskooee & Ardalani (2006) conducted their research at the industry or product level, and they concluded that depreciation in FX rates led to a recovery in the trade balance for these sectors.

The outcomes of the empirical papers on the Turkish J-curve could be more precise. According to Kale (2001), Halıcıoğlu (2008b), Yazıcı (2010), Yavuz et al. (2010), Erdem et al. (2010), Özşahin (2017), Albayrak & Korkmaz (2019), and Ünal (2021), the exchange rate has a statistically significant linear effect, and the depreciation improves the bilateral trade balance of Türkiye. So, the J curve hypothesis is valid either in the short or long term. However, Akbostancı (2004), Kimbugwe (2006), Çelik & Kaya (2010), Yazıcı & Klasra (2010), Yazıcı & İslam (2014), Gözen & Bostancı (2021), and Özdemir et al. (2022) found the opposite evidence that response of external balance to changes in FX rate is not consistent with the J curve hypothesis meaning that exchange rate adjustments do not succeed in improving trade balance. So, the J-curve effect does not exist.

Only some studies follow non-linear methods since linear models have primarily dominated the research. However, some researchers criticised this assumption and introduced asymmetries by modelling nonlinearities into the error-correction and cointegration processes. Baldwin & Krugman (1989) demonstrated that the movement and adjustment of the trade balance could be asymmetric. When a currency appreciates, the expectation is that export revenue will decrease by a lesser extent than it would increase in the event of a similar magnitude of currency depreciation. This is because, after appreciation, new entrants into the export market intensify competition for established firms, reducing revenue. In this regard, Bahmani-Oskee & Fariditavana (2015) defined the J curve as reflecting short-run deterioration combined with long-run trade balance improvement due to currency depreciation. They claimed that the effects of exchange rate changes could be asymmetric. Thus, the authors introduced nonlinearity into the co-integration method and found evidence for five US trading partners. Bahmani-Oskee et al. (2016) examine Mexico's bilateral trade with 13 trade partners, adopting both the linear and the nonlinear version of the ARDL method. According to the results, while peso depreciation improves Mexico's trade balance in the linear model, the nonlinear ARDL model implies that peso appreciation hurts Mexico's trade balance. Karamelikli (2016) investigated the linear and nonlinear dynamics of the trade balance of Türkiye with her main trade partners (Germany, France, the United Kingdom, and the U.S.A.) using monthly time series data from 2000 to 2015. The empirical results indicate no J-curve effect during the short-run for the United States and France; it symmetrically exists in Germany and asymmetrically in the United Kingdom. Nusair (2017) examined the J-curve phenomenon for 16 European transition economies by employing both linear and non-linear approaches of the ARDL method. The author could not find support for the J-curve phenomenon; however, sufficient evidence for it was found in 12 out of the 16 countries when using a non-linear model. Similarly, Harvey (2018) applied both approaches to examine the case of the Philippines and its nine most significant trading partners. In the linear ARDL approach, two countries were found to be significant. However, under the NARDL model, evidence indicates that three countries exhibit asymmetry in the short run. In contrast, asymmetry effects were observed in the case of Indonesia, Japan, and Singapore in the long run. When considering the Turkish economy, Arı, Cergibozan & Cevik (2019) conducted both linear and nonlinear ARDL models for the Turkish economy concerning 18 "European Union" members from 1990Q1 to 2017Q3.

According to the results, the nonlinear ARDL model yielded more support for the J-curve phenomenon than the linear model. Bilgin (2020) analysed the effects of the real exchange rate changes on the sectoral exports of Türkiye's manufacturing industry using the NARDL method. Results from the model for each sector indicate that the domestic currency's depreciation and appreciation have significant asymmetric effects on sectoral exports. Similarly, Hunter (2019) found more evidence (support for the J-curve impact on three out of four models) when using a non-linear approach compared to a linear model for the Chinese economy. Bahmani-Oskee & Durmaz (2021) assess the asymmetric effects of exchange rate changes on the trade balance of 57 industries that trade between Türkiye and the EU using the *"asymmetric Co-Integration"* method. They found short-run asymmetry effects in all industries, short-run adjustment asymmetry in 24 industries, short-run impact asymmetry in 17 industries, and long-run asymmetry effects in 23 industries. Ceyhan & Gürsoy (2021) aimed to determine the validity of the J-curve hypothesis in the Turkish economy by employing the *"Toda Yamamoto (1995) Causality Test"* and *"Hatemi-J (2012) Asymmetric Causality Test"* using monthly data from 1996 to 2019. The findings indicated that the causality test confirmed a unidirectional causality relationship between the real exchange rate and imports. Conversely, the results of the Hatemi-J (2012) Asymmetric Causality Test suggested that shocks in the real exchange rate do not affect exports but decrease imports.

In this regard, our paper contributes in several ways. Firstly, we challenge the assumption of a linear relationship between variables by recognising the potential for an asymmetric trend in the trade balance's response to exchange rate devaluation. We adopted linear and nonlinear ARDL approaches, as in Bahmani-Oskooee and Halicioglu (2017). The nonlinear ARDL approach to error-correction modelling and cointegration incorporates a nonlinear adjustment process into the testing procedure. It allows us to ascertain whether currency depreciation's short-run and long-run effects on the trade balance are symmetric or asymmetric. For this purpose, we examine "*positive*" and" *negative"* changes separately, identifying asymmetrical effects only when their signs and magnitudes differ. Using the most up-to-date *"bilateral"* trade data (because the use of aggregate data suppresses the actual movements of those variables involved), we employ both *linear* and *nonlinear* cointegration methods to investigate the J-curve hypothesis between Türkiye and its primary *"non-EU"* trading partners. Secondly, we use linear and nonlinear Granger non-causality tests alongside the cointegration analysis to explore potential causal relationships and their directions (one-way or two-way) between the variables. This comprehensive method allows us to differentiate between the impacts of positive and negative shocks, considering the principle of asymmetric information. In this paper, we pose the following research question: Could failure to confirm the J-curve using disaggregated trade data stem from assuming a linear adjustment process? Can we find further evidence for the J-curve if we introduce nonlinearity into error correction and cointegration modelling methods? Lastly, we utilise recent quarterly data spanning the entire post-liberalization era, including data from non-EU countries that are significant trade partners of Türkiye regarding export revenues and import expenditures.

The primary motivation behind this research is the lack of empirical studies that have employed a non-linear approach to analyse the Turkish J-curve. After the 1980 transformation in the Turkish economy, factors such as rising capital movements, high inflation rates, price stickiness, increased volatility, and spillover effects between markets have emerged, which could give rise to non-linearity. Another motivation for this study is to address the literature gap and comprehensively analyse the case of Türkiye, given its outlier status in terms of macroeconomic indicators such as foreign exchange rates, inflation, and interest rates. In this context, it is important to seek answers to several research questions, such as whether we can plot the J-curve using linear or non-linear methods in error-correction and cointegration modelling, whether there is any difference between the short- and long-run coefficients of estimated parameters, and whether there is a statistically significant short- and long-run relationship between the trade balance with a given country and the real exchange rate. Lastly, can we find further evidence for J-curve if we introduce nonlinearity into error correction and cointegration modelling methods?

Figure: 1
Trade Composition of Turkish Economy with Non-EU Trading Partners ($ Billion)
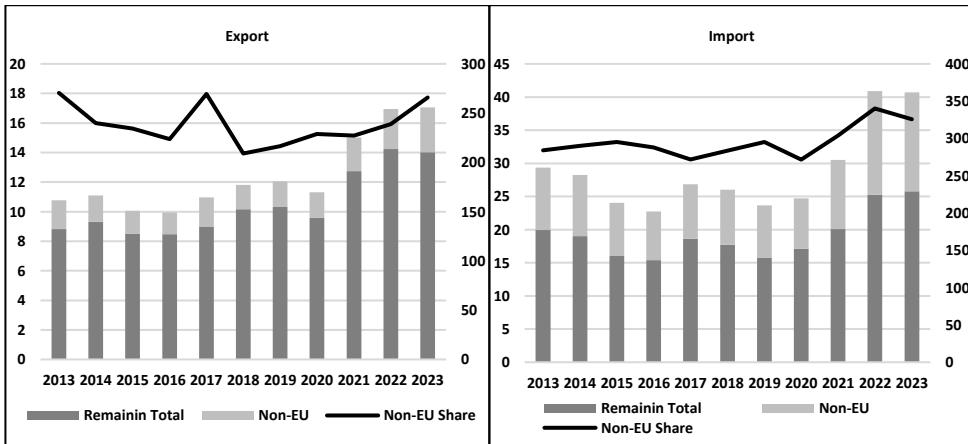
Source: TUIK Foreign Trade Statistics.

There are several reasons for choosing non-EU economies. According to Figure 1, non-EU trading partners, such as the USA, China, Russia, India, Ukraine, S. Arabia, and UAE, in our case, account for 18% of total exports (left scales) and 37% of total imports as of 2023. The figure also provides trade volumes (suitable scales). Accordingly, as of 2023, $45 billion of Türkiye's $255 billion exports are made to these countries. Similarly, $133 billion of the total $362 billion imports are made from these countries. As can be seen from the statistics, these partners play a significant role in Türkiye's foreign trade. The importance of these partners lies in diversifying Türkiye's trade portfolio and reducing dependency on any single market. These trading partners offer opportunities for Türkiye to expand its export markets, access new technologies, and attract foreign investment. Additionally,

strengthening trade ties with these countries can buffer Türkiye against economic fluctuations within the EU and provide alternative avenues for economic growth. Furthermore, fostering relationships with major global economies like Russia, China, and the USA can enhance Türkiye's geopolitical influence and position it as a key player in international trade and diplomacy.

3. Data and Methodology

For model specification in this paper, we have adopted the approach of Rose & Yellen (1989), which involves modelling the external balance between Türkiye and its partner countries as a linear function of the domestic income levels of both parties, as well as the bilateral FX rate. To eliminate scale effects and skewness, we have transformed the variables into logarithmic data;

$$LnTB_{i,t} = \beta_0 + \beta_1 LnY_{Tur,t} + \beta_2 LnY_{i,t}^* + \beta_3 LnREX_{i,t} + \varepsilon_t \tag{1}$$

The variable *LnTB* (Trade Balance) represents the trade balance, traditionally expressed as the difference between imports and exports. However, following Bahmani-Oskooee & Goswami (2006), we measure the trade deficit as the (M/X) ratio, where M is the import and X is the export volume with partners, to turn it into a series of real values. In this respect, when the value of *LnTB* exceeds one, it indicates a trade deficit, and a ratio of less than one means a trade surplus. LnY_{Tur} and LnY_i^* represent the GDP of Türkiye and its trading partner in constant 2015 US dollars, respectively. There are no a priori expectations regarding the signs of β_1 and β_2. Bahmani-Oskooee (1985), Felmingham (1988), and Bahmani-Oskooee & Goswami (2006) assert that an increase in domestic GDP leads to a rise in imports and a deterioration in the external balance. Accordingly, increases in a partner's GDP cause a rise in demand for domestic exports and, thus, an improvement in the trade balance. On the other hand, Brada et al. (1997) and Narayan & Narayan (2004) argue that increases in domestic GDP may stem from macroeconomic recovery or a boost period, in which case we expect an increase in the production of exportable goods and, in turn, a recovery in the trade deficit. Therefore, we did not specify any expectations regarding the sign of the coefficient of the income variable.

LnREX denotes the real bilateral exchange rate between Türkiye and her trading partner. As it was expressed in Himarios (1989), and Rose & Yellen (1989), we converted the nominal exchange rate into real exchange rate using the consumer price index (CPI - All Items, 2010 = 100) by $LnREX_t = NER_{i,j} * \left[CPI_t^i / CPI_t^{TUR} \right]$. When *LnREX* increases, the domestic currency depreciates, and the trading partner's currency appreciates. According to the J-curve hypothesis, it is expected that $\beta_3 < 0$ in the short run since an increase in real effective exchange rate initially deteriorates the trade balance and a significant and positive coefficient ($\beta_3 > 0$) is expected in the long run, meaning that depreciation will lead to an improvement. Lastly, β_0 is the model's constant, ε is a stochastic error term, and i and t refer to the trading partner (i= 1,... 9, countries) and quarterly period (2000Q1-2022Q4),

respectively. In the study, we focused on the post-2000 period to be able to see the effects of the structural program implemented after the 2001 crisis, to analyse the impact of the exchange rate policies of the newly elected government, and the fluctuating course of the Turkish Lira against the US dollar on the external balance. Starting in September 2020, the New Economic Model, implemented to alleviate the contraction caused by the COVID-19 pandemic and to control the increasing foreign trade deficit, has been included in the study period along with its results.

The J-Curve hypothesis is generally tested by adopting time-series models. In particular, the traditional Engle & Granger (1987) or Johansen's (1988) methods of co-integration techniques (they are a powerful way of detecting the presence of steady-state equilibrium between non-stationary variables) and the Vector Error Correction Model (VECM) has gained widespread space in detecting the short-term and long-term effects of exchange rate fluctuations on bilateral trade balances. The cointegration relationship indicates that the linear combination of two non-stationary time series (e.g. trade balance and exchange rate in our case) can be stationary. It implies a long-term, or steady-state, relationship among them (Gujarati, 2004: 830).

However, the ARDL bound test method, introduced by Pesaran, Shin, & Smith (2001), has some advantages. First, when the variables in the study are integrated in different orders, traditional methods are not applicable. However, in the ARDL procedure, a series with varying orders of integration can run. Second, the ARDL method helps identify the co-integrating vector(s). Since it is determined, we can parametrise it into the Error Correction Model (ECM), which gives short-run dynamics and long-run relationships between the variables without losing long-run information. Also, both short-run dynamics and the long-run parameters of the model can be predicted contemporaneously. Third, the ARDL technique is free from residual correlation. So, endogeneity is less of a problem. Finally, the small sample properties of the ARDL are far superior to those of multivariate cointegration (Nkoro & Uko, 2016: 78-9). To sum up, following Pesaran et al. (2001), a linear version of the unrestricted error correction form of the ARDL (p;q) bound test model can be achieved by the following regression;

$$y_t = m + \alpha_1 y_{t-1} + \alpha_2 y_{t-2} + \ldots \alpha_\rho y_{t-\rho} + \beta_0 x_t + \beta_1 x_{t-1} + \ldots \beta_q x_{t-q} + \varepsilon_t \qquad (2)$$

where y is the dependent variable, m is the constant, y_{t-i} is the autoregressive part, and x_t to x_{t-q} represent independent variables (distributed lag part). The bounds test uses ECM to check for cointegration. Accordingly, we can re-write this regression model as ECM;

$$\Delta y_t = m + \delta_1 y_{t-1} + \delta_2 x_{t-1} + \sum_{j=1}^{\rho} \alpha_j \Delta y_{t-j} + \sum_{j=1}^{q} \beta_j \Delta x_{t-j} + \varepsilon_t \qquad (3)$$

where Δ is the difference operator with an optimal lag order, δ_1 is the error correction coefficient, δ_2 is the long-run co-integration parameter, and β_j is the error correction

parameter. In this model, we have the null of *no cointegration* (H_0: $\delta_1 = \delta_2 = 0$) against the alternative hypothesis of at least one cointegration (H_0: $\delta_1 < 0$). In equation (3), the part represents the long-run error correction mechanism, and the rest of the notation gives the long-run mechanism (Bahmani-Oskee & Fariditavana, 2015: 520). To test the null hypothesis, we need residual sum square (RSS) from the restricted and unrestricted model as follows;

$$\Delta y_t = m + \sum_{j=1}^{p} \alpha_j \Delta y_{t-j} + \sum_{j=1}^{q} \beta_j \Delta x_{t-j} + \varepsilon_t \tag{4}$$

$$\Delta y_t = m + \delta_1 y_{t-1} + \delta_2 x_{t-1} + \sum_{j=1}^{p} \alpha_j \Delta y_{t-j} + \sum_{j=1}^{q} \beta_j \Delta x_{t-j} + \varepsilon_t \tag{5}$$

Restricted model of equation (4) and unrestricted model of equation (5) are estimated by ordinary least squares (OLS) and estimated RSS's are substituted in the F test to make decision; $F_{test} = \dfrac{(RSS_R - RSS_{UR}) / \text{Restriction number}}{RSS_{UR} / T - k}$, where T is the number of observation and the k is the number of explanatory variable. The calculated F statistics have any value in which they are either stationary I(0) or integrated in order one I(1). I(0) denotes the lower bound, and I(1) is the upper bound. When the F statistic exceeds the upper bound, the null hypothesis is rejected, whereas if the computed F-statistic is below the lower bound, the null hypothesis is not rejected. The results will be inconclusive if they fall inside between them (Pesaran et al., 2001: 298). To sum up, the linear ARDL(p:q_1:q_2:q_3) model for this study can be written by replacing equation (1) with equation (6);

$$\Delta LnTB_{i,t} = \alpha_0 + \sum_{k=1}^{p} \alpha_i \Delta LnTB_{j,t-k} + \sum_{k=1}^{q} \lambda_i \Delta LnY_{Tur,t-k} + \sum_{k=1}^{r} \varphi_i \Delta LnY_{j,t-k} + \sum_{k=1}^{s} \gamma_i \Delta LnREX_{j,t-k} +$$
$$\phi_i LnTB_{j,t-1} + \delta_{1i} LnY_{Tur,t-1} + \delta_{2i} LnY_{j,t-1} + \delta_{3i} LnREX_{j,t-1} + \varepsilon_t \tag{6}$$

where $\phi_i = -(1 - \sum_{i=1}^{\rho_1} \alpha_i)$ is the error correction speed of the adjustment parameter of *lnTB*. $\delta_{1i} = \sum_{i=0}^{\rho_2} \lambda_i$, $\delta_{2i} = \sum_{i=0}^{\rho_3} \varphi_i$ and $\delta_{3i} = \sum_{i=0}^{\rho_4} \gamma_i$ are the long-run coefficients on the variables *lnY_{TUR}*, (GDP Türkiye) *lnY_j* (GDP partner) and *lnREX_j* (Real exchange rates) respectively. Accordingly, α_i λ_i φ_i and γ_i are short-run coefficients. The error term $\varepsilon_{i,t} \approx$ IID $(0, \sigma^2)$, p, q, r, and s are the optimal lags based on the Schwarz-Bayesian Criterion (SBC). In the first stage, we determine whether the variables included in the analysis have a long-term relationship. If they have, long and short-term elasticity is obtained in the following stages (Özdemir et al., 2022: 1429). In the first step we test the null of H_0: $\phi_i = \delta_{1i} = \delta_{2i} = \delta_{3i} = 0$ against the alternative H_1: $\phi_i \neq \delta_{1i} \neq \delta_{2i} \neq \delta_{3i} \neq 0$. According to the model, if the short-run coefficient γ_i is negative and followed by a positive and significant long-run coefficient δ_{3i}, we can conclude that the J-curve is proved. However, Rose & Yellen (1989) define the J-

curve as a short-term worsening or insignificant estimate followed by long-term *significant positive* effect (Hunter, 2019: 2).

The standard assumption is that currency appreciations and depreciations have symmetrical effects. However, exports and imports respond differently depending on the direction of the exchange rate variation. It is a widely recognised fact in the economic literature that economic agents react differently against changes from the equilibrium level. On that note, the recent focus on nonlinear structure is motivated by some empirical reasons. Rhee & Rich (1995) and Peltzman (2000) show that firms increase their prices when costs go up faster than they bring them down. Kim et al. (2019) found evidence that exchange rate appreciations are more passed through to export and import prices than depreciations, especially on differentiated goods closer to the consumer. Moreover, it is widely acknowledged in the economic literature that the effect of a decrease in prices on wages is not equivalent to that of an increase in prices. This phenomenon, known as *'sticky wages'*, is primarily attributed to price stickiness, thereby contributing to asymmetry and nonlinearity (Karimi et al., 2020: 12). Hiemstra & Jones (1992) found evidence of significant nonlinearities in aggregate trading volume. El-Bejaoui (2013) and Mahmood & Alkhateeb (2018) assert that *wealth and substitution effects* may lead to asymmetry through money demand. According to Kassi et al. (2019), the type of prevailing currency policies (fixed or floating regime), inflation level, and size of the exchange rate changes are also effective nonlinear factors. Arize & Malindretos (2012) show that asymmetry might occur in positive and negative deviations from the mean or the speed of adjustment when there is a deviation from equilibrium. Thus, the adjustment process could be nonlinear, where the trade balance responds differently to depreciations and appreciation. Shin et al. (2013) introduced a non-linear ARDL (NARDL) model to investigate whether there is long-term co-integration and an asymmetrical relationship. This method allowed us to decompose the movement of *LnREX* as *LnREX_NEG* (depreciation) and *LnREX_POS* (appreciation) values. Thus, we generate two new series as follows.

$$LnREX_{POS,t} = \sum_{j=1}^{t} \Delta lnREX_j^+ = \sum_{j=1}^{t} \max(\Delta lnREX_j, 0) \tag{7}$$

$$LnREX_{NEG,t} = \sum_{J=1}^{t} \Delta lnREX_j^- = \sum_{j=1}^{t} \min(\Delta lnREX_j, 0) \tag{8}$$

Now we can replace *LnREX* in equation (6) with a positive and negative value in equations (7) and (8); it yields;

$$\Delta LnTB_{i,t} = \alpha_0 + \sum_{k=1}^{\rho} \alpha_i \Delta LnTB_{j,t-k} + \sum_{k=1}^{q} \lambda_i \Delta LnY_{Tur,t-k} + \sum_{k=1}^{r} \varphi_i \Delta LnY_{j,t-k} + \sum_{k=1}^{s} \gamma_i \Delta LnREX_{j,t-k}^+ +$$

$$\sum_{k=1}^{l} \Phi_i \Delta LnREX_{j,t-k}^- + \phi_i LnTB_{j,t-1} + \delta_{1i} LnY_{Tur,t-1} + \delta_{2i} LnY_{j,t-1} + \delta_{3i} LnREX_{j,t-1} + \varepsilon_t \tag{9}$$

Eventually, we achieved a non-linear expression of the ARDL model in equation (6) by introducing a partial sum of LnREX in equations (7) and (8). It enables us to examine whether fluctuations in the exchange rates have a symmetric or asymmetric impact on the trade balance between trading partners. Lastly, we have also checked the stability of the ARDL model by cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests based on the recursive regression residuals. Because the existence of a cointegration does not necessarily imply that the estimated coefficients in regression are stable. If it is concluded that the coefficients are stable according to the CUSUM test, it is decided that there is no structural change.

In the second step, we checked the possible causal relationship between variables. Standard Granger (1969) non-causality tests are commonly used to investigate causal interactions. These models assume that the causal impacts of positive and negative shocks are identical. However, the causal relation could also be nonlinear. On that note, Akerlof (1970) introduced asymmetric information. According to the theory, economic agents react differently to negative shocks than positive ones. Dennis et al. (2006) and Talpsepp & Rieger (2009) found that volatility might respond heavily to negative return shocks rather than positive ones in financial markets due to asymmetric information and the heterogeneity of economic agents. Granger & Yoon (2002) introduced the concept of hidden cointegration based on cumulative positive and negative shocks to clarify this relationship. Finally, Hatemi-J (2011) extended the causality test to allow for asymmetric causal effects, with the understanding that positive and negative shocks may have different causal impacts (Umar & Dahalan, 2016: 420-1). Thus, the causal relationship between the real exchange rate and the trade balance is further investigated using the Bootstrap Toda-Yamamoto test. Granger & Yoon (2002) defined the stochastic process between two integrated variables, x_t and y_t, in line with the cumulative sums approach;

$$y_t = y_{t-1} + e_{1t} = y_0 + \sum_{i=1}^{t} \varepsilon_{1i} \tag{10}$$

$$x_t = x_{t-1} + e_{2t} = x_0 + \sum_{i=1}^{t} \varepsilon_{2i} \tag{11}$$

where x_0 and y_0 are the initial values of the random walk process, e_{1i} and e_{2i} are the white noise terms. Positive and negative shocks can be defined as the maximum and the minimum value of disturbance term, $\varepsilon_{1i}^+ = \max(\varepsilon_{1i};0)$, $\varepsilon_{2i}^+ = \max(\varepsilon_{2i};0)$, $\varepsilon_{1i}^- = \min(\varepsilon_{1i};0)$ and $\varepsilon_{2i}^- = \min(\varepsilon_{2i};0)$ (Hatemi-J, 2012: 449). Accordingly, new error terms are $\varepsilon_{1i} = \varepsilon_{1i}^+; \varepsilon_{1i}^-$ and $\varepsilon_{2i} = \varepsilon_{2i}^+; \varepsilon_{2i}^-$. Now, we defined the following decomposition of negative and positive shocks of x and y;

$$y_t = y_{t-1} + \varepsilon_{1t} = y_0 + \sum_{i=1}^{t} \varepsilon_{1i}^+ + \sum_{i=1}^{t} \varepsilon_{1i}^- \tag{12}$$

$$x_t = x_{t-1} + \varepsilon_{2t} = x_0 + \sum_{i=1}^{t} \varepsilon_{2i}^+ + \sum_{i=1}^{t} \varepsilon_{2i}^- \tag{13}$$

Then, we denote the positive and negative shocks of variables x and y in cumulative form as follows;

$$y_t^+ = \sum_{i=1}^{t} \varepsilon_{1i}^+ \ ; \ y_t^- = \sum_{i=1}^{t} \varepsilon_{1i}^- \ ; \ x_t^+ = \sum_{i=1}^{t} \varepsilon_{2i}^+ \ ; \ x_t^- = \sum_{i=1}^{t} \varepsilon_{2i}^- \tag{14}$$

In equation (14), each shock has a permanent effect. We can estimate each effect using the Vector Autoregressive Model (VAR) p model.

$$y_t^+ = \alpha_0 + \alpha_1 y_{t-1}^+ + \dots \alpha_\rho y_{t-\rho}^+ + \beta_1 x_{t-1}^- + \beta_2 x_{t-2}^- + \dots \beta_\rho x_{t-\rho}^- + u_t \tag{15}$$

Equation (15) provides the causal linkage that arises from the negative shocks of variable x toward the positive shocks of variable y. This is the standard Granger non-causality model. In the traditional causality tests, F and χ^2 distributions may have non-standard asymptotic properties when the series under consideration are stationary at different orders and the ARCH effect is present. The "bootstrap" distribution would be better than the F or χ^2 distributions. Conventional causality tests require the stability of time series data, and the integration process should be identical. The Toda Yamamoto method will improve if the time series integration process differs. The causality test by Toda & Yamamoto (1995) requires estimating the following VAR(ρ+d$_{Max}$) model (Moftah & Dilek, 2021: 62). In this respect, Hatemi-J (2012) modified the lag length (ρ) in the equation (15) and estimate VAR (ρ+d$_{Max}$) model.

$$y_t^+ = \alpha_0 + \alpha_1 y_{t-1}^+ + \dots \alpha_\rho y_{t-\rho}^+ + \alpha_{\rho+d} y_{t-(\rho+d)}^+ + \beta_1 x_{t-1}^- + \dots \beta_\rho x_{t-\rho}^- + \beta_{\rho+d} x_{t-(\rho+d)}^- + v_t \tag{16}$$

VAR (ρ+d$_{Max}$) model in Equation (16) measures the causal linkage between negative x and positive y under the null hypothesis of *"negative shocks of variable x does not granger cause positive shocks of variable y"*, H$_0$: $\beta_1 = \beta_2 = \dots \beta_\rho = 0$ against the alternative, H$_1 \neq \dots \beta_\rho = 0$.

4. Empirical Findings

In this section, we estimated the primary model by adopting linear and non-linear methods using bilateral trade data from the 2000Q1-2022Q4 period. The data are retrieved from the electronic databases of the World Bank (2023) World Development Indicators, the IMF (2023) International Financial Statistics, the Turkish Statistical Institute (TUIK), and the Central Bank of the Republic of Türkiye (EVDS). We gathered bilateral trade data to

avoid the problem of aggregate bias. Our study covers seven major non-EU trading partners of Türkiye, namely China, India, Russia, the USA, Ukraine, Saudi Arabia, and the United Arab Emirates (UAE). Before estimating the models, it would be helpful to demonstrate the statistical properties of the time series. On that note, we present common statistics (such as mean, median, skewness, and kurtosis) of the dataset to describe the basic features of variables in Table 1. A normal distribution has a zero skewness (perfectly symmetrical around the mean) and a kurtosis of three. Based on the provided kurtosis and skewness values, it can be inferred that the dataset closely approximates a normal distribution. However, to be more precise, the Jargue-Bera test statistic should be evaluated.

Table: 1
Descriptive Statistics of Data Set

Statistics	TB	GDP	REX	Covariance Analysis			
					TB	GDP	REX
Mean	3.984	1.07E+12	0.590				
Median	2.664	2.75E+11	0.313	TB	1.157	0.425	-0.801
Maximum	28.761	5.24E+12	4.926	GDP	0.425	2.691	0.713
Minimum	0.168	1.31E+10	0.025	RER	-0.801	0.713	1.792
Std. Dev.	1.077	1.64E+00	1.340	Correlation Analysis			
Skewness	-0.27	0.45	-0.06		TB	GDP	REX
Kurtosis	2.82	2.96	3.10	TB	1	0.641	-0.576
Jarque-Bera	4.43	3.32	15.66	GDP	0.641	1	0.513
Probability	0.10	0.19	0.00	RER	-0.576	0.513	1

According to the Jarque-Bera test statistic (it is usually used for large data sets because other normality tests are not reliable when n is large), the null hypothesis of the error term is not rejected (0.10 and 0.19 > 0.01) in terms of their probability means that series are normally distributed except for RER variable. Secondly, correlation analysis assesses the linear relationship between variables, with correlation values ranging from -1 to +1. In this case, both variables exhibit a moderate correlation, surpassing the 0.5% significance level. The negative sign indicates that changes in the variables occur in opposite directions. Additionally, covariance, denoted as cov (x; y), quantifies how two random variables vary together, representing the direction of their linear relationship and how they change in tandem. In Table 1, the negative covariance coefficient between TB and REX implies that these variables tend to exhibit opposite behaviour, while the remaining pairwise comparisons show positive movement.

After descriptive statistics, we must determine the order of integration of the time series to ensure that they combine I(0) and I(1). We cannot run the ARDL bound test if any series are integrated in the second order. To this end, all variables were tested using the Augmented Dickey-Fuller (ADF) and Phillips-Peron (PP) unit root test.

Table: 2
Unit Root Tests

	TB		GDP(Y)		REX	
	ADF	PP	ADF	PP	ADF	PP
Trade Partner	$H_0=I(0)$	$H_0=I(0)$	$H_0=I(1)$	$H_0=I(1)$	$H_0=I(1)$	$H_0=I(1)$
China	-4.33***	-4.39***	-3.85***	-4.76***	-8.75***	-8.63***
India	-4.51***	-4.10***	-7.36***	-9.64***	-10.79***	-9.47***
Russia	-3.16**	-3.52***	-4.34***	-12.05***	-4.62***	-9.15***
USA	-1.39*	-1.05	-11.73***	-9.08***	-9.08***	-9.07***
Ukraine	-1.96*	-1.64*	-7.41***	-10.07***	-8.53***	-8.67***
S. Arabia	-2.73*	-2.61*	-10.68***	-11.88***	-9.40***	-8.59***
UAE	-2.79*	-2.74*	-10.59***	-11.51***	-9.32***	-8.72***
Türkiye	-	-	-4.37***	-8.64***	-	-

Note: $H_0 = I(0)$ and $H_0 = I(1)$ of the ADF and PP tests show that the variable is stationary at their level and first difference against the alternative hypothesis, respectively. The numbers in parentheses are probability values. ***, **, and* denote statistical significance at the % 1, % 5, and 10% levels. The Schwarz Bayesian Criterion (SBC) determines the lag order.

In Table 2, we reported the test results of the model. Accordingly, the TB variable is stationary at its level for all partners. The null hypothesis (unit root) has been rejected at conventional test size, and it can be concluded that TB series are stationary at level I(0). However, Y (income) and REX variables follow the I(1) process. We fail to reject the null hypothesis for these variables at the 1% level. Therefore, it is proved that Y and REX are integrated in order one for all trading partners. Also, we ensure that none of our variables are integrated in the second order, I(2). Thus, we can go further and safely estimate the ARDL model.

At the first stage, we estimate both the linear (equation 6) and nonlinear (equation 9) ARDL models, respectively, based on SBC criteria with optimum lags to select the best-fitted model using bilateral data between Türkiye and each of its seven major trading partners. We present the results in Tables 3-9. We split the tables into two groups: linear and non-linear models. Finally, we provided their diagnostics for each. We impose a maximum of 4 lags on each first-difference variable since we use quarterly data and employ the SCB to select the optimum number of lags for the model. As suggested by Pesaran et al. (2001), we selected the orders of the model specified as ARDL $(p:q_1:q_2:q_3)$ representing the lags belonging to four variables: TB, $GDP_{Partner}$, GDP_{Tur}, and REX.

Initially, we reported the short-run model to determine the j-curve. Following Rose & Yellen (1989), we defined the evidence for the J curve as a *"short-run deterioration or insignificant estimates of the FX rate"*, together with *"long-run significantly positive effects" instead of the* traditional definition. Accordingly, our findings indicate a linear confirmation of the J-curve only for Russia and the UAE. This is due to the positive and statistically significant coefficient observed in the long run, at least at the 10% significance level. A real depreciation of the Turkish lira against the currencies of these countries appears favourable to the trade balance. We also gather that the income levels in Russia and Saudi Arabia have negative coefficients but are statistically insignificant. UAE has a positive coefficient at the 10% significance level, which affects external balance positively with this partner. For the remaining countries, namely China, India, the USA, Ukraine, and Saudi Arabia, exchange rate depreciation has some short-term effects but doesn't last in the long term, and so they are not considered in the decision criteria building as they have a negative

sign of exchange rate variables. The long-run results revealed that the real depreciation of the Turkish lira against the currencies of those countries has unfavourable impacts on Türkiye's external balance with these partners since the lnREX has a negative and significant coefficient. This result also indicates that the Marshall-Lerner (ML) condition does not hold. In the long run, trade with these partners (such as China, India, the USA, Ukraine, and Saudi Arabia) may result from the positive impact of devaluation against one country, but this effect could be counteracted by its negative impact against another. Additionally, the high foreign dependency of the Turkish economy, particularly in terms of intermediate goods and inputs (e.g. energy), plays a significant role in shaping these dynamics.

Diagnostic tests and cointegration results are required to verify the short-run results. If the variables are co-integrated, the lagged level of the variables must be retained, which jointly forms the lagged error correction term. Section C in Part I reports the cointegration relationship between Türkiye and these partners since the calculated F-stats are higher than the critical upper bound value. Thus, we can reject the null hypothesis of *"no cointegration"* with at least a 10% significance level for Russia, the UAE, and other partners and infer a long-run relationship among variables. A negative and significant coefficient obtained for ECM_{t-1} is also an indication of cointegration. It measures the speed of adjustment needed to restore equilibrium in the long run. The results show that they have a negative sign as expected, and they are statistically significant at the 1% confidence level in almost all cases, supporting gradual convergence toward long-run equilibrium or cointegration. The average coefficient of -0.29 for the entire model means that deviation from the long-run equilibrium due to an external shock is attained only after 3,44 quarter periods. Another diagnostic test is the Lagrange multiplier (LM) statistic for detecting serial correlation. Probability values in the parenthesis support the autocorrelation-free residuals since we cannot reject the null hypothesis that "no serial correlation" exists for all partners. In addition, we conducted white tests to determine the heteroscedastic (differently dispersed) errors. We cannot reject the null hypothesis because the variances for the errors are not equal due to probability values in the parenthesis, and we get evidence that there is no heteroskedasticity. The third diagnostic test is the Ramsey Reset test to check model specifications. According to the probability values in parenthesis, test results prove we cannot reject the null hypothesis of "the model is correctly specified" for all cases. We also applied the cumulative sum (CUSUM) and cumulative sum of the squares (CUSUMSQ) tests for parameter stability. We denote the stable coefficient of the ARDL model as "S" and the unstable one as "US". The results for the sample countries yielded the same outcomes, and the CUSUM test or the CUSUMSQ test appeared stable except in Ukraine. Lastly, adjusted R^2 is also reported to assess the goodness of fit.

In the second step, we analysed the NARDL model reported in Part 2. We detected asymmetric formation with some trade partners since the coefficient estimates obtained for $\Delta LnREX_{POS}$ and $\Delta LnREX_{NEG}$ variables differ in size, sign, and duration, except for Ukraine and Saudi Arabia. We gather that, at least at the 10% significance level, the NEG and POS variables carry significant coefficients in the short run. However, asymmetric effects have lasted only for India, the USA, and the UAE in the long run. The NEG (depreciation) and

POS (appreciation) variables of exchange rates have either a positive or negative sign. The estimates indicate the j-curve pattern for these partners, and their coefficients are statistically significant at various confidence levels. For instance, in the results for India, the effects of the $LnREX_{POS}$ and $LnREX_{NEG}$ variables are different, and both are significant at the 10% level. For this partner, the results support the existence of the J-curve, as indicated by the positive and statistically significant coefficient (4.08) of $LnREX_{POS}$ in the long term. This suggests that an appreciation of the Turkish lira leads to an improvement in India's trade balance. Additionally, these effects were asymmetric, with lira depreciation having a less negative impact on mutual trade. The significance of the difference between the positive and negative coefficients is uncertain, and further evaluation is needed through a statistical test such as the t-test to determine the normalised coefficient of positive $LnREX_{POS}$ and $LnREX_{NEG}$ variables for each country. As a result, our analysis revealed evidence supporting both short and long-run asymmetry, further corroborating the existence of the J curve phenomenon. This aligns with the findings of studies utilising non-linear models such as Bahmani-Oskee & Fariditavana (2015), Nusair (2017), Arı, Cergibozan & Cevik (2019), Hunter (2019), Bahmani-Oskee & Durmaz (2019), and Bhat & Bhat (2021).

To do this, we can use the formula as suggested by Bahmani-Oskee et al. (2016) $t = \beta_{Pos} - \beta_{Neg} / \sqrt{\sigma_{Pos}^2 + \sigma_{Neg}^2}$, where β denotes the normalised coefficient estimate, which is obtained for $\Delta LnREX_{POS}$ and $\Delta LnREX_{NEG}$ variable for tables 2-8 and σ is the corresponding standard error term. We reported the t-statistics in the parentheses as (0.55) for China, (2.98) for India, (3.12) for Russia, (3.33) for USA, (1.24) for Saudi Arabia, (1.65) for Ukraine, and (3.53) for UAE. It can be inferred that except for China and Saudi Arabia, t ratios are significant, at least at the 10% level, supporting asymmetric effects of exchange rate changes on the trade balance of Türkiye.

To verify these results, we have to conduct the diagnostic tests again. For all non-linear models, cointegration is supported by the F tests. Next, the term error carries a negative sign and is statistically significant in all cases. The "average" of the significant negative error term (ECM_{t-1}) is 0.36 for all models, indicating convergence, which means that deviations from the steady state condition are corrected nearly 2,77 quarters later. According to the LM and White tests, residuals are all autocorrelation and heteroscedasticity-free. Ramsey Reset tests point out that there is no model specification error in the non-linear models. Finally, the CUSUM and CUSUMSQ plots remain within the critical bounds of a 5% significance level, indicating the stability of the estimated coefficients except in Ukraine and Saudi Arabia. Consequently, we found evidence of the j-curve in 2 out of 7 trading partners in Türkiye for the linear model and in 4 trading partners for the non-linear model.

Table: 3
Estimates of the Türkiye-China Trade Model

Part 1: Linear Estimation of ARDL			
Section A: Short-Term Model			

Lag Length	0	1	2	3	4		
ΔLnTB	-	0.66 (5.76***)					
ΔGDP$_{TUR}$	0.38 (1.02)						
ΔGDP$_{CHINA}$	-0.22 (0.75)						
ΔLnREX	-0.04 (0.75*)						
Section B: Long-Term Model							
Constant	-8.72 (0.42)						
GDP$_{TUR}$	0.86 (0.45)						
GDP$_{CHINA}$	-1.63 (0.62)						
LnREX	0.42 (0.45)						
Section C: Stability Tests							
F	ECM$_{t-1}$	LM	White Test	Ramsey Reset	CUSUM	CUSUM^2	Adj. R^2
4.42**	-0.31 (4.28***)	0.55 [0.57]	1.34 [0.20]	0.32 [0.57]	S	S	0.58
Part 2: Non-Linear Estimation of ARDL							
Section A: Short-Term Model							
Lag Length	0	1	2	3	4		
ΔLnTB	-	-0.65 (5.65***)					
ΔGDP$_{TUR}$	0.26 (0.43)						
ΔGDP$_{CHINA}$	-0.36 (1.74*)						
ΔLnREX$_{Pos}$	-0.17 (5.65***)						
ΔLnREX$_{Neg}$	2.02 (1.75*)	-3.20 (1.64*)					
Section B: Long-Term Model							
Constant	-19.42 (2.86***)						
GDP$_{TUR}$	-1.77 (2.11***)						
GDP$_{CHINA}$	-1.60 (2.04***)						
LnREX$_{Pos}$	0.19 (0.16)						
LnREX$_{Neg}$	-1.21 (0.53)						
Section C: Stability Tests							
F Test	ECM$_{t-1}$	LM	White Test	Ramsey Reset	CUSUM	CUSUM^2	Adj. R^2
3.58*	-0.34 (4.32***)	1.45 [0.21]	1.12 [0.34]	0.30 [0.58]	S	S	0.42

Note: Absolute t-ratios are in parentheses. ***, **, and * indicate the null hypothesis to be rejected at 1% (2.58), 5%, (1.96) or 10% (1.64) significance level, respectively. Numbers inside the brackets are probability values. The corresponding critical values of lower: I(0) and upper bounds: I(1) to test the null hypothesis of no cointegration are 2.72 and 3.77 at 10%, 3.23 and 4.35 at 5%, 4.29 and 5.61 at 1% confidence level in the linear model and 2.45 and 3.52 at 10%, 2.86 and 4.01 at 5%, 3.74 and 5.06 at 1% confidence level in the non-linear model. The models have been estimated following the general-to-specific approach (uni-directional method and p-value backwards 10% significance level as stopping criteria) with maximum lag length 4 (Campa & Goldberg, 2005; Dellatte & Villavicencio, 2012).

Table: 4
Estimates of the Türkiye-India Trade Model

Part 1: Linear Estimation of ARDL							
Section A: Short-Term Model							
Lag Length	0	1	2	3	4		
ΔLnTB	-	-0.68 (6.48***)	-0.19 (1.55)	0.20 (1.94*)			
ΔGDP$_{TUR}$	0.22 (0.56)						
ΔGDP$_{INDIA}$	0.20 (0.35)						
ΔLnREX	-0.18 (1.66*)						
Section B: Long-Term Model							
Constant	-7.23 (1.82*)						
GDP$_{TUR}$	0.55 (1.52)						
GDP$_{INDIA}$	-0.28 (1.32)						
LnREX	-0.70 (1.69*)						
Section C: Stability Tests							
F Test	ECM$_{t-1}$	LM	White Test	Ramsey Reset	CUSUM	CUSUM^2	Adj. R^2
7.83***	-0.32 (4.56***)	1.05 [0.35]	1.68 [0.09*]	0.12 [0.87]	S	S	0.45
Part 2: Non-Linear Estimation of ARDL							
Section A: Short-Term Model							
Lag Length	0	1	2	3	4		
ΔLnTB	-	0.68 (8.01***)	-0.20 (1.57)	0.19 (1.95*)			
ΔGDP$_{TUR}$	0.18 (0.43)						
ΔGDP$_{INDIA}$	-0.17 (0.35)						
ΔLnREX$_{Pos}$	-0.52 (1.71*)						
ΔLnREX$_{Neg}$	0.65 (1.68*)						
Section B: Long-Term Model							
Constant	-16.65 (1.89*)						
GDP$_{TUR}$	0.51 (0.38)						
GDP$_{INDIA}$	0.71 (0.57)						
LnREX$_{Pos}$	4.08 (1.72*)						
LnREX$_{Neg}$	-2.93 (2.21**)						

Section C: Stability Tests							
F Test	ECM$_{t-1}$	LM	White Test	Ramsey Reset	CUSUM	CUSUM^2	Adj. R^2
3.89*	-0.36 (4.47***)	1.27 [0.25]	1.10 [0.37]	0.26 [0.60]	S	S	0.63

Note: Same as Table 2.

Table: 5
Estimates of the Türkiye-Russia Trade Model

Part 1: Linear Estimation of ARDL							
Section A: Short-Term Model							
Lag Length	0	1	2	3	4		
ΔLnTB	-	-0.74 (4.52***)					
ΔGDP$_{TUR}$	-0.52 (2.20**)	0.94 (4.77***)					
ΔGDP$_{RUSSIA}$	-0.28 (1.24)						
ΔLnREX	-0.21 (1.95**)						
Section B: Long-Term Model							
Constant	13.25 (0.39)						
GDP$_{TUR}$	1.59 (2.97***)						
GDP$_{RUSSIA}$	-1.10 (1.25)						
LnREX	0.78 (2.03**)						
Section C: Stability Tests							
F	ECM$_{t-1}$	LM	White	Ramsey Reset	CUSUM	CUSUM^2	Adj. R^2
4.27**	-0.22 (4.20***)	0.20 [0.97]	1.49 [0.10]	0.31 [0.56]	S	S	0.65
Part 2: Non-Linear Estimation of ARDL							
Section A: Short-Term Model							
Lag Length	0	1	2	3	4		
ΔLnTB	-	0.73 (9.65***)					
ΔGDP$_{TUR}$	-0.64 (2.56**)						
ΔGDP$_{RUSSIA}$	-0.13 (0.55)						
ΔLnREX$_{Pos}$	1.21 (1.74*)	-1.56 (2.18**)					
ΔLnREX$_{Neg}$	-1.63 (3.51***)						
Section B: Long-Term Model							
Constant	14.07 (2.03*)						
GDP$_{TUR}$	2.13 (2.34**)						
GDP$_{RUSSIA}$	-0.96 (1.70*)						
LnREX$_{Pos}$	2.43 (0.34)						
LnREX$_{Neg}$	-4.10 (0.89)						
Section C: Stability Tests							
F	ECM$_{t-1}$	LM	White Test	Ramsey Reset	CUSUM	CUSUM^2	Adj. R^2
4.03**	-0.27 (4.58***)	0.15 [0.83]	1.52 [0.12]	0.11 [0.72]	S	S	0.68

Note: Note: Same as Table 2.

Table: 6
Estimates of the Türkiye-USA Trade Model

Part 1: Linear Estimation of ARDL							
Section A: Short-Term Model							
Lag Length	0	1	2	3	4		
ΔLnTB	-	0.49 (4.72***)	0.30 (3.11***)				
ΔGDP$_{TUR}$	-0.13 (0.55)	0.63 (2.79***)					
ΔGDP$_{USA}$	2.34 (2.75***)						
ΔLnREX	-0.32 (3.42***)						
Section B: Long-Term Model							
Constant	-4.13 (0.78)						
GDP$_{TUR}$	-4.98 (1.49)						
GDP$_{USA}$	15.30 (1.65*)						
LnREX	-1.99 (2.97***)						
Section C: Stability Tests							
F	ECM$_{t-1}$	LM	White Test	Ramsey Reset	CUSUM	CUSUM^2	Adj. R^2
5.71***	-0.18 (3.80***)	0.77 [0.46]	0.77 [0.46]	1.27 [0.26]	S	S	0.87

Part 2: Non-Linear Estimation of ARDL						
Section A: Short-Term Model						
Lag Length	0	1	2	3	4	
ΔLnTB	-	-0.49 (4.82***)	-0.28 (2.99***)			
ΔGDP$_{TUR}$	0.14 (0.41)	-0.45 (2.05**)				
ΔGDP$_{USA}$	0.31 (1.67*)					
ΔLnREX$_{Pos}$	-0.62 (2.88***)					
ΔLnREX$_{Neg}$	1.03 (3.71***)					
Section B: Long-Term Model						
Constant	-21.07 (2.44**)					
GDP$_{TUR}$	-3.29 (2.23**)					
GDP$_{USA}$	2.89 (2.27**)					
LnREX$_{Pos}$	-3.23 (3.18***)					
LnREX$_{Neg}$	4.05 (4.41***)					
Section C: Stability Tests						
F	ECM$_{t-1}$	LM	White Test	Ramsey Reset	CUSUM	CUSUM²	Adj. R²
4.72**	-0.21 (4.20***)	0.75 [0.43]	0.73 [0.79]	0.09 [0.83]	S	S	0.85

Note: Same as Table 2.

Table: 7
Estimates of the Türkiye-Ukraine Trade Model

Part 1: Linear Estimation of ARDL						
Section A: Short-Term Model						
Lag Length	0	1	2	3	4	
ΔLnTB	-	-0.41 (4.74***)				
ΔGDP$_{TUR}$	0.34 (0.93)	1.10 (2.51**)	-1.90 (4.96***)			
ΔGDP$_{UKRAINE}$	-0.58 (3.39***)	0.10 (0.51)	0.88 (5.14***)	0.28 (2.33**)		
ΔLnREX	-0.25 (2.48**)					
Section B: Long-Term Model						
Constant	18.14 (3.13***)					
GDP$_{TUR}$	-0.79 (1.03)					
GDP$_{UKRAINE}$	0.86 (5.52***)					
LnREX	-0.25 (2.48**)					
Section C: Stability Tests						
F	ECM$_{t-1}$	LM	White Test	Ramsey Reset	CUSUM	CUSUM²	Adj. R²
6.50***	-0.53 (7.33***)	0.51 [0.59]	1.78 [0.03**]	0.41 [0.51]	S	US	0.74
Part 2: Non-Linear Estimation of ARDL						
Section A: Short-Term Model						
Lag Length	0	1	2	3	4	
ΔLnTB	-	-0.39 (4.36***)				
ΔGDP$_{TUR}$	-2.04 (5.04***)	1.16 (2.71**)	0.14 (0.38)			
ΔGDP$_{UKRAINE}$	-0.49 (3.19**)	-0.34 (1.85**)	0.95 (6.09**)			
ΔLnREX$_{Pos}$	1.81 (1.79*)					
ΔLnREX$_{Neg}$	-1.32 (3.30***)					
Section B: Long-Term Model						
Constant	24.33 (4.41***)					
GDP$_{TUR}$	1.26 (1.86*)					
GDP$_{UKRAINE}$	-0.46 (1.95*)					
LnREX$_{Pos}$	-1.80 (3.38***)					
LnREX$_{Neg}$	-0.78 (1.92*)					
Section C: Stability Tests						
F	ECM$_{t-1}$	LM	White Test	Ramsey Reset	CUSUM	CUSUM²	Adj. R²
9.28***	-0.27 (7.21***)	3.46 [0.03**]	1.45 [0.17]	0.24 [0.62]	S	US	0.77

Note: Same as Table 2.

Table: 8
Estimates of the Türkiye-Saudi Arabia Trade Model

Part 1: Linear Estimation of ARDL						
Section A: Short-Term Model						
Lag Length	0	1	2	3	4	
ΔLnTB	-	1.07 (5.38***)	-0.37 (2.94***)			
ΔGDP$_{TUR}$	1.33 (2.10**)	-1.06 (1.77*)	2.34 (3.90***)	-1.84 (3.04***)		
ΔGDP$_{S.ARABIA}$	-0.77 (1.60)					
ΔLnREX	0.19 (1.09)					

Section B: Long-Term Model							
Constant	17.02 (069)						
GDP_TUR	2.39 (0.99)						
GDP_S.ARABIA	-1.75 (0.55)						
LnREX	-0.81 (1.65*)						
Section C: Stability Tests							
F	ECM_{t-1}	LM	White Test	Ramsey Reset	CUSUM	CUSUM²	Adj. R²
4.38**	-0.21 (4.24***)	1.37 [0.25]	1.52 [0.12]	7.94 [0.00***]	S	S	0.81
Part 2: Non-Linear Estimation of ARDL							
Section A: Short-Term Model							
Lag Length	0	1	2	3	4		
ΔLnTB	-	-0.31 (2.98***)	1.06 (9.98***)				
ΔGDP_TUR	0.98 (1.34)	-1.15 (1.89*)	2.31 (3.86***)	-1.92 (3.14***)			
ΔGDP_S.ARABIA	0.24 (0.33)						
ΔLnREX_Pos	0.94 (1.68*)						
ΔLnREX_Neg	-0.11 (0.92)						
Section B: Long-Term Model							
Constant	17.48 (1.97**)						
GDP_TUR	-1.60 (0.46)						
GDP_S.ARABIA	-9.43 (1.53)						
LnREX_Pos	3.91 (1.43)						
LnREX_Neg	-0.49 (0.21)						
Section C: Stability Tests							
F	ECM_{t-1}	LM	White Test	Ramsey Reset	CUSUM	CUSUM²	Adj. R²
3.68*	-0.23 (4.72***)	2.72 [0.07*]	1.62 [0.07*]	1.37 [0.17]	S	US	0.85

Note: Same as Table 2.

Table: 9
Estimates of the Türkiye-UAE Trade Model

Part 1: Linear Estimation of ARDL							
Section A: Short-Term Model							
Lag Length	0	1	2	3	4		
ΔLnTB	-	0.73 (6.65***)					
ΔGDP_TUR	1.12 (1.64*)						
ΔGDP_UAE	-1.16 (1.64*)						
ΔLnREX	-1.11 (1.99**)	1.29 (2.08***)					
Section B: Long-Term Model							
Constant	-11.56 (1.21)						
GDP_TUR	1.78 (1.04)						
GDP_UAE	1.99 (0.77)						
LnREX	0.66 (1.69*)						
Section C: Stability Tests							
F	ECM_{t-1}	LM	White Test	Ramsey Reset	CUSUM	CUSUM²	Adj. R²
4.15*	-0.23 (3.40***)	0.61 [0.50]	0.83 [0.71]	0.70 [0.40]	S	S	0.71
Part 2: Non-Linear Estimation of ARDL							
Section A: Short-Term Model							
Lag Length	0	1	2	3	4		
ΔLnTB	-	0.59 (6.60***)					
ΔGDP_TUR	-0.37 (1.79*)						
ΔGDP_UAE	-0.97 (1.39)						
ΔLnREX_Pos	-3.14 (2.85***)						
ΔLnREX_Neg	2.15 (2.70***)						
Section B: Long-Term Model							
Constant	-9.32 (1.72*)						
GDP_TUR	6.38 (2.13**)						
GDP_UAE	-5.32 (1.70*)						
LnREX_Pos	6.39 (2.46**)						
LnREX_Neg	-4.37 (2.81***)						
Section C: Stability Tests							
F	ECM_{t-1}	LM	White Test	Ramsey Reset	CUSUM	CUSUM²	Adj. R²
6.34***	-0.49 (4.77***)	0.96 [0.38]	0.95 [0.53]	0.17 [0.85]	S	S	0.74

Note: Same as Table 2.

After estimating the ARDL model for each partner, we can use the first differences to investigate the causal connection between the exchange rate and trade balance. For this purpose, we employed the linear Granger causality test. It investigates whether the historical

information of one time series could help improve the predictability of the present and future estimations for another time series (Yu et al., 2015: 304).

Table: 10
Linear Granger Causality Test

Country	Null Hypothesis	Lag Lenght	χ2 Test Statistic	Probability Value
China	*LnTB≠> LnRex*	1	0.47	0.78
	LnRex≠> LnTB		2.58	0.27
India	*LnTB≠> LnRex*	3	1.82	0.40
	LnRex≠> LnTB		0.73	0.69
Russia	*LnTB≠> LnRex*	4	3.64	0.16
	LnRex≠> LnTB		0.38	0.82
USA	*LnTB≠> LnRex*	2	2.61	0.26
	LnRex≠> LnTB		5.77**	0.04
Ukraine	*LnTB≠> LnRex*	3	5.41	0.14
	LnRex≠> LnTB		6.97**	0.03
S. Arabia	*LnTB≠> LnRex*	2	0.18	0.91
	LnRex≠> LnTB		0.47	0.78
UAE	*LnTB≠> LnRex*	2	2.63	0.10
	LnRex≠> LnTB		0.39	0.53

Note: *, **, and * indicate the null hypothesis to be rejected at 1%, 5%, or 10% significance level, respectively.

Table 10 shows the results from the linear Granger non-causality test. We estimated χ2 statistics and p-values based on the SCB criteria. The lag length was determined with robustness in mind, and we ensured the models were stable by confirming that all characteristic roots were less than one and that all models were free from heteroscedasticity and autocorrelation. Our tests revealed evidence of unidirectional causality, where the exchange rate is the cause of the trade balance with the USA and Ukraine at a 5% confidence level. However, for the remaining partners, we could not reject the null hypothesis of no Granger causality between the series. Due to some drawbacks, we did not find enough evidence to support a co-integration relationship, as was the case for most partners.

A limitation of the linear causality technique is the potential for disregarding non-linear connections. Indeed, there can be relationships between asymmetry and nonlinearity in economic agents or macroeconomic variables, especially when considering threshold effects. For example, in monetary policy, the impact of interest rate changes on economic activity may be asymmetric, with different effects observed below and above a specific interest rate threshold. Second, asymmetry and nonlinearity can also interact through feedback mechanisms in economic systems. Feedback loops can amplify or dampen the effects of shocks or changes in economic variables, leading to nonlinear responses. Lastly, in complex economic systems, asymmetry and nonlinearity often arise from the interactions between multiple agents and variables. Therefore, exploring non-linear causal connections among the relevant variables is crucial. In that respect, we reported the asymmetric Granger non-causality test results between LnREX and the LnTB variable. Exchange rate effects are expected to be more sensitive to negative shocks than positive ones. Therefore, the markets could have asymmetric causal effects (Erdoğan et al. 2022: 31729). In this context, four types of directions can be defined for positive or negative shocks that follow from LnREX to LnTB. Table 11 presents the results of the bootstrap panel Granger causality analysis according to four directions for the null hypothesis that real exchange rate changes do not

cause trade balance and vice versa. We make decisions according to our critical values. The underlying empirical data is used in a bootstrap simulation conducted 10,000 times to generate critical values. After each iteration, MWALD t-statistics are estimated to determine the upper αth quantile of the bootstrapped distribution of MWALD t-statistics, which generates 1%, 5%, and 10% confidence levels. If the MWALD statistics are greater than the bootstrapped critical values, the null hypothesis of non-Granger causality is typically rejected. The bootstrap method can yield robust results even if there are ARCH effects and deviations from a normal distribution in the model (Pata & Terzi, 2016: 62-4).

Table: 11
Asymmetric Bootstrap Toda-Yamamoto Test

Country & Null Hypothesis	Optimal Lag Length	M. Wald Test Statistics	Asymptotic χ2 Probability Values	Leverage Bootstrap		
				1% CV	5% CV	10% CV
China						
$LnRex^+ \neq > LnTB^+$	2	0.97	0.55	8.46	4.02	2.77
$LnRex^+ \neq > LnTB^-$	1	1.89	0.16	12.15	4.46	2.53
$LnRex \neq > LnTB^+$	3	0.38	0.86	11.38	4.88	2.66
$LnRex \neq > LnTB^-$	1	0.89	0.51	12.06	4.24	2.84
$LnTB+ \neq > LnRex+$	2	1.11	0.29	8.28	4.29	2.79
$LnTB+ \neq > LnRex-$	1	2.45	0.11	8.65	3.88	2.59
$LnTB- \neq > LnRex+$	3	2.56	0.10	9.45	4.60	3.17
$LnTB- \neq > LnRex-$	1	1.54	0.21	9.617	5.38	3.17
India						
$LnRex^+ \neq > LnTB^+$	1	17.14**	0.00	27.09	16.50	13.52
$LnRex^+ \neq > LnTB^-$	2	0.23	0.88	8.74	4.61	3.05
$LnRex \neq > LnTB^+$	1	0.31	0.57	6.53	3.69	2.64
$LnRex \neq > LnTB^-$	1	0.29	0.69	9.57	4.30	2.97
$LnTB+ \neq > LnRex+$	3	3.82*	0.05	9.85	4.74	3.23
$LnTB+ \neq > LnRex-$	1	0.72	0.39	7.41	3.99	2.54
$LnTB- \neq > LnRex+$	2	1.92	0.16	7.61	4.76	2.94
$LnTB- \neq > LnRex-$	1	0.20	0.64	10.53	5.06	3.51
Russia						
$LnRex^+ \neq > LnTB^+$	1	1.29	0.25	9.01	4.36	3.05
$LnRex^+ \neq > LnTB^-$	1	0.62	0.43	7.81	3.83	2.66
$LnRex \neq > LnTB^+$	2	0.20	0.65	11.83	6.51	4.70
$LnRex \neq > LnTB^-$	1	13.22***	0.00	9.07	5.10	2.98
$LnTB+ \neq > LnRex+$	2	0.25	0.65	6.69	4.04	3.01
$LnTB+ \neq > LnRex-$	1	0.30	0.58	8.54	4.66	3.31
$LnTB- \neq > LnRex+$	3	15.47***	0.00	10.86	4.48	2.70
$LnTB- \neq > LnRex-$	2	5.60**	0.01	8.82	4.39	3.00
USA						
$LnRex^+ \neq > LnTB^+$	1	0.52	0.81	5.96	3.70	2.59
$LnRex^+ \neq > LnTB^-$	1	0.18	0.66	6.99	4.23	3.07
$LnRex \neq > LnTB^+$	1	6.93**	0.04	13.91	7.30	5.04
$LnRex \neq > LnTB^-$	1	0.17	0.67	8.99	4.15	2.81
$LnTB+ \neq > LnRex+$	3	0.14	0.89	8.55	4.73	3.30
$LnTB+ \neq > LnRex-$	3	0.32	0.84	20.03	7.32	4.98
$LnTB- \neq > LnRex+$	1	0.37	0.54	13.08	4.27	2.63
$LnTB- \neq > LnRex-$	2	6.39**	0.04	13.91	7.30	5.04
Ukraine						
$LnRex^+ \neq > LnTB^+$	1	2.66	0.44	14.29	9.62	7.32
$LnRex^+ \neq > LnTB^-$	2	1.71	0.42	7.47	3.87	2.60
$LnRex \neq > LnTB^+$	2	2.74	0.25	11.03	6.58	5.04
$LnRex \neq > LnTB^-$	3	0.11	0.73	7.25	4.03	2.70
$LnTB+ \neq > LnRex+$	1	5.61	0.13	12.56	8.82	6.73
$LnTB+ \neq > LnRex-$	2	0.82	0.66	10.15	6.34	4.74
$LnTB- \neq > LnRex+$	2	0.84	0.35	8.63	4.13	2.70
$LnTB- \neq > LnRex-$	2	2.74	0.25	11.03	6.58	5.04

Saudi Arabia						
LnRex⁺≠> LnTB⁺	1	4.24**	0.03	7.70	4.49	2.84
LnRex⁺≠> LnTB⁻	3	0.84	0.35	8.28	4.30	2.68
LnRex≠> LnTB⁺	1	1.16	0.28	9.79	4.74	3.03
LnRex≠> LnTB⁻	1	0.31	0.57	10.80	4.68	3.08
LnTB+≠> LnRex+	3	0.91	0.34	7.65	4.82	3.03
LnTB+≠> LnRex-	2	2.83*	0.09	8.92	3.87	2.80
LnTB-≠> LnRex+	2	0.28	0.59	7.21	4.12	3.03
LnTB-≠> LnRex-	1	0.17	0.68	10.65	4.68	2.71
UAE						
LnRex⁺≠> LnTB⁺		5.44**	0.02	9.66	4.93	3.16
LnRex⁺≠> LnTB⁻	1	0.97	0.61	10.16	6.67	4.95
LnRex≠> LnTB⁺	1	0.23	0.65	7.82	3.99	2.74
LnRex≠> LnTB⁻	1	0.17	0.67	8.16	3.92	3.06
LnTB+≠> LnRex+	3	0.10	0.74	8.57	3.80	2.87
LnTB+≠> LnRex-	1	0.39	0.52	7.89	4.34	2.86
LnTB-≠> LnRex+	2	0.07	0.79	7.67	4.22	2.78
LnTB-≠> LnRex-	2	0.35	0.55	7.34	4.19	2.86

Note: ***, **, and * indicate the null hypothesis to be rejected at 1%, 5%, or 10% significance level, respectively.

The results of the MWALD test based on the leverage bootstrap distribution indicate different findings. At first sight, we reject the null hypothesis in favour of the alternative one and find evidence for asymmetric causality in either direction except for Ukraine and China. In this manner, we have supported the cointegration results in the non-linear model for India, the USA, and the UAE. For instance, in the case of India, there is a causal linkage between positive shocks to the exchange rate and those to the trade balance, indicating bidirectional causality. It can also be seen from Table 3 in the non-linear model that the LnRexPos (appreciation in domestic currency) variable positively affects the external balance between Türkiye and India in the long run. Likewise, the test results for the UAE implicate the rejection of the null hypothesis of Granger non-causality between the positive shocks of exchange rates and the external balance of Türkiye. Therefore, positive shocks in exchange rates cause positive shocks to the trade balance with these partners. In Table 8, the LnRexPos variable positively affects the external balance between Türkiye and the UAE in the long run for the non-linear model. For the USA, the null hypothesis of non-Granger causality from negative shocks of the exchange rate variable to positive shocks of the trade balance variable is rejected at a 5% significance level. Similarly, as seen from Table 5, the LnRexNeg (depreciation in currency) variable in the non-linear model positively affects the external balance between Türkiye and the USA in the long run.

5. Conclusion

This paper investigates the short-run and long-run responses of the trade balance to currency movements (the J-curve hypothesis) for the Turkish economy from Q1 2000 to Q4 2022, using both the linear (ARDL) and nonlinear autoregressive distributed lag (NARDL) approaches as well as asymmetric Toda-Yamamoto causality analysis under bootstrap leverage. For this purpose, we employ the bilateral trade balance model proposed by Rose & Yellen (1989), using bilateral data from Türkiye and seven of her largest non-EU trading partners.

Using the linear ARDL approach for error correction and cointegration analysis, we observed a specific pattern that supports the J-curve phenomenon only for Russia and the

UAE. When we applied the non-linear ARDL approach, we found supportive evidence for both the asymmetrical exchange rate effect and the J-curve hypothesis in three (India, USA, and UAE) out of seven in the long term. This indicates that currency appreciations impact the trade balance differently than currency depreciations. We also observed that the magnitude of the coefficients is higher in the long term than in the short term. Additionally, lira depreciation improves Türkiye's trade balance with India, the USA, and the UAE in the short run. However, in the long run, the trade balance is affected "positively" by lira appreciation in the cases of India and the UAE and depreciation in the case of the USA. In other words, lira depreciation has affected the trade balance "negatively" in the cases of India and the UAE, and lira appreciation has affected the case of the USA. Third, according to the error correction coefficients, the error correction mechanism in the non-linear model adjusts the long-run equilibrium faster than the linear model.

The findings of this study differ somewhat from those of previous studies in terms of the short- and long-term dynamics of the trade balance response to changes in the exchange rate concerning different partners. Although the non-linear approach provided more evidence for our case, we only found evidence for the J-curve pattern in 2 out of 7 partners in the linear models and three trading partners in the non-linear models. Therefore, the ML condition was found to hold only for a small group of countries in this study. Thus, we can conclude that exchange rate movements have a limited effect on the Turkish economy.

In the case of Türkiye, the effects of exchange rate movements on the trade balance have been limited by structural reasons. First of all, the Turkish economy, like many other emerging markets, heavily depends on imported inputs and intermediate goods for domestic production, and any depreciation in the Turkish Lira leads to an increase in the cost of production. The rise in exchange rates also makes importing advanced technology, know-how and capital goods more expensive. Furthermore, any depreciation increases the price of imported goods and services, making them costlier for consumers. Another factor that reduces the impact of exchange rates is the pricing behaviour in countries with persistent inflation. In such cases, expectations also play a role in diminishing the effect of exchange rates. Furthermore, an increase in dollarisation can cause exchange rate movements to be more volatile, leading to a cycle of exchange rate inflation. As a result, these factors reinforce the exchange rate pass-through mechanism, making the devaluation of domestic currencies ineffective in achieving the desired outcomes, particularly regarding trade balance, in the long run.

In this regard, the Turkish economy has struggled with a persistent trade deficit for many years, and devaluations of the TL have been employed as a solution at various times, such as in 1980, 1994, and 2001. More recently, the New Economy Model (NEM) was initialised in December 2021 to turn the country's chronic current account deficits into a surplus by artificially lowering interest rates and weakening the Turkish lira. However, as of June 2023, the current account deficit has increased almost sevenfold to $60 billion since the launch of the NEM. According to recent data, the Turkish economy recorded a trade deficit of 45.2 billion dollars for 2023. To address the persistent trade deficit issue,

policymakers should consider promoting the development of medium and high-tech industries, implementing comprehensive structural reforms in the economy, attracting foreign direct investment, reducing reliance on imported inputs, enhancing export competitiveness, and pursuing complementary macroeconomic policies.

References

Ahn, J. et al. (2017), "Real Exchange Rate And External Balance: How Important Are Price deflators?", *IMF Working Paper* WP/17/81.

Akbostancı, E. (2004), "Dynamics of The Trade Balance: The Turkish J Curve", *Economic Research Centre Emerging Markets Finance & Trade*, 40(5), 55-73.

Akerlof, G. (1970), "The Market for "Lemons": Quality Uncertainty and The Market Mechanism", *The Quarterly Journal of Economics*, 84(3), 488-500.

Albayrak, Ş.G. & H.S. Korkmaz (2019), "Turkish J-Curve: Trade Balance and Real Exchange Rate Relation", *Selçuk Üniversitesi SBE Dergisi*, (Prof.Dr. Fuat Sezgin Özel Sayısı), 348-359.

Arı, A. et al. (2019), "J-Curve in Turkish Bilateral Trade: A Nonlinear Approach", *The International Trade Journal*, 33(1), 31-53.

Aries, M. et al. (2006), "A Model for a Fair Exchange Rate", *Review of Pacific Basin Financial Markets and Policies*, 9(1), 51-66.

Arize, A.C. & J. Malindretos (2012), "Nonstationarity and Nonlinearity in Inflation Rate: some further evidence", *International Review of Economics & Finance*, 24, 224-234.

Arora, S. et al. (2003), "Bilateral J-Curve Between India and Her Trading Partners", *Applied Economics*, 35(9), 1037-1041.

Aytac, O. (2016), "Macroeconomic Developments and Exchange-Rate Policy in Turkey, 1980-2001", *Accounting and Finance Research*, 5(2), 115-125.

Baek, J. (2006), "The J-Curve Effect and The USA-Canada Forest Products Trade", *Journal of Forest Economics*, 13, 245-258.

Bahmani-Oskee, M. & N. Durmaz (2021), "Exchange rate volatility and Turkey-EU commodity trade: an asymmetry analysis", *Empirica*, 48(1), 429-482.

Bahmani-Oskoee, M. & Z. Ardalani (2006), "Exchange Rate Sensitivity of USA Trade Flows: Evidence From Industry Data", *Southern Economic Journal*, 72(3), 542-559.

Bahmani-Oskooee M. & H. Fariditavana (2015), "Nonlinear ARDL Approach, Asymmetric Effects And The J-Curve", *Journal of Economic Studies*, 42(3), 519-530.

Bahmani-Oskooee, M. & A.M. Kutan (2009), "The J-Curve in the Emerging Economies of Eastern Europe", *Applied Economics*, 41(20), 2523-2532.

Bahmani-Oskooee, M. & H. Harvey (2010), "The J-Curve: Malaysia Versus Her Major Trading Partners", *Applied Economics*, 42, 1067-1076.

Bahmani-Oskooee, M. & J. Alse (1994), "Short-Run Versus Long-Run Effects of Devaluation: Error Correction Modelling and Cointegration", *Eastern Economic Journal*, 20, 453-464.

Bahmani-Oskooee, M. & T. Kanitpong (2017), "Do Exchange Rate Changes Have Symmetric or Asymmetric Effects on The Trade Balance of Asian Countries?", *Applied Economics*, 49(46), 4668-4678.

Bahmani-Oskooee, M. (1985), "Devaluation and The J-Curve: Some Evidence From LDCs", *The Review of Economics and Statistics*, 67(3), 500-504.

Bahmani-Oskooee, M. et al. (2006), "Bilateral J-Curve Between The UK Vis-À-Vis Her Major Trading Partners", *Applied Economics*, 38(8), 879-888.

Bahmani-Oskooee, M. et al. (2016), "Mexican Bilateral Trade and The J-Curve: An Application of The Nonlinear ARDL Model", *Economic Analysis and Policy*, 50, 23-40.

Baldwin, R. & P. Krugman (1989), "Persistent trade effects of large exchange rate shocks", *Quarterly Journal of Economics*, 104, 635-654.

Bayoumi, T. et al. (2005), "A Fair Exchange? Theory and Practice of Calculating Equilibrium Exchange Rates", *IMF Working Paper*, WP/05/229.

Bilgin, C. (2020), "Asymmetric Effects of Exchange Rate Changes on Exports: A Sectoral Nonlinear Cointegration Analysis for Turkey", *MPRA Paper* No. 1013.

Boyd, D. et al. (2001), "Real Exchange Rate Effects on The Balance of Trade: Cointegration and The Marshall-Lerner Condition", *International Journal of Finance & Economics*, 6(3), 187-200.

Brada, J.C. et al. (1997), "The Exchange Rate and The Balance of Trade: The Turkish Experience", *Journal of Development Studies*, 33, 675-692.

Campa, J. & L. Goldberg (2005), "Exchange Rate Pass-Through into Import Prices", *The Review of Economics and Statistics*, 87(4), 679-690.

Ceyhan, T. & S. Gürsoy (2021), "The J Curve Hypothesis: An Analysis for Turkey", *Gümüşhane Üniversitesi Sosyal Bilimler Enstitüsü Elektronik Dergisi*, 12(3), 1169-1181.

Çelik, S. & H. Kaya (2010), "Real Exchange Rates and Bilateral Trade Dynamics of Turkey: Panel Cointegration Approach", *Applied Economics Letters*, 17(8), 791-795.

Dellate, A.L. & A.L. Villavicencio (2021), "Asymmetric Exchange Rate Pass-Through: Evidence from Major Countries", *Journal of Macroeconomics*, 34(3), 833-844.

Dennis, P. et al. (2006), "Stock Returns, Implied Volatility Innovations, and The Asymmetric Volatility Phenomenon", *The Journal of Financial and Quantitative Analysis*, 41(2), 381-406.

Doroodian, K. et al. (1999), "The J-Curve Effect And US Agricultural And Industrial Trade", *Applied Economics*, 31(6), 687-695.

El-Bejaoui, H.J. (2013), "Asymmetric Effects of Exchange Rate Variations: An Empirical Analysis for Four Advanced Countries", *International Economics*, 135-136, 29-46.

Engle, R. & C. Granger (1987), "Cointegration and Error Correction Representation: Estimation and Testing", *Econometrica*, 55, 251-276.

Erdem, E. et al. (2010), "The Macroeconomy and Turkish Agricultural Trade Balance with The EU Countries: Panel ARDL Analysis", *International Journal of Economic Perspectives*, 4(1), 371-379.

Erdoğan, S. et al. (2022), "Analyzing Asymmetric Effects of Cryptocurrency Demand on Environmental Sustainability", *Environmental Science and Pollution Research*, 29, 31723-31733.

Felmingham, B.S. (1988), "Where Is The Australian J-Curve?", *Bulletin of Economic Research*, 40(1), 43-56.

Frieden, J. (2008), "*Globalization and Exchange Rate Policy*", in: E. Zedillo (ed.), *The Future of Globalization* (344-357), New York: Routledge.

Gözen, M.C. & C. Bostancı (2021), "Validity of J-Curve for Turkey and Its Main External Trade Partners: An Application of a Panel Data Approach", *Sosyoekonomi*, 29(50), 149-168.

Granger, C.W.J. & G. Yoon (2002), "Hidden Cointegration. University of California", *Economics*, Working Paper No, 2002-02.

Granger, C.W.J. (1969), "Investigating Causal Relations By Econometric Models and Cross-Spectral Methods", *Econometrica*, 37(3), 424-438.

Gujarati, D.N. (2004), *Basic Econometrics*, 4th ed., The McGraw-Hill Companies.

Hacker, R.S. & A. Hatemi-J (2003), "Is The J-Curve Effect Observable for Small North European Economies?", *Open Economies Review*, 14, 119-134.

Halicioglu, F. (2007), "The J-Curve Dynamics of Turkish Bilateral Trade: A Cointegration Approach", *Journal of Economic Studies*, 34(2), 103-119.

Halicioglu, F. (2008a), "The Bilateral J-Curve: Turkey Versus Her 13 Trading Partners", *Journal of Asian Economics*, 19(3), 236-243.

Halicioglu, F. (2008b), "The J-Curve Dynamics of Turkey: An Application of ARDL Model", *Applied Economics*, 40(18), 2423-2429.

Harvey, H. (2018), "Bilateral J-Curve Between Philippines And Trading Partners: Linear And Non-Linear Approach", *Asian Econ. and Financial Rev.*, 8(2), 131-144.

Hatemi-J, A. (2011), *AC Test: GAUSS Module To Apply Asymmetric Causality Tests. Statistical Software Components G00014*, Boston College Department of Economics.

Hatemi-J, A. (2012), "Asymmetric Causality Tests With An Application", *Empirical Economics*, 43(1), 447-456.

Hiemstra, C. & J. Jones (1992), "Detection And Description of Linear And Nonlinear Dependence in Daily Dow Jones Stock Returns And NYSE Trading Volume", *Working Paper*, University of Strathclyde and Securities and Exchange Commission.

Himarios, D. (1989), "Do Devaluations Improve the Trade Balance? The Evidence Revisited", *Economic Inquiry*, 27(1), 143-168.

Hsing, Y. (2009), "Test of The J-Curve for Six Selected New EU Countries", *International Journal of Economic Policy in Emerging Economies*, 2(1), 76-85.

Hunter, A. (2019), "A Non-linear Autoregressive Distributed Lag Model Approach and the J-Curve Phenomenon: China and Her Major Trading Partners", *Major Themes in Economics*, 21, 1-13.

IMF (2023), *International Financial Statistics*, <https://data.imf.org/?sk=4c514d48-b6ba-49ed-8ab9-52b0c1a0179b&sId=-1>, 22.07.2023.

Jamilov, R. (2011), "J-Curve Dynamics And The Marshall-Lerner Condition: Evidence From Azerbaijan", *Munich Personal RePEc Archive,* MPRA Paper No. 36799.

Johansen, S. (1988), "Statistical Analysis of Cointegrating Vectors", *Journal of Economic Dynamics and Control*, 12(2-3), 231-254.

Kale, P. (2001), "Turkey's Trade Balance in The Short and The Long Run: Error Correction Modeling And Cointegration", *The International Trade Journal*, 15(1), 27-56.

Karamelikli, H. (2016), "Linear and nonlinear dynamics of the Turkish trade balance", *International Journal of Economics and Finance*, 8(2), 70-80.

Karimi, M. et al. (2020), "Does Asymmetric Nonlinear Approach Explain The Relationship Between Exchange Rate And Trade of Iran?", *The Vienna Institute for International Economic Studies Working Paper* 187.

Karluk, R.S. (2013), "*International Economics: Theory and Policy (in Turkish)*", Beta Yayıncılık, İstanbul.

Kassi, D.F. et al. (2019), "Asymmetry in Exchange Rate Pass-Through to Consumer Prices: New Perspective from Sub-Saharan African Countries", *Economies*, 7 (1), 1-33.

Kılıç, R. et al. (2018), "Validity of the J-Curve Hypothesis for Turkey: ARDL Bound Test Approach", *International Journal of Disciplines in Economics and Administrative Sciences Studies*, 4(7), 112-128.

Kim, M. et al. (2019), "Asymmetries and Non-Linearities in Exchange Rate Pass-Through", *European Central Bank Conference on Inflation in A Changing Economic Environment*.

Kimbugwe, H. (2006), "The Bilateral J-Curve Between Turkey And Her Nine Trading Partners", *Munich Personal RePEc Archive*, <https://mpra.ub.uni-muenchen.de/4254/>, 22.10.2023.

Krueger, A.D. (1983), "*Exchange Rate Determination*", *Cambridge Surveys of Economic Literature* Cambridge University Press, ISBN 10: 0521273013.

Krugman, P.R. & R.E. Baldwin (1987), "The Persistence of The US Trade Deficit", *Brookings Papers on Economic Activity*, 1, 1-55.

Kutlu, S. (2013), "Changes in Exchange Rates and The Balance of Trade: A Literature Survey With Reference to Turkey's Foreign Trade", *Atatürk Üniversitesi İktisadi ve İdari Bilimler Dergisi*, 27(2), 121-140.

Magee, S.P. (1973), "Currency Contracts, Pass-Through, And Devaluation", *Brookings Papers on Economic Activity*, 4(1), 303-325.

Mahmood, H. & T.T. Alkhateeb (2018), "Asymmetrical Effects of Real Exchange Rate on the Money Demand in Saudi Arabia: A Nonlinear ARDL Approach", *PLoS ONE*, 13(11), e0207598.

Miles, M.A. (1979), "The Effects of Devaluation on The Trade Balance And The Balance of Payments: Some New Results", *The Journal of Political Economy*, 87(3), 600-620.

Moftah, N. & S. Dilek (2021), "Toda-Yamamoto Causality Test Between Energy Consumption And Economic Growth: Evidence From A Panel of Middle Eastern Countries", *Journal of Empirical Economics and Social Science*, 3(1), 56-78.

Narayan, P.K. & S. Narayan (2004), "The J-Curve: Evidence From Fiji", *International Review of Applied Economics*, 18(3), 369-380.

Nkoro, E. & A.K. Uko (2016), "Autoregressive Distributed Lag (ARDL) Cointegration Technique: Application and Interpretation", *Journal of Statistical and Econometric Methods*, 5(4), 63-91.

Nusair, A. S. (2017), "The J-Curve Phenomenon in European Transition Economies: A Nonlinear ARDL Approach", *International Rev. of Applied Economics*, 31(1), 1-27.

Özdemir, S. et al. (2022), "Bilateral J-Curve between Turkey and The Eurozone", *Mehmet Akif Ersoy University Journal of Economics and Administrative Sciences Faculty*, 8(3), 1420-1432.

Özşahin, Ş. (2017), "An Examination of Bilateral J-Curve: Evidence from Turkey and Her 20 Major Trading Partners", *Theoretical and Applied Economics*, 2(611), 221-236.

Pata, U.K. & H. Terzi (2016), "Testing for Symmetric and Asymmetric Causality Between FDI and Foreign Trade in Turkey", *The Romanian Economic Journal*, XIX(61), 47-70.

Peltzman, S. (2000), "Prices Rise Faster Than They Fall", *Journal of Political Economy*, 108(3), 466-502.

Pesaran, M.H. et al. (2001), "Bounds Testing Approaches to The Analysis of Level Relationships", *Journal of Applied Econometrics*, 16, 289-326.

Quirk, P. (1990), *Exchange Rate Policies and Management: A Model for Successful Structural Adjustment*, IMF E-Libary.

Rhee, W. & R.W. Rich (1995), "Inflation and the asymmetric effects of money on output fluctuations", *Journal of Macroeconomics*, 17(4), 683-702.

Rose, A.K. & J.L. Yellen (1989), "Is There A J-Curve?", *Journal of Monetary Economics*, 24(1), 53-68.

Rose, A.K. (1990), "Exchange Rates and The Trade Balance: Some Evidence from Developing Countries", *Economics Letters*, 34(3), 271-275.

Seyidoğlu, H. (2013), *Uluslararası İktisat; Teori, Politika ve Uygulama*, Güzem Yayınları, No: 28, 19. Baskı, İstanbul.

Shin, Y. et al. (2013), "Modelling Asymmetric Cointegration and Dynamic Multipliers in A Nonlinear ARDL Framework", in: W.C. Horrace & R.C. Sickles (eds.), *Festschrift in Honor of Peter Schmidt* (281-314).

Singh, T. (2004), "Testing J-Curve Hypothesis and Analysing The Effect of Exchange Rate Volatility on the Balance of Trade in India", *Empirical Economics*, 29, 227-245.

Talpsepp, T. & M.O. Rieger (2009), "Explaining Asymmetric Volatility Around The World", *SSRN Electronic Journal*, 17(5), 938-956.

Toda, H.Y. & T. Yamamoto (1995), "Statistical Inference in Vector Autoregressions with Possibly Integrated Processes", *Journal of Econometrics*, 66(1-2), 225-250.

TUIK (N/A), *İstatistik Veri Portalı*, <https://data.tuik.gov.tr/Kategori/GetKategori?p=dis-ticaret-104&dil=2>, 08.08.2023.

Umar, M. & J. Dahalan (2016), "An Application of Asymmetric Toda-Yamamoto Causality on Exchange Rate-inflation Differentials in Emerging Economies", *International Journal of Economics and Financial Issues*, 6(2), 420-426.

Ünal, A.E. (2021), "İkili Dış Ticaret Dengesi ve Reel Döviz Kuru İlişkisi: Türkiye-Rusya Örneği", *Niğde Ömer Halisdemir Üniversitesi İ.İ.B.F. Dergisi*, 14(2), 542-558.

Verheyen, F. (2012), "Bilateral Exports from Euro Zone Countries to The US - Does Exchange Rate Variability Play A Role?", *International Review of Economics and Finance* 24, 97-108.

Wang, C.H. et al. (2012), "Short-Run and Long-Run Effects of Exchange Rate Change on Trade Balance: Evidence from China and Its Trading Partners"*, Japan and the World Economy*, 24(4), 266-273.

Wilson, P. & K.C. Tat (2001), "Exchange Rates and The Trade Balance: The Case of Singapore 1970 to 1996", *Journal of Asian Economics*, 12(1), 47-63.

World Bank (2023), *World Development Indicators*, <https://databank.worldbank.org/source/world-development-indicators>, 08.08.2023.

Yavuz, N.Ç. et al. (2010), "Reel Döviz Kurunun Dış Ticaret Dengesine Etkisi: Türkiye İçin Marshall-Lerner Koşulunun Testi", *İktisat, İşletme ve Finans*, 25(287), 69-90.

Yazıcı, M. & A. Klasra (2010), "Import Content of Exports and J-curve Effect?", *Applied Economics*, 42, 769-776.

Yazıcı, M. & M.Q. Islam (2014), "Exchange Rate and Bilateral Trade Balance of Turkey with EU (15) Countries", *Journal of Business, Economics & Finance*, 3(3), 341-356.

Yazıcı, M. (2010), "Is There A J-Curve Effect In Turkish Services?", *Quality and Quantity*, 44(1), 167-172.

Yu, L. et al. (2015), "Linear and Nonlinear Granger Causality Investigation Between Carbon Market and Crude Oil Market: A Multi-Scale Approach", *Energy Economics*, 51, 300-311.

The Strategies of Turkish Female Managers to Break Glass Ceiling[1]

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Türk Kadın Yöneticilerin Cam Tavan Aşma Stratejileri[2]

Abstract

The number of female employees in the business world is increasing daily; however, managerial positions have disadvantages. They are not significantly represented in corporate leadership positions. The fragile and transparent but real barrier that prevents qualified women from advancing to senior management positions has been conceptualised as the glass ceiling in the literature. This study aims to identify and conceptualise Turkish female managers' strategies to break the glass ceiling through the qualitative research method within the framework of elements that create a glass ceiling, such as gender discrimination and gender prejudices in society, organisational culture, some female-specific behavioural faults, personal compromises and encouragers for a career. Content analysis of the interviews conducted with senior female managers was carried out using the MAXQDA software program. As a result of the study, it has been determined that Turkish female managers apply different strategies in three areas: work-life and family balance, professional life, and career path. These are inspiring strategies for women at all management levels, which they can use to advance their career paths. Among these strategies, the approach that the organisation can support will also be a guide for human resources management practitioners, managers and leaders, and organisational structure and culture designers.

Keywords : Glass Ceiling, Breaking Glass Ceiling, Female Manager.

JEL Classification Codes : J71, M12, M52, M54, M59.

Öz

İş dünyasında kadın çalışanların sayısı her geçen gün artmasına rağmen, yönetici pozisyonlarında bazı dezavantajlara sahiptirler. Kurumlardaki liderlik pozisyonlarında önemli ölçüde temsil edilmemektedirler. Nitelikli kadınların üst düzey yöneticilik pozisyonlarına ilerlemesini engelleyen, çok ince ve şeffaf ama gerçek olan engel, literatürde cam tavan olarak kavramsallaştırılmıştır. Bu çalışmanın amacı, toplumdaki cinsiyet ayrımcılığı ve cinsiyetçi önyargılar, örgüt kültürü, kadınlara özgü bazı davranışsal hatalar, kişisel tavizler ve kariyer için teşvik ediciler gibi cam tavan oluşturan unsurlar çerçevesinde Türk kadın yöneticilerin cam tavanı kırma stratejilerini nitel araştırma yöntemiyle belirlemek ve kavramsallaştırmaktır. MAXQDA yazılım programı kullanılarak, üst düzey kadın yöneticilerle yapılan görüşmelerin içerik analizi gerçekleştirilmiştir. Analiz sonucunda Türk kadın yöneticilerin iş-yaşam ve aile dengesi, iş hayatı ve kariyer yolu olarak

kavramsallaştırılabilecek üç alanda farklı stratejiler uyguladıkları tespit edilmiştir. Bunlar, her yönetim düzeyindeki kadınlar için kariyer yollarını ilerletmekte kullanabilecekleri ilham verici stratejilerdir. Aynı zamanda, bu stratejiler arasında yer alıp kuruluşun destekleyebileceği stratejiler insan kaynakları yönetimi uygulayıcılarına, yönetici ve liderlere, örgüt yapısı ve kültür tasarımcılarına da yol gösterici olabilecektir.

Anahtar Sözcükler : Cam Tavan, Cam Tavan Aşma, Kadın Yönetici.

1. Introduction

Despite a significant increase in women participating in the workforce, women have made slight progress in power and influence in working life (Berry, 2021). Women have certain qualities such as emotional intelligence, being extroverted and coping with stress, a positive approach to life, being more collaborative than men, more sensitive to co-workers than men, which are vital to the survival and success of any business (Goleman, 2004; Goleman, 2012; Berry, 2021), they continue to bang their heads against the glass ceiling (Jones & Palmer, 2011). It has been proved in several research that with these and similar qualities, women leaders make positive contributions to organisations (Nakagawa & Schreiber, 2014; Makochekanwa & Nchake, 2019; Bektur & Arzova, 2022; Graafland, 2020; Burkhardt et al., 2020). However, they must still be significantly represented in corporate leadership positions (Morgan, 1998; Glass & Cook, 2015). When the literature is examined, it is seen that some studies include the factors that create the glass ceiling for women managers. However, a few of these include suggestions for breaking the glass ceiling. Also, studies have yet to reveal strategies for breaking the glass ceiling. On the other hand, due to women managers' positive contributions to organisations, it is important to determine the strategy that can be reached at the senior level. Therefore, this study aims to identify and conceptualise Turkish female managers' strategies to break the glass ceiling through the qualitative research method within the framework of elements that create a glass ceiling, such as gender discrimination and gender prejudices in society, organisational culture, some female-specific behavioural faults, personal compromises and encouragers for a career.

In this context, the research contains four sections: the literature section that emphasises the gap in the literature and explains the framework of elements that create a glass ceiling, such as gender discrimination and gender prejudices in society, organisational culture, some female-specific behavioural faults, personal compromises and encouragers for a career; next, the sample, instruments and data-gathering process are explained in the methodology section. Afterwards, the findings of the content analysis of the interviews conducted with senior female managers are presented, interpreted and summarised, and the conclusion and discussion are presented in the final section.

2. Literature

Female manager is a significant topic in today's male that's hardly getting attention. Today's world needs women in more managerial positions (Akkaya & Üstgörül, 2020). There has been a rapid increase in female executive positions, especially with the significant number of women participating in the workforce in recent years. In the research conducted by Grant Thornton (2021) company to examine the impact of the pandemic period on female managers, with the participation of nearly 5,000 companies from 29 countries, including Türkiye, Türkiye ranked 12th with an average of 35% female managers, while Japan is in the 12th place ranked last with 15%. Considering the results of this study and similar studies, it can be said that women have made slight progress in power and influence in working life (Berry, 2021). However, women still face professional business and managerial disadvantages (Morgan, 1998). In summary, women struggling to achieve workplace equality continue to bang their heads against the glass ceiling (Jones & Palmer, 2011).

Women have specific qualities that can be vital to the survival and success of any business. Emotional intelligence is one of the features that enable the best leaders to maximise the performance of themselves and their followers, and it is seen that women with high emotional intelligence are people who can stand out, are at peace with themselves, and have a positive approach to life (Goleman, 2012). Women are much more collaborative than men in their management styles and listen to their colleagues more than men; even they are more sensitive to co-workers than men. (Berry, 2021). They also have success in being extroverted and coping with stress. They have no difficulty communicating with new people and show affectionate behaviours. Women are more successful than men, especially in empathy, harmony and perceiving (Goleman, 2004; Goleman, 2012). While women leaders positively contribute to organisations with these and similar qualities, they are less significantly represented in corporate leadership positions (Glass & Cook, 2015). This issue is stated as a glass ceiling in the literature and defined as a fragile and transparent but real barrier that prevents qualified women from advancing to senior management positions (Hu & Mybong-Su, 2008). "Ceiling" is an obstacle preventing upward progress, while "Glass" reflects the invisibility of the obstacle (Jauhar & Lau, 2018).

Considering the literature, it is seen that the elements that create a glass ceiling for women have different dimensions. Akpınar-Sposito (2013) interviewed French and Turkish senior female managers in his study and discussed potential career barriers in three categories as a result of the interviews. These are personal compromises, encouragers for career, and organisational culture. When the relevant literature is examined, it has been determined that gender discrimination and gender prejudices in society (Bishop, 2004; Omran et al., 2015; Sahoo & Lenka, 2016; Rüzgar, 2020) and some female-specific behaviours can hinder women while they are climbing the career ladder (Powell et al., 1979; Grant, 1988; Lindsay & Pasquali, 1993). Therefore, this study added categories of social factors and behavioural mistakes to the career barrier categories determined by Akpınar-Sposito (2013).

2.1. Personal Compromises

Both historical and cultural aspects of society affect individuals' sense of self and their way of perceiving equal opportunities. On the other hand, the family is a vital institution in society, especially for women (Barragan & Mills, 2011). For this reason, women make a great effort to simultaneously coordinate the responsibilities required by their work and family lives, and it is a common opinion that having a family for a woman is a significant milestone that affects her career progression (Anafarta et al., 2008: Higgins et al., 1992). There are learned codes that arise depending on the perspective towards women in society, and these codes cause balance problems in work and family life due to women undertaking some family duties or taking all the responsibilities of the family. The fact that they experience work-family conflict more than men, mainly due to the duties imposed on women, also creates an obstacle for women to rise in business life (Gordon & Hall, 1974).

Due to the responsibilities and social roles imposed on women, gender is at the centre of work-life balance (Sullivan & Lewis, 2001). Women are responsible for caring for children and housework, which limits their capacity to follow a career path (Jauhar & Lau, 2018). In addition, women are aware that having children will change family dynamics and prevent them from achieving senior management positions, so some women compromise by slowing down their career progress instead of promoting to an upper level when parenting (Ezzedeen & Ritchey, 2009). Social stereotypes, such as women should give priority to motherhood and being a good wife, and the concessions made by women both negatively affect the process of women's being a manager and weaken the place of women in the business world by reproducing the barriers of women in the career development process (Evetts, 2000). In a study conducted in Mexico, it was determined that women's illegal and part-time work in low-productivity sectors causes them to earn lower income from work and disrupts their social rights (Henry & Fraga, 2019).

A study on women who had academic careers in an Oncology Clinic in England revealed that women considered academic life's cost more than their welfare. They preferred something other than academic life due to childcare, travel, time pressure, and publication conditions (Finn, 2017). On the contrary, in a study conducted on 304 women working in aviation and security business lines, it was revealed that the family responsibilities of the participants did not have a negative impact on their business life and did not prevent them from being promoted to managerial positions, being a mother, spouse or employee did not put pressure on them and did not cause role conflicts (Özenç, 2019).

Another factor affecting women's promotion to senior management levels is self-efficacy. Women who feel inadequate about their job skills believe they will be unsuccessful and think being at the top will make them lonely, so they do not prefer to rise in their careers (Kanter, 1989). Women who lack the necessary knowledge, skills, self-confidence and courage to manage large organisations and enter risky businesses create glass ceilings for themselves (Taşkın, 2017). In addition, assimilating social values without judgment and

accepting negative prejudices against women can be given as examples of the glass ceilings that women create for themselves while advancing in their careers (Rüzgar, 2020).

2.2. Encouragers for Career

Mentors are usually top-level, experienced, knowledgeable and senior employees committed to supporting lower-level employees and helping them rise in their careers (Raabe & Beehr, 2003).

Mentoring relationships are considered important for male employees, but they are especially needed for female managers because mentor support helps female employees and managers overcome the individual and institutional barriers they encounter (Cross & Linehan, 2006).

Due to the scarcity of female employees in senior management positions, junior female employees cannot benefit from professional guidance. When these female managers are deprived of a talented mentor, they may feel worthless and develop intentions to resign (Sahoo & Lenka, 2016).

Women primarily want to get the support of their families and relatives in their career path. In particular, the support of their families is considered a significant factor (Er & Adıgüzel, 2015). Strong relationships and solidarity between family members mean more important opportunities for career advancement for women with children. In a study, it was revealed that women who received support from their families and husbands had significant opportunities in their career path (Akpınar-Sposito, 2013). Moreover, female managers have more leadership and managerial qualities (Akkaya & Üstgörül, 2020).

2.3. Organisational Culture

Women have difficulty developing careers due to the influence of men who outnumber them in their working lives and the masculine organisational culture created by them (Procter & Maureen, 1999). In their study, Afza and Newaz (2008) examined five factors responsible for the glass ceiling effects that restrict women's career opportunities and progression at a particular stage. The study's results showed that organisational culture and perception of management were the most critical determinants of the glass ceiling (Afza & Newaz, 2008).

The fact that organisational culture is mainly shaped by men contributes to the inequality between men and women while simultaneously forming one of the essential elements of the glass ceiling (Bajdo & Dickson, 2001; Vianen et al., 2002). In addition, most men have yet to accept successful women's leadership, and women responsible for leadership roles are often perceived as a threat and a negative challenge for the average male executive (Berry, 2021).

In masculine organisations, women must prove their abilities and perform better than men to reach the same levels as men (Gorman, 2006). In many professional organisations, women face significant barriers regarding promotion, especially when it comes to reaching senior management positions, whereas men only receive support for promotion (As cited in Ansari, 2016). The inequality between men and women in masculine organisations manifests itself differently. For example, a female manager may lose her promotion opportunity against a less experienced male colleague, or a skilled female manager may undergo demotion after maternity leave (Meyerson & Fletcher, 2000). In addition, it is argued that there is no glass ceiling in traditional organisations dominated by masculine culture, and it is claimed that women are given lower wages because they leave work halfway, work less and enter low-risk jobs (Rai & Srivastava, 2010).

In organisations where masculine organisational culture is dominant, the more women climb the career ladder, the higher the risk of encountering more obstacles (Lathabhavan & Balasubramanian, 2017). In addition, male managers in a masculine organisational culture generally perceive their female subordinates as poor performers and have lower performance expectations (Sahoo & Lenka, 2016).

There is no doubt that significant progress has been made in the field of gender equality in the labour market in recent years. Governments, businesses, unions, and women's organisations spend a lot of thought and energy overcoming the attitudes and institutional discrimination that keep women away from specific jobs and hinder their career advancement. Nonetheless, despite all the efforts, women are still concentrated in the world's most insecure forms of work. Breaking the "glass ceiling" still seems complicated to them, except for an elite minority (Berry, 2010).

2.4. Social Factors

Social roles and factors are important in preventing women from advancing on their career path (Kiaye & Singh, 2013). Having responsibilities in family life is not the only situation in which women are affected in their efforts to maintain work-life balance. In addition, the fact that women are considered suitable for specific roles and professions, the idea that men are leaders and gender stereotypes also have societal implications (Sahoo & Lenka, 2016).

From a traditional perspective, specific domestic responsibilities and behaviours such as childcare, laundry, and cooking are expected of women in Türkiye and worldwide. This kind of gender discrimination brings men to the fore and creates a belief that women will "fail" in the jobs that men do (Naz, 2019; Rüzgar, 2020).

A combination of social attitudes and gender inequality in education and training has contributed significantly to occupational discrimination. It has resulted in diverting men and women into different jobs and occupations, a situation called "horizontal separation" (Carnavale & Stone, 1994). Cultural and social attitudes towards what constitutes "male" or

"female" jobs cause occupational discrimination (Akpınar-Sposito, 2013). A study by the International Labor Organization noted that male-dominated occupations are seven times more common than female-dominated occupations (Wirth, 2001).

The basis of gender discrimination in society is the perception that men and women have different skills. It is claimed that women lack qualities such as ambition and trust compared to men, as well as leadership skills such as sociability and influence, and it is also alleged that women do not have the necessary experience or training for leadership (Singh & Terjesen, 2008). There are stereotypes that women are not suitable for senior management positions because they do not have enough enthusiasm to succeed in the business world, are very emotional and do not show aggression (Omran et al., 2015). In addition, researchers have suggested that women need to learn how to compete and negotiate for senior leadership positions (Jones & Palmer, 2011).

In a male-dominated social culture, female managers were only taken seriously for a few years. In such societies, men saw women as short-lived "office flowers" that displayed a decorative appearance with their presence (Bishop, 2004). However, the number of women in executive positions in influential and high-performance-oriented organisational cultures that care about gender equality and human values is increasing (Bajdo & Dickson, 2001).

2.5. Behavioural Faults

It is thought that management is related to masculine behaviours and patriarchal thoughts (Koenig et al., 2011). In generalisations about women's being emotional, they are seen as "motherly". Expecting women to be sincere and affectionate or labelling them as "iron women" when they behave harshly stems from the masculine thoughts women are exposed to (Kanter, 1989). Management has been masculinised because the characteristics attributed to managers, such as entrepreneurship, courage, ambition and adapting to the competitive environment, are thought to be more dominant in men (Basow, 2013). Therefore, the perception that a good manager should be a "man" or "act like a man" is common among both men and women (Powell et al., 1979). So, can women achieve senior management positions without losing their femininity and speaking skills?

Numerous recent studies on organisational behaviour have answered this question. The literature has shown few personality or behavioural differences between male and female managers. As women move up the organisational hierarchy, their identification with the male managerial model of success becomes so essential that they reject even a few valuable feminine managerial traits they previously endorsed (Grant, 1988). Women think they will be empowered by identifying themselves with men who consider themselves successful and by distancing themselves from women who consider themselves ordinary and unsuccessful (Hatmaker, 2013). Many women take a "masculine" attitude when they qualify as managers (Simpson, 1997).

While the barriers created by male managers in career promotion are the subject of discussion, the barriers imposed by female managers are ignored. However, "queen bee syndrome", expressed as women struggling with each other, is one of the behavioural faults women make and prevents female managers from advancing to the upper management levels on the career ladder (Rüzgar, 2020).

3. Methodology

3.1. Sample

Within the scope of this research, which was completed in mid-2021, interviews were held with ten female executives who worked at senior management levels, such as Board Members, General Managers, and Regional Managers in various sectors. By adopting the purpose-oriented sampling technique, the study aimed to reach women who worked at senior management levels during the data period when the interviews were conducted. Therefore, senior female managers constitute the sample group of the research to determine which strategies they used to overcome the glass ceiling.

3.2. Instruments

Some studies in the literature (Akpınar-Sposito, 2013; Bishop, 2004; Omran et al., 2015; Sahoo & Lenka, 2016; Rüzgar, 2020) found that factors such as gender discrimination and gender biases in society, organisational culture, some female-specific behavioural errors, personal compromises and encouragers for a career can be an obstacle to women while climbing the career ladder. Based on these studies, a semi-structured interview form was created to conduct in-depth interviews to determine the strategies that female managers who reached senior management positions implemented to overcome these obstacles. The interview form consisted of two sections: questions for determining demographic characteristics and questions for determining the strategies of female managers to overcome the glass ceiling.

3.3. Data-gathering Process

To present a study that could be useful to female managers working in different sectors, in-depth interviews were conducted online via Google Meet with a total of 10 senior female executives from differentiated sectors such as Pharmaceuticals, Energy, Law, Art, Aviation, Cosmetics, Banking, Technology and Food, on predetermined days and hours. All interviews were recorded during the interview thanks to the service provided by the Google Meet application. Each interview video was then replayed and deciphered. The deciphered interview texts were uploaded to the MAXQDA software program and read individually. Different codes for main themes, sub-themes, and different expressions were also defined during readings. This process continued until the end of 10 interview texts. To ensure the validity and reliability of the defined codes, the re-encoding process was performed one week later, and the new codes and the codes made a week ago were compared. The comparison clustered the main themes, sub-themes, and codes similarly.

A committee of researchers and academicians who know about the glass ceiling discussed the codes and themes that emerged from the coding process. As a result of the discussions, some codes and themes were renamed.

4. Findings

The analysis determined that female managers who reached senior management positions used strategies in three main areas: ensuring work-life and family balance, coping with various situations encountered in business life, and progressing in their career paths.

Figure: 1
Main Areas Women in Work Life Apply Strategies
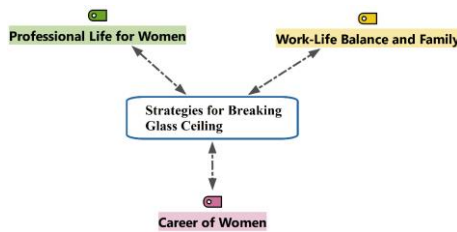
4.1. The Strategies for Women's Professional Life

In the analysis performed regarding the difficulties faced by women in the business world, it was determined that eight women emphasised the extra burdens caused by gender roles, six women the obligation of working and endeavouring more, three women gendered judgments in 5 different points, five women gender-based discrimination in 6 different points, seven women gender-based exclusions in 13 different points, one woman fear of being stigmatised due to gender-based disadvantages in 2 different points and one woman sexual harassment.

Among these difficulties, to deal with discrimination, gender stereotypes, and inhibitions, it was observed that they implemented strategies such as common and open communication, overwork and being lawless, discreet communication, patience and unresponsiveness, self-limitation for appearance, avoidance of conflict, developing a hobby for joining the group, and respect for privacy and family life.

Among these strategies applied for acceptance, it is pretty remarkable that women impose dress restrictions on themselves, develop common hobbies to be included in the work networks of their male colleagues, and emphasise respect for privacy to prove that they are harmless women in terms of family life. Women's statements regarding dress restrictions are as follows:

"I have paid great attention to my clothing; there is no décolleté, I pay attention to that. It's already annoying. Even if it's just one person, it already bothers you as soon as you feel it" (Interviewee 2, 49)

"When I got divorced, I abstained from…until I got married again, paid attention to my appearance... I applied less makeup, dressed more unpretentiously...." (Interviewee 8, 40)

Figure: 2
The Difficulties and Strategies for Women's Professional Life
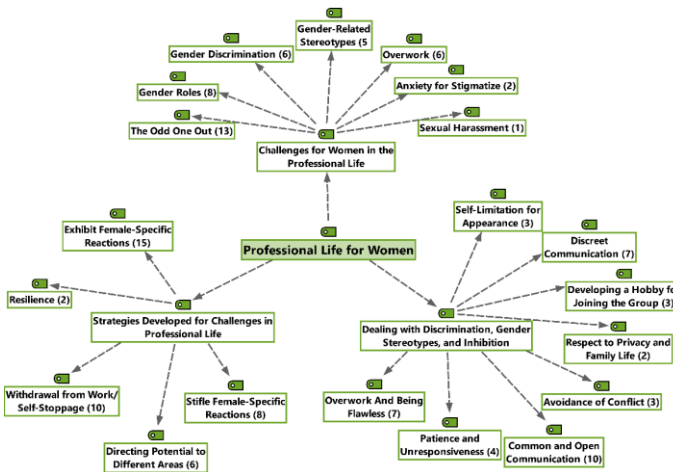
Female executives' statements about developing common hobbies to be included in their male colleagues' networks include:

"…I mean, sometimes if revilement needs to be necessary, I use bad language too; when there is a football game, I go to the game… I had a season ticket, too, so I was going to. We had a few drinks at Develi Restaurant and then went to the game. But men need to accept you there, too. Not just you alone either. The issue of being together as a man and a woman is critical there. (Interviewee 8, 40)

"I have luck with that issue; for example, there are always game comments at our house on Sunday evenings. My favourite team is Fenerbahçe. I don't know about offside, but I'm generally close to sports. That's why I always had a keen ear for things that interest them. I mean, at first, I didn't do this consciously. But then I tried to make it up a bit. So I could be included among them. Nobody says you can't get into a group, but an invisible wall has been drawn into the room when you cannot be included in that conversation." (Interviewee 10, 50)

The expressions of female managers about the strategies of emphasising respect for private life to prove that they are harmless women in terms of family life are as follows:

"First of all, the most important factor here is my connection to my family, my connection to my husband, their knowledge of that relationship and the fact that I share them. Then, my interest in his wife or children or his relationship… I respect his private life and ask about his wife and kids. I think it's a significant factor that each of us knows our private lives and somehow knows the family structure, even from a distance. ……" (Interviewee 1, 42)

"……as I said, you have a good family life. Most importantly, you pay more attention to your clothing when with those people. Thirdly, with your behaviour, your speeches, your expressions, your gaze, you give the impression that in any way I or my husband will not harm you or pose a threat to you." (Interviewee 2, 49)

To cope with other difficulties encountered in business life, it was found that female managers sometimes implement strategies such as showing female-specific reactions, stifling female-specific reactions, withdrawing from work/self-stoppage, directing potential to different areas and resilience. Half of the participants admitted that they had female-specific reactions and stated that their reactions did not harm them on their career journey and that they continued to show such reactions consciously.

"So sometimes, as women, we can have a higher sensuality. No matter how much you try to destroy it, there are times when your eyes are close to being full of tears, and you have difficulty in gulping. I think it's important to prevent them because men never react that way to anything in business. I have been in this situation a few times but didn't see it as a mistake." (Interviewee 1, 42)

Still, it is necessary to be more strategic about some things. I underwent the results, and it's induced. But I would not linger on myself; I said, "So be it...". I'm a moderate but straightforward woman, and if it had created a problem, I said, "That's who I am. " I understood it and said, "That's why it happened." But I didn't dwell on it. (Interviewee 5, 56)

"I don't see it as a mistake. But it can be seen as a mistake by men. I always try to solve things tolerantly. I always empathise and think about why the other person reacted that way. Although some male managers characterise this as a lack of willpower or too maternal, I have never been harmed by it." (Interviewee 6, 50)

"I believe very much that the naive side of female managers is a balance. The breathing of a female manager creates steps that balance the management at points where a male manager may be aggressive. Female managers have a feature that softens what needs to be managed and can turn a hard situation

into a soft one. This is not negativity; on the contrary, I have experienced
many times the positivity of it." (Interviewee 7, 40)

"I do things like If my daughter or son calls me at the most important meeting,
I pick up the phone and say it's important to me. I used to do it more often
when the kids were little. Now, for instance, after losing my mother, my father
is alone. My father's caretaker calls, and I say I have to pick up that phone,
and I do so…. But I can say, when I go back in my career, these are the things
that every male manager would not do….. I prefer to reveal my feminine
reactions more clearly on purpose because I don't need to succeed like a man."
(Interviewee 10, 50)

4.2. The Strategies for Work-Life Balance and Family

The analyses revealed that women emphasised family culture, childcare, social
support, and their efforts in terms of work-life balance and family. They can balance work-
life and family life by combining their efforts with the opportunities offered by family
culture, childcare, and social support.

Figure: 3
The Difficulties and Strategies for Work-Life Balance and Family
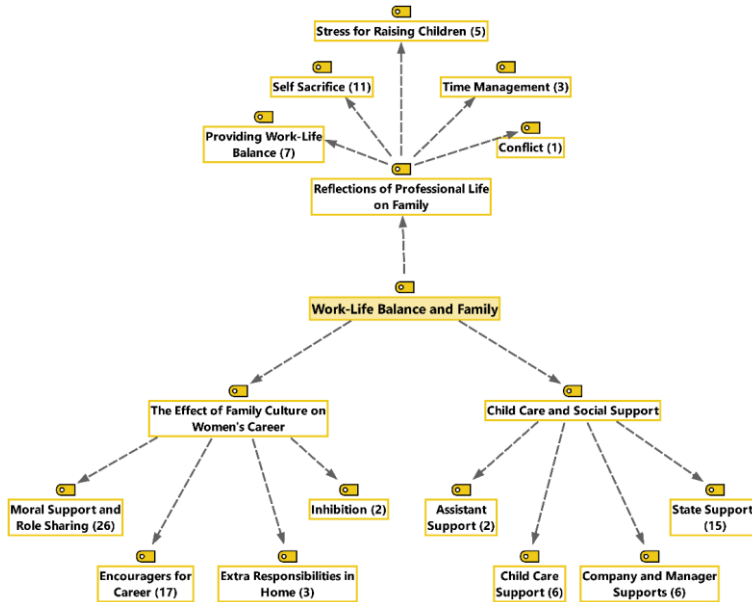
It has been understood that female managers adopt an understanding that cares about
women's being in working life in the family culture of both their parents and spouses and

spouses' parents in terms of providing work-life and family balance. It has influenced women's career paths and is an important reflection of this culture. Moral support, role sharing, and encouragement for careers have influenced the career path of women and are important reflections of this culture. Only two female managers stated that their husbands' families wanted to prevent them, but they did not allow this due to the influence of their own family culture.

> "My mom and dad never set a barrier before me; they always set me free. Since I was kind of a child who did my work and always showed it, they couldn't set it. Then, my husband's family wanted to set it, but they failed." (Interviewee 6, 50)

> "That's true. I was experiencing things like this, but it wasn't something that prevented me. I heard a sentence saying that your job is a priority. But that's not what caused us to break up. Yes, his family had a more traditional attitude on this issue. But it didn't affect me much as our cities were different, so it didn't affect me in that sense. I mean, at least I didn't stop for something like that. More precisely, because of the family that raised me or my character, I always gave importance to my career, and I am not someone to see my husband or children as an obstacle." (Interviewee 8, 40)

Although there is an understanding that values and supports the presence of women in the work life, it is understood that, nevertheless, due to gender roles, women may have to take on more responsibility within the family to balance work-life and family life.

> "Unfortunately, cooking is on women. If I prepare breakfast, we have breakfast. But on the weekends, my husband prepares breakfast. There is such a share of work, but only on the weekends. For example, I prepare it for five days. If I don't do anything, we will all be hungry. It is always women who think even about what to eat. So why is it always me?.....

> ..... When you consider it, yes, even if there is no such pressure, there is such acceptance. The woman cleans the house, the woman cooks, the woman is responsible for doing the laundry……..

> ..... For example, my husband is incapable of even cutting bread. I accepted that he doesn't have that dexterity. There's nothing to do. He wasn't taught to do that. He was told that he couldn't. It's in our hands, in the hands of mothers. So, I'm trying to encourage my son to go in the kitchen and tell him, "I'll tell you, and you'll do it now. Learn to make pasta; you have to feed yourself; don't be dependent on anyone; you have to do your own thing." (Interviewee 9, 47)

In the case of childcare, which is an important element of work-life and family balance, the female managers stated that the state support and the permissions offered for

the woman were inadequate, that the maternity leave period should be extended, that the options of working from home after childbirth and/or part-time work should be offered, and that fathers should be given the right to use as much leave as the woman with the newborn baby. The examples for these recommendations are as follows:

> "I think that men and women, not just women, should be given responsibility together. Since I also want to go out and work. It doesn't comfort me that I'm given a year of unpaid leave……. regulation needs to take men in and women in. Men should be given what is given to women in childcare so that tradition could change slightly." (Interviewee 8, 40)

> "In that sense, it is important for the state to remind also men that he has a baby, as well as just as hold the women responsible. In this sense, holding men responsible is important to make it easy for women. Otherwise, it is unfortunately possible to use the woman as a birth machine." (Interviewee 10, 50)

> "…….. Since working systems such as home office have increased even more, I think that in that period, maybe after the first six months, the women can be supported with a system such as working from home until the child turns one year old." (Interviewee 9, 47)

> "I think there should be the opportunity to work part-time there. I support this a lot. You can work part-time. Secondly, if you can do your job from home, you should be allowed to work from home. You can get your files and enter them from home. Thirdly, the measures against the risk of women's losing their job should be much more stringent, and the maternity leave should be extended to at least one year." (Interviewee 5, 56)

While the support of family and caregivers in childcare is important for female managers, the support of the company and managers is undeniable. Five different female managers benefited from these supports. A few examples of the support received by women managers are given below.

> "…apart from that, the opportunities provided by the companies more than any opportunity provided by the state-supported me in this regard." (Interviewee 1, 42)

> "…….. such incidents have been overcome as a result of processes such as my senior manager's providing a more sharing environment and taking more responsibility when faced with these situations." (Interviewee 3, 43)

> "…. we had breast-feeding permission at the time. I didn't have a chance to go home as I was working at the airport on breast-feeding permission. So, I determined one day a week to combine breastfeeding permission times until the kid was one year old and did not go to work that day. I hardly went to work

on Wednesdays. It helped me that way. Other than that, I used unpaid leave. I took unpaid leave to take care of the baby until she was six months old. I mean, I was having a little trouble, to be honest….." (Interviewee 9, 47)

"The company I worked for was very flexible in that sense. ….. At that time, although there was no opportunity in Türkiye, I could use maternity leave for six months each. Since I worked in a company that gave me more opportunities to be promoted every 2-3 years and had flexible working hours, no one called me then and said anything. Therefore, I think that the policies of the institutions are very balanced. …… We had an American manager when I worked for a multinational company. I clearly remember walking into his room, shivering. He also thought that I was going to quit my job. …… He was a male manager. I said I was pregnant, the man jumped up, hugged me and, kissed me, congratulated me and said, "You are living one of the best things in your life; you are good at your job; I will take care of your promotion, don't worry about it." (Interviewee 10, 50)

4.3. The Strategies for Career Path

As a result of the analysis, it has been revealed that women emphasise the prevailing opinion on promoting women in the organisation, their managerial influences, and their efforts and characteristics on the career path. Based on their efforts and characteristics, it is understood that they can advance in their career journey by benefiting from the institution's support for promoting women and combating the adverse effects of other managers.

Women managers emphasised that personal characteristics and efforts such as the power of expertise, personality characteristics, analytic intelligence, discipline and diligence, holistic approach, detailer, solution-oriented, relationship-oriented, emotional intelligence, and training are important to advance their career journey by distinguishing themselves from their competitors.

It is understood that with the superiority created by these personal characteristics and efforts, they apply the strategies of using the understanding that supports the promotion of women and managing the adverse effects of other managers. Although eight female managers stated that there is an understanding supporting the promotion of women in the organisation, only one female manager said that she faced positive discrimination in promoting women.

"………an American firm, it's something desirable for women to come to the top level here. ….. They already had women improvement projects, you know, aimed at increasing the number of female managers. ….. There was a project like if two candidates applied for a job application and everything was equal, privilege would be given to the woman." (Interviewee 1, 42)

On the other hand, three women stated that the understanding of equality prevails in promoting female and male candidates, and their confidence in them supports promotion.

Although female managers stated that the promotion of women was supported in the institutions they worked for, they said that subordinates and other male managers made negative assessments of the promotion of women. From the negative assessments stated, it is understood that women are only sometimes accepted in the positions they are promoted to. The sample statements for these assessments are as follows:

"…… I see that the executive style of women is a little less supported; I can say that. In other words, I hear that women have more rigid insight, are more despotic than men, and take straight and firm steps. I've been witnessing many of them. It is also said that it is easier to work with men, but more difficult to work with female managers………" (Interviewee 2, 49)

"…. Male managers, especially if they have been doing this job for many years, have an " I know it better" attitude to new female managers. They tend to show that they have been here for years and know this job best. They have an insight that the new manager is not that good, especially if the newcomer is a woman." (Interviewee 4, 58)

Figure: 4
The Difficulties and Strategies for Career Path
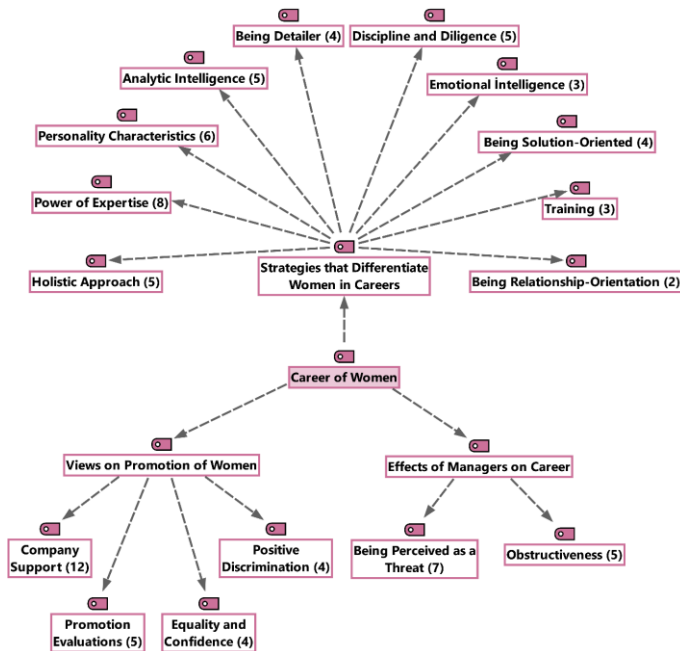
The latest situation understood in the analysis is that in their career path, women managers had to apply strategies such as convincing the male managers that they were no threat, keeping a distance and focusing on their work to regulate their relations with other managers who perceive themselves as a danger. Examples of women managers' perceptions of threats by different managers and the strategies they implemented are as follows:

"In a company where I had just joined, some of the responsibilities of a female manager had been given to me due to my competencies. Therefore, I was seen as a threat. Frankly, I first tried to approach it like this: I tried to understand the situation of that woman as a woman. I tried to convince her that I understood her a little more and was not a threat to her. She went on a little longer; I kept myself away from her. When I put that distance, I focused on my work and got out of her span of authority; after a certain period, she was more relaxed. After that, we did not make any moves that would hurt each other, as she was probably convinced in her way. In other words, there was still a secret women's solidarity there." (Interviewee 1, 42)

"Such behaviours were shown. But I don't think they are behaviours related to being a woman or a man. I'm a woman; they're men. This is just human nature." (Interviewee 5, 56)

"I mean, such things occurred; for instance, men expected to be promoted to my position. But I was brought to their top position, for example, and I was brought from outside my institution. So, of course, they tried to find fault in what I did; they conveyed this to the bosses, they tried to make me look unsuccessful at work, and they tried to undermine the trust of my customers with words like" she can't do this as her team is insufficient in number", but somehow I overcame them all." (Interviewee 6, 50)

Some female executives stated that they were not only seen as a threat but also encountered other managers who deliberately tried to hinder their career path.

"I mean, such things occurred; for example, men expected to be promoted to my position. But I was brought to their top position, and I was brought from outside my institution. Of course, they tried to find fault in what I did; they conveyed this to the bosses, they tried to make me look unsuccessful at work, and they tried to undermine the trust of my customers with statements like "she can't do this, her team is insufficient in number", but somehow I overcame them all." (Interviewee 6, 50)

"…..I saw this behaviour very seriously in one or two of my counterparts… I had a lot of joint projects with them. They don't get you involved. You agree to do the project together, and your manager will allow you to do it together. The man does not include you in it. He says," Okay, I will explain," but later, he does not. He repeats this three times five times but still does not explain it

to you. You see what he is doing from your back. If your administrator can't solve it, the problem will not be resolved. Yes, I have experienced these, so I was very unhappy there." (Interviewee 8, 40)

5. Conclusion and Discussion

Although the number of women in the business world has increased in recent years compared to the past, women still face disadvantages in professional business life and managerial positions. Women who struggle to survive in business and reach management positions try to break the glass ceiling, an invisible obstacle. As a result of this study, which aims to inspire women who are struggling to break the glass ceiling by identifying the strategies applied by women who have achieved this, it was revealed that female managers who reached senior management positions implemented strategy in three main areas which are ensuring work-life and family balance, dealing with various situations in business life and advancing their career path.

The results of the analysis showed that women faced problems such as extra burdens created by gender roles in the business world, the obligation to overwork and endeavour more, gendered judgments, gender-based discrimination, gender-based exclusions, being stigmatised due to gender-based disadvantages, and sexual harassment. In the study by Metz and Tharenou (2001), women stated that they most frequently faced the barrier of gender discrimination at every management level. We can say that these problems stem from the reflections of the opinion on women and their roles that prevail in most of society. These findings are similar to those of the study conducted by Näsman and *Hyvönen (2016).* They also stated in their research that women's chances of reaching top management positions are very low due to the understanding of women's family responsibilities, caring and mothering duties and the necessity of obedience to men, and they explained the reason for this as Brazilian society's being characterised by conservative approach and machismo. Considering that Turkish society is characterised similarly, it seems usual for female administrators to encounter similar problems. Although the families of the women managers and their husbands who participated in this research do not have such an understanding, the fact that individuals brought up in the prevailing view of society carry this understanding of the business environment causes women managers to encounter these problems.

To deal with discrimination, gender stereotypes and inhibitions at the workplace, it was observed that women implemented strategies such as common and open communication, overwork and being lawless, discreet communication, patience and unresponsiveness, self-limitation for appearance, avoidance of conflict, developing a hobby for joining the group and respect to the privacy and family life. These results support the results stated by Johnson et al. (2008). They have said that women leaders/managers must be warm, sensitive, and caring to handle stereotypes associated with their gender roles. These results are also similar to the results of the study conducted by İşeri and Çalık (2019). İşeri and Çalık (2019) revealed that female school administrators develop solutions such as trying to promote themselves with their attitudes and behaviours, showing generosity, proving that

they are successful and ignoring some situations to eliminate the problems they experience regarding their social acceptance in the school. While the solutions in question are reactive responses to pacify the emerging situation, we can state that the strategies identified in this study are proactive strategies that will change the course of the problem.

Descriptive gender stereotypes are important for people's perceptions of men and women. They enable one to gain impressions about others quickly and easily. Research has shown that some individual qualities of women, such as physical attractiveness and motherhood, cause them to be evaluated more negatively than their male counterparts and women who do not have these qualities (Colella & King, 2018). Therefore, in order not to trigger gender discrimination, women can be advised to avoid clothing styles and make-up that will reveal physical attractiveness and to avoid sharing information about private life, such as marital status and motherhood, until they are recognised in the workplace just like the female managers participating in the current research did. According to the research findings, communication is essential to cope with gender stereotypes. For this reason, physically attractive women, especially, may be advised to emphasise that they respect their private lives and establish respectful communication to network with their male colleagues. In addition, being warm, sensitive, and caring in their communication with everyone in the work environment can stifle negative evaluations arising from gender stereotypes and enable them to be accepted. These suggestions for women are to combat gender discrimination stereotypes in the short term individually, and they are not sufficient. It should be supported by organisational policies and new social values created by the state.

To cope with other difficulties encountered in business life, it was found that female managers sometimes implement strategies such as exhibiting female-specific reactions, stifling female-specific reactions, withdrawing from work/self-stoppage, directing potential to different areas and resilience. Among these strategies, it is remarkable that female managers use female-specific responses according to the situation. Even though it was stated in some earlier studies that women need to act like men to be taken seriously and succeed (Gilderhus, 1987; Mani, 1997), some companies adopted the approach of educating female employees to act like men and take on tough tasks (Meyerson & Fletcher, 2000), today's female managers who participated in our research stated that they considered female specific reactions as particularly useful and did not care about how others understood them. They indicated that they did not feel obliged to succeed by acting like men and that they deliberately gave female-specific reactions. For this reason, it may be recommended that women analyse their situation at work and display female-specific reactions or stifle feminine reactions as appropriate.

It has been revealed that women emphasise family culture, childcare, and social support, as well as their work-life balance and family efforts. It is understood that they can balance work-life and family life by combining family culture with the opportunities offered by childcare, social support, and individual effort. It has been understood that moral support, role sharing, and encouragers for careers within the family significantly impact women's career paths. Despite role sharing and encouragers for career, it was concluded that women

may have to assume more responsibilities within the family to balance work-life and family life due to gender roles.

Regarding childcare, one of the essential elements of work-life and family balance, female administrators stated that the state support and the leave provided for women were insufficient. They expressed the need to extend the period of maternity leave, to offer options to work from home and/or to work part-time after giving birth, and to give fathers, in particular, the right to take leave with their newborn baby as much as women. While the support of family and caregivers in childcare is of great importance for female managers, it has been observed that the support of companies and managers is at a level that cannot be ignored. Today, many companies understand the importance of keeping the female employees they invest in. For this reason, they carry out various studies to ensure that professional women stay in business. For example, IBM grants female employees the right to be on leave for one year and work part-time for two years when they become mothers (Butler, 2006). In that case, companies can make positive discrimination practices such as whole-home or part-time home office work and longer leave rights for female employees with children, forming a policy about them. Also, the state can legislate for these practices and childcare leave for men with children.

As a result of the analysis, it was concluded that based on their efforts and characteristics, women managers could advance in their career journey by benefiting from the institution's support for promoting women and struggling with the adverse effects of other managers. It can be said that personal characteristics and efforts such as power of expertise, personality traits, analytic intelligence, discipline and diligence, holistic approach, detailer, solution-oriented, relationship-oriented, emotional intelligence and training impact women managers' promotion. It is understood that in favour of the superiority created by these personal characteristics and efforts, they apply the strategies of using the understanding that supports the promotion of women and managing the adverse effects of other managers. In that case, women can be suggested to improve their characteristics and efforts to be appropriate for a job. It has been determined that to regulate their relations with other managers who perceive them as a danger, female managers apply strategies such as convincing them that they are not a threat to them, keeping their distance and focusing on their work. These results support the approach of Ragins and Sundstrom (1989), whose early study examined how women advance to leadership positions. They revealed the advancement factors for women managers at four levels: individual, interpersonal, organisational, and social systems. The personal level focuses on individual resources; the interpersonal level focuses on relationships with subordinates, peers, and, in particular, supervisors; the organisational level states selection and promotion practices in the organisation. The social systems level focuses on gender stereotypes stemming from society. In addition to the advice above that women can improve their personal characteristics and personal efforts to be appropriate for a job, women can be suggested that they should positively communicate with subordinate, peer and their managers and select to work in organisations that provide convenience for them. Also, they should follow the advantages of organisation for promotion.

The strategies revealed in the study are inspiring strategies that women at all levels of management can benefit from to advance in their career journey. The strategy the organisation can support will also be a guide for human resources management practitioners, managers and leaders, and organisational structure and culture designers. Female leaders and managers should be brought forward to lead others toward a better future (Akkaya & Üstgörül, 2020).

In future academic studies, factors affecting women's ability to implement these strategies can be determined, scales can be developed, or the relationship and effect levels between other variables related to these strategies can be examined.

References

Adler, N.J. (1993), "An international perspective on the barriers to the advancement of women managers", *Applied Psychology*, 42(4), 289-300.

Afza, R. et al. (2008), "Factors Determining the Presence of Glass Ceiling and Influencing Women Career Advancement in Bangladesh", *BRAC University Journal*, 5(1), 85-92.

Akkaya, B. & S. Üstgörül (2020), "Leadership styles and female managers in perspective of agile leadership", in: *Agile Business Leadership Methods for Industry 4.0* (121-137), Emerald Publishing Limited, Leeds.

Akpınar-Sposito, C. (2013), "The Glass Ceiling: Structural, Cultural and Organizational Career Barriers for French and Turkish Women Executives", *Procedia-Social and Behavioral Sciences*, (75), 488-497.

Al-Manasra, E.A. (2013), "What are the 'Glass Ceiling' barriers effects on women career progress in Jordan?", *International Journal of Business and Management*, 8(6), 40-46.

Anafarta, N. et al. (2008), "Konaklama İşletmelerinde Kadın Yöneticilerin Cam Tavan Algısı: Antalya İlinde Bir Araştırma", *Akdeniz İİBF Dergisi*, (15), 111-137.

Ansari, S. (2016), "Respectable femininity: a significant panel of glass ceiling for career women", *Gender in Management: An International Journal*, 31(8), 528-541.

Arfken, D.E. et al. (2004), "The ultimate glass ceiling revisited: The presence of women on corporate boards", *Journal of Business Ethics*, 50(2), 177-186.

Bajdo, L.M. & M.W. Dickson (2001), "Perceptions of Organizational Culture and Women's Advancement in Organizations: A Cross-Cultural Examination", *Sex Roles*, 45(5-6), 399-414.

Barragan, S. et al. (2011), "The Mexican Glass Ceiling and The Construction of Equal Opportunities: Narratives of Women Managers", *Journal Workplace Rights*, 15(3-4), 255-277.

Basow, S.A. (2013), "Women in Management: Does Manager Equal Male?", in: A.P. Michele (ed.), *Women and Management: Global Issues and Promising Solutions Vol. 1* (3-17), ABC-CLIO.

Baumgartner, M.S. & D.E. Schneider (2010), "Perceptions of women in management: A thematic analysis of razing the glass ceiling", *Journal of Career Development*, 37(2), 559-576.

Bektur, Ç. & S.B. Arzova (2022), "The effect of women managers in the board of directors of companies on the integrated reporting: example of Istanbul Stock Exchange (ISE) Sustainability Index", *Journal of Sustainable Finance & Investment*, 12(2), 638-654.

Berry, P. (2010), "Women in The World of Corporate Business: Looking At The Glass Ceiling", *Contemporary Issues In Education Research*, 3(2), 1-10.

Bishop, B.J. (2001), *Gender Regime and Gender Orders: Women workers in the post-war model of capitalism in Japan*. <http://www.shef.ac.uk/socst/Shop/bishop.pdf>, 06.01.2022.

Burkhardt, K. et al. (2020), "Agents of change: Women in top management and corporate environmental performance", *Corporate Social Responsibility and Environmental*, 27(4), 1591-1604.

Butler, K.M. (2006), "Today's working women seek mentors, motherhood transition", *Employee Benefit News*, 20, 17-19.

Carnevale, P. & S.C. Stone (1994), "Diversity beyond the golden rule", *Training and Development*, 48(10), 22-39.

Chen, L.Y.I. (2005), *A study of the glass ceiling and strategies for women's career advancement*, Lynn University.

Choi, S. & C. Park (2014), "Glass Ceiling in Korean Civil Service: Analyzing Barriers to Women's Career Advancement in the Korean Government", *Public Personnel Management*, 43(1), 118-139.

Colella, A. & E. King (eds.) (2018), *The Oxford Handbook of Workplace Discrimination*, Oxford University Press.

Cross, C. & M. Linehan (2006), "Barriers to advancing female careers in the high-tech sector: empirical evidence from Ireland", *Women in Management Review*, 21(1), 28-39.

Enid Kiaye, R. & A. Maniraj Singh (2013), "The glass ceiling: a perspective of women working in Durban", *Gender in Management: An International Journal*, 28(1), 28-42.

Er, O. & O. Adıgüzel (2015), "Cam tavan gölgesindeki kraliçe arılar: Kadınların kariyer ilerlemelerinde karşılaştıkları engeller ve etkili liderlik", *Recep Tayyip Erdoğan Üniversitesi Sosyal Bilimler Dergisi*, 1(2), 163-175.

Evetts, J. (2000), "Analyzing change in women's careers: Culture, structure and action dimensions", *Gender, Work & Organization*, 7(1), 57-67.

Ezzedeen, S. & K. Ritchey (2009), "Career advancement and family balance strategies of executive women", *Gender in Management: An International Journal*, 24(6), 388-411.

Finn, C.F. (2017), "Breaking the Glass Ceiling for Women in Academic Clinical Oncology in the UK: A Personal View", *Clinical Oncology*, 29, 1-2.

Gilderhus, M.T. (1987), "Many Mexicos: Tradition and Innovation in the Recent Historiography", *Latin American Research Review*, 22(1), 204-213.

Glass, C. & A. Cook (2016), "Leading at the top: Understanding women's challenges above the glass ceiling", *The Leadership Quarterly*, 27(1), 51-63.

Goleman, D. (2004), "What makes a leader", *Harvard Business Review*, (82), 82-91.

Goleman, D. (2012), *Emotional intelligence: Why it can matter more than IQ*, Bantam.

Gordon, F.E. & D.T. Hall (1974), "Self-image and stereotypes of femininity: Their relationship to women's role conflicts and coping", *Journal of Applied Psychology*, 59(2), 241-243.

Gorman, E.H. (2006), "Work Uncertainty and the Promotion of Professional Women: The Case of Law Firm Partnership", *Social Forces*, 85(2), 865-890.

Graafland, J. (2020), "Women in management and sustainable development of SMEs: Do relational environmental management instruments matter?", *Corporate Social Responsibility and Environmental Management*, 27(5), 2320-2328.

Grant Thornton International Ltd. (2021), *Women in Business A Window of Opportunity*, <https://www.grantthornton.com.tr/globalassets/_markets_/tur/media/pdf/grant-thornton-women-in-business-report-2021.pdf>, 08.03.2021.

Grant, J. (1988), "Women as Managers: What They Can Offer to Organizations", *Organizational Dynamics*, 16(3), 56-63.

Hatmaker, D.M. (2013), "Engineering identity: Gender and professional identity negotiation among women engineers", *Gender, Work & Organization*, 20(4), 382-396.

Henry, C. & F. Fraga (2019), "Gender equality and old-age income security: The case of Mexico", *Research Department Working*, 53, 8-32.

Higgins, C.A. et al. (2004), "Work-family conflict in the dual-career family", *Organizational Behavior and Human Decision Processes*, 51(1), 51-75.

Hu, T. & Y. Mybong-Su (2008), "Is the Glass Ceiling Cracking? A Simple Test", *Iza Discussion Papers*, Paper No: 3518.

Ismail, M. & M. Ibrahim (2008), "Barriers to career progression faced by women: Evidence from a Malaysian multinational oil company", *Gender in Management: An International Journal*, 23(1), 51-66.

İşeri, E.T. & T. Çalık (2019), "Kadın Okul Yöneticilerinin Karşılaştıkları Kurumsal Kariyer Engelleri ve Bunları Aşmaya Yönelik Çözüm Yolları", *İnsan ve Toplum Bilimleri Araştırmaları Dergisi*, 8(3), 1470-1503.

Jauhar, J. & V. Lau (2018), "The 'Glass Ceiling' and Women's Career Advancement to Top Management: The Moderating Effect of Social Support", *Global Business and Management Research: An International Journal*, 10(1), 163-178.

Johnson, S.K. et al. (2008), "The strong, sensitive type: Effects of gender stereotypes and leadership prototypes on the evaluation of male and female leaders", *Organizational Behavior and Human Decision Processes*, 106(1), 39-60.

Jones, S.J. & E.M. Palmer (2011), "Glass ceilings and catfights: Career barriers for professional women in academia", *Advancing Women in Leadership Journal*, 31, 189-198.

Kanter, R.M. (1989), "Work and family in the United States: A critical review and agenda for research and policy", *Family Business Review*, 2(1), 77-114.

Karadag, N. (2018), "Determining the Difficulties Female Managers Experience in Higher Education and the Factors Supporting Them", *Educational Policy Analysis and Strategic Research*, 13(3), 74-88.

Keenawinna, K.A.S.T. & T.L. Sajeevanie (2015), "Impact of Glass Ceiling on Career Development of Women A Study of Women Branch Managers in State Owned Commercial Banks in Sri Lanka", *2nd International Human Resource Management Conference*.

Kılıç, T. (2017), "Relationship between glass ceiling syndrome and self-efficacy; in health sector", *European Journal of Multidisciplinary Studies*, 2(3), 84-87.

Koenig, A.M. et al. (2011), "Are leader stereotypes masculine? A meta-analysis of three research paradigms", *Psychological Bulletin*, 137(4), 616-642.

Lindsay, C.P. & J.M. Pasquali (1993), "The wounded feminine: from organizational abuse to personal healing", *Business Horizons*, 36(2), 35-42.

Makochekanwa, A. & M.A. Nchake (2019), "Do Female Managers Affect Productivity? Evidence from Zimbabwean Manufacturing Firms", *African Development Review*, 31(3), 364-379.

Mani, B.G. (1997), "Gender and the federal senior executive service: Where is the glass ceiling?", *Public Personnel Management*, 26(4), 545-558.

McCrady, B.S. (2012), "Overcoming the glass ceiling: Views from the cellar and the roof", *Behavior Therapy*, 43, 718-720.

Metz, I. & P. Tharenou (2001), "Women's career advancement: The relative contribution of human and social capital", *Group & Organization Management*, 26(3), 312-342.

Meyerson, D.E. & J.K. Fletcher (2000), "A modest manifesto for shattering the glass ceiling", *Harvard Business Review*, 78(1), 126-136.

Meyerson, D.E. & J.K. Fletcher (2000), "A modest manifesto for shattering the glass ceiling", *Harvard Business Review*, 78(1), 126-136.

Morgan, L.A. (1998), "Glass-ceiling effect or cohort effect? A longitudinal study of the gender earnings gap for engineers, 1982 to 1989", *American Sociological Review*, 63(4), 479-493.

Nakagawa, Y. & G.M. Schreiber (2014), "Women As Drivers of Japanese Firms Success: The Effect of Women Managers and Gender Diversity on Firm Performance", *Journal of Diversity Management*, 9(1), 19-40.

Näsman, C. & C. Hyvönen (2016), *Gender and Leadership in Brazil-a Study on Women in Management Positions*, UMEA Universitet, Sweden.

Naz, R. (2019), *Women in business life*, Istanbul Business Administration Institute, <https://www.iienstitu.com/blog/is-hayatinda-kadinlar>, 15.03.2021.

Özenç, M.Ç. & M.A. Salepçioğlu (2019), "Erkek egemen işlerde çalışan kadınlarda cam tavan sendromu ve iş motivasyonu", *Anadolu Bil Meslek Yüksekokulu Dergisi*, 14(56), 313-333.

Powell, G.N. & D.A. Butterfield (1979), "The 'good manager': Masculine or androgynous?", *Academy of Management Journal*, 22(2), 395-403.

Procter, I. & M. Padfield (1999), "Work orientations and women's work: A critique of Hakim's theory of the heterogeneity of women", *Gender, Work & Organization*, 6(3), 152-162.

Raabe, B. & T.A. Beehr (2003), "Formal mentoring versus supervisor and coworker relationships: Differences in perceptions and impact", *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior*, 24(3), 271-293.

Ragins, B.R. & E. Sundstrom (1989), "Gender and power in organizations: A longitudinal perspective", *Psychological Bulletin*, 105(1), 51-88.

Rai, U.K. & D.M. Srivastava (2010), "Women executives and the glass ceiling: Myths and mysteries from Razia Sultana to Hillary Clinton", *BHU Management Review*, 1, 79-83.

Rüzgar, N. (2020), "Glass Ceiling Barriers in Front of White Collar Women Employees: A Research in Bursa", in: V. Krystev et al. (eds.), *Advances in Social Science Research* (391-406), St. Kliment Ohridski University Press, Sofia.

Sahoo, D.K. & U. Lenka (2016), "Breaking the glass ceiling: Opportunity for the organization", *Industrial and Commercial Training*, 48(6), 311-319.

Saleem, S. et al. (2017), "Investigating the glass ceiling phenomenon: An empirical study of glass ceiling's effects on selection-promotion and female effectiveness", *South Asian Journal of Business Studies*, 6(3), 297-313.

Shaji, J.K. & J.P Shaji (2020), "Career Barriers for Women Executives in India and the Glass Ceiling Syndrome", *Journal of the Social Sciences*, 23(2), 552-560.

Simpson, R. (1997), "Have times changed? Career barriers and the token woman manager", *British Journal of Management*, 8, 121-130.

Soleymanpour Omran, M. et al. (2015), "The analysis of glass ceiling phenomenon in the promotion of women's abilities in organizations", *International Journal of Organizational Leadership*, 4, 315-323.

Sullivan, C. & S. Lewis (2001), "Home-based telework, gender, and the synchronization of work and family: perspectives of teleworkers and their co-residents", *Gender, Work & Organization*, 8(2), 123-145.

Terjesen, S. & V. Singh (2008), "Female presence on corporate boards: A multi-country study of environmental context", *Journal of Business Ethics*, 83, 55-63.

Van Vianen, A.E. & A.H. Fischer (2002), "Illuminating the glass ceiling: The role of organizational culture preferences", *Journal of Occupational and Organizational Psychology*, 75(3), 315-337.

Wirth, L. (2001), *Breaking Through The Glass Ceiling: Women in Management*, ILO, Geneva.

Kamu Harcamaları ve Vergi Gelirleri Arasındaki Asimetrik Nedensellik İlişkisi: Geçiş Ekonomileri Örneği

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Asymmetric Causality Relationship Between Public Expenditures and Tax Revenues: Transition Economies Case

Abstract

The study aims to investigate the causality relationship between public expenditures and tax revenues with Dumitrescu & Hurlin's (2012) panel asymmetric causality analysis for 12 transition economies. Dumitrescu & Hurlin's (2012) asymmetric causality analysis findings determined an asymmetric causality relationship between public expenditures and tax revenues. Accordingly, it was determined that there is a bidirectional causality relationship between the positive components and a unidirectional causality relationship between the negative components from public expenditures to tax revenues. The significance of the findings is that the results for positive and negative shocks differ for transition economies, and it has been determined that the result for positive shocks supports fiscal synchronisation. In contrast, the result for negative shocks supports the expenditure-tax hypothesis.

Keywords : Public Expenditures, Tax Revenues, Panel Asymmetric Causality, Transition Economies.

JEL Classification Codes : H50, H20, P20.

Öz

Çalışmanın amacı 12 geçiş ekonomisi için Dumitrescu & Hurlin (2012) panel asimetrik nedensellik analiziyle kamu harcamaları ile vergi gelirleri arasındaki nedensellik ilişkisinin araştırılmasıdır. Dumitrescu & Hurlin (2012) asimetrik nedensellik analizi bulgularına göre kamu harcamaları ve vergi gelirleri arasında asimetrik nedensellik ilişkisinin varlığı tespit edilmiştir. Buna göre, pozitif bileşenler arasında çift yönlü, negatif bileşenler arasında ise kamu harcamalarından vergi gelirlerine doğru tek yönlü bir nedensellik ilişkisinin varlığı belirlenmiştir. Elde edilen bulguların önemi, geçiş ekonomileri için pozitif ve negatif şoklara ilişkin sonuçların farklılık arz etmesi ve pozitif şoklara ilişkin sonucun mali senkronizasyon, negatif şoklara ilişkin sonucun ise harcama-vergi hipotezini desteklediğinin belirlenmiş olmasıdır.

Anahtar Sözcükler : Kamu Harcamaları, Vergi Gelirleri, Panel Asimetrik Nedensellik, Geçiş Ekonomileri.

1. Giriş

Sürdürülebilir ekonomik büyümenin temel gereksinimlerinden biri, mali açıkların kontrol altında tutulmasıdır. Ülke bazında ya da küresel ölçekte oluşan ekonomik krizler, terör, salgın hastalıklar, siyasi karışıklıklar vb. durumların kamu gelir ve giderlerinde önemli sapmalara ve dolayısıyla bütçe açıklarına neden olduğu görülmektedir.

Müdahaleci bir devlet ve sosyal refah devleti anlayışını savunan Keynesyen iktisadi politikalar, 1930'lu yıllarda yoğun olarak uygulama alanı bularak dünya genelinde önem kazanmıştır. Söz konusu anlayışın hâkim olmasıyla birlikte bu dönemde; ekonomik istikrar, gelir dağılımında adaletin sağlanması ve kaynak dağılımındaki etkinlik başta olmak üzere devletin görev alanı oldukça genişlemiştir. Dolayısıyla çoğu ülkede kamu harcamaları ve vergi gelirlerinde önemli artışlar yaşanmıştır (Yılancı vd., 2020: 122). Devlet için önemli bir mali kaynak olan vergiler, ekonomik büyüme ve toplumun sosyal gelişimi için kamu mal ve hizmetlerinin inşasında kullanılır. Dolayısıyla vergiler bu özelliği nedeniyle hem vatandaşlar hem de hükümetler için hayati bir rol oynamaktadır (Koçak, 2021). Kamu gelir ve giderlerinde meydana gelecek sapmalar, bütçe açığına veya bütçe fazlasına yol açmaktadır. Bütçe açıkları, altyapı ve sosyal yatırımlar için kamu harcamalarına yönelik artan talep ile vergi matrahının düşük seviyelerde seyretmesi nedeniyle artan harcamaları finanse etmede yerel kaynaklardan gelir sağlanamaması gibi iki ana sebepten kaynaklamaktadır. Bu nedenle, kamu gelirleri ile kamu harcamaları arasındaki ilişkinin iyi anlaşılması, özellikle mali dengesizliklerin ele alınmasında önem taşımaktadır (Aregbeyen & Insah, 2013: 18). Nitekim kamu harcamaları kamu gelirlerine neden oluyorsa, bu durum devletin kamu harcamalarını finanse etmek için vergileri artırdığı anlamına gelmektedir. Böyle bir durumda kamu harcamalarında meydana gelen bir artış vergilerin gelecekte artacağı beklentisi oluşturması ile sermaye çıkışlarına neden olacaktır. Ayrıca kamu gelirleri ve kamu harcamaları eşanlı olarak belirlenmiyorsa, kamu harcamalarına ilişkin kararlar gelir kararlarından bağımsız olarak alınıyor demektir ki bu durumda ciddi bütçe açıklarıyla karşılaşmak olasıdır. Bu bağlamda, ilişkinin net bir şekilde ortaya konulması önem arz etmektedir (Akbulut & Yereli, 2016: 105).

Kamu harcamaları vergi gelirlerinden fazla ise bütçe açığı oluşmaktadır. Kamu harcamalarının fazlalığı toplam talebi artırmakta ve ülke ekonomilerinde enflasyonist sürece girilmesine sebep olmaktadır. Söz konusu durum tasarruflar ile yatırımlar arasındaki bağın kopması ile faiz oranlarının artmasına ve üretimin azalmasına neden olmaktadır. Bununla birlikte, gelişmekte olan ülkelerdeki hükümetler, yüksek ekonomik büyüme oranlarını ortaya çıkarabilecek ve sürdürebilecek köklü ve sağlam bir özel sektörün olmayışından veya özel sektörün payının çok az olmasından dolayı, toplam ekonomik faaliyetlerde baskın bir rol oynamaktadır. Durum böyleyken, birçok ülkede güvenilen hükümet programları artan bütçe açıkları ve hızlı bir kamu borcu artışı ile sonuçlanmaktadır. Artan açık/borç sorunlarının yüksek reel faiz oranları, yavaş sermaye birikimi, yüksek işsizlik ve ticaret hesabı dengesizlikleri dahil olmak üzere olumsuz ekonomik sonuçlarının olması muhtemeldir (Darrat, 2002: 221).

Kamu harcamaları ve vergi gelirleri arasındaki ilişkinin belirlenmesi, mali disiplinin sağlanması adına uygun stratejilerin ortaya konulabilmesi için esastır (Athanasenas, 2014: 366). Kamu harcamaları ve vergilendirme arasındaki ilişkiyi anlamak, kaynakların dağıtımında hükümetin rolünü ve mali dengesizliklerin nasıl ele alınacağını değerlendirme konusunda son derece önemlidir (Chang & Chiang, 2009: 165). Buradan hareketle kamu harcamaları ve kamu gelirleri arasındaki ilişkinin yönünün tespiti önem arz etmektedir. Bu iki makroekonomik büyüklük arasındaki karşılıklı bağımlılığın yönünü belirlemek, hükümetlere ve politika yapıcılarına olası bir mali dengesizliğin kaynağını belirleme konusunda yardımcı olabilir ve uygun bir mali reform stratejisi tasarlamalarını kolaylaştırabilir (Kollias & Makrydakis, 2000: 536).

Varşova Paktı'nın ortadan kalkması ve Sovyetler Birliğinin dağılması ile bağımsızlıklarını kazanan geçiş ekonomileri, merkezi planlamalı sosyalist sistemden serbest piyasa ekonomisine geçiş yapmışlardır. Geçiş süreci birçok düzenleme yapılmasını gerektirmiş ve bu düzenlemeler de önemli harcamaları beraberinde getirmiştir. Diğer taraftan GSYH'deki hızlı düşüşler bütçe gelirlerinin azalmasına neden olmuştur (Çetintaş & Baigonushova, 2016: 773). Böylelikle bu ülkelerde, piyasa ekonomisine geçişinin etkilerinden biri, bütçe açığı problemi olmuştur. Bu bağlamda piyasa ekonomisine geçiş, ekonominin tüm alanlarında farklılaşma ve iyileştirme çabalarına yönelik politikaları da beraberinde getirmiştir. Söz konusu politikalara yönelik uygulamalar kamu harcamalarına sebep olarak bütçe dengesine etki eden süreçlere zemin hazırlamıştır. Merkezi planlı sistemden piyasa ekonomisine dayalı sisteme geçişte devletin rolünün azaltılması durumu, kamunun asli görevleri olan temel kamu hizmetleri dışındaki rolünün azaltılması gerekliliğini ortaya koymuştur. Fakat uygulamada geçiş süreci ve sonrasında yaşanan ekonomik sorunlar müdahaleci kamu uygulamalarına ve yüksek bütçe açıklarına sebep olmuştur. Grafik 1 ve 2'de sırasıyla 12 geçiş ekonomisinin 2000-2019 dönemine ait kamu harcamaları ve vergi gelirlerine ait bilgiler yer almaktadır.

Grafik: 1
12 Geçiş Ekonomisi için 2000-2019 Dönemi Kamu Harcamaları (%GSYH)
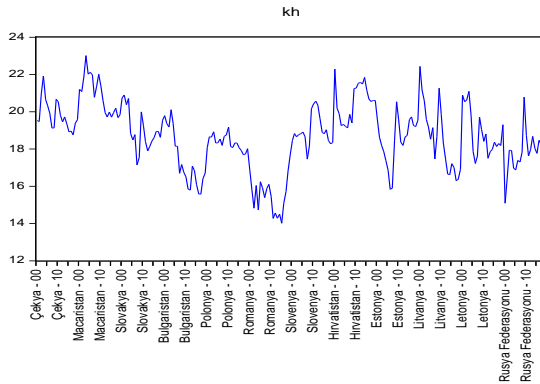
Grafik 1'den görüldüğü üzere Macaristan ve Hırvatistan'ın kamu harcamaları büyüklüğü gruptaki diğer ülkelere kıyasla daha yüksek seyretmiştir. Romanya ise bu grupta yer alan ülkeler içinde en düşük kamu harcamasına sahip ülke konumundadır. Bununla birlikte 12 ülke için kamu harcamaları büyüklüğü benzer seviyede gerçekleştiği ifade edilebilir.

Grafik: 2
12 Geçiş Ekonomisi için 2000-2019 Dönemi Vergi Gelirleri (%GSYH)
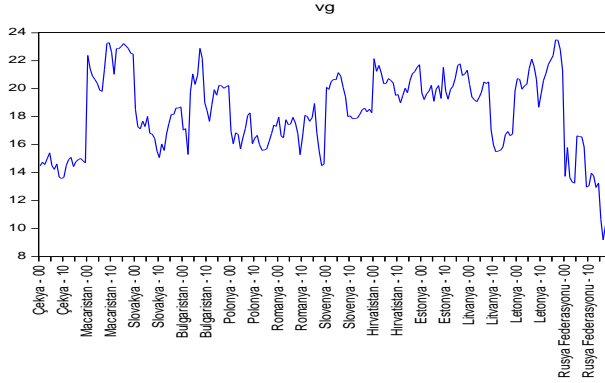
Grafik 2'den Macaristan ve Hırvatistan ve Letonya'nın vergi gelirleri gruptaki diğer ülkelere kıyasla daha yüksek olduğu görülmektedir. En düşük vergi gelirleri Çekya ve Rusya Federasyonu'nda olduğu görülmektedir. Vergi gelirleri ile kamu harcamaları arasındaki farkı ortaya koyan bütçe dengesine yönelik duruma bakıldığında ise Çekya, Slovekya, Polonya ve Rusya Federasyonu ilgili dönem boyunca bütçe açığı verirken Estonya hariç diğer ülkelerin tamamı bazı yıllar bütçe açığı verirken bazı yıllar ise bütçe fazlası vermişlerdir.

Çalışmada kamu harcamaları ile vergi gelirleri arasındaki ilişki, geçiş sürecinden önce ve sonra benzer ekonomik performansa ve temel özelliklere sahip olan geçiş ekonomileri bazında inceleme konusu yapılmıştır. Geçiş ekonomilerinin piyasa ekonomisine geçiş sürecinde yaşadıkları benzer ekonomik sorunlar ve çözüm politikalarına yönelik uygulamalarda ortaya çıkan yüksek bütçe açıkları bu grupta yer alan ülkelerin seçiminde motivasyon kaynağını oluşturmuştur. Dahası kamu harcamaları ve vergi gelirleri arasındaki ilişkiyi ortaya koymak için uygulanan ekonometrik yöntemin bu ülke grubu için daha önce uygulanmadığının belirlenmesi literatürde yer alan bu boşluğa katkı sunması bakımından da geçiş ekonomilerinin seçiminde rol oynamıştır. Zira kamu harcamaları ve vergi gelirlerine ait pozitif ve negatif şokların etkisinin ayrı ayrı belirlendiği asimetrik nedensellik yaklaşımı sonuçları, etkin politikaların oluşturulmasına zemin hazırlayabilecektir. Böylelikle bütçe açıklarının sürdürülebilir uygulamalarına yönelik politikalarda ekonominin büyüme ve daralma dönemlerinin pozitif ve negatif süreçler bazında değerlendirilmesi ile olası politika farklılıkları da belirlenmiş olacaktır. Bütçe

açığını planlanan seviyede tutma mekanizmaları büyük oranda vergi idaresine dayanmaktadır. İlişkinin yönünün belirlenmesi vergi idaresinde yapılması gerekenleri ortaya koyması bakımından politika yapıcılara yol gösterebilecektir. Bu doğrultuda çalışmanın amacı benzer ekonomik hedefleri uygulayan seçili geçiş ekonomilerinde kamu harcamaları ile vergi gelirleri arasındaki ilişkinin yönü araştırılmasıdır. Söz konusu ilişkinin yönünün belirlenmesi literatürde yer alan teorik temellere dayanarak ekonomik kararların maliyetini azaltacak adımlara katkı sunması bakımından da ayrıca önem arz etmektedir.

Bu noktadan hareketle çalışmanın literatüre katkıları aşağıda maddeler halinde sunulmuştur. Buna göre;

- Kamu harcamaları ile vergi gelirleri arasındaki ilişki literatürde incelenen konular arasındadır. Bununla birlikte bütçe açığı problemi yaşayan geçiş ekonomileri için konunun mevcut literatürde sınırlı sayıda incelendiği belirlenmiştir. Bu amaçla çalışmanın gelişmekte olan literatüre katkı sunması hedeflenmiştir.
- Panel veri yöntemi hem zaman hem de birim boyutunu dikkate alarak aynı anda birden fazla ülkenin bir arada bir bütün olarak değerlendirilmesi ile örneklem büyüklüğünün artmasına ve dolayısıyla sonuçların sağlıklı olmasına imkân sunması bakımından önem arz etmektedir.
- Çalışmada değişkenler arasındaki ilişki asimetrik nedensellik yaklaşımı ile irdeleme konusu yapılmıştır. Asimetrik nedensellik testleri geleneksel nedensellik testlerinin tüm şokları aynı kabul etmesinden farklı olarak pozitif ve negatif şokların etkilerini ayrı ayrı incelemeye olanak sunmaktadır. Diğer yandan literatürde yer alan çalışmalar incelendiğinde kullanılan yöntemlerin çoğunlukla simetrik analiz yöntemlerine dayandığı belirlenmiştir. Vergi gelirlerinin asimetrik özellik taşıması artış ve azalışların iki ayrı değişken bazında pozitif ver negatif bileşenler ile asimetrik nedensellik analizi ile değerlendirilmesi elde edilen sonuçların politika yapıcılara geniş bir açıdan yol göstermesine olanak tanıyacak olması bakımından çalışmanın bir diğer önemli katkısını belirtmektedir.
- İncelenen literatür sonucu geçiş ekonomileri için konunun asimetrik analiz yöntemi ile araştırıldığı bir çalışmaya rastlanılmamış olması çalışmanın literatürde yer alan bu boşluğa katkı sunması bakımından ayrıca önem arz ettiğini ortaya koymaktadır. Zira politika yapıcılar pozitif ve negatif şoklara ilişkin sonuçlar neticesinde ayrı ayrı kararlar ile hedeflere ulaşmada başarılı olabileceklerdir.

Kamunun en önemli finansman kaynağı olan vergi gelirleri ile kamu harcamaları arasındaki asimetrik ilişkinin dikkate alınması saklı nedensellik ilişkisinin belirlenmesi bakımından önem arz etmektedir. Zira bütçe açığı problemi yaşayan geçiş ekonomileri için sürdürülebilir bütçe dengesini ortaya koyacak politikalar ile ekonomik büyümeye yönelik alınacak kararların istikrarlı bir şekilde hedefe ulaşması güven ortamına da katkı sunacaktır. Fiyat istikrarının sağlanmasına imkân tanımak ve çıktı ve istihdamdaki büyümeyi sürdürmek için sağlam bir maliye politikasının uygulanması çok önemlidir. Maliye politikası, makroekonomik politika aracı olarak, çıktı ve istihdamdaki kısa vadeli dalgalanmaları azaltmak için kullanılabilecek bir araç olarak görülmektedir ve ekonomiyi potansiyel

seviyesine yaklaştırma politikalarına hizmet etmektedir. Nitekim maliye politikalarının temelini oluşturan en önemli hedef ekonomik büyümedir. Politika yapıcılar, kamu harcamaları ile vergi gelirleri arasındaki ilişkiyi belirleyerek alacakları maliye politikası kararlarının etkinliğini artırabilirler. Bu nedenle geçiş ekonomileri için kamu harcamaları ve vergi gelirleri arasındaki ilişkinin asimetrik analiz ile incelenmesi önemlidir.

GE için kamu harcamaları ile vergi gelirleri arasındaki asimetrik nedensellik ilişkisinin belirlenmesi doğrultusunda çalışma yedi kısım olarak tasarlanmıştır. Giriş kısmının ardından ikinci kısımda konunun teorik çerçevesi sunulmuştur. Takip eden bölümde literatürde konu ile ilgili incelenen çalışmalar özet tablo şeklinde verilmiştir. Dördüncü ve beşinci kısımda veri seti ve ekonometrik yöntem tanıtılmış altıncı kısımda ekonometrik bulgular sunulmuştur. Son olarak elde edilen bulgulardan hareketle sonuç ve değerlendirmeler yapılmıştır.

2. Teorik Çerçeve

Literatürde, kamu harcamaları ve vergi gelirleri arasındaki ilişki dört hipotez kapsamında ele alınmıştır. Söz konusu hipotezler sırasıyla; gelirden harcamalara doğru bir nedensellik ilişkisinin varlığını işaret eden vergi-harcama hipotezi, harcamalardan gelire doğru bir nedensellik ilişkisinin olduğunu ifade eden harcama-vergi hipotezi, alternatif hükümet programlarının maliyet ve faydalarını analiz ederek gelir ve harcama kararlarının aynı anda alındığını varsayan mali senkronizasyon hipotezi ve hükümetin harcama ve vergilendirme işlevlerinin kurumsal olarak ayrılmasını ve gelir ve harcamaların bağımsız olarak belirlenmesini vurgulayan kurumsal ayrılık hipotezidir.

Vergi-harcama hipotezini, Friedman 1978 yılında yaptığı çalışmasında ele almıştır. Friedman (1978), vergi gelirlerinin artırılmasının kamu harcamalarını artıracağını ileri sürmektedir. Böylece gelir vergisi, tüketim vergisi vb. gibi artan vergilerin kamu harcamalarını teşvik ederek bütçe açığının azalmasına etki etmeyeceğini belirtmektedir. Söz konusu hipotez, kamu harcamaları ve vergiler arasında doğrusal bir ilişkinin varlığını ifade etmektedir. Bu ilişki; vergi gelirleri artarsa kamu harcamalarının da artacağı ve/veya vergi gelirleri azalırsa kamu harcamalarının da azalacağı şeklinde açıklanabilir (Aysu & Bakırtaş, 2018: 6). Dolayısıyla bütçe açığının azaltılmasında vergi gelirlerinin düşürülmesi gerekliliğini ortaya koymaktadır.

Benzer şekilde Buchanan ve Wagner (1977) de tıpkı Friedman gibi vergi-harcama hipotezini savunmuştur. Nitekim yazarlar, vergilerin artırılmasıyla kamusal mal ve hizmetlerin fiyatlarının yükseleceği dolayısıyla taleplerinin azalacağını ve bu durumun etkisiyle kamu gelirlerinin düşeceğini ifade etmektedirler. Böylelikle harcama yapacak kaynak yetersizliği kamu harcamalarının da azalmasına sebep olacaktır. Diğer bir ifadeyle kamu gelirlerindeki artış (ya da azalış) ters orantılı olarak kamu harcamalarının da azalışına (ya da artışına) neden olmaktadır. Bu nedenden dolayı bütçe açıklarının vergilerde indirime gidilerek değil ancak vergi artışına gidilerek azalacağı belirtilmektedir. Vergi artışları vergi mükelleflerinde isteksizlik oluşturarak kamu gelirlerinin azalmasına ve bütçe açığının

düşmesine neden olacaktır. Vergiler düşürüldüğünde diğer bir ifadeyle indirime gidildiğinde bireyler tarafından kamu mal ve hizmetlerinin fiyatlarında bir düşüş olduğu kanısı ortaya çıkmaktadır. Ortaya çıkan bu düşünce bireylerde kamu mal ve hizmetlerine olan talebi daha fazla artırmaktadır. Artan talep kamu harcamalarını teşvik etmektedir. Bu durumda bütçe açıklarının azaltılamayacağını belirten Buchanan & Wagner (1977), açıkları azaltmak için vergi gelirlerinde artışa gidilmesi gerektiğini ortaya koymaktadır (Buchanan & Wagner, 1977; Arslan, 2019: 6) Vergi-harcama hipotezi nedensellik ilişkisinde vergi gelirlerinden kamu harcamalarına doğru tek yönlü bir nedensellik ilişkisini ortaya koymaktadır.

Harcama-vergi hipotezinin destekleyicileri Peacock & Wiseman (1961)'a göre, II. Dünya Savaşı esnasında ve sonrasında yaşananlardan ve savaşların getirdiği zorunluluklardan kaynaklanan kamu harcamaları artışı, kamu gelirlerini artırma amacıyla vergi oranlarının yükseltilmesi ve gelir vergisi tabanının genişletilmesi gibi vergi uygulamalarını ortaya çıkartmıştır. Kamu harcamalarındaki artış vergilerinde artmasına sebep olacaktır. Dolayısıyla harcama-vergi hipotezine göre bütçe açığını azaltmak için kamu harcamalarının azaltılması gerekmektedir (Aysu & Bakırtaş, 2018; Payne, 2003; Kamacı & Kurt, 2021;). Benzer şekilde Robert J. Barro (1974), hükümet tarafından harcamaları finanse etmek için yapılan bir tahvil ihracının, gelecekteki faiz ödemeleri ve olası nihai anapara geri ödemesi için bir yükümlülük içerdiğini ve bu nedenle harcamaların cari vergilendirme ile finanse edilmesinin, gelecekteki vergileri artıracağını ifade ettiğini belirtmektedir. Harcama-vergi hipotezi nedensellik ilişkisi kamu harcamalarından vergi gelirlerine doğru tek yönlü bir nedensellik ilişkisini ortaya koymaktadır.

Meltzer & Richard (1981), mali senkronizasyon hipotezini savunmuştur. Bu hipotez kamu harcamaları ve vergi gelirleriyle ilgili kararların eş zamanlı alındıklarını ortaya koymaktadır. Nitekim kamu harcamalarının ve vergilerin, 1950'li yıllardan beri seçilmiş hükümetlere sahip olan çoğu ülkede sürekli olarak üretime nispeten daha fazla arttığı sonucuna varmışlardır. Öte yandan Musgrave (1985), hükümetlerin vergi koymasını ve tüketiciye ücretsiz olarak sağlanan mal ve hizmetler için harcama yapmasını gerektiren sosyal ihtiyaçların karşılanması gerektiğini ifade ederek harcamaların ve gelirlerin, bir toplumun zamanlar arası sosyal refah işlevini en üst düzeye çıkarmak için eşzamanlı olarak belirlendiğini düşünmektedir. Mali senkronizasyon hipotezi kamu harcamaları ve vergi gelirleri arasında çift yönlü bir nedensellik ilişkisinin söz konusu olduğunu ileri sürmektedir.

Kurumsal ayrılık hipotezinde ise söz konusu değişkenler arasında bir ilişkinin olmadığı ifade edilmektedir. Hoover & Sheffrin (1992), kurumsal kayıtların incelenmesiyle belirlenen harcama sürecindeki yapısal müdahalelerin, marjinal gelir sürecindeki kesintilerle ilişkili olmadığını ve bunun da harcamaların gelire neden olmadığı anlamına geldiğini ve benzer şekilde, tahsilat sürecindeki yapısal müdahalelerin, harcamalar için marjinal modeldeki kesintilerle ilişkili olmadığını ve bunun da gelirin harcamalara neden olmadığı anlamına geldiğini belirtmişlerdir. Baghestani & McNown (1994) ne vergi-harcama ne de harcama-vergi hipotezlerinin II. Dünya Savaşı sonrası bütçe genişlemesinin nedenini açıklayamadığı sonucuna ulaşarak kurumsal ayrılık hipotezini desteklemişlerdir. Kurumsal

ayrılık hipotezi nedensellik ilişkisinde kamu harcamaları ve vergi gelirleri arasında herhangi bir nedensellik ilişkisinin olmadığını ifade etmektedir.

3. Literatür

Literatürde kamu harcamaları ve vergi gelirleri arasındaki ilişkiyi ele alan çalışmalar incelendiğinde farklı sonuçların varlığı tespit edilmiştir. Söz konusu durumun nedeninin seçilen ülke, kullanılan yöntem ve dönem farklılıklarından kaynaklandığı ifade edilebilir. Literatür incelemesi bir bütün olarak değerlendirildiğinde panel veri ve zaman serisi yöntemlerini kullanan çok sayıda çalışma belirlenmiştir. Çalışmanın yöntemi esasına göre öncelikle panel çalışmalar irdelenmiştir. Bunun yanında ülke grubu bazında çalışan ve ülkeleri tek tek inceleyen çalışmaların sonuçları da sunulmuştur.

Konuya ilişkin literatür incelendiğinde Von Furstenberg vd. (1986), Anderson vd. (1986), Manage & Marlow (1986), Blackley (1986), Trehan & Walsh (1988), Jones & Joulfaian (1991), Bohn (1991), Hoover & Sheffrin (1992), Baghestani & McNown (1994), Hondroyiannis & Papapetrou (1996), Payne (1997), Payne (1998), Ross & Payne (1998), Darrat (1998), Sorensen vd. (2001), Payne vd. (2002), Ewing vd. (2006), Payne vd. (2008), Saunoris & Payne, (2010)'un zaman serisi, Von Furstenberg vd. (1985), Marlow & Manage (1987), Ram (1988), Miller & Russek (1990), Joulfaian & Mookerjee (1991), Baffes & Shah (1994), Koren & Stiassny (1998), Ewing & Payne (1998)'in panel veri yöntemiyle kamu harcamaları ve vergi gelirleri arasındaki ilişkiyi ele alan ilk ampirik çalışmalardan olduğu belirlenmiştir.

Kamu harcamaları ve vergi gelirleri arasındaki nedensellik ilişkisini panel veri veya zaman serisi yöntemini kullanarak inceleyen ve ulaşılabilen çalışmalardan elde edilen bulgular vergi-harcama, harcama-vergi, mali senkronizasyon ve kurumsal ayrılık hipotezleri şeklinde sınıflandırılarak Tablo 1'de özet şeklinde sunulmuştur.

Tablo: 1
Literatür Özeti

Vergi-Harcama Hipotezi			
Yazar/Dönem	**Ülke**	**Yöntem**	**Sonuç**
Joulfaian & Mookerjee (1991) 1961-1986	22 OECD Üyesi	Granger Nedensellik	kh→vg (11 ülke) vg→kh (2 ülke)
Owoye (1995) 1961-1990	G7 Ülkeleri	Granger Nedensellik	vg→kh (2 ülke)
Ewing & Payne (1998) 1950-1994	5 Latin Amerika Ülkesi	Granger Nedensellik	vg→kh (3 ülke)
Koren & Stiassny (1998) 1956-1992	9 OECD Üyesi	Hata Düzeltme Modeli Frekans Alanı Sor	vg→kh (4 ülke)
Cheng (1999) 1949-1995	8 Latin Amerika Ülkesi	Hsiao Granger Nedensellik	vg→kh (2 ülke)
Garcia & Henin (1999) 1960-1996	5 OECD Üyesi	Vektör Hata Düzeltme	vg→kh (3 ülke)
Chang vd. (2002) 1951-1996	10 Sanayileşmiş Ülke	Granger Nedensellik	vg→kh (5 ülke)
Fasona & Wang (2002) 1975-2000	6 GCC Ülkesi	Granger Nedensellik	vg→kh
AbuAI-Foul & Baghestani (2004) Mısır (1977-1998) & Ürdün (1975-2001)	Mısır, Ürdün	Hsiao Granger Nedensellik	vg→kh (Mısır)

Narayan (2005) 1960-2000	9 Asya Ülkesi	Granger Nedensellik	vg→kh (4 ülke)
Narayan & Narayan (2006) 1950-2000	10 Gelişmekte Olan Ülke	Toda-Yamamoto Nedensellik	vg→kh (5 ülke)
Kollias & Paleologou (2006) 1960-2002	15 AB Üyesi	Granger Nedensellik	vg→kh (5 ülke)
Westerlund vd. (2011) 1963-1997	ABD Eyaletleri	Panel Nedensellik	vg→kh
Dökmen (2012) 1994-2007	34 OECD Üyesi	Holtz-Eakin, Newey ve Rosen Panel Nedensellik	vg→kh
Garcia (2012) 1987-2003	İspanya'nın 15 Özerk Bölgesi	Panel Granger Nedensellik	vg→kh
Özmen & Balı (2018) 1980-2011	14 AB Üyesi	Panel Hatemi-J Asimetrik Nedensellik	vg→kh (3 ülke)
Mutascu vd. (2016) 1995-2012	10 Doğu Avrupa Ülkesi	Bootstrap Panel Granger Nedensellik	vg→kh (3 ülke)
Gürdal vd. (2021) 1980-2016	G7 Ülkeleri	Emirmahmutoğlu ve Köse (2011) Zaman Alanı Panel Nedensellik	vg→kh
Harcama-Vergi Hipotezi			
Von Furstenberg vd. (1985) 1955-1982	ABD Eyaletleri	Panel Nedensellik	kh→vg
Koren & Stiassny (1998) 1956-1992	9 OECD Üyesi	Hata Düzeltme Modeli	kh→vg (3 ülke)
Ram (1988) 1929-1983	ABD Eyaletleri	Panel Granger Nedensellik	kh→vg
Miller & Russek (1990) 1946-1987	ABD Eyaletleri	Panel Granger Nedensellik	kh→vg
Joulfaian & Mookerjee (1991) 1961-1986	22 OECD Üyesi	Granger Nedensellik	kh→vg (8 ülke)
Chang vd. (2002) 1951-1996	10 Ülke	Granger Nedensellik	kh→vg (2 ülke)
Narayan (2005) 1960-2000	9 Asya Ülkesi	Granger Nedensellik	kh→vg (2 ülke)
Kollias & Paleologou (2006) 1960-2002	15 AB Üyesi	Granger Nedensellik	kh→vg (1 ülke)
Zapf & Payne (2009) 1959-2005	ABD Eyaletleri	Panel Hata Düzeltme	kh→vg
Mutascu vd. (2016) 1995-2012	10 Doğu Avrupa Ülkesi	Bootstrap Panel Granger Nedensellik	kh→vg (1 ülke)
Özmen & Balı (2018) 1980-2011	14 AB Üyesi	Panel Hatemi-J Asimetrik Nedensellik	kh→vg (2 ülke)
Mali Senkronizasyon Hipotezi			
Chowdhury (1988) 1983-1986	ABD Eyaletleri	Panel Granger Nedensellik	kh↔vg
Miller & Russek (1990) 1946:1-1987:2 (Nominal) 1947:1-1987:2 (Reel)	ABD Eyaletleri	Panel Hata Düzeltme	kh↔vg
Joulfaian & Mookerjee (1991) 1961-1986	22 OECD Üyesi	Granger Nedensellik	kh↔vg (1 ülke)
Baffes & Shah (1994) Brezilya (1908-1985); Arjantin (1913-1984); Meksika (1895-1984)	Brezilya, Arjantin, Meksika	Granger Nedensellik	kh↔vg (2 ülke)
Owoye (1995) 1961-1990	G7 Ülkeleri	Granger Nedensellik	kh↔vg (5 ülke)
Ewing & Payne (1998) 1950-1994	5 Ülke	Engle-Granger	kh↔vg (2 ülke)
Cheng (1999) 1949-1995	8 Latin Amerika Ülkesi	Hsiao Granger Nedensellik	kh↔vg (4 ülke)
Chang vd. (2002) 1951-1996	10 Ülke	Granger Nedensellik	kh↔vg (1 ülke)
AbuAl-Foul & Baghestani (2004) Mısır (1977-1998); Ürdün (1975-2001)	Mısır, Ürdün	Hsiao Granger Nedensellik	kh↔vg (1 ülke)
Kollias & Paleologou (2006) 1960-2002	15 AB Üyesi	Granger Nedensellik	kh↔vg (6 ülke)
Ho & Huang (2009) 1999-2005	Çin'in 31 Eyaleti	Çok Değişkenli Panel Hata Düzeltme	kh↔vg
Chang & Chiang (2009) 1992-2006	15 OECD Üyesi	Panel Granger Nedensellik	kh↔vg
Mehrara vd. (2011) 1995-2008	40 Asya Ülkesi	Panel Engle-Granger Nedensellik	kh↔vg

Vamvoukas (2011) 1970-2007, 1970-1991, 1992-2007	15 AB Üyesi	Panel Granger Nedensellik	kh↔vg
Vamvoukas (2012) 1970-2006	12 Avrupa Parasal Birliği Ülkesi	Panel Genelleştirilmiş İki Aşamalı En Küçük Kareler (GTSLS) ve Genelleştirilmiş Momentler Yöntemi (GMM)	kh↔vg
Paleologou (2013) 1965-2009 döneminde	İsveç, Yunanistan, Almanya	Eşik Otoregresif (TAR), Momentum Eşik Otoregresif (MTAR) Modeli, ECM	kh↔vg (2 ülke)
Mutascu vd. (2016) 1995-2012	10 Doğu Avrupa Ülkesi	Bootstrap Panel Granger Nedensellik	kh↔vg (1 ülke)
Özmen & Balı (2018) 1980-2011	14 AB Üyesi	Panel Hatemi-J Asimetrik Nedensellik	kh↔vg (4 ülke)
Ekinci (2020) 1995-2016	20 OECD Üyesi	Panel Granger Nedensellik	kh↔vg
Gürdal vd. (2020) 1980-2016	G7 Ülkeleri	Emirmahmutoğlu ve Köse (2011) Frekans Alanı Panel Nedensellik	kh↔vg
Kurumsal Ayrılık Hipotezi			
Marlow & Manage (1987) 1952-1982	ABD Eyaletleri	Panel Granger Nedensellik	kh≠vg
Joulfaian & Mookerjee (1991) 1961-1986	22 OECD Üyesi	Granger Nedensellik	kh≠vg (11 ülke)
Koren & Stiassny (1998) 1956-1992	9 OECD Üyesi	Hata Düzeltme Modeli	kh≠vg (2 ülke)
Garcia & Henin (1999) 1960-1996	5 OECD Üyesi	Vektör Hata Düzeltme	kh≠vg (2 ülke)
Chang vd. (2002) 1951-1996	10 Ülke	Granger Nedensellik	kh≠vg (2 ülke)
Narayan (2005) 1960-2000	9 Asya Ülkesi	Granger Nedensellik	kh≠vg (5 ülke)
Narayan & Narayan (2006) 1950-2000	10 Gelişmekte Olan Ülke	Toda-Yamamoto Nedensellik	kh≠vg (5 ülke)
Kollias & Paleologou (2006) 1960-2002	15 AB Üyesi	Granger Nedensellik	kh≠vg (3 ülke)
Mutascu vd. (2016) 1995-2012	10 Doğu Avrupa Ülkesi	Bootstrap Panel Granger Nedensellik	kh≠vg (5 ülke)
Özmen & Balı (2018) 1980-2011	14 AB Üyesi	Panel Hatemi-J Asimetrik Nedensellik	kh≠vg (5 ülke)

Not: → ve ↔, sırasıyla ok yönünde tek yönlü nedensellik ilişkisini, çift yönlü nedensellik ilişkisini göstermektedir. ≠, değişkenler arasında herhangi bir nedensellik ilişkisinin olmadığı ortaya koymaktadır.

Literatürde geçiş ekonomileri için kamu harcamaları ile vergi gelirleri arasındaki ilişkiyi inceleyen çalışmalardan, Payne vd. (2002), Hırvatistan için 1994-1999 dönemi aylık verilerini kullanarak Granger nedensellik testini uygulamışlar ve vergi-harcama hipotezinin geçerli olduğunu ortaya koymuşlardır. Konukçu Önal & Tosun (2008), 1999-2007 döneminde Granger nedensellik testinden yararlanarak 4 geçiş ekonomisinden Belarus ve Rusya Federasyonu'nda vergi-harcama hipotezinin, Kazakistan ve Kırgızistan'da ise mali senkronizasyon hipotezinin geçerli olduğunu ifade etmişlerdir. Bolat & Belke (2015)'in, 1999-2014 dönemi için Granger nedensellik testinden elde ettikleri bulgulara göre 10 Merkezi ve Doğu Avrupa ülkesinden Slovenya'da vergi-harcama, Estonya, Letonya ve Slovakya'da harcama-vergi, Romanya ve Bulgaristan'da mali senkronizasyon ve Çekya, Macaristan, Litvanya ve Polonya'da kurumsal ayrılık hipotezinin geçerli olduğu belirtilmiştir. Benzer şekilde, Mutascu (2016), Granger nedensellik testini kullanarak 1995-2012 döneminde 10 Merkezi ve Doğu Avrupa ülkesi için analiz yapmıştır. Çalışmanın sonuçları Bolat & Belke (2015)'den farklı olarak bu ülkelerden Slovakya'da mali senkronizasyon hipotezi, Bulgaristan'da ise harcama-vergi hipotezinin geçerli olduğunu göstermiştir. Bununla birlikte, Çekya, Macaristan ve Slovenya'da vergi-harcama hipotezinin ve Estonya, Letonya, Litvanya, Polonya ve Romanya'da kurumsal ayrılık hipotezinin geçerli olduğunu ortaya koymuştur. Karakaş & Turan (2019), 6 Merkezi ve Doğu Avrupa ülkesini kapsayan çalışmalarında 1995-2016 döneminde asimetrik ARDL yöntemini kullanmışlar ve Slovenya'da mali senkronizasyon hipotezinin, Çekya'da harcama-vergi hipotezinin,

Hırvatistan ve Macaristan'da vergi-harcama hipotezinin ve Romanya ve Polonya'da kurumsal ayrılık hipotezinin geçerli olduğunu belirtmişlerdir. Tashevska vd. (2020), Granger nedensellik testi ile 5 geçiş ekonomisini analiz etmişler ve 1999-2015 döneminde Arnavutluk, Bulgaristan, Hırvatistan ve Slovenya'da vergi-harcama ve Kuzey Makedonya'da mali senkronizasyon hipotezini destekleyen sonuçlara ulaşmışlardır. Sonuç olarak literatürde geçiş ekonomileri için kamu harcamaları ile vergi gelirleri arasındaki ilişkiyi ele alan çalışmalar incelendiğinde az sayıda çalışma yapıldığı belirlenmiştir. Bununla birlikte konuyu geçiş ekonomileri için 12 ülke bazında ve panel asimetrik nedensellik yaklaşımı ile inceleyen çalışmaya rastlanılmamıştır. Dolayısıyla literatürde yer alan bu boşluğa ve literatürün gelişimine katkı sunmak çalışmanın bir diğer amacını oluşturmaktadır.

Kamu harcamaları ve vergi gelirleri arasındaki ilişkiyi araştıran çalışmalar bir bütün olarak incelendiğinde, bu iki değişken arasındaki nedensellik ilişkisini panel veri ve zaman serisi yöntemini kullanarak araştırıldığı ve farklı bulgulara ulaşıldığı görülmektedir. Bununla birlikte kamu harcamaları ve vergi gelirleri arasındaki nedensellik ilişkisi simetrik analiz yöntemleri ile daha çok araştırıldığı görülmüştür. Buna karşın az sayıda çalışmada örneğin, Özmen & Balı (2018); Gürdal vd. (2021) söz konusu ilişkinin panel asimetrik nedensellik ilişki analizi yardımıyla araştırıldığı tespit edilmiştir. Diğer yandan, geçiş ekonomileri için literatürde kamu harcamaları ve vergi gelirleri arasındaki asimetrik nedensellik ilişkisini inceleyen çalışmaya rastlanmamıştır. Dolayısıyla çalışma bu açıdan gelişmekte olan literatüre katkı sunacağa benzemektedir.

4. Veri Seti

12 geçiş ekonomisi[1] için kamu harcamaları (kh) ile vergi gelirleri (vg) arasındaki nedensellik ilişkisi Dumitrescu & Hurlin (2012) panel asimetrik nedensellik yöntemi ile araştırılmıştır. Analizde kullanılan değişkenlere ait açıklamalar Tablo 2'de yer almaktadır.

Tablo: 2
Değişkenler ve Açıklamaları

Değişkenler	Açıklama	Kaynak
kh	Genel Kamu Nihai Tüketim Harcaması (% GSYH)	Dünya Bankası
vg	Vergi Geliri (% GSYH)	

Çalışmada (Ewing & Payne, 1998; Garcia & Henin, 1999; Koçak vd. 2022; Zapf & Payne, 2009'dan hareketle kullanılan kh ve vg değişkenleri sırasıyla, genel devlet nihai tüketim harcamaları, mal ve hizmet satın alımlarına yönelik tüm devlet cari harcamaları (çalışanların tazminatı dahil) toplamını ve kamusal amaçlarla merkezi hükümete yapılan zorunlu transferlerin GSYH oranını içermektedir.

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[1] *Bulgaristan, Çekya, Estonya, Hırvatistan, Letonya, Litvanya, Macaristan, Polonya, Romanya, Rusya Federasyonu, Slovakya, Slovenya.*

kh ve vg arasındaki nedensellik ilişkisi ülkeler bazında uzun dönem ve kesiksiz veri bulunabilirliği kriterine göre belirlenen 2000-2019 dönemi için yıllık veriler kullanılarak araştırılmıştır. Vergiler kaynaklarına göre gelir, servet ve harcamalar üzerinden alınmaktadır. Gelir ve servet üzerinden alınan vergiler dolaysız vergiler olarak adlandırılırken, harcama üzerinden alınan vergiler dolaylı vergiler olarak adlandırılmaktadır (Bağcı-Aydoğdu & Sever, 2022: 261). Gelişmekte olan ülkelerde toplam vergi gelirleri içinde dolaysız vergilerin payı yüksektir. Dolaylı vergiler yükümlüsü belli olmayan ne zaman ve ne kadar tahsilinin olacağı kestirilemeyen vergilerdir (Ay & Talaşlı, 2008: 137). Yılsonu itibariyle vergi gelirlerine ait bilgiler o yılın vergi gelirine ait kesinleşmiş bilgiyi içermektedir. Dolayısıyla kısa dönemde vergi gelirlerinin istikrarsız bir yapı sergilemesi ve bütçe harcamalarının yıllık olarak belirlenmesi durumu ile tahsilat dönemlerinin uyumsuz olması örneklem frekansının yıllık bazda seçimini ortaya koymuştur. Bununla birlikte söz konusu dönem tespitinde öncelikle geçiş ekonomileri özelinde tüm ülkeler dikkate alınmıştır. Elde edilen bulgular neticesinde uzun ortak dönem ve ilgili yıllarda tam veri bulunabilirliği kriterini sağlayan 12 ülke belirlenebilmiştir. Söz konusu durum çalışmanın kısıtını ortaya koymaktadır. Değişkenler arasındaki nedensellik ilişkisinin belirlenmesine yönelik uygulanan testler Eviews 10 ve Stata 14 paket programları yardımıyla uygulanmıştır.

5. Ekonometrik Yöntem

Çalışmanın bu kısmında öncelikle değişkenlere uygulanan yatay kesit bağımlılık ve panel birim kök testleri tanıtılmıştır. Daha sonra kh ve vg arasındaki ilişkiyi belirlemeye yönelik uygulanan ekonometrik yöntem sunulmuştur.

5.1. Yatay Kesit Bağımlılık ve Swamy S Homojenlik Testi

Yatay kesit bağımlılığı ile birimler arasında korelasyon olup olmadığı belirlenmektedir. Yatay kesit bağımlılığı tespit edilmesi durumunda sonuçların tutarlı olması için bu ilişkiyi dikkate alan testler kullanılmaktadır. Yatay kesit bağımlılığı T>N durumunda kullanılan ve Denklem (1)'de yer alan Breusch-Pagan LM (CDLM) testi ile belirlenmiştir.

$$CD_{LM} = \sqrt{\frac{1}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \left(TP_{ij}^2 - 1\right) \sim N(0,1) \tag{1}$$

Breusch-Pagan LM (CDLM) testinin temel hipotezi olan H_0 = "Yatay kesit bağımlılığı yoktur" iken alternatif hipotezi olan H_A = "Yatay kesit bağımlılığı vardır" şeklinde kurulmaktadır. H_0 hipotezinin reddedilmesi ile yatay kesit bağımlılığı belirlenmiş olmaktadır.

Panel veri uygulamalarda değişkenlerin homojenlik sınaması kullanılacak testlerin seçimini etkileyerek sonuçların tutarlı olmasını sağlamaktadır. Swamy S testi her bir değişken için uygulanarak değişkenlerin homojenliğinin sınandığı H_0 temel hipotezi "Eğim katsayısının homojen" olduğunu H_A alternatif hipotezi "Eğim katsayısı heterojen" olduğunu

ortaya koymaktadır. Ayrıca homojenlik sınaması Pesaran & Yamagata (2008) Delta testi ile de yapılmıştır.

5.2. Panel Birim Kök Testi

Yatay kesit bağımlılığı tespit edilmesi ikinci nesil panel birim kök testlerinin kullanılmasını gerekli kılmaktadır. Değişkenlerin durağanlık seviyeleri Taylor & Sarno (1998) tarafından geliştirilen Multivariate Augmented Dickey Fuller (MADF) birim kök testi ile incelenmiştir. T>N durumunda kullanılan testin temel hipotezi olan H_0= "Değişkenler birim kök taşır" alternatif hipotezi H_A= "Değişkenler birim kök taşımaz" şeklinde kurulmaktadır. Temel hipotezin reddedilmesi değişkenlerin seviyesinde durağan olduklarını ortaya koymaktadır.

Değişkenler arasındaki asimetrik nedensellik ilişkisi pozitif ve negatif şoklara yönelik tepkilerin ortaya konması bakımından önem arz etmektedir. Diğer bir ifadeyle değişkenlerin pozitif şok durumda ortaya koyduğu davranış ile negatif şok durumunda ortaya koyduğu davranışın etkileri ayrı ayrı gözlenebilmektedir. Bu amaçla söz konusu nedensellik ilişkisinin pozitif ve negatif şoklar için ayrı ayrı belirlenmesi farklı bir etkinin varlığının olup olmadığını da belirlemesi bakımından önem arz etmektedir.

5.3. Dumitrescu ve Hurlin (2012) Panel Asimetrik Nedensellik Testi

Vektör otoregresif modele dayanan Dumitrescu & Hurlin (2012) panel nedensellik testi, yatay kesit bağımlılığını dikkate alması ve zaman boyutunun kesit boyutundan büyük ya da küçük olması durumlarında etkin tahminciler üretebilmektedir (Dumitrescu & Hurlin, 2012: 1457). Dumitrescu & Hurlin (2012) tarafından geliştirilen test (2) nolu Denklem üzerinden gerçekleştirilmektedir.

$$y_{i,t} = \beta_i + \sum_{k=1}^{K} \alpha_i^{(k)} y_{i,t-k} + \sum_{k=1}^{K} \gamma_i^{(k)} x_{i,t-k} + \varepsilon_{i,t} \tag{2}$$

Birimler arasında değiştiği varsayılan $\alpha i(k)$ ve $\gamma i(k)$ sırasıyla otoregresif parametre ve eğim katsayısını ifade etmektedir. β_i sabit ve K gecikme uzunluğu ise tüm birimler için ortak kabul edilmektedir. Testin temel hipotezi H_0= "Tüm yatay kesitlerinde incelenen değişkenler arasında nedensellik ilişkisi yoktur" ve alternatif hipotezi H_A= "En az bir yatay kesitte incelenen değişkenler arasında nedensellik ilişkisi vardır" şeklinde kurulmaktadır. x'in y'nin nedeni olup olmadığı hipotezlere yönelik testlerin incelenmesi ile belirlenmektedir. Buna göre H_0'ın reddedilmesi ile kurulan modelde bağımsız değişkenden bağımlı değişkene doğru nedensellik ilişkisinin olduğu sonucuna varılmaktadır. Denklem (2)'de yer alan bağımlı ve bağımsız değişkenlerin yer değiştirmesi ile karşılıklı ilişkinin varlığını ortaya koyan çift yönlü nedensellik ilişkisinin varlığı benzer şekilde belirlenmektedir.

Dumitrescu & Hurlin (2012) testinde temel hipotez Denklem (3)'de yer alan ortalama Wald istatistiği ile hesaplanabilmektedir.

$$W_{N,T}^{HNC} = \frac{1}{T}\sum_{i=1}^{N} W_{i,T} \tag{3}$$

Bununla birlikte Denklem (4)'den görüldüğü üzere, T'nin küçük değerleri için bireysel Wald istatistikleri aynı χ2 dağılımına yakınsamadığı için Dumitrescu & Hurlin (2012) bilinmeyen bu dağılımın ortalama ve varyansının tahmini değerlerini kullanarak, $W_{N,T}^{Hnc}$ için tahmini standardize edilmiş test istatistiğini kullanmayı önermişlerdir (Bozoklu & Yılancı 2013: 177).

$$z_N^{HNC} = \frac{\sqrt{N}\,[W_{N,T}^{HNC} - N^{-1}\sum_{i=1}^{N} E\,(w_{i,T})]}{\sqrt{N^{-1}\sum_{i=1}^{N} Var\,(w_{i,T})}} \xrightarrow[N,T\to\infty]{d} N\,(0,1) \tag{4}$$

$Z_{N,T}^{HNC}$ test istatistiğinin, az sayıda birime sahip panellerde bile iyi boyut ve güç özelliklerine sahip olduğunu, gecikme uzunluğunun yanlış belirlenmesi durumunda bile bu test istatistiğinin oldukça güçlü olduğunu göstermişlerdir (Bozoklu & Yılancı, 2013: 177).

Asimetrik nedensellik testinde değişkenler (+) ve (-) bileşenlerine ayrılarak Dumitrescu & Hurlin (2012) nedensellik testine tabi tutulmaktadırlar. Öncelikle Denklem (2), (+) ve (-) bileşenler için yeniden düzenlenerek Denklem (5) ve (6)'ya dönüştürülmektedir.

$$y_{i,t}^{+} = \alpha_i + \sum_{k=1}^{K} \gamma_i^{(k)} y_{i,t-k}^{+} + \sum_{k=1}^{K} \beta_i^{(k)} x_{i,t-k}^{+} + \varepsilon_{i,t}^{+} \tag{5}$$

$$y_{i,t}^{-} = \alpha_i + \sum_{k=1}^{K} \gamma_i^{(k)} y_{i,t-k}^{-} + \sum_{k=1}^{K} \beta_i^{(k)} x_{i,t-k}^{-} + \varepsilon_{i,t}^{-} \tag{6}$$

Denklem (5) ve (6) esas alınarak Dumitrescu & Hurlin (2012) nedensellik testi ile asimetrik ilişki belirlenmektedir.

(+) ve (-) bileşenler Denklem (7) ve (8) üzerinden oluşturulmaktadır.

$$\varepsilon_{1\,i\,t}^{+} = (\varepsilon_{1i\,t}, 0)\,, \varepsilon_{1\,i\,t}^{-} = (\varepsilon_{1i\,t}, 0) \tag{7}$$

$$\varepsilon_{2\,i\,t}^{+} = (\varepsilon_{2\,i\,t}, 0)\,, \varepsilon_{2\,i\,t}^{-} = (\varepsilon_{2i\,t}, 0) \tag{8}$$

Değişkenlerin birikimli durumları Denklem (9) ve (10)'daki gibi elde edilmektedir.

$$y_{i\,t}^{+} = y_{i,0}^{+} + \varepsilon_{1\,i\,t}^{+} = y_{i,0} + \sum_{j=1}^{t} \varepsilon_{1\,i\,j}^{+} \tag{9}$$

$$y_{i\,t}^{-} = y_{i,0}^{-} + \varepsilon_{1\,i\,t}^{-} = y_{i,0} + \sum_{j=1}^{t} \varepsilon_{1\,i\,j}^{-}$$

$$x_{i\,t}^{+} = x_{i,0}^{+} + \varepsilon_{1\,i\,t}^{+} = x_{i,0} + \sum_{j=1}^{t} \varepsilon_{1\,i\,j}^{+} \tag{10}$$

$$x_{i\,t}^{-} = x_{i,0}^{-} + \varepsilon_{1\,i\,t}^{-} = x_{i,0} + \sum_{j=1}^{t} \varepsilon_{1\,i\,j}^{-}$$

Denklem (9) ve (10) üzerinden hesaplanan test istatistiği ile değişkenlerin (+) ve (-) bileşenleri arasında bir nedensellik ilişkisinin olup olmadığına karar verilmektedir (Hatemi-J, 2011: 4).

6. Ekonometrik Bulgular

Çalışmanın bu kısmında ekonometrik analiz sonucu elde edilen tüm bulgular sunulmuştur.

6.1. Yatay Kesit Bağımlılığı ve Swamy S Homojenlik Test Sonuçları

Tablo 3'te Breusch-Pagan LM yatay kesit bağımlılık test sonuçları yer almaktadır.

Tablo: 3
Breusch-Pagan LM Yatay Kesit Bağımlılık Homojenlik Test Sonuçları

	Yatay Kesit Bağımlılığı Testi		Homojenlik Testi	
Değişkenler	t-istatistiği	Olasılık Değeri	X^2 Test İstatistiği	Olasılık Değeri
kh^+	632,5685	0,0000	397,80	0,0000
vg^+	457,2027	0,0000	378,70	0,0000
kh^-	639,2539	0,0000	439,65	0,0000
vg^-	647,1111	0,0000	437,33	0,0000

Not: Değişken üst indisleri olan + ve - sırasıyla değişkenin pozitif ve negatif bileşenini temsil etmektedir.

Tablo 3'ten görüldüğü üzere tüm değişkenler için yatay kesitler arasında bağımlılık yoktur şeklinde kurulan temel hipotez reddedilmiş ve yatay kesit bağımlılığı olduğu belirlenmiştir. Dolayısıyla birimlerden birinde meydana gelen şokun diğer birimleri de etkilediği sonucuna ulaşılmıştır. Her bir değişken için uygulanan Swamy S homojenlik test sonucu değişkenlerin homojenliğinin sınandığı H_0 temel hipotezi istatistiksel olarak %1 anlamlılık düzeyinde reddedilmiştir. Diğer bir ifadeyle değişkenlerin heterojen olduğuna karar verilmiştir. Ayrıca Pesaran & Yamagata (2008) delta (Δ) test sonuçlarına göre Δ ve düzeltilmiş Δ sonuçları sırasıyla 4.965[a] ve 6.158[a] olarak tespit edilmiş ve istatistiki olarak %1 anlamlılık düzeyinde H_0 reddedilerek değişkenlerin heterojen olduğu belirlenmiştir.

6.2. MADF Panel Birim Kök Test Sonuçları

Yatay kesit bağımlılığı ve değişkenlerin heterojen olduğunun tespit edilmesi neticesinde değişkenlerin birim kök sınamaları ikinci nesil birim kök testlerinden olan ve heterojenlik durumunu dikkate alan MADF birim kök testi yardımıyla araştırılmış ve sonuçlar Tablo 4'te sunulmuştur.

Tablo: 4
MADF Birim Kök Test Sonuçları

Değişkenler	MADF Test İstatistiği	Ortalama 5% CV
kh^+	45,124	
vg^+	163,360	41,700
vg^-	228,687	
kh^-	20,615	
Δkh^-	465,356	45,195

Not: Δ, fark operatörünü ifade etmektedir. Analizler 1 gecikme uzunluğu üzerinden yapılmıştır.

Tablo 4'ten görüldüğü üzere kh^- birinci farkında durağan iken diğer tüm değişkenlerin seviye değerlerinde durağan oldukları belirlenmiştir. Nedensellik sınamasına

ilişkin yapılan analizlerde değişkenler durağan oldukları seviyeden modele dahil edilmiştirler.

6.3. Dumitrescu ve Hurlin (2012) Panel Asimetrik Nedensellik Test Sonuçları

Tablo 5'te kh ve vg değişkenlerinin pozitif ve negatif bileşenleri arasında asimetrik nedensellik ilişkisinin belirlenmesine yönelik uygulanan Dumitrescu & Hurlin (2012) asimetrik nedensellik test sonuçları yer almaktadır.

Tablo: 5
Dumitrescu & Hurlin (2012) Panel Asimetrik Nedensellik Test Sonuçları

Temel Hipotez	$\tilde{Z}^{HNC}$ Test İstatistiği			Sonuç
	K_1	K_2	K_3	
Ho= vg$^+$ ⇸ kh$^+$	2,93401[a]	2,62784[a]	2,89223[a]	H$_0$ Red
Ho= kh$^+$ ⇸ vg$^+$	3,73043[a]	2,15003[b]	0,18546	H$_0$ Red
Ho= vg$^-$ ⇸ kh$^-$	-1,34578	0,52317	1,99187[a]	H$_0$ Reddedilemedi
Ho= kh$^-$ ⇸ vg$^-$	-0,34549	11,8561[a]	7,85930[a]	H$_0$ Red

Not: ⇸, ok yönünde nedenselliğin olmadığını göstermektedir. a ve b, istatistiksel olarak %1 ve %5 düzeyindeki anlamlılığı, K gecikme uzunluğunu ifade etmektedir.

Tablo 5'ten görüldüğü üzere kh+ ile vg+ arasında çift yönlü bir nedensellik ilişkisi belirlenmiştir. Diğer yandan kh-'den vg-'ye doğru tek yönlü bir nedensellik ilişkisi tespit edilmiştir.

7. Sonuç

Sürdürülebilir bütçe açıkları için kamu harcamaları ile kamu gelirleri arasındaki nedensellik ilişkisinin bilinmesi uygulanacak politikalarda politika yapıcılara yol göstermektedir. Dolayısıyla bu ilişkinin belirlenmesi hem politika yapıcılar hem de araştırmacıların ilgisini çeken konular arasında yer almaktadır. Kamu harcamaları ile kamu gelirleri arasındaki nedensellik ilişkisi gelir harcama arasındaki teorik temellere dayalı dört hipotez ile açıklanmaktadır. Bunlardan ilki, vergi gelirlerinden kamu harcamalarına doğru tek yönlü nedensellik ilişkisini ortaya koyan ve Friedman (1978) ile Buchanan & Wagner (1977) tarafından ortaya atılan vergi-harcama hipotezi'dir. İkinci ve üçüncüsü sırasıyla kamu harcamalarından vergi gelirlerine doğru tek yönlü nedensellik ilişkisini ortaya koyan ve Peacock & Wiseman'nın (1961) ve Barro'nun (1974) tarafından açıklanan harcama-vergi hipotezi, Meltzer & Richard (1981) ve Musgrave (1985)'nin belirttiği kamu harcamaları ile vergi gelirleri arasında çift yönlü bir nedensellik ilişkisini belirten mali senkronizasyon hipotezidir. Son olarak Hoover & Sheffrin (1992)'nin kamu harcamaları ile vergi gelirleri arasında herhangi bir nedensellik ilişkisinin olmadığını ileri süren kurumsal ayrılık hipotezidir.

Kamu harcamaları ile vergi gelirleri arasındaki ilişkinin bilinmesi bütçeye yönelik uygulanacak politika seçimlerinde yol gösterici olması nedeniyle önem arz etmektedir. Son yıllarda yaşanan ekonomik krizler ve salgın hastalıklar uluslararası alanda ortaya çıkan etkilerle birleşince devletin ekonomiye müdahalesi daha da önemli bir hal almış ve bu durum da bütçenin planlanması konusunu daha da fazla ön plana çıkarmıştır. Dolayısıyla söz

konusu müdahalelere yönelik finansman konuları tüm toplum için önem taşımaktadır. Bu noktada uygulanacak politikaların bütçe üzerindeki etkisine yönelik kamu harcamaları ve vergi gelirleri arasındaki nedensellik ilişkisinin yönünün bilinmesi faydalı olacaktır. Literatürde söz konusu ilişkiye yönelik dört hipotez bütçe açıklarının azaltılmasına yönelik politika uygulamalarını ve etkilerini de ortaya koymaktadır. Bu noktadan hareketle kamu harcamaları ile vergi gelirleri arasındaki ilişkinin belirlenmesinin önemi ortaya çıkmaktadır.

Çalışmada Sovyet bloğunun çökmesiyle ortaya çıkan ve ortak ekonomik ve siyasi politikalara sahip mali sistemleri kapsayan ve bütçe açığı problemi yaşayan 12 geçiş ekonomisi için kamu harcamaları ile vergi gelirleri arasındaki ilişki Dumitrescu & Hurlin (2012) panel asimetrik nedensellik testleri yardımıyla araştırılma konusu yapılmıştır. Kamu harcamaları ve vergi gelirleri GSYH oranı olarak dünya bankası veri tabanından elde edilmiş ve kesiksiz veri kriteri esasına göre 2000-2019 dönemi için yıllık frekansta analizlere dahil edilmiştir.

Dumitrescu & Hurlin (2012) panel asimetrik nedensellik testi sonucu, değişkenlerin pozitif bileşenleri arasında çift yönlü bir nedensellik ilişkisi olduğunu ortaya koymuştur. Söz konusu sonuç, geçiş ekonomileri için pozitif bileşenler arasında mali senkronizasyon hipotezini desteklemektedir. Bu sonuç Gürdal vd. (2020), Ekinci (2020), Vamvoukas (2012)'in çalışmaları ile desteklenmektedir. Pozitif bileşenler arasındaki mali senkronizasyon hipotezini destekleyen sonuç, pozitif şokların yaşandığı dönemde maliye politikasına yönelik kararlarda politika yapıcılar hem kamu harcamaları hem de vergi gelirlerine yönelik kararları aynı anda eş zamanlı olarak almaları gerekliliğini belirtmektedir. Dolayısıyla bütçe açığı problemini iyileştirmeye yönelik uygulanacak kararlarda kamu harcamaları ve vergi gelirlerine yönelik iki taraflı iyileştirmelerin gerekliliği öne çıkmaktadır.

Değişkenlerin negatif bileşenlerine yönelik sonuçlara göre ise negatif kamu harcamalarından negatif vergi gelirlerine doğru tek yönlü bir nedensellik ilişkisinin varlığı belirlenmiştir. Dolayısıyla, negatif bileşenleri arasında harcama-vergi hipotezini destekleyen sonuçlar belirlendiği tespit edilmiştir. Söz konusu sonuç Miller & Russek (1990), Mutascu vd. (2016), Özmen & Balı (2018), Von Furstenberg vd. (1985), Zapf & Payne (2009)'un çalışmaları ile desteklenmektedir. Harcama-vergi hipotezi kamu harcamalarında alınan artış kararı sonrasında vergi gelirlerinin de artırılması gerekliliğini ortaya koymaktadır. Ya da kamu harcamalarında kısıntıya gidilmesi vergi gelirlerinin de azalmasını beraberinde getirecektir. Dolayısıyla negatif bileşenlere yönelik sonuçlardan hareketle söz konusu durumda bütçe açığını azaltmak için kamu harcamalarının azaltılması yönünde politika kararlarının uygulanması gerekliliği belirlenmiştir.

Tüm bu sonuçlardan hareketle geçiş ekonomileri için kamu harcamaları ile vergi gelirleri arasında asimetrik bir nedensellik ilişkisi olduğu belirlenmiştir. Geçiş ekonomilerinde kamu harcamaları ve vergi gelirleri arasındaki ilişkinin asimetrik yapı sergilediğinin tespiti ve saklı olan nedensellik ilişkilerinin belirlenmesi ile bütçe açığı problemlerine yönelik politik kararların etkin yönetilmesine yardımcı olacağa

benzemektedir. Dolayısıyla söz konusu ilişkide mali senkronizasyon ve harcama-gelir hipotezlerinin ayrı ayrı tespit edilmesi durumunun, politika kararlarına etki etmesi bakımından önem arz ettiği ifade edilebilir. Pozitif şok durumunda kamu harcamaları ile vergi gelirleri arasındaki mali senkronizasyon ilişkisi bütçeye yönelik alınacak kararlarda her iki unsurun birlikte organize edilerek uyum içinde olması gerekliliği kamu harcamalarının finansmanını ve bütçe açığı probleminin çözümüne katkı sunacağa benzemektedir. Diğer yandan negatif şok durumunda, kamu harcamalarındaki azalışların azalan vergi gelirlerinin nedeni olması, harcamalara yönelik kararların negatif şok durumunda kısılması ile vergi gelirlerinin de bu harcama düzeyini gerçekleştirecek oranda planlanmasının gerekliliğini ortaya koymaktadır. Dolayısıyla etkin bir maliye politikası için söz konusu sonuçların politika yapıcılara alınacak kararlarda yol gösterici olabileceği ifade edilebilir.

Son olarak, yeni araştırmacıların farklı gelir gruplarında yer alan ülkeleri analiz ederek farklı sonuçlara ulaşabilecekleri düşünülmektedir. Bu bağlamda yeni araştırmacılar yeni nesil zaman serisi ya da panel veri uygulamaları ile elde edilecek sonuçları değerlendirerek politika önerilerinde bulunabilirler.

Kaynaklar

Abual-Foul, B. & H. Baghestani (2004), "The Causal Relation Between Government Revenue and Spending: Evidence from Egypt and Jordan", *Journal of Economics and Finance*, 28(2), 260-269.

Akbulut, H. & A.B. Yereli (2016), "Kamu Gelirleri ve Kamu Harcamaları Nedensellik İlişkisi: 2006-2015 Dönemi için Türkiye Örneği", *Sosyoekonomi*, 24(27), 103-120.

Anderson, W. et al. (1986), "Government Spending and Taxation: What Causes What?", *Southern Economic Journal*, 52(3), 630-639.

Aregbeyen, O. & B. Insah (2013), "A Dynamic Analysis of The Link Between Public Expenditure and Public Revenue in Nigeria and Ghana", *Journal of Economics and Sustainable Development*, 4(4), 18-26.

Athanasenas, A. et al. (2014), "Government Spending and Revenues in The Greek Economy: Evidence from Nonlinear Cointegration", *Empirica*, 41(2), 365-376.

Ay, H.M. & E. Talaşlı (2008), "Ülkelerin Ekonomik Gelişmişlik Seviyeleri ve Vergi Yapıları Arasındaki İlişki", *Maliye Dergisi*, 154, 135-155.

Aysu, A. & D. Bakırtaş (2018), "Kamu Harcamaları ve Vergi Gelirleri Arasındaki Asimetrik Nedensellik İlişkisi: Türkiye Örneği", *Erciyes Üniversitesi İİBF Dergisi*, 51, 1-19.

Baffes, J. & A. Shah (1994), "Causality and Comovement Between Taxes and Expenditures: Historical Evidence from Argentina, Brazil, and Mexico", *Journal of Development Economics*, 44(2), 311-331.

Baghestani, H. & R. Mcnown (1994), "Do Revenues or Expenditures Respond to Budgetary Disequilibria?", *Southern Economic Journal*, 61(2), 311-322.

Bağcı-Aydoğdu, A. & E. Sever (2022), "Gelişmiş ve Gelişmekte Olan Ülkelerde Kaynaklarına Göre Vergi Türleri ve Ekonomik Büyüme İlişkisi", *Sosyoekonomi*, 30(51), 261-282.

Barro, R.J. (1974), "Are Government Bonds Net Wealth?", *Journal of Political Economy*, 82(6), 1095-1117.

Blackley, P.R. (1986), "Causality Between Revenues and Expenditures and The Size of The Federal Budget", *Public Finance Quarterly*, 14(2), 139-156.

Bohn, H. (1991), "Budget Balance Through Revenue or Spending Adjustments?: Some Historical Evidence for The United States", *Journal of Monetary Economics*, 27(3), 333-359.

Bolat, S. & M. Belke (2015), "Fiscal Assessment in The Tax-Spending Nexus: A Tale of Central and Eastern European Countries", *International Conference on Theoretical and Practical Aspects of Public Finance*, Prag.

Bozoklu, Ş. & V. Yılancı (2013), "Finansal Gelişme ve İktisadi Büyüme Arasındaki Nedensellik İlişkisi: Gelişmekte Olan Ekonomiler İçin Analiz", *DEÜ İİBF Dergisi*, 28(2), 161-187.

Buchanan, J.M. & R.E. Wagner (1977), *Democracy in Deficit: The Political Legacy of Lord Keynes*, New York: Academic Press.

Chang, T. & G. Chiang (2009), "Revisiting the Government Revenue-Expenditure Nexus: Evidence From 15 OECD Countries Based on The Panel Data Approach", *Czech Journal of Economics and Finance (Finance A Uver)*, 59(2), 165-172.

Chang, T. et al. (2002), "Tax-And-Spend, Spend-And-Tax, or Fiscal Synchronization: New Evidence for Ten Countries", *Applied Economics*, 34(12), 1553-1561.

Cheng, B.S. (1999), "Causality Between Taxes and Expenditures: Evidence from Latin American Countries", *Journal of Economics and Finance*, 23(2), 184-192.

Chowdhury, A.R. (1988), "Expenditures and Receipts in State and Local Government Finances: Comment", *Public Choice*, 59(3), 277-285.

Çetintaş, H. & D. Baigonushova (2016), "Devlet Harcamaları ve Gelirleri Arasındaki İlişkinin Test Edilmesi: Kırgızistan Örneği", *International Conference on Eurasian Economies*, Kaposvár.

Darrat, A.F. (1998), "Tax and Spend or Spend and Tax? An Inquiry into The Turkish Budgetary Process", *Southern Economic Journal*, 64(4), 940-956.

Darrat, A.F. (2002), "Budget Balance Through Spending Cuts or Tax Adjustments?", *Contemporary Economic Policy*, 20(3), 221-233.

Dökmen, G. (2012), "Kamu Harcamaları ve Kamu Gelirleri Arasındaki İlişki: Panel Nedensellik Analizi", *DEÜ İİBF Dergisi*, 27(2), 115-143.

Dumitrescu, E.I. & C. Hurlin (2012), "Testing for Granger Non-Causality in Heterogeneous Panels", *Economic Modelling*, 29, 1450-1460.

Ekinci, A.A. (2020), "Causality Between Excise Tax Revenue and Government Spending in OECD Countries", *HÜ İİBF Dergisi*, 38(4), 721-741.

Ewing, B. & J. Payne (1998), "Government Revenue-Expenditure Nexus: Evidence from Latin America", *Journal of Economic Development*, 23(2), 57-69.

Ewing, B.T. et al. (2006), "Government Expenditures and Revenues: Evidence from Asymmetric Modeling", *Southern Economic Journal*, 73(1), 190-200.

Famulska, T. et al. (2020), "The Relationship Between Tax Revenue and Public Social Expenditure in The EU Member States", *European Research Studies Journal*, 23(4), 136-1156.

Fasano, U. & Q. Wang (2002), "Testing the Relationship Between Government Spending and Revenue: Evidence from GCC Countries", *IMF Working Papers*, WP/02/201, International Monetary Fund, Washington, DC.

Friedman, M. (1978), "The Limitations of Tax Limitation", *Quadrant*, 22(8), 22-24.

Garcia, M.J. (2012), "The Revenues-Expenditures Nexus: A Panel Data Analysis of Spain's Regions (Running Title: Tax-Expenditure, Expenditure-Tax or Fiscal Synchronization)", *International Journal of Academic Research in Economics and Management Sciences*, 1(1), 24-38.

Garcia, S. & P.Y. Hénin (1999), "Balancing Budget Through Tax Increases or Expenditure Cuts: Is It Neutral?", *Economic Modelling*, 16(4), 591-612.

Gürdal, T. et al. (2020), "The Relationship Between Tax Revenue, Government Expenditure, And Economic Growth in G7 Countries: New Evidence from Time and Frequency Domain Approaches", *Economic Change and Restructuring*, 54(2), 305-337.

Hatemi-J, A. (2011), "Asymmetric Panel Causality Tests with an Application to the Impact of Fiscal Policy on Economic Performance in Scandinavia", *MPRA Working Papers*, No. 55527, Munich Personal RePEc Archive, Munich.

Ho, Y. & C. Huang (2009), "Tax-Spend, Spend-Tax, or Fiscal Synchronization: A Panel Analysis of The Chinese Provincial Real Data", *Journal of Economics and Management*, 5(2), 257-272.

Hondroyiannis, G. & E. Papapetrou (1996), "An Examination of The Causal Relationship Between Government Spending and Revenue: A Cointegration Analysis", *Public Choice*, 89(3), 363-374.

Hoover, K.D. & S.M. Sheffrin (1992), "Causation, Spending, And Taxes: Sand in The Sandbox or Tax Collector for The Welfare State?", *The American Economic Review*, 82(1), 225-248.

Jones, J.D. & D. Joulfaian (1991), "Federal Government Expenditures and Revenues in The Early Years of The American Republic: Evidence from 1792 to 1860", *Journal of Macroeconomics*, 13(1), 133-155.

Joulfaian, D. & R. Mookerjee (1991), "Dynamics of Government Revenues and Expenditures in Industrial Economies", *Applied Economics*, 23(12), 1839-1844.

Kamacı, A. & O. Kurt (2021), "Kamu Harcamaları ile Vergi Gelirleri İlişkisi: Pandemi Öncesi ve Sonrası için bir Değerlendirme", *Journal of Life Economics*, 8(4), 455-462.

Karakas, M. & T. Turan (2019), "The Government Spending-Revenue Nexus in Cee Countries: Some Evidence for Asymmetric Effects", *Prague Economic Papers*, 28(6), 633-647.

Koçak, S. (2021), "Is Exchange Rate Volatility An Important Determinant of Tax Revenues? Evidence From Turkey", *Romanian Economic Journal*, 24(81), 33-49.

Koçak, S. vd. (2022), "Enflasyon, Enflasyon Oynaklığı ve Vergi Gelirleri Arasındaki Dinamik İlişkiler: Türkiye Örneği", *Uluslararası İktisadi ve İdari İncelemeler Dergisi*, (36), 209-222.

Kollias, C. & S. Makrydakis (2000), "Tax and Spend or Spend and Tax? Empirical Evidence from Greece, Spain, Portugal and Ireland", *Applied Economics*, 32(5), 533-546.

Kollias, C. & S.M. Paleologou (2006), "Fiscal Policy in The European Union: Tax and Spend, Spend and Tax, Fiscal Synchronization or Institutional Separation?", *Journal of Economic Studies*, 33(2), 108-120.

Konukcu-Önal, D. & A.N. Tosun (2008), "Government Revenue-Expenditure Nexus: Evidence from Several Transitional Economies", *Economic Annals*, 53, 145-56.

Koren, S. & A. Stiassny (1998), "Tax and Spend, or Spend and Tax? An International Study", *Journal of Policy Modeling*, 20(2), 163-191.

Manage, N. & M.L. Marlow (1986), "The Causal Relation Between Federal Expenditures and Receipts", *Southern Economic Journal*, 52(3), 617-629.

Marlow, M.L. & N. Manage (1987), "Expenditures and Receipts: Testing for Causality in State and Local Government Finances", *Public Choice*, 53(3), 243-255.

Mehrara, M. et al. (2011), "Government Revenue and Government Expenditure Nexus in Asian Countries: Panel Cointegration and Causality", *International Journal of Business and Social Science*, 2(7), 199-207.

Meltzer, A.H. & S.F. Richard (1981), "A Rational Theory of The Size of Government", *Journal of Political Economy*, 89(5), 914-927.

Miller, S.M. & F.S. Russek (1990), "Co-Integration and Error-Correction Models: The Temporal Causality Between Government Taxes and Spending", *Southern Economic Journal*, 57(1), 221-229.

Musgrave, R.A. (1985), "A Brief History of Fiscal Doctrine", in: *Handbook of Public Economics 1st ed.* (1-59), Amsterdam, Elsevier Science Publishers.

Mutascu, M. (2016), "Government Revenues and Expenditures in The East European Economies: A Bootstrap Panel Granger Causality Approach", *Eastern European Economics*, 54(6), 489-502.

Narayan, P.K. & S. Narayan (2006), "Government Revenue and Government Expenditure Nexus: Evidence from Developing Countries", *Applied Economics*, 38(3), 285-291.

Narayan, P.K. (2005), "The Government Revenue and Government Expenditure Nexus: Empirical Evidence from Nine Asian Countries", *Journal of Asian Economics*, 15(6), 1203-1216.

Owoye, O. (1995), "The Causal Relationship Between Taxes and Expenditures in The G7 Countries: Cointegration and Error-Correction Models", *Applied Economics Letters*, 2(1), 19-22.

Özmen, İ. & S. Bali (2018), "Vergi Gelirleri ve Kamu Harcamaları Arasındaki İlişki: 14 Avrupa Birliği Ülkesinde Asimetrik Panel Nedensellik Testi", *International Congress on Political Economic and Social Studies*, Venedik.

Paleologou, S.M. (2013), "Asymmetries in the Revenue-Expenditure Nexus: A Tale of Three Countries", *Economic Modelling*, 30, 52-60.

Payne, J.E. (1997), "The Tax-Spend Debate: The Case of Canada", *Applied Economics Letters*, 4(6), 381-386.

Payne, J.E. (1998), "The Tax-Spend Debate: Time Series Evidence from State Budgets", *Public Choice*, 95(3), 307-320.

Payne, J.E. (2003), "A Survey of the International Empirical Evidence on The Tax-Spend Debate", *Public Finance Review*, 31(3), 302-324.

Payne, J.E. et al. (2002), "Revenue-Expenditure Nexus in A Transition Economy: Evidence from Croatia", *Privredna Kretanja I Ekonomska Politika*, 12(93), 27-37.

Payne, J.E. et al. (2008), "Turkish Budget Deficit Sustainability and The Revenue-Expenditure Nexus", *Applied Economics*, 40(7), 823-830.

Peacock, A.T. & J. Wiseman (1961), *The Growth of Public Expenditure in The United Kingdom*, New Jersey: Princeton University Press.

Ram, R. (1988), "Additional Evidence on Causality Between Government Revenue and Government Expenditure", *Southern Economic Journal*, 54(3), 763-769.

Ross, K.L. & J.E. Payne (1998), "A Reexamination of Budgetary Disequilibria", *Public Finance Review*, 26(1), 67-79.

Saunoris, J.W. & J.E. Payne (2010), "Tax More or Spend Less? Asymmetries in the UK Revenue-Expenditure Nexus", *Journal of Policy Modeling*, 32(4), 478-487.

Sørensen, B.E. et al. (2001), "Output Fluctuations and Fiscal Policy: US State and Local Governments 1978-1994", *European Economic Review*, 45(7), 1271-1310.

Tashevska, B. et al. (2020), "The Government Revenue-Expenditure Nexus in Southeast Europe: A Bootstrap Panel Granger-Causality Approach", *Eastern European Economics*, 58(4), 309-326.

Taylor, M.P. & L. Sarno (1998), "The Behavior of Real Exchange Rates During the Post-Bretton Woods Period", *Journal of International Economics*, 46(2), 281-312.

Trehan, B. & C.E. Walsh (1988), "Common Trends, The Government's Budget Constraint, and Revenue Smoothing", *Journal of Economic Dynamics and Control*, 12(2-3), 425-444.

Vamvoukas, G.A. (2011), "The Tax-Spend Debate with An Application to the EU", *Economic Issues*, 16(1), 65-88.

Vamvoukas, G.A. (2012), "Panel Data Modelling and The Tax-Spend Controversy in The Euro Zone", *Applied Economics*, 44(31), 4073-4085.

Von Furstenberg, G.M. et al. (1985), "Have Taxes Led Government Expenditures? The United States as A Test Case", *Journal of Public Policy*, 5(3), 321-348.

Von Furstenberg, G.M. et al. (1986), "Tax and Spend, or Spend and tax?", *The Review of Economics and Statistics*, 68(2), 179-188.

Westerlund, J. et al. (2011), "The Tax-Spending Nexus: Evidence from A Panel of US State-Local Governments", *Economic Modelling*, 28(3), 885-890.

Yılancı, V. vd. (2020), "Türkiye'de Kamu Harcamaları ile Vergi Gelirleri Arasındaki İlişki: Frekans Alanda Asimetrik Testinden Kanıtlar", *Sayıştay Dergisi*, 31(116), 121-139.

Zapf, M. & J.E. Payne (2009), "Asymmetric Modelling of The Revenue-Expenditure Nexus: Evidence from Aggregate State and Local Government in the US", *Applied Economics Letters*, 16(9), 871-876.

Maliyet Yapışkanlığı ile Kâr Yönetimi ve Firma Karakteristikleri Arasındaki İlişki: Borsa İstanbul Üzerine Bir İnceleme

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The Relationship Between Cost Stickiness and Earnings Management and Firm Characteristics: A Review on Borsa Istanbul

Abstract

The main aim of this study is to examine the relationship between cost stickiness, earnings management and firm characteristics. Data from 196 companies operating in Borsa Istanbul for 2012-2020 were used to achieve this aim. The ABJ method was frequently used in the literature to measure cost stickiness, and the Modified Jones Model was used as an earnings management indicator. According to the analysis results using the balanced panel data analysis method, no statistically significant relationship between cost stickiness and earnings management could be obtained. On the other hand, it has been determined that there are significant relationships between cost stickiness and firm characteristics, including firm profitability, debt ratio, firm size and firm age.

Keywords : Cost Stickiness, Earnings Management, Firm Characteristics.

JEL Classification Codes : M49, M41, M40.

Öz

Bu çalışmanın temel amacı, maliyet yapışkanlığı ile kar yönetimi ve firma karakteristikleri arasındaki ilişkiyi incelemektir. Bu amacı gerçekleştirmek üzere Borsa İstanbul'da faaliyet gösteren 196 firmanın 2012-2020 yıllarına ait verilerinden yararlanılmıştır. Maliyet yapışkanlığının ölçümünde literatürde sıklıkla kullanılan ABJ yöntemi, kâr yönetimi göstergesi olarak da Modifiye Edilmiş Jones Modelinden yararlanılmıştır. Dengeli panel veri analizi yönteminin kullanıldığı analiz sonuçlarına göre maliyet yapışkanlığı ile kâr yönetimi arasında istatistiksel olarak anlamlı bir ilişki elde edilememiştir. Buna karşın maliyet yapışkanlığı ile firma kârlılığı, firmanın borçlanma oranı, firma büyüklüğü ve firma yaşını içeren firma karakteristikleri arasında anlamlı ilişkilerin varlığı tespit edilmiştir.

Anahtar Sözcükler : Maliyet Yapışkanlığı, Kâr Yönetimi, Firma Karakteristikleri.

1. Giriş

İşletmeler globalleşmenin etkisiyle birlikte değişen ticaret koşullarına ayak uydurmalı ve müşterilerinin taleplerini en iyi şekilde cevaplandırmalıdırlar. Aynı zamanda da mevcut sektörde yaşanan rekabeti de göz önünde bulundurarak hem pazar payını korumalı hem de payını artırarak faaliyetlerini sürdürmelidirler.

İşletme yöneticileri tarafından faaliyetlerin etkin bir şekilde yürütülmesinde ve rekabette varlığını sürdürmesinde önemli bir unsur olan maliyet kavramı, işletmelerin planlama, kontrol ve karar alma mekanizmalarında önemli yere sahiptir ve bu kavramın çalışanlar tarafından da iyi anlaşılması gerekmektedir. Maliyet, bir amaca ulaşmada ve bir nesneye sahip olmada katlanılan fedakârlıkların tümü olarak tanımlanmaktadır (Yükçü, 2018: 41). İşletmeler faaliyetlerini devam ettirirken sabit, değişken ve karma (yarı değişken) maliyetlere katlanmak zorundadırlar. Sabit maliyetler, işletmelerin üretim hacimlerindeki değişimlerden etkilenmeyen (Gürdal, 2019: 25), değişken maliyetler ise, sabit maliyetlerin aksine işletmenin üretim hacmine bağlı olarak artıp azalan maliyetlerdir (Bengü & Fidancan, 2020: 334). Karma (yarı değişken) maliyetler ise hem sabit hem değişken maliyeti içermektedir ve üretim hacmine bağlı olarak yarı sabit yarı değişken olarak tanımlanmaktadır (Periasamy, 2010: 308).

İşletmelerin faaliyet hacimlerinde meydana gelen değişimlere karşılık maliyet muhasebesinin temel varsayımı maliyetlerinde aynı oranla artarak veya azalarak cevap verdiği bir başka ifadeyle simetrik davrandıklarıdır (Erdoğan vd., 2019: 265). Ancak bu varsayıma farklı bir açıdan bakılmasını sağlayan ve özellikle son yıllarda çok sayıda araştırmacı tarafından çalışılan yeni varsayım ise asimetrik maliyet davranışı ya da maliyet yapışkanlığı kavramıdır. Maliyet yapışkanlığı, faaliyet hacimlerinde meydana gelen artış ve azalışlara maliyetlerinde artarak ve azalarak cevap verdiklerini ancak söz konusu faaliyet artışlarında meydana gelen maliyet artışı kadar maliyetlerde azalmanın olmaması durumudur (Anderson et al., 2003: 51).

Maliyet yapışkanlığı literatürde ilk kez 2003 yılında Anderson, Banker ve Janakiraman tarafından geliştirilen ABJ yöntemiyle ölçülmüştür. Daha sonra maliyet yapışkanlığını ölçmek için farklı yöntemler ortaya çıkartılmış ancak bu yöntemler ABJ yöntemini baz alarak geliştirilmiştir. Yaklaşık 20 yıldır konuyla ilgili yapılan belirli bir zaman diliminde ülke, sektör ve firma verilerinden yararlanılan çalışmalarda hangi maliyetlerin yapışkan oldukları hangi maliyetlerin yapışkan olmadıkları belirlenmeye çalışılmıştır. Sonrasında ise maliyetlerin yapışkan olmalarının nedenleri araştırmalara konu olmuştur. Literatüre genel olarak bakıldığında kendi çıkarlarını düşünen yöneticilerin olması, yönetimsel iyimserlik ya da karamsarlık, yöneticilerin feshedilebilecek veya yeniden değerlendirildiğinde daha maliyetli olan sözleşmelerden kaçınması, firma özellikleri, vekâlet teorisi, yönetici özgüveni, varlık ve çalışan yoğunluğu ve kâr yönetim uygulamaları maliyet yapışkanlığının nedenleri arasında yer almaktadır.

Maliyet yapışkanlığı nedenlerinden biri olarak sayılan kâr yönetim uygulamaları, yöneticilerin finansal raporların hazırlanması ve sunulmasında gerçek performanslarını gizleyerek benimsedikleri strateji ve teknikler olarak tanımlanabilir (Boakye et al., 2019: 65). İşletmenin satışlarında meydana gelen azalmalarla birlikte zarar etmeye başlaması işletme paydaşları ve yatırımcıları açısından istenmeyen bir durum olduğundan yöneticiler finansal tablolarda yaptıkları çeşitli yönlendirmelerle bu durumu yansıtmamaya çalışmaktadırlar. Ancak tablolarda yapılan bu yönlendirmeler bazı maliyetlere uygulanan ayarlamalarla yapıldığından bu durum maliyet yapışkanlığına neden olmaktadır.

Literatürde maliyet yapışkanlığının varlığının tespitinin yanı sıra yapışkanlık üzerinde etkisi olduğu düşünülen ve Hashemi ve Nejati (2015), Xue ve Hong (2016), Sayrani vd. (2018), Megeid ve El-Deeb (2021), Kontesa ve Brahmana (2018), He vd. (2020), Zhao (2020), Warganegara ve Tamara (2014), Cheung vd. (2016) tarafından yapılan çalışmalarda kurumsal yönetim olarak da ifade edilen firma karakteristikleri de incelenmiştir. Firma karakteristikleri olarak bu çalışmada firma kârlılık oranı, firma borçlanma oranı, firma büyüklüğü ve firma yaşı değişkenleri yer almaktadır. Yöneticiler potansiyel yatırımcı ve işletme paydaşları için firmanın kârlılığını yüksek gösterme ya da borçlanma oranını düşük gösterme gibi amaçlar doğrultusunda bazı maliyetleri ayarlamak istemektedirler (Banker & Byzalov, 2014: 44; Kontesa & Brahmana, 2018: 7; Zhong et al., 2020: 1850). Dolayısıyla bu durum maliyet yapışkanlığına neden olabilmektedir. Ayrıca firma varlıklarının doğal logaritmasını gösteren firma büyüklüğü (Cheung et al., 2016) ve faaliyette bulunduğu yılı ifade eden firma yaşının maliyet yapışkanlığı üzerinde etkisi olduğu düşünülmektedir.

Yukarıda açıklanan teorik tartışmalar ışığında bu çalışmanın temel amacı maliyet yapışkanlığı ile kâr yönetimi ve firma karakteristikleri arasındaki ilişkiyi incelemektir. Bu amacı gerçekleştirmek amacıyla Borsa İstanbul'da 2012-2020 yılları arasında faaliyet gösteren 196 firmaya ait 1764 firma-gözlem yılı verilerinden yararlanılmıştır. Çalışmada maliyet yapışkanlığını ölçmek amacıyla literatürde de sıklıkla kullanılan ABJ yönteminden yararlanılmıştır. Maliyet unsuru olarak ise pazarlama, satış ve dağıtım giderleri, genel yönetim giderleri ve satışların maliyeti kullanılmıştır.

Çalışmanın ilerleyen bölümlerinde konuyla ilgili kurama, yapılan literatür araştırmasına, araştırma metodolojisine ve analizlerden elde edilen bulgulara yer verilmiştir.

2. Kuram

İşletmeler ömürlerinin sonsuz olduğu varsayımıyla kaynak ve kapasitelerini en verimli şekilde kullanmak ve faaliyetlerini en kârlı biçimde sürdürmek isterler. Ancak işletme kaynaklı ve işletme kaynaklı olmayan bazı durumlardan dolayı işletmeler istedikleri kâr hedeflerine ulaşamayabilirler. Literatürde işletmenin kârlılığının azalmasına neden olan durumlardan bir tanesi de maliyet yapışkanlığı olarak belirtilmektedir. Bu yüzden işletmelerin kârlılığını artırmak, kaynak ve kapasitelerini daha verimli biçimde kullanmaları için maliyet yapışkanlığı kavramını iyi anlaşılması ve bunun nedenlerinin iyi analiz edilmesi gerekmektedir (Erdoğan vd., 2019).

Maliyet yapışkanlığı, satışlarda meydana gelen artış ve azalışlara maliyetlerin vermiş oldukları asimetrik davranışlardır (Anderson et al., 2003). Başka bir ifadeyle maliyet yapışkanlığı, satışların arttığı dönemdeki maliyetlerdeki artışın, satışların azaldığı dönemdeki maliyetlerdeki azalışından daha fazla olması anlamına gelmektedir. Örneğin, satış gelirleri %20 artarsa maliyet %15 artacak, ancak satış gelirleri %20 azalırsa maliyetler %15'ten daha az azalacaktır. Böyle bir durumda maliyetlerin davranışları yapışkandır (Weiss, 2010).

İşletmelerin ayarlama maliyetlerinin varlığı, faaliyet miktarlarındaki değişim, gelecekteki satışlara ilişkin farklı beklentilerin olması ve yöneticilerin hırslı davranışları maliyet yapışkanlığını ortaya çıkarabilen durumlardan bazılarıdır (Venieris et al., 2015). Ayrıca farklı kâr seviyeleri altında farklı kâr yönetimi uygulamalarına yönelen firmaların toplam maliyet, pazarlama, satış ve genel yönetim giderleri gibi maliyetlerinin davranışlarını etkilediklerini belirtmişlerdir. Özet olarak yöneticiler maliyetlerde yaşanan durumları önlemek amacıyla maliyetleri yönetmeye çalışacak ve bu da kâr yönetimi uygulamaları ile maliyet davranışlarını etkileyecektir (Koo et al., 2015). Dolayısıyla tüm bu durumlarla birlikte maliyet yapışkanlığının varlığı çalışmada firma karakteristikleri olarak adlandırılan kârlılık oranı, borçlanma oranı, firma büyüklüğü ve firma yaşından da etkilenebilecektir.

3. Literatür

Maliyet yapışkanlığının artan önemine ilişkin olarak konu ile ilgili özellikle son yıllarda çok sayıda çalışmanın olduğu görülmektedir. Yapılan literatür araştırmasında konu ile ilgili çalışmalar öncelikle maliyet yapışkanlığının varlığının tespit edilmesine yöneliktir. Daha sonra maliyet yapışkanlığının kâr yönetimi ve çalışmada firma karakteristikleri olarak adlandırdığımız kârlılık oranı, borçlanma oranı, büyüklük ve yaş değişkenleri ile ilişkisini inceleyen çalışmalara yer verilmiştir. Bu kapsamda bu bölümde konuyla ilgili yurtiçi ve yurt dışında maliyet yapışkanlığının varlığı ile ilgili yapılan çalışmalar (Tablo 1) ve maliyet yapışkanlığı ile kâr yönetimi ve firma karakteristikleri arasındaki ilişkiyi inceleyen çalışmalar (Tablo 2) aşağıda verilmiştir.

3.1. Maliyet Yapışkanlığının Varlığı ile İlgili Yapılan Çalışmalar

Maliyet yapışkanlığı davranışının varlığını araştırmaya yönelik yapılan çalışmalar 2003 yılında Anderson, Banker ve Janakiraman tarafından ortaya çıkarılan ABJ yöntemiyle çeşitli sektör ve faaliyet yılı kapsamında farklı yazarlar tarafından özellikle son yıllarda artan bir şekilde devam etmektedir. Yapılan çalışmalarda maliyet yapışkanlığı satış ve genel yönetim giderleri, satışların maliyeti ve faaliyet giderleri vd. gibi maliyet/gider kalemlerinde farklı ülke ve sektörlerde uygulanmıştır.

Tablo: 1

Maliyet Yapışkanlığının Varlığını Tespit Etmeye Yönelik Yapılan Yurtiçi ve Yurtdışı Çalışmalar

Yazar(lar) ve Yılı	Maliyet Değişkeni	Analiz Yılı	Firma Sayısı (Gözlem)	Bulgular
Anderson et al. (2003)	Satış ve Genel Yönetim Giderleri (SGYG)	1979-1998	(7,629)	Satışlardaki %1'lik artış SGYG'de %0,55 artışa, %1'lik azalış ise SGYG'de %0,35 azalışa neden olmaktadır.
Medeiros & Costa (2004)	Satış ve Genel Yönetim Giderleri (SGYG)	1986-2003	542	Satışlardaki %1'lik artışın SGYG'de %0,59'luk artışa, satışlardaki %1'lik azalış ise SGYG'de %0,32'lik azalışa neden olmaktadır.
Calleja et al. (2006)	Faaliyet Giderleri (FG)	1988-2004	(3,500)	Satışlardaki %1'lik artışın FG'de %0,97'luk artışa, satışlardaki %1'lik azalış ise FG'de %0,91'lik azalışa neden olmaktadır.
Yükçü & Özkaya (2011)	Satış ve Genel Yönetim Giderleri (SGYG) ve Faaliyet Giderleri (FG)	1987-2008	(1,731)	Satışlardaki %1'lik artışın SGYG'de %0,7'lik FG 'de %0,93'lük artışa, satışlardaki %1'lik azalış ise SGYG'de %0,51'lik, FG'de %0,81'lik azalışa neden olmaktadır.
Çelik & Kök (2013)	Pazarlama Satış ve Dağıtım Giderleri (PSDG), Satışların Maliyeti (SM) ve Toplam Faaliyet Giderleri (FG)	1995-2011	119	Satışlardaki %1'lik artışın PSDG'de %0,28'lik, SM'de %0,84'lük FG 'de %0,74'lük artışa, satışlardaki %1'lik azalış ise PSDG'de %0,17'lik, SM'de %0,67'lik, FG'de %0,41'lik azalışa neden olmaktadır.
Banker & Byzalov (2014)	Satış ve Genel Yönetim Giderleri (SGYG)	1988-2008	(2,000)	Satışlardaki %1'lik artışın SGYG'de %0.66 'lik artışa, %1'lik azalışın ise SGYG'de %0.52'lik azalışa neden olmaktadır.
Zanjirdar et al. (2014)	Satışların Maliyeti (SM) ve Satış ve Genel Yönetim Giderleri (SGYG)	2002-2011	70	Satışlardaki %1'lik artışın SM'%0.88'lik, SGYG'de %0.39 artışa, satışların %1'lik azalış ise SM'de %0.77'lik, SGYG'de %0.29'luk azalışa neden olmaktadır.
Zhang (2016)	Satış ve Genel Yönetim Giderleri (SGYG)	2005-2014	(9,575)	Satışlardaki %1'lik artışın SGYG 'de %0.693'luk artışa, %1'lik azalışın ise SGYG'de %0.598'luk azalışa neden olmaktadır.
Alavinasab et al. (2017)	Satış ve Genel Yönetim Giderleri (SGYG), Satışların Maliyeti (SM) ve Faaliyet Giderleri (FG)	2008-2013	100	2008-2011 döneminde %1'lik artış SGYG maliyetlerinde %25'lik, SM'de %38'lik, FG'de ise %37'lik artışa, %1'lik azalış ise SGYG'de %15'lik, SM'de %17'lik ve FG'de ise %21'lik azalışa neden olmaktadır. 2011-2013 döneminde ise anti yapışkanlık söz konusudur.
Hacıhasanoğlu & Dalkılıç (2018)	Satış ve Genel Yönetim Giderleri (SGYG)	2006-2016	138	Satışlardaki %1'lik artışın SGYG'de %0,62'lik artışa, satışlardaki %1'lik azalış ise SGYG'de %0,44'lük azalışa neden olmaktadır.
Habib & Hasan (2019)	Faaliyet Giderleri (FG)	1991-2013	(21,957)	Satışlardaki %1'lik artışın FG'de %0,87'lik artışa, satışlardaki %1'lik azalış ise FG'de %0,79'luk azalışa neden olmaktadır.
Karadeniz et al. (2019)	Satışların Maliyeti (SM) ve Satış ve Genel Yönetim Giderleri (SGYG)	2008-2016	31	Satışlardaki %1'lik artışın SM'de %0,59'luk SGYG'de %0,25'lik artışa, satışlardaki %1'lik azalış ise SM'de %0,43'lük SGYG'de %0,12'lik azalışa neden olmaktadır.
Özkaya (2020)	Satışların Maliyeti (SM), Genel Yönetim Giderleri (GYG) ve Toplam Maliyet (TM)	2013-2017	(7,787)	Satışlardaki %1'lik artışın SM'de %1.03'lük, GYG'de %0.44'lük, TM'de %0.97'lik artışa, %1'lik azalışın ise SM'de %98'lık, GYG'de %25'lık, TM'de %90'lık azalışa neden olmaktadır.
Bengü & Fidancan (2022)	Satışların Maliyeti (SM) ve Faaliyet Giderleri (FG)	2001-2019	255	Türkiye'de satışların %1 oranında artmasıyla FG'de %0.47'lik artışa, satışların %1 azalması durumunda FG'de %0.19'luk azalışa neden olmaktadır.

Yapılan çalışmalar sonucunda söz konusu maliyetlerin geleneksel maliyet davranışının aksine satışlarda meydana gelen artış ve azalışlara karşın maliyetlerin aynı oranda artıp azalmadığı görülmektedir. Başka bir ifadeyle faaliyet hacimlerinde meydana gelen artışlara maliyetler belli bir oranda artarak cevap verirken, faaliyet hacimlerinde meydana gelen azalışlara ise aynı oranda azalarak cevap vermemekte, artış oranından daha az bir oranla azalış gerçekleşmektedir. Dolayısıyla bu durum maliyet yapışkanlığını ortaya çıkarmaktadır.

2.2. Maliyet Yapışkanlığı ile Kâr Yönetimi ve Firma Karakteristikleri Arasındaki İlişkiyi İnceleyen Çalışmalar

Maliyet yapışkanlığı ile kâr yönetimi ve firma karakteristikleri arasındaki ilişkiyi inceleyen bazı çalışmalara aşağıdaki tabloda yer verilmiştir. Maliyet yapışkanlığı ile ilgili kavramsal çerçeve incelendiğinde maliyet yapışkanlığının nedenlerinden biri de kâr yönetimi uygulamaları olduğundan çalışmalar ikili arasında ilişkinin varlığını belirlemek amacıyla yapılmıştır. Konuyla ilgili yapılan çalışmaların bazılarında negatif ve pozitif ilişki elde edilmiş hatta bazı çalışmaların elde ettiği sonuçlar ise kâr yönetiminin maliyet yapışkanlığı üzerinde etkisinin olmadığı ifade edilmiştir. Bu farklılığın en önemli sebepleri olarak çalışmalarda baz alınan ülke, yıl ve sektörün farklı olması gösterilebilir.

Diğer yandan maliyet yapışkanlığına neden olan başka faktörlerin de bulundukları ve özellikle faaliyet hacimleriyle ilgili olarak yöneticilerin nasıl hareket ettikleri firma ile ilgili verdikleri kararlar göz önüne alındığında maliyet yapışkanlığının firma karakteristikleri olarak tanımlanan firma kârlılık oranı, firma borçlanma oranı, firma büyüklüğü ve firma yaşı üzerinde etkisi olabileceği ortaya çıkmaktadır. Genel olarak çalışmalar maliyet yapışkanlığı ile firma büyüklüğü ve firma kârlılık oranı arasında negatif ilişki elde etmişlerdir. Bu iki değişkenin sonucunun benzer sonuçların çıkması her iki değişkenin hesaplanmasında varlıkların kullanılmasından kaynaklı olabileceğini göstermektedir. Firma borçlanma oranı ile de farklı çalışmalar farklı sonuçlar elde etmişlerdir.

Tablo: 2
Maliyet Yapışkanlığı, Kâr Yönetimi ve Firma Karakteristikleri Arasındaki İlişkiyi İnceleyen Yurtiçi ve Yurtdışı Çalışmalar

Yazar(lar) ve Yılı	Firma Değişkeni	Analiz Yılı	Firma Sayısı (Gözlem)	Bulgular
Warganegara & Tamara (2014)	Firma Kârlılık Oranı ve Firma Büyüklüğü	2007-2011	165	Negatif İlişki*
Hashemi & Nejati (2015)	Kâr Yönetimi	2007-2015	115	Negatif İlişki*
Cheung et al. (2016)	Firma Büyüklüğü	1990-2012	(172,427)	Negatif İlişki*
Xue & Hong (2016)	Kâr Yönetimi	2003-2010	(7,702)	Pozitif İlişki
Hemati & Javid (2017)	Kâr Yönetimi Firma Kârlılık Oranı Firma Büyüklüğü	2010-2016	112	Firma Kârlılığı ile negatif ilişki* Firma Büyüklüğü ile pozitif ilişki*
Jin (2017)	Kâr Yönetimi	2011-2015	(9,539)	Pozitif İlişki*
Sayrani et al. (2018)	Kâr Yönetimi	2006-2015	576	Pozitif İlişki
Ballios et al. (2020)	Kâr Yönetimi	1995-2015	(967,496)	Negatif İlişki*
Ghazalat & Abu-Serdaneh (2020)	Firma Borçlanma Oranı (Kaldıraç)	2010-2019	294	Pozitif İlişki*
Zulfiati et al. (2020)	Firma Büyüklüğü	2014-2018	97	Negatif İlişki*
Zhao (2020)	Firma Büyüklüğü ve Firma Borçlanma Oranı	1977-2017	(253,013)	Negatif İlişki*
Megeid & El-Deeb (2021)	Kâr Yönetimi Firma Büyüklüğü	2015-2019	41	Kâr Yönetimi ile pozitif ilişki Firma Büyüklüğü ile negatif ilişki*
Abdullah (2021)	Firma Kârlılık Oranı	2009-2018	102	Negatif İlişki*
Wiayanti et al. (2022)	Firma Kârlılık Oranı ve Firma Borçlanma Oranı	2015-2019	24	Pozitif İlişki*

Maliyet yapışkanlığı ile ilgili literatür incelendiğinde Türkiye'de maliyet yapışkanlığının varlığını test eden çalışmaların olduğu ancak maliyet yapışkanlığı ile kâr yönetimi ve firma karakteristikleri arasındaki ilişkiyi inceleyen çalışmalara rastlanılmamıştır. Dolayısıyla yapılan çalışma Türkiye'de maliyet yapışkanlığının varlığının

kâr yönetim uygulamaları ve firma karakteristikleri üzerindeki etkisinin görülmesi açısından önem taşımakta ve elde edilen sonuçlarla literatüre katkı sunmayı amaçlamaktadır.

4. Yöntem

Bu bölümde çalışmanın amacına yönelik olarak kullanılan veri seti, değişkenler ve araştırma yöntemi ile ilgili bilgiler yer almaktadır.

4.1. Veri Seti, Modeller ve Değişkenler

Çalışmada maliyet yapışkanlığı ile kâr yönetimi ve firma karakteristikleri arasındaki ilişkiyi incelemek amaçlanmaktadır. Regresyon modellerinin test edildiği ampirik çalışmalarda üç tür veri söz konusu olmaktadır ve bu veriler çok sayıda birimin tek sayıda gözleminden oluşan yatay kesit, tek birimin birden fazla dönemi kapsayan zaman serisi, bir diğeri ise zaman ve yatay kesitin birlikte alındığı panel veri setinden oluşmaktadırlar (Günay & Koşan, 2020: 681). Bu çalışmada 196 firmanın (2012-2020 yıllarını içeren) 9 yıllık verilerinden yararlanıldığından ampirik analizlerde panel veri analiz yöntemi kullanılmıştır. Ayrıca çalışmada yıllık verilerin alınmasının nedeninin, Borsa İstanbul'da faaliyet gösteren firma verilerinden yararlanırken sektörel olarak ayrım yapılmadığından alınacak dönemlik verilerden elde edilen bulguların yorumlanmasının doğru olmayacağı ifade edilebilir. Varlık yapılarının farklı olması sebebiyle bankacılık, sigortacılık ve finans işletmeleri kapsam dışında tutulmuştur. Çalışmada kullanılan veriler Kamuyu Aydınlatma Platformu (KAP) resmî web sayfasından ve Finnet Mali Analiz veri tabanından elde edilmiştir.

Çalışmada öncelikle Borsa İstanbul'da faaliyet gösteren ve analiz kapsamında incelenen firmalarda pazarlama, satış ve dağıtım giderleri, genel yönetim giderleri ve satışların maliyetlerinde yapışkanlığın var olup olmadığı test edilmiştir. Bu doğrultuda üç farklı model kurulmuş ve maliyet yapışkanlığının varlığı Anderson, Banker ve Janakiraman (2003) tarafından ortaya çıkarılan ABJ yöntemiyle test edilmiştir. ABJ yöntemine göre maliyet yapışkanlığından bahsedebilmek için, β_1 katsayısının pozitif, β_2 katsayısının ise negatif olması ve sonuçların istatistiksel olarak anlamlı olması gerekmektedir. Koşul sağlandığında, satış gelirlerindeki %'1'lik artış söz konusu maliyetleri % β_1 kadar artırırken, satış gelirlerinde %1'lik azalış ise maliyetleri % $\beta_{1+}\beta_2$ kadar azaltacağı şeklinde yorumlanmaktadır.

$$\log\left|\frac{PSDG_{i,t}}{PSDG_{i,t-1}}\right| = \beta_0 + \beta_1.\log\left|\frac{SATIŞ_{i,t}}{SATIŞ_{i,t-1}}\right| + \beta_2.AZKUK.\log\left|\frac{SATIŞ_{i,t}}{SAT_{i,t-1}}\right| + \varepsilon_{i,t}. \tag{I}$$

$$\log\left|\frac{GYG_{i,t}}{GYG_{i,t-1}}\right| = \beta_0 + \beta_1.\log\left|\frac{SATIŞ_{i,t}}{SATIŞ_{i,t-1}}\right| + \beta_2.AZKUK.\log\left|\frac{SATIŞ_{i,t}}{SATIŞ_{i,t-1}}\right| + \varepsilon_{i,t}. \tag{II}$$

$$\log\left|\frac{SM_{i,t}}{SM_{i,t-1}}\right| = \beta_0 + \beta_1.\log\left|\frac{SATIŞ_{i,t}}{SATIŞ_{i,t-1}}\right| + \beta_2.AZKUK.\log\left|\frac{SATIŞ_{i,t}}{SATIŞ_{i,t-1}}\right| + \varepsilon_{i,t}. \tag{III}$$

Tablo: 3
Maliyet Yapışkanlığının Varlığına Yönelik Değişkenlere İlişkin Bilgiler

Değişken	Değişken Ölçümü
PSDG $_{i,t}$	i firmasının t yılındaki pazarlama, satış ve dağıtım giderleri
PSDG $_{i,t-1}$	i firmasının t-1 yılındaki pazarlama, satış ve dağıtım giderleri
GYG $_{i,t}$	i firmasının t yılındaki genel yönetim giderleri
GYG $_{i,t-1}$	i firmasının t-1 yılındaki genel yönetim giderleri
SM $_{i,t}$	i firmasının t yılındaki satışların maliyeti
SM $_{i,t-1}$	i firmasının t-1 yılındaki satışların maliyeti
SATIŞ $_{i,t}$	i firmasının t yılındaki net satışları
SATIŞ $_{i,t-1}$	i firmasının t-1 yılındaki net satışları
AZKUK	t yılındaki net satışlar t-1 yılındaki net satışlara göre azalmışsa 1 değerini alan, artmış ya da aynı kalmışsa 0 değerini alan azalış kukla değişken

Modellerde sırasıyla firmaların pazarlama satış ve dağıtım giderleri, genel yönetim giderleri ve satışların maliyetinin t yılının t-1 yılına oranının logaritması bağımlı değişkenleri oluşturmaktadır. Bağımsız değişkenler olarak satış gelirlerinin t yılının t-1 yılına oranının logaritması ve azalış kukla değişkenin satış gelirlerindeki oranın logaritmasıyla çarpımı kullanılmıştır. Kurulan regresyon eşitliklerindeki logaritmik dönüşümler katsayıların kolay bir biçimde yorumlanması için kullanılmaktadır. Azalış kukla değişkeni, satışlardaki gelirin önceki yıla düşmesi durumunda 1 değerini, satış gelirlerinin aynı kalması veya artması durumunda 0 değerinin alan değişkendir.

Tablo: 4
Maliyet Yapışkanlığının Varlığının Test Edilmesine İlişkin Bulgular

Model I				
Değişkenler	Katsayılar	Standart Sapma	t	P
Sabit	0,0197	0,0048	4,08	0,000
Satış - β_1	0,5485	0,0405	13,53	0,000
Azkuk*Satış - β_2	0,0108	0,0779	0,14	0,889
Model II				
Değişkenler	Katsayılar	Standart Sapma	t	P
Sabit	0,0313	0,0034	9,01	0,000
Satış - β_1	0,3104	0,0292	10,63	0,000
Azkuk*Satış - β_2	-0,1077	0,0561	-1,92	0,055
Model III				
Değişkenler	Katsayılar	Standart Sapma	t	P
Sabit	0,0044	0,0016	2,63	0,009
Satış - β_1	0,8985	0,0141	63,69	0,000
Azkuk*Satış - β_2	0,0281	0,0271	1,04	0,299

Tablo 4'te maliyet yapışkanlığının var olup olmadığını test etmek amacıyla kurulan üç modele ait analiz sonuçları yer almaktadır.

Model I'de firmaların pazarlama satış ve dağıtım giderlerinde maliyet yapışkanlığının varlığı test edilmiştir. Analiz sonuçlarına göre, β_1 katsayısının pozitif ve anlamlı olması ancak β_2 katsayısının pozitif ve istatistiksel olarak anlamlı olmaması pazarlama satış ve dağıtım giderlerinde maliyetlerin yapışkan olmadıklarını göstermektedir. Başka bir ifadeyle, Borsa İstanbul'da faaliyet gösteren firmaların pazarlama satış ve dağıtım giderleri, satışlarda meydana gelen değişimlere simetrik olarak artarak ve azalarak cevap vermektedir.

Model II'de genel yönetim giderlerinde maliyetlerin yapışkanlığı test edilmiştir. Buna göre, β_1 katsayısının pozitif ve anlamlı olması, β_2 katsayısının negatif ve istatistiksel olarak anlamlı olması genel yönetim giderlerinde maliyetlerin yapışkan oldukları göstermektedir. Satış gelirlerinde meydana gelen %1'lik artış genel yönetim giderlerinde %0,3104'lük artışa, satış gelirlerindeki %1'lik azalış ise genel yönetim giderlerinde %0,2027 (0,3104-0,1077)'lik azalışa neden olacaktır. Borsa İstanbul'a kayıtlı firmaların genel yönetim giderleri satış gelirlerinde meydana gelen artışlarla birlikte belirli bir oranda artarken, genel yönetim giderlerinin satış gelirlerindeki azalışlara artışlardaki oranla azalarak cevap vermediği sonucuna ulaşılmaktadır.

Model III'de ise satışların maliyetinde maliyetlerin yapışkan davranıp davranmadıkları test edilmiştir. Analiz sonuçlarına göre β_1 katsayısının pozitif ve anlamlı olması, β_2 katsayısının pozitif ve anlamlı olması satışların maliyetlerinde maliyetlerin yapışkan olmadıklarını simetrik davrandıklarını göstermektedir. Borsa İstanbul'da faaliyet gösteren işletmelerin satış maliyetleri satış gelirlerinde meydana gelen değişimlere simetrik olarak artarak ve azalarak cevap verdiğini ifade edebiliriz.

Borsa İstanbul'da faaliyet gösteren firmalarda var olan genel yönetim giderlerindeki maliyet yapışkanlığının kâr yönetimi ve firma karakteristikleri ile ilişkisinin incelenmesi amacıyla aşağıdaki hipotezler kurulmuş ve modeller verilmiştir. Modellerde genel yönetim giderlerinin t yılının t-1 yılına oranının logaritması bağımlı değişkeni oluştururken, tahakkuk, firma kârlılık oranı, firma borçlanma oranı, firma büyüklüğü ve firma yaşı ise modellerin bağımsız değişkenlerini oluşturmaktadır.

Yöneticiler kâr yönetim uygulamalarına firmalarını gerçek performansları dışında daha iyi bir şekilde gösterebilmek amacıyla finansal bilgi kullanıcılarına finansal tabloları olduğundan farklı göstererek başvurmaktadırlar. Böylece hem işletme performansları yüksek gösterilmekte hem de işletmeler yatırımcı açısında yatırım yapılabilir işletme haline gelmektedir. Yöneticiler ise bu işlemleri yaparken işletme imajına zarar vermemek adına kaynak kesmede isteksiz olduğundan maliyetleri ayarlamayı tercih etmektedir. Maliyet yapışkanlığının bir nedeni de ayarlama maliyetlerden kaynaklandığından kâr yönetimi uygulamak için kullanılan ayarlama maliyetler ile kâr yönetimi arasında anlamlı bir ilişki beklenmektedir.

H$_1$: Maliyet yapışkanlığı ve kâr yönetimi arasında anlamlı bir ilişki vardır.

İşletmelerin kuruluş amaçlarını gerçekleştirmeleri ve faaliyetlerinin devamını sağlamaları için kâr elde etmeleri gerekmektedir. Yöneticiler açısından hedeflenen kâra ulaşmak işletmeyi hem rakiplerine karşı daha avantajlı hale getirecek hem de yöneticilerin işletmedeki konumlarını sağlamlaştıracaktır. Dolayısıyla yöneticiler gereksiz maliyetlerden kaçınacaklarından maliyet yapışkanlığı ile firma kârlılık oranları arasında anlamlı bir ilişki beklenmektedir.

H$_2$: Maliyet yapışkanlığı ve firma kârlılık oranı arasında anlamlı bir ilişki vardır.

İşletmeler kurulurken tamamını özsermaye ile finanse etmenin dışında tamamını yabancı kaynakla ya da bir kısmını yabancı kaynak bir kısmını özkaynakla da finanse edebilmektedir. Ancak tamamı veya bir kısmını yabancı kaynaklarla finanse etme belirli bir miktar faiz ödemesini gerektirmektedir. İşletmelerin finansal durumlarında önceki yıla göre zarar etmesi durumunda yöneticiler ortaya çıkan bu açığı kapatmak isteyeceklerinden maliyetlerde ayarlama yapacaktır. Firmanın borçlanması sonucu yapılan ayarlama maliyetlerden dolayı maliyet yapışkanlığı ile firma borçlanma oranı arasında anlamlı bir ilişki beklenmektedir.

H₃: Maliyet yapışkanlığı ve firma borçlanma oranı arasında anlamlı bir ilişki vardır.

Firma karakteristikleri arasında yer alan firma büyüklüğü işletme varlıklarının doğal logaritması ile hesaplanmıştır. İşletme varlığının fazla olduğu firma büyük firma olduğundan bu firmaların âtıl kapasite ve kaynakları da fazladır. Dolayısıyla faaliyet hacimlerinde meydana gelen değişikliklere maliyetlerle verdikleri karşılık diğer firmalara kıyasla farklı olacağından maliyet yapışkanlığı ve firma büyüklüğü arasında anlamlı ilişki beklenmektedir.

H₄: Maliyet yapışkanlığı ve firma büyüklüğü arasında anlamlı bir ilişki vardır.

Firma yaşı, işletmenin kuruluş yılı ile cari yıl arasındaki farkın alınmasıyla hesaplanmaktadır. İşletmelerin kuruluşlarından itibaren sahip oldukları deneyim çalışan tecrübeleri ve bulundukları sektördeki konumları açısından faaliyetlerde meydana gelecek değişimlere karşı maliyetlerinde yapacakları ayarlamalardan dolayı firma yaşı ile maliyet yapışkanlığı arasında anlamlı bir ilişki beklenmektedir.

H₅: Maliyet yapışkanlığı ve firma yaşı arasında anlamlı bir ilişki vardır.

Tablo: 5
Kâr Yönetimi ve Firma Karakteristikleri Değişkenlerine İlişkin Bilgiler

Değişken	Değişken Ölçümü
Tahakkuk	$DACC_{i,t} = \frac{TACC_{i,t}}{A_{i,t-1}} - \left[\alpha_t - \left(\frac{1}{A_{i,t-1}}\right)\right] + \alpha_{1i}\left[\frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{A_{i,t-1}}\right] + \alpha_{2i}[PPE_{i,t}/A_{i,t-1}]*$
Kârlılık	Net Kâr $_{i,t}$ / Toplam Varlıklar $_{i,t}$
Borçlanma	Toplam Yabancı Kaynaklar $_{i,t}$ / Toplam Varlıklar $_{i,t}$
Büyüklük	Firmadaki Toplam Varlıkların Doğal Logaritması
Yaş	Firmanın Kuruluş Yılı ile Baz Alınan Yıl Arasındaki Fark

* Çalışmada kâr yönetimi için literatürde konuyla ilgili yapılan çalışmalar ile tutarlı olarak isteğe bağlı tahakkuklar kullanılmıştır. Bu amaçla, isteğe bağlı tahakkukların ölçümünde etkili model olarak kabul edilen ve Dechow vd. (1995) tarafından geliştirilen Modifiye Edilmiş Jones Modeli kullanılmıştır. Formülde yer alan, $DACC_{i,t}$ i firmasının t yılındaki isteğe bağlı tahakkuklarını, $TACC_{i,t}$, i firmasının t yılındaki toplam tahakkuklarını, $\Delta REV_{i,t}$, i firmasının t yılındaki satışlarında meydana gelen değişimi, $\Delta REC_{i,t}$, i firmasının t yılındaki ticari alacaklarındaki değişimi, $PPE_{i,t}$, i firmasının t yılındaki maddi duran varlıklarını, $A_{i,t-1}$, i firmasının t-1 dönemindeki toplam varlıklarını belirtmektedir.

$$\log\left|\frac{GYG_{i,t}}{GYG_{i,t-1}}\right| = \beta_0 + \beta_1.\log\left|\frac{SATIŞ_{i,t}}{SATIŞ_{i,t-1}}\right| + \beta_2.AZKUK.\log\left|\frac{SATIŞ_{i,t}}{SATIŞ_{i,t-1}}\right| +$$

$$\beta_3.AZKUK.\log\left|\frac{SATIŞ_{i,t}}{SATIŞ_{i,t-1}}\right|.TAHAKKUK_{i,t} + \varepsilon_{i,t}. \tag{IV}$$

$$\log\left|\frac{GYG_{i,t}}{GYG_{i,t-1}}\right| = \beta_0 + \beta_1.\log\left|\frac{SATIŞ_{i,t}}{SATIŞ_{i,t-1}}\right| + \beta_2.AZKUK.\log\left|\frac{SATIŞ_{i,t}}{SATIŞ_{i,t-1}}\right| +$$

$$\beta_3.AZKUK.\log\left|\frac{SATIŞ_{i,t}}{SATIŞ_{i,t-1}}\right|.Kârlılık_{i,t} + \beta_4.AZKUK.\log\left|\frac{SATIŞ_{i,t}}{SATIŞ_{i,t-1}}\right|.Borçlanma_{i,t} +$$

$$\beta_5.AZKUK.\log\left|\frac{SATIŞ_{i,t}}{SATIŞ_{i,t-1}}\right|.Büyüklük_{i,t} + \beta_6.AZKUK.\log\left|\frac{SATIŞ_{i,t}}{SATIŞ_{i,t-1}}\right|.Yaş_{i,t} + \varepsilon_{i,t}. \qquad (V)$$

4.2. Araştırma Yöntemi

Ekonometrik ilişkilerin belirlenmesinde modelde yer alan değişkenlerle ilgili gözlenemeyen etkileri de kontrol etme isteğini yansıtan panel veri analizleri hem zaman hem de yatay kesit verilerinin eş zamanlı kullanılarak daha fazla veri ile çalışılmasını sağlamaktadır. Dolayısıyla gözlem sayısının fazla olmasından dolayı serbestlik derecesi artmakta ve değişkenler arasında doğrusal bağlantı probleminin azalması sağlanarak daha etkin tahminler yapılmaktadır (Akçay & Sayın, 2022: 855). Bu sebeple, Borsa İstanbul'da faaliyet gösteren toplam 196 firmanın maliyet yapışkanlığı ile kâr yönetimi ve firma karakteristikleri arasındaki ilişkiyi incelemek amacıyla Stata 15 paket programı kullanılarak panel veri analizinden yararlanılmıştır. Panel veri analizlerinde sahte regresyon sorunu ya da sapmalı tahminlere neden olmamak amacıyla değişkenlerin durağan olup olmadıklarının incelenmesi gerekmektedir (Tatoğlu, 2013: 199). Ancak Baltagi (2013: 175)'e göre kısa yatay kesit ve uzun zamana sahip olan (N<T) mikro panellerde durağanlık beklenirken, uzun yatay kesit ve kısa zamana sahip olan (N=196>T=9) mikro panellerde durağanlık varsayımının sağlanmasına gerek duyulmamaktadır. Yapılan çalışmada yatay kesit boyutunun N=196 olması ve zaman boyutunun T=9 olması nedeniyle mikro panel veri seti yaklaşımı varsayılmış ve seriler durağan kabul edilerek analizler gerçekleştirilmiştir.

Bu amaçla çalışmada öncelikle değişkenler arasında çoklu doğrusal bağlantı problemi olup olmadığını belirlemek amacıyla korelasyon analizi ve VIF (Varyans Artış Faktörü) değerleri ile sınanmıştır. Daha sonra uygun modele karar vermek amacıyla F ve Breusch-Pagan LM (1980) testleri yapılmıştır. Uygun modele karar vermenin ardından etkinliği bozan varsayımların olup olmadığını sınamak amacıyla değişen varyans (heteroskedasite) için White (1980) testi, otokorelasyon için Wooldridge (2002) testi uygulanmıştır. Söz konusu varsayımlar için dirençli tahminci olan Parks-Kmenta Esnek Genelleştirilmiş En Küçük Kareler tahmincisiyle modeller tahmin edilmiştir.

4.3. Analiz Bulguları

Maliyet yapışkanlığı ile kâr yönetimi ve firma karakteristikleri arasındaki ilişkiyi ortaya koymak amacıyla gerçekleştirilen analizler ve elde edilen bulgular çalışmanın bu bölümünde yer almaktadır. Bu doğrultuda çalışmada kullanılan değişkenlere ilişkin tanımlayıcı istatistikler Tablo 6'da verilmiştir.

Tablo: 6
Tanımlayıcı İstatistikler

Değişkenler	Ortalama	Standart Sapma	Minimum	Maksimum	Örneklem
GYG	0,050	0,110	-0,789	0,928	1764
SATIŞ	0,057	0,118	-0,862	0,793	1764
AZKUK*SATIŞ	-0,016	0,061	-0,862	0	1764
Tahakkuk	-0,013	0,121	-1,221	0,773	1764
Kârlılık	0,043	0,099	-0,931	0,748	1764
Borçlanma	0,526	0,243	0,017	0,998	1764
Büyüklük	8,637	0,833	6,025	11,272	1764
Yaş	38,02	15,27	3	85	1764

Tabloya göre, GYG ve SATIŞ, genel yönetim giderleri ve satışlar gelirleri, cari yılın önceki yıla bölünerek elde edilen değerin logaritmasını göstermektedir. Her iki değerin ortalamalarının yaklaşık 0,05 olduğu görülmektedir. Analizlerde kâr yönetimi göstergesi olarak kullanılan tahakkukların ortalama değeri-0,013'tür. Örnekleme dahil edilen firmaların ortalama kârlılık oranları ise 0,043 iken, borçlanma oranlarının 0,526 olduğu belirlenmiştir. Analiz kapsamındaki 196 firmanın ortalama yaşı ise 38 iken, maksimum 85 yıllık olan firmanın yanı sıra minimum 3 yıldır faaliyette olan firmada bulunmaktadır.

Tablo: 7
Pearson Korelasyon Analizi ve VIF Değerleri Tablosu

	1	2	3	4	5	6	7	8	VIF
GYG	1,000								
SATIŞ	0,2916	1,000							2,03
Azkuk*Sat	0,1685	0,6866	1,000						1,96
Tahakkuk	0,0790	0,0994	0,0136	1,000					1,11
Kârlılık	0,0469	0,1727	0,1266	0,2044	1,000				1,36
Borçlanma	0,0248	0,0465	-0,0062	-0,2667	-0,4447	1,000			1,41
Büyüklük	0,0459	0,0295	0,1065	-0,0664	0,0844	0,1616	1,000		1,19
Yaş	-0,0599	-0,0561	0,0397	-0,0790	0,0424	-0,0026	0,3079	1,000	1,12

Değişkenlere ait Pearson korelasyon analizi sonuçları ve VIF değerleri Tablo 7'te yer almaktadır. Pearson korelasyon analizi ve VIF analizi değişkenler arasında çoklu doğrusal bağlantı problemi olup olmadığını sınamak için yapılmaktadır.

Pearson korelasyon analizinde istatistiksel açıdan bakıldığında korelasyon katsayılarının -1 ve +1 arasında değer alması değişkenler arasında ilişkinin yönünü göstermektedir. Katsayıların 0'a yakın olması değişkenler arasında zayıf ilişkiyi gösterirken, 1'e yakın olması güçlü ilişkiyi göstermektedir. Ayrıca değişkenler arasında çoklu doğrusal bağlantı probleminin varlığından bahsedebilmek için değerin 0,75'ten yüksek olması gerekmektedir. Tabloya göre değerlerin 0,75'ten küçük olması, değişkenler arasında çoklu doğrusal bağlantı problemi olmadığını göstermektedir.

VIF analizi ise çoklu doğrusal bağlantı probleminin sınandığı diğer bir analizdir. Burada değerlerin 5'ten küçük olması çoklu doğrusal bağlantı problemi olmadığını, 5 ve 10 arasında orta şiddette çoklu doğrusal bağlantı problemi olduğunu, 10'dan büyük olması ise şiddetli çoklu doğrusal bağlantı probleminin varlığını göstermektedir. Çoklu doğrusal bağlantı olması durumunda örneklem sayısının artırılması veya probleme neden olan

değişkenin analiz dışında bırakılması önerilmektedir. Ancak tabloya göre, VIF değerlerinin 5'ten küçük olması değişkenler arasında çoklu doğrusal bağlantı probleminin olmadığını ifade etmektedir (Tatoğlu, 2020: 259).

Değişkenlere ilişkin tanımlayıcı istatistikler, Pearson korelasyon analizi ve VIF analizden sonra maliyet yapışkanlığı ile kâr yönetimi ve firma karakteristikleri arasındaki ilişkiyi incelemek amacıyla kurulan modellerde hangi panel veri regresyon modelinin kullanılması gerektiği test edilmiştir. Bu amaçla hangi modelin uygulanmasına karar vermek için F Testi (Tablo 8), Breusch-Pagan LM Testi (Tablo 9) uygulanmıştır. Tüm modellerde F değerlerinin 0,05'ten küçük olmasından dolayı klasik modelin uygulanmasına karar verilmiştir.

Tablo: 8
Panel Veri Modeli Seçim Analizi Sonuçları (F Testi)

F Testi		
H₀: Klasik model uygundur.		
H₁: Sabit Etkiler modeli uygundur.		
	İstatistik	Olasılık
Model IV	*0,90*	*0,8277*
Model V	*0,87*	*0,8864*

Tablo: 9
Panel Veri Modeli Seçim Analizi Sonuçları (LM Testi)

Breusch-Pagan LM testi		
H₀: Klasik model uygundur.		
H₁: Tesadüfi Etkiler modeli uygundur.		
	İstatistik	Olasılık
Model IV	*0,000*	*1,000*
Model V	*0,000*	*1,000*

Ayrıca çalışmada klasik modelle tahmin edilen modellerde değişen varyans (heteroskedasite) ve otokorelasyon gibi etkinliği bozan varsayımların varlığı sınanmıştır. Değişen varyans (heteroskedasite) için White testi (1980) Tablo 10'de, otokorelasyon için ise Wooldridge testi (2002) Tablo 11'da uygulanmıştır.

Tablo: 10
Varsayımdan Sapmalar Test Sonucu (Değişen Varyans)

White Testi			
H₀: Değişen varyans yoktur.			
H₁: Değişen varyans vardır.			
Model IV			
	Chi2	df	p
Değişen varyans	*208,96*	*71*	*0,0000*
Çarpıklık	*19,78*	*12*	*0,0714*
Basıklık	*10,29*	*1*	*0,0013*
Toplam	*147,12*	*84*	*0,0000*
Model V			
	Chi2	df	p
Değişen varyans	*120,30*	*24*	*0,0000*
Çarpıklık	*14,39*	*6*	*0,0256*
Basıklık	*10,68*	*1*	*0,0011*
Toplam	*145,37*	*31*	*0,0000*

Değişen varyansın varlığını tespit etmek amacıyla yapılan White testi, hata terimlerinin normal dağılıp dağılmadığını içeren çarpıklık ve basıklık değerlerini de içermektedir. Tablo 10'e göre her iki modelde de değişen varyansın olasılık değerinin $p<0,05$ olduğundan dolayı H_0 hipotezi reddedilmekte ve modellerde değişen varyans varlığını göstermektedir. Ayrıca her iki modelde de çarpıklık değerinin 0'a, basıklık değerlerinin ise 3'e eşit olmamasından dolayı hata terimleri normal dağılmamakta şekilsel olarak ise sağa çarpık ve basıktır.

Tablo: 11
Varsayımdan Sapmalar Test Sonucu (Otokorelasyon)

Wooldridge'in Testi		
H0: Birinci mertebeden otokorelasyon yoktur.		
H1: Birinci mertebeden otokorelasyon vardır.		
	F (1,195)	**p**
Model IV	0,024	0,8781
Model V	0,043	0,8354

Tablo 11'da birinci mertebeden otokorelasyonun varlığını sınamak için yapılan Wooldridge testi yer almaktadır. Tabloya göre Model IV ve Model V için p değerlerinin 0,05'ten büyük olması H_0 hipotezinin reddedilemeyeceğini bir başka ifadeyle birinci mertebeden otokorelasyonun olmadığı anlamına gelmektedir.

Panel veri analizinde kurulan modellerde varsayımdan sapmalardan herhangi birinin bulunması durumunda bile katsayı tahminleri etkinlikleri yitirmekte ve sapmalı sonuçlar elde edilmektedir. Söz konusu durumda klasik modelin uygunluğunu da göz önünde bulundurarak değişen varyansa karşı dirençli tahminci olan Parks-Kmenta Tahmincisinin esnek genelleştirilmiş en küçük kareler tahmincisi ile parametre tahminleri gerçekleştirilmiştir. Ayrıca tabloda sabit etkiler ve tesadüfi etkiler modellerine ait sonuçlara da yer verilmiştir.

Tablo: 12
Genel Yönetim Giderlerindeki Maliyet Yapışkanlığı ile Kâr Yönetimi Arasındaki İlişkinin Regresyon Sonucu

Model IV: log (GYG $_{t/t-1}$) = β0 + β1* log (Satış $_{t/t-1}$) + β2* AZKUK* log (Satış $_{t/t-1}$) + β3* AZKUK* TAH$_{i,t}$											
Model	**Havuzlanmış EKK Modeli**				**Sabit Etkiler Modeli**				**Tesadüfi Etkiler Modeli**		
Değişkenler	β	SE	t	Sig	β	SE	t	Sig	β	SE	t	Sig
SABİT	0,0374	0,0019	19,14	0,000	0,0385	0,0034	11,18	0,000	0,0362	0,0035	10,20	0,000
Satış - β1	0,2549	0,0215	11,85	0,000	0,2156	0,0611	3,53	0,001	0,2566	0,0623	4,12	0,000
AZKUK*Satış - β2	-0,0395	0,0412	-0,96	0,037	0,0550	0,0758	0,72	0,469	0,2693	0,0728	0,51	0,607
Tahakkuk-β3	0,0153	0,2256	0,07	0,946	0,0695	0,4311	0,16	0,872	0,6445	0,3794	-0,07	0,941
R²	0,0999				0,0669				0,0667			
Wald chi2	263,08				14,58				61,74			
Prob>chi2	0,000				0,000				0,000			
Gözlem Sayısı	1764				1764				1764			
Tahminci	Parks-Kmenta Esnek Genelleştirilmiş En Küçük Kareler				Arellano, Froot ve Rogers Sabit Etkiler Tahmincisi				Arellano, Froot ve Rogers Tesadüfi Etkiler Tahmincisi			

Parks-Kmenta Esnek Genelleştirilmiş En Küçük Kareler Tahmincisiyle tahmin edilen Borsa İstanbul'da faaliyet gösteren 196 firmaya ait 1764 firma gözlem yılı verilerinden yararlanılarak yapılan Model IV'e ilişkin regresyon analizi sonuçları Tablo

12'da yer almaktadır. Tabloda ayrıca modelin sabit etkiler ve tesadüfi etkiler modellerine göre sonuçları da yer almaktadır. Modelde yer alan değişkenlerin bir bütün olarak anlamlılığını sınayan Waldchi testi olasılık değerinin 0,00 olması, bağımlı değişken ve bağımsız değişkenlerin bir bütün olarak %1 düzeyinde anlamlı olduğunu göstermektedir.

Modele ilişkin sonuçlara bakıldığında, genel yönetim giderlerindeki maliyet yapışkanlığı ile kâr yönetimi arasında pozitif ancak istatistiksel olarak anlamlı olmayan bir ilişki tespit edilmiştir. Başka bir ifadeyle, Borsa İstanbul'da faaliyet gösteren firmaların genel yönetim giderlerinde var olan maliyet yapışkanlığı ile kâr yönetimi uygulayıp uygulamadıklarına yönelik bir ilişkinin olmadığı söylenebilir. Dolayısıyla H_1 hipotezi reddedilir.

Tablo: 13
Genel Yönetim Giderlerindeki Maliyet Yapışkanlığı ile Firma Karakteristikleri Arasındaki İlişkinin Regresyon Sonucu

Model V: log (GYG $_{i,t-1}$) = β₁* log (Satış $_{i,t-1}$) + β₂* AZKUK* log (Satış $_{i,t-1}$) + β₃ AZKUK* Kârlılık $_{i,t}$ + β₄ AZKUK* Borçlanma $_{i,t}$ + β₅ AZKUK* Büyüklük $_{i,t}$ + β₆*AZKUK * Yaş $_{i,t}$											
Model	**Havuzlanmış EKK Modeli**				**Sabit Etkiler Modeli**				**Tesadüfi Etkiler Modeli**		
Değişkenler	β	SE	t	Sig	β	SE	t	Sig	β	SE	t	Sig
SABİT	0,0380	0,0019	19,06	0,000	0,3003	0,0052	5,73	0,000	0,0272	0,0044	6,08	0,000
Satış - β₁	0,2494	0,0217	11,52	0,000	0,2658	0,0671	3,96	0,000	0,2998	0,0669	4,48	0,000
AZKUK*Satış - β₂	-0,2939	0,1332	-3,78	0,000	0,2388	0,0802	2,98	0,003	0,2693	0,0765	3,52	0,000
Kârlılık-β₃	0,5062	0,3896	0,79	0,432	0,5007	0,9136	0,55	0,584	0,6445	0,9201	0,70	0,484
Borçlanma- β₄	0,2298	0,1166	1,90	0,058	-0,0112	0,2690	-0,04	0,967	0,0851	0,2369	0,36	0,719
Büyüklük-β₅	-0,1010	0,0555	-1,82	0,069	-0,1015	0,0327	-3,10	0,002	-0,1172	0,0319	-3,67	0,000
Yaş-β₆	0,0107	0,0027	3,83	0,000	0,0147	0,0051	2,88	0,004	0,1561	0,0051	3,06	0,002
R²	0,0999				0,0819				0,0817			
Wald chi2	263,08				10,59				90,32			
Prob>chi2	0,000				0,000				0,000			
Gözlem Sayısı	1764				1764				1764			
Tahminci	Parks-Kmenta Esnek Genelleştirilmiş En Küçük Kareler				Arellano, Froot ve Rogers Sabit Etkiler Tahmincisi				Arellano, Froot ve Rogers Tesadüfi Etkiler Tahmincisi			

Tablo 13 ise Borsa İstanbul'da işlem gören firmaların genel yönetim giderlerinde bulunan maliyet yapışkanlığı ile firma karakteristikleri arasındaki ilişkiyi gösteren regresyon analizi sonuçlarına yer vermektedir. Modelde firma karakteristikleri olarak firma kârlılık oranını gösteren Kârlılık, firmanın borçlanma oranını gösteren Borçlanma, firma büyüklüğünü gösteren Büyüklük ve firma yaşını gösteren Yaş değişkenleri yer almaktadır. Waldchi, bağımlı değişken ile bağımsız değişkenlerin bir bütün olarak %1 düzeyinde anlamlı olduğunu göstermektedir.

Varlık kârlılığı oranı ile ölçümlenen kârlılık değişkeni ile maliyet yapışkanlığı arasındaki ilişkinin yöneticiler tarafından hedeflenen kârlılığa ulaşmada etkin kullanılacağı beklentisinden dolayı pozitif olması beklenmektedir. Ancak BIST firmalarının verilerinden yararlanarak yapılan analiz sonucuna göre, genel yönetim giderlerindeki maliyet yapışkanlığı ile kârlılık değişkeni arasında pozitif ancak istatistiksel olarak anlamlı olmayan bir ilişki tespit edilmiştir. Dolayısıyla firma kârlılık oranları genel yönetim giderlerindeki maliyet yapışkanlığı üzerinde etkisinin olmadığı göstermekte ve H_2 hipotezi reddedilir.

Kaldıraç oranı ile ölçülen Borçlanma değişkeni, firmanın faaliyetlerini gerçekleştirirken ne ölçüde borçla finanse edildiğini gösteren orandır. Yöneticilerin firma performansını artırmak amacıyla yetersiz oldukları noktada dışarıdan finanse edilen fonların, firma performansında yaşanacak herhangi bir olumsuzlukta katlanılması gereken maliyetleri bulunmaktadır. Analiz sonuçları borçlanma ve genel yönetim giderlerindeki maliyet yapışkanlığı arasında pozitif ve anlamlı bir ilişkinin olduğunu göstermektedir. Dolayısıyla H₃ hipotezi kabul edilir.

Büyüklük değişkeni, firma varlıklarının doğal logaritmasıyla ölçülmekte ve firma büyüklüğünü göstermektedir. Analiz sonuçlarına göre genel yönetim giderlerindeki maliyet yapışkanlığı ile büyüklük arasında negatif ve istatistiksel olarak anlamlı bir ilişki tespit edildiğinden H₄ hipotezi kabul edilir. Başka bir deyişle, firmanın büyüklüğü arttıkça genel yönetim giderlerindeki maliyet yapışkanlığı azalmakta, satışlardaki artış azalışlara karşı maliyetlerde aynı oranda artıp azalmaktadır.

Firma karakteristikleri değişkeninin sonuncusu ise Yaş değişkenidir. Firmanın faaliyette olduğu yılın baz alındığı değişkenin genel yönetim giderlerindeki maliyet yapışkanlığı ile ilişkisi pozitif ve istatistiksel olarak %1 düzeyinde anlamlı olması H₅ hipotezinin kabul edildiğini göstermektedir. Bu durum firmanın faaliyet gösterdiği yılın artmasıyla maliyet yapışkanlığının da arttığı anlamına gelmektedir.

4.4. Sağlamlık Testleri

Çalışmada firma karakteristikleri olarak firma kârlılık oranı (ROA), borçlanma oranı (kaldıraç oranı), büyüklük (Toplam varlıkların doğal logaritması) ve yaş değişkenleri kullanılmıştır. Çalışmanın bu bölümünde firma karakteristikleri için değişkenler farklı ölçüm yöntemleri kullanılarak modeller panel veri analizi yöntemiyle test edilmiştir.

Sağlamlık testi için firma kârlılık oranı olarak kullanılan varlık kârlılık oranı (ROA), özkaynak karlılık oranı (ROE) olarak, kaldıraç oranı cari oran olarak ve büyüklük ise toplam varlıkların doğal logaritması yerine satışların doğal logaritması olarak hesaplanmış ve gerekli testler yapılarak Tablo 14'te yer verilmiştir.

Panel veri analizinde F, LM ve Hausman testleri uygulanmış ve modelin analiz edilmesinde sabit etkiler modelinin uygun olduğuna karar verilmiştir. Daha sonra sabit etkiler modelinde etkinliği bozan varsayım testleri olan otokorelasyon, değişen varyans ve birimler arası korelasyonun var olup olmadığına bakılmıştır. Yapılan analizler sonucunda otokorelasyon, değişen varyans ve birimler arası korelasyonun varlığı tespit edildiğinden bu varsayımlara karşı dirençli tahminci olan Driscoll ve Kraay Tahmincisi (1998) ile model tahmin edilmiştir. Ayrıca tabloda havuzlanmış EKK modeli ve tesadüfi etkiler modeline göre sonuçlara da yer verilmiştir.

Tablo: 14

Genel Yönetim Giderlerindeki Maliyet Yapışkanlığı ile Firma Karakteristikleri Arasındaki İlişkinin Regresyon Sonucu (2)

Model VI: log (GYG $_{i,t-1}$) = β$_1$* log (Satış $_{i,t-1}$) + β$_2$* AZKUK* log (Satış $_{i,t-1}$) + β$_3$ AZKUK* ROE $_{i,t}$+ β$_4$ AZKUK* Carioran $_{i,t}$ + β$_5$ AZKUK* Büyüklük $_{i,t}$+ β$_6$*AZKUK * Yaş $_{i,t}$											
	Sabit Etkiler Modeli				**Havuzlanmış EKK Modeli**				**Tesadüfi Etkiler Modeli**		
Değişkenler	β	SE	t	P>t	β	SE	t	P>t	β	SE	t	P>t
SABİT	0,0382	0,0034	11,25	0,000	0,0165	0,0058	2,81	0,005	0,0165	0,0062	2,65	0,029
Satış - β$_1$	0,2176	0,0217	5,57	0,000	0,3510	0,0592	5,93	0,000	0,3510	0,0629	5,58	0,001
AZKUK*Satış - β$_2$	-0,0985	0,1332	-0,28	0,000	0,0287	0,0064	4,45	0,000	0,0287	0,0068	4,19	0,003
AZKUK *Satış*ROE-β$_3$	0,0196	0,3896	3,50	0,001	0,0134	0,0052	2,56	0,011	0,0134	0,0055	2,41	0,042
AZKUK *Satış*CARİORAN- β$_4$	0,0187	0,0220	0,85	0,396	-0,0007	0,0241	-0,03	0,974	-0,0007	0,0256	-0,03	0,976
AZKUK *Satış*BÜYÜKLÜK-β$_5$	-0,0133	0,0310	-0,43	0,667	-0,0453	0,0289	-1,57	0,118	-0,0453	0,0307	-1,48	0,178
AZKUK *Satış*AGE-β$_6$	0,0064	0,0030	2,14	0,033	0,0071	0,0040	1,77	0,078	0,0071	0,0043	1,67	0,134
R^2	0,0723				0,1013				0,1013			
WaldChi2	263,08				224,61				1193,86			
Prob>Chi2	0,000				0,000				0,000			
Gözlem Sayısı	1764				1764				1764			
Tahminci	Driscoll ve Kraay Tahmincisi				Driscoll ve Kraay Tahmincisi				Driscoll ve Kraay Tahmincisi			

Analiz kapsamında sabit etkiler modelinin uygun olduğuna karar verildiğinden genel yönetim giderlerindeki maliyet yapışkanlığının firma karakteristikleri ile ilişkisinde bu model üzerinden sonuçlarına yer verilmiştir. Buna göre, genel yönetim giderlerinde var olan maliyet yapışkanlığının ROE ile ölçülen firma kârlılığı ve yaş değişkenleri ile pozitif ve istatistiksel olarak anlamlı olduğu tespit edilmiştir. Ancak cari oran ve büyüklük ile genel yönetim giderlerindeki maliyet yapışkanlığı arasında istatistiksel olarak anlamlı bir sonuç bulunamamıştır.

5. Sonuç

Yöneticiler işletme faaliyetlerini kesintisiz devam ettirmenin yanında faaliyetleri ile ilgili maksimum kâra ulaşmak isterler. Özellikle imalat işletmelerinde yüksek faaliyet hacmi ve düşük maliyet ile ulaşılacak kâr maksimizasyonu için yöneticilerin maliyet davranışlarını iyi anlamaları ve âtıl maliyetlerden kaçınmaları gerekmektedir. Maliyet davranışları hakkında 2003 yılında Anderson, Banker ve Janakiraman tarafından geliştirilen ABJ modeline kadar maliyetlerin simetrik davranış sergiledikleri satışlardaki artış ve azalışla aynı oranda artış ve azalış gösterdikleri bilinmekteydi. Ancak yaklaşık 20 yıldır ortaya çıkan maliyet yapışkanlığı kavramı, maliyetlerin tamamının doğrusal davranmadıklarını faaliyet hacminde meydana gelen artış ve azalışlara karşılık maliyetlerin simetrik davranmadıklarını özellikle azalış söz konusu olduğunda maliyetlerin artışa oranla daha az azaldığını ifade etmektedir.

Bu çalışmada analizler Borsa İstanbul'da 2012-2020 arasındaki dönemlerinde faaliyet gösteren 196 firmaya ait 1764 firma gözlem yılından yararlanılarak yapılmıştır. Bankalar, finans kuruluşları, sigorta şirketleri ve yatırım ortaklıkları varlık yapılarının farklılığından dolayı örnekleme dahil edilmemiştir. Ayrıca 2012-2020 arasındaki döneme ait verilerine ulaşılamayan firmalarda kapsam dışında bırakılmıştır. Kullanılan verilere Kamuyu Aydınlatma Platformu (KAP) resmî web sayfasından ve FİNNET veri tabanından ulaşılmıştır. STATA 15 paket programı kullanılan çalışmada modeller panel veri analiz yöntemiyle tahmin edilmiştir.

Çalışmada öncelikle maliyet yapışkanlığının varlığını test etmek amaçlanmış ve bu doğrultuda pazarlama, satış ve dağıtım giderleri, genel yönetim giderleri ve satışların maliyeti olmak üzere üç farklı gider kalemi kullanılmıştır. Maliyet yapışkanlığının varlığı 2003 yılında Anderson, Banker ve Janakiraman tarafından geliştirilen ABJ yöntemiyle test edilmiştir. Yönteme göre maliyet yapışkanlığının varlığından söz edebilmek için β_1 katsayısının pozitif ve istatistiksel olarak anlamlı ve β_2 katsayısının ise negatif ve istatistiksel olarak anlamlı olması gerekmektedir. Daha sonra maliyet yapışkanlığının var olduğu gider kaleminin kâr yönetimi ve firma karakteristikleri ile ilişkisi incelenmiştir.

Analiz sonucunda pazarlama satış ve dağıtım giderlerinde ve satışların maliyetinde maliyetlerin yapışkan olmadıkları ancak genel yönetim giderlerinde maliyetlerin yapışkan oldukları tespit edilmiştir. Dolayısıyla bulunan sonuç, yöneticilerin satışlarda meydana gelen değişikliklerine bir işletmenin yönetim fonksiyonlarını, organizasyonu ve kuruluşunu, büro hizmetlerini, kamuyla olan ilişkilerini, güvenlik, hukuk işleri, personel işleri, kredi ve tahsilat işlemleri ile ilgilenen muhasebe ve mali işler servisleri gibi giderleri kapsayan genel yönetim giderlerindeki maliyetleri ayarlayarak cevap verdikleri şeklinde ifade edebilir. Genel yönetim giderlerinde var olan maliyet yapışkanlığı ile faaliyet hacminde meydana gelen 1 birimlik artışın maliyetlerde 0,3104 artışa, faaliyet hacmindeki 1 birimlik azalmanın ise maliyetlerde 0,2027'lik azalmaya neden olacaktır. Elde edilen sonuç, literatürdeki Anderson vd. (2003), de Medeiros & De Souza Costa (2004), Yükçü & Özkaya (2011), Zanjirdar vd. (2014), Banker & Byzalov (2014), Zhang (2016), Salehi vd. (2018), Özkaya (2020)'nin çalışmalarıyla tutarlıdır.

Kâr yönetimi uygulamalarının genel yönetim giderlerindeki maliyet yapışkanlığına etkisini görmek amacıyla kurulan modelde kâr yönetimi göstergesi olarak literatür ile tutarlı olarak isteğe bağlı tahakkuklar kullanılmış ve ölçümünde Modifiye Edilmiş Jones Modeli'nden yararlanılmıştır. İki değişkenin birbirleri üzerindeki etkisini göstermesi amacıyla etkileşim değeri önemlidir. Panel veri analiz yöntemi kullanılan modelde iki değişken arasında anlamlı bir sonuç elde edilememiştir. Dolayısıyla elde edilen sonuçla, firmaların kâr yönetim uygulamalarının genel yönetim giderlerinde varlığı tespit edilen maliyet yapışkanlığı üzerinde etkisinin bulunmadığı ifade edilebilir. Ayrıca bulunan sonuç, Xue & Hong (2016), Hemati & Javid (2017), Sayrani vd. (2018), Megeid & El-Deeb (2021)'in çalışmalarıyla tutarlıdır.

Analizlerde son model ise genel yönetim giderlerindeki maliyet yapışkanlığının firma karakteristikleri ile olan ilişkisini göstermektedir. Bu analizde de değişkenler ile maliyet yapışkanlığı üzerindeki ilişkiyi gösterebilmek amacıyla etkileşim değerleri dikkate alınmıştır. Analiz sonucunda firma karakteristiklerinden kârlılık, borçlanma, büyüklük ve yaş değişkenlerinin kullanıldığı çalışmada genel yönetim giderlerindeki maliyet yapışkanlığı ile borçlanma oranı ve yaş değişkeni ile pozitif ve istatistiksel olarak anlamlı ilişki, büyüklük ile istatistiksel açıdan anlamlı ve negatif ilişki tespit edilmiştir. Elde edilen sonuçla, işletmeler yabancı kaynaklardan yararlandıkça faaliyet hacimlerinde meydana gelen değişimlere genel yönetim giderlerindeki maliyetleri ayarlamayla karşılık verdiklerinden firma borçlanma oranı arttıkça genel yönetim giderlerindeki maliyet yapışkanlığı da

artmaktadır. Firma borçlanması ile elde edilen sonuç literatürde Ghazalat & Abu-Serdaneh (2020) ve Wijayanti vd. (2020)'nin çalışmalarıyla tutarlıdır. Aynı şekilde firma yaşının da artması genel yönetim giderlerindeki maliyet yapışkanlığını artıran bir diğer husustur. Buna karşın firma büyüklüğü ile maliyet yapışkanlığı arasındaki negatif ilişki ise, sahip oldukları varlıklar ile sınıflandırılan firmaların büyüdükçe genel yönetim giderlerindeki maliyet yapışkanlığını azalttığını göstermektedir. Bulunan sonuç ise Warganegara & Tamara (2014), Cheung vd. (2016), Zulfiati vd. (2020), Zhao (2020)'nin çalışmalarıyla tutarlıdır. Ancak kârlılık değişkeni ile genel yönetim giderlerindeki maliyet yapışkanlığı arasında anlamlı bir ilişkinin olmadığı tespit edilmiştir.

Yapılan çalışma Türkiye özelinde maliyet yapışkanlığı ve kâr yönetimi arasındaki ilişkiyi incelemesi ve verilerin güncel olması ve örneklem hacminin geniş tutulması bakımından önemli bir yere sahiptir. Konu ile ilgili varlığı tespit edilen maliyet yapışkanlığının kâr yönetimi ve kârlılık oranı, borçlanma oranı, büyüklük ve yaşı içeren firma karakteristikleri ile ilişkisini ortaya koyan çalışmada literatüre katkı sunmak amaçlanmaktadır. Ancak bu amacı gerçekleştiren çalışmada birtakım sınırlılıklar bulunmaktadır. Bu sınırlıklar aynı zamanda gelecek çalışmalara yol göstermesi açısından da önemlidir ve öneri niteliğindedir.

- Çalışmada analiz yöntemi olarak seçilen dengeli panel veri analizi Borsa İstanbul'da faaliyet gösteren ancak baz alınan yıllar içerisinde eksik veriye sahip olması nedeniyle elimine edilmiştir. Bu durum gözlem sayısının düşmesine neden olmuştur.
- Örneklem olarak seçilen firmaların sektörel olarak ayrıştırılmaması ve baz alınan yıl sayısının artırmaması,
- Maliyet yapışkanlığı ve kâr yönetimi için tek yöntem kullanılmış ve konuyla ilgili olarak farklı ölçüm yöntemlerinden yararlanılmaması,
- Türkiye'de yaşanan enflasyonun finansal tablolara yansıması göz önüne alınmamıştır. Dolayısıyla bilanço kalemlerine enflasyon muhasebesi uygulanarak analizler yapılabilir.

Kaynaklar

Abdullah, A.A.H. (2021), "Cost Stickiness and Firm Profitability: A Study In Saudi Arabian Industries", *Investment Management and Financial Innovations*, 18(3), 327-333.

Alavinasab, M.S. et al. (2017), "The Effect of Economic Growth on Cost Stickiness in Tehran Stock Exchange", *International Journal of Finance and Accounting*, 6(3), 87-94.

Anderson, M. et al. (2003), "Are Selling, General and Administrative Costs 'Sticky' ?", *Journal of Accounting Research*, 41(1), 47-63.

Balios, D. et al. (2020), "Sticky Behaviour of Selling, General and Administrative Costs and Earnings Management Practices: An International Comparative Perspective", *International Journal Managerial and Financial Accounting*, 12(3-4), 242-264.

Baltagi, B.H. (2013), *Econometric Analysis of Panel Data*, 5th Edition, Wiley.

Banker, R.D. & D. Byzalov (2014), "Asymmetric Cost Behavior", *Journal of Management Accounting Research*, 26(2), 43-79.

Bengü, H. & C. Fidancan (2020), "BİST Kimya ve Metal Ana Sanayi Sektörlerindeki İmalat İşletmelerinde Maliyet Yapışkanlığının Test Edilmesine İlişkin Bir Uygulama", *Niğde Ömer Halisdemir Üniversitesi İİBF Dergisi*, 13(2), 331-342.

Bengü, H. & C. Fidancan (2022), "İmalat İşletmelerinde Maliyet Yapışkanlığının Karşılaştırılması: Türkiye, Endonezya ve Meksika Örneği", *Niğde Ömer Halis Demir Üniversitesi İİBF Dergisi*, 15(2), 386-398.

Boakye, B.Y. et al. (2019), "The Relationship Between Real Earnings Management and Cost Behavior", *SEISENSE Journal of Management*, 2(6), 65-77.

Breusch, T. & A. Pagan (1980), "The Lagrange Multiplier Test and Its Applications to Model Specification in Econometrics", *Review of Economic Studies*, 47(1), 239-253.

Calleja, K. et al. (2006), "A Note On Cost Stickiness: Some International Comparisons", *Management Accounting Research*, 17(1), 127-140.

Cheung, J. et al. (2016), "Is The Asymmetric Cost Behavior Affected By Competition Factors?", *Asia-Pacific Journal of Accounting & Economics*, 25(6), 1-17.

Çelik, M. & D. Kök (2013), "Türkiye'de Maliyet Yapışkanlığının Geçerliliği: İstanbul Menkul Kıymetler Borsası (IMKB) Örneğinde Panel Veri Analizi", *Business and Economics Research Journal*, 4(4), 37-48.

de Medeiros, O.R. & De Souza Costa, P. (2004), *Cost Stickiness in Brazilian Firms*, Available at SSRN, <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=632365>, 26.02.2021.

Dechow, P.M. et al. (1995), "Detecting Earnings Management", *The Accounting Review*, 70(2), 193-225.

Erdoğan, M. vd. (2019), "BIST'de Sektörler İtibariyle Maliyet Yapışkanlığının Panel Veri Analiziyle İncelenmesi", *Süleyman Demirel Üniversitesi Vizyoner Dergisi*, 10(24), 264-274.

Ghazalat, A. & J. Abu-Serdaneh (2020), "Sticky Cost Behavior and Conditional Conservatism: An Empirical Analysis From GCC Countries", *International Journal of Management*, 11(12), 2717-2729.

Günay, F. & L. Koşan (2020), "Maliyet Yapışkanlığının Pay Getirisine Etkisi: Turizm Alt Sektörlerinde Bir Uygulama", *Journal of Accounting and Taxation Studies*, 13(3), 667-707.

Gürdal, K. (2019), *Maliyet Muhasebesi*, Ankara: Siyasal Kitabevi.

Habib, A. & M.M. Hasan (2019), "Corporate Social Responsibility and Cost Stickiness", *Business & Society*, 58(3), 453-492.

Hacıhasanoğlu, T. & E. Dalkılıç (2018), "Maliyet Yapışkanlığı Hipotezinin BİST İmalat Sektörü Kapsamında Test Edilmesi", *Hitit Üniversitesi SBE Dergisi*, 11(3), 1802-1808.

Hashemi, S.A. & A. Nejati (2015), "The Effect of Earnings Management on Costs Stickiness", *Journal of Iranian Accounting Review*, 2(8), 93-108.

He, J. et al. (2020), "Asymmetric Cost Behavior and Dividend Policy", *Journal of Accounting Research*, 58(4), 989-1021.

Hemati, M. & D. Javid (2017), "The Effects of The Earnings Management and Corporate Governance on Expense Stickiness", *International Journal of Accounting Research*, 5(2), 1-6.

Jin, Y. (2017), "Does Earnings Management Affect The Cost Stickiness of Corporate?", *7th International Conference on Education, Management, Computer and Society (EMCS 2017)*, <https://dx.doi.org/10.2991/emcs-17.2017.120>, 08.12.2021.

Karadeniz, E. et al. (2019), "Halka Açık Konaklama İşletmelerinde Maliyet Yapışkanlığının Analizi", *Journal of Tourism Theory and Research*, 5(2), 171-181.

Kontesa, M. & R.K. Brahmana (2018), "Cost Stickiness Effect on Firm's Performance: Insights From Malaysia", *Asia-Pacific Management Accounting Journal*, 13(1), 1-19.

Koo, J.H. et al. (2015), "Earnings Management and Cost Stickiness", *Advanced Science and Technology Letters*, 84(1), 40-44.

Megeid, N.S.A. & M.S. El-Deeb (2021), "Board Characteristics Effect on Cost Stickiness Using Earnings Management as a Mediating Variable 'Evidence from Egypt'", *Alexandria Journal of Accounting Research*, 5(2), 1-48.

Özkaya, H. (2020), "Sticky Cost Behavior: Evidence From Small and Medium Sized Enterprises in Turkey", *Euraisan Business Review*, 11, 349-369.

Öztürkçü-Akçaya, A. & H.C. Sayın (2022), "Yatırım Harcamaları ve Finansal Esneklik İlişkisi: Borsa İstanbul Üzerine Bir İnceleme", *İşletme Araştırmaları Dergisi*, 14(1), 846-864.

Periasamy P. (2010), *A Textbook of Financial Cost and Management Accounting*, Nagpur: Himalaya Publishing House.

Salehi, M. et al. (2018), "The relationship between cost stickiness and financial reporting quality in Tehran Stock Exchange", *International Journal of Productivity and Performance Management*, 67(9), 1550-1565.

Sayrani, M. et al. (2018), "Evaluation The Relationship Between Cost Stickiness and Corporate Governance", *Journal of Management and Accounting Studies*, 6(1), 27-32.

Tatoğlu, F.Y. (2013), *Panel Veri Ekonometrisi: Stata Uygulamalı*, İstanbul: Beta Yayıncılık.

Tatoğlu, F.Y. (2020), *Panel Veri Ekonometrisi: Stata Uygulamalı*, İstanbul: Beta Yayıncılık.

Venieris, G. et al. (2015), "Organisation Capital and Sticky Behaviour of Selling, General and Administrative Expenses", *Management Accounting Research*, 26(1), 54-82.

Warganegara, D.L. & D. Tamara (2014), "The Impact of Cost Stickiness on the Profitability of Indonesian Firms", *International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering*, 8(11), 3542-3545.

Weiss, D. (2010), "Cost Behavior and Analysts' Earnings Forecasts", *The Accounting Review*, 85(4), 1441-1471.

Wijayanti, I. et al. (2020), "The Effect of Corporate Social Responsibility Disclosure, Leverage, Firm Size, and Profitability Toward Earnings Response Coefficient", *Int. J. Innov. Creat. Chang*, 13, 1202-1216.

Wijayanti, I. et al. (2022), "Sticky Cost Behavior in Agricultural Sector Companies in Indonesia", *Journal of Economics, Finance and Management Studies*, 5(1), 127-133.

Xue, S. & Y. Hong (2016), "Earnings Management, Corporate Governance and Expense Stickiness", *China Journal of Accounting Research*, 9(1), 41-58.

Yükçü, S. & H. Özkaya (2011), "Cost Behavior in Turkish Firms: Are Selling, General and Administrative Costs and Total Operating Costs 'Sticky' ?", *World of Accounting Science*, 13(3), 1-27.

Yükçü, S. (2018), *Yönetim Açısından Maliyet Muhasebesi*, İzmir: Altın Nokta Yayınevi.

Zanjirdar, M. et al. (2014), "Comparative Analysis of Sticky SGA Costs and Cost of Goods Sold: Evidence From Tehran Stock Exchange", *Management Science Letters*, 4(3), 521-526.

Zhang, Y. (2016), "The Stickiness of SG&A Costs, Agency Problems and Competition Intensity", *Masters' Thesis*, Erasmus University Rotterdam, Erasmus School of Economics.

Zhao, B.J. (2020), *Supply Chain Bargaining Power and Cost Stickiness*, Available at SSRN, <https://dx.doi.org/10.2139/ssrn.3685994>, 01.03.2021.

Zhong, T. et al. (2020), "Business Strategy, State-Owned Equity and Cost Stickiness: Evidence from Chinese Firms", *Sustainability*, 12(5), 1850.

Zulfiati, L. et al. (2020), "Cost Stickiness: Behavior and Factors", *Advances in Economics, Business and Management Research*, 127(1), 143-145.

EK-A
Hesaplamada Kullanılan Firma Listesi

Sıra No	Firma Kodu	Firma Adı
1	AVOD	A.V.O.D. KURUTULMUŞ GIDA VE TARIM ÜRÜNLERİ SANAYİ VE TİCARET A.Ş.
2	ACSEL	ACISELSAN ACIPAYAM SELÜLOZ SANAYİ VE TİCARET A.Ş.
3	ADEL	ADEL KALEMCİLİK TİCARET VE SANAYİ A.Ş.
4	ADESE	ADESE GAYRİMENKUL YATIRIM A.Ş.
5	AFYON	AFYON ÇİMENTO SANAYİ T.A.Ş.
6	AKCNS	AKÇANSA ÇİMENTO SANAYİ VE TİCARET A.Ş.
7	ATEKS	AKIN TEKSTİL A.Ş.
8	AKSA	AKSA AKRİLİK KİMYA SANAYİİ A.Ş.
9	AKSEN	AKSA ENERJİ ÜRETİM A.Ş.
10	ALCAR	ALARKO CARRIER SANAYİ VE TİCARET A.Ş.
11	ALCTL	ALCATEL LUCENT TELETAŞ TELEKOMÜNİKASYON A.Ş.
12	ALKA	ALKİM KÂĞIT SANAYİ VE TİCARET A.Ş.
13	ALKIM	ALKİM ALKALİ KİMYA A.Ş.
14	AYCES	ALTIN YUNUS ÇEŞME TURİSTİK TESİSLER A.Ş.
15	AEFES	ANADOLU EFES BİRACILIK VE MALT SANAYİİ A.Ş.
16	ASUZU	ANADOLU ISUZU OTOMOTİV SANAYİ VE TİCARET A.Ş.
17	ARCLK	ARÇELİK A.Ş.
18	ARENA	ARENA BİLGİSAYAR SANAYİ VE TİCARET A.Ş.
19	ARMDA	ARMADA BİLGİSAYAR SİSTEMLERİ SANAYİ VE TİCARET A.Ş.
20	ARSAN	ARSAN TEKSTİL TİCARET VE SANAYİ A.Ş.
21	ASELS	ASELSAN ELEKTRONİK SANAYİ VE TİCARET A.Ş.
22	AYGAZ	AYGAZ A.Ş.
23	BAGFS	BAGFAŞ BANDIRMA GÜBRE FABRİKALARI A.Ş.
24	BAKAB	BAK AMBALAJ SANAYİ VE TİCARET A.Ş.
25	BNTAS	BANTAŞ BANDIRMA AMBALAJ SANAYİ TİCARET A.Ş.
26	BANVT	BANVİT BANDIRMA VİTAMİNLİ YEM SANAYİİ A.Ş.
27	BASCM	BAŞTAŞ BAŞKENT ÇİMENTO SANAYİ VE TİCARET A.Ş.
28	BTCIM	BATIÇİM BATI ANADOLU ÇİMENTO SANAYİİ A.Ş.
29	BSOKE	BATISÖKE SÖKE ÇİMENTO SANAYİİ T.A.Ş.
30	BRKSN	BERKOSAN YALITIM VE TECRİT MADDELERİ ÜRETİM VE TİCARET A.Ş.
31	BEYAZ	BEYAZ FİLO OTO KİRALAMA A.Ş.
32	BLCYT	BİLİCİ YATIRIM SANAYİ VE TİCARET A.Ş.
33	BIMAS	BİM BİRLEŞİK MAĞAZALAR A.Ş.
34	BRKO	BİRKO BİRLEŞİK KOYUNLULULAR MENSUCAT TİCARET VE SANAYİ A.Ş.
35	BIZIM	BİZİM TOPTAN SATIŞ MAĞAZALARI A.Ş.
36	BRSAN	BORUSAN MANNESMANN BORU SANAYİ VE TİCARET A.Ş.
37	BFREN	BOSCH FREN SİSTEMLERİ SANAYİ VE TİCARET A.Ş.
38	BOSSA	BOSSA TİCARET VE SANAYİ İŞLETMELERİ T.A.Ş.
39	BRISA	BRİSA BRIDGESTONE SABANCI LASTİK SANAYİ VE TİCARET A.Ş.
40	BURCE	BURÇELİK BURSA ÇELİK DÖKÜM SANAYİ A.Ş.
41	BURVA	BURÇELİK VANA SANAYİ VE TİCARET A.Ş.
42	BUCIM	BURSA ÇİMENTO FABRİKALARI A.Ş.
43	CRFSA	CARREFOURSA CARREFOUR SABANCI TİCARET MERKEZİ A.Ş.
44	CCOLA	COCA-COLA İÇECEK A.Ş.
45	CELHA	ÇELİK HALAT VE TEL SANAYİ A.Ş.
46	CEMAS	ÇEMAŞ DÖKÜM SANAYİ A.Ş.
47	CEMTS	ÇEMTAŞ ÇELİK MAKİNA SANAYİ VE TİCARET A.Ş.
48	CMBTN	ÇİMBETON HAZIRBETON VE PREFABRİK YAPI ELEMANLARI SANAYİ VE TİCARET A.Ş.
49	CMENT	ÇİMENTAŞ İZMİR ÇİMENTO FABRİKASI T.A.Ş.
50	CIMSA	ÇİMSA ÇİMENTO SANAYİ VE TİCARET A.Ş.
51	CUSAN	ÇUHADAROĞLU METAL SANAYİ VE PAZARLAMA A.Ş.
52	DAGI	DAGİ GİYİM SANAYİ VE TİCARET A.Ş.
53	DGATE	DATAGATE BİLGİSAYAR MALZEMELERİ TİCARET A.Ş.
54	DMSAS	DEMİSAŞ DÖKÜM EMAYE MAMÜLLERİ SANAYİ A.Ş.
55	DERIM	DERİMOD KONFEKSİYON AYAKKABI DERİ SANAYİ VE TİCARET A.Ş.
56	DESA	DESA DERİ SANAYİ VE TİCARET A.Ş.
57	DESPC	DESPEC BİLGİSAYAR PAZARLAMA VE TİCARET A.Ş.
58	DITAS	DİTAŞ DOĞAN YEDEK PARÇA İMALAT VE TEKNİK A.Ş.
59	DOBUR	DOĞAN BURDA DERGİ YAYINCILIK VE PAZARLAMA A.Ş.
60	DGKLB	DOĞTAŞ KELEBEK MOBİLYA SANAYİ VE TİCARET A.Ş.
61	DOGUB	DOĞUSAN BORU SANAYİİ VE TİCARET A.Ş.
62	DOAS	DOĞUŞ OTOMOTİV SERVİS VE TİCARET A.Ş.
63	DOKTA	DÖKTAŞ DÖKÜMCÜLÜK TİCARET VE SANAYİ A.Ş.
64	DURDO	DURAN DOĞAN BASIM VE AMBALAJ SANAYİ A.Ş.
65	DYOBY	DYO BOYA FABRİKALARI SANAYİ VE TİCARET A.Ş.

66	ECILC	EİS ECZACIBAŞI İLAÇ, SINAİ VE FİNANSAL YATIRIMLAR SANAYİ VE TİCARET A.Ş.
67	EGEEN	EGE ENDÜSTRİ VE TİCARET A.Ş.
68	EGGUB	EGE GÜBRE SANAYİİ A.Ş.
69	EGPRO	EGE PROFİL TİCARET VE SANAYİ A.Ş.
70	EGSER	EGE SERAMİK SANAYİ VE TİCARET A.Ş.
71	EPLAS	EGEPLAST EGE PLASTİK TİCARET VE SANAYİ A.Ş.
72	EKIZ	EKİZ KİMYA SANAYİ VE TİCARET A.Ş.
73	EMKEL	EMEK ELEKTRİK ENDÜSTRİSİ A.Ş.
74	EMNIS	EMİNİŞ AMBALAJ SANAYİ VE TİCARET A.Ş.
75	ENKAI	ENKA İNŞAAT VE SANAYİ A.Ş.
76	ERBOS	ERBOSAN ERCİYAS BORU SANAYİİ VE TİCARET A.Ş.
77	EREGL	EREĞLİ DEMİR VE ÇELİK FABRİKALARI T.A.Ş.
78	FLAP	FLAP KONGRE TOPLANTI HİZMETLERİ OTOMOTİV VE TURİZM A.Ş.
79	FMIZP	FEDERAL-MOGUL İZMİT PİSTON VE PİM ÜRET,M TESİSLERİ A.Ş.
80	FROTO	FORD OTOMOTİV SANAYİ A.Ş.
81	FRIGO	FRİGO-PAK GIDA MADDELERİ SANAYİ VE TİCARET A.Ş.
82	GEDZA	GEDİZ AMBALAJ SANAYİ VE TİCARET A.Ş.
83	GENTS	GENTAŞ DEKORATİF YÜZEYLER SANAYİ VE TİCARET A.Ş.
84	GEREL	GERSAN ELEKTRİK TİCARET VE SANAYİ A.Ş.
85	GOODY	GOODYEAR LASTİKLERİ T.A.Ş.
86	GOLTS	GÖLTAŞ GÖLLER BÖLGESİ ÇİMENTO SANAYİ VE TİCARET A.Ş.
87	GUBRF	GÜBRE FABRİKALARI T.A.Ş.
88	HATEK	HATEKS HATAY TEKSTİL İŞLETMELERİ A.Ş.
89	HEKTS	HEKTAŞ TİCARET T.A.Ş.
90	HURGZ	HÜRRİYET GAZETECİLİK VE MATBAACILIK A.Ş.
91	IHEVA	İHLAS EV ALETLERİ İMALAT SANAYİ VE TİCARET A.Ş.
92	IHGZT	İHLAS GAZETECİLİK A.Ş.
93	INTEM	İNTEMA İNŞAAT VE TESİSAT MALZEMELERİ YATIRIM VE PAZARLAMA A.Ş.
94	IPEKE	İPEK DOĞAL ENERJİ KAYNAKLARI ARAŞTIRMA VE ÜRETİM A.Ş.
95	ISDMR	ISKENDERUN DEMİR VE ÇELİK A.Ş.
96	IZMDC	İZMİR DEMİR ÇELİK SANAYİ A.Ş.
97	IZFAS	İZMİR FIRÇA SANAYİ VE TİCARET A.Ş.
98	JANTS	JANTSA JANT SANAYİ VE TİCARET A.Ş.
99	KAPLM	KAPLAMİN AMBALAJ SANAYİ VE TİCARET A.Ş.
100	KRDMD	KARDEMİR KARABÜK DEMİR ÇELİK SANAYİ VE TİCARET A.Ş.
101	KAREL	KAREL ELEKTRONİK SANAYİ VE TİCARET A.Ş.
102	KARSN	KARSAN OTOMOTİV SANAYİ VE TİCARET A.Ş.
103	KRTEK	KARSU TEKSTİL SANAYİİ VE TİCARET A.Ş.
104	KARTN	KARTONSAN KARTON SANAYİ VE TİCARET A.Ş.
105	KATMR	KATMERCİLER ARAÇ ÜSTÜ EKİPMAN SANAYİ VE TİCARET A.Ş.
106	KENT	KENT GIDA MADDELERİ SANAYİİ VE TİCARET A.Ş.
107	KERVT	KEREVİTAŞ GIDA SANAYİ VE TİCARET A.Ş.
108	KLMSN	KLİMASAN KLİMA SANAYİ VE TİCARET A.Ş.
109	KNFRT	KONFRUT GIDA SANAYİ VE TİCARET A.Ş.
110	KONYA	KONYA ÇİMENTO SANAYİ A.Ş.
111	KORDS	KORDSA TEKNİK TEKSTİL A.Ş.
112	KOZAL	KOZA ALTIN İŞLETMELERİ A.Ş.
113	KOZAA	KOZA ANADOLU METAL MADENCİLİK İŞLETMELERİ A.Ş.
114	KRSTL	KRİSTAL KOLA VE MEŞRUBAT SANAYİ TİCARET A.Ş.
115	KRONT	KRON TEKNOLOJİ A.Ş.
116	KUTPO	KÜTAHYA PORSELEN SANAYİ A.Ş.
117	LINK	LİNK BİLGİSAYAR SİSTEMLERİ YAZILIMI VE DONANIMI SANAYİ VE TİCARET A.Ş.
118	LOGO	LOGO YAZILIM SANAYİ VE TİCARET A.Ş.
119	LKMNH	LOKMAN HEKİM ENGÜRÜSAĞ SAĞLIK TURİZM EĞİTİM HİZMETLERİ VE İNŞAAT TAAHHÜT A.Ş.
120	LUKSK	LÜKS KADİFE TİCARET VE SANAYİ A.Ş.
121	MAKTK	MAKİNA TAKIM ENDÜSTRİSİ A.Ş.
122	MRSHL	MARSHALL BOYA VE VERNİK SANAYİİ A.Ş.
123	MARTI	MARTI OTEL İŞLETMELERİ A.Ş.
124	MEGAP	MEGA POLİETİLEN KÖPÜK SANAYİ VE TİCARET A.Ş.
125	MNDRS	MENDERES TEKSTİL SANAYİ VE TİCARET A.Ş.
126	MERIT	MERİT TURİZM YATIRIM VE İŞLETME A.Ş.
127	MGROS	MİGROS TİCARET A.Ş.
128	TIRE	MONDİ TURKEY OUKLU MUKAVVA KÂĞIT VE AMBALAJ SANAYİ A.Ş.
129	NETAS	NETAŞ TELEKOMÜNİKASYON A.Ş.
130	NIBAS	NİĞBAŞ NİĞDE BETON SANAYİ VE TİCARET A.Ş.
131	NUHCM	NUH ÇİMENTO SANAYİ A.Ş.
132	ODAS	ODAŞ ELEKTRİK ÜRETİM SANAYİ TİCARET A.Ş.
133	OLMIP	MONDİ OLMUKSAN KÂĞIT VE AMBALAJ SANAYİ VE TİCARET A.Ş.
134	OTKAR	OTOKAR OTOMOTİV VE SAVUNMA SANAYİ A.Ş.
135	OYLUM	OYLUM SINAİ YATIRIMLAR A.Ş.

136	OZBAL	ÖZBAL ÇELİK BORU SANAYİ TİCARET VE TAAHHÜT A.Ş.
137	OZRDN	ÖZERDEN AMBALAJ SANAYİ A.Ş.
138	PARSN	PARSAN MAKİNA PARÇALARI SANAYİİ A.Ş.
139	PGSUS	PEGASUS HAVA TAŞIMACILIĞI A.Ş.
140	PENGD	PENGUEN GIDA SANAYİ A.Ş.
141	PKENT	PETROKENT TURİZM A.Ş.
142	PETUN	PINAR ENTEGRE ET VE UN SANAYİİ A.Ş.
143	PINSU	PINAR SU VE İÇECEK SANAYİ VE TİCARET A.Ş.
144	PNSUT	PINAR SÜT MAMULLERİ SANAYİİ A.Ş.
145	PKART	PLASTİKKART AKILLI KART İLETİŞİM SİSTEMLERİ SANAYİ VE TİCARET A.Ş.
146	POLTK	POLİTEKNİK METAL SANAYİ VE TİCARET A.Ş.
147	PRZMA	PRİZMA PRES MATBAACILIK YAYINCILIK SANAYİ VE TİCARET A.Ş.
148	RYSAS	REYSAŞ TAŞIMACILIK VE LOJİSTİK TİCARET A.Ş.
149	RODRG	RODRİGO TEKSTİL SANAYİ VE TİCARET A.Ş.
150	ROYAL	ROYAL HALI İPLİK TEKSTİL MOBİLYA SANAYİ VE TİCARET A.Ş.
151	RTALB	RTA LABORATUVARLARI BİYOLOJİK ÜRÜNLER İLAÇ VE MAKİNE SANAYİ TİCARET A.Ş.
152	SANFM	SANİFOAM ENDÜSTRİ VE TÜKETİM ÜRÜNLERİ SANAYİ TİCARET A.Ş.
153	SANKO	SANKO PAZARLAMA İTHALAT İHRACAT A.Ş.
154	SAMAT	SARAY MATBBAACILIK KÂĞITCILIK KIRTASİYECİLİK TİCARET VE SANAYİ A.Ş.
155	SARKY	SARKUYSAN ELEKTROLİTİK BAKIR SANAYİ VE TİCARET A.Ş.
156	SASA	SASA POLYESTER SANAYİ A.Ş.
157	SAYAS	SAY YENİLENEBİLİR ENERJİ EKİPMANLARI SANAYİ VE TİCARET A.Ş.
158	SEKUR	SEKURO PLASTİK AMBALAJ SANAYİ A.Ş.
159	SELEC	SELÇUK ECZA DEPOSU TİCARET VE SANAYİ A.Ş.
160	SELGD	SELÇUK GIDA ENDÜSTRİ İHRACAT İTHALAT A.Ş.
161	SNKRN	SENKRON SİBER GÜVENLİK YAZILIM VE BİLİŞİM ÇÖZÜMLERİ A.Ş.
162	SILVR	SİLVERLİNE ENDÜSTRİ VE TİCARET A.Ş.
163	SODSN	SODAŞ SODYUM SANAYİİ A.Ş.
164	SKTAS	SÖKTAŞ TEKSTİL SANAYİ VE TİCARET A.Ş.
165	SNPAM	SÖNMEZ PAMUKLU SANAYİİ A.Ş.
166	SISE	TÜRKİYE ŞİŞE VE CAM FABRİKALARI A.Ş.
167	TBORG	TÜRK TUBORG BİRA VE MALT SANAYİİ A.Ş.
168	TATGD	TAT GIDA SANAYİ A.Ş.
169	TKURU	TAZE KURU GIDA SANAYİ VE TİCARET A.Ş.
170	TEKTU	TEK-ART İNŞAAT TİCARET TURİZM SANAYİ VE YATIRIMLAR A.Ş.
171	TKNSA	TEKNOSA İÇ VE DIŞ TİCARET A.Ş.
172	TMPOL	TEMAPOL POLİMER PLASTİK VE İNŞAAT SANAYİ TİCARET A.Ş.
173	TOASO	TOFAŞ TÜRK OTOMOBİL FABRİKASI A.Ş.
174	TUKAS	TUKAŞ GIDA SANAYİ VE TİCARET A.Ş.
175	TCELL	TURKCELL İLETİŞİM HİZMETLERİ A.Ş.
176	TMSN	TÜMOSAN MOTOR VE TRAKTÖR SANAYİ A.Ş.
177	TUPRS	TÜPRAŞ-TÜRKİYE PETROL RAFİNELERİ A.Ş.
178	THYAO	TÜRK HAVA YOLLARI A.O.
179	PRKAB	TÜRK PRYSMİAN KABLO VE SİSTEMLERİ A.Ş.
180	TTKOM	TÜRK TELEKOMÜNİKASYON A.Ş.
181	TTRAK	TÜRK TRAKTÖR VE ZİRAAT MAKİNELERİ A.Ş.
182	ULUSE	ULUSOY ELEKTRİK İMALAT TAAHHÜT VE TİCARET A.Ş.
183	ULUUN	ULUSOY UN SANAYİ VE TİCARET A.Ş.
184	USAK	UŞAK SERAMİK SANAYİ A.Ş.
185	UTPYA	UTOPYA TURİZM İNŞAAT İŞLETMECİLİK TİCARET A.Ş.
186	UZERB	UZERTAŞ BOYA SANAYİ TİCARET VE YATIRIM A.Ş.
187	ULKER	ÜLKER BİSKÜVİ SANAYİ A.Ş.
188	VAKKO	VAKKO TEKSTİL VE HAZIR GİYİM SANAYİ İŞLETMELERİ A.Ş.
189	VESTL	VESTEL ELEKTRONİK SANAYİ VE TİCARET A.Ş.
190	VESBE	VESTEL BEYAZ EŞYA SANAYİ VE TİCARET A.Ş.
191	VKING	VİKİNG KÂĞIT VE SELÜLOZ A.Ş.
192	YATAS	YATAŞ YATAK VE YORGAN SANAYİ VE TİCARET A.Ş.
193	YBTAS	YİBİTAŞ YOZGAT İŞÇİ BİRLİĞİ İNŞAAT MALZEMELERİ TİCARET VE SANAYİ A.Ş.
194	YONGA	YONGA MOBİLYA SANAYİ VE TİCARET A.Ş.
195	YUNSA	YÜNSA YÜNLÜ SANAYİ VE TİCARET A.Ş.
196	ZOREN	ZORLU ENERJİ ELEKTRİK ÜRETİM A.Ş.

Ülke Risk Primi, Krediler ve Makro İktisadi Değişkenler Arasındaki İlişkinin İncelenmesi: Türkiye Örneği

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The Relationship Between Country Risk Premium, Loans and Macroeconomic Variables: Case of Türkiye

Abstract

This study examines the short-term dynamic relationship between country risk premium, loans and macroeconomic variables in the Turkish economy for January 2011 - November 2021 within the framework of the VARX model. The study is one of the few studies in the literature that examines the relationship between the bank loan channel and the CDS premium for Türkiye. Moreover, it is concluded that analysing the real loan volume in terms of Turkish currency and foreign currency affects the empirical results. In addition to the CBRT policy rate, 1-month and 12-month deposit rate variables, which reflect the cost of funds of banks, are used as interest rate variables and the effect of the change in maturity risk is also included in the model. Main findings of the study: (i) Country risk premium reacts positively and significantly for the first month against inflation, exchange rate (depreciation in TL) and interest rate shock. (ii) The shock in the country's risk premium positively and significantly affects inflation, exchange rate, and interest rates during the first two months. (iii) The shock in the country risk premium has a negative effect on Turkish lira real loans for the whole response period, and the response is significant and negative in the second and third months.

Keywords : CDS, Country Risk Premium, Loans, Banking.

JEL Classification Codes : E51, E62, H63, H74.

Öz

Bu çalışma, Türkiye ekonomisinde ülke risk primi, krediler ve makroekonomik değişkenler arasındaki kısa dönemli dinamik ilişkiyi Ocak 2011-Kasım 2021 dönemi için VARX modeli çerçevesinde incelemektedir. Çalışma literatürde banka kredi kanalı ile CDS primi arasındaki ilişkiyi Türkiye özelinde inceleyen az sayıdaki çalışmadan biridir. Ayrıca, reel kredi hacminin Türk Parası ve Yabancı Para ayrımında incelenmesinin ampirik sonuçları etkilediği sonucuna varılmıştır. Faiz değişkeni olarak, TCMB politika faizinin yanı sıra bankalar kaynak maliyetini de yansıtan 1 ve 12 aylık mevduat faizi değişkenleri kullanılarak vade riskindeki değişmenin etkisi de modele dahil edilmiştir. Çalışmadan elde edilen temel bulgular şöyledir: (i) Enflasyon, kur (TL'deki değer kaybı) ve faizdeki şoka karşı, ülke risk primi ilk ay için pozitif ve anlamlı tepki vermektedir. (ii) Ülke risk primindeki şok, enflasyon, kur ve faiz üzerinde iki ay boyunca pozitif ve anlamlı bir etkiye sahiptir. (iii) Ülke risk primindeki şok, bankacılık sektörü Türk lirası reel kredilerde ikinci ve üçüncü ayda anlamlı ve tüm dönem için negatif etkiye sahiptir.

Anahtar Sözcükler : CDS, Ülke Risk Primi, Krediler, Bankacılık.

1. Giriş

En yaygın kredi türevlerinden olan kredi temerrüt takasları (Credit Default Swap - CDS), alıcı ve satıcı arasında, satıcının referans kuruluşun çıkardığı tahvilin kredi riskine karşı koruma sattığı ikili sözleşmelerdir. CDS'lerde alıcı, satıcıya üstlendiği karşı taraf kredi riski için periyodik bir prim öder. Kamu dengesi bozulduğunda, risk artar, bu durumda sigorta maliyeti yükseleceği için, devlet borçlanma kâğıdına ait CDS primi ile fiyatlandırılan tahvil risk primi artar. Bu açıdan, CDS primi ülke risk primi için önemli bir ölçüm görevi de görmektedir. Türev ve tahvil piyasası arasındaki bu arbitraj ilişkisi, ülke risk primindeki artış ile temel makroekonomik değişkenler arasındaki karşılıklı ilişkilerin analizini oldukça önemli bir araştırma konusu haline getirmektedir.

Diğer taraftan literatürde bankacılık kanalı veya kredi kanalı olarak bilinen ve temelinde banka kredileri ile ekonomik büyümeyi inceleyen çalışmalar özellikle 2008 Küresel Finans Krizi sonrasında artmıştır. Geleneksel parasal aktarım kanalının sıfıra yakın faiz oranlarında dahi istenen ölçüde işlememesi, politika yapıcıları bir taraftan maliye politikasının araçlarını daha etkin kullanmaya itmiş, diğer taraftan geleneksel olmayan para politikası ve makro ihtiyati tedbirlerle ekonomiler desteklenmiştir. Bu ortam içerisinde, geleneksel olmayan parasal aktarım kanalları da hem akademisyenlerin hem de uygulamacıların ilgisini çekmiştir. Bankacılık kanalı[1], Türkiye'de özellikle 2018 sonrasında uygulanan kredi paketleri ve başta BDDK olmak üzere düzenleyici kuruluşların kredi hacmini etkileyen düzenlemeleri ile daha da önem kazanmıştır. Bununla birlikte literatürde Türkiye ekonomisi için ülke risk primi ile kredi hacmi arasındaki ilişkiyi inceleyen oldukça az sayıda çalışma olduğu görülmektedir (Bkz. Erdaş, 2022).

Literatürdeki birçok çalışma CDS primlerinin ülke veya ülke grupları için belirleyicilerine odaklanmıştır (Bkz. Collin-Dufresne et al., 2001; Norden & Weber, 2004; Benkert, 2004; Alexander & Kaeck, 2008; Ericsson et al., 2009; Galil & Soffer, 2011; Baldacci et al., 2011; Fender et al., 2012; Oliveira & Santos, 2014; Da Silva et al., 2015; Kajurova, 2015; Kocsis & Monostori, 2016; De Boyrie & Pavlova, 2016; Ho, 2016; Fontana & Scheicher, 2016; Kim et al., 2017).

Türkiye özelinde ise CDS primini konu alan birçok çalışma bulunmaktadır. Bu çalışmaların çoğu CDS primlerinin belirleyicilerini veya CDS primleri ile makroekonomik değişkenler arasındaki ilişkiyi (Bkz. Kargı, 2014; Polat, 2017; Kılcı, 2019; Fettahoğlu, 2019; Sarıgül & Şengelen, 2020; Bolaman-Avcı, 2020; Gürel, 2021; Çetin, 2022; Erdaş, 2022) incelemişlerdir.

Bu çalışma, Türkiye ekonomisi için ülke risk primi, kredi hacmi ve temel makroekonomik büyüklükler arasındaki ilişkiyi Dışsal Değişkenli Vektör Otoregresyon (VARX) Modeli ile Ocak 2011 - Kasım 2021 dönemi için incelemektedir. Makroekonomik değişkenlerden kur, enflasyon, brent petrol ve faiz değişkenleri kullanılmıştır. Kur

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[1] *Daha fazla bilgi için bkz. Boivin et al., 2010.*

değişkeni, ABD doları ve eşit ağırlıklı sepet kur ayrımı ile faiz değişkeni ise TCMB politika faizinin yanı sıra bankalar kaynak maliyetini de yansıtan 1 ve 12 aylık mevduat faizi değişkenleri kullanılarak ölçülmüştür. Ayrıca toplam kredi hacmi reelleştirilmiştir. Çalışmayı diğer çalışmalardan ayıran en önemli husus banka kredi kanalına odaklanmasıdır. Bölüm "4.4. Kredilerin Para Birimine Göre Ayrıştırılması" başlığında incelendiği üzere, literatürdeki çalışmalarda Türkiye ekonomisi için genelde bulunan ülke risk priminin artmasının kredileri olumlu etkilemesi veya kredilerdeki artışın ülke risk primini artırması bulguları ekonomik teoriyle uyumlu görünmemektedir. Bu nedenle, kur değerinin YP krediler üzerindeki etkisini ayrıştırabilmek amacıyla reel krediler TP ve YP krediler olarak ikiye ayrılarak etki-tepki ve varyans ayrıştırma sonuçları yeniden analiz edilmiş ve sonuçların ana teorik açıklamayla uyumlu yönde değiştiği sonucuna ulaşılmıştır.

Çalışmanın birinci bölümünde literatür tanıtılmakta, ikinci bölümde veri seti sunulmaktadır. Üçüncü bölümde VARX modeli çerçevesinde etki-tepki ve varyans ayrıştırma sonuçları yer almaktadır. Son bölüm, çalışmadan elde edilen sonuçların değerlendirildiği bölümdür.

2. Literatür

Kargı (2014) Türkiye ekonomisi için CDS primi, GSYH ve faiz oranları arasındaki ilişkiyi çeyreklik bazda 2005:01-2013:03 dönemi için Engle-Granger ve Johansen-Juselius koentegrasyon testleri ile incelemiştir. Yazar, değişkenler arasında uzun dönemli ilişkinin varlığını bulmuştur. Kısa dönemde ise Granger nedensellik analizi, CDS değişkeni ile faiz değişkeni arasında çift yönlü ilişki olduğunu ve üretimden CDS'e nedensellik ilişkisi bulunduğunu göstermiştir.

Polat (2017) Türkiye ekonomisi için CDS primi ile içsel ve dışsal birçok makroekonomik değişken arasındaki ilişkiyi 2006:01-2015:12 dönemi için doğrusal regresyon ve doğrusal olmayan Markov regime-switching modelini kullanarak analiz etmiştir. Yazar CDS priminin bağımlı değişken olduğu temel model olan doğrusal regresyonun tüm farklı spesifikasyonları için (10 farklı model) ABD doları ile ölçülen kur değişkeni için pozitif ve anlamlı katsayılar bulmuştur. Faiz değişkeni 1 yıllık Hazine gösterge faizidir ve dahil olduğu sekiz model için de pozitif ve anlamlı ilişki bulunmuştur. Faiz ve kur ile ilgili bu bulgu, bu çalışmanın sonuçları ile de uyumludur. Ayrıca, VIX endeksi dahil olduğu dokuz modelin sekizinde pozitif ve anlamlı katsayıya sahiptir. Bu durum, bu çalışmadaki Türkiye örneği için VIX endeksinin dışsal değişken olarak VAR modeline dahil edilmesi ile ilgili ampirik bir destek de sağlamaktadır. Ayrıca, üretim vekil değişkeni olarak kullanılan borsa endeksi ile CDS arasında beklentiyle uyumlu olarak on modelin dokuzunda negatif ve anlamlı bir ilişki bulunmuştur. Markov regime-switching analizi, kur değişkeninin ülke risk primi üzerindeki etkisinin beklendiği gibi daha oynak dönemlerde daha fazla olduğu sonucuna ulaşmıştır.

Kılcı (2019), ülke CDS primlerini etkileyen ve ülkenin ödeme gücünün önemli bir göstergesi olan dış borç/GSYİH oranındaki artışın, finansal kırılganlığın da artışına işaret

etmesi ve söz konusu oranın Türkiye'de son yıllarda artışının dikkat çekici olması nedeniyle, dış borç/GSYİH oranı ve ülke CDS primleri arasındaki ilişkiyi 2000-2018 dönemi için çeyreklik veri ile araştırmıştır. Analizde Fourier SHIN Eşbütünleşme Testi ve Fourier Granger Nedensellik Testi uygulanmış ve sonuçta değişkenlerin arasında pozitif ilişki olduğunu tespit etmiştir.

Fettahoğlu (2019) çalışmasında, CDS primleri ile risk iştahı endeksi arasında bir ilişki olup olmadığını belirlemek istemiştir. Yabancı ve yerli yatırımcı risk iştahını, risk iştahına ilişkin bağımsız değişkenler olarak kullanmış ve CDS primini açıklamada anlamlı sonuç elde etmiştir. Ayrıca CDS primi ile her üç yatırımcı (kurumsal, yabancı ve yerli yatırımcılar) sınıfına göre risk iştahı endeksi arasında negatif yönlü ve anlamlı bir korelasyonun olduğunu, dolayısıyla yatırımcıların risk iştahı arttıkça CDS primlerinin düştüğünü ortaya koymuştur.

Bolaman Avcı (2020), CDS primleri ile hisse senedi piyasası arasındaki ilişkiyi Türkiye verileri üzerinden incelemiş, çalışmanın sonucunda değişkenler arasında uzun dönemli bir ilişki olduğu sonucuna ulaşmıştır. Bununla birlikte çalışmada değişkenler arasında herhangi bir nedensellik ilişkisi tespit edilememiştir. Elde edilen uzun dönemli ilişki hem yabancı hem de yerli yatırımcıların CDS primlerini ülke kredi riskinin bir barometresi olarak algılamaları ve ülke kredi riskini de içeren faktörleri dikkate alarak yatırım kararı vermeleri ile ilişkilendirilmiştir.

Sarıgül Şengelen (2020) çalışmalarında, Türkiye CDS primi ile BIST bankacılık endeksi ve bankaların hisse senedi fiyatları arasındaki kısa ve uzun dönemli ilişkiyi araştırmış ve ülke riski algısının belirtilen piyasa üzerindeki etkilerini analiz etmişlerdir. Uzun dönemli ilişkinin varlığını belirleyebilmek için VAR analizine dayalı Johansen Eşbütünleşme testi uygulanmış ve CDS'in uzun dönemde BIST bankacılık endeksi ile değerleri test edilen beş bankaya etkileri olduğu tespit edilmiştir. Granger Nedensellik Analizi bulgularına göre de CDS primi ile bir banka arasında iki yönlü nedensellik ilişkisi belirlenmiş olup tek yönlü nedenselliği bulunan değişken sayısı beştir. Bir bankanın ise CDS primlerinin Granger nedeni olduğu görülmüştür.

Gürel (2021) Türkiye'nin ülke risk primi ile makroekonomik değişkenler ve küresel risk faktörü arasındaki ilişkiyi 2011:01-2020:09 dönemi için yapısal VAR (SVAR) yöntemi ile incelemiştir. Değişkenler; Türkiye CDS primi, sanayi üretim endeksi, tüketici fiyatları endeksi, nominal döviz kuru, politika faiz oranı ve VIX oynaklık endeksidir. Etki-tepki fonksiyonu, sanayi üretimi, enflasyon ve borsadaki bir birimlik yapısal şok karşısında CDS priminin ilk ay için anlamlı bir biçimde negatif tepki verdiğini, ABD doları ile ölçülen kur değişkeni karşısında ise ilk ay için anlamlı pozitif tepki verdiğini göstermektedir. Faiz değişkeni karşısında, CDS değişkeninin tepkisi ise anlamsızdır. Yazarın da belirttiği gibi enflasyon karşısında ülke risk priminin azalması ekonomik teori ile örtüşmemektedir. Yazar kur değişkeninin, ülke risk primi üzerinde en önemli etkiye sahip olan makroekonomik değişken olduğunu belirtmiştir. Kurdaki şokun ülke risk primini artırması ve kur değişkeninin en etkili değişkenlerden olması bulgusu bu çalışmanın sonuçları ile uyumludur.

Çetin (2022), 2010:04-2021:01 dönemi için CDS primi ile BIST100 endeksi, döviz kuru ve faiz oranı arasındaki ilişkiyi Granger nedensellik testi ile incelediği çalışmasında, CDS primleri ile BIST100 endeksi arasında iki yönlü ve CDS primlerinden döviz kuruna doğru tek yönlü nedensellik ilişkisi tespit etmiştir. Çalışmada CDS primleri ile BIST100 endeksinin birbirlerinin nedeni, CDS priminin ise döviz kurunun nedeni olduğu ortaya koyulmuştur. Varyans ayrıştırmasına göre, kısa ve uzun dönemde CDS primlerindeki değişimin yaklaşık %91'inin kendisi, %6'sının ise BIST100 endeksi tarafından açıklandığı, BIST100 endeksindeki değişimlerin ilk dönem yaklaşık %65'inin kendi şoklarından kaynaklandığı, %34'ünün ise CDS kaynaklı olduğu, uzun dönemde CDS'in etkisinin yaklaşık %39, faizin etkisinin ise %4 oranında kaldığı belirlenmiştir. Kurdaki değişimlerin ilk dönem yaklaşık %68'lik kısmının kendi şokları tarafından, %30'unun CDS, %0.60'ının ise BIST100 endeksi tarafından açıklandığı, son dönemde kurdaki değişimlerin yaklaşık %42'sinin CDS primleri tarafından, %53'ünün ise kendi şokları tarafından belirlendiği tespit edilmiştir.

Erdaş (2022) ilgili literatürde ülke risk primi, banka kredi hacmi ve makroekonomik değişkenleri inceleyen nadir çalışmalardan biridir. Yazar, Mart 2012-Mart 2020 dönemi için Türkiye'nin 5 yıllık CDS primi, borsa endeksi, ABD doları cinsinden kur, banka kredi hacmi ve banka likit yükümlülüklerini kullandığı çalışmasında değişkenler arasında uzun dönemli bir ilişki bulmuş, uzun dönemli katsayıları fully modified least square (FMOLS) yöntemiyle elde etmiştir. Çalışmada beklendiği gibi BIST 100 katsayısı negatif ve anlamlı bulunmuş, kur değişkeninin katsayısı yine beklentilerle paralel olarak pozitif bulunarak istatistiksel olarak anlamlı olmadığı sonucuna ulaşılmıştır. Krediler, beklentilerin tersine pozitif ve anlamlı olup nominal yurtiçi kredi hacmini göstermektedir. Bu sonuç modelde enflasyon değişkeninin bulunmaması ve kredilerin Türk Parası (TP) ve Yabancı Para (YP) diye ayrılmamasından[2] kaynaklanabilir. Ayrıca, pasif tarafta yer alan banka likit yükümlülükleri ile aktif tarafta yer alan banka kredileri birbirine oldukça yakın iki büyüklüktür. Bu iki değişkenin birlikte modelde yer alması da katsayı işaret ve anlamlılıklarını etkileyecektir.

Görüldüğü üzere, literatürde CDS primleri ile çeşitli makroekonomik değişkenleri Türkiye özelinde inceleyen çok sayıda çalışma olmakla birlikte, bu değişkenler içerisinde kredi değişkenini dikkate alan az sayıda çalışma bulunmaktadır. Bu çalışma gerek kredi değişkenini modele katması gerek kredi değişkenini TP ve YP ayrımı ile incelemesi, gerekse de kısa ve orta dönem faiz oranı ayrımına göre (1 Ay ve 12 Ay Vadeli Mevduat Faizli) modelleri test etmesi açısından literatürdeki diğer çalışmalardan ayrılmaktadır.

3. Veri

Çalışmada, ülke risk priminin göstergesi olan CDS primi Bloomberg veri terminalinden, Brent petrol ile VIX endeksi Federal Reserve Economic Data (FRED) veri

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[2] *Kredilerin, TP ve YP olarak ayrılmasının krediler ile CDS primi arasındaki ilişkiyi doğru yansıtması açısından oldukça önemli olduğu bulgusu bu çalışmanın 4.4. Kredilerin Para Birimine Göre Ayrıştırılması bölümünde ortaya koyulmuştur.*

tabanından, diğer değişkenler ise TCMB Elektronik Veri Dağıtım Sistemi'nden (EVDS) elde edilmiştir. Ocak 2011 - Kasım 2021 dönemini kapsayan çalışma, 131 aylık gözlemden oluşmaktadır.

Çalışmada kullanılan tüm değişkenler[3] durağanlık şartının sağlanması amacıyla logaritmik aylık büyüme oranı olarak kullanılmıştır. Ayrıca, enflasyon değişkeni mevsimsellikten arındırılmıştır. Ülke risk primini yansıtan CDS primi, Türkiye'nin 5 yıl vadeli ABD doları cinsinden CDS primlerinin kapanış verisini göstermektedir. CDS primindeki artış, Türkiye'nin ABD doları cinsinden borçlanma kağıtlarındaki korunma priminin arttığını ve dolayısıyla ülke risk priminin yükseldiğini ifade etmektedir. Türkiye ekonomisinde özellikle son dönemde bir politika bileşeni olarak kullanılan bankacılık sektörü toplam kredi hacmi, TÜFE endeksi ile reel hale getirilerek kullanılmıştır. Kur değişkeni olarak, ABD dolar kuru ve euro ile eşit ağırlıklı oluşturulan sepet kur kullanılmıştır. Kurdaki bir artış, Türk lirasının değer kaybetmesi anlamına gelmektedir.

Faiz değişkeni olarak, üç farklı faiz tanımı kullanılmıştır. Politika faizinin göstergesi olarak TCMB Ağırlıklı Ortalama Fonlama Maliyeti, bankaların kısa ve uzun dönem kaynak maliyetinin bir göstergesi olarak da 1 ay ve 1 yıl vadeli Bankalarca Açılan Mevduatlara Uygulanan Ağırlıklı Ortalama Faiz Oranları kullanılmıştır. Tüm faiz değişkenleri durağanlık koşulunu sağlamak için birincil farkları alınarak spread olarak kullanılmıştır.

Brent petrol, varil başına ABD doları cinsinden ham petrol kapanış fiyatlarını göstermektedir. Brent petrol fiyatlarındaki artış, Türkiye ekonomisi için bir yandan enerji ithalatını artırarak, cari açığı artırırken; diğer taraftan küresel talep artışını da işaret etmektedir.

Tablo: 1
Betimleyici İstatistikler

	Ortalama	Max.	Min.	Std. Sap.	Sivrilik	Basıklık	J-B	ADF
Kredi	0,783	7,979	-1,003	2,277	-0,607	7,419	1,138***	-9,428***
Enflasyon	0,927	6,295	-1,528	0,828	2,153	1,594	1,007***	-4,715***
Brent	-0,257	6,343	-1,240	1,544	-3,408	3,503	5,810***	-9,338***
CDS	0,849	6,062	-4,497	1,520	0,600	5,101	3,172***	-11,36***
USD	1,469	1,880	-8,656	3,747	0,947	6,567	8,836***	-8,301***
SEPET	1,409	1,816	-9,279	3,615	0,870	6,903	9,890***	-8,554***
AOFM	1,130	2,550	4,520	5,369	1,126	3,261	2,783***	-3,583***
Faiz_1ay	1,076	2,285	5,264	4,319	1,264	3,617	3,669***	-5,047***
Faiz_12ay	1,127	2,370	6,495	3,793	1,427	4,472	5,587***	-8,585***
VIX	0,051	1,079	-3,730	1,987	1,717	9,769	3,121***	-11,87***

Not: *** %1 güven aralığını göstermektedir. AOFM, Faiz_1_ay ve Faiz_12_ay değişkenleri ADF test değeri, birincil fark (spread) için hesaplanmıştır.

VAR modelinin dışsal değişkenini VIX endeksi oluşturmaktadır. VIX endeksi, Chicago Opsiyon Borsası (Chicago Board of Options Exchange) tarafından S&P 500 endeksinde vadesine 22 işlem günü (30 takvim günü) kalmış olan alım ve satım opsiyonlarından hesaplanmış zımni volatiliteyi göstermektedir. Borsadaki düşüş beklentisi, yatırımcıların portföylerini sigortalatmak amacıyla opsiyon kullanmalarına ve opsiyon

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[3] *Faiz değişkenleri hariç.*

primlerinin artmasına neden olmaktadır. Bu nedenle VIX endeksi yatırımcı korku endeksi olarak da isimlendirilmektedir ve kısa dönemli küresel risk beklentilerini ölçmektedir.

Tablo 1, çalışmada kullanılan değişkenlerin istatistiki özelliklerini ve ADF durağanlık test sonuçlarını göstermektedir. Daha önce belirtildiği gibi çalışmada kullanılan tüm değişkenler, -faiz değişkenleri hariç- durağanlık şartını sağlamaları amacıyla doğal logaritmik birincil farkları elde edilerek getiri oranı olarak kullanılmıştır. Faize bağlı değişkenlerin istatistiksel özellikleri ve grafiği seviye değerini, ADF test değeri ise spread değeri için hesaplanan test istatistiğini göstermektedir. Tablo 1'in son satırında görüleceği üzere, tüm değişkenler için değişkenlerin birim köke sahip olduğu sıfır hipotezi %1 anlamlılık derecesinde reddedilmektedir[4]. Ayrıca Şekil 1'de çalışmada kullanılan getiri serilerinin zaman yolu grafiği gösterilmektedir.

Şekil: 1
Değişkenlerin Zaman Yolu Grafikleri
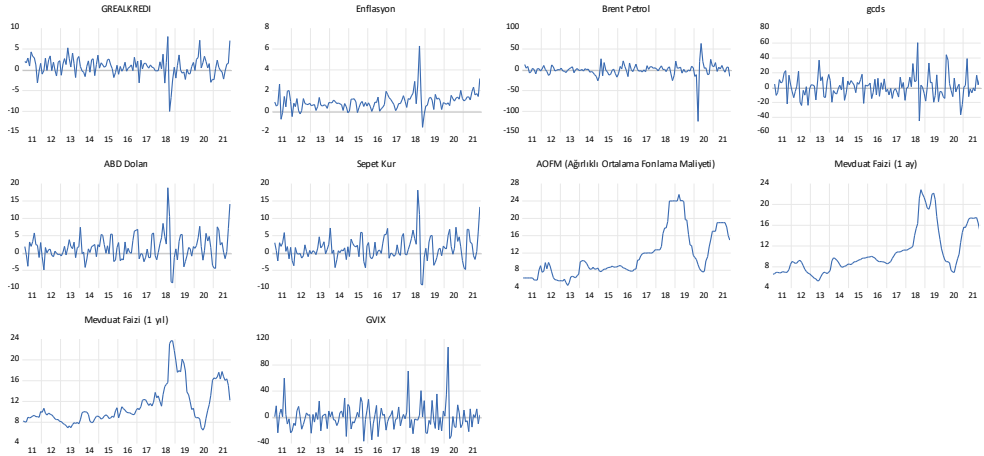
4. Model ve Ampirik Bulgular

4.1. Model

Ülke risk priminin makroekonomik etkilerinin anlaşılması amacıyla Peersman ve Smets (2001), Majon ve Peersman (2001) ile Cecioni ve Neri (2011)'nin kullandıkları VAR modelleri, ülke risk primi değişkeni ile farklı kur ve faiz değişkenlerinin kullanımı yoluyla genişletilmiştir. Çalışmada tahmin edilen VAR modeli aşağıdaki gibi gösterilebilir:

$$Y_t = A(L)Y_{t-1} + \varepsilon_t \tag{1}$$

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[4] Sabitli model, SIC bilgi kriterine göre, maksimum gecikme 28 olarak alınmıştır.

Burada Y_t içsel değişkenler vektörünü ve ε_t beyaz gürültülü hata terimi vektörünü simgelemektedir. Hata terimlerinin bağımsız olduğu ve sıfır ortalama $\sum$ kovaryans matrisi ile normal dağıldığı varsayılmaktadır. İçsel değişkenler vektörü kredi büyümesi(g_t), enflasyon (π_t), enerji (e_t), CDS (d_t), kur (x_t) ve faiz(i_t) olarak belirlenmiştir:

$$Y_t^{'} = [\ g_t\ \pi_t\ e_t\ d_t\ x_t\ i_t] \tag{2}$$

VAR modelinin uygun gecikme uzunluğu tüm modeller için Final Prediction Error (FPE) kriterine göre 4 olarak seçilmiştir. LM otokorelasyon testi hata terimlerinde anlamlı serisel korelasyon bulunduğu hipotezini reddetmektedir. Ayrıca VAR modellerinin AR karakteristik polinomun ters kökleri birim çember içerisinde yer almaktadır. Bu sonuç, kurulan VAR modellerinin durağan ve istikrarlı bir yapıya sahip olduğunu ve etki-tepki ile varyans ayrıştırma sonuçlarının güvenilir olduğunu göstermektedir.

4.2. Klasik VAR Modeli Çözümü

Etki tepki fonksiyonları, VAR sisteminde içsel bir değişken üzerindeki şokun diğer içsel değişkenler üzerindeki etkisini takip etmektedir. Çalışma, ülke risk primi ile diğer makroekonomik değişkenler arasındaki ilişkiye odaklandığından, ilk olarak ülke risk primine verilen bir standart sapmalık[5] şokun, diğer değişkenler üzerindeki etkisi, daha sonra diğer değişkenlere verilen bir standart sapmalık şokun iç büyüme üzerindeki etkisi incelenecektir.

Klasik VAR modeli[6] sonuçlarına dayalı etki-tepki fonksiyonu (Bkz. Şekil 2), makroekonomik değişkenlerdeki meydana gelecek bir standart sapmalık pozitif şoka karşın Türkiye risk priminin tepkisini göstermektedir. Önemli bir nokta, ülke risk priminin enerji fiyatları dışındaki tüm makroekonomik değişkenler için anlamlı pozitif tepkiye sahip olduğudur. Diğer bir deyişle, bankacılık kesimi reel kredilerinde, enflasyonda, kurda ve faizdeki pozitif bir şok, ülke risk primini ilk ay için artırmaktadır. Brent petrol aylık fiyat artışı ile temsil edilen enerji fiyatlarındaki bir artışa ise, ülke risk priminin duyarsız olduğu görülmektedir.

Şekil 3, ülke risk primindeki bir standart sapmalık şoka karşı diğer makroekonomik değişkenlerin tepkisini göstermektedir. Ülke risk primindeki pozitif bir şok, beklendiği gibi enerji fiyatlarını etkilemezken diğer tüm makroekonomik değişkenlerin pozitif yanıt verdiği görülmektedir. Ülke risk primine karşı krediler ilk ay, enflasyon, kur ve faiz değişkenleri ise iki ay boyunca pozitif ve anlamlı bir tepkiye sahiptirler. Ülke risk primindeki pozitif bir şok karşısında bankacılık kesimindeki reel krediler artış yönünde tepki vermektedir. Benzer biçimde ülke risk primindeki pozitif bir şok karşısında, Türk lirası değer kaybetmekte, enflasyon artmakta ve faiz yükselmektedir.

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[5]   *Response to Generalized One S.D. Innovations ± 2 S.E.*

[6]   *Kur değişkeni olarak ABD doları, faiz değişkeni olarak TCMB AOFM kullanılan model.*

Şekil: 2
Makroekonomik Değişkenlerdeki Şoka Ülke Risk Priminin Tepkisi
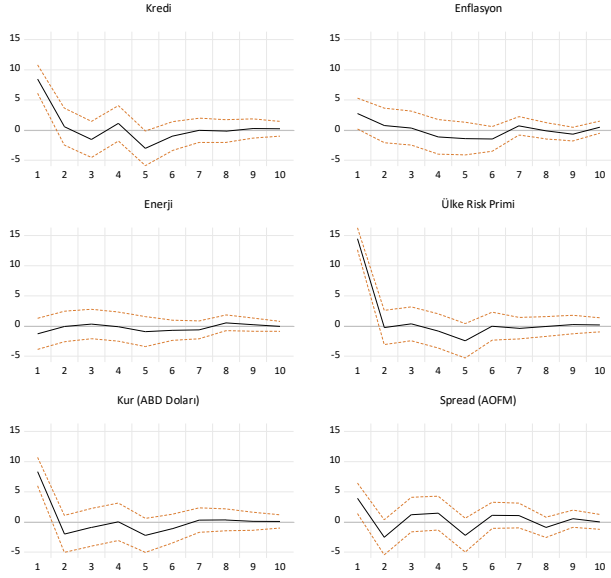
Şekil: 3
Ülke Risk Primindeki Şoka Makroekonomik Değişkenlerin Tepkisi
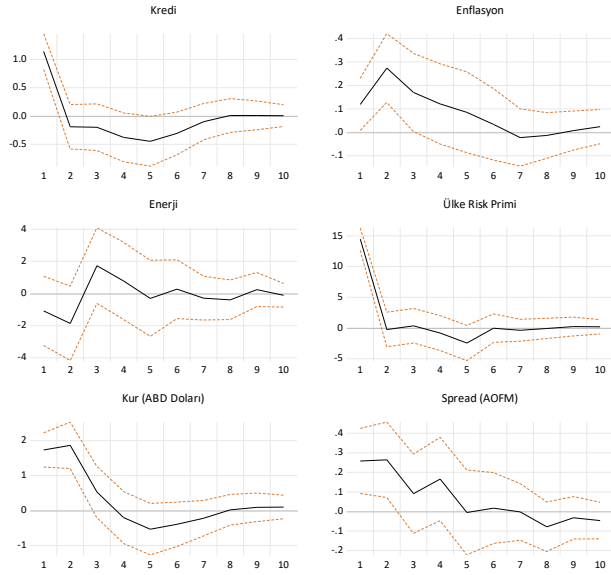
Şekil 3 ve Şekil 4'teki etki-tepki fonksiyonlarından elde edilen ampirik bulgular; ülke risk primi, enflasyon, kur ve faiz arasındaki güçlü etkileşimi ortaya koymaktadır. Bununla birlikte ülke risk priminin arttığı bir ortamda reel kredilerin de artması veya reel kredilerdeki bir artışa karşılık ülke risk priminin de artma yönünde tepki vermesi, üzerinde durulması gereken bir noktadır. Bu nedenle, kur ve faiz ile ilgili diğer proxy değişkenler kullanılmadan önce, ilk olarak varyans ayrıştırma sonuçları değerlendirilmiştir.

Varyans ayrıştırma analizi, kurulan VAR modelindeki her bir değişkenin öngörü hata varyansının diğer değişkenlerin şokları ve kendi şokları tarafından açıklanma yüzdesini zaman içerisinde gösterir. Tablo 2'de görüleceği üzere ülke risk primi değişkenine ait öngörü hata varyansı ilk dönem için %61,59 oranında kendisi ve %34,15 oranında kredi değişkeni tarafından açıklanmaktadır. Yine aynı dönem için enflasyonun açıklayıcılık oranı %3,89 iken, kur ve faiz ikinci aydan itibaren etkili olduğu gözlemlenmektedir. 10 ayın sonunda ülke risk primi öngörü hata varyansını kendi dışında açıklayan ilk dört değişken; %31,29 ile ülke risk primi, %6,12 ile kur, %5,68 ile enflasyon ve %5,82 ile faiz değişkenleridir. Ekte sunulan varyans ayrıştırma sonuçları incelendiğinde, krediler değişkeninin CDS değişkeni üzerindeki önemli etkisine karşın, CDS değişkeninin benzer bir açıklayıcılık gücüne sahip olmadığı görülmektedir. Krediler, kendinden sonra en çok kur ve enflasyon değişkenlerinden etkilenmektedir.

Tablo: 2
Ülke Risk Primi (CDS) Değişkeninin Varyans Ayrıştırması

Periyot	Kredi	Enflasyon	Brent	CDS	USD	D(AOFM)
1	34.15708	3.893392	0.354998	61.59453	0.000000	0.000000
2	31.14973	3.790832	0.332148	56.29741	6.620077	1.809806
3	31.24695	3.721274	0.327054	55.64626	6.579946	2.478518
4	30.70871	4.102771	0.333998	54.79944	6.378610	3.676468
5	32.40684	4.667926	0.733101	51.72524	6.094062	4.372830
6	32.00525	5.369923	0.843115	50.88308	5.947209	4.951424
7	31.65644	5.498158	1.061837	50.49920	5.894705	5.389662
8	31.42679	5.461634	1.162683	50.12010	6.063716	5.765078
9	31.32665	5.606569	1.209862	49.95268	6.072735	5.831499
10	31.29030	5.683214	1.213477	49.86823	6.123123	5.821662

4.3. Farklı Kur ve Faiz Değişkenleri için Çözüm

4.3.1. Sepet Kur Değişkenli VAR Modeli

ABD dolarının yanı sıra eşit ağırlıklandırılmış euronun da eklenerek oluşturulduğu sepet kur değişkeni ile aynı VAR modeli kurulduğunda, gerek makro değişkenlerdeki şoka ülke risk priminin verdiği tepki, gerekse ülke risk primindeki şoka diğer makro değişkenlerin yanıtları anlamlı biçimde değişmemektedir. Sepet kur değişkeni kullanıldığında da ABD doları ile elde edilen klasik VAR modeli etki-tepki sonuçlarındaki gibi oldukça benzer sonuçlar elde edilmektedir. (Bkz. Ek 2 Sepet Kur Değişkenli VAR Modeli Etki-Tepki Fonksiyonları).

4.3.2. 1 Ay ve 12 Ay Vadeli Mevduat Faizli VAR Modelleri

TCMB'nin ağırlıklı ortalama fonlama maliyeti, politika faizi olarak kısa vadeli risksiz faiz oranını yansıtmaktadır. Politika faizinin piyasa faizleri üzerindeki etkisi, vade yapısı uzadıkça azalmaktadır. Türk bankacılık sisteminde mevduatlar en önemli kaynak fonlama kalemidir ve ortalama vadesi üç ay civarındadır. Ayrıca, mevduatların krediler için önemli bir kaynak olduğu düşünüldüğünde, bankalar tarafından 1 aylık mevduata verilen faizler önemli bir kısa vadeli faiz değişkeni olmaktadır. Diğer taraftan kısa vadeli faizler politika faizine nazaran, beklentiler, piyasa riski, likidite riski, kur ve faiz riski gibi birçok değişkenden etkilenmektedir.

1 ay vadeli mevduat faizini faiz değişkeni olarak VAR modelinde kullandığımızda, enflasyon ve faiz değişkenlerindeki şoklara karşı ülke risk priminin tepkisinin anlamsız olduğu görülmektedir (Bkz. Şekil 4). Kur ve kredi değişkenleri hala ülke risk primi üzerinde güçlü, pozitif bir ilk ay yanıtına sahiptir. Bu durum klasik VAR modelinde gösterilen makroekonomik değişkenlerdeki bir şoka, ülke risk priminin ilk ay anlamlı tepki vermesi sonucu ile uyumludur. Zira politika faizindeki bir değişimin, 1 ay vadeli mevduat faizine geçişi için bir gecikme söz konusudur ve bu süre zarfında, ülke risk primleri politika faizine göre tepki vermiş bulunmaktadır.

Şekil: 4
Makroekonomik Değişkenlerdeki Şoka Ülke Risk Priminin Tepkisi
(1 Ay Vadeli Mevduat Faizli Model)
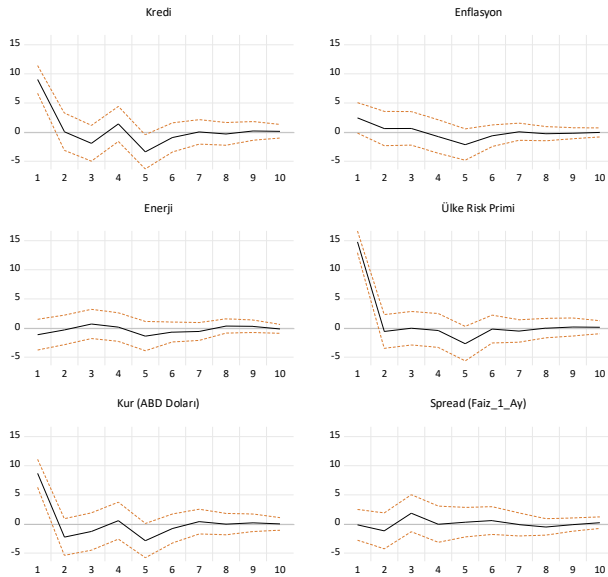
Şekil: 5
Ülke Risk Primindeki Şoka Makroekonomik Değişkenlerin Tepkisi
(1 Ay Vadeli Mevduat Faizli Model)
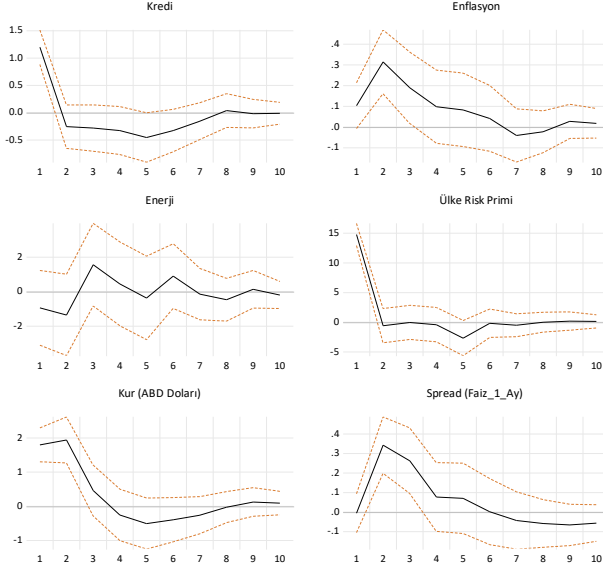
Şekil 5, 1 ay vadeli mevduat faizli VAR modeli için ülke risk primindeki bir standart sapmalık şoka karşı diğer makroekonomik değişkenlerin tepkisini göstermektedir. Klasik VAR modeline göre enflasyon ilk ay anlamsız iken ikinci ay enflasyonun pozitif ve anlamlı tepki verdiği görülmektedir. Benzer biçimde faiz değişkeni de ilk ay için anlamsız iken, ikinci ve üçüncü ayda pozitif ve anlamlı tepki vermektedir. Faiz değişkeninin tepkisinin, ilk iki aydan ikinci ve üçüncü aya kayması, faiz değişkenine ait vade yapısının uzaması (TCMB genellikle 1 aydan daha kısa vadede açık piyasa işlemi yapmaktadır) ve diğer riskleri içermesinin doğal bir sonucudur.

1 ay vadeli mevduat faizi yerine 12 ay vadeli ağırlıklı ortalama mevduat faizi kullanıldığında da etki-tepki fonksiyonları 1 ay vadeli mevduat faizli VAR modeliyle benzer sonuçlar vermektedir. Sonuçlar Ek 3'te sunulmuştur.

4.4. Kredilerin Para Birimine Göre Ayrıştırılması

Bankacılık kesiminin sağladığı reel kredi hacmi ile ekonomik büyüme arasında güçlü bir ilişkinin bulunduğu açıktır. Bankacılık kesimi, özellikle Türkiye gibi bir ülkede finansal kesimin büyük bir kısmını oluşturarak aktarım mekanizması için hayati bir rol oynamaktadır. Bununla birlikte klasik VAR modeli ve kur ile faiz için çeşitli vekil değişkenlerin kullanıldığı modeller, ülke risk primindeki pozitif bir şokun kredileri, benzer biçimde kredilerdeki şokun da ülke risk primini artırdığını göstermektedir. Ülke risk

priminin artmasının kredileri olumlu etkilemesi veya kredilerdeki artışın ülke risk primini artırması beklenen ana açıklama değildir. Bu nedenle, bu bölümde mevduat bankaları tarafından verilen krediler Türk Parası (TP) ve Yabancı Para (YP) olarak ikiye ayrılmıştır[7]. Her iki kredi değişkeni de reelleştirilmiş ve daha öncekiler gibi logaritmik aylık büyüme oranı olarak hesaplanmıştır.

Şekil 6 ve 7, TP olarak verilen krediler için kurulmuş VAR modelinin etki tepki fonksiyonlarını sunmaktadır. TP-YP ayrımı yapılmamış olan (Bkz. Şekil 2 ve 3) klasik VAR modeli etki-tepki sonuçlarına kıyasla değişen temel sonuç, krediler değişkeninin yanıtıdır. Krediler (TP) değişkenindeki bir standart sapmalık şok, beklendiği gibi ülke risk primi üzerinde tüm dönemler için anlamsızdır (Bkz. Şekil 6). Ülke risk primindeki bir standart sapmalık şoka karşı ise, TP kredilerin tüm dönemler için (10 ay boyunca) negatif tepki verdiği ve bu tepkinin sadece ikinci ve üçüncü ay için anlamlı olduğu görülmektedir. Ülke risk primindeki bir artış, mevduat bankalarının verdiği TP cinsinden reel kredilerde, ikinci ve özellikle üçüncü ayda belirginleşen bir azalmaya yol açmaktadır. Bu bulgu, ülke risk primindeki artışın fonlama maliyetini yükseltici ve dolayısıyla kredileri azaltıcı yönde beklenen etkisi ile tutarlıdır.

Şekil: 6
Makroekonomik Değişkenlerdeki Şoka Ülke Risk Priminin Tepkisi (Krediler-TP)

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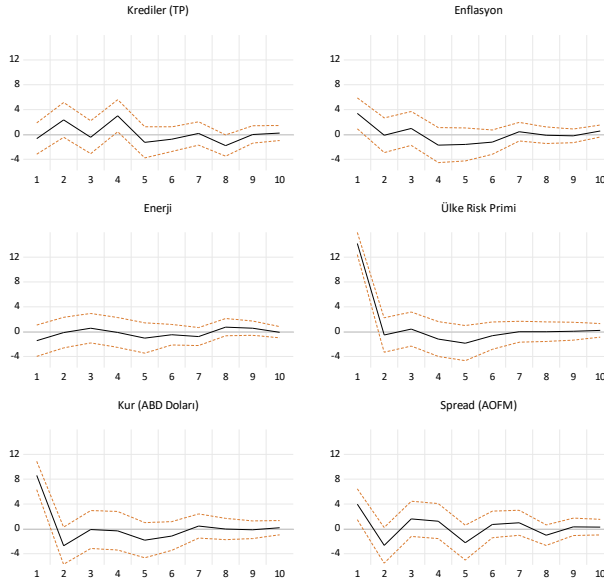
7   BDDK, *Aylık Bankacılık Sektörü Verileri*, <https://www.bddk.org.tr/BultenAylik/tr/Home/Gelismis>.

Şekil: 7
Ülke Risk Primindeki Şoka Makroekonomik Değişkenlerin Tepkisi (Krediler-TP)
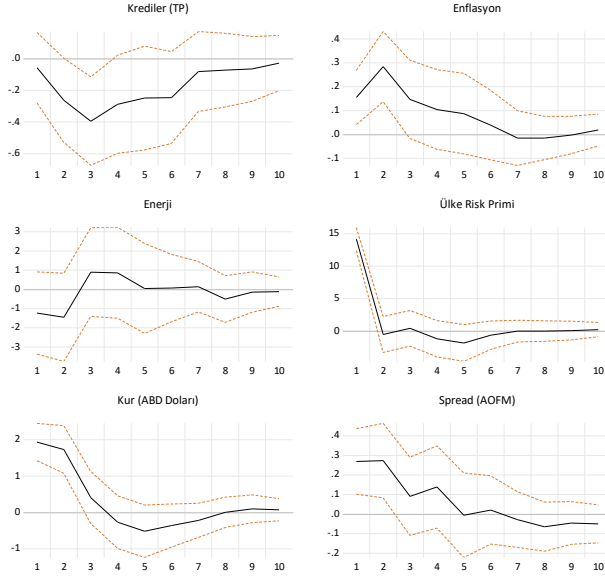
Tablo: 3
Ülke Risk Primi (CDS) Değişkeninin Varyans Ayrıştırması (Kredi-TP)

Periyot	Kredi (TP)	Enflasyon	Brent	CDS	USD	D(AOFM)
1	0.215155	5.799587	1.975505	92.00975	0.000000	0.000000
2	2.644378	5.530162	1.774627	82.70830	5.271495	2.071038
3	2.680677	5.732492	1.807502	81.02289	5.533610	3.222833
4	6.262331	5.538907	1.759104	76.64826	5.801464	3.989933
5	6.578866	7.312390	2.020616	73.79248	5.553760	4.741886
6	6.671628	8.229176	2.040700	72.35129	5.527500	5.179706
7	6.625983	8.273801	2.296197	71.77613	5.548729	5.479161
8	7.680027	8.405044	2.380718	70.32503	5.441362	5.767822
9	7.662355	8.409316	2.509127	70.18149	5.435084	5.802625
10	7.662899	8.568795	2.512125	70.01715	5.433758	5.805268

Kredi (TP) değişkeninin kullanıldığı VAR modelinden elde edilen varyans ayrıştırma analizi de etki-tepki sonuçlarını desteklemektedir. Görüleceği üzere, ülke risk priminin (CDS) kendini açıklama yüzdesi artarken, kredilerin ülke risk primindeki değişimi açıklama yüzdesi azalmıştır. Tablo 2'de yer alan ülke risk primi değişkeni öngörü hata varyansı, ilk dönem için %61,59 oranında kendisi ve %34,15 oranında kredi değişkeni tarafından açıklanırken, Tablo 3'te ilk dönem için açıklayıcılık %92'ye yükselmiştir. İkinci ve üçüncü dönemde ise enflasyon ve kur en önemli iki açıklayıcı değişkendir.

YP Krediler, verilen kredilerin o ayki kur seviyeleri üzerinden Türk lirasına çevrilmesi ile hesaplanmaktadır. Dolayısıyla, kurdaki bir artış, YP kredi hacminde bir artış olmasa bile, yerli para birimi cinsinden kredilerin artmasına neden olmaktadır. Bu durumda,

pozitif kur şoku; YP krediler için de yüksek pozitif korelasyonla çalışmaktadır. Ek 4 Krediler (YP) Değişkenli VAR Modeli Etki-Tepki Fonksiyonları incelendiğinde, Şekil 2 ve 3'te sunulan klasik VAR modeli temel sonuçlarının değişmediği görülecektir. En önemli değişim -beklendiği gibi- kredi ve ülke risk primindeki karşılıklı şok etkileşimlerindeki değer artışıdır. Nitekim Şekil 2'de kredi değişkenindeki şoka ülke risk priminin ilk ay yanıtı 8,5 iken, bu değer Ek 4 Şekil A'da 10,4'tür. Benzer biçimde, Şekil 3'te ülke risk primindeki şoka kredi değişkeninin ilk ay yanıtı 1,14 iken, aynı yanıt YP Kredili modelin sunulduğu Ek 4 Şekil B'de 3,4'tür.

5. Sonuç

Bu çalışmada Türkiye ekonomisi için Ocak 2011 - Kasım 2021 döneminde ülke risk primi ile bankacılık kesimi arasındaki kısa dönemli dinamik ilişki incelenmiştir. Bu amaçla ülke risk primi için 5 yıllık CDS primi, kredi değişkeni için de reel kredi hacmi kullanılmıştır. Kur, enflasyon, enerji fiyatları ve faiz değişkenleri diğer içsel değişkenleri oluştururken VIX endeksi dışsal değişken olarak küresel riski kontrol altında tutmak için kullanılmıştır. VARX modeli kur ve faiz için, farklı temsil değişkenler için ve kredilerin TP/YP ayrımı için genişletilerek test edilmiştir.

Etki-tepki fonksiyonu ve varyans ayrıştırma sonuçları, ülke risk primi ile enerji fiyatları arasında karşılıklı olarak bir etkileşim bulunmadığı sonucuna varmıştır. Ülke risk primi, bankacılık kesimi reel kredilerinde, enflasyonda, kurda ve faizdeki pozitif bir şok karşısında ilk ay için pozitif tepki göstermektedir. Enflasyondaki artış[8], Türk lirasındaki değer kaybı ve faizdeki yükselişin, ülke risk primini artırması ekonomik teori ile tutarlıdır. Ayrıca ülke risk primindeki bir şok karşısında krediler ilk ay, enflasyon, kur ve faiz değişkenleri ise ilk iki ay boyunca pozitif ve anlamlı bir tepkiye sahiptir. Ülke risk primindeki artışın, Türk lirasının değer kaybetmesi, enflasyonun artması ve faizin yükselmesi yönünde etki etmesi beklenen bir sonuçtur.

Diğer taraftan, literatürde de genelde bulunan sonucun aksine, kredilerdeki artışın ülke risk primini artırması beklenmez. Aksine reel kredilerdeki artışın büyümeyi artırması ve ülke risk primini düşürmesi beklenir. Buna karşın ülke risk primindeki bir artışın da benzer şekilde kredileri artırması beklenmez. Aksine böyle bir artışın, fonlama maliyetini artırarak kredileri negatif etkilemesi beklenir. Bu ilişkilerdeki çelişki nedeniyle krediler değişkeni çalışmada daha derin analiz edilmiş, kur değerinin YP krediler üzerindeki etkisini ayrıştırabilmek amacıyla reel krediler TP ve YP krediler olarak ikiye ayrılarak etki-tepki ve varyans ayrıştırma sonuçları yeniden analiz edilmiştir.

Klasik VAR modeli etki-tepki sonuçlarına göre değişen temel sonuç, krediler değişkeninin yanıtı olmuştur. TP krediler değişkenindeki artışa karşı, ülke risk primi üzerinde anlamsız iken, ülke risk primindeki bir artışa karşı, TP reel krediler tüm dönem için (10 ay boyunca) negatif tepki verdiği ve bu tepkinin ikinci ve üçüncü ay için anlamlı olduğu

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[8]   *Bir standart sapmalık şok.*

görülmektedir. Ülke risk primindeki bir artış, mevduat bankalarının verdiği TP cinsinden reel kredilerde, ikinci ve özellikle üçüncü ayda belirginleşen bir azalmaya yol açmaktadır. Bu bulgu, ülke risk primindeki artışın fonlama maliyetini yükseltici ve dolayısıyla kredileri azaltıcı yönde beklenen etkisi ile tutarlıdır.

Ayrıca, klasik VARX modeli için kur değişkeni ABD doları ve euro ile eşit ağırlıklandırılmış sepet kur değişkeni ile de test edilmiş ve temel sonuçların değişmediği görülmüştür. TCMB ağırlıklı ortalama fonlama faizi yerine 1 ay ve 12 ay vadeli mevduat faiz oranı değişkenlerinin kullanıldığı klasik VARX modeli sonuçlarında ise, temel sonuçlar aynı kalmakla birlikte ülke risk primindeki şoka karşı faiz değişkeninin pozitif ve anlamlı tepkisinin ilk iki aydan, ikinci ve üçüncü aya kaydığı görülmektedir. Bu bulgu, faizin vade yapısının uzamasının doğal bir sonucudur.

Çalışma, ülke risk primi ile krediler arasındaki ilişkiyi inceleyen gelecekteki çalışmalara krediler kaleminin TP ve YP ayrımı içerisinde incelenmesini önermekte ve bu ayrımın modelin özellikle kredi kanalı üzerinden CDS primindeki değişime verdiği tepkiyi değiştirdiğini göstermektedir. Bu açıdan, CDS priminin de içerisinde olduğu gelecekteki çalışmaların, krediler kanalının etkisini daha doğru yorumlamak için reel kredileri TP ve YP ayrımı ile incelemesi, kur değişiminin etkisini doğrudan krediler hacmine katmaması önerilir.

Kaynaklar

Alexander, C. & A. Kaeck (2008), "Regime dependent determinants of credit default swap spreads", *Journal of Banking & Finance*, 32, 1008-1021.

Baldacci, E. et al. (2011), "Political and fiscal risk determinants of sovereign spreads in emerging markets", *Review of Development Economics*, 15(2), 251-263.

Benkert, C. (2004), "Explaining credit default swap premia", *The Journal of Futures Markets*, 24, 71-92.

Boivin, J. et al. (2010), "How has the Monetary Transmission Mechanism Evolved over Time?", *NBER Working Papers*, 15879.

Bolaman-Avcı, Ö. (2020), "Interaction Between CDS Premiums and Stock Markets: Case of Turkey", *Niğde Ömer Halisdemir Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 13(1), 1-8.

Cecioni, M. & S. Neri (2011), "The monetary transmission mechanism in the euro area: has it changed and why?", Bank of Italy Temi di Discussione *(Working Paper)*, No. 808.

Collin-Dufresne, P. et al. (2001), "The determinants of credit spread changes", *The Journal of Finance*, 61, 2177-2207.

Çetin, A.C. (2022), "Kredi Temerrüt Takasları Primi ile Bist100 Endeksi, Döviz Kuru ve Faiz Arasındaki İlişki: Türkiye Örneği", *Bingöl Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 6(1), 39-77.

Da Silva, P.P. et al. (2015), "The determinants of CDS open interest Dynamics", *Journal of Financial Stability*, 21, 95-109.

De Boyrie, M.E. & I. Pavlova (2016), "Dynamic interdependence of sovereign credit default swaps in BRICS and MIST countries", *Applied Economics*, 48(7), 563-575.

Erdaş, M.L. (2022), "The Impact of Financial Drivers on Credit Default Swap (CDS) in Turkey: The Cointegration with Structural Breaks and FMOLS Approach", *Istanbul Business Research*, 51(1), 25-46.

Ericsson, J. et al. (2009), "The determinants of credit default swap premia", *Journal of Financial and Quantitative Analysis*, 44, 109-132.

Fender, I. et al. (2012), "Daily pricing of emerging market sovereign CDS before and during the global financial crisis", *Journal of Banking & Finance*, 36(10), 2786-2794.

Fettahoğlu, S. (2019), "Relationship Between Credit Default Swap Premium and Risk Appetite According to Types of Investors: Evidence from Turkish Stock Exchange", *Journal of Accounting & Finance*, (84), 265-278.

Fontana, A. & M. Scheicher (2016), "An analysis of euro area sovereign CDS and their relation with government bonds", *Journal of Banking & Finance*, 62, 126-140.

Galil, K. & G. Soffer (2011), "Good news, bad news and rating announcements: An empirical investigation", *Journal of Banking & Finance*, 35(11), 3101-3119.

Gürel, S.P. (2021), "How the macroeconomic conditions and the global risk factors affect sovereign CDS spreads? New Evidence from Turkey", *Business & Management Studies: An International Journal*, 9(2), 547-560.

Ho, S.H. (2016), "Long and short-runs determinants of the sovereign CDS spread in emerging countries", *Research in International Business and Finance*, 36, 579-590.

Kajurova, V. (2015), "The determinants of CDS spreads: The case of UK companies", *Procedia Economics and Finance*, 23, 1302-1307.

Kargi, B. (2014), "Credit default swap (CDS) spreads: the analysis of time series for the integration with the interest rates and the growth in Turkish economy", *Montenegrin Journal of Economics*, 10(1), 59-66.

Kılcı, E.N. (2019), "Dış borçların ülke CDS primleri üzerindeki etkisinin incelenmesi: Türkiye örneği", *Sayıştay Dergisi*, (112), 75-92.

Kim, G.H. et al. (2017), "The CDS-bond basis arbitrage and the cross section of corporate bond returns", *Journal of Futures Markets*, 37(8), 836-861.

Kocsis, Z. & Z. Monostori (2016), "The role of country-specific fundamentals in sovereign CDS spreads: Eastern European experiences", *Emerging Markets Review*, 27, 140-168.

Mojon, B. & G. Peersman (2001), "A VAR Description of the Effects of Monetary Policy in the Individual Countries of the Euro Area", *European Central Bank Working Paper*, 92.

Norden, L. & M. Weber (2004), "Informational efficiency of credit default swap and stock markets: The impact of credit rating announcements", *Journal of Banking & Finance*, 28(11), 2813-2843.

Oliveira, M.A. & C. Santos (2014), "Sovereign CDS Contagion in the European Union: A Multivariate GARCH-in-Variables Analysis of Volatility Spill-Overs", in: *27th International Business Research Conference*.

Peersman, G. & F. Smets (2001), "The Monetary Transmission Mechanism in the Euro Area: More Evidence from VAR Analysis", *European Central Bank Working Paper*, 91.

Polat, U. (2017), "Regime Switching Determinants of Sovereign CDS Spreads: Evidence from Turkey", *Eurasian Journal of Economics and Finance*, 5(4), 124-141.
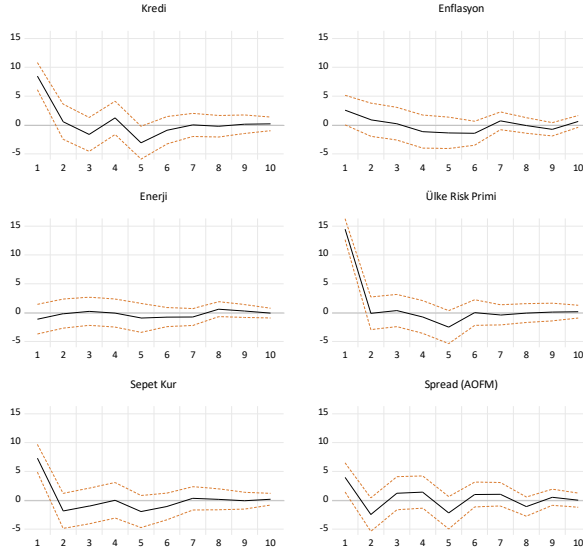
Sarıgül, H. & H.E. Şengelen (2020), "Ülke Kredi Temerrüt Takas Primleri ile Hisse Senedi Fiyatları Arasındaki İlişki: Borsa İstanbul'da Banka Hisse Senetleri Üzerine Ampirik Bir Araştırma", *Muhasebe ve Finansman Dergisi*, (86), 205-222.
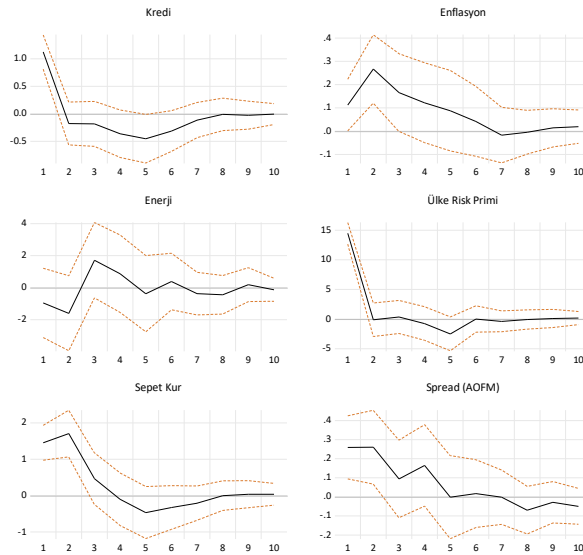
EK: 1
Varyans Ayrıştırma Sonuçları

Kredi Değişkenin Varyans Ayrıştırması						
Periyod	S.E.	Kredi	Enflasyon	Brent	CDS	USD	D(AOFM)
1	1.949706	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	2.111798	85.37003	3.917262	0.894883	0.202337	8.346982	1.268511
3	2.271359	78.70266	5.111784	0.796991	0.908503	13.03732	1.442738
4	2.407133	70.20261	4.557150	1.930211	6.373885	13.10252	3.833622
5	2.492067	67.69926	4.436585	1.943882	7.167927	12.72141	6.030936
6	2.543139	66.44557	6.403159	2.094858	6.983175	12.22132	5.851911
7	2.568611	65.13438	6.356498	3.363577	7.268029	12.13346	5.744055
8	2.575593	64.78884	6.361848	3.357071	7.234569	12.08411	6.173561
9	2.580074	64.57406	6.446191	3.345767	7.251389	12.04265	6.339943
10	2.585650	64.29602	6.479193	3.332160	7.222012	12.16903	6.501589

Enflasyon Değişkenin Varyans Ayrıştırması						
Periyod	S.E.	Kredi	Enflasyon	Brent	CDS	USD	D(AOFM)
1	0.627045	0.016963	99.98304	0.000000	0.000000	0.000000	0.000000
2	0.821483	17.90754	71.63899	2.293540	0.087893	6.112487	1.959553
3	0.917078	22.24704	57.56705	3.011831	0.145690	6.600038	10.42836
4	0.937192	21.33935	55.46165	3.395890	2.120921	6.828606	10.85358
5	0.955116	20.84413	54.47972	3.292534	2.269646	6.589223	12.52476
6	0.961412	20.70473	54.35066	3.400099	2.240189	6.528044	12.77628
7	0.966583	20.94445	53.88789	3.583888	2.325648	6.458437	12.79969
8	0.969546	20.97124	53.58373	3.621653	2.314913	6.424241	13.08422
9	0.971868	20.91738	53.45307	3.607699	2.328420	6.661781	13.03165
10	0.973828	20.83925	53.26168	3.611072	2.413336	6.893505	12.98116

Brent Değişkenin Varyans Ayrıştırması						
Periyod	S.E.	Kredi	Enflasyon	Brent	CDS	USD	D(AOFM)
1	12.07726	1.233953	2.943564	95.82348	0.000000	0.000000	0.000000
2	12.46899	1.349955	2.853583	90.12756	5.121007	0.197691	0.350205
3	13.01404	6.286811	2.784486	83.75130	4.703494	1.667951	0.805953
4	13.32511	6.372029	2.751170	80.94440	5.585865	1.917195	2.429343
5	13.40884	6.297516	3.150727	80.43789	5.722252	1.893387	2.498230
6	13.55875	7.422740	3.081675	78.83914	5.903881	2.302406	2.450155
7	13.60051	7.496167	3.268900	78.42168	5.882335	2.334407	2.596512
8	13.61480	7.555144	3.354548	78.25806	5.876687	2.345270	2.610296
9	13.65068	7.674753	3.411568	77.87978	5.868323	2.344000	2.821578
10	13.65954	7.668332	3.411043	77.79916	5.864852	2.351379	2.905236

CDS Değişkenin Varyans Ayrıştırması						
Periyod	S.E.	Kredi	Enflasyon	Brent	CDS	USD	D(AOFM)
1	14.46841	34.15708	3.893392	0.354998	61.59453	0.000000	0.000000
2	15.18439	31.14973	3.790832	0.332148	56.29741	6.620077	1.809806
3	15.41411	31.24695	3.721274	0.327054	55.64626	6.579946	2.478518
4	15.68119	30.70871	4.102771	0.333948	54.79944	6.378610	3.676468
5	16.16078	32.40684	4.667926	0.733101	51.72524	6.094062	4.372830
6	16.36051	32.00525	5.369923	0.843115	50.88308	5.947209	4.951424
7	16.45057	31.65644	5.498158	1.061287	50.49920	5.894705	5.389662
8	16.51316	31.42679	5.461634	1.162683	50.12010	6.063716	5.765078
9	16.54641	31.32665	5.606569	1.209862	49.95268	6.072735	5.831499
10	16.56055	31.29030	5.683214	1.213477	49.86823	6.123123	5.821662

USD Değişkeninin Varyans Ayrıştırması						
Periyod	S.E.	Kredi	Enflasyon	Brent	CDS	USD	D(AOFM)
1	3.004524	35.25012	20.39951	0.014208	3.198010	41.13815	0.000000
2	3.839730	51.32603	14.06158	0.107365	5.325738	25.21521	3.964078
3	4.011205	47.15035	13.28481	0.829364	7.581652	25.83381	5.320010
4	4.088645	46.11884	12.80208	0.861188	7.300826	27.49613	5.420931
5	4.149405	45.30548	12.64718	1.042266	8.491517	26.81509	5.698469
6	4.185276	45.49991	12.65760	1.072383	8.479644	26.38304	5.907417
7	4.214512	45.29087	12.92437	1.529354	8.367258	26.01828	5.869875
8	4.226776	45.05746	12.92579	1.889986	8.324007	25.87928	5.923480
9	4.233915	44.94458	12.93003	1.889599	8.302336	26.01955	5.913904
10	4.240540	44.84499	12.89686	1.946822	8.312541	26.01220	5.986589

D(AOFM) Değişkeninin Varyans Ayrıştırması						
Periyod	S.E.	Kredi	Enflasyon	Brent	CDS	USD	D(AOFM)
1	0.950399	2.769769	1.706979	0.043912	3.642736	2.542590	89.29401
2	1.055208	7.554962	11.05256	1.431895	3.560175	3.737980	72.66243
3	1.112898	9.964083	11.17157	3.535953	3.212537	6.382799	65.73306
4	1.173649	10.95257	10.13012	3.457515	3.401322	6.068693	65.98978
5	1.194444	11.58127	9.923163	3.823225	3.999407	6.002942	64.66999
6	1.210787	11.83134	10.49687	3.774539	3.909303	6.033092	63.95485
7	1.219756	11.75270	10.38768	3.771583	3.886311	6.614534	63.58720
8	1.226466	11.63774	10.33810	3.768246	4.308667	6.620550	63.32670
9	1.230605	11.65187	10.38369	3.744379	4.512435	6.592223	63.11540
10	1.232622	11.61603	10.38754	3.733337	4.718148	6.629767	62.91518

EK: 2
Sepet Kur Değişkenli VAR Modeli Etki-Tepki Fonksiyonları
Şekil: A
Makroekonomik Değişkenlerdeki Şoka Ülke Risk Priminin Tepkisi

Kredi   Enflasyon

Enerji   Ülke Risk Primi

Sepet Kur   Spread (AOFM)

Şekil: B
Ülke Risk Primindeki Şoka Makroekonomik Değişkenlerin Tepkisi

Kredi   Enflasyon

Enerji   Ülke Risk Primi

Sepet Kur   Spread (AOFM)

EK: 3
12 Ay Vadeli Mevduat Faizli VAR Modeli Etki-Tepki Fonksiyonları
Şekil: A
Makroekonomik Değişkenlerdeki Şoka Ülke Risk Priminin Tepkisi

Şekil: B
Ülke Risk Primindeki Şoka Makroekonomik Değişkenlerin Tepkisi
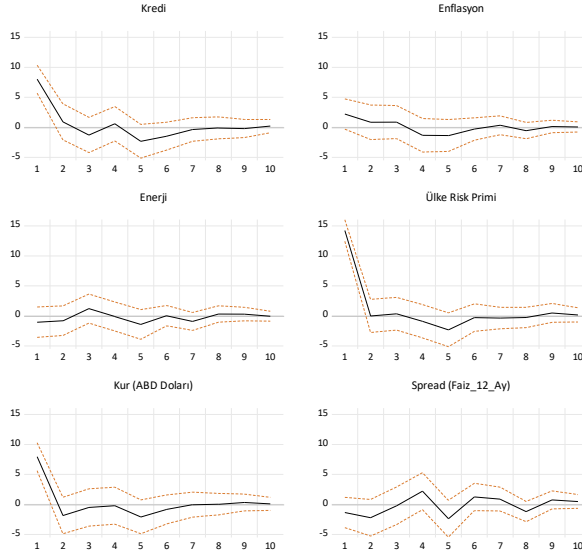
EK: 4
Krediler (YP) Değişkenli VAR Modeli Etki-Tepki Fonksiyonları
Şekil: A
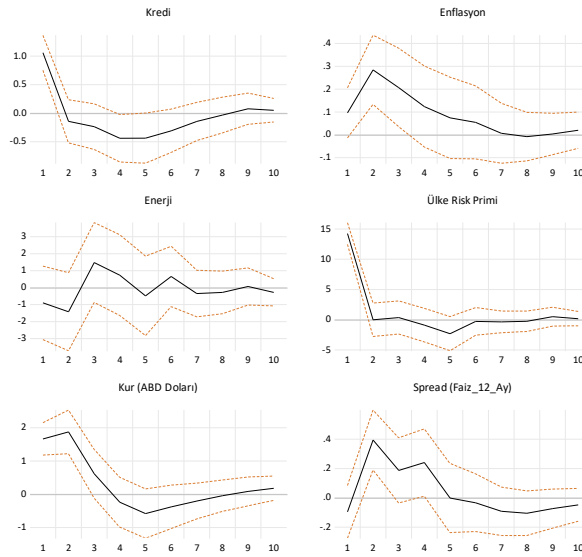## Makroekonomik Değişkenlerdeki Şoka Ülke Risk Priminin Tepkisi

Şekil: B
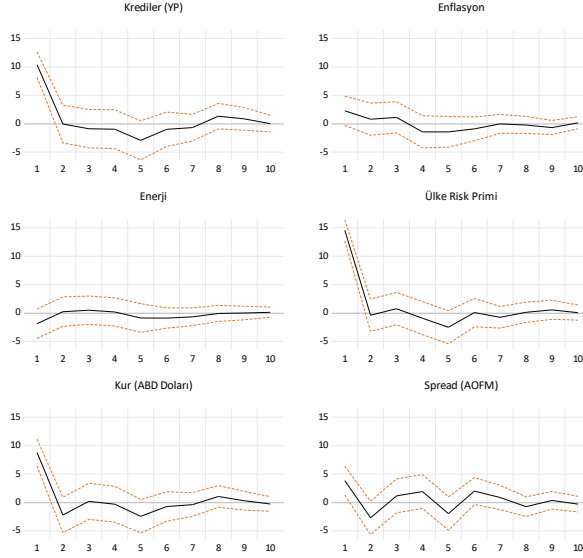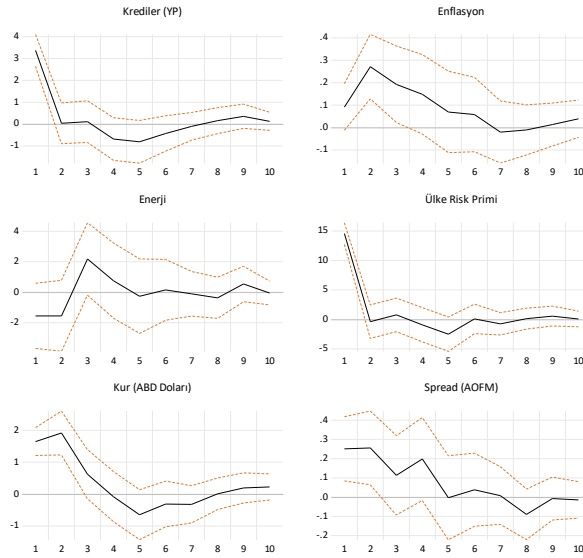## Ülke Risk Primindeki Şoka Makroekonomik Değişkenlerin Tepkisi

Doğu Antalya Turizm Gelişim Bölgesi'nde Turistik Ürün Satıcılarının Turizme ve Turistlere Karşı Tutumu[1]

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Attitudes of Tourism Product Sellers towards Tourism and Tourists in the Eastern Antalya Tourism Development Region[2]

Abstract

In the Eastern Antalya Tourism Development Region (Kundu, Belek, Side), meeting the expectations of both tourism product sellers and tourists is crucial for advancing tourism activities. Hence, this study aims to determine the attitudes of tourism product sellers toward tourism and tourists. Employing a quantitative research method, a survey was conducted on 364 participants between June and October 2022. According to the data, tourism product sellers generally hold a friendly view of tourists and recognise their role in stimulating the local economy. However, tourists also contribute to the increased cost of living in the area. The COVID-19 pandemic has led to a decline in tourism activities, while the 'all-inclusive' concept of hotels has also negatively impacted tourism. Therefore, identifying the attitudes of tourism product sellers toward tourism and tourists will be significant for Antalya's future tourism planning.

Keywords : Tourism Geography, Eastern Antalya Tourism Development Region, Sellers of Tourism Products, Tourist.

JEL Classification Codes : A11, C83, R12.

Öz

Doğu Antalya Turizm Gelişim Bölgesi'nde (Kundu, Belek, Side) turizm faaliyetlerinin geliştirilmesi için hem turistik ürün satıcılarının hem de turistlerin beklentilerini karşılamak son derece önemlidir. Bu nedenle bu araştırmada; Doğu Antalya Turizm Gelişim Bölgesi'ndeki turistik ürün satıcılarının turizme ve turistlere karşı tutumlarının belirlenmesi amaçlanmıştır. Bu bağlamda nicel araştırma yöntemine başvurulmuş ve 2022 yılı Haziran-Ekim aylarında Antalya ili Doğu Antalya Turizm Gelişim Bölgesi'ndeki turistik ürün satıcılığı yapan 364 katılımcıya anket uygulanmıştır. Elde edilen verilere göre; araştırma sahasındaki turistik ürün satıcılarının turistleri arkadaşça gördüğü ve turistlerin bölgede yerel ekonomiyi canlandırdığı tespit edilmiştir. Ancak turistlerin bölgede yaşam maliyetini artırdığı, Covid-19 Pandemisinin turizm faaliyetlerini azalttığı ve otellerin 'her şey dâhil'(all-inclusive) konseptinin turizm faaliyetlerini azalttığının gözlemlenmesi sebebiyle turistik ürün satıcılarının turizme ve turistlere karşı tutumlarının belirlenmesi Antalya'nın gelecekteki turizm planlaması için hem kamuya hem de özel sektör karar vericilerine önemli veriler sunacaktır.

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[1] *Bu çalışma Başak Sahara Can-Akbalık tarafında hazırlanan "Doğu Antalya Turizm Gelişim Bölgesi'nde Turistik Ürün Satıcıları ve Turist Tutumları" isimli yüksek lisans tezi esas alınarak hazırlanmıştır.*

[2] *This study was based on the master's thesis titled "Touristic Product Sellers and Tourist Attitudes in Eastern Antalya Tourism Development Region" prepared by Başak Sahara Can-Akbalık.*

1. Giriş

Dünya ekonomileri, hızla gelişen teknoloji ve küreselleşme ile ulusal sınırları aşarak, evrensel bir yapıya dönüşmüştür (Yılmaz & Yakut, 2023: 250). Özellikle 20. yüzyılın ikinci yarısından itibaren, küreselleşme olgusu nedeniyle turizm sektörü, dünya ekonomisinin en dinamik ve değişen alanlarından biri olarak belirgin bir şekilde büyüme eğilimi gerçekleştirmiştir. Küreselleşmenin hızlı iletişim teknolojileri ile getirdiği etkiler, turizmin demokratikleşmesinin artışı, yatırımların artması, hisse devirleri ve sermaye akışlarının canlılığı, finansal ve bankacılık sektörlerinin turizm endüstrisiyle güçlü etkileşimi gibi faktörler, uluslararası turizmin gelişiminde büyük bir etki sağlamıştır (Çeken vd., 2008: 72). Beraberinde uluslararası coğrafi sınırların azalması, çeşitli inanç ve kültürlere sahip milletler arasındaki karşılıklı tanıma ve kabul etme eğiliminin artışı, küresel ölçekte yaygınlaşan ortak dillerin kullanımı ve kültürel alışverişlerin artışı gibi unsurlar turizmin gelişiminde önemli bir rol oynamıştır (Çeken & Ateşoğlu, 2008: 139). Fakat turizm sektörünün dinamik bir yapıya sahip bulunmasından dolayı uluslararası ölçekte sosyal, siyasi ve ekonomik ilişkilerde meydana gelen sorunlar ve uygulanan kısıtlamalar turizm sektörünü derinden etkilemiştir (Şahin vd., 2023: 232). Özellikle tüm dünyanın etkilendiği ve ülkelerin ekonomisini çökme noktasına getiren COVID-19 pandemisi ile Rusya ile Ukrayna arasında yaşanan savaş turizm sektörü üzerinde yadsınamaz etkiler meydana getirmiştir.

Dünya Sağlık Örgütü (WHO) verilerine göre, 20 Eylül 2022 tarihinden itibaren dünya genelinde toplam 609.848.852 vaka onaylanmış ve 6.507.002 ölüm gerçekleşmiştir (WHO, 2022). Vaka sayılarının azalması amacıyla çeşitli krize karşı proaktif bir yönetim stratejileri (evde kal, sokağa çıkma yasağı, bireyler arası en az 1 m mesafe kuralı vb.) uygulamaya başlamıştır. Fakat salgına bağlı olarak seyahat hizmetleri arzı %1 ile %3 oranında azalmış dolayısıyla da yaklaşık turizm gelirlerinde 30 ile 50 milyar Amerikan doları kayıp yaşanmasına sebebiyet vermiştir (UNWTO, 2020; Acar, 2020: 16).

2022 yılında meydana gelen Rus- Ukrayna savaşı da uluslararası turizm açısından yeni bir tehdit oluşturmuştur (Demirkıran vd., 2022: 73). Türkiye de bulunmuş olduğu coğrafi konumundan dolayı ve Rusların tatil amacıyla en çok tercih ettiği ülkeler arasında ilk sırada yer almasına bağlı olarak derinden etkilenmiştir (<www.haberturizm.com>, 2023). Rusların en fazla tercih ettiği destinasyonlardan biri olan ve Türkiye'nin turizm başkenti olarak ifade edilen Antalya ili ülkenin en önemli turizm bölgelerinden birisidir. Akdeniz kıyısında konumlanması nedeniyle de turizm açısından ideal bir şehir olarak değerlendirilebilir. Antalya'nın hızlı gelişimi ve turizm alanındaki etkisi, doğal güzellikleri, sıcak iklimi, berrak denizi, ince kumlu plajları, dağları, milli parkları ve antik kentleri gibi birçok özellikle yerli ve yabancı turistlerin ilgisini çekmektedir (Kapan & Timor, 2018: 54). Bu nedenle her yıl dünyanın çeşitli ülkelerinden milyonlarca turisti ağırlayan Antalya, hızla gelişen bir turizm sektörüne sahiptir. Bu durum bölgenin turist sayısı ve yatak kapasitesinin

artmasına sebep olmasından dolayı Antalya ilinin dünya turizm sektöründe önemli bir konuma yükselmesinde etkili olmaktadır. Bu kıyı kuşağında doğal güzelliklerini beşerî yatırımlarla (Güney ve Doğu / Side Antalya Turistik Gelişim Projeleri) desteklemede başarıyı yakalamış olan Antalya, Türk turizminde ağırlığını ve turizm potansiyelini her geçen gün daha da artırmaktadır (Sarı, 2014: 107-116; Sarı, 2007: 133). İl sınırları içinde, Doğu Antalya Turizm Gelişim Bölgesi'nde yer alan Kundu, Belek ve Side turizm merkezleri, önemli turistik merkezler arasındadır. Kundu, Belek ve Side; Antalya'nın en çok turist çeken bölgeleri olarak çok sayıda doğal ve kültürel çekiciliklere sahiptir. Bölgedeki turizm faaliyetlerinin geliştirilmesi için hem turistik ürün satıcılarının hem de turistlerin beklentilerini karşılamak son derece önemlidir. Yapılan araştırmadan elde edilen veriler, gelecekte hem ulusal hem de uluslararası düzeyde turizm planlaması açısından büyük öneme sahip olacağı ifade edilebilir.

2. Araştırmanın Amacı

Turizm faaliyetlerinin geliştirilmesi için, bölgedeki politika yapıcıları, üniversiteler ve sivil toplum kuruluşları, turizm paydaşları ile bir araya gelerek geleceğe yönelik turizm planlarının oluşturulması üzerinde çalışmalar (Alaeddinoğlu & Aliağaoğlu, 2005; Şahbaz & Akdu, 2010; Atça-Tonbil, 2019 vb.) yürütmektedir. Bu çalışmalar, genellikle turistler, konaklama tesislerinin kalitesi ve turistik bölgelerin niceliksel ve niteliksel özellikleri gibi konulara odaklanmaktadır. Fakat turistik faaliyetlerde önemli bir rol üstlenen ve doğrudan turistlerle etkileşim kuran turistik ürün satıcılarına yönelik yeterli akademik araştırma yapılmamış ve yapılmış olan mevcut çalışmaların da sadece birkaç bölge ile sınırlı olduğu gözlemlenmiştir. Bu sebeple bu araştırmanın temel amacı, Doğu Antalya Turizm Gelişim Bölgesi'nde (Kundu, Belek, Side) faaliyet gösteren turistik ürün satıcılarının, turizme ve turistlere karşı tutumlarının belirlenmesi ve elde edilen verilerin analiz edilerek Doğu Antalya Turizm Gelişim Bölgesi'ndeki sorunların çözümüne yönelik öneriler sunmak ve turizm faaliyetlerini geliştirmektir.

3. Araştırmanın Önemi

Bu çalışmanın önemi, turizm politika yapıcıları ve diğer ilgili paydaşlar için, turistik ürün satıcılarına yönelik stratejilerin geliştirilmesine katkı sağlamaktadır. Bu nedenle, bu araştırma, Doğu Antalya Turizm Gelişim Bölgesi'nde (Kundu, Belek, Side) turistik ürün satıcılarının turizme ve turistlere karşı tutumlarını karşılaştırmalı olarak inceleyerek, elde edilen verilerin coğrafya bilimine ve turizm paydaşlarına katkı sağlayacağı düşünülmektedir. Bu araştırma ayrıca, Antalya'nın gelecekteki turizm planlaması için hem kamuya hem de özel sektör karar vericilerine önemli veriler sunacaktır.

4. Literatür

Çalışma konusu ile ilgili literatür tarandığında turistik ürün satıcılarının tutumlarına ilişkin araştırmaların sınırlı olduğu görülmektedir. Ulusal bazda azımsanamayacak ölçüde ülkeye önemli gelir sağlayan turizm sektörünün içinde destinasyonlardaki turistik ürün

satıcıları da yer almaktadır. Bu bağlamda turistik ürün satıcılarının turizme ve turiste karşı tutumlarının nicel veriler ile ortaya konulması literatüre katkı sağlayacaktır. Bununla birlikte Türkiye'nin turizm başkenti olarak ifade edilen Antalya'da bölgeden bölgeye turistlerin turistik ürün satıcılarının turizme ve turiste karşı tutumların farklılık göstereceği düşünüldüğünde bu tür çalışmaların sayısının artması Antalya'nın gelecekteki turizm planlaması üzerinde hem kamuya hem de özel sektör karar vericilerine önemli veriler sunacaktır.

Altunyüzük (2022) yaptığı çalışmada nitel araştırma yöntemlerinden faydalanarak Serik ilçesinin Belek mahallesi ile bütünleşen kongre turizminin Belek'teki gelişim süreci üzerindeki etkilerini, bölgenin coğrafi özellikleri ile açıklayarak ortaya koymayı amaçlamıştır. Elde edilen bulgulara göre son 20 ile 25 yıl içerisinde önemli turizm destinasyon noktalarından birisi olan Belek mahallesinin coğrafi özellikleri ve tesisleri ile ulusal ve uluslararası kongre ve toplantı organizasyonlarında İstanbul'dan sonra ikinci sırada geldiği ortaya koymuştur.

Aylan ve Kaya (2020) yaptığı çalışmada, Mann Whitney U, Kruskal Wallis H ve Posthoc Tamhane Testlerini kullanarak, Burhaniye'ye gelen yerli turistlerin turistik ürün satıcılarına karşı tutum ve davranışlarını tespit etmek amacıyla ve bu tutumların demografik değişkenler açısından farklılaşma gösterip göstermediğini ortaya koymayı amaçlamıştır. Elde edilen bulgulara göre katılımcıların demografik özelliklerine bağlı olarak satıcıların tutumlarında anlamlı farklılıklar olduğu ortaya konulmuştur.

Sarı ve Saruhan (2019) yaptığı çalışmada, nicel araştırma yöntemini kullanarak Alanya'daki turistik yerel ürünlerin oluşturulmasında yerel halkın faaliyetlerinin ve turistik ürün satıcılarının turiste yönelik tutumlarının belirlenmesini amaçlamıştır. Elde edilen bulgulara göre turistlerin %70,9'unun Alanya'ya ait ürünleri sorguladığı ve %92,6'sının ise yerel ürünlere ilgi duyduğu belirtilmiştir. Turistik ürün satıcılarının ise turistleri önemli bir istihdam kaynağı olarak görmesi nedeniyle tutumlarının olumlu olduğu ortaya konulmuştur.

Özdemir ve Salt (2019) yaptığı çalışmada, karma araştırma yöntemini kullanarak günümüz esnaf kültüründeki değişimi Ahilik temelli geleneksel esnaf kültürü çerçevesinde ortaya koymayı amaçlamıştır. Elde edilen bulgulara göre, Sakarya esnafının mesleki (%35,4) ve sosyal hayatlarında (%34,4) geleneksel yapıdan orta düzey bir farklılaşma tespit edilirken bireysel hayatlarında (%24,2) geleneksel yapıdan düşük düzey bir farklılaşma olduğu ortaya konulmuştur.

Sarı ve Bayraktar (2018) yaptığı çalışmada, nicel araştırma yöntemini kullanarak Kemer'de faaliyet gösteren esnafların turizm ile turist ilgili tutumlarını belirlemek ve esnaf-turist ilişkisini belirleyerek şehrin turizm planlanmasında paydaşların fonksiyonlarını ortaya koymayı amaçlamıştır. Elde edilen bulgulara göre, esnafların turizm gelirlerinden memnun olmadığı ve kurumsal mağazaların esnafı olumsuz etkilediği ortaya konulmuştur.

Literatür incelendiğinde çalışmaların uygulandıkları bölgelere göre farklılık gösterdiği görülmektedir. Bu bağlamda bu çalışmada Doğu Antalya Turizm Gelişim Bölgesi'ndeki turistik ürün satıcılarının turizme ve turistlere karşı tutumlarının ortaya konulması, bölgenin turizm ekonomisinde turizm paydaşları içerisinde yer alan turistik ürün satıcılarının rolünün ortaya konulmasını sağlayacaktır.

5. Araştırmanın Yöntemi

Bu araştırmada, Doğu Antalya Turizm Gelişim Bölgesi'nde (Kundu, Belek, Side) faaliyet gösteren turistik ürün satıcılarının turizme ve turistlere yönelik tutumlarının belirlenmesi amacıyla nicel araştırma yöntemi kullanılmıştır.

Nicel araştırma yöntemi, aynı zamanda sayısal araştırma veya ampirik araştırma olarak da adlandırılan bilimsel araştırma yöntemlerinden biridir. Bu araştırma yaklaşımı, tekrarlanabilir, nesnel ve ölçülebilir sonuçlar elde etmeyi amaçlayan bir ölçme ve gözlem temelli bir yöntemdir. Verilerin analizi için istatistiksel ve matematiksel modellerden yararlanılmaktadır. Bu yöntemle elde edilen sonuçlar, kişisel yargılardan uzak, tarafsız ve nesnel niteliktedir. Yapılan analiz sonucunda elde edilen veriler sayısal olarak ifade edilmektedir (Bekman, 2022: 238-258). Bu sebepten dolayı, bu araştırmada veri toplama yöntemlerinden biri olarak nicel araştırma için kullanılan anket tekniğine başvurulmuştur. Araştırma süreci, ilk olarak literatür taramasıyla başlamıştır. Literatür taramasının ardından, konunun kapsamının geniş ve çok yönlü olması sebebiyle, yerel ve uluslararası düzeyde çeşitli kaynaklar titizlikle incelenmiş ve değerlendirilmiştir. Bu kaynaklar arasında makaleler, bildiriler, yayınlar, kitaplar, bültenler, resmi internet siteleri, gazeteler, yüksek lisans ve doktora tezleri bulunmaktadır.

Mevcut literatürün gözden geçirilmesinin ardından, anket formu hazırlanmış ve ankette yer alan sorular, sosyal bilimler alanında yaygın olarak kullanılan 5'li Likert ölçeği kullanılarak oluşturulmuştur. Doğu Antalya Turizm Gelişim Bölgesi'nde faaliyet gösteren turistik ürün satıcılarının, turizm sektörünü ve turistleri nasıl algıladıkları ile, bölgeye gelen turistlere yönelik memnuniyet düzeylerini anlamak amacıyla 34 soruluk bir anket formu kullanılmıştır. Anketin ilk 11 sorusu, katılımcıların demografik özelliklerini belirlemeye yönelik hazırlanmıştır; diğer sorular ise turistik ürün satıcılarının turizm ve turistlere yönelik tutumlarını değerlendirmek amacıyla tasarlanmıştır. Araştırmanın örneklemi, 2022 yılı Haziran-Ekim aylarında Antalya ili içerisinde bulunan Doğu Antalya Turizm Gelişim Bölgesi'nde faaliyet gösteren 364 turistik ürün satıcısına yönelik Türkçe anket formları kullanılarak oluşturulmuştur. Anket formları, Doğu Antalya Turizm Gelişim Bölgesi'ndeki turistik ürün satıcılarına, Google Forms aracılığıyla elektronik olarak sunulmuştur. Bu araştırma kapsamında uygulanan anketin katılımcılarını; Antalya'nın turistler tarafından en yoğun ilgi gören ve konaklama tesislerinin sıkça bulunduğu Kundu, Belek ve Side destinasyonlarındaki turistik ürün satıcıları oluşturmaktadır. Bazı turistik ürün satıcıları zaman yetersizliğinden dolayı ankete katılmayı kabul etmemişlerdir. Elde edilen veriler, SPSS istatistik paket programına aktarılarak analiz edilmiştir. Bu aşamada, frekans analizi yöntemi kullanılmış ve elde edilen veriler, betimsel analiz yaklaşımıyla açıklanmıştır.

6. Araştırma Sahasının Yeri ve Sınırları

Araştırma sahası, Harita 1'de görüldüğü gibi, Antalya ili sınırları içinde yer alan Doğu Antalya Turizm Gelişim Bölgesi'ndeki Kundu, Belek ve Side bölgelerini kapsamaktadır.

Harita: 1
Kundu, Belek ve Side'nin Yeri ve Sınırları
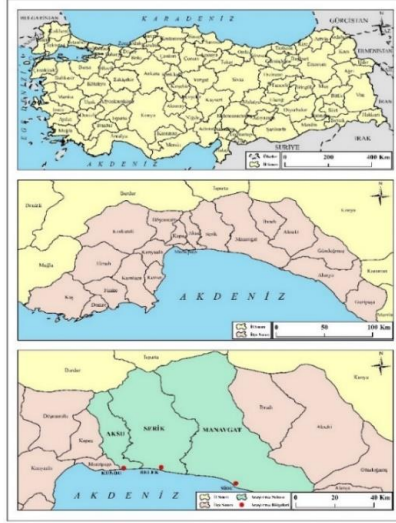
Kundu, Harita 2'de gösterildiği gibi, Akdeniz bölgesinde konumlanan ve Antalya ilinin Aksu ilçesine bağlı bir yerleşim bölgesidir. Kundu Turistik Tesisleri, Antalya Havalimanı'na 20 km uzaklıkta yer almakta olup, Aksu-Acısu dereleri arasında bulunan Kundu köyü sahilinde bulunmaktadır. Bu alan, etrafı fıstık çamı ormanı ile çevrili olan 1,5 kilometre uzunluğundaki kıyı şeridi boyunca konumlandırılmıştır. Antalya'nın Kemerağzı-Kundu bölgesi, 2004 yılında Bakanlar Kurulu'nun kararıyla kültür turizmi amaçlı korunaklı bölge olarak belirlenmiştir. Bu bağlamda, bölgenin imar düzenlemeleri Kültür ve Turizm Bakanlığı'na aktarılmış ve kıyı şeridi boyunca konsept oteller inşa edilmiştir (Arüv vd., 2008: 5).

Belek, Harita 3'te gösterildiği gibi Antalya ilinin doğusunda yer almakta olup Serik ilçesine bağlı bir bölgedir. Belek, Serik ilçe merkezine yaklaşık olarak 7 kilometre mesafede konumlanmıştır. Bunun yanı sıra, Belek semti Antalya şehir merkezine yaklaşık 31 kilometre uzaklıktadır. Belek'in batısında Antalya merkezi, doğusunda Side, kuzeyinde Serik ve güneyinde ise Akdeniz bulunmaktadır. Belek turizm bölgesi, planlı bir yapılanmayla şekillendirilmiş ve özellikle lüks tesisleriyle turizm sektöründe oldukça popüler bir konuma sahiptir.

Harita: 2	**Harita: 3**	**Harita: 4**
Kundu'nun Yeri ve Sınırları	**Belek'in Yeri ve Sınırları**	**Side'nin Yeri ve Sınırları**

Side, Harita 4'te görüldüğü gibi, Manavgat ilçesinin doğusunda bulunan antik bir liman kentidir. Antik dönemde liman kenti olarak adlandırılan Side, Antalya'ya yaklaşık 75 kilometre ve Manavgat ilçe merkezine 7 kilometre mesafededir. Side'nin doğusunda Sorgun Köyü, batısında ise Ilıca Beldesi yer almaktadır. Deniz, güneş ve bu kumsalların varlığı, Side bölgesini turistik açıdan son derece cazip kılmış ve turistik tesislerin inşasını hızlandırmıştır. Side, turistler için birçok açıdan uygun koşullara sahip olan bir bölge olarak dikkat çekmektedir.

7. Araştırmanın Bulguları ve Analizleri

7.1. Demografik Bilgiler

Araştırmanın örneklemini, 2022 yılının Haziran ve Ekim ayları arasında, Antalya ilinin Kundu, Belek ve Side bölgelerinde turistik ürün satışı yapan toplam 364 kişi oluşturmaktadır. Katılımcıların demografik bilgileri, yüzde ve frekans dağılımları şeklinde Tablo 1'de gösterilmiştir. Veri toplama aracında detaylı olarak yazılan demografik bilgiler tablolaştırılırken kodlanmıştır. Şöyle ki; Cinsiyet Durumu Kadın (1), Erkek (2); Yaş 18-20 (1), 21-30 (2), 31-40 (3), 41-50 (4), 50+ (5); Medeni Durumu Bekâr (1), Evli (2), Eğitim Durumu İlköğretim (1), Lise (2), Üniversite (3), Lisansüstü (4); Sektörde Faaliyetlerini Gerçekleştirme Sıklığı Sezonluk (1), Yıllık (2); İşletmenin Mülkiyet Durumu Sahibi (1), Kira (2); Çalışma Pozisyonu İşyeri Sahibi (1), Yönetici (2), Çalışan (3); Aylık Ortalama Gelirleri 1.0000-25.000 (1), 25.001-50.000 (2), 50.001-75.000 (3), 75.001-100.000 (4) ve 100.001 ve üstü (5); İşletmede Çalışan Sayı Bir (1), İki (2), Üç (3), Dört ve üstü (4); Çalıştığı Bölge Kundu (1), Side (2) ve Belek (3) olarak kodlanmıştır.

Tablo: 1
Turistik Ürün Satıcısının Demografik Bilgileri

Katılımcılar		Sayı	%
Cinsiyet	1	153	42,0
	2	211	58,0
Yaş	1	16	4,4
	2	45	12,4
	3	70	19,2
	4	106	29,1
	5	127	34,9
Medeni Durum	1	172	47,3
	2	192	52,7
Eğitim Durumu	1	24	6,6
	2	209	57,4
	3	120	33,0
	4	11	3,0
Faaliyet Sıklığı	1	145	39,8
	2	219	60,2
Mülkiyet Durumu	1	75	20,6
	2	289	79,4
İşletmedeki Pozisyonu	1	84	23,1
	2	54	14,8
	3	226	62,1
Aylık Gelir	1	200	54,9
	2	28	7,7
	3	86	23,6
	4	14	3,8
	5	36	9,9
İşletmedeki Personel Sayısı	1	39	10,7
	2	140	38,5
	3	111	30,5
	4	74	20,3
Çalışma Süresi	1	24	6,6
	2	52	14,3
	3	49	13,5
	4	75	20,6
	5	164	45,1
Doğu Antalya Turizm Gelişim Bölgesi	1	109	29,9
	2	138	37,9
	3	117	32,1

Araştırmaya katılan turistik ürün satıcılarının demografik bilgileri Tablo 1'de yer almaktadır. Araştırmaya dâhil olan turistik ürün satıcılarının cinsiyet özellikleri değerlendirildiğinde, kadın katılımcıların sayısı 153 ve erkek katılımcıların sayısı 211'dir. Kadınlar toplam katılımcıların %42'sini, erkekler ise %58'ini oluşturmaktadır. Elde edilen bulgulara göre; erkek katılımcı sayısının daha fazla olduğu görülmektedir.

Araştırmaya katılan turistik ürün satıcılarının medeni durumları, evli katılımcıların sayısı 192 iken, bekâr katılımcıların sayısı 172 olarak belirlenmiştir. Evli olan katılımcılar toplam sayının %52,7'sini temsil ederken, bekâr olan katılımcılar ise toplam sayının %47,3'ünü oluşturmaktadır. Elde edilen bulgulara göre; evli katılımcı daha fazladır.

Araştırmaya dâhil olan turistik ürün satıcılarının yaş dağılımları, 18-20 yaş aralığındaki katılımcı sayısı 16 (%4,4), 21-30 yaş aralığındaki katılımcı sayısı 45 (%12,4), 31-40 yaş aralığındaki katılımcı sayısı 70 (%19,2), 41-50 yaş aralığındaki katılımcı sayısı 106 (%29,1) ve 50 yaş ve üstündeki katılımcı sayısı 127 (%34,9)'dir. Araştırma sahasındaki turistik ürün satıcılarına uygulanan anket verilerine göre, en fazla katılımcının bulunduğu yaş aralığı 41-50 ve 50 yaş üzeridir.

Araştırmaya katılan turistik ürün satıcılarının eğitim durumlarına bakıldığında, İlkokul mezunu katılımcı sayısı 24 (%6,6), lise mezunu katılımcı sayısı 209 (%57,4), üniversite mezunu katılımcı sayısı 120 (%33,0) ve lisansüstü eğitim mezunu katılımcı sayısı ise 11 (%3,0) olarak görülmektedir. Elde edilen bulgulara göre, bölgedeki turistik ürün satıcılarının çoğunun lise ve üniversite mezunu olduğunu göstermektedir. Bu bulgular, turistik ürün satıcılarının genel olarak yüksek eğitim seviyelerine sahip olduğunu yansıtmaktadır.

Araştırmaya katılan kişilerin mesleklerindeki çalışma süreleri; 1-3 yıl çalışan kişi sayısı 24, 3-5 yıl çalışan kişi sayısı 52, 5-7 yıl çalışan kişi sayısı 49, 7-9 yıl çalışan kişi sayısı 75, 9 yıl ve üzeri süredir çalışan kişi sayısı ise 164'tür. Buna göre, 1-3 yıl çalışanlar toplam katılımcı sayısının %6,6'sını, 3-5 yıl çalışanlar %14,3'ünü, 5-7 yıl çalışanlar %13,5'ini, 7-9 yıl çalışanlar %20,6'sını ve 9 yıl ve üzeri çalışanlar ise toplamın %45,1'ini oluşturmaktadır.

Araştırmaya katılan katılımcıların faaliyetlerini sezonluk olarak gerçekleştirenlerin sayısı 145 (%39,8) iken, faaliyetlerini yıllık olarak gerçekleştiren sayısı ise 219 (%60,2) olarak tespit edilmiştir.

Araştırmada yer alan turistik ürün satıcısının işletmesinde çalışan katılımcı sayılarına bakıldığında, işletmede 1 kişi çalışanların sayısı 39 (%10,7), 2 kişi çalışanların sayısı 140 (%38.5), 3 kişi çalışanların sayısı 111 (%30.5) ve 4 ya da daha fazla kişi çalışanların sayısı ise 74 (%20.3) olduğu görülmektedir. Araştırma bulguları, işletmede iki kişi çalışanların çoğunluğunu oluşturduğunu göstermektedir.

Araştırmaya katılan turistik ürün satıcılarının işletme mülkiyet durumları; kendi mülkiyetine sahip olan turistik ürün satıcısının sayısı 75 (%20,6), mülkiyeti kira olan turistik ürün satıcısının sayısı ise 289 (%79,4)'dur. Araştırma bulgularına göre, katılımcıların büyük bir çoğunluğu çalıştıkları işletmenin mülkiyetinin kira olduğunu belirtmektedir.

Araştırmaya katılan katılımcıların işletmedeki pozisyonlarına göre dağılışı, işyeri sahibi olanların sayısı 84 (%23,1), yönetici pozisyonunda olanların sayısı 54 (%14,8) ve çalışanların sayısı ise 226 (%62,1) olarak belirlenmiştir. Katılımcıların büyük bir kısmı işletmedeki görevlerini çalışan olarak icra etmektedir.

Araştırmada, aylık geliri 1.000-25.000 TL aralığında olan katılımcıların sayısı 200 (%54,9), 25.001-50.000 TL aralığında olan katılımcıların sayısı 28 (%7,7), 50.001-75.000 TL aralığında olan katılımcıların sayısı 86 (%23,6), 75.001-100.000 TL aralığında olan katılımcıların sayısı 14 (%3,8), 100.001 TL ve üzeri olan katılımcıların sayısı ise 36 (%9,9) olarak belirlenmiştir. Araştırmanın bulgularına göre, katılımcıların büyük bir çoğunluğunun aylık ortalama geliri 1.000-25.000 TL arasındadır.

Araştırmaya katılan turistik ürün satıcılarının çalıştığı Doğu Antalya Turizm Gelişim bölgelerine göre dağılımı, Kundu bölgesinde çalışan katılımcıların sayısı 109 (%29,9), Belek bölgesinde çalışan katılımcıların sayısı 117 (%32,1) ve Side bölgesinde çalışan

katılımcıların sayısı 138 (%37,9) olarak tespit edilmiştir. Araştırmanın bulgularına göre, katılımcıların büyük bir çoğunluğun Belek turizm bölgesinde çalıştığı görülmektedir.

7.2. Ankete İlişkin Turistik Ürün Satıcılarının Turizme ve Turiste Yönelik Tutumunun Değerlendirilmesi

Anketin ikinci bölümünde, turistik ürün satıcısının turizme ve turistlere yönelik tutumunu değerlendirebilmek amacıyla, bölgedeki katılımcılara yöneltilen 23 sorudan oluşan 5 puanlı Likert Ölçeği uygulanmıştır. Bu ölçekteki puanlama seçenekleri ise şunlardır: '1- Kesinlikle Katılmıyorum', '2- Katılmıyorum', '3- Kararsızım', '4- Katılıyorum' ve '5- Kesinlikle Katılıyorum'. Bulgular yorumlanırken anketteki seçenekler olumlu, olumsuz ve kararsızlar olmak üzere 3 ana grupta sınıflandırılmıştır. Bu doğrultuda Kesinlikle Katılmıyorum ve Katılmıyorum seçenekleri olumsuz görüşleri, Kesinlikle Katılıyorum ve Katılıyorum seçenekleri de birleştirilerek olum görüşleri yansıtacak şekilde yorumlanmıştır. Anketten elde edilen bulgular tümleşik olarak Tablo 2' de aritmetik ortalama değerler ile sunulmuş ve her bir maddeye ilişkin bulgular alt başlıklar halinde raporlaştırılmıştır.

Tablo: 2
Turistik Ürün Satıcılarının Turizme ve Turiste Yönelik Tutumları

Madde	Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle katılıyorum	A. Ort.
Turizm gelirlerinden memnunum.	7,4	14	22,8	32,4	23,4	3,50
Turistlerin yerel ekonomimizi canlandırdığını düşünüyorum.	3,3	5,5	9,9	36	45,3	4,15
Turistlerle iletişimimin iyi olduğunu düşünüyorum.	1,6	2,5	10,2	36,0	49,7	4,30
Turistlerin milliyetlerine bakmaksızın herkese saygı duyuyorum	1,4	2,5	6,3	29,1	60,7	4,45
Turizm sebebiyle ürün, hizmet ve gayrimenkul fiyatlarının arttığını düşünüyorum.	1,9	2,5	5,5	18,7	71,4	4,55
Dünyanın her yerinden turistlerle tanışmanın değerli bir deneyim olduğunu düşünüyorum.	0,8	3,6	4,9	20,9	69,8	4,55
COVID-19 Pandemisinin turizm faaliyetlerini azalttığını düşünüyorum.	1,1	3,6	6,3	20,1	69,0	4,52
COVID-19 Pandemisinin turizm ekonomisine zarar verdiğini düşünüyorum.	,8	4,1	6,3	17,9	70,9	4,54
COVID-19 Pandemisinin turistlerin konaklama tercihlerinde değişiklikler meydana getirdiğini düşünüyorum.	1,9	3,8	9,3	22,8	62,1	4,39
Turistlerle yaşadığım herhangi bir sorunda çözüm odaklı olduğumu düşünüyorum.	1,1	1,1	6,0	28,0	63,7	4,52
Turistlerin yerel kültürü olumsuz etkilediğini düşünüyorum.	17,3	20,6	20,9	18,7	22,5	3,09
Turistlerin her türlü inanışına saygı duyuyorum.	1,1	2,2	6,0	29,9	60,7	4,47
Turistlerle iletişimimi uzun yıllar boyunca devam ettiriyorum.	1,9	6,0	8,2	29,9	53,8	4,28
Turistlerin bölge halkının geleneksel yaşam şeklinde değişiklik meydana getirdiğini düşünüyorum.	6,0	9,9	18,7	37,6	27,7	3,71
Turistlerin cana yakın olduğunu düşünüyorum.	7,7	11,8	17,3	33,2	29,9	3,66
Turistlerin sosyal hayat standartlarını yükselttiğini düşünüyorum.	2,5	4,9	8,5	40,1	44,0	4,18
Turistlerle etkileşimde olmamın yabancı dil seviyemi artırdığını düşünüyorum.	,5	2,2	6,9	68,7	4,56	
Turist kalitesinde yıllara göre düşüş olduğunu düşünüyorum.	6,6	13,7	15,1	29,4	35,2	3,73
Turistlerin bölge halkına karşı önyargılı olduğunu düşünüyorum.	10,2	17,0	25,0	22,8	25,0	3,35
Turistlerin bölgede hayat pahalılığına neden olduğunu düşünüyorum.	2,2	4,9	8,2	30,8	53,8	4,29
Bazı turistlerin çevreye karşı duyarsız olduğunu düşünüyorum.	10,4	15,7	17,6	26,6	29,7	3,49
Turistlerden Türkçe kelimeler duyduğumda mutlu oluyorum.	0	2,7	5,5	25,0	66,8	4,56
Bölgedeki her şey dahil' (all-inclusive) sisteminin turistik ürün satıcılarını olumsuz yönde etkilediğini düşünüyorum.	3,6	1,9	10,2	21,2	63,2	4,38

Tablo 2 incelendiğinde Madde 1'deki turizm gelirlerinden memnuniyet durumlarına ilişkin bulgulara göre; katılımcıların% 21'4 ünün turizm gelirden memnun olmadığı, % 55.8' inin memnun olduğu, % 22,8'nin ise ne olumlu ne de olumsuz bir görüş belitmediği görülmüştür. Bu bulguların aritmetik ortalaması incelendiğinde ise katılımcıların

memnuniyet oranının pozitif yönde (m:3.50) olduğu görülmüştür. Turistik ürün satıcılarının gelirlerinin döviz kuruyla ilişkili olması ve diğer iş sektörleriyle kıyaslandığında turizmin daha yüksek gelir sağlaması, bölgedeki turistik ürün satıcılarının ekonomik olarak tatmin olmasına katkı sağladığı ifade edilebilir.

Madde 2' deki turistlerin yerel ekonomiyi canlandırdığına ilişkin bulgulara göre, katılımcıların %8,8'i turistlerin yerel ekonomiyi canlandırmasından memnun olmadığı, %81,3'nün memnun olduğu, %9,9'nun ise ne olumlu ne de olumsuz bir görüş belirtmediği görülmüştür. Bu bulguların aritmetik ortalaması incelendiğinde ise katılımcıların memnuniyet oranının pozitif yönde (m:4,15) olduğu görülmüştür. Turizmin yerel ekonomiyi canlandırması, hem bölgede yaşayanların hayat standartlarının gelişmesine hem de bölgenin sosyal ve ekonomik açıdan kalkınmasına büyük önem taşımaktadır. Doğu Antalya Turizm Gelişim Bölgesi'nde gerçekleştirilen turizm faaliyetlerinin elde edilen gelir, bölge ekonomisinin ve ülke ekonomisinin gelişimine doğrudan katkı sağlayarak yerel ekonominin canlanmasına katkı sağlamaktadır.

Madde 3'teki turistik ürün satıcılarının turistlerle iletişimine ilişkin bulgulara göre, katılımcıların %4,1 iyi olmadığını, %85,7'si iyi olduğu, %10,2'si ise ne olumlu ne de olumsuz bir görüş belirtmediği görülmüştür. Bu bulguların aritmetik ortalaması incelendiğinde ise katılımcıların memnuniyet oranının pozitif yönde (m:4,30) olduğu görülmüştür. Etkin iletişim kurabilmek için insanlar, kendi görüşlerinden farklı düşünen bireyleri olumlu bir tutumla karşılamalı ve onların düşüncelerine, inançlarına ve yaşam tarzlarına saygı göstermelidirler. Turistik bölgeye gelen ziyaretçilerin beklentilerini, gereksinimlerini ve sorunlarını anlamak ve bu konuda yardımcı olmaya çalışmak, ancak doğru ve etkili bir iletişim yoluyla mümkün olur. Elde edilen verilere göre, çalışma alanındaki turistik ürün satıcılarının iletişim becerilerini başarılı bir şekilde kullandıkları gözlemlenmiştir. Bu durum, turistlerin memnuniyetle ayrılmalarını ve gelecekte tekrar aynı bölgeyi ziyaret etmeyi düşünmelerini teşvik etmektedir.

Madde 4'teki turistlerin milliyetlerine bakılmaksızın herkese saygı göstermelerine ilişkin bulgulara göre, katılımcıların %3,9 iyi olmadığı, %89,8'nin iyi olduğu, %6,3'nün ise ne olumlu ne de olumsuz bir görüş belirtmediği görülmüştür. Bu bulguların aritmetik ortalaması incelendiğinde ise katılımcıların memnuniyet oranının pozitif yönde (m:4,45) olduğu görülmüştür. Katılımcıların büyük bir kısmı, turistlere gerekli saygıyı göstermekte ve turistlerin hangi ülkenin vatandaşı olduğuna bakılmaksızın hoşgörülü bir tutum sergilemektedir. Bu durum, taraflar arasında karşılıklı hoşgörünün ve anlayışın gelişmesine katkıda bulunarak, turistlerin kendilerini değerli hissetmelerine destek olmaktadır.

Madde 5'teki turistik ürün satıcılarının, turizm sebebiyle ürün, hizmet ve gayrimenkul fiyatlarının arttığı düşüncesine ilişkin bulgulara göre, katılımcıların %4,4 katılmadığı, %90,1'nin katıldığı, %5,5'nin ise ne olumlu ne de olumsuz bir görüş belirtmediği görülmüştür. Bu bulguların aritmetik ortalaması incelendiğinde ise katılımcıların memnuniyet oranının pozitif yönde (m:4,55) olduğu görülmüştür. Türkiye'nin önde gelen turistik cazibe noktalarından biri olan Doğu Antalya Turizm Gelişim Bölgesi,

son dönemde hem turistlerin hem de yabancı yatırımcıların dikkatini çekmektedir. Aynı zamanda, bölgede sunulan çeşitli fırsatlarla konut satışında da yabancı yatırımcılara ve turistlere cazip olanaklar sunulmaktadır. Doğu Antalya Turizm Gelişim Bölgesi'nde gayrimenkul fiyatları her geçen gün artmaktadır. Özellikle Rusya ve Ukrayna savaşı sonrasında bölgeye yerleşen Rus ve Ukrayna vatandaşlarının etkisiyle, kiralık ve satılık konut-gayrimenkul fiyatlarının yükseldiği gözlemlenmektedir. Bu durum, bölgede hayat maliyetinin artmasına yol açmakta ve yerel halkın yaşam standartlarını olumsuz etkilemektedir.

Madde 6'daki dünyanın her yerinden turistlerle tanışmanın değerli bir deneyim olduğunu düşünmesine dair bulgulara göre, %4,4 katılmadığı, %90,7'sinin katıldığı, %4,9'nun ise ne olumlu ne de olumsuz bir görüş belirtmediği görülmüştür. Bu bulguların aritmetik ortalaması incelendiğinde ise katılımcıların memnuniyet oranının pozitif yönde (m:4,55) olduğu görülmüştür. Araştırmaya katılanların büyük bir çoğunluğu, turistlerle tanışmanın değerli bir deneyim olduğuna inanmaktadır. Bu bulgu, bölgedeki turistik ürün satıcılarının farklı kültürlere ve perspektiflere açık olduklarını, yeni insanlarla tanışmaktan çekinmediklerini ve başkalarının inançlarına, düşüncelerine ve bakış açılarına anlayış gösterdiklerini yansıtmaktadır.

Madde 7'deki COVID-19 pandemisinin turizm faaliyetlerini azalttığı düşüncesine ilişkin bulgulara göre, %4,7'nin katılmadığı, %89,1'nin katıldığı, %6,3'nün ise ne olumlu ne de olumsuz bir görüş belirtmediği görülmüştür. Bu bulguların aritmetik ortalaması incelendiğinde ise katılımcıların memnuniyet oranının pozitif yönde (m:4,52) olduğu görülmüştür. COVID-19 pandemisi ile ortaya çıkan seyahat kısıtlamaları ve sınırların kapatılması, dünya genelinde turizm faaliyetlerini önemli ölçüde etkilemiştir. Doğu Antalya Turizm Gelişim Bölgesi'nde turizm faaliyetleri neredeyse tamamen durma noktasına gelmiştir. Salgın döneminde birçok otel, seyahat acentesi ve tur operatörü faaliyetlerini geçici olarak durdurmuş, bu da binlerce turistik ürün satıcısı ve yerel halk için olumsuz sonuçlar doğurmuştur. Bölgedeki turizm faaliyetlerinin azalmasıyla birlikte, ekonomik ve sosyal açıdan birçok insan olumsuz etkilenmiştir.

Madde 8'deki turistik ürün satıcısının COVID-19 pandemisinin turizm ekonomisine zarar verdiği düşüncesine ilişkin bulgulara göre, %4,9'nun katılmadığı, %88,8'nin katıldığı, %6,3'nün ise ne olumlu ne de olumsuz bir görüş belirtmediği görülmüştür. Bu bulguların aritmetik ortalaması incelendiğinde ise katılımcıların memnuniyet oranının pozitif yönde (m:4,54) olduğu görülmüştür. Turistik ürün satıcılarının büyük bir bölümü, COVID-19 pandemisinin turizm ekonomisine olumsuz etkileri olduğunu düşünmektedir. Salgın, ülkemizde de diğer ülkelerde olduğu gibi ciddi kayıplara neden olmuştur.

Madde 9'daki COVID-19 salgınının turistlerin konaklama tercihlerinde değişiklikler yarattığına yönelik düşüncesine ilişkin bulgulara göre, %5,7'sinin katılmadığı, %82,9'nun katıldığı, %9,3'nün ise ne olumlu ne de olumsuz bir görüş belirtmediği görülmüştür. Bu bulguların aritmetik ortalaması incelendiğinde ise katılımcıların memnuniyet oranının pozitif yönde (m:4,39) olduğu görülmüştür. COVID-19 salgını, turistlerin konaklama

tercihlerinde bazı değişikliklere yol açmıştır. Bu süreçte turistler, kalabalık ortamlardan kaçınarak bireysel hareket edebilecekleri işletmeleri tercih etmeye başlamışlardır. Bu durum, bölgedeki işletmeler ve oteller için talebi azaltmış ve turistleri alternatif turizm türlerine yönlendirmiştir.

Madde 10'daki turistik ürün satıcısının, turistlerle karşılaştığı herhangi bir sorunla ilgili çözüm odaklı olduğuna ilişkin bulgulara göre, %2,2'sinin katılmadığı, %91,7'sinin katıldığı, %6'sının ise ne olumlu ne de olumsuz bir görüş belirtmediği görülmüştür. Bu bulguların aritmetik ortalaması incelendiğinde ise katılımcıların memnuniyet oranının pozitif yönde (m:4,52) olduğu görülmüştür. Bölgedeki turistik ürün satıcılarının büyük bir bölümünün, turistlerin ziyaretleri esnasında yaşadıkları zorluklarla aktif olarak ilgilendikleri ve bu sorunlara farklı çözüm yöntemleri arayışında oldukları bulunmuştur.

Madde 11'deki turistik ürün satıcısının, turistlerin yerel kültürü olumsuz etkilediğine yönelik düşüncesine dair bulgulara göre, %37,9'nun katılmadığı, %41,2'sinin katıldığı, %20,9'nun ise ne olumlu ne de olumsuz bir görüş belirtmediği görülmüştür. Bu bulguların aritmetik ortalaması incelendiğinde ise katılımcıların memnuniyet oranının pozitif yönde (m:3,09) olduğu görülmüştür. Yapılan analizler sonucunda, bu düşünceye katılanlar ile katılmayanlar arasında belirgin bir farklılık gözlenmemektedir. Ayrıca, turistik ürün satıcıları arasında turistlerin yerel kültürü olumsuz etkilediği düşüncesine karşı çıkanlar olduğu gibi, bunun yanı sıra turistlerin yerel kültürü olumsuz etkilediğini düşünenler de bulunmaktadır. Bu farklı düşüncelerin varlığı, turistik ürün satıcılarının turistlerle yaşadıkları kişisel deneyimlere bağlı olabilir.

Madde 12'deki turistik ürün satıcılarının, turistlerin her türlü inanışına saygı duymasına ilişkin bulgulara göre, %3,3'nün katılmadığı, %90,6'sının katıldığı, %6'sının ise ne olumlu ne de olumsuz bir görüş belirtmediği görülmüştür. Bu bulguların aritmetik ortalaması incelendiğinde ise katılımcıların memnuniyet oranının pozitif yönde (m:4,47) olduğu görülmüştür.

Madde 13'teki turistik ürün satıcılarının, uzun yıllar boyunca turistlerle iletişimini sürdürme durumlarına ilişkin bulgulara göre, %7,9'nun katılmadığı, %83,7'sinin katıldığı, %8,2'sinin ise ne olumlu ne de olumsuz bir görüş belirtmediği görülmüştür. Bu bulguların aritmetik ortalaması incelendiğinde ise katılımcıların memnuniyet oranının pozitif yönde (m:4,28) olduğu görülmüştür.

Madde 14'teki turistik ürün satıcısının turistlerin bölge halkının geleneksel yaşam şeklinde değişiklik meydana getirdiğine ilişkin bulgulara göre, %15,9'nun katılmadığı, %65,3'nün katıldığı, %18,7'sinin ise ne olumlu ne de olumsuz bir görüş belirtmediği görülmüştür. Bu bulguların aritmetik ortalaması incelendiğinde ise katılımcıların memnuniyet oranının pozitif yönde (m:3,71) olduğu görülmüştür. Araştırma sahasındaki turistik ürün satıcılarının büyük bir çoğunluğu, turistlerin bölge halkının geleneksel yaşam tarzında değişikliklere neden olduğuna inanmaktadır. Turizm, temelde insan ilişkilerine,

kültürel, toplumsal ve ekonomik etkileşimlere dayanan bir sektör olduğundan, bu bağlamda sosyal açıdan bazı değişikliklerin meydana gelmesi beklenen bir durumdur.

Madde 15'teki turistik ürün satıcılarının, turistlerin cana yakın olduğu yönündeki algılarına dair bulgulara göre, %19,5'in katılmadığı, %63,1'in katıldığı, %17,3'nün ise ne olumlu ne de olumsuz bir görüş belirtmediği görülmüştür. Bu bulguların aritmetik ortalaması incelendiğinde ise katılımcıların memnuniyet oranının pozitif yönde (m:3,66) olduğu görülmüştür. Turistik ürün satıcılarının büyük bir kısmı, turistlerin cana yakın oldukları düşüncesini benimsemektedir.

Madde 16'daki turistik ürün satıcılarının, turistlerin sosyal yaşam standartlarını yükselttiği düşüncesine ilişkin bulgulara göre, %7,4'nün katılmadığı, %84,1'nin katıldığı, %8,5'nin ise ne olumlu ne de olumsuz bir görüş belirtmediği görülmüştür. Bu bulguların aritmetik ortalaması incelendiğinde ise katılımcıların memnuniyet oranının pozitif yönde (m:4,18) olduğu görülmüştür.

Madde 17'deki turistik ürün satıcısının turistlerle etkileşimde olmasının yabancı dil seviyesini arttığını düşünmesine ilişkin bulgulara göre, %2,7'sinin katılmadığı, %90,4'nün katıldığı, %6,9'nun ise ne olumlu ne de olumsuz bir görüş belirtmediği görülmüştür. Bu bulguların aritmetik ortalaması incelendiğinde ise katılımcıların memnuniyet oranının pozitif yönde (m:4,56) olduğu görülmüştür. Araştırma sahasındaki katılımcıların büyük çoğunluğu, turistlerle etkileşimde bulunmanın yabancı dil seviyesini artırdığı görüşündedir.

Madde 18'deki turistik ürün satıcılarının, yıllara göre turist kalitesinde bir düşüş olduğu düşüncesine ilişkin bulgulara göre, %20,3'nün katılmadığı, %64,6'sının katıldığı, %15,1'nin ise ne olumlu ne de olumsuz bir görüş belirtmediği görülmüştür. Bu bulguların aritmetik ortalaması incelendiğinde ise katılımcıların memnuniyet oranının pozitif yönde (m:3,73) olduğu görülmüştür. Araştırma sahasındaki turistik ürün satıcılarının büyük bir bölümü, turist kalitesinde yıllara göre düşüş yaşandığına inanmaktadır. Bu durumun nedenlerinden biri olarak araştırma sahasını ziyaret eden turistlerin turizm bilincine sahip olmamaları halinin etkili olduğu ifade edilebilir.

Madde 19'daki turistik ürün satıcılarının, turistlerin bölge halkına karşı önyargılı tutum sergilediğini düşüncesine ilişkin bulgulara göre, %27,2'sinin katılmadığı, %47,8'nin katıldığı, %25'nin ise ne olumlu ne de olumsuz bir görüş belirtmediği görülmüştür. Bu bulguların aritmetik ortalaması incelendiğinde ise katılımcıların memnuniyet oranının pozitif yönde (m:3,35) olduğu görülmüştür. Araştırma, turistik ürün satıcılarının turistlerin bölge halkına karşı önyargılı olup olmadığına ilişkin algılarının farklı durumlarda olumlu ya da olumsuz olabileceğini göstermektedir.

Madde 20'deki turistlerin bölgede hayat pahalılığına neden olduğu düşüncesine yönelik bulgulara göre, %7,1'nin katılmadığı, %84,6'sının katıldığı, %8,2'sinin ise ne olumlu ne de olumsuz bir görüş belirtmediği görülmüştür. Bu bulguların aritmetik

ortalaması incelendiğinde ise katılımcıların memnuniyet oranının pozitif yönde (m:4,29) olduğu görülmüştür.

Madde 21'deki turistik ürün satıcılarının, bazı turistlerin çevreye karşı duyarsız davrandığı düşüncesine yönelik bulgulara göre, %26,1'nin katılmadığı, %56,3'nün katıldığı, %17,6'sının ise ne olumlu ne de olumsuz bir görüş belirtmediği görülmüştür. Bu bulguların aritmetik ortalaması incelendiğinde ise katılımcıların memnuniyet oranının pozitif yönde (m:3,49) olduğu görülmüştür. Araştırma sahasındaki turistik ürün satıcılarının çoğunluğu, ülkeyi ziyaret eden bazı turistlerin çevreye karşı duyarsız davranabileceği düşüncesini benimsemektedir.

Madde 22'deki turistik ürün satıcılarının, turistlerden Türkçe kelimeler duyduğunda mutlu olmalarına ilişkin bulgulara göre, %2,7'sinin katılmadığı, %91,8'nin katıldığı, %5,5'nin ise ne olumlu ne de olumsuz bir görüş belirtmediği görülmüştür. Bu bulguların aritmetik ortalaması incelendiğinde ise katılımcıların memnuniyet oranının pozitif yönde (m:4,56) olduğu görülmüştür. Elde edilen bulgular, turistik ürün satıcılarının turistlerden duydukları Türkçe kelimeler karşısında mutluluk yaşadığını göstermektedir.

Madde 23'teki turistik ürün satıcılarının, Doğu Antalya Turizm Gelişim Bölgesi'nde uygulanan 'Her Şey Dahil' (All-Inclusive) konseptinin turistik ürün satıcısını olumsuz yönde etkilediği düşüncesine ilişkin bulgulara göre, %5,5'nin katılmadığı, %84,4'nün katıldığı, %10,2'sinin ise ne olumlu ne de olumsuz bir görüş belirtmediği görülmüştür. Bu bulguların aritmetik ortalaması incelendiğinde ise katılımcıların memnuniyet oranının pozitif yönde (m:4,38) olduğu görülmüştür. Otellerde sunulan ücretsiz yeme-içme hizmetleri ve turistlerin hemen hemen tüm ihtiyaçlarını karşılayabileceği dükkanların otellerde bulunması, turistlerin alışverişlerini otellerde gerçekleştirmesine olanak tanımaktadır. Bu durum, çarşıda işletmesi bulunan turistik ürün satıcılarını zor bir durumda bırakmaktadır.

8. Sonuç ve Öneriler

Antalya ilinin turizm sektörü, bölgenin ekonomik yapısında belirgin bir role sahip olup, dünyanın dört bir yanından gelen turistlerin ilgisini çekmektedir. Bu durum üzerinde belirleyici olan faktörlerin temelinde esnafların, turistik ürün satıcılarının, yerel halkın tutum ve davranışları gelmektedir. Antalya'daki turistik ürün satıcıları, turizm sektöründeki büyüme ile iş hacimlerinin artmasından ve hem ulusal hem de yerel ekonomiye katkıda bulunmasından ötürü turizm gelirlerinden memnuniyet duymaktadırlar. Çünkü turistlerin bölgeye katkıları, turizm sektörünün canlanmasına, iş hacminin artmasına katkı sağlamaktadır. Bu durumda turistik ürün satıcılarının turizm gelirlerinin tatmin edici düzeylere çıkmasında ve ekonomik kazanç elde etmelerinde etkili olmaktadır. Bu araştırmanın amacı ise Doğu Antalya Turizm Gelişim Bölgesi'nde (Kundu, Belek, Side) faaliyet gösteren turistik ürün satıcılarının, turizme ve turistlere karşı tutumlarının belirlenmesi ve elde edilen verilerin analiz edilerek Doğu Antalya Turizm Gelişim Bölgesi'ndeki sorunların çözümüne yönelik öneriler sunmak ve turizm faaliyetlerinin

geliştirmesini sağlamaktadır. Bu nedenle Doğu Antalya Turizm Gelişim Bölgesi'nde (Kundu, Belek, Side) faaliyet gösteren turistik ürün satıcılarının, turizme ve turistlere karşı tutumlarının belirlenmesi amacıyla nicel araştırma yönteminden faydalanılarak Google formlar üzerinden 364 kişiye anket uygulanmıştır. Elde edilen bulgulara göre, Kundu, Belek ve Side gibi bölgelerdeki turistik ürün satıcılarının %81,3'ü, turistlerin bölge ekonomisine olumlu katkı sağladığını ifade ettiği görülmüştür. Turistlerin genellikle pek çok yerel işletmenin sunduğu hizmetlerden faydalandığı, bu işletmelerin, konaklama, yeme-içme, alışveriş ve turistik geziler gibi çeşitli aktiviteler için birçok hizmet sunmakta olduğu ifade edilmiştir. Bu nedenle, turizm sektörü, bölgedeki yerel ekonominin canlandırılmasında kritik bir rol oynamaktadır.

Turistlerin bölgeye olan ilgisi, konaklama, yeme-içme, alışveriş ve diğer turizm faaliyetleri için talebi artırmaktadır. Bu durum da bölgedeki ürün ve gayrimenkul fiyatlarının artmasına sebep olmaktadır. Her üç bölgede yapılan araştırma sonucunda turistik ürün satıcılarının %90,1'i turizm sebebiyle ürün ve gayrimenkul fiyatlarının yükseldiğini düşünmektedir. Fiyat artışlarını sınırlamak ve alım gücünü tekrardan yükseltmek amacıyla düşük vergi oranları sunulabilir.

COVID-19 pandemisi, Doğu Antalya Turizm Gelişim Bölgesi'nde, dünya genelinde olduğu gibi, turizm ekonomisine ciddi zararlar vererek bölgedeki turizm faaliyetlerini durma noktasına getirmiştir. Pandemi, Doğu Antalya Turizm Gelişim Bölgesi'ndeki turizm sektörünü büyük ölçüde etkilemiş olup, oldukça fazla ekonomik zararlar vermiş; Kundu, Belek ve Side gibi turistik bölgelerde faaliyet gösteren turistik ürün satıcılarının %89'u bu durumdan olumsuz etkilenmiştir. Bu zorlu dönemi atlatmalarına destek olmak amacıyla, devlet tarafından finansal yardım, kira desteği ve vergi kolaylığı gibi çeşitli destek paketleri sunulabilir. Beraberinde olumsuz etkilerin oranını azaltabilmek amacıyla yıl boyunca turistik ürün satıcıları ile çeşitli oteller, tatil köyleri ile anlaşmaların yapılabilmesi amacıyla devlet destekli kampanyalar oluşturulabilir.

COVID-19 pandemisi, turizm sektöründe önemli değişikliklere sebep olmuştur. Antalya'nın en popüler turistik destinasyonlarından biri olan Doğu Antalya Turizm Gelişim Bölgesi'nde de bu değişiklikleri gözlemlemek mümkündür. Araştırmaya katılan turistik ürün satıcılarının %84,9'u, pandeminin turistlerin konaklama tercihlerinde değişikliklere yol açtığına inanmaktadır.

Kundu, Belek ve Side bölgelerindeki turistik ürün satıcılarının (%84,4) oteller tarafından uygulanan "her şey dahil" sistemiyle ilgili memnuniyetsizlikleri yapılan araştırma kapsamında tespit edilmiştir. Araştırmaya katılan turistik ürün satıcılarının %84,4'ü, otellerin "her şey dahil" konseptiyle sunulan hizmetlerin yerel restoranlar, barlar ve dükkanlara olan talebi azalttığına ve bu durumun yerel ekonomiye zarar verdiğine inanmaktadır. Bu nedenle, araştırma sahasındaki turistik ürün satıcıları ile iş birliği yapılarak bu sorunlara yönelik çözümler geliştirilebilir ve yerel ekonomi desteklenebilir. Her şey dahil sisteme ortak anlaşmalar yapılarak turistik ürün satıcılarının dahil edilmesi sağlanabilir.

Turistik ürün satıcılarının %84,6'sı, bölgede yaşanan hayat pahalılığının turistlerin taleplerindeki artıştan kaynaklandığını düşünmektedir. Araştırma sahasındaki yerel halk ve turistik ürün satıcıları, hayat pahalılığının etkilerini büyük ölçüde hissetmektedir. Bu durumun etkilerini azaltmak ve her iki tarafın yaşam kalitesini artırmak amacıyla fiyat artışlarının kontrol altına alınması, devletin küçük ve orta ölçekli işletmelere destek sağlaması gerekmektedir.

Araştırma sahasındaki turistik ürün satıcılarının kalkınabilmesi için fiyat politikalarının adil ve dengeli olması turistik ürün satıcılarının güvenini artırabilir. Söz konusu adımlar, araştırma sahasındaki turistik ürün satıcılarının kalkınmasına yönelik destek sağlayarak turizmin Doğu Antalya Turizm Gelişim Bölgesi'nde gelişmesine katkı sağlayabilir. Turistik ürün satıcılarının karşılaştıkları sorunların azaltılması amacıyla devlet ve özel kurum ve kuruluşları çeşitli destek paketleri ile turistik ürün satıcılarının işletmelerini geliştirmelerine ve sürdürülebilir bir büyüme elde etmelerine yardımcı olabilir.

Kaynaklar

Acar, Y. (2020), "Yeni Koronavirüs (COVID-19) Salgını ve Turizm Faaliyetlerine Etkisi", *Güncel Turizm Araştırmaları Dergisi*, 4(1), 7-21.

Alaeddinoğlu, F. & A. Aliağaoğlu (2005), "Turizmde Plânlama ve Türkiye 'de Turizm Plânlaması: Turizm Plânlarının Etkinliği ve Başarılarına İlişkin Bir Değerlendirme", *Erdem*, 15(43), 87-118.

Altunyüzük, A.İ. (2022), "Coğrafi Özellikleri Yönüyle Belek'te (Antalya) Kongre Turizmi", *Yüksek Lisans Tezi*, Bursa Uludağ Üniversitesi Sosyal Bilimler Enstitüsü, Bursa.

Arüv, A. vd. (2008), *Antalya Kentinde Turizm Faaliyetlerini Kıyı Alanlarına Etkilerinin Belirlenmesi*, İnşaat Mühendisleri Odası.

Atça-Tonbil, S. (2019), "Türkiye'de Turizm Politikası ve Planlaması", *Yüksek Lisans Tezi*, İstanbul Üniversitesi Sosyal Bilimler Enstitüsü, İstanbul.

Aylan, S. & İ. Kaya (2020), "Turizm işletmelerinde Karşılaşılan Satıcı Tacizine (Hanutçuluk) Yönelik Müşteri Tutumlarının İncelenmesi: Burhaniye Örneği", *İşletme Araştırmaları Dergisi*, 12(4), 4065-4084.

Bekman, M. (2022), "Halkla İlişkiler Uygulamalarında Nicel Araştırma Yöntemi: İlişkisel Tarama Modeli", *Meriç Uluslararası Sosyal ve Stratejik Araştırmalar Dergisi*, 6(16), 238-258.

Çeken, H. & L. Ateşoğlu (2008), "Küreselleşme Sürecinde Turizm Endüstrisinin Avrupa Birliği ve Türkiye Ekonomisindeki Yeri ve Önemi", *Ticaret ve Turizm Eğitim Fakültesi Dergisi*, (1), 136-151.

Çeken, H. vd. (2008), "Turizm Talebine Bağlı Olarak Uluslararası Turizm Hareketlerindeki Gelişmeler", *Elektronik Sosyal Bilimler Dergisi*, 7(26), 72-77.

Demirkıran, M. vd. (2022), "Rusya- Ukrayna Savaşının Türkiye'deki Turizm Sektörüne Etkileri: Kriz Yönetimi Stratejileri Açısından Antalya İli Örneği İncelemesi", *İktisat İşletme ve Uluslararası İlişkiler Dergisi*, 1(1), 68-87.

Haberturizm (2023), <https://www.haberturizm.com/iste-rus-turistlerin-en-cok-tercih-ettigi-ulkeler/29224/>, 18.12.2023.

Kapan, K. & A.N. Timor (2018), "Turizm Gelişme Modellemeleri Açısından Antalya Şehri", *Türk Coğrafya Dergisi*, (71), 53-61.

Özdemir, M.Ç. & M.S. Salt (2019), "Esnaf Kültüründeki Değişim: Sakarya Esnafları Üzerine Bir Araştırma", *Bilgi*, 21(2), 364-398.

Sarı, C. & S. Bayraktar (2018), "Kemer'de Esnafın Turizm ve Turist ile İlgili Tutumları", *TÜCAUM 30. Yıl Uluslararası Coğrafya Sempozyumu*, 3-6 Ekim, Ankara.

Sarı, C. & Z. Saruhan (2019), "Alanya'da Turistik Ürün Satıcılarının Faaliyetleri ve Turist ile İlgili Tutumları", içinde: *İnsan ve Medeniyet Araştırmaları* (213-222), Çizgi Kitabevi Yayınları.

Sarı, C. (2007), "Antalya'nın Alternatif Turizm Kaynakları ve Planlaması", *Doktora Tezi*, Ankara Üniversitesi Sosyal Bilimler Enstitüsü, Ankara.

Sarı, C. (2014), "Bir Turizm Coğrafyası Araştırması: Antalya Turizminin Son On Yılı", *Coğrafyacılar Derneği Uluslararası Kongresi* (107-116), 4-6 Haziran, Muğla.

Şahbaz, R.P. & U. Akdu (2010), "Katılımcı Turizm Planlaması; Fethiye'de Alan Araştırması", *Balıkesir Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 13 (23), 152-170.

Şahin, M.T. vd. (2023), "COVID-19'un Seyahat Acenteleri Üzerine Etkisinin İçerik Analizi Yöntemi ile İncelenmesi: Antalya İli Örneği", *Sosyoekonomi*, 31(58), 231-248.

UNWTO (2020), *Impact Assessment of the COVID-19 Outbreak on International Tourism*, <https://webunwto.s3.eu-west-1.amazonaws.com/s3fspublic/2020-03/UNWTO-Impact-Assessment-COVID19.pdf>, 10.03.2020.

WHO World Health Organization (2022), *WHO Coronavirus Disease (COVID-19) Pandemic Dashboard*, 21.11.2022.

Yılmaz, H. & E. Yakut (2023), "COVID-19 Pandemisinin BİST Turizm Endeksi İşletmelerinin Finansal Performanslarına Etkisinin CRITIC Tabanlı COPRAS ve PROMETHEE Yöntemleri ile İncelenmesi", *Sosyoekonomi*, 31(58), 249-276.

Türkiye'de Serbest Liman Kentlerindeki Kamu Yatırımlarının ve Mali Teşviklerin Yerel Düzeydeki Ekonomik Büyüme Dinamikleri Üzerine Etkileri

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The Effects of Public Investments and Fiscal Incentives in Free Port Cities on Economic Growth Dynamics at Local Level in Türkiye

Abstract

In the study, from 2006 to 2019, in 11 cities with free zones and seaports in Türkiye, public investments and fiscal incentives were examined as economic growth dynamics at the local level. This is not only in a relational context; It is also put forward by considering the supportive and complementary context of investment expenditures to investments in the incentive system. A comparative empirical analysis is applied for 11 free port cities (Adana, Antalya, Bursa, İzmir, İstanbul, Kocaeli, Mersin, Rize, Samsun, Tekirdağ, Trabzon). Because port cities are at the centre of market relations (as functioning, processing, and mechanism) in the historical process, cities with free zones and seaports were specially selected for the study. Thus, in the empirical analysis applied through COPRAS, one of the multi-criteria decision-making methods, the current situation regarding the relationship between public investments and financial incentives and economic growth at the local level is determined in 11 free port cities. As a result of the findings, it was determined that while free port cities in Türkiye are expected to have a high growth potential, this is generally not valid at the local level.

Keywords : Free Zones, Port Cities, Public Investments, Fiscal Incentives, COPRAS.

JEL Classification Codes : O18, P48, R11.

Öz

Çalışmada, 2006-2019 döneminde Türkiye'deki serbest bölgesi ve deniz limanı olan 11 kentte; yerel düzeyde ekonomik büyüme dinamikleri olarak kamu yatırımları ve mali teşvik uygulamaları incelenmektedir. Bu durum sadece ilişkisel bağlamda değil; yatırım harcamalarının, teşvik sistemindeki yatırımları destekleyici ve tamamlayıcı bağlamı da dikkate alınarak ortaya koyulmaktadır. 11 adet serbest liman kenti (Adana, Antalya, Bursa, İzmir, İstanbul, Kocaeli, Mersin, Rize, Samsun, Tekirdağ, Trabzon) için karşılaştırmalı ampirik bir analiz uygulanmaktadır. Liman kentlerinin tarihsel süreçte piyasa ilişkilerinin (işleyiş, işlem ve mekanizma olarak) merkezinde olmasından hareketle çalışmada serbest bölgesi ile deniz limanı olan kentler özellikle seçilmiştir. Böylece, çok kriterli karar verme yöntemlerinden olan COPRAS aracılığıyla uygulanan ampirik analizde, 11 adet serbest liman kenti özelinde, kamu yatırımları ve mali teşvikler ile yerel düzeydeki ekonomik büyüme arasındaki ilişkiye dair mevcut durum saptaması yapılmaktadır. Bulgular

sonucunda Türkiye'deki serbest liman kentlerinin büyüme için yüksek potansiyellerinin olması beklenirken, bunun genel olarak yerel düzeyde geçerli olmadığı saptanmıştır.

Anahtar Sözcükler	:	Serbest Bölgeler, Liman Kentleri, Kamu Yatırımları, Mali Teşvikler, COPRAS.

1. Giriş

Gelişmekte olan ülkeler, 1980 sonrası küreselleşme sürecinde, sosyoekonomik yapılarına göre ekonomik büyümeye yönelik olarak çeşitli maliye politikası araçlarına başvurmuşlardır. Bu politika araçlarından en önemlisi yatırımlar ve teşviklerdir. Kamu kesimi, piyasa ilişkilerine müdahale ederek yatırım ve teşvik araçları ile sosyoekonomik yapıdaki sorunlu alanları çözmeyi hedeflemektedir. Ekonomik büyümeyi sağlamak ve sektörel rekabet seviyesine ulaşmak için kamu yatırımları ve mali teşvikler kullanılmaktadır (Recepoğlu & Değer, 2016: 7-8). Türkiye'deki iktisadi gelişme stratejileri; kamu kesimi kalkınma planları, orta vadeli ve yıllık programlar çerçevesinde detaylı incelendiğinde, ekonomik büyümenin esas hedef olduğu görülmektedir. Bu kapsamda uygulanan maliye politikaları; (bütçe kapsamında yer alan kamu yatırımları ve doğrudan bütçe kapsamında yer almayan mali teşvikler) ekonomik büyümeyi tamamlayıcı niteliktedir. Tamamlayıcı politikalar olarak kamu yatırımları ve mali teşvikler, kamu maliyesinde teorik bağlamı tartışılmakla birlikte, özellikle gelişmekte olan ülkelerde ekonomik büyüme için eşanlı olarak uygulanmaya devam etmektedir.

Kamu yatırımları, özellikle altyapı yatırımları (elektrik, gaz, telekom, su, yollar, köprüler, kanalizasyon, enerji, limanlar ve havaalanları), nitel ve nicel artışlar aracılığıyla; özel sektör için elverişli koşulların oluşmasını sağlayarak ekonomik büyümeye olumlu katkı sağlamaktadır (KB, 2018b: 51). Ekonomik büyümeye yönelik yerel düzeydeki uygulamalarla; ülkenin coğrafi konumu içeresinde bölgesel/kentsel alanlardaki sorunlara çözüm önerileri getirmektedir. Böylece, bölge ölçeğine ve kent seviyesine göre, mali teşvik düzenlemeleri ve kamu yatırım uygulamaları ile üretim ve tüketim alanında piyasalarda fayda yaratılmaktadır (Atakişi, 2012: 154). Türkiye'de, kamu yatırımları ile var olan altyapı güçlendirilirken, ek altyapı yatırımları yapılması gereği de sürekli artmaktadır. Çünkü hızlı kentleşme ve sürekli artan nüfus ile sanayinin gelişmesi ve ticaretin artması; altyapı yatırımları ihtiyacını beraberinde getirmektedir. Bununla birlikte, mevcut altyapı hem yoğunluk hem de standartlar bakımından gelişmiş ülkelerdeki seviyenin altındadır (KB, 2012: 20). Türkiye'de tarımsal üretim çeşitliliği, iklimsel değişimler ve sosyoekonomik yapılar açısından kuzey-güney ve doğu-batı bölgeleri arasında farklılıklar mevcuttur. Tarihsel süreçte, üretim ve ticaret bölgeleri olarak belirginleşen Batı-Kuzey Batı bölgelerinde/kentlerinde kurulan serbest bölgeler; deniz-hava limanları ile genişleyen ölçekte ve büyüyen alanda hızla cazibe merkezlerine dönüşmektedir (Atakişi, 2012: 154).

2000'lerde yeniden tasarlanan yerel yönetimler ile bölgesel gelişme anlayışı, gelinen noktada Türkiye'deki kentlerin potansiyellerini harekete geçirmekte yetersiz kalmaktadır. Böylece, bölge ölçeğindeki ve kent seviyesindeki yatırım harcamalarının ve teşvik

uygulamalarının, mevcut durum verili alındığında yerel düzeyde etkin ve verimli sonuçlar üretip üretmediği tartışılmaktadır (TÜRKONFED, 2017: 17). Çalışmada, 2006-2019 yılları arasında yerel düzeydeki ekonomik büyüme dinamikleri kamu yatırımları ve yatırımlara yönelik teşvikler itibariyle 11 adet kentte karşılaştırmalı olarak incelenmektedir[1]. Bu doğrultuda, döneme ilişkin ekonomik büyümeye yönelik maliye politikası araçları göz önünde bulundurularak; serbest bölgesi ve deniz limanı olan 11 adet kent (Adana, Antalya, Bursa, İzmir, İstanbul, Kocaeli, Mersin, Rize, Samsun, Tekirdağ, Trabzon) için karşılaştırmalı ampirik bir analiz uygulanmaktadır. Liman kentlerinin tarihsel süreçte piyasa ilişkilerinin (işleyiş, işlem ve mekanizma olarak) merkezinde olmasından hareketle ve potansiyellerini yüksek olması nedeniyle serbest bölgesi ile deniz limanı olan kentler seçilmiştir. Çalışmada, çok kriterli karar verme yöntemleri aracılığıyla uygulanmakta olan ampirik analizde; kamu yatırımları ve mali teşvikler ile yerel düzeydeki ekonomik büyüme arasındaki ilişki mevcut durum itibariyle 11 adet serbest liman kenti bazında karşılaştırmalı olarak incelenmektedir. Öncelikle serbest bölgeler ve yerel düzeydeki ekonomik büyüme ilişkisi ile Türkiye'deki serbest liman kentleri ve ekonomik büyüme dinamikleri hakkında bilgi verilmekte, daha sonra bu amaç kapsamındaki bulgular neticesinde kent bazlı spesifik değerlendirmeler yapılmaktadır. Sonuç bölümünde ise, genel bir değerlendirme ortaya koyularak, yerel düzeydeki maliye politikası temelli ekonomik büyüme dinamikleri üzerine ampirik katkı sunulması hedeflenmektedir.

2. Serbest Bölgeler ve Yerel Düzeyde Ekonomik Büyüme

1980 sonrası küreselleşme sürecinde, iktisadi performansın alanları kentler olmakta; iktisadi, politik ve demografik eğilimler kentleri önemli coğrafi konumlar haline getirmektedir. Artık sosyoekonomik yapıyı biçimlendiren ekonomik büyüme dinamikleri kentlerde mayalanmakta ve yine kentler üzerinden küresel ekonomiye yayılmaktadır (TÜRKONFED, 2017: 18). Bu süreçte gelişmekte olan ülkeler, ihracata yönelik sanayileşme modeli aracılığıyla küresel ekonomi ile bütünleşmelerini artırmaktadır. Ülkelerde ihracatı artırmak için de serbest bölgeler gündeme gelmektedir (Acar & Gültekin-Karakaş, 2017: 28). Aslında serbest bölgeler, iktisadi gelişme stratejileri arayışı neticesinde ortaya çıkmıştır. Çıkış noktası uluslararası ticaretten verimli olarak fayda sağlamak olsa da popülerlikleri küreselleşmeden kaynaklanmıştır. Küreselleşme; ulusal sınırların kalkmasını, yoğun uluslararası ticaretin kurulmasını, ülkeler arası gümrük duvarlarının yıkılmasını ve rekabetin artmasını getirmiştir. Bunlara iktisadi kaynaklarının kıtlaşması eklendiğinde, alternatif iktisadi gelişme stratejileri öne çıkmıştır. Böylece serbest bölgeler, çözüm aracı olarak farklı mali ayrıcalıklarla kurulmuştur (Makal & Yüzer, 2022: 186). Serbest bölgeler, sadece ticareti değil, ihracata yönelik üretimi de içermiştir. Gelişmekte olan ülkelerde ise, bir yandan dışa dönük iktisadi gelişme stratejisinin bileşeni haline gelmiş, diğer yandan üretimin küresel ölçekte yeniden yapılanmasında işlevsellik kazanmıştır. Serbest bölgeler;

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[1] 2006 yılında 5018 sayılı Kamu Mali Yönetim ve Kontrol Kanunu tümüyle uygulamaya girmiş ve performans esaslı bütçeleme sistemine geçilmiştir. 2019 yılı sonrasında ise, performans esaslı program bütçe sistemine geçilmiş ve olağanüstü bir süreç olan pandeminin iktisadi ve mali sonuçları kamu bütçesine yansımaya başlamıştır. Bu nedenlerle 2006-2019 yılları arası ampirik analiz için uygun bulunmuştur.

ucuz işgücü, doğal kaynaklara erişim, vergi ayrıcalıkları ve gelişmiş altyapılarıyla sermaye kesimi için çekici yatırım alanları haline gelmiştir (Acar & Gültekin-Karakaş, 2017: 28)[2]. Aslında gelişmekte olan ülkelerdeki serbest üretim ve tüketim bölgeleri, uluslararası iktisadi iş bölümünde, ihracata yönelik sanayileşme modelinin ve dışa dönük iktisadi gelişme stratejisinin parçası olarak anlam kazanmıştır. Türkiye'de, 1980'lerdeki serbest bölgeler özellikle liman kentlerinde bu süreçte ortaya çıkmıştır.

Serbest bölge terimlerinde farklılık ve çeşitlilik görülmektedir. Endüstriyel serbest bölgeler, ihracat işleme bölgeleri, yatırım geliştirme bölgeleri ve özel ekonomik bölgeler bunlardan birkaçıdır. Oluşan farklılıklar ülkelerin değişen iktisadi, politik ve demografik süreçlerinden kaynaklanmaktadır (Makal & Yüzer, 2022: 187-188). Genel olarak serbest bölgeler; uluslararası liman veya havaalanı yakınında özel amaçlarla kurulan, ülkenin gümrük alanı dışında tutularak gümrüksüz olarak malların ithal edilebildiği, depolanabildiği, çeşitli işlemlerden geçirilebildiği, üretim amacıyla kullanılabildiği ve malların ulusal gümrüğe girmediği müddetçe gümrük vergisinin tahsil edilmediği, diğer vergisel yükümlülüklerin ise asgari düzeye indirildiği alan olarak tanımlanmaktadır (Buyrukoğlu & Şimşek, 2022: 64). Uygulamada yaygın olarak kullanılan üç tür serbest bölge bulunmaktadır. Bunlardan ilki serbest ticaret bölgesi; gümrük vergisinden muaf olarak, transit ticaret, ihracat ve ithalat amaçlarıyla malların depolandığı ve hafif montaj faaliyetlerine izin verilen alandır. İkincisi serbest ticaret bölgelerine benzeyen serbest limandır. Serbest liman; bir hava ya da deniz limanında kurulan, ev sahibi ülkedeki gümrük mevzuatına tabi olmadan, yabancı malların yerel olarak tüketildiği veya satıldığı alandır. Üçüncüsü serbest üretim bölgesi ise, serbest ticaret bölgesinden farklı olarak; ihracata yönelik sınai üretim faaliyetlerini içermektedir (Acar & Gültekin-Karakaş, 2017: 23). Bu çerçevede finans, istihdam ve fiyat politikaları sektörün geneline yayılmadan önce, ilk olarak serbest bölge kapsamındaki liman kentlerinde uygulamaya geçirilmektedir (Acar & Gültekin-Karakaş, 2017: 29). Türkiye'de serbest bölgeler, Gümrük Bölgesi'nin bir parçasıdır. Bu bölgeler, ülkede dolaşımda olmayan eşyanın gümrük rejimine tabi tutulmaksızın ve serbest dolaşıma sokulmaksızın, gümrük mevzuatındaki haller dışında kullanılmamak ya da tüketilmemek kaydıyla kurulan yerlerdir. Bu nedenle ithalat vergileri, ticaret politikası ve kambiyo mevzuatı bakımından Gümrük Bölgesi dışındadır (Buyrukoğlu & Şimşek, 2022: 69). Başlangıçta kamu kesimi tarafından kuruluş maliyetleri üstlenilerek işletilen serbest bölgeler, 1980'lerden itibaren özel sektör inisiyatifinde faaliyet göstermektedir. Bunların kuruluş ve işletme maliyetlerinin; kamu kesimince üstlenildiği yapıdan, kamu-özel ortaklıklarınca üstlenildiği yapıya geçişin nedeni, özel sektör için karlı alana dönüşmesidir (Acar & Gültekin-Karakaş, 2017: 25).

Türkiye'de ihracata yönelik sanayileşme modeli çerçevesinde, 1980'li yılların sonlarında işlek liman kentleri olan Mersin, Antalya, İstanbul, İzmir, Adana ve Trabzon'da serbest bölgeler kurulmuştur. Liman kentlerindeki serbest bölgeler, ihracatı artıracağı ve

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[2] *Serbest bölgeler, uluslararası iktisadi iş bölümündeki rekabet ortamında sermaye kesimine rekabet gücü için uygun koşullar ve devlet müdahalelerinin azaltılmasıyla küresel çapta serbestlik kazandırmaktadır (Acar & Gültekin-Karakaş, 2017: 28).*

işsizliğe çözüm olacağı sebebiyle özellikle desteklenmiştir. Zamanla serbest bölgelerde gümrük muafiyetinin yanı sıra, gelire sağlanan vergi muafiyetleri de artmıştır (Öztürk vd., 2009: 367). Dışa dönük iktisadi gelişme stratejisine uygun olarak; 1985 yılında 3218 sayılı Serbest Bölgeler Kanunu kabul edilmiştir. Böylece ihracata dayalı üretim için yatırımlar ve teşvikler yoluyla döviz biçimindeki sermaye gereksinimi giderilmek istenmiştir[3]. Ancak serbest bölgelerin Türkiye'de, ekonomik fayda sağlamaya yönelik olarak kullanımı 1990'larda gerçekleşmiştir (Acar & Gültekin-Karakaş, 2017: 32). Türkiye'de 18 adet serbest bölge aktiftir. Aslında 1985'ten beri 21 adet serbest bölge kurulmuş fakat 3'ü istenilen ekonomik faydayı sağlayamadığı için kapatılmıştır[4]. Mersin ve Antalya ilk serbest bölgeler olmasına rağmen, süreç içinde ekonomik büyüme açısından aktif olan İzmir'deki serbest bölge olmuştur (Makal & Yüzer, 2022: 200).

Serbest bölgeler ülkedeki; politik sınırları içinde olmakla beraber gümrük hattı dışında sayılan, art alanlara ilişkin idari-mali düzenlemelerin uygulanmadığı, sanayi ve ticaret için geniş teşviklerin tanındığı ve diğer kısımlarından fiziksel olarak ayrılan yerlerdir. Küreselleşme ile serbest bölgelerin ortaya çıkışı ulusal ekonominin dışa açılma isteği ile ilgilidir. 1980 sonrası, bilişim teknolojilerinin ilerlemesiyle üretimin ve ticaretin birbirinden farklı bölgelerde yapılmasının sağlanması ve ulaşım ile vergi sorunlarının maliyet içinde önemli yer tutmaması serbest bölgelerin artmasına sebep olmuştur (Üçışık, 1998: 244). Buna karşın, iktisadi gelişme stratejileri için coğrafi konumun etkisi yadsınamaz olmakla beraber; 1980 sonrası süreçte artık ekonomik büyüme için konum avantajının faydası ve verimliliği ilk sıralarda yer almamıştır. Küreselleşmeyle; rekabet avantajı, pazar genişliği ve teknoloji düzeyi ulusal ekonomilerin gidişatında, coğrafi konum avantajından daha baskın rol oynamıştır (Makal & Yüzer, 2022: 208). Uygulamada, gelişmiş ülkelerde serbest liman; gelişmekte olan ülkelerde ise, serbest limanın yanında üretim bölgesi kurmak itibar görmüştür. Yoğun üretimin gerçekleştiği bölgelerdeki ürünler, ucuz işgücü sayesinde dünya emtia piyasalarında daha öne çıkmıştır. Bu şekilde, serbest liman kentleri kurmak çekici hal almıştır (Üçışık, 1998: 244). Ayrıca New York, Singapur, Hong Kong, Barcelona tarzı büyük kentlerin iktisadi gelişmişliğinin sebebi çok olmakla birlikte; tarihsel süreçte önemli liman kentleridir ve deniz limanlarına yakınlığın verdiği avantajla güç kazanmışlardır (Makal & Yüzer, 2022: 208)[5]. Serbest bölgelerin; Ortadoğu'nun ve Avrupa Birliği'nin yakınında, Akdeniz ve Karadeniz'deki deniz limanları, uluslararası havalimanları ve kara yolları yanındaki art alanlarda olması transfer kolaylığı açısından faydalı olmuştur (Çetinkaya & Bektaş, 2014: 58).

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[3]   3218 sayılı Serbest Bölgeler Kanunu'nun 1. maddesi: *"ihracata yönelik yatırım ve üretimi teşvik etmek, doğrudan yabancı yatırımları ve teknoloji girişini hızlandırmak, işletmeleri ihracata yönlendirmek ve uluslararası ticareti geliştirmek amacıyla serbest bölgelerin kurulması, yer ve sınırlarıyla faaliyet konularının belirlenmesi, yönetimi, işletilmesi, bölgelerdeki yapı ve tesislerin teşkili ile ilgili hususları kapsar.".*

[4]   Ticari faaliyetlerine devam etmeyen serbest bölgeler; İMKB Menkul Kıymetler, Doğu Anadolu ve Mardin Serbest Bölgesi'dir.

[5]   Ancak istikrarlı iktisadi gelişimleri yeni dünya düzeni kriterlerine uyum sağlamaları ile ilgilidir (Makal & Yüzer, 2022: 208).

Küreselleşme sürecinde gelişmekte olan ülkeler, dış ticaret dengelerini sağlamak ve ekonomik büyümelerini dinamik tutabilmek için uzun vadeli çözüm arayışındadırlar (Makal & Yüzer, 2022: 191). Aslında bu ülkeler için ekonomik büyüme, teorik ve pratik anlamda hep tartışılan konu olmaktadır. Tartışmalar kamu kesiminin ekonomik büyüme dinamikleri üzerindeki rolü etrafında yoğunlaşmaktadır. Bu çerçevede, kamu kesiminin; özel sektör yatırımlarının tamamlayıcısı niteliğindeki kamu yatırımları ile ekonomik büyüme üzerinde doğrudan ve dolaylı etkilere sahip olduğu ortaya koyulmaktadır (Değer & Doğanay, 2015: 77). Böylece kamu kesimine, ekonomik büyümede özel sektör yatırımlarını özendirici ve yatırım iklimini iyileştirici görevler verilmektedir. Bu kapsamdaki iki temel politika aracı kamu yatırımları ve mali teşviklerdir (Değer & Recepoğlu, 2018: 2). Bu araçlar yerel düzeydeki ekonomik büyüme için serbest bölgelere de devlet müdahalesinin parçası olarak katkı sağlamaktadır. Yerel düzeydeki ekonomik büyümeye etki eden faktörün de devlet müdahalesi olduğu görülmektedir (Makal & Yüzer, 2022: 191). Çalışmada da kamu kesimi ile özel sektörün rolleri açısından ekonomik büyüme dinamiklerinin yerel düzeydeki belirleyenleri olarak bu araçlar kullanılmaktadır.

Yerel düzeydeki ekonomik büyümenin birinci yolu olarak yatırım, sabit sermaye stokuna eklemede bulunan harcama akımıdır. Belirli mal ve hizmetlerin üretimine yönelik tesisler oluşturmak üzere kaynak tahsis edilmesi, üretim gücüne ve sermaye stokuna ilaveler yapılmasıdır. Yatırımlar iki farklı harcama bileşiminden oluşmaktadır: Bunun ilki, gelecekte üretim yapmak amacı ile cari dönemde üretilmiş dayanıklı mallar olarak sabit sermaye yatırımlarıdır[6]. İkincisi ise, aynı dönemde ara ve nihai tüketimin geleceğe ertelenmesinden kaynaklanan stoklardır. Kamu yatırımları tanımlanırken, stoklar kapsam dışı tutulmaktadır (KB, 2018b: 22). Kamu yatırımları, ekonomik büyümeye; bir yandan yerel düzeyde çarpan mekanizmasıyla doğrudan etki etmekte, diğer yandan özel sektör için yatırım ortamını iyileştirerek dolaylı olarak ivme kazandırmaktadır. Özellikle ulaşım, iletişim ve enerji altyapısındaki iyileşmeler, yatırım ortamını iyileştirmektedir. Eğitim ve sağlık yatırımları ile de beşerî sermayenin kalitesi artırılarak özel sektörü uyarıcı etkiler oluşturulmaktadır (Değer & Recepoğlu, 2018: 2). Kamu yatırımları, farklı mekanizmalarıyla iktisadi performans üzerinde etkiler yaratmaktadır. Toplam üretimi doğrudan etkileyerek, fiziki ve mali kaynakların çoğalmasını ve dolayısıyla yerel düzeydeki mali kaynak sorununun giderilmesini sağlamaktadır. Yine, kamu kesimi tarafından bölge ölçeğinde ve kent seviyesinde üstlenilen enerji, otoyol, havaalanı, liman ve altyapı yatırımları; yerel düzeydeki maliyetleri azaltarak, faktör girdilerinin verimini artırmaktadır. Bu altyapı yatırımlarının özel sektör yatırım kararlarında kolaylaştırıcı rol oynaması beklenmektedir (Erden & Karaçay-Çakmak, 2005: 17).

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[6] *Sabit sermaye yatırımları içerik olarak arsa bedeli, bina inşaat giderleri (ana fabrika bina ve tesisleri, yardımcı işletmeler bina ve tesisleri, ambarlar, idare binaları, sosyal tesisler, arazi düzenlemesi ve hazırlık yapıları), ana fabrika makine-teçhizat giderleri ve diğer yatırım harcamalarından (yardımcı işletme makine teçhizat, mefruşat, ithalat ve gümrükleme, taşıma ve sigorta, montaj, taşıt araçları ve işletmeye alım giderleri, etüt ve proje, genel giderler ve diğer giderler) oluşmaktadır (KB, 2018b: 22).*

Yerel düzeydeki ekonomik büyümenin diğer yolu ise, özel sektöre kamu kesimi tarafından verilen ve firmaların maliyetlerini azaltan veya gelirlerini artıran teşviklerdir. Teşvikler vasıtasıyla kamu kesimi, firmaların belirli sektörler ve bölgelerde yoğunlaşmasına imkân vermektedir (Değer & Recepoğlu, 2018: 2). Teşvik, doğrudan ve dolaylı olarak ikiye ayrılmaktadır. Buna göre, ilgili kuruma ya da firmaya doğrudan düşük faizli borç para veya hibe sağlanması doğrudan teşviktir. Dolaylı teşvikler ise, ilgili kurum ya da firma yatırımı gerçekleştirdikten sonra uygulanan KDV istisnası, gümrük vergisi muafiyeti, gelir vergisi indirimi gibi yararlanıcıyı yatırım sonrasında destekleyen istisnalardır. Buradaki amaç, piyasa ilişkilerine zarar vermeden iktisadi gelişmenin sağlanmasıdır (KB, 2018a: 3-4)[7]. İktisadi performansa yönelik önemli sektörlerde ve faaliyet alanlarında, özel sektörü destekleyici mali teşvikler verilerek yerel düzeydeki ekonomik büyüme hızlandırılmaktadır. Bu durum için kullanılacak belli iktisadi araçlar vardır. Bunlar, ekonomik faaliyetleri teşvik tedbirleriyle belirli yerlere yönlendirmek ve bölgesel gelişme için gerekli kamu yatırımlarını gerçekleştirmektir. Bu iktisadi araçların başarısı için, devletin doğrudan müdahalesi gerekmektedir (Değer & Recepoğlu, 2018: 5-6).

Türkiye'de 1980 sonrası iktisadi gelişme stratejisine göre; kamu kesimi tarafından farklı araçlarla ve şekillerde mali teşvikler kullanılmaktadır. Türkiye'de; vergi indirimi, gümrük vergisi muafiyeti, KDV istisnası ve gelir vergisi stopaj desteği araçları olarak başvurulan vergisel teşvikler, sistemin önemli parçasıdır. Vergisel teşvikler, yatırımlar ve istihdam üzerinde olumlu etki yaratarak, ekonomik büyümeye katkı sağlamaktadır. Vergisel teşviklerin, yatırımlar üzerindeki etkisinin olumlu olduğu literatürdeki çalışmalarla desteklenmektedir (Gürler-Hazman & Karakuş-Büyükben, 2020: 209)[8]. 2000 sonrasında Türkiye'deki yatırım teşvik sistemi dört başlıkta şekillenmektedir. Bunlar; bölgesel teşvik, büyük ölçekli yatırımların teşviki, stratejik yatırımların teşviki ve genel teşvik uygulamalarıdır. Bu dört başlık altında; yatırımcılara katma değer vergisi istisnası, gümrük vergisi muafiyeti, vergi indirimi, sigorta primi işveren hissesi desteği, gelir vergisi stopajı desteği, sigorta primi desteği, faiz desteği, yatırım yeri tahsisi ve KDV iadesi unsurları sunulmaktadır (Recepoğlu & Değer, 2016: 14). Serbest bölgelerde ise; gelir ve kurumlar vergisi, gelir vergisi stopajı, damga vergisi ve harç, gümrük ve emlak vergisi ile taşımacılıkta KDV imalatçı kullanıcılar için tümüyle istisna edilmiştir (Yılmaz, 2021: 71).

1980 sonrasında gelişmekte olan ülkelere, dışa dönük iktisadi gelişme stratejileri çerçevesinde artan oranda finansal sermaye gelmiştir. Böylece, uluslararası sermaye hareketlerinin sınırlamalardan özgürleşmesiyle, serbest bölgeler; finansal sermayenin arttığı, özel sektöre ilişkin alt sözleşmelerin yoğunlaştığı ve mal ile hizmetlerden oluşan küresel düzeydeki hareketin geçtiği temel mekanlar haline gelmiştir (Ercan, 1996: 66-67). Bu doğrultuda, yerel düzeydeki toplumsal aktörlerin ulus-üstü ölçeğe yönelik stratejiler

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[7] *Doğrudan teşvikler yatırım gerçekleşirken özel sektör üzerindeki maddi yüke ortak olurken, dolaylı teşvikler ise yatırım gerçekleştikten sonra yatırımın sürdürülebilirliğini sağlamaktadır. Böylece özel sektör riski paylaşılmaktadır (KB, 2018a: 4).*

[8] *Vergisel teşviklerin, ekonomik büyümeye etkisi incelendiğinde elde edilen bulgular, bu etkinin pozitif olduğu şeklindedir.*

oluşturup uygulamaya koyması, kamu kesimi içindeki mekânsal biçimlerin yeniden ölçeklendirilmesi dinamiğiyle birleşerek; yerel-bölgesel-ulusal-uluslararası-küresel düzeylerdeki üretim ve ticaret ilişkilerini karmaşıklaştırmıştır (TÜRKONFED, 2017: 19). Ayrıca serbest liman kentleri arasındaki artan rekabetten, yerel düzeydeki toplumsal aktörler aynı şekilde faydalanamamaktadır. Bu nedenle yerel düzeyde etkin toplumsal aktörler; ulusal, uluslararası ve küresel düzeydeki yönelimlere göre stratejiler tanımlamak ve öncelikleri doğrultusunda yeni mali teşvikler aramak durumundadırlar. Üstelik mekânsal biçimlerin yeniden ölçeklendirilmesinin sınırları, farklı düzeydeki iktidar ilişkilerinin ve güç dengelerinin bileşenleri uyarınca belirlenmektedir (TÜRKONFED, 2017: 22)[9].

Gelişmekte olan ülkelerde serbest bölgeler, küreselleşme sürecinde avantajlar sağlamaktadır. Türkiye de gelişmekte olan ülke olarak, benzer süreçten geçmektedir. Gelişmekte olan ülkeler yoğun işgücü gerektiren sektörlerde uzmanlaşarak, yabancı sermaye odaklı iktisadi gelişme göstermektedir. Türkiye de yoğun işgücü gerektiren sektörlere odaklanmakta, ancak serbest bölgelerde yabancı sermayeden çok, ulusal sermaye etkin olmaktadır[10]. Serbest bölgeler, gelişmekte olan ülkelerde; ticari teşvik sağlamada önemlidir ve ihracatların büyük kısmı buradan gerçekleşmektedir. Çünkü bu bölgede; ithalatta ve ihracatta vergi avantajları ile mali teşvikler sağlanmaktadır. Buradaki önemli unsur, özel sektör önündeki kısıtlamaların kaldırılmasıdır. Ayrıca, vergi avantajlarının yanında politik ve yapısal avantajlar da sunulmaktadır (Makal & Yüzer, 2022: 192-193). Deniz limanı olan kentlerdeki serbest bölgeler ise; kamu kesiminin büyük ağırlığının bulunması ve özel sektörü de doğrudan etkilemesi nedenleriyle, ihracata yönelik sanayileşme modelinde yerel düzeydeki ekonomik büyüme dinamiği haline gelmektedir. Türkiye'de de sınırlı mali kaynakların yerel düzeyde etkin ve verimli olarak kullanılması, ekonomik büyüme dinamiklerine yönelik maliye politikalarının oluşumu açısından önemlidir. Maliye politikaları, yerel düzeydeki iktisadi performansa yönelik önemli araçtır ve etkili kullanılarak ekonomik büyüme ile serbest liman kentleri arasındaki farklılık asgari düzeye indirilmektedir (Yavuzdurmaz & Karadağ, 2014: 650). Ayrıca hareketsiz nokta olarak deniz limanları, çoğunlukla ithal malı ürünlere dayalı arz temelli ve ihracat için üretim yapan pazara dönük sanayi odaklarını cezbetmektedir (Kocaman, 2007: 116). Ancak Türkiye'de serbest liman kentleri arasında; iktisadi performans açısından dengesizlikler hala vardır.

Sonuç olarak, serbest bölgelerdeki mali teşvikler üretimin ve ihracatın artırılması için önem arz etmekte olup, kamu yatırımları da özel sektörü bölgesel/kentsel alanlara çekmektedir. Üretim ve işgücü maliyetlerinin azaltılmasına ön ayak olan teşvikler ile serbest bölgelerde; yatırımların artırılması, yüksek teknoloji ürün üretimine ağırlık verilmesine yönelik Ar-Ge faaliyetlerine girişilmesi ve ekonominin girdi ihtiyacının ucuz olarak temin edilmesi ekonomik büyüme açısından önemlidir (Yılmaz, 2021: 76). Ayrıca özel sektöre

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[9] *Bu durumda, iktisadi gelişmeden pay almak amacıyla yerel düzeydeki toplumsal aktörlerin bir araya gelip ekonomik büyüme koalisyonları oluşturmasını her zaman başarılı kılmamaktadır (TÜRKONFED, 2017: 22).*

[10] *Gelişmiş ülkeler başta yoğun işgücü gerektiren sektörlere odaklanmış, şimdi ise teknoloji odaklı faaliyetlere doğru gelişim göstermiştir. Türkiye'deki serbest bölgelerde böyle bir gelişimin gerçekleşmesi varsayılmaktadır (Makal & Yüzer, 2022: 192).*

beşerî sermayenin ve Ar-Ge faaliyetlerinin artırılması için kamu kesiminin yeterli teşvikleri sağlaması gerekmektedir. Buna ek olarak, mali teşvikler sonucu oluşan üretim faaliyetlerinin tamamlayıcısı olarak kamu yatırımları da gerekli düzeyde olmalıdır (Değer & Recepoğlu, 2018: 4). Türkiye'de yerel düzeyde büyüme dinamiğinde kullanılan araçlar iktisadi sektörlere ve coğrafi konumlara göre farklılaşmış teşvik sistemidir. Bu da kentlerin gelişmişlik seviyelerine göre farklı oranlardadır. Aslında teşvikler temelde mali olarak gruplandırılmaktadır[11]. Mali teşvikler dışında kullanılan diğer araç ise, kamu yatırımlarıdır. Kamu yatırımları, 1980 sonrasında başlangıçta etkin araç olarak kullanılmasına karşın, 2000 yıllarda azalmıştır. Böylece, yerel kalkınmada kamu yatırımlarının kullanılmasından vazgeçilmiş, ihracata yönelik sanayileşme modeli bağlamında ekonomik büyüme için özel sektör yatırımlarına öncülük verilmiştir (İncekara & Kılınç-Savrul, 2011: 100-101). Ayrıca serbest bölgelerde, özel sektör için iş yapmayı zorlaştıran dâhilde işleme rejimi kolaylaştırılarak ve KDV iadeleri hızlandırılarak ihracatın geliştirilmesi istenmiştir. Son yıllarda Türkiye'de teknolojik değişimin sağlanması amacı için serbest bölgelerdeki teşviklerin, orta ve yüksek teknolojili yatırımlara da tanınması talep edilmektedir (KB, 2018a: 57-59). Kısaca, devlet müdahalesi yöntemleri olarak kamu yatırımlarının ve mali teşviklerin; ekonomik büyüme üzerinde derin etkisi bulunmaktadır. Bu çalışmada da Türkiye'deki kamu kesimi desteklerinin karşılaştırmalı olarak düzeyleri incelenmektedir. Kamu yatırımları ve mali teşvikler, yerel düzeydeki ekonomik büyüme dinamikleri olarak değerlendirilmekte, böylece ihracata yönelik sanayileşme modelinin gelişiminde devlet müdahalesinin etkisi maliye politikası araçları ile yakalanmak istenmektedir.

3. Literatür

Kamu harcaması niteliğindeki yatırımlar ve mali teşvikler akademik literatür bağlamında ele alındığında; bunların büyük ölçüde ekonomik büyüme ve bölgesel gelişme üzerindeki etkisine yönelik ampirik değerlendirme niteliğinde olduğu görülmektedir. Türkiye özelinde yapılan çalışmaların özeti aşağıda yer alan tablo aracılığıyla gösterilmektedir.

Yazarlar	Bölgeler/İller ve Dönem	İlişki	Yöntem	Sonuç
Karaçay-Çakmak ve Erden (2004)	12 adet düzey 1 alt bölgesi (1991-2000)	Kamu kredi yatırım ve teşviklerinin özel yatırım üzerine etkisi	Panel EKK, Sabit ve Rassal Etkiler Modeli	Kamu yatırım ve teşvikleri gelişmiş bölgelerde dışlayıcı (negatif), azgelişmiş bölgelerde ise tamamlayıcı (pozitif) etkiye sahiptir.
Gerni, Değer ve Emsen (2009)	Türkiye'nin illeri 1991 -2000 dönemi	İllerdeki yatırım teşvikleri ile diğer ekonomik faktörlerin illerin GSYH'leri üzerinde etkisi	Yatay-kesit Regresyon Analizleri	Gelişmiş illerin ekonomik büyümesinde yatırım teşviklerinin anlamlı ve pozitif etkileri mevcuttur.
Gülmez ve Yalman (2010)	Sivas ilindeki 38 adet KOBİ (2007)	Yatırım teşviklerinin Sivas'taki firmaların üretimine etkisi	Yüz Yüze Anket ve Ki-Kare Testi	Yatırım teşvikleri firmaların üretimini olumlu etkilemektedir.
Şahin ve Uysal (2011)	Türkiye'nin 7 coğrafi bölgesi (2002-2009)	Yatırım teşvikleri ve bölgesel kalkınma	Değişim Payı Analizi	Bölgesel kalkınmaya yatırım teşviklerinin olumlu etkisi yoktur.
Yavan (2012)	Türkiye'nin 81 ili (2000)	Yatırım teşviklerinin bölgesel ekonomik büyümeye etkisi	Yatay Kesit Regresyon Analizi	Bir bölgede teşvik kapsamında yatırımların artması bölgenin GSYH'si artırmaktadır.

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[11] *Bunlar; gelir ve gümrük vergisi indirimi, vergi, resim ve harç istisnası, uzun vadeli ve düşük faizli teşvik fonu, devlet iştiraki ve faizsiz kredi, döviz tahsisinde öncelik, enerji ve istihdam desteği, kamu arazi, bina ve tesislerinin satış ve kiralanması, devlet garantisi, organize sanayi bölgeleri ve küçük sanayi siteleri kurmak gibi araçlardır (İncekara & Kılınç-Savrul, 2011: 100).*

Gerni, Sarı, Sevinç ve Emsen (2015)	26 adet düzey 2 bölgesi ve 81 il (2004-2012)	Yatırım teşvikleri ve bölgesel kalkınma	Yakınsama Analizi	Yatırım teşvikleri bölgesel düzeyde gelir yakınsamasını pozitif yapmaktadır.
Sevinç, Emsen ve Bozkurt (2016)	26 adet düzey 2 alt bölgesi (2004-2012)	Bölgesel gelişme için yatırım teşviklerinin belirleyicileri ve etkinliği	Panel Eşbütünleşme, Nedensellik ve Sabit Etkiler	Türkiye'deki bölgesel teşviklerin yetersiz olduğu sonucuna varılmıştır.
Recepoğlu ve Değer (2016)	Türkiye'nin düzey 2 bölgeleri (2004-2011)	Bölgesel yatırım teşviklerin yerel düzeydeki ekonomik büyüme üzerindeki etkileri	Panel Eşbütünleşme ve Nedensellik Analizleri	Türkiye'de yatırım teşvikleri uzun dönemde yerel düzeydeki ekonomik büyümede pozitif etki yapmaktadır.
Değer ve Recepoğlu (2018)	Türkiye'nin 81 ili (2004-2014)	Türkiye'de yerel düzeyde ekonomik büyümenin belirleyeni olarak kamu yatırımları ile yatırım teşviklerinin etkileri	Dinamik Panel Nedensellik Testleri	Tüm iller için hem yatırım teşviklerinden hem de kamu yatırımlarından ekonomik büyümeye tek yönlü nedensellik ilişkisi vardır.
Baykul, Işık-Maden ve Kutgi (2019)	Türkiye'nin 26 düzey 2 bölgesi (2017)	Türkiye'de kamu yatırım teşviklerinin bölgesel düzeydeki etkileri	Veri Zarflama Analizi	TR 26 düzey 2 bölgesinde 2017 yılı yatırım teşviklerinin istihdam üzerindeki etkileri saptanmıştır.
Gürler - Hazman ve Karakuş - Büyükben (2020)	TR33 bölgesindeki iller (2004 -2017)	Vergisel nitelikli teşviklerin bölge ekonomisine etkisi	Panel Regresyon Analizi	TR33 bölgesi açısından vergisel teşvikler ile ekonomik sonuçlar arasındaki ilişki zayıftır.
Kara ve Taş (2012)	Türkiye'nin bölgeleri (2004-2008)	Ulaştırma-haberleşme altyapı yatırımlarının bölgesel gelişmeye etkisi	Panel Veri Analizi	Ulaştırma-haberleşme altyapı yatırımları bölgesel geliri pozitif etkilemektedir. Ayrıca görece gelişmiş ve azgelişmiş bölgelerde ulaştırma-haberleşme altyapı yatırımları bölgesel gelişmede pozitif etkiye sahiptir.
Aybarç, Selim ve Kızılgöl (2019)	Türkiye'deki 81 ili (2005-2015)	Turizme yönelik teşvik politikaları açısından illerin teknik etkinliği	Veri Zarflama Analizi	Doğu bölgelerdeki illere göre Ege ve Akdeniz bölgelerindeki illerin turizm açısından daha etkin olduğuna ulaşılmıştır.
Ekinci ve Yüce (2019)	Şırnak ilinde ve ilçelerinde faaliyet gösteren firmalar (2019)	Firmaların teşviklerden yararlanma düzeyi ve teşviklere bakış açıları	Frekans Analizi	Firmaların istihdam ve ihracat teşviklerinde yararlanarak, olumlu etkisi olduğu sonuca ulaşılmıştır.

Ayrıca Mutlu ve Başer (2020) tarafından Antalya özelinde turizm yatırım teşvikleri, mikro nitelikli incelemeye de yer verecek şekilde detaylı şekilde ele alınmıştır. İnceleme sonucunda turist profilindeki değişme, kültür, turizm ve koruma bölgelerindeki doluluğun artması sebepleriyle Antalya'da teşvik başvuruları azalırken, iptal edilen teşvik başvurularının da arttığı sonucuna ulaşılmıştır. Bu çalışmada ise literatürden farklılaşan iki temel bağlam bulunmaktadır. İlk olarak inceleme kapsamı Türkiye geneli, 81 il, spesifik bir kent ya da bölge özelinde değil; liman kentlerinden oluşmaktadır. Nitekim kamu yatırımlarının ve mali teşviklerin etkisini inceleyen ampirik literatürde serbest liman kentleri özelinde bir inceleme bulunmazken; liman kentleri ile ilgili literatürün (Ünlü, 2009; Ballı, 2015; Ürkmez, 2016; Ünlü, 2020) tarihsel süreçteki gelişim bağlamında olduğu görülmektedir. İkinci olarak, kamu yatırımları ve mali teşvikler; alternatif politikalar olarak ya da ilgili yerel ve ulusal düzeylerde sosyoekonomik yapı üzerindeki etkisi bağlamında değerlendirilmemiştir. Buna karşın kamu yatırımları ve mali teşvikler, yatırımlara yönelik tamamlayıcılık niteliği bağlamında karşılaştırmalı ampirik yöntemle ele alınmıştır. Böylelikle ilgili literatüre inceleme kapsamı ve sorunsal itibariyle katkı sunulması hedeflenmektedir.

4. Ampirik Değerlendirme

Bu bölümde, 2006-2019 yılları arasında serbest liman kentlerindeki ekonomik büyüme dinamikleri, yerel düzeydeki kamu yatırımları ve mali teşvikler bağlamında

karşılaştırmalı istatistiki temelle bir değerlendirmeye tabi tutulmaktadır. Burada öncelikle araştırmanın amaç ve kapsamı; sonrasında ise, elde edilen bulgular oraya konulmaktadır.

4.1. Araştırmanın Amacı ve Kapsamı

Araştırmanın amacı 2006-2019 dönemi itibariyle, Türkiye'de serbest liman kentlerindeki yatırım teşvik sistemi kapsamındaki yatırım düzeyi farklılığını, kamu yatırım düzeyi ve farklılığı ile karşılaştırmalı olarak ortaya koymaktır. Bununla birlikte ilgili kamu yatırımları alt kalemler itibariyle incelendiğinde, yatırımların teşvik sistemi kapsamındaki yatırımların alternatifi olacak şekilde yeni yatırım niteliğinde olmayıp, esas olarak bakım onarım, alt yapı yatırımları şeklinde olduğu görülmektedir. Buna bağlı olarak çalışmanın amacı doğrultusunda söz konusu farklılık sadece ilişkisel bağlamda değil, kamu yatırımlarının teşvik sistemi kapsamındaki yatırımları tamamlayıcı bağlamı da dikkate alınarak incelenmektedir.

Araştırmanın kapsamını, Türkiye'deki serbest bölgesi ve deniz limanı bulunan 11 kentin (Marmara bölgesinde Tekirdağ, İstanbul, Kocaeli ve Bursa; Ege bölgesinde İzmir; Akdeniz Bölgesinde Antalya, Mersin ve Adana; Karadeniz bölgesinde ise Samsun, Trabzon ve Rize); 2006-2019 dönemi için kişi başına GSYH büyüme oranları, yatırım programı başlangıç ödenek tutarları, yatırım teşvik sistemi kapsamında yapılan yatırım tutarına ilişkin veriler oluşturmaktadır. Bu kapsamda; TÜİK kişi başı GSYH verilerinden, Strateji ve Bütçe Başkanlığı yatırım programı başlangıç ödenekleri veri setinden ve Sanayi ve Teknoloji Bakanlığı 2021 yılı teşvik veri setinden yararlanılmıştır.

Şekil: 1
Serbest Bölgesi ve Deniz Limanı Bulunan Kentler

Kaynak: Geoda programı kullanılarak yazarlar tarafından oluşturulmuştur.

4.2. Araştırma Yöntemi

Çalışma kapsamında, araştırmanın amacı doğrultusunda kentler itibariyle bir durum saptaması yapabilmek için karşılaştırmalı değerlendirmeye imkân veren COPRAS

(Complex Proportional Assessment) yani Karmaşık Nisbi Değerlendirme yöntemi uygulanmaktadır. Çok kriterli karar verme yöntemi olan COPRAS 1996 yılında geliştirilmiştir (Zavadskas & Kaklauskas, 1996). Yöntemde çok kriterli değerlendirme, kriter değerlerinin maksimize ve minimize edilmesi esasına dayanarak gerçekleştirilmektedir. Bununla birlikte maksimize ve minimize edilen kriterlerin değerlendirme sonuçları üzerindeki etkisi de her bir kriter bazında ayrıca görülmektedir. Bu nedenle karşılaştırmalı karmaşık değerlendirmelerde oldukça tercih edilen bir yöntemdir (Podvezko, 2011: 138).

7 aşamalı süreçten oluşan yöntemin 1. aşamasında x_{ij} değerlerinden oluşan karar matrisi oluşturulmaktadır. 2. aşamada söz konusu karar matrisi, eşitlik 1 aracılığıyla normalize matrise dönüştürülmektedir.

$$x_{ij}^* = \frac{x_{ij}}{\sum_{i=1}^{m} x_{ij}} \forall ij = 1,2, \dots , n \tag{1}$$

3. aşamada kriterlere verilen önem doğrultusunda, normalize matris elemanları ağırlıklandırılarak, ağırlıklandırılmış normalize karar matrisi oluşturulmaktadır.

$$d_{ij} = w_j * x_{ij}^* \quad i=1,\dots,n; \ j=1\dots k \tag{2}$$

4. aşamada ağırlıklandırılmış matristeki değerler eşitlik 3 ve eşitlik 4 ile tanımlandığı şekliyle maksimize ve minimize kriterler için toplanmaktadır.

$$S_{i+} = \sum_{j=1}^{k} d_{ij} \ j=1, 2,\dots k \ (\text{maksimize kriterler}) \tag{3}$$

$$S_{i-} = \sum_{j=k+1}^{n} d_{ij} \ j=k+1 , \ k+2 , \dots , n \ (\text{minimize kriterler}) \tag{4}$$

5. aşamada göreceli önem değeri, her alternatif için eşitlik 5 aracılığıyla hesaplanmaktadır.

$$Q_i = S_{i+} + \frac{\sum_{i=1}^{m} S_{i-}}{S_{i-} \sum_{i=1}^{m} \frac{1}{S_{i-}}} \ i=1,\dots,n \tag{5}$$

6. aşamada en yüksek göreceli önem değeri, eşitlik 6 aracılığıyla hesaplanmaktadır.

$$Q_{max} = \text{en büyük } \{Q_i\} \ \forall i = 1,2, \dots , m \tag{6}$$

7. aşamada performans endeksi, eşitlik 7 aracılığıyla hesaplanmaktadır.

$$P_i = \frac{Q_i}{Q_{max}} * 100 \tag{7}$$

4.3. Analiz Bulguları

Yöntemin ilk aşaması olarak karar matrisi elde edilmiştir (Tablo 1).

Tablo: 1
Karar Matrisi

Karar Alternatifleri	Kriterler		
	Ekonomik Büyüme	Kamu Yatırımları	Mali Teşvikler
Adana	0,125917371	5.259.962.000	36.027.938.655
Antalya	0,121360362	12.351.956.000	33.059.694.396
Bursa	0,121197531	7.279.054.000	71.782.486.113
İzmir	0,12510282	14.590.243.000	141.737.132.579
Kocaeli	0,122991296	6.588.152.000	72.848.396.769
Mersin	0,125841367	5.687.476.000	108.756.203.655
Rize	0,123339554	2.488.213.000	1.405.555.759
Samsun	0,124474265	4.352.745.000	10.773.332.654
Trabzon	0,122945727	3.178.788.000	4.380.198.679
İstanbul	0,12495318	66.007.566.000	238.969.240.260
Tekirdağ	0,120385435	3.262.021.000	41.481.163.559

Yönteminin ikinci aşaması olarak, birinci eşitlik aracılığıyla, karar matrisi normalize matrise dönüştürülmüştür (Tablo 2).

Tablo: 2
Normalize Karar Matrisi

Karar Alternatifleri	Kriterler		
	Ekonomik Büyüme	Kamu Yatırımları	Mali Teşvikler
Adana	0,113116	0,085144908	0,074937846
Antalya	0,109022279	0,199945581	0,06876392
Bursa	0,108876002	0,117828681	0,149307041
İzmir	0,112384261	0,236177543	0,294812188
Kocaeli	0,110487404	0,1066448	0,151524127
Mersin	0,113047723	0,092065232	0,2262121
Rize	0,110800257	0,040277604	0,002923546
Samsun	0,111819607	0,070459458	0,022408452
Trabzon	0,110446468	0,051456192	0,009110781
İstanbul	0,091978182	0,503697002	0,313928718
Tekirdağ	0,08861586	0,024892149	0,054492907

Yöntemin üçüncü aşaması olarak, ikinci eşitlik aracılığıyla, ağırlıklandırılmış normalize karar matrisi oluşturulmuştur. Burada kriterlere verilen önemin belirlenmesi dolayısıyla kriterlerin ağırlıklandırılması sübjektif olarak gerçekleştirilmiştir. Araştırmanın amacı doğrultusunda kriterlerin eşit ağırlıkta olduğu varsayılmıştır (Tablo 3).

Tablo: 3
Ağırlıklandırılmış Normalize Karar Matrisi

Karar Alternatifleri	Kriterler		
	Ekonomik Büyüme	Kamu Yatırımları	Mali Teşvikler
Adana	0,037705333	0,028381636	0,024979282
Antalya	0,03634076	0,066648527	0,022921307
Bursa	0,036292001	0,039276227	0,049769014
İzmir	0,03746142	0,078725848	0,098270729
Kocaeli	0,036829135	0,035548267	0,050508042
Mersin	0,037682574	0,030688411	0,075404033
Rize	0,036933419	0,013425868	0,000974515
Samsun	0,037273202	0,023486486	0,007469484
Trabzon	0,036815489	0,017152064	0,003036927
İstanbul	0,030659394	0,167899001	0,104642906
Tekirdağ	0,02953862	0,008297383	0,018164302

Yöntemin dördüncü aşaması olarak, üçüncü ve dördüncü eşitlik aracılığıyla, maksimize ve minimize kriterler için ağırlıklandırmış normalize matristeki değerler toplanmıştır (Tablo 4). Buna yönelik öncelikle maksimum ve minimum yönlü kriterler belirlenmiştir. Buna göre ekonomik büyüme ve kamu yatırımları maksimum yönlü; yatırım teşvikleri ise minimum yönlü kriter olarak belirlenmiştir.

Tablo: 4
Maksimize ve Minimize Kriterler Toplamı

Karar Alternatifleri	S_{i+}	S_{i-}
Adana	0,066086969	0,024979282
Antalya	0,102989287	0,022921307
Bursa	0,075568228	0,049769014
İzmir	0,116187268	0,098270729
Kocaeli	0,072377401	0,050508042
Mersin	0,068370985	0,075404033
Rize	0,050359287	0,000974515
Samsun	0,060759689	0,007469484
Trabzon	0,053967553	0,003036927
İstanbul	0,198558395	0,104642906
Tekirdağ	0,037836003	0,018164302

Yöntemin beş ve altı ve yedinci aşamalarında, eşitlik 5 aracılığıyla, göreceli önem değeri; eşitlik 6 aracılığıyla en yüksek göreceli önem değeri; eşitlik 7 aracılığıyla ise performans endeks değeri hesaplanmıştır. Yapılan hesaplamalardan hareketle de karar alternatifleri sıralanmıştır (Tablo 5).

Tablo: 5
Alternatifler için Göreceli Önem Değeri ve Performans Endeksi

Karar Alternatifleri	Q_i	P_i	Sıralama
Rize	0,240545383	100	1
İstanbul	0,199757993	83,04378608	2
Trabzon	0,103698632	43,10979938	3
Antalya	0,069867869	29,04560795	4
İzmir	0,069830856	29,03022081	5
Samsun	0,068222618	28,36164085	6
Bursa	0,052246673	21,72008956	7
Adana	0,052232185	21,71406665	8
Kocaeli	0,050870969	21,14817951	9
Mersin	0,047980044	19,94635846	10
Tekirdağ	0,04474678	18,60221938	11

Performans endeksi 100 olan alternatif maksimize edilen değerlerin minimize edilen değerlere göre daha yüksek olduğu alternatiftir. Performans endeks değeri en yüksek alternatif, ekonomik büyüme ve kamu yatırımlarının göreli olarak yüksek, yatırım teşviklerinin ise göreli olarak düşük olması durumudur. Sıralama ise performans indeks değerlerinin büyükten küçüğe sıralanmasıyla elde edilmiştir. Buna göre, ilk sıradaki alternatif %100 performans endeks değerine sahip olan Rize, son sıradaki alternatif ise % 18,60 performans endeks değeri ile Tekirdağ'dır.

Genel itibariyle sıralamanın ortaya koyduğu durum, kamu yatırım düzeyine göre teşvik sistemi kapsamındaki yatırımların düzeyidir. Buna göre de sıralamada baştan sona doğru gidildikçe, yani performans endeks değeri azaldıkça, kamu yatırım düzeyine göre

teşvik sistemi kapsamındaki yatırım düzeyi artmaktadır. Bu bağlamda karar alternatiflerinin göreceli önem değerleri ve performans endeks değerleri karşılaştırmalı olarak incelendiğinde, alternatifler arasındaki farklılığın oldukça yüksek olduğu dikkat çekicidir. Bu durum, karar matrisi aracılığıyla da görülebileceği gibi (Tablo 1) ilgili dönemde söz konusu kentlerin ekonomik büyüme oranları arasında belirgin bir farklılık olmamasına rağmen, kamu yatırımları ve teşvik sistemi kapsamındaki yatırım düzeyleri arasındaki belirgin farklılıktan kaynaklanmaktadır. Bununla birlikte, özellikle ilk sırada yer alan alternatif (Rize) ile ikinci sırada (İstanbul) ve özellikle de üçüncü sırada yer alan alternatif (Trabzon) arasındaki performans endeks değeri arasındaki farklılık çok yüksektir. Bunun nedeni ise, Rize'de hem kamu yatırım düzeyi hem de teşvik sistemi kapsamındaki yatırım düzeyi diğer kentlerden düşük olmasına rağmen, diğer kentlerin aksine Rize'nin kamu yatırım düzeyi, teşvik sistemi kapsamında yapılan yatırım düzeyinden yüksek olan tek il olmasıdır. Nitekim son sıralardaki kentlere bakıldığında (Tekirdağ, Mersin, Kocaeli, Adana, Bursa) teşvik sistemi kapsamındaki yatırım düzeyinin kamu yatırım düzeyinden oldukça yüksek olduğu (20 katına kadar) görülmektedir. Diğer taraftan sıralamada ilk sıralara yakın olan kentlerde de teşvik sistemi kapsamındaki yatırım düzeyinin kamu yatırım düzeyinden oldukça yüksek olduğu durumlar (İstanbul, İzmir) bulunmaktadır. Bu durumun temel sebebi ise İstanbul ve İzmir'de teşvik sistemi kapsamındaki yatırımların yüksekliğine rağmen, bu kentlerin söz konusu 11 kent arasında kamu yatırım düzeyinin en yüksek olduğu kentler olmasıdır. Nitekim benzer bir durum Antalya için de geçerlidir.

5. Genel Değerlendirme

Serbest bölge kurulduğu zaman; teşvik, muafiyet ve istisna uygulamalarıyla bölgesel/kentsel alanın var olan gizli karşılaştırmalı üstünlüklerini ortaya çıkararak, yeni sanayi odaklarını çekmesi ve ticaret ağlarını cezbetmesi beklenmektedir (Kocaman, 2007: 118). Bununla birlikte Türkiye'deki liman kentleri incelendiğinde, bölgeler/kentler arasında iktisadi performans açısından dengesizliğin belirgin düzeyde olduğu görülmektedir. Bu literatür kapsamında serbest liman kentleri arasındaki ekonomik büyümeye etki eden bölgeler arası farklılıkların asgari düzeye indirilmesi için, maliye politikası araçlarının etkili şekilde uygulanması gerekli görülmektedir (Yavuzdurmaz & Karadağ, 2014: 650). Bu doğrultuda analiz bulguları, serbest bölgesi bulunan 11 adet liman kenti arasında iktisadi performans açısından dengesizliğin nedenlerini ortaya koyarak karşılaştırmalı olarak değerlendirilmektedir.

Serbest bölgeler, tarihsel süreçteki işlevlerinden iktisadi gelişmede yüklendikleri misyona kadar köklü değişimler yaşamıştır. Transit taşımacılık faaliyetlerinin gerçekleştiği alanlardan serbest finansal faaliyetin gerçekleştirildiği alanlara evrilen serbest bölgelerin coğrafi konum tercihlerinde de benzer bir durum vardır. Öncelikle serbest bölgeler, liman ve sınır bölgelerine yakın alanlarda tercih edilmiştir. Günümüzde ise serbest bölgelerin yer seçimi daha karmaşık bir hal almıştır (Makal & Yüzer, 2022: 207). Serbest bölgeler gelir ve istihdamı artırmak, imalat sanayi ihracat artışını sağlamak ve bu yolla döviz gelirlerini yükseltmek için kurulması teşvik edilen ayrıcalıklı alanlardır (Acar & Gültekin-Karakaş, 2017: 26). 1960'larda popülerlikleri artan serbest bölgelerin Türkiye'deki kurulma süreci

daha geç gerçekleşmiştir. Dışa dönük iktisadi gelişme stratejisinin parçası olarak 1985-2000 yılları arasında kurulan 18 serbest bölgenin ilki Mersin'de kurulmuştur (Makal & Yüzer, 2022: 213). Türkiye'nin kapasite olarak birinci, ihracat hacminde ise ikinci olan Mersin Limanı, Anadolu'dan üç ayrı yerden (Akdeniz ile İç ve Güneydoğu Anadolu) gelen ürünlerin deniz yoluyla uzak pazarlara ihracatını mümkün kılmaktadır. Adana ise, karayolu üzerinden Ortadoğu pazarlarına açılan kapıdır. Adana-Mersin bölgesindeki ticari faaliyetlerin önemli kollarından biri lojistiktir ve bu alandaki ekonomik büyüme dinamiği devam etmektedir. Dahası Mersin Limanı; ulusal, uluslararası ve küresel düzeylerde yüksek potansiyeli ile öne çıkan bir limandır (TÜRKONFED, 2019: 62).

Samsun'un dış ticaret açısından sahip olduğu potansiyel, kentin çok taraflı taşımacılığa uygun altyapısı ve coğrafi konumundan kaynaklanmaktadır. Karadeniz bölgesindeki ve iç kesimlerindeki kentlerin deniz yoluyla dış pazarlara açılmasını mümkün kılan Samsun; sahip olduğu limanlar, ulusal demiryolu, karayolu ağındaki konumu ve kargo taşımacılığı yapılabilen havalimanı ile potansiyel lojistik merkezi konumundadır (TÜRKONFED, 2017: 99). Ayrıca sahip olduğu ılıman iklim ile Doğu ve Batı Karadeniz'den farklılaşarak küçük üreticiliğin nispeten yaygın olduğu sosyoekonomik yapıya sahiptir (Keskin & Yaman, 2016: 217). Ancak dış ticaret açısından sahip olunan potansiyelin, ekonomik büyüme dinamiği olarak hayata geçirildiğini söylemek zordur (TÜRKONFED, 2017: 99). Bu durum, 2000'lerin başında Samsun'da büyük etkisi olan TEKEL'in özelleştirilmesi ile yakından ilişkilidir. 2000'lerde tütün üretiminde merkez niteliğindeki Samsun'da üretim gerilemiş, küçük atölyeler kapanmış ve üretilen sigaradan sağlanan kar küresel şirketler tarafından transfer edilmiştir. Böylelikle kentteki genç nüfus, potansiyel açısından önemli tütün üretiminden uzaklaşarak, İstanbul'a ve Bursa'ya göç etmiştir (Keskin & Yaman, 2016: 220-223). Bursa ise, Marmara Denizi çevresindeki ekonomik büyüme dinamiğinin önemli odaklarından biridir. Bunun ileri seviyelere vardırılması için kentin ulaşım ve lojistik bağlantıları kuvvetlendirilmelidir. Ancak, Bursa burada geride kalmaktadır. Altısı Gemlik, biri Mudanya ilçesinde olmak üzere toplamda 7 limana sahip olsa da bu limanların görece düşük kapasitede olması ve üretim alanlarıyla bağlantılarının yeterli nitelikte olmaması nedenleriyle lojistik sektörü halen karayollarına dayanmaktadır. Gemlik Liman Bölgesine ve serbest bölgeye demiryolu bağlantısının olmayışı kentteki lojistiği ve limanları olumsuz yönde etkilemektedir (TÜRKONFED, 2017: 75). İzmir, sahip olduğu altyapı, beşerî sermaye, ulaşım ve lojistik imkanlarıyla ülkenin yerel düzeyde güçlü ekonomik büyüme dinamiklerinden biridir. İzmir Alsancak Limanı, yüksek kapasitesiyle en büyük konteynır ihracat limanıdır. Batı ve İç Anadolu bölgelerinin ihracatının büyük bölümü bu limandan gerçekleştirilmektedir (TÜRKONFED, 2017: 55). Antalya ise, düşük kapasiteli limana sahiptir. Ayrıca ulusal demiryolu ağıyla bağı olmayan Antalya'nın ulaşım ve lojistik altyapısı, yerel düzeydeki ekonomik büyüme dinamiğine kıyasla yetersizdir (TÜRKONFED, 2017: 99).

Trabzon özel sektör yatırımcıları açısından ne Rize kadar sınırlı ne de Samsun kadar cazciptir. Rize ile benzer şekilde Doğu Karadeniz ili olan Trabzon'un, coğrafi konumu dezavantaj oluşturmaktadır. Buna karşın Samsun kadar olmasa da art alan avantajı Trabzon'u Rize'den farklılaştırmaktadır. Bununla birlikte ithalat limanı niteliğinde olan ve

ihracat için elverişli bir art alana sahip olmayan Trabzon limanı fındık ihracatındaki yerine rağmen, kapasitesinin çok altında çalışarak sönen konumdadır (Haspolat, 2016: 69). İstanbul ise, sadece coğrafi konum ve art alan avantajı değil; sahip olduğu sanayi ve finans merkezi niteliği ile de bütün serbest bölgesi bulunan liman kentlerden farklılaşmaktadır. Ancak yapılan analizde İstanbul'un hem performans puanın yüksekliği hem de Rize ile en çok benzerlik gösteren il durumunda olması hem kamu yatırım düzeyi hem de teşvik kapsamında yatırım düzeyinin yüksekliğine rağmen, yatırım düzeyine göre teşvik kapsamındaki yatırım düzeyinin göreli olarak düşük olmasından kaynaklanmaktadır. Bu durum ise Rize ve Trabzon'un aksine İstanbul'un özel sektör yatırımcıları tarafından tercih edilmesine rağmen, kentin kamu yatırımları ile de desteklenme düzeyi göz önünde bulundurulduğunda teşvik sistemi kapsamında daha da fazla özel sektör yatırımı beklentisine yol açmaktadır. Ancak kentin bulunduğu alan itibariyle etrafındaki kentlerin de özel sektör yatırımcıları açısından cazip niteliği yatırımların bölge içinde dağılmasına yol açmaktadır. İstanbul; Tekirdağ'dan Kocaeli'ne, hatta Bursa'ya uzanan coğrafi konumda işlevsel olarak kendisini eklemleyerek Marmara Denizi etrafına yayılmış geniş bir bölge ölçeği oluşturmaktadır. Bu büyüklükteki kent, bölgesel/kentsel alanların ekonomik büyüme dinamiklerini artırmaktadır (TÜRKONFED, 2017: 23). İstanbul Limanı merkezli lojistik sistemi çok merkezli olmakta ve Marmara Bölgesi'ndeki deniz taşımacılığı İzmit Körfezi'nden Tekirdağ'a uzanan geniş sahaya yayılan özel sektör ve kamu kesimi liman işletmelerinin oluşturduğu ağ üzerinden işler hale gelmektedir (TÜRKONFED, 2017: 66).

Serbest liman kentleri, analiz bulguları bağlamında bütün olarak değerlendirildiğinde ilk sırada yer alan Rize'nin diğer 10 ilin tamamından önemli ölçüde farklılık gösterdiği görülmektedir. Serbest bölgesi bulunan liman kenti olmasına rağmen gerek kamu yatırım düzeyi gerekse yatırım teşvik sistemindeki yatırım düzeyi oldukça düşüktür. Bununla birlikte kamu yatırım düzeyinin teşvik kapsamında yapılan yatırım düzeyine göre yüksekliği, Rize'nin söz konusu süreçte özel sektör yatırımlarını çekecek hale dönüşemediğini göstermektedir. Bu durum diğer kentlerin aksine Rize'nin coğrafi konumu ile sanayi odağı olmaması ve ticaret ağlarının içinde bulunmaması nedenleriyle açıklanabilir. Trabzon ve İstanbul ise, bütün kentlerden farklılık göstermektedir. İstanbul için teşvik sistemi kapsamındaki yatırımların göreli düşüklüğü çevre kentlerin yatırım çeken niteliği ile açıklanabilir. Trabzon'da kamu yatırım düzeyi yüksek olmamakla birlikte, benzerlik gösterdiği kentler bulunmaktadır. Ancak Trabzon'daki esas belirleyici, kamu yatırım düzeyine göre teşvik kapsamındaki yatırımların göreli düşüklüğüdür. Bu durum Trabzon'un coğrafi konum dezavantajı da göz önünde bulundurulduğunda özel sektör yatırımları açısından tercih düzeyinin düşüklüğünü göstermektedir. İzmir ve Antalya'nın sıralamada daha üstte yer almalarının nedeni ise teşvik kapsamındaki yatırımların göreli olarak düşüklüğü değil; aksine teşvik kapsamındaki yatırım düzeyi yüksekliğine rağmen kamu yatırım düzeylerindeki önemli ölçüdeki yüksekliktir. Dolayısıyla İzmir ve Antalya, özel sektör yatırımcıları açısından tercih edilen serbest liman kenti olmakla birlikte mevcut kamu yatırım düzeyi göz önünde bulundurulduğunda teşvik kapsamındaki yatırımların daha da yüksek olması beklenmektedir. Nitekim daha önce de Makal ve Yüzer (2022: 200) tarafından belirtildiği gibi Antalya ilk serbest bölgelerden olmasına rağmen ekonomik

büyüme açısından diğer bölgelerin gerisinde kalmaktadır. Bununla birlikte Antalya düşük kapasiteli bir limana sahip olup, ulaşım ve lojistik alt yapısı da yetersizdir (TÜRKONFED, 2017: 99). Sıralamada sonda yer alan Samsun, Bursa, Adana, Kocaeli, Mersin, Tekirdağ kentlerinde ise kamu yatırım düzeyi yüksek olmamasına rağmen, özel sektör için yatırım bölgesi olarak tercih edilmelerinde coğrafi konumlarının, sanayi odaklarının ve ticaret ağlarının genişlikleri de göz ardı edilemez.

6. Sonuç

1980 sonrası küreselleşme sürecinde, mekânsal biçim üzerinden iktisadi gelişme stratejileri bölgesel/kentsel alanları büyütmüş ve genişletmiştir. Mekânsal biçimin yeniden ölçeklendirilmesine dayalı devlet müdahalesi; bölge ölçeği ve kent seviyesi kavrayışlarını da değiştirmiştir (Çınar, 2009: 280). İşte mekânsal biçim olarak serbest bölgeler, bu süreçte ana hatlarıyla üç açıdan şekillenmiştir. İlki, serbest bölgeler; iktisadi ve mali avantajla çevrelenmiş üretim alanları için sanayi odakları olmaktadır. Aynı zamanda, çok uluslu şirketlerin küresel ekonomideki coğrafi konumunu güçlendirmektedir. İkincisi, bölgesel gelişme ve yerel kalkınma kapsamında aracı yeni iktisadi performans alanları olarak ortaya çıkmaktadır. Üçüncüsü ise, lojistik ve liman odaklı ekonomik büyüme dinamiği gösteren ticaret ağlarını ifade etmektedir. Ülkelerin değişen ihtiyaçlarına göre şekillenen serbest liman kentleri, iktisadi gelişmeyi yönlendirici kutuplar olmakta; zamanla gösterdikleri ekonomik büyüme ile kompleks bir yapıya ve daha geniş iktisadi performans alanlarına dönüşmektedir (Makal & Yüzer, 2022: 189).

Günümüzde serbest bölgeler; ülkenin egemenlik sınırlarında bulunmakla birlikte gümrük sınırları dışında yer alan, değişik amaçlara hizmet eden, sanayi ve ticaret açısından daha fazla teşvik gören ve sınırları belirlenerek yoğun olarak korunan alanlar olmaktadır (Gümüş, 2007: 48). Bu çalışmada; kamu yatırımları ve mali teşviklere yönelik maliye politikası araçlarının yerel düzeyde ekonomik büyüme dinamiği üzerindeki etkisinden yola çıkarak Türkiye'de serbest bölgesi ve deniz limanı olan kentler ele alınmaktadır. Çünkü serbest bölgeler, yerel düzeyde üretilen ürünleri hedef pazarlara kolayca ve düşük maliyetlerle ulaştıran alanlara kuruldukları zaman, işlem hacimlerinde artışa imkân vermektedir. Dolayısıyla serbest bölgeler ulaşım maliyetlerini azaltacak şekilde deniz limanı olan kentlerde kurularak, yerel düzeydeki ekonomik büyüme üzerinde daha anlamlı etkilere yol açmaktadır. Serbest liman kentlerine yönelik ampirik tahminler de bunu desteklemektedir. Yani gelişmiş durumdaki deniz limanı olan kentlerde kurulan serbest bölgeler, burada yeni iktisadi performans sağlamaktadır (Öztürk vd., 2009: 375). Ayrıca Türkiye'nin sürdürülebilir ve kapsayıcı bir ekonomik büyüme süreci yakalamasına yönelik olarak, serbest liman kentlerinin potansiyellerinin açığa çıkarılması için yerel düzeydeki yatırımların ve teşviklerin tamamlayıcı rolü önem kazanmaktadır (TÜRKONFED, 2017: 17). Diğer taraftan gelişmekte olan ülkelerde ulaşım sektörü büyük liman kentlerinden dallanan ağaç biçimindedir. Böylelikle nüfus bu limanlar etrafında yoğunlaşırken geniş art alanlar boş kalmaktadır. Böylece özel sektörün ulaştırma maliyetlerini azaltmak için fazla alternatifi de kalmamaktadır (Kocaman, 2007: 120).

Çalışmada, ilgili literatürde yerel düzeydeki ekonomik büyümenin iki temel politika aracı olarak kabul edilen kamu yatırımları ve mali teşvikler temelinde, serbest bölgesi ve deniz limanı olan 11 adet kent 2006-2019 dönemi itibariyle karşılaştırmalı ampirik temelli incelenmiştir. Yapılan incelemeyle, serbest liman kentlerinde; ekonomik büyüme ve teşvik sistemi kapsamındaki yatırımların tamamlayıcısı niteliğindeki kamu yatırım düzeyine göre, yatırım teşvik sistemi kapsamında yapılan yatırım düzeyi farklığının ortaya koyulması amaçlanmıştır. Bu doğrultuda uygulanan çok kriterli karar verme yöntemlerinden olan COPRAS ile kentler arası karşılaştırma imkânı da sağlanmıştır. Böylelikle serbest bölge liman kenti niteliğindeki 11 ilin kamu yatırım düzeyleri ve teşvik sistemi kapsamındaki yatırım düzeyleri arasındaki ilişkide kentlerin coğrafi konumları ve ekonomik bütünleşme düzeyleri gibi faktörlerin önemli olduğu görülmektedir. Bununla birlikte yapılan istatistiki analiz sonucunda ulaşılan sıralama ile kamu yatırım düzeyine göre teşvik sistemi kapsamında yapılan yatırım düzeyi ortaya koyulmuştur. Buna göre de sıralamada sondan başa doğru gidildikçe, yani performans endeks değeri yükseldikçe, kamu yatırım düzeyine göre teşvik sistemi kapsamındaki yatırım düzeyi azalmaktadır. Bu durum ise coğrafi konumda ve sosyoekonomik yapıda kentlere özgü durumların yanı sıra, ilgili dönemde kamu yatırımlarının bakım onarım ağırlıklı içeriği göz önünde bulundurulduğunda, teşvik sistemi kapsamındaki yatırımların artırılması için kamu yatırımların içeriğinde değişiklik yapılması gerekliliği ile açıklanabilir.

Nihayetinde analiz ve sonucunda ulaşılan bulgular neticesinde, teşvik sistemi kapsamındaki yatırımların düşük olduğu serbest liman kentlerinde, altyapı ve lojistik ihtiyacını giderecek nitelikte kamu yatırım düzeyi ihtiyacının bulunduğu saptanmıştır. Bu doğrultuda, mali teşvikler kapsamındaki faaliyetlerin gerçekleşebilmesi için; kamu yatırımları ile destekleniyor olması ya da doğrudan kamu bütçesi kaynaklı yatırımların belli bir düzeye ulaşmış olması gerektiği görülmektedir. Böylelikle maliye politikası araçlarının uygulanması sürecinde serbest liman kentlerinde; iktisadi performans açısından bölgeler arasındaki dengesizliklerin giderilmesi, gerekse yeni sanayi odaklarının gelişmesi, uluslararası iktisadi işbölümüne dahil olunması, ulusal rekabet gücünün yüksek kılınması ve küresel ticaret ağlarının olası etkilerinin karşılanması için, kamu yatırımları ile mali teşvikler arasındaki tamamlayıcılık ilişkisinin öneminin göz ardı edilmemesi gerektiği düşünülmektedir.

Kaynaklar

Acar, S. & D. Gültekin-Karakaş (2017), "Dünyada ve Türkiye'de Serbest Bölgeler", *Marmara İktisat Dergisi*, 1(1), 21-35.

Akan, Y. & İ. Arslan (2008), "Türkiye'de Sektörel Yatırım Teşvik Belgeleri ile İstihdam Analizi: Doğu Anadolu Bölgesi Üzerine Bir Uygulama 1980-2006", *Çalışma ve Toplum Dergisi*, 1(16), 107-119.

Atakişi, A. (2012), "Bölgesel Farklılıkların Oluşumu: Yeni Ekonomik Coğrafya Yaklaşımı", *İstanbul Üniversitesi İktisat Fakültesi Mecmuası*, 62(2), 153-175.

Ay, H.M. (2005), "Yatırım Teşviklerinin Sabit Sermaye Yatırımları Üzerindeki Etkisi", *Selçuk Üniversitesi Karaman İktisadi ve İdari Bilimler Dergisi*, 5(2), 176-184.

Aybarç, S. vd. (2019), "Türkiye'de Turizme Yönelik Kamu Teşvik Politikaları Çerçevesinde İllerin Etkinlik Analizi", *Eskişehir Osmangazi Üniversitesi İktisadi ve İdari Bilimler Dergisi*, 14(1), 129-148.

Ballı, E. (2015), "Modernleşme Çağında Karadeniz'de Bir Liman Kenti: Bartın", *Ordu Üniversitesi Sosyal Bilimler Enstitüsü Sosyal Bilimler Araştırmaları Dergisi*, 5(12), 510-541.

Baykul, A. vd. (2019), "Bölgesel Kalkınma Politikası Aracı Olarak Kamu Yatırımları ve Teşvikler: Türkiye'de Düzey 2 Bölgeleri Üzerine Bir Etkinlik Analizi", *Avrasya Uluslararası Araştırmalar Dergisi*, 7(16), 652-669.

Buyrukoğlu, S. & M.H. Şimşek (2022), "Türkiye'de Vergi Planlaması Aracı Olarak Serbest Bölgeler", *Gümrük Ticaret Dergisi*, 9(29), 58-75.

Çetinkaya, Ö. & N.B. Belkıs (2014), "Serbest Bölgeler ve Ekonomik İşlevleri Yönüyle Değerlendirilmesi", *Uludağ Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 7(2), 53-70.

Değer, M.K. & M. Recepoğlu (2018), "Yerel Ekonomik Büyümede Devletin Rolü: Kamu Yatırım Harcamaları mı Yoksa Yatırım Teşvikleri mi?", *Çağdaş Yerel Yönetimler Dergisi*, 27(1), 1-22.

Değer, M.K. & M.A. Doğanay (2015), "Ekonomik Büyüme Üzerinde Altyapı Yatırımlarının Etkisi: Ülke Grupları İçin Panel Veri Analizleri (1994-2013)", *PARDOKS Ekonomi, Sosyoloji ve Politika Dergisi*, 11(2), 63-82.

Doğan, E. (2018), "Bölgesel Nitelikli Yatırım Teşviklerine Yönelik Temel Mantık ve Mekansal Otokorelasyon Yöntemi ile Bir Değerlendirme", *Maliye Araştırmaları Dergisi*, 4(3), 141-158.

Ekinci, F. & Ş. Yüce (2019), "Yatırımlarda Vergisel Teşvikler: Güneydoğu Anadolu Bölgesi Değerlendirmesi Şırnak İli Örneği", *Sakarya İktisat Dergisi*, 8(4), 311-330.

Ercan, F. (1996), "Kriz ve Yeniden Yapılanma Sürecinde Dünya Kentleri ve Uluslararası Kentler: İstanbul", *Toplum ve Bilim Dergisi*, 71(Kış), 61-96.

Erden, L. & H. Karaçay-Çakmak (2005), "Türkiye'de Yerel Kalkınma E-Devletin Rolü: Bir Yöresel Panel Veri Analizi", *HÜ İİBF Dergisi*, 23(2), 13-32.

Eser, E. (2011), "Türkiye'de Uygulanan Yatırım Teşvik Sistemleri ve Mevcut Sistemin Yapısına Yönelik Öneriler", *Uzmanlık Tezi*, Ankara: T.C. Başbakanlık DPT Müsteşarlığı İktisadi Sektörler ve Koordinasyon Genel Müdürlüğü, Nisan Yayın No: 2822.

Gerni, C. vd. (2009), Türkiye'de Kentsel Ekonomik Büyüme: Yatay-Kesit Analizler", *İktisat İşletme ve Finans Dergisi*, 24(282), 54-81.

Gerni, C. vd. (2015), "Bölgesel Dengesizliklerin Giderilmesinde Yatırım Teşviklerinin Rolü ve Başarı Kriteri Olarak Yakınsama Analizleri: Türkiye Örneği", içinde: *2015 International Conference On Eurasian Economies*, İstanbul: Eurasian Economists Association, 311-320.

Gülmez, M. & İ. Noyan-Yalman (2010), "Yatırım Teşviklerinin Bölgesel Kalkınmaya Etkileri: Sivas İli Örneği", *Atatürk Üniversitesi İktisadi ve İdari Bilimler Dergisi*, 24(2), 235-257.

Gümüş, E. (2007), "Serbest Bölgelerde Vergi Uygulamalarının Değerlendirilmesi", *Atatürk Üniversitesi İktisadi ve İdari Bilimler Dergisi*, 21(1), 47-60.

Gürler-Hazman, G. & N. Karakuş-Büyükben (2020), "Vergi Teşviklerinin Yerel Ekonomik Büyüme ve İstihdam Üzerindeki Etkisi: TR33 Bölge Açısından Değerlendirme", *Maliye Dergisi,* 179, 186-212.

Haspolat, E. (2016), "Bir Liman Kentinin Siyasal Dönüşümü: Dünden Bugüne Samsun", içinde: D. Yıldırım & E. Haspolat (ed.), *Değişen Karadeniz'i Anlamak*, Ankara: Phoenix Yayınevi.

İncekara, A. & B. Kılınç-Savrul (2011), "Bölgesel Kalkınma Politikaları ve Türkiye Açısından Bir Değerlendirme", *Journal of Economy Culture and Society*, 44, 91-132.

Kara, M.A. & S. Taş (2012), "Ulaştırma ve Haberleşme Altyapısının Bölgesel Kalkınmaya Katkısı ve Türkiye Üzerine Bir Uygulama", *Maliye Dergisi*, 163, 468-480.

Karaçay-Çakmak, H. & L. Erden (2004), "Yeni Bölgesel Kalkınma Yaklaşımları ve Kamu Destekleme Politikaları: Türkiye'den Bölgesel Panel Veri Setiyle Ampirik Bir Analiz", *Gazi Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 6(3), 77-96.

KB (2012), *Dünyada ve Türkiye'de Kamu-Özel İşbirliği Uygulamalarına İlişkin Gelişmeler*, Ankara: T.C. Kalkınma Bakanlığı.

KB (2018a). *Teşvik Uygulamalarında Etkinlik Özel İhtisas Komisyonu Raporu*, Ankara: T.C. Kalkınma Bakanlığı.

KB (2018b), *Yatırım Politikaları ve Öncelikleri Özel İhtisas Komisyonu Raporu*, Ankara: T.C. Kalkınma Bakanlığı.

Keskin, N.E. & M. Yaman (2016), "Tekelden Sonra Samsun", içinde: D. Yıldırım & E. Haspolat (ed.), *Değişen Karadeniz'i Anlamak*, Ankara: Phoenix Yayınevi.

Kocaman, Ç. (2007), "Serbest Bölgelerin Makro Ekonomik Etkilerinin Değerlendirilmesi: Türkiye Örneği", *Ankara Üniversitesi Hukuk Fakültesi Dergisi*, 56(3), 99-135.

Makal, D. & M.A. Yüzer (2022), "Serbest Bölgelerin Yer Seçimini Etkileyen Dinamiklerin Belirlenmesi: Mersin Serbest Bölgesi Üzerine Bir Değerlendirmesi", *İdealkent Dergisi*, 14(Bölgesel Çalışmalar Özel Sayısı), 184-220.

Mutlu-Kesici, E. & G. Başer (2020), "Turizm Yatırım Teşvikleri Çerçevesinde Antalya", *Anatolia: Turizm Araştırmaları Dergisi*, 31(3), 264-275.

Öz, E. & S. Buyrukoğlu (2015), "Osmanlı Döneminden Günümüze Türkiye'de Uygulanan Yatırım Teşvik Politikaları ve Etkinliği", *Gümrük ve Ticaret Dergisi*, 6, 35-59.

Öztürk, L. vd. (2009), "Kentsel Ekonomik Büyümede Serbest Bölgeler: Politik veya Ekonomik Tercih Mi?", *Atatürk Üniversitesi İktisadi İdari Bilimler Dergisi*, 23(1), 363-377.

Podvezko, V. (2011), "The Comparative Analysis of MCDA Methods SAW and COPRAS", *Engineering Economics*, 22(2), 134-146.

Recepoğlu, M. & M.K. Değer (2016), "Türkiye'de Bölgesel Yatırım Teşviklerinin Bölgesel Ekonomik Büyüme Üzerine Etkisi: Düzey 2 Bölgeleri Üzerine Panel Veri Analizleri (2004-2011)", *Kastamonu Üniversitesi İİBF Dergisi*, 14, 6-21.

Sanayi ve Teknoloji Bakanlığı (2019), *İllerin ve Bölgelerin Sosyo-Ekonomik Gelişmişlik Sıralaması Araştırması Sege-2017*, <https://www.sanayi.gov.tr/merkez-birimi/b94224510b7b/sege/2017-il>, 30.04.2021.

Sanayi ve Teknoloji Bakanlığı (2021), *Yatırım Teşvik Uygulamaları*, <https://www.sanayi.gov.tr/destek-ve-tesvikler/yatirim-tesvik-sistemleri/md0103011615>, 30.04.2021.

Sanayi ve Teknoloji Bakanlığı (2021), *Yatırım Teşvik Verisi (2001-2021)*, <https://sanayi.gov.tr/istatistikler/yatirim-istatistikleri/mi1304021615>, 30.04.2021.

Sanayi ve Teknoloji Bakanlığı (2021), *Yatırımlarda Devlet Yardımları Hakkında Karar*, <https://www.sanayi.gov.tr/mevzuat/diger/mc0403018201>, 30.04.2021.

Sevinç, H. vd. (2016), "Yatırım Teşvik Politikalarının Bölgesel Belirleyicilerine Yönelik Bir Analiz: Türkiye Örneği", *Çankırı Karatekin Üniversitesi İİBF Dergisi,* 6(1), 525-556.

Şahin, M. & Ö. Uysal (2011), "Bölgesel Kalkınma Çerçevesinde Yatırım Teşviklerinin Shift-Share Analizi", *Maliye Dergisi*, 160, 111-138.

Tezel, M. (2014), "Türkiye'de 1980-2010 Yılları Arasında Yatırımlara Sağlanan Teşviklerin İBBS Çerçevesinde Bölgesel ve Sektörel Dağılımı ve Bölgesel Gelişme Farkları ile İlişkisi", içinde: M.N. Bozdoğan (ed.), *Türkiye'de Bölgesel Kalkınma ve Teşvik Politikaları* (289-340), Ankara: Nobel Akademik Yayıncılık.

TÜRKONFED (2017), *Kent Bölge: Yerel Yönetimde Yeni Dinamikler Türkiye'nin Kentlerinden Kentlerin Türkiyesi'ne*, İstanbul: SİS CB Basımevi Matbaacılık Ltd. Şti.

TÜRKONFED (2019), *Kent Bölge: Yerel Yönetimde Yeni Dinamikler Türkiye'nin Kentlerinden Kentlerin Türkiyesi'ne*, İstanbul: Türk Girişim ve İş Dünyası Konfederasyonu ve İstanbul Politikalar Merkezi Resmi Yayını.

Üçışık, S. (1998), "Türkiye'de Serbest Bölgeler", *Marmara Coğrafya Dergisi*, 2, 243-254.

Ünlü, T.S. (2009), *Bir İskeleden Liman Kentine Doğu Akdeniz'in Önemli Bir Limanı Olarak 19. Yüzyılın İkinci Yarısında Mersin'de Mekânsal Gelişim*, Ankara: TMMOB Şehir Plancıları Yayını, 3-4.

Ünlü, T.S. (2020), "19. Yüzyılda Doğu Akdeniz Liman Kentinin Yapısı", *Planlama Dergisi*, 30(1), 1-14.

Ürkmez, N. (2016), *Doğu Akdeniz'de Bir Liman Kenti: İskenderun (1914-1919)*, Ankara: Pegem Akademi.

Üzümcü, A. vd. (2018), "Türkiye'de Yatırım Teşviklerinin 2010-2017 Döneminde Gelişimi: 26 Düzey 2 Bölgesi Üzerine Bir İnceleme", içinde: *IV. International Caucasus, Central Asia Foreign Trade And Logistics Congress Proceeding Book* (1103-1120).

Yavan, N. (2012), "Türkiye'de Yatırım Teşviklerinin Bölgesel Belirleyicileri: Mekânsal ve İstatistiksel Bir Analiz", *Coğrafi Bilimler Dergisi*, 10(1), 9-38.

Yavuzdurmaz, A. & M. Karadağ (2014), "Türkiye'de Bölgesel Kamu Yatırım Politikalarını Etkileyen Temel Faktörler", *Ege Akademik Bakış Dergisi*, 14(4), 619-660.

Yılmaz, Y. (2021), "Serbest Bölgelerin Olumlu ve Olumsuz Yönleri ile Vergisel Boyutunun Değerlendirilmesi", *Vergi Raporu Dergisi*, 265, 61-77.

Zavadskas, E.K. & A. Kaklauskas (1996), *Multicriteria Evaluation of Building (Pastatų Sistemotechninis Ivertinimas)*, Vilnius: Technika.

Döviz Kuru Değişimlerinin Bilanço Etkisi ve Borç Dolarizasyonu: Türk Reel Sektörü Üzerine Ekonometrik Bir Analiz[1]

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Balance Sheet Effects of Exchange Rate Changes and Debt Dollarisation: An Econometric Analysis on the Turkish Real Sector[2]

Abstract

The impact of exchange rate changes on the real sector is not limited to an expansionary competitive effect caused by domestic currency depreciation. The balance sheet effect may be a significant source of risk, especially for companies with high levels of debt in foreign currency, i.e., experiencing liability dollarisation. Exchange rate increases may raise risks by increasing the value of debts in domestic currency. The Turkish real sector faces significant balance sheet risks due to high debt dollarisation and domestic currency depreciation. This study analyses the impact of liability dollarisation and exchange rate changes on investments as the best indicator of sectoral performance through "balance sheet effect" and "competitive effect" channels with the GMM estimator using data for 76 sectors in Türkiye for 2009-2022. Our findings indicate that, while the corporate sector is exposed to a significant negative balance sheet effect due to short-run liability dollarisation, there are no significant effects of long-run liability dollarisation on investments. Also, there are no significant findings regarding the competitiveness effect channel. Therefore, the fragilities in the balance sheet of the Turkish real sector make it necessary for political decision-makers to avoid unexpected depreciation in the value of the Turkish lira.

Keywords : Liability Dollarisation, Balance Sheet Effect, Competitiveness Effect, GMM Estimator.

JEL Classification Codes : C23, F31, E52.

Öz

Döviz kuru değişimlerinin reel sektör üzerindeki etkisi sadece ulusal para değer kayıplarının neden olduğu genişletici bir rekabetçi etki ile sınırlı değildir. Özellikle yüksek düzeyde döviz cinsinden borcu olan, yani borç dolarizasyonu yaşayan şirketler için bilanço etkisi büyük bir risk kaynağıdır. Döviz kuru artışları, borçların ulusal para cinsinden değerini artırarak riskleri artırabilir. Türk reel sektörü de yüksek borç dolarizasyonu ve ulusal para değer kayıpları nedeniyle önemli bilanço kaynaklı

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risklerle karşı karşıyadır. Bu çalışmada borç dolarizasyonu ve döviz kuru değişimlerinin sektörel performansın en temel göstergesi olan yatırımlar üzerindeki etkisi araştırılmakta, Türkiye için 2009-2022 dönemine ilişkin 76 alt sektör verisinden yararlanılarak "bilanço etkisi" ve "rekabetçi etki" kanalları GMM tahmincisi ile analiz edilmektedir. Elde edilen bulgulara göre, kısa vadeli döviz cinsi borçlardan kaynaklı olarak reel sektör anlamlı bir negatif bilanço etkisine maruz kalırken, uzun vadeli döviz cinsi borçların yatırımlar üzerinde anlamlı etkileri bulunamamıştır. Rekabetçi etki kanalına ilişkin de anlamlı bulgular söz konusu değildir. Dolayısıyla Türk reel sektörünün bilançosundaki kırılganlıklar, politik karar alıcılar açısından Türk lirasının değerindeki beklenmedik kayıplardan kaçınmayı gerekli kılmaktadır.

Anahtar Sözcükler : Borç Dolarizasyonu, Bilanço Etkisi, Rekabetçi Etki, GMM Tahmincisi.

1. Giriş

Dışa açık bir ekonomide reel sektör performansı üzerinde belirleyiciliği olan temel faktörlerden birisi döviz kurudur. Döviz kurları farklı rejimler altında farklı karar alıcılar tarafından belirlenebilmektedir. İki uç duruma karşılık gelen *sabit* ve *esnek* döviz kuru sistemlerinde kur, sırasıyla para otoritesi tarafından ve piyasa tarafından belirlenmektedir. Bretton Woods sistemi sonrasında yaygın döviz kuru rejimi uluslararası piyasalarda kurların belirli bir miktarda altının değerini taahhüt eden dolara sabitlenmesi biçimindeydi (Williamson, 1985: 74-75). 1973'te Bretton Woods sisteminin çöküşünden sonra ise döviz kurlarının dalgalanmaya bırakılmaya başlanması, artan küreselleşme, teknolojik gelişmeler ve yüksek sermaye hareketliliği döviz kurundaki ani ve kayda değer değişimlerin kaynağını oluşturmuştur. Döviz kurundaki bu ani değişimler ekonomiler ve mikro ölçekte karar alıcılar için önemli bir risk kaynağı durumundadır (Yıldız & Yılmaz, 2022).

Döviz kurunun ekonomi üzerindeki performans etkileri genelde dış ticaret kanalları üzerinden değerlendirilir. Buna göre bir ülke ulusal parası değer kaybettiğinde ülkeler arasında malların nispi fiyatları değişecek ve parası değer kaybeden ülkenin malları küresel piyasalarda daha ucuz ve daha rekabetçi hâle gelecektir. Daha ucuz ve daha rekabetçi hâle gelen yerli mallara uluslararası talebin artması beklenir. Esnek döviz kuru sisteminde ulusal para değer kayıplarının Marshall-Lerner koşulu altında reel ekonomi üzerinde meydana getirdiği bu olumlu etkileri açıklayan model literatürde *Mundell-Fleming* veya *Fleming-Mundell Modeli* (Boughton, 2003: 5) olarak bilinmektedir (Mundell, 1960; Fleming, 1962).

İhracat artışlarının ekonomik performans veya daha genel anlamda ekonomik büyüme üzerindeki etkileri çeşitli argümanlar ile savunulmaktadır. İhracat artışları daha yüksek kapasite kullanımına, verimlilik ve istihdam artışlarına ve toplam talep artışları yolu ile daha yüksek bir hasılaya yol açabilmektedir (Dixon & Thirlwall, 1975; Balassa, 1978; Kaldor, 1978; Feder, 1982). Döviz kurundaki değişimlerin ihracat kanalı üzerinden gerçekleşen olumlu performans etkileri ekonomik karar alıcıları ulusal paralarının değerini düşük tutmaya teşvik etmekte, bu sayede daha yüksek ihracat ve daha düşük ithalat ile dış ticaret kazançları artırılmaya çalışılmaktadır.

Esnek döviz kuru rejiminin yaygınlaşmaya başlaması ve sermaye hareketliliğinin önemli düzeylere ulaşmış olması döviz kurlarında kayda değer ve beklenmedik değişimlere kaynaklık etmektedir. Ulusal para değer kayıplarının ihracat kanalı üzerinden olumlu performans etkilerinin yanı sıra döviz kurlarındaki önemli değişimler ve dalgalanmalar reel sektör üzerinde kur riski sorunlarına da yol açabilmektedir. Reel sektör firmalarının *kur etkisine açıklık* (exchange rate exposure) sorunları literatürde esas olarak döviz kurundaki değişimlerin firma nakit akımları ve firma değeri üzerindeki etkileri üzerinden incelenmektedir (Adler & Dumas, 1984; Jorion, 1990). Kurdaki değişimler firmanın nakit akımlarını ve firma değerini olumsuz yönde etkiliyorsa firmanın kur etkisine açık olduğu veya kur etkisine maruz kaldığı söylenebilir. Firmaların yabancı para birimi cinsinden gerçekleştirmiş oldukları işlemlerdeki artış, diğer bir ifadeyle firmanın dışa açıklığı kur etkisine maruz kalma ihtimalini artırırken (Demirhan & Atış, 2013; Akay & Çifter, 2014; Erdoğan, 2016), kurlardaki değişimler makroekonomi üzerinden farklı sektör ve kesimleri de etkilemektedir (Aggarwal & Harper, 2010: 1620; Mutluay & Turaboğlu, 2013: 60).

Ulusal paraların değerleri farklı döviz kuru rejimleri altında bir politika aracı olarak merkez bankalarının alacağı para politikası kararları ile de belirlenebilmektedir. Sabit döviz kuru rejiminde merkez bankası sürdürmeyi taahhüt ettiği kur üzerinde devalüasyon/revalüasyon kararları alarak ulusal paranın değerini artırıp azaltabilir. Diğer yandan esnek döviz kuru rejiminde merkez bankasının alacağı faiz kararları ve iletişim stratejisi ile piyasa faiz oranları ve beklentiler, dolayısıyla da döviz kurları kontrol edilebilir. Bu sayede merkez bankası parasal değişimler veya faiz oranındaki değişim kararları ile döviz kuru üzerinden reel sektöre etki edebilmektedir (Taylor, 1995: 17). Bu durum literatürde "parasal aktarımın döviz kuru kanalı" olarak bilinmektedir.

Merkez bankası para politikasındaki değişikliklerle parasal aktarım kanalları yoluyla reel sektöre etki edebilmektedir. Literatürde parasal aktarımın şu dört temel kanaldan gerçekleştiği ileri sürülür: Faiz oranı, döviz kuru, varlık fiyatları ve kredi kanalı (Mishkin, 1995: 4). Bu kanallara ilave olarak, kredi kanalının özel bir durumuna karşılık gelen bir "bilanço kanalı" da bulunmaktadır. Bilanço kanalına göre, para politikasındaki değişiklikler reel sektör bilançoları üzerinden yatırım kararlarını etkileyebilmektedir. Bu çıkarım, borçluların finansal pozisyonlarının karşılaştıkları kredi hadleri üzerinde etkisi olduğu argümanına dayanmaktadır. Politika faiz oranındaki bir artış kararı, bilançolarında değişken faizli borç tutan firmaların borçlarının reel değerini ve firmaların borçluluklarını artırmaktadır. Bununla birlikte artan faiz oranları varlık fiyatlarını azaltarak firmaların teminat değerlerini ve nakit akışlarını da bozabilir (Bernanke & Gertler, 1995: 36).

Para politikasının bilançolar üzerindeki etkisi yalnızca değişken faizli borçlar üzerinden gerçekleşmez. Firma veya sektörün bilançosundaki borçların para birimine göre de etki biçimi farklılaşabilir. Bilanço döviz cinsinden yüksek düzeyde borçlara sahipse ulusal para değer kayıpları kırılganlıklara neden olabilir (Acar, 2000: 66). Başta para politikasındaki değişiklikler olmak üzere, ulusal paranın değer kaybı ile sonuçlanan her türlü gelişme bu tür bilançolarda borçların ulusal para cinsinden değerinde bir artışa yol açacaktır. Böylece firma net değer kayıpları görülebilir. Para politikasındaki değişikliklerin döviz kuru

ve dolayısıyla bilançolar üzerinden reel sektör üzerinde yarattığı bu etkiler, para politikası kararlarında yüksek borç dolarizasyonunun da dikkate alınması gerektiğini göstermektedir (Rossini & Vega, 2008: 410). Diğer yandan ulusal para değer kayıplarının bilançolar üzerindeki etkisi yalnızca firma değerini etkilemez. Kısa vadeli döviz cinsi borçların hacmi ve net değerdeki azalmaların ortaya çıkaracağı risk prim artışı nedeniyle vade uyumsuzluğu ve faiz riskleri de ortaya çıkacaktır (Demirkılıç, 2021: 1). Bu durumda ulusal para değer kaybının ekonomi üzerindeki etkisi daraltıcı yönde gerçekleşecektir (Krugman, 1999: 464; Cespedes et al., 2004: 1183).

Firmanın *para birimi uyumsuzluğu* (currency mismatch) içerisinde olması da ulusal para değer kaybının net etki düzeyinde ve etki yönünde belirleyici olacaktır. Bu bağlamda döviz geliri bulunmayıp yüksek döviz cinsi borç tutan firmalar için ulusal para değer kayıpları önemli bir kırılganlık kaynağı oluşturur (Aghion et al., 2000: 734; Eichengreen et al., 2007: 131). Bilançolarında döviz cinsinden yüksek miktarda borç tutmasına rağmen yüksek ihracat (doğal sigortalama) ve döviz gelirlerine sahip olan bir firma için ise kırılganlık ciddi boyutlarda olmayabilir. Diğer yandan ihracat piyasasına giriş maliyetlerinin yüksek olması nedeniyle, olumsuz bilanço etkisi ihracat performansı üzerinde de negatif etkiler meydana getirebilmektedir (Berman & Berthou, 2009: 104).

Döviz cinsinden borçlanma, yani *borç dolarizasyonu* literatürde *ilk günah* (original sin) sorunu olarak da bilinmektedir. Eichengreen ve Hausmann (1999: 11)'a göre, ilk günah "bir ülkenin kendi para biriminden dış borç ve uzun vadeli iç borç bulamaması" şeklinde tanımlanmaktadır. Her iki durumda da finansal kırılganlıktan söz edilebilir. Buna göre, kendi para biriminden borçlanamama para birimi uyumsuzluğuna ilişkin sorunları ortaya çıkarırken, uzun vadeli borç bulamama *vade uyumsuzlukları*na (maturity mismatch) neden olabilmektedir (Eichengreen & Hausmann, 1999: 11). Diğer yandan, gelişmekte olan ülkelerin yurtiçi tahvil piyasalarındaki gelişmeler doğrultusunda uzun vadeli yurtiçi borç temin edebilmeleri mümkün olurken, ulusal para cinsinden yurtdışı borçlanabilme becerileri gelişim göstermemiştir. Bu nedenle, *ilk günah* kavramı yalnızca para birimi uyumsuzluğunu içerecek şekilde yeniden tanımlanmıştır (Eichengreen et al., 2007: 122-123).

İlk günah veya borç dolarizasyonu sorunu krizlerin kaynağı olarak da görülmektedir. 1997 Doğu Asya Krizi bu duruma örnek teşkil etmektedir. Nitekim söz konusu krizin temel nedenlerinden birisi reel sektör bilançolarındaki dolar cinsi borçlardır. Ulusal paranın devalüe edilmesi sonrasında döviz cinsi borçların ulusal para cinsinden değerlerindeki artış yatırımlar üzerinde negatif bir baskı yaratmıştır. Bu bağlamda Doğu Asya Krizinin kendisinden önceki krizlerden farklı dinamiklere sahip olması *üçüncü nesil kriz* modelinin oluşturulması gereksinimini ortaya çıkarmıştır (Krugman, 1999).

Borç dolarizasyonunun neden olduğu kırılganlıklar döviz kurunda önemli değişikliklerden kaçınmayı gerektirmektedir. Ne var ki Türkiye ekonomisi, bilançolarında yüksek miktarda döviz cinsi borç tutan reel sektörüne rağmen, önemli döviz kuru atakları tecrübe etmiştir. Bu çerçevede bu çalışmanın amacı Türk reel sektöründe faaliyette bulunan tüm alt sektörlerde borç dolarizasyonu ve döviz kuru değişimlerinin sektörel performansın

en temel göstergesi olan yatırımlar üzerindeki etkisinin araştırılmasıdır. Çalışmada ele alınan, 2009-2022 döneminin temel özelliklerinden birisi birçok kur ataklarını içermesi ve dönem boyunca Türk lirasının yaşadığı sürekli değer kaybıdır. Bu doğrultuda çalışmada döviz kuru değişimlerine ilişkin değerlendirmelerin genel olarak ulusal para değer kaybı üzerinden yapılması tercih edilmiştir. Çalışma sırasıyla; literatür taramasının ardından model ve yöntemin, daha sonra da veri ve bulguların tartışıldığı bölümlerden oluşmaktadır.

2. Literatür

Döviz kuru etkisine açıklık temel olarak esnek döviz kuru rejimi altında ani ve beklenmedik döviz kuru hareketlerinin reel sektör üzerinde ortaya çıkardığı etkilere odaklanmaktadır. Ancak ulusal para değer kaybının söz konusu olduğu her türlü rejim için kur risklerinden söz etmek mümkündür. Üstelik sabit döviz kuru rejiminin yarattığı düşük kur riski beklentileri bilançoları daha da kırılgan hâle getirebilir; zira, firmalar kurda herhangi bir değişiklik olmayacağını düşündükleri için yabancı para cinsinden borçlanma konusunda daha istekli olacaktır (Mishkin, 1996: 44). Bu durum kur istikrarının sağlandığı esnek döviz kuru rejimleri altında da söz konusu olabilir.

Döviz cinsinden borçların ulusal para değer kayıpları karşısında yarattığı kırılganlık ve firma performansı üzerindeki etkileri çeşitli ülke ve sektörler bağlamında ekonometrik olarak analiz edilmiştir. Bu analizler temel olarak firma bilançolarına odaklanmaktadır (Forbes, 2002; Carranza et al., 2003; Benavente et al., 2003; Pratap et al., 2003; Bonomo et al., 2003; Gönenç vd., 2003). Firma bazlı verilerin kullanımı çok daha geniş ve daha mikro bazda bir veri setine olanak verdiğinden, analizin daha etkin sonuçlar verebileceği açıktır. Ancak firma bazlı verilere erişim kısıtının bulunması ve firma düzeyinde verilerin ele alınan dönemlerde dengeli olmaması gibi nedenlerle sektörel bilançolar üzerinden de analizler yapılmıştır (Adanur-Aklan & Nargeleçekenler, 2010; Kesriyeli et al., 2011; Tkalec & Verbic, 2013; Taşseven & Çınar, 2015; İncekara vd., 2017; Aydın vd., 2017; Burgaz, 2020).

Bilançolardaki döviz cinsi borçlardan kaynaklanan kırılganlıkların sektör veya firma performansı üzerindeki etkileri çeşitli performans göstergeleri üzerinden araştırılmıştır. Bu göstergelerden en yaygın olanı yatırım düzeyidir (Carranza et al., 2003; Benavente et al., 2003; Pratap et al., 2003; Bonomo et al., 2003; Gönenç vd., 2003, Adanur-Aklan & Nargeleçekenler, 2010; Kesriyeli et al., 2011; Tkalec & Verbic, 2013; Taşseven & Çınar, 2015; Burgaz, 2020). Diğer yandan bilanço etkisinin kârlar, net satışlar ve firma piyasa değeri üzerindeki etkilerini açıklamaya çalışan çalışmalar da bulunmaktadır (Forbes, 2002; Kesriyeli et al., 2011; Tkalec & Verbic, 2013; İncekara vd., 2017; Aydın vd., 2017).

Ulusal para değer kayıplarının firma veya sektör performansı üzerindeki etkileri bağlamında yapılan analizlerin sonuçlarını üç grupta ele almak mümkündür.

Bunlardan ilki, ulusal para değer kayıplarının firma veya sektör performansı üzerinde olumlu etkilere yol açtığı bulgularına ulaşan çalışmalardır (Benavente et al., 2003; Taşseven & Çınar, 2015). Bu çalışmaların sonuçlarına göre, ulusal para değer kaybettiğinde firmaların

ulusal para cinsinden borçlulukları artmasına rağmen firma performansları olumlu yönde tepki vermektedir. Diğer bir ifadeyle, ele alınan örneklem için pozitif bilanço etkisi söz konusudur. Elde edilen olumlu performans etkilerinin temel nedeni, ticarete yönelik firmalarda ulusal para değer kayıplarının yarattığı diğer etki olan rekabetçi etki ve dolayısıyla beklentilerdeki iyileşmelerdir (Forbes, 2002: 225; Benavente et al., 2003: 398). Ulusal para değer kayıpları bir yandan döviz cinsinden borçlara sahip firmaların bilançolarına zarar verse de diğer yandan firmayı daha rekabetçi hâle getirebilmektedir. Bu nedenle rekabetçi etki ve bilanço etkisinin firma üzerinde yarattığı etkiler ayrıştırılarak net etki tespit edilmeye çalışılmalıdır. Döviz kuru değişimlerinin firma faaliyetleri üzerindeki etkilerinin yalnızca bilanço ve ihracat kanalları üzerinden gerçekleştiği de söylenemez. Bu durumda döviz kuru değişimlerinin firma performansı üzerindeki etkileri borç dolarizasyonu etkilerinden farklılaşabilmektedir (Taşseven & Çınar, 2015: 137).

İkinci grup çalışmalar, ulusal para değer kayıplarının döviz cinsi borçlara sahip firma veya sektörlerin performansı üzerinde olumsuz etkileri olduğunu göstermektedir (Carranza et al., 2003; Pratap et al., 2003; Gönenç vd., 2003; Adanur-Aklan & Nargeleçekenler, 2010; Kesriyeli et al., 2011; Tkalec & Verbic, 2013; Aydın vd., 2017; Demirkılıç, 2021). Bu çalışmalarda bilanço etkisi ile bir rekabetçi etkinin olup olmadığını araştıran modeller de bulunmaktadır. Bulgulara göre, ulusal para cinsinden artan borçluluğun bilançolarda kırılganlık yaratarak firma performansını olumsuz etkilediği, yani negatif bilanço etkisinin söz konusu olduğu ifade edilebilir. Diğer yandan bilanço etkisine karşıt bir rekabetçi etki de bulunabilir (Carranza et al., 2003: 473-474). Özellikle döviz cinsi borçlanma eğilimi yüksek firmaların büyük ölçekli ve ihracata dönük firmalar olması rekabetçi etkinin bilanço etkisi karşısında dengeleyici bir role sahip olmasını sağlayabilir (Pratap et al., 2003: 467). Her iki etki katsayısı istatistiksel olarak anlamlı ve beklentiler doğrultusunda olmasına rağmen, etki düzeyleri farklılık gösterdiğinden, net etki pozitif olabileceği gibi, negatif de olabilir. Net etkinin ne yönde olduğunu tespit edebilmek güç olsa da katsayı büyüklükleri üzerinden bilanço veya rekabetçi etkinin hangisinin daha baskın olduğu konusunda yorum yapılabilmektedir (Tkalec & Verbic, 2013: 226). Ancak bu etkilerin tüm durumları kapsadığı söylenemez. Temel olarak döviz cinsinden yüksek nakit akışına sahip firmaların döviz cinsi borçlanması önemli bir kırılganlık kaynağı olmasa da yüksek düzeyde bir para birimi uyumsuzluğu söz konusuysa kırılganlık çok yüksek olacaktır. Yani firmalar negatif bilanço etkisinden olumsuz etkilenirken, herhangi bir rekabetçi etki söz konusu olmayabilir (Carranza et al., 2003: 491). Bu tip firma veya sektörler için ulusal para değer kayıpları önemli bir kırılganlık kaynağıdır.

Üçüncü çalışma grubu ise, herhangi bir bilanço etkisi bulgusuna ulaşamamıştır (Bonomo et al., 2003). Firmaların döviz kuru risklerine karşı sigortalama ve çeşitli finansal koruma yollarını tercih etmeleri bilanço etkisinin ortaya çıkmamasının temel nedeni olarak ileri sürülmektedir (Bonomo et al., 2003: 392).

Bu alanda Türkiye üzerinde gerçekleştirilen çalışmalarda ağırlıklı olarak sektörel veriler kullanılmaktadır. Ancak, bu konuda yapılan firma düzeyli çalışmalar da mevcuttur (Kıymaz, 2003; Gönenç vd., 2003; Demirkılıç, 2021). Firma düzeyli verilere erişim kısıtı

nedeniyle ve firma düzeyinde veri sunan Borsa İstanbul ve İstanbul Sanayi Odasının yayımladığı firma bilançolarının reel kesimin oldukça dar bir kesimini temsil etmesi nedeniyle, Türk reel sektörüne ilişkin yapılan firma düzeyinde çalışmalar birtakım eksiklikler içermektedir. Diğer yandan, bilanço etkisine ilişkin yapılan çalışmalarda, diğer sektörlerle olan karşılıklı etkileşimi ve ekonomiye bir bütün olarak önemli etkileri nedeniyle, imalat sanayi sektörü ağırlıklı bir konumda bulunmaktadır (Adanur-Aklan & Nargeleçekenler, 2010; İncekara vd., 2017; Aydın vd., 2017; Burgaz, 2020). Ele alınan çalışmaların önemli bir kısmı Türk lirası değer kayıplarının reel sektör bilançolarında önemli negatif etkiler ortaya çıkardığı bulgularına ulaşırken, rekabetçi etki kanalına ilişkin bulgular yeterli değildir.

3. Yöntem ve Bulgular

3.1. Araştırmanın Amacı ve Kapsamı

Döviz cinsinden yüksek borçluluğa sahip bilançolar için döviz kuru değişimlerinin reel sektör üzerinde iki temel performans etkisi bulunmaktadır. Bunlar bilanço etkisi ve rekabetçi etki kanallarıdır. Ulusal para değer kaybettiğinde ihracat kanalı firma veya sektör üzerinde bir genişletici etki yaratırken, ulusal para cinsinden artan borçlar negatif bir bilanço etkisi ile daraltıcı etkiler meydana getirecektir. Döviz kuru değişimlerinin Türk reel sektörü üzerindeki net etkisini tespit edebilmek için her iki etkiyi de ölçen Carranza vd. (2003)'nin oluşturduğu modelden faydalanılmaktadır. Bu model yardımıyla Türk reel sektör bilançolarındaki yüksek borç dolarizasyonunun Türk lirası değer kayıpları karşısında yarattığı kırılganlıklar sektör yatırımları üzerinden test edilebilecektir.

3.2. Model ve Yöntem

Carranza vd. (2003) çalışmasında temel model, yatırımlar ve reel döviz kuru arasındaki ilişkiyi gösterecek biçimde şu şekilde tasarlanmıştır:

$$I_{it} = q_0 + q_1 \Delta REER_t + q_2' Z_{it} + \mu_i + \varepsilon_{it} \tag{1}$$

Eşitlik 1'e göre, t döneminde i sektörünün yatırımları (I), t dönemindeki reel efektif döviz kuru (REER) değişimleri ve t döneminde i sektörüne ait sektöre özgü değerler (Z) ile açıklanmaktadır. Temel model döviz kuru ve yatırımlar ilişkisinden hareketle bilanço etkisi ve rekabetçi etki gibi alt etkileri göz ardı etmektedir. Döviz kuru değişimlerinin yatırımlar üzerindeki etkisini gösteren q_1 katsayısı tüm etkileri barındırmaktadır. Bilanço etkisi ve rekabetçi etkiye ulaşabilmek için bu katsayı şu şekilde yazılabilir:

$$q_1 = \alpha + \beta D_{it}^* + \gamma X_{it} \tag{2}$$

Eşitlik 2'de D_{it}^* katsayısı t dönemde i sektörünün borç dolarizasyon oranını temsil etmektedir. Carranza vd. (2003)'nin çalışmasında bilanço etkisi etkileşim terimi oluşturulurken borç dolarizasyonu oranının t-1 dönemi dikkate alınırken, bu modelde Kasriyeli vd. (2011)'e paralel olarak borç dolarizasyonunun t zamanındaki değeri modele

dahil edilmiştir. Sektörün borç dolarizasyonunu ölçmek için yabancı para cinsinden nakdi kredilerinin toplam nakdi kredilere oranı dikkate alınmaktadır (Kesriyeli et al., 2011). X_{it} Katsayısı ise t döneminde i sektörünün ihracat oranını temsil etmekte olup, sektörün net yurtdışı satışlarının toplam satışlara oranı olarak hesaplanmaktadır. Bu bağlamda β Katsayısı sektörün bilanço etkisini verirken γ katsayısı ise rekabetçi etkiyi vermektedir. Eşitlik 2, Eşitlik 1'de yerine konulduğunda şu denklem elde edilir:

$$I_{it} = q_0 + \alpha\Delta REER_t + \beta(D_{it}^* * \Delta REER_t) + \gamma(X_{it} * \Delta REER_t) + q_2'Z_{it} + \mu_i + \varepsilon_{it} \qquad (3)$$

Reel efektif döviz kuru ile sektörün borç dolarizasyonu ve ihracat oranının karşılıklı etkileşim katsayıları olan β ve γ katsayıları sırasıyla bilanço ve rekabetçi etki büyüklüklerini verecektir. Diğer yandan reel efektif döviz kurunun başlıca etkisini ölçen α katsayısı döviz kuru etkisinin yanı sıra tüm sektörler için ortak olan çeşitli makro etkileri de içereceği için bir tanımlama sorununa neden olacaktır. Bu nedenle, yatırımların önemli bir belirleyicisi olarak görülebilecek makro bir gösterge olan faiz oranı değişkeni ve yatırım davranışındaki birtakım dinamikleri dikkate almak için bağımlı değişkenin gecikmeli değeri de modelin açıklayıcı değişkenleri arasına ilave edilmektedir (Carranza et al., 2003: 484). Bu durumda modelin son hâli şu şekilde ifade edilebilir:

$$I_{it} = \partial I_{it-1} + \beta(D_{it}^* * \Delta REER_t) + \gamma(X_{it} * \Delta REER_t) + \emptyset D_{it}^* + \delta D_{it} + \sigma\eta_t + \mu_i + \varepsilon_{it} \qquad (4)$$

Eşitlikteki D katsayısı t döneminde i sektörünün toplam borçlarının toplam varlıklarına oranını göstermektedir. Modelin bağımlı değişkeni olan sektör yatırımlarının dinamik yapısı, modelin açıklayıcı değişkenleri arasında yatırımların gecikmeli değerinin bulunmasını gerekli kılmaktadır. Gecikmeli bağımlı değişkenin ortaya çıkaracağı içsellik probleminden kaçınmak amacıyla birim boyutunun zaman boyutundan büyük olduğu panel veri yapısına da uygun biçimde Arellano-Bond ve Arellano-Bover/Blundell-Bond tahmincileri tercih edilmektedir (Arellano & Bond, 1991; Arellano & Bover, 1995; Blundell & Bond, 1998; Roodman, 2009b: 86).

Arellano-Bond tahmincisi Genelleştirilmiş Momentler Metodunu (GMM) kullanması nedeniyle Fark GMM olarak da ifade edilir. Sistem GMM ise, Arellano-Bover/Blundell-Bond'un Fark GMM'e yapmış oldukları geliştirmeler ile oluşturulmuştur. Fark GMM, değişkenlerin birinci fark dönüşümleri ile tahmine başlarken, Sistem GMM değişkenlerin olası tüm gelecek değerlerinin ortalamasının farkını almaktadır (Roodman, 2009b: 86-87; Yerdelen-Tatoğlu, 2020: 138). İki yöntem arasından hangisinin tercih edileceği ise empirik olarak tespit edilebilmektedir. Fark GMM yöntemi ile model tahmin edildikten sonra fark değişkeninin tahmin katsayısı aynı modelin Sıradan En Küçük Kareler ve Sabit Etkiler tahmininden elde edilen tahmin katsayıları ile karşılaştırılır. Fark GMM ile elde edilen tahmin katsayısı Sabit Etkiler tahmininin altında kalıyor veya yakınsıyorsa Fark GMM tahmin sonuçları sapmalı ve tutarsız olabilmektedir. Bu durumda Sistem GMM analizi daha tutarlı sonuçlar verecektir (Bond, 2002: 155).

Fark ve Sistem GMM tahmincilerinin sonuçlarının tutarlı olup olmadıkları temelde iki test ile sınanmaktadır. Bunlar; otokorelasyon ve Sargan/Hansen testleridir. GMM model yapısında araç değişkenler olarak gecikmeler kullanılmaktadır. Eğer hata terimleri kendi içerisinde kısmi korelasyonlara sahipse tahminciden elde edilen sonuçlar tutarsız olacaktır (Arellano & Bond, 1991: 278). Bu tutarsızlık otokorelasyonun AR2 yapısında test edilmesi ile sınanmaktadır. AR1 yapısı için ise negatif bir kısmi korelasyonun varlığı matematiksel açıdan beklenen bir durumdur (Roodman, 2009b: 119). Dolayısıyla tutarlılık açısından model yapısında AR2 tipi bir otokorelasyon bulunmamalıdır. GMM tahmincisinin ikinci önemli tutarlılık testi Sargan/Hansen testleridir. Sargan/Hansen testi ile model yapısında aşırı tanımlama kısıtlamalarının söz konusu olup olmadığı sınanmaktadır. Diğer bir ifadeyle model yapısındaki araç değişkenlerin geçerliliği test edilmektedir. Test aynı zamanda modelin yapısal spesifikasyonunun bir testi olarak da görülebilir (Roodman, 2009a: 141). İki temel teste ilave olarak Wald testi ile de tahmin edilen katsayıların tümünün bir bütün olarak sıfırdan farklı olup olmadığı sınanabilir.

Panel veri yapısına ilişkin olarak bir diğer sorun zaman boyutundaki durağanlık sorunudur. Panel yapısının zaman boyutunu da içermesi nedeniyle serilerin durağanlıkları tutarlı sonuçlar elde edebilmek için gereklidir. Ancak mikro panel yapısı (T<N) için ve zaman boyutunun çok fazla olmaması durumunda durağanlık testleri gerekli görülmemektedir. Bu doğrultuda çalışmada ele alınan veri setinin mikro panel yapısına uygun ve zaman boyutunun çok yüksek olmaması nedeniyle birim kök test sonuçlarına yer verilmemiştir.

3.3. Veri Seti ve Değişkenler

Bu çalışmada Türk reel sektöründe faaliyette bulunan tüm alt sektörlerde bilanço etkisi ve rekabetçi etkilerin söz konusu olup olmadığı araştırılmaktadır. Bilanço ve rekabetçi etki kanallarının sektör performansı üzerindeki etkisi sektör yatırımları üzerinden analiz edilmektedir. Bu kapsamda reel sektör etkisini ölçmek için TCMB Sektör Bilançolarından elde edilen 2009-2022 dönemine ilişkin 76 alt sektör verisinden faydalanılmıştır. Alt sektörler, Avrupa Topluluğu'ndaki Ekonomik Faaliyetlerin İstatistiksel Sınıflamasına (NACE Rev.2) göre belirlenmiş tüm ekonomik faaliyet kollarını içeren 17 ana sektör içerisindeki 2'li kırılımlardır. 17 ana sektör için 2'li alt kırılımda 78 alt sektör bulunsa da "Bilimsel Araştırma ve Geliştirme Faaliyetleri" ve "Üye Olunan Kuruluşların Faaliyetleri" adlı alt sektörlere ilişkin veri bulunmaması nedeniyle 76 alt sektör analize tabi tutulmuştur. Carranza vd. (2003)'e paralel oluşturulan modelde sektör yatırımlarını açıklamaya yönelik değişkenler olarak bilanço etkisi, rekabetçi etki, kaldıraç oranı, faiz oranı ve kısa vadeli borç dolarizasyonu kullanılmaktadır. Oluşturulan modeller Stata paket programı ile analiz edilmiştir. Sektör yatırımı, kaldıraç oranı ve ihracat oranı verileri TCMB Sektör Bilançolarından, faiz oranı ve döviz kuru verileri ise TCMB EVDS veri tabanından elde edilmiştir. Diğer yandan, kısa ve uzun vadeli borç dolarizasyonu verileri TCMB Sektör Bilançolarının Sektör Riski tablolarından yazarlar tarafından derlenmiştir. Bilanço ve Rekabetçi etki etkileşim terimleri de Tablo 1'deki açıklamada ifade edildiği şekilde yazarlar

tarafından oluşturulmuştur. Değişkenlere ilişkin detaylı açıklama Tablo 1'de, değişkenlerin tanımlayıcı ve özet istatistikleri Tablo 2'de verilmektedir.

Tablo: 1
Değişkenler ve Veri Kaynakları

Değişken	Açıklama	Veri Kaynağı
Yatırım	Maddi Duran Varlıklar/Aktifler Toplamı	TCMB Sektör Bilançoları
Bilanço Etkisi Etkileşim Değişkenleri	(Kısa-Uzun Vadeli Borç Dolarizasyonu)*Döviz Kuru	Yazarlar Tarafından Oluşturulmuştur.
Rekabetçi Etki Etkileşim Değişkeni	(İhracat Oranı)*Döviz Kuru	Yazarlar Tarafından Oluşturulmuştur.
Kaldıraç Oranı	Yabancı Kaynaklar Toplamı/Aktifler Toplamı	TCMB Sektör Bilançoları
Faiz Oranı	TL Üzerinden Açılan Ticari Kredi Faizlerinin Doğal Logaritması	TCMB EVDS
Kısa Vadeli Borç Dolarizasyonu	Kısa Vadeli Yabancı Para Cinsinden Krediler/Toplam Krediler	TCMB Sektör Bilançoları
Uzun Vadeli Borç Dolarizasyonu	Uzun Vadeli Yabancı Para Cinsinden Krediler/Toplam Krediler	TCMB Sektör Bilançoları
İhracat Oranı	Yurt Dışı Satışlar/Net Satışlar	TCMB Sektör Bilançoları
Döviz Kuru	TÜFE Bazlı Reel Efektif Döviz Kurunun Doğal Logaritması	TCMB EVDS

Tablo: 2
Tanımlayıcı ve Özet İstatistikler

Değişkenler	Gözlem Sayısı	Ortalama	Standart Sapma	En Düşük Değer	En Yüksek Değer	Skewness	Kurtosis
Yatırım	1064	0.233	0.119	0.001	0.707	0.981	4.541
Kısa Vadeli Bilanço Etkisi	1064	1.409	1.190	0	4.584	0.535	2.179
Uzun Vadeli Bilanço Etkisi	1064	2.292	1.400	0	4.785	-0.175	1.852
Rekabetçi Etki	1064	0.649	0.689	0	3.815	1.677	6.305
Kısa Vadeli Borç Dolarizasyonu	1064	0.315	0.266	0	0.990	0.534	2.178
Kaldıraç Oranı	1064	0.457	0.126	0.105	0.929	-0.190	3.051
Faiz Oranı	1064	2.704	0.284	2.187	3.181	0.092	2.126

3.4. Hipotezler ve Model

Çalışmada, iki karşıt etki olan bilanço ve rekabetçi etkilerin Türk reel sektöründe var olup olmadıkları analiz edilmektedir. Söz konusu etkilerin varlığı, sektörel performans göstergesi olarak literatürde de yaygın bir şekilde ele alınan sektör yatırımları üzerinden ölçülmektedir. Diğer bir ifadeyle, oluşturulan model üzerinden sektör yatırımları sektörün bilanço ve rekabetçi etki katsayıları üzerinden açıklanmaya çalışılmaktadır. Bununla birlikte, çalışmada borç dolarizasyonundaki vade farklılıklarının bilanço etkisi bağlamında ne tür bir farklılaşmaya yol açtığı analiz edilmektedir. Ayrıca kontrol değişkenleri olarak kaldıraç oranı, kısa vadeli borç dolarizasyonu ve faiz oranı değişkenlerinin etkileri araştırılmaktadır. Ekonometrik model analiz sonuçlarına ilişkin hipotezler şu şekildedir:

- H1: Kısa vadeli bilanço etkisi etkileşim terimi Türk reel sektör alt sektörlerinde sektör yatırımlarını pozitif (negatif bilanço etkisi) etkilemektedir.
- H2: Rekabetçi etki etkileşim terimi Türk reel sektör alt sektörlerinde sektör yatırımlarını negatif (pozitif rekabetçi etki) etkilemektedir.
- H3: Uzun vadeli bilanço etkisi etkileşim terimi Türk reel sektör alt sektörlerinde sektör yatırımlarını pozitif (negatif bilanço etkisi) etkilememektedir.
- H4: Kaldıraç oranı Türk reel sektör alt sektörlerinde sektör yatırımlarını negatif etkilemektedir.
- H5: Kısa vadeli borç dolarizasyonu Türk reel sektör alt sektörlerinde sektör yatırımlarını negatif etkilemektedir.

- H6: Faiz oranı Türk reel sektör alt sektörlerinde sektör yatırımlarını negatif etkilemektedir.

Bilanço ve rekabetçi etki değişkenleri bir tür etkileşim terimidir. Bu terimler Tablo 1'de ifade edildiği gibi sırasıyla sektörün kısa vadeli yabancı para cinsinden kredi oranları ve ihracat oranlarının reel efektif döviz kuru ile çarpılması sonucu elde edilmektedir. Bilanço etkisi terimi için beklenen katsayı işareti pozitif, rekabetçi etki terimi için ise negatiftir. Her iki değişken için elde edilecek istatistiksel olarak anlamlı sonuçlar sırasıyla negatif bilanço etkisi ve pozitif rekabetçi etkinin varlığı şeklinde yorumlanır. Katsayı işaretlerinin tersine bir etki yorumu yapılması etkileşim değişkenlerini oluştururken kullanılan reel efektif döviz kuru değişkeninden kaynaklanmaktadır. Etkileşim terimi içerisinde yer alan reel efektif döviz kuru değişkeni, ulusal para değer kayıpları ile paralel olarak azalırken nominal döviz kuru artışlarının tersine hareket etmektedir. Bu nedenle katsayı işaretinin pozitif olması bilançodaki daraltıcı etkiyi göstermektedir. Başka bir deyişle, nominal döviz kuru artarken (yerli para değer kaybederken) reel efektif döviz kuru azalmakta, buna paralel olarak yatırımlar da azalmaktadır. Aksine, nominal döviz kuru azalırken (yerli para değer kazanırken) reel efektif döviz kuru artmakta, bunun sonucu olarak yatırımlar da artmaktadır.

Kısa vadeli borç dolarizasyonun yüksek olduğu sektörlerde ulusal para değer kayıpları sektörün kısa vadede ulusal para cinsinden borçluluğunu artırarak sektör performansını olumsuz etkileyecektir. Kısa vadeli performans etkilerinin ayrıştırılabilmesi için modele uzun vadeli borç dolarizasyonu üzerinden oluşturulmuş bir uzun vadeli bilanço etkisi etkileşim terimi dahil edilmiştir. Etkileşim teriminin oluşturulma ve yorumlanma biçimi kısa vadeli bilanço etkisi etkileşim terimi ile aynıdır. Ancak sektörel anlamda uzun vadeli bir negatif bilanço etkisi (pozitif katsayı tahmini) beklenmemektedir. Yüksek düzeyde uzun vadeli döviz cinsi borç tutan bilançolar için kısa vadeli ekonomik istikrarsızlıkların ve kur belirsizliklerinin olumsuz performans etkileri oldukça düşük olacaktır.

3.5. Analiz Sonuçları

Türk reel sektörü, kayda değer ulusal para değer kayıpları ve döviz kuru istikrarsızlıklarına rağmen, bilançolarında önemli düzeyde yabancı para cinsinden borç tutmaktadır. Diğer bir ifadeyle, Türk reel sektörü için yüksek bir borç dolarizasyonu söz konusudur. Bu olgu bilançolarda döviz kuruna karşı önemli bir kırılganlık kaynağıdır. Diğer yandan, ulusal para değer kayıpları bir rekabetçi etki yaratmak suretiyle sektör üzerinde genişletici etkiler de meydana getirebilir. Dolayısıyla döviz kuru değişimlerinin bilanço etkisi ve rekabetçi etki kanallarıyla Türk reel sektörü üzerindeki nihai etkisini ölçmek, Türk parasında meydana gelen değer kayıplarının yatırımlar ve dolayısıyla büyüme üzerinde olumlu bir etki meydana getirip getirmediğini anlamak bakımından önemlidir. Bu amaçla bu çalışmada Türk reel sektöründe faaliyette bulunun 76 alt sektör bilançolarından elde edilen veriler ile yabancı para cinsinden kısa ve uzun dönem borçların yatırımlar üzerindeki etkileri tek bir modelde analiz edilmektedir. Kısa zaman ve uzun birim kesitine uygun veri seti ve dinamik yapıya uygun model nedeniyle GMM tahmincisi tercih edilmiştir (Roodman, 2009b: 86). Reel sektör yatırımlarını açıklamaya yönelik oluşturulan bilanço etkisi yatırım

modeli için Sabit Etkiler, Fark GMM ve Sıradan En Küçük Kareler yöntemlerine göre tahmin edilmiş bağımlı değişkenin gecikme katsayı tahmin sonuçları Tablo 3'te verilmektedir. Katsayı tahminleri ile Fark GMM tahmincisinin sonuçlarının sapmalı olup olmadığı sınanmaktadır (Bond, 2002: 155). Böylece Fark GMM ve Sistem GMM tahmincileri arasından hangisinin tercih edileceği de saptanmış olacaktır.

Tablo: 3
Fark Değişkeni Katsayı Tahminleri

Model	Sabit Etkiler	Fark GMM	Sıradan En Küçük Kareler
Bilanço Etkisi Yatırım Modeli	0. 6776	0. 8315	0. 9460

Tablo 3'te de görüldüğü üzere, Fark GMM tahmincisinden elde edilen bağımlı değişkenin gecikme katsayı tahminleri Sabit Etkiler ve Sıradan En Küçük Kareler yöntemlerinden elde edilen katsayı tahminlerinin arasında yer almaktadır. Diğer bir ifadeyle, Fark GMM tahmincisinden elde edilen tahmin sonuçları sapmalı değildir (Bond, 2002: 155). Bu doğrultuda her iki tahminciye ilişkin sonuçlar yorumlanabilmektedir. Diğer yandan Sistem GMM'in çoklu doğrusallık varsayımının geçerli olup olmadığını tespit etmek için değişkenler arasında korelasyon ilişkisine bakılmalıdır. Modelde kullanılan değişkenlerin korelasyon matrisi Tablo 4'te verilmektedir.

Korelasyon matrisindeki kısa ve uzun vadeli bilanço etkisi ve rekabetçi etki etkileşim terimlerinin yatırım düzeyiyle olan korelasyon katsayı işaretleri analiz sonucundan beklenen işaretlerle paralellik göstermektedir. Ancak, mutlak olarak rekabetçi etki ve uzun vadeli bilanço etkisi korelasyon katsayıları kısa vadeli bilanço etkisi korelasyon katsayısına göre nispeten daha küçüktür. Bu sonuçlar alt sektör yatırımlarını açıklamada etkileşim terimlerinin göreli önemleri hakkında fikir verebilmektedir. Rekabetçi etki etkileşim teriminin kısa vadeli borç dolarizasyonu ile olan pozitif ve nispeten yüksek korelasyon düzeyleri ihracatçı sektörlerin yabancı para cinsinden kısa vadeli borçlanma eğilimlerinin daha yüksek olduğunu göstermektedir. Dolayısıyla sektörler için para birimi uyumsuzluğuna karşı bir miktar doğal sigortalamanın söz konusu olduğu ifade edilebilir. Öte yandan, korelasyon matrisinden kısa vadeli bilanço etkisi etkileşim terimi ve kısa vadeli borç dolarizasyonu değişkenlerinin beklendiği üzere tama yakın bir korelasyona sahip oldukları görülmektedir.

Tablo: 4
Değişkenlerin Korelasyon Matrisi

	Yatırım	Kısa Vadeli Bilanço Etkisi	Uzun Vadeli Bilanço Etkisi	Rekabetçi Etki	Kısa Vadeli Borç Dolarizasyonu	Kaldıraç Oranı	Faiz Oranı
Yatırım	1.000						
Kısa Vadeli Bilanço Etkisi	0.206	1.000					
Uzun Vadeli Bilanço Etkisi	0.056	0.676	1.000				
Rekabetçi Etki	-0.082	0.504	0.367	1.000			
Kısa Vadeli Borç Dolarizasyonu	0.193	0.995	0.665	0.508	1.000		
Kaldıraç Oranı	-0.312	-0.467	-0.462	-0.073	-0.454	1.000	
Faiz Oranı	-0.091	-0.098	-0.101	0.023	-0.048	0.209	1.000

Bilindiği gibi yatırımlar finansman ihtiyacını doğurur. Bu ihtiyaç yetersiz yurtiçi tasarruflara sahip ülkelerde tamamen yerli kaynaklardan karşılanamayacağı için, sektörler doğal olarak döviz cinsinden borçlanma eğilimi gösterecektir. Dolayısıyla ekonomik büyümenin temel taşlarından birisi olan yatırım artışları için borçların dolarizasyonuna gereksinim bulunduğu söylenebilir. Ancak, ulusal paranın yabancı paralar karşısında değer kayıpları durumunda döviz cinsinden borçların nihai etkisi daraltıcı bir hâle gelebilir. Bu durumda döviz cinsi borçların vade yapısındaki farklılıkların sektörler üzerindeki etkilerinde farklılıklar beklenir. Şöyle ki, sektörler uzun vadeli borçlanarak yatırımlarını gerçekleştirirken kısa vadeli borçlar doğrudan ulusal para değer kayıplarından etkilenerek hem para birimi uyumsuzluğu sorununa ve hem de vade uyumsuzluğuna yol açmaktadır. Bu nedenle çalışmada reel sektör bilanço etkisi kısa ve uzun vadeli borçları içerecek şekilde tek bir modelde analiz edilmektedir. Kısa ve uzun vadeli döviz cinsi borçlar üzerinden elde edilen bilanço etkisi ölçümleri Tablo 5'te verilmiştir.

Tablo 5'teki analiz sonuçları yorumlanmadan önce tahmincilerin sınama testlerinden geçip geçmedikleri tespit edilmelidir. GMM tahmincisinden elde edilen sonuçlar, otokorelasyon ve Sargan testlerinin geçerliliğinde tutarlıdır ve yorumlanabilmektedir. Tablo 5'teki tahmin sonuçları için modelin dinamik yapısı gereği matematiksel beklentilere uygun şekilde birinci derece kısmi korelasyon (AR1) katsayı işareti negatif bulunmuştur (Roodman, 2009b: 119). İkinci dereceden kısmi korelasyon (AR2) ise iki analiz sonucu için de söz konusu değildir. Dolayısıyla tahmincilerde otokorelasyon sorunun olmadığı görülmektedir. Kullanılan araç değişkenlerin geçerliliğini test eden Sargan/Hansen testi bağlamında iki analizde de %5 anlamlılık düzeyinde istatistiksel olarak anlamlı sonuçlara ulaşılmıştır. Fark GMM tahmincisinden elde edilen Sargan/Hansen test sonuçları Roodman (2009b: 129)'ın güvenli aralığında bulunmaktadır. Buna ilaveten, modellere ilişkin Wald testi sonuçları da modelde yer alan değişkenlerin gerekli olduklarını göstermektedir. Tablo 5'te verilen tüm tahmin sonuçları gerekli testlerden geçmektedir.

Tablo: 5
Kısa ve Uzun Vadeli Döviz Cinsi Borçların Yatırımlara Etkisi

Değişkenler	Fark GMM	Sistem GMM
Yatırım Gecikmesi	0.832***	0.871***
Kısa Vadeli Bilanço Etkisi	0.041*	0.048**
Uzun Vadeli Bilanço Etkisi	-0.001	-0.002
Rekabetçi Etki	0.021	-0.004
Kısa Vadeli Borç Dolarizasyonu	-0.190*	-0.202**
Kaldıraç Oranı	-0.041	-0.032**
Faiz Oranı	0.010**	0.017**
Gözlem Sayısı	912	988
Grup Sayısı	76	76
Araç Sayısı	8	9
Wald Test	3.51 [0.004]	2.22 [0.050]
AR (1)	-3.16 [0.002]	-3.08 [0.002]
AR (2)	-0.05 [0.957]	-0.00 [0.997]
Sargan/Hansen	2.09 [0.148]	2.14 [0.344]

Not: Test istatistiklerine ilişkin prob değerleri köşeli parantez içerisinde verilirken katsayı tahmini prob değerleri sırasıyla %1, %5 ve %10 anlamlılık düzeylerine göre ***, **, * şeklinde belirtilmiştir.

3.6. Analiz Sonuçlarının Değerlendirilmesi

Tablo 5'ten de görüleceği üzere, kısa vadeli bilanço etkisi etkileşim teriminin yatırımlar üzerindeki etkisi pozitif (negatif bilanço etkisi) ve istatistiksel olarak anlamlıdır. Bu sonuç beklentilerle paralellik gösterir, zira alt sektörler 2 analiz sonucuna göre de kısa vadeli döviz cinsi borçlarından kaynaklı olarak bir negatif bilanço etkisine sahiptir. Uzun vadeli döviz cinsi borçların ise sektör yatırımları üzerinde anlamlı etkileri bulunamamıştır. Her iki analiz sonucundan da elde edilen katsayı işaretinin negatif olması sektörün uzun vadeli döviz cinsi borçlarından kaynaklı olarak önemli bir döviz kuru riskine maruz kalmadığını göstermektedir.

Rekabetçi etki katsayısı için anlamlı sonuçlar bulunamamış olmakla birlikte, iki analiz sonucunda katsayı işaretleri de farklılaşmaktadır. Katsayı işaretlerindeki farklılıklar Türk reel sektöründe rekabetçi etki kaynaklı genişletici bir etkinin varlığına dair şüpheyi güçlendirmektedir. Dolayısıyla, Türk reel sektörü için daraltıcı bilanço etkisini telafi edecek herhangi bir genişletici rekabetçi etkinin varlığından söz edilememektedir. O hâlde, reel sektörün kısa vadeli borçlardan kaynaklı olarak önemli bir para birimi uyumsuzluğu sorununa sahip olduğu ifade edilebilir.

Yatırım artışlarını açıklamaya yönelik kontrol değişkenleri olan sektöre özgü kaldıraç oranı ve kısa vadeli borç dolarizasyonu oranı ile makroekonomik bir değişken olarak faiz oranının etkileri de Tablo 5'te görülmektedir. Faiz oranı ve kısa vadeli borç dolarizasyonunun yatırımlar üzerinde 2 analiz için de istatistiksel olarak anlamlı sonuçları bulunurken, faiz oranının katsayı işaretinin pozitif olması beklenenin tersinedir. Faiz oranı ve yatırımlar arasındaki ilişkinin teorik olarak negatif olacağı beklense de yatırımcı beklentilerindeki bozulmalar ve kredi kısıtları bu ilişkinin yönünü bozabilmektedir (Carranza et al., 2003). Kaldıraç oranının ise yalnızca Sistem GMM tahmincisinden elde edilen katsayı tahmininin yatırımlar üzerindeki etkisi istatistiksel olarak anlamlı bulunmuştur. Tahmin edilen katsayı işareti ise negatiftir. Kaldıraç oranlarındaki artış sektörün bilançosu içerisindeki borçluluk oranının arttığını göstermektedir. Bu durumda sektör için risk artışları ve teminat sorunları ortaya çıkacaktır. Dolayısıyla negatif katsayı tahmini beklentiye paralel olarak gerçekleşmiştir.

4. Sonuç

Döviz kurları reel sektör tarafından izlenen önemli değişkenlerden biridir. Döviz kurlarındaki istikrarsızlıkların yanı sıra döviz kuru değişimlerinin yönü de etkinin biçimini belirlemektedir. Döviz kuru değişimlerinin en yaygın bilinen etkisi ulusal para değer kayıplarının uluslararası piyasalarda yurtiçinde üretilen malların göreli olarak daha ucuz hâle gelmesi ile ortaya çıkan *rekabetçi etki* kanalıdır. Rekabetçi etki kanalı bağlamında ulusal para değer kayıplarının genel olarak genişletici etkileri ileri sürülmektedir. Ancak bu yaklaşımlar sektörlerin bilançolarını ve döviz cinsinden borçlanmaların bilanço etkisini göz ardı etmektedir. Ulusal para değer kayıpları sektörün mamul mallarını göreli olarak ucuz hâle getirirken, aynı zamanda döviz cinsi borçlarının ulusal para cinsinden tutarını da

artırmaktadır. Bu durumda özellikle yüksek miktarda döviz cinsi borç tutan bilançolar için kırılganlık oldukça yüksek olacaktır. Bu koşullar altında daraltıcı *bilanço etkisi*nin genişletici *rekabetçi etki*ye baskın gelmesi söz konusu olabilir.

Türk reel sektör borçlarının yüksek düzeyde dolarizasyonu ve Türk lirasının önemli değer kayıpları reel sektörde bilanço etkisi kanalının önemini ortaya çıkarmaktadır. Bu kapsamda bu çalışmada 2009-2022 dönemi için Türk reel sektöründe faaliyette bulunan tüm alt sektörlerin yatırımları üzerinde bilanço ve rekabetçi etki kanallarının geçerli olup olmadığı GMM tahmincisi ile analiz edilmektedir. Bilanço etkisini ölçmek için kısa ve uzun vadeli yabancı para cinsinden borçları dikkate alan bir model oluşturularak iki farklı analiz yapılmıştır. Borçların vade yapısındaki farklılık, sektörün yatırımları gerçekleştirebilmek için yabancı para cinsi borçlara duyduğu gereksinimi vurgulamak bakımından dikkate alınmıştır. Sektörün ulusal para değer kayıplarında yaşadığı para birimi uyumsuzluğu kısa vadeli borçlar bağlamında bir vade uyumsuzluğuna da yol açarak daha büyük etki yaratması beklenmektedir. Bu çalışma, literatürdeki diğer bilanço etkisi çalışmalarından reel sektörün tüm alt sektörlerini dikkate alacak şekilde bilanço etkisi ve rekabetçi etkiyi modellemesi bakımından ayrılmaktadır. Ayrıca literatürden farklı olarak bu çalışmada kısa ve uzun dönem borç dolarizasyonlarının farklı bilanço etkilerine yol açabileceği de araştırılmaktadır. Diğer yandan çalışmada ele alınan dönem, politika ve parasal duruştaki değişikliklerin ve Türk lirasındaki önemli değer kayıplarının yaşandığı bir dönem olarak bilanço etkisinin incelenmesini önemli hâle getirmektedir. Yapılan analizlerden elde edilen bulgular, beklentiler doğrultusunda, kısa vadeli borç dolarizasyonunun önemli bir negatif bilanço etkisi meydana getirdiği yönündedir. Diğer yandan reel sektörde uzun vadeli borç dolarizasyonu kaynaklı anlamlı bilanço etkisi bulgularına ulaşılamamıştır. Benzer şekilde, Türk reel sektöründe rekabetçi etkinin varlığına işaret eden herhangi bir bulgu da tespit edilememiştir.

Kısa ve uzun vadeli borç dolarizasyonuna ilişkin bilanço etkisi tahminleri arasındaki farklılık, sektörlerin ulusal para değer kayıpları karşısında karşı karşıya olduğu risklerin kısa vadeli borçlar üzerinde yoğunlaştığını göstermektedir. Uzun vadeli döviz cinsinden borçlar ise önemli bir risk kaynağı değildir. Literatürde Türk reel sektörüne ilişkin yapılan çalışmaların görebildiğimiz kadarıyla tamamı vade yapısını göz ardı etmiştir. Oysa bu çalışmada, vade yapısındaki farklılıkların reel sektör bilançolarındaki kırılganlıkların önemli bir kaynağı olduğu tespit edilmiştir. Ulusal para değer kayıplarının bilançolar kaynaklı bu daraltıcı etkilerinin genişletici rekabetçi bir etkiyle karşılanması beklense de, Türk reel sektörü için herhangi bir rekabetçi etkinin varlığına ilişkin bulguya rastlanmamıştır. Kontrol değişkeni olarak modele ilave edilen kaldıraç, faiz ve kısa vadeli yabancı para cinsinden borçların da yatırımlar üzerinde anlamlı etkileri bulunmaktadır. Kaldıraç ve kısa vadeli borç dolarizasyonunun etkileri beklenildiği üzere negatif iken, faiz oranları teorik beklentilerin aksine pozitif bulunmuştur. Bu durumun faiz oranlarında bir artışın yabancı fonların girişini özendirip yatırımlar üzerinde dolaylı bir olumlu etki yaratmasıyla ve kredi kısıtı sorunlarıyla ilgili olabileceği düşünülmekle birlikte, bu konuda daha detaylı çalışmalara ihtiyaç vardır.

Ulusal para değer kayıplarının reel sektör üzerinde meydana getirdiği karşıt etkiler politika kararları üzerinde de kısıt oluşturmaktadır. Ulaşılan sonuçlardan görüleceği üzere, Türk reel sektörü için bu kırılganlıklar önemli boyuttadır. Dolayısıyla özellikle de kısa vadeli yabancı para cinsinden borçların yüksek olduğu dönemlerde bu tip politika kararlarının ve çeşitli kaynaklardan gerçekleşen kur şoklarının reel sektör performansı üzerindeki önemli negatif etkileri olacaktır. Bu bulguların politika içerimi çok açıktır: Yurt içinde üretilen malların göreli fiyatını düşürerek ihracata dönük bir genişletici politikayı hedefleyen bir siyasi otorite ya da karar alıcı, reel sektör bilançolarının kırılganlık yapısını dikkate almak durumundadır. Bununla birlikte, reel sektörün yabancı para cinsinden borçlarının vade yapısı bakımından bileşenini uzun vadeli borçların lehine değiştirecek şekilde politikalar izlenebilir. Aksi takdirde devalüasyon ya da döviz kuru artışlarından beklenen genişletici etki konusunda hayal kırıklığı yaşanması kaçınılmaz olup, ulusal paranın değer kaybından beklenen yatırım, ihracat ve ekonomik büyümenin görülmemesi muhtemeldir. Nitekim "Türkiye modeli" adıyla takdim edilen ve düşük faiz-yüksek kur üzerinden cari açığı kapatıp yatırımları artırmayı ve ekonomik büyümeyi hızlandırmayı öngören modelin beklenen sonuçları vermemesinin bu olguyla yakından ilişkili olduğu düşünülmektedir.

Kaynaklar

Acar, M. (2000), "Devaluation in Developing Countries: Expansionary or Contractionary?", *Journal of Economic and Social Research*, 2(1), 59-83.

Adanur-Aklan, N. & M. Nargeleçekenler (2010), "Yükümlülük Dolarizasyonu ve Bilanço Etkisi: Türkiye Üzerine Bir Analiz", *İ.Ü. Siyasal Bilgiler Fakültesi Dergisi*, 43, 177-204.

Adler, M. & B. Dumas (1984), "Exposure to Currency Risk: Definition and Measurement", *Financial Management*, 13(2), 41-50.

Aggarwal, R. & J.T. Harper (2010), "Foreign Exchange Exposure of "Domestic" Corporations", *Journal of International Money and Finance*, 29, 1619-1636.

Aghion, P. et al. (2000), "A Simple Model of Monetary Policy and Currency Crises", *European Economic Review*, 44, 728-738.

Akay, G.H. & A. Çifter (2014), "Exchange Rate Exposure at the Firm and Industry Levels: Evidence from Turkey", *Economic Modelling*, 43, 426-434.

Arellano, M. & O. Bover (1995), "Another Look at the Instrumental Variable Estimation of Error-Components Models", *Journal of Econometrics*, 68(1), 29-51.

Arellano, M. & S. Bond (1991), "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations", *The Review of Economic Studies*, 58(2), 277-297.

Aydın, Ü. vd. (2017), "Türkiye'deki Reel Sektörün Finansal Yapısı: Kur Değişimlerinin ve Politik İstikrarsızlığın İmalat Sanayi Üzerine Etkisi", *3rd SCF International Conference on "Economic and Social Impacts of Globalization"*, 5-14.

Balassa, B. (1978), "Exports and Economic Growth: Further Evidence", *Journal of Development Economics*, 5(2), 181-189.

Benavente, J.M. et al. (2003), "Debt Composition and Balance Sheet Effects of Exchange Rate Depreciations: A Firm-Level Analysis for Chile", *Emerging Markets Review*, 4(4), 397-416.

Berman, N. & A. Berthou (2009), "Financial Market Imperfections and the Impact of Exchange Rate Movements on Exports", *Review of International Economics*, 17(1), 103-120.

Bernanke, B.S. & M. Gertler (1995), "Inside the Black Box: The Credit Channel of Monetary Policy Transmission", *Journal of Economic Perspectives*, 9(4), 27-48.

Blundell, R. & S. Bond (1998), "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models", *Journal of Econometrics*, 87, 115-143.

Bond, S. (2002), "Dynamic Panel Data Models: A Guide to Micro Data Methods and Practice", *Portuguese Economic Journal*, 1, 141-162.

Bonomo, M. et al. (2003), "Debt Composition and Exchange Rate Balance Sheet Effect in Brazil: A Firm Level Analysis", *Emerging Markets Review*, 4(4), 368-396.

Boughton, J.M. (2003), "On the Origins of the Fleming-Mundell Model", *IMF Staff Papers*, 50(1), 1-9.

Burgaz, N. (2020), "Borç Dolarizasyonunun İmalat Sanayi Firmaları Üzerindeki Bilanço Etkisi", *Türkiye Sosyal Araştırmalar Dergisi*, 24(3), 511-522.

Carranza, J.J. et al. (2003), "Exchange Rate Volatility and Economic Performance in Peru: A Firm Level Analysis", *Emerging Markets Review*, 4(4), 472-496.

Cespedes, L.F. et al. (2004), "Balance Sheets and Exchange Rate Policy", *American Economic Review*, 94(4), 1183-1193.

Demirhan, D. & A.G. Atış (2013), "A Research on the Exchange Rate Exposure of Firms Listed in Borsa Istanbul", *Business and Economics Research Journal*, 4(4), 25-35.

Demirkılıç, S. (2021), "Balance Sheet Effects of Foreign Currency Debt and Real Exchange Rate on Corporate Investment: Evidence from Turkey", *Emerging Markets Review*, 47, 100796.

Dixon, R. & A.P. Thirlwall (1975), "A Model of Regional Growth-Rate Differences on Kaldorian Lines", *Oxford Economic Papers*, 27(2), 201-214.

Eichengreen, B. & R. Hausmann (1999), "Exchange Rates and Financial Fragility", *NBER Working Paper*.

Eichengreen, B. et al. (2007), *Currency Mismatches, Debt Intolerance, and the Original Sin: Why They Are Not the Same and Why It Matters*, University of Chicago Press.

Erdoğan, M. (2016), "Foreign Exchange Exposure and Hedging of Turkish Companies: Panel Data Evidence", *International Business Research*, 9(6), 44-52.

Feder, G. (1982), "On Exports and Economic Growth", *Journal of Development Economics*, 12, 59-73.

Fleming, J.M. (1962), "Domestic Financial Policies under Fixed and under Floating Exchange Rates", *IMF Staff Papers*, 9(3), 369-380.

Forbes, K.J. (2002), "How Do Large Depreciations Affect Firm Performance?", *IMF Staff Papers*, 49, 214-238.

Gönenç, H. vd. (2003), "Balance Sheet Exchange Rate Exposure, Investment and Firm Value: Evidence from Turkish Firms", *Central Bank Review*, 3(2), 1-25.

İncekara, A. vd. (2017), "Borç Dolarizasyonunun Türk İmalat Sanayii Sektörü Büyümesi Üzerine Etkisi", *İktisat Politikası Araştırmaları Dergisi*, 4(1), 16-38.

Jorion, P. (1990), "The Exchange-Rate Exposure of U.S. Multinationals", *The Journal of Business*, 63(3), 331-345.

Kaldor, N. (1978), "The Effect of Devaluation on Trade in Manufacturers", *Future Essays in Applied Economics*, 99-116.

Kesriyeli, M. et al. (2011), "Corporate Sector Liability Dollarization and Exchange Rate Balance Sheet Effect in Turkey", *Applied Economics*, 43(30), 4741-4747.

Kıymaz, H. (2003), "Estimation of Foreign Exchange Exposure: An Emerging Market Application", *Journal of Multinational Financial Management*, 13, 71-84.

Krugman, P. (1999), "Balance Sheets, the Transfer Problem, and Financial Crises", *International Tax and Public Finance*, 6, 459-472.

Mishkin, F.S. (1995), "Symposium on the Monetary Transmission Mechanism", *Journal of Economic Perspectives*, 9(4), 3-10.

Mishkin, F.S. (1996), "Understanding Financial Crises: A Developing Country Perspective", *NBER Working Paper*, 1-49.

Mundell, R.A. (1960), "The Monetary Dynamics of International Adjustment under Fixed and Flexible Exchange Rates", *The Quarterly Journal of Economics*, 74(2), 227-257.

Mutluay, A.H. & T.T. Turaboğlu (2013), "Döviz Kuru Değişimlerinin Firma Performansına Etkileri: Türkiye Örneği", *BDDK Bankacılık ve Finansal Piyasalar Dergisi*, 7(1), 59-78.

Pratap, S. et al. (2003), "Debt Composition and Balance Sheet Effects of Exchange Rate Volatility in Mexico: A Firm Level Analysis", *Emerging Markets Review*, 4(4), 450-471.

Roodman, D. (2009a), "A Note on the Theme of Too Many Instruments", *Oxford Bulletin of Economics and Statistics*, 71(1), 135-158.

Roodman, D. (2009b), "How to Do xtabond2: An Introduction to Difference and System GMM in Stata", *The Stata Journal*, 9(1), 86-136.

Rossini, R. & M. Vega (2008), "The Monetary Policy Transmission Mechanism Under Financial Dollarisation: The Case of Peru 1996-2006", *BIS Papers*.

Taşseven, Ö. & S. Çınar (2015), "Türkiye'de Borç Dolarizasyonunun Belirleyicileri ve Makroekonomik Göstergeler Üzerindeki Etkileri", *Social Sciences Research Journal*, 4(2), 121-141.

Taylor, J.B. (1995), "The Monetary Transmission Mechanism: An Empirical Framework", *Journal of Economic Perspectives*, 9(4), 11-26.

Tkalec, M. & M. Verbic (2013), "A New Look into the Prevalence of Balance Sheet or Competitiveness Effect of Exchange Rate Depreciation in a Highly Euroised Economy", *Post-Communist Economies*, 25(2), 225-240.

Williamson, J. (1985), "On the System in Bretton Woods", *American Economic Association*, 75(2), 74-79.

Yerdelen-Tatoğlu, F. (2020), *İleri Panel Veri Analizi: Stata Uygulamalı*, İstanbul: Beta Yayıncılık.

Yıldız, B. & T. Yılmaz (2022), "Yabancı Para Pozisyonunun Firma Kârlılığına Etkisi: Borsa İstanbul Örneği", *ODÜ Sosyal Bilimler Araştırmaları Dergisi*, 12(2), 1399-1418.

Türkiye'nin Avrupa Yeşil Mutabakatına Uyumu Kapsamında Yeşil Ekonomi Performansı: Değerlendirme ve Perspektifler[1]

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Türkiye's Green Economy Performance in Compliance with the European Green Deal: Assessment and Perspectives[2]

Abstract

This study aims to evaluate Türkiye's performance in the green economy within the framework of the European Green Deal. Türkiye's green economy performance was assessed using a Green Economy Progress (GEP) index developed through the Green Economy Measurement Framework. The study examines the progress in the green economy's environmental, social, and economic dimensions to determine Türkiye's readiness to transition to a sustainable economy. The dataset utilised in this study comprises 13 green economy indicators spanning from 2011 to 2020. The findings demonstrate that Türkiye is indeed progressing towards a greener economy. However, the rate of progress falls short in terms of meeting the criteria set by the European Green Deal. Notably, the high greenhouse gas emissions present substantial challenges for Türkiye.

Keywords   :   Green Economy, European Green Deal, Climate Change,
                           Sustainability, Green Economy Progress Index.

JEL Classification Codes :   Q01, Q5, Q56.

Öz

Bu çalışma, Türkiye'nin Avrupa Yeşil Mutabakatı çerçevesindeki yeşil ekonomi performansını belirlemeyi amaçlamaktadır. Çalışmada, Türkiye'nin yeşil ekonomi performansını hesaplamak için Yeşil Ekonomi Ölçüm Çerçevesi-GEP kullanılarak bir GEP endeksi oluşturulmuştur. Çalışma, yeşil ekonominin çevresel, sosyal ve ekonomik boyutlarındaki ilerlemeyi inceleyerek Türkiye'nin sürdürülebilir bir ekonomiye geçiş için ne kadar hazır olduğunu belirlemeyi amaçlamaktadır. Çalışmada kullanılan veri seti, 2011'den 2020'ye kadar olan 13 yeşil ekonomi göstergesini içermektedir. Bulgular, Türkiye'nin yeşil bir ekonomiye doğru ilerlediğini göstermektedir. Ancak, bu ilerleme Avrupa Yeşil Mutabakatının belirlediği kriterleri karşılama konusunda yetersiz kalmaktadır. Özellikle yüksek sera gazı emisyonları, Türkiye için ciddi riskler oluşturmaktadır.

Anahtar Sözcükler   :   Yeşil Ekonomi, Avrupa Yeşil Mutabakatı, İklim değişikliği,
                                    Sürdürülebilirlik, Yeşil Ekonomi İlerleme Endeksi.

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[1]   *Çalışma yazar tarafından sunulan "Yeşil Ekonomiye Geçiş: Avrupa Yeşil Mutabakatı ve Türkiye'nin Yeşil Ekonomi Performansı" başlıklı yüksek lisans tezinden üretilmiştir.*

[2]   *The study was produced from the master's thesis titled "The Transition to the Green Economy: The European Green Deal and Türkiye's Green Economy Performance" presented by the author.*

1. Giriş

İklim modelleri, Akdeniz Havzasının iklim değişikliğine karşı yüksek hassasiyete sahip olduğunu ve bu alanın 'iklim değişikliği' bölgesi olduğunu belirtmektedir (Intergovernmental Panel on Climate Change, 2022: 2242). Bir Akdeniz ülkesi olarak Türkiye birçok çevresel zorlukla karşı karşıyadır. Bununla birlikte, büyük bir nüfusa, hızlı ekonomik kalkınmaya ve hızla artan enerji talebine sahiptir. Ancak Türkiye hala yoksulluk, eşitsizlik ve işsizlik gibi zorluklarla mücadele etmektedir. Üstelik artan enerji talebinin büyük çoğunluğunu fosil yakıtlardan karşılamaktadır. Artan çevresel, ekonomik ve sosyal baskıları ele almak için Türkiye'nin daha çevre dostu, yeşil ve sürdürülebilir bir ekonomik modele geçişi hızlandırması gerekmektedir.

Türkiye, iklim değişikliğine uyumu sağlamak için düşük karbonlu temiz enerjiye ve kapsamlı bir yeşil ekonomiye geçişte önemli fırsatlara sahiptir. Özellikle, Avrupa Birliği'nin (AB) 2019 yılında Avrupa Yeşil Mutabakatı (AYM) ile başlattığı yeşil ekonomiye geçiş süreci Türkiye'nin yeşil ekonomiye geçişini hızlandırması açısından önemlidir. AYM, iklim değişikliyle mücadele kapsamında Avrupa'yı 2050 yılında ilk iklim nötr kıta haline getirmeyi ve Avrupa ekonomisinin rekabet gücünün artmasını amaçlayan bir yol haritasıdır. Bu yol haritası, yeşil büyümeden sürdürülebilir sanayiye, yenilenebilir enerji kullanımından kaynak verimli döngüsel ekonomi oluşturulmasına kadar birçok alanda kapsamlı dönüşüm içermektedir. AB'nin başlattığı bu yeni yeşil dönüşüm, AB ile yakın ticari ve siyasi ilişkiler içinde olan ülkeleri de etkilemektedir. Özellikle Türkiye bu dönüşümden en çok etkilenecek ülkelerden biridir. Türkiye'nin AB ile olan dış ticaret ortaklığı ve adaylık süreci göz önünde alındığında AYM'ye uyumun sağlanmasının bir gereklilik olduğu görülmektedir.

Türkiye, 2021 yılında Paris İklim Anlaşması'nı onaylayarak 2053 yılına kadar net-sıfır hedefine ulaşmayı taahhüt etmiştir. Buna ek olarak, aynı yıl AYM'ye uyum bağlamında yenilenebilir enerjiyi teşvik etmeyi, enerji verimliliğini artırmayı ve kaynak yönetimini iyileştirmeyi amaçlayan bir dizi yeşil ekonomi eylemi başlatmıştır. Yeşil ekonomi, ekonomik büyüme sağlanırken çevresel riskleri en aza indirmeyi ve herkes için refah ve sosyal eşitlik oluşmasını amaçlar. Kapsayıcı bir yeşil ekonomi, insanların ihtiyaçlarını karşılarken doğal kaynakların korunmasına ve sürdürülebilir kullanılmasına odaklanır. Türkiye'nin yeşil ekonomiye geçişi, iklim değişikliğiyle mücadeleye ve düşük karbonlu sürdürülebilir büyümeye yardımcı olabilir.

Türkiye'nin yeşil ekonomi performansının değerlendirilmesi, yeşil ekonomi yolunda kaydettiği ilerlemenin anlaşılması, güçlü ve zayıf yönlerinin belirlenmesi etkili geçiş politikalarının geliştirilmesi açısından kritik önem taşımaktadır. Bu doğrultuda bu çalışma, Türkiye'nin yeşil ekonomi performansını değerlendirerek AYM'ye ne kadar hazır olduğunu ve hangi alanlarda iyileştirme yapılması gerektiğini belirlemeyi amaçlamaktadır. Özellikle Türkiye'nin çevre ve iklim politikalarının hızlandığı 2011 ve sonrası dönem ile Paris İklim Anlaşması sonrası dönemdeki yeşil ekonomi performansı ölçülmüştür. Çalışmada Birleşmiş Milletler Çevre Programı (UNEP) ve Yeşil Ekonomi Eylem Ortaklığı (PAGE)'nın tarafından hazırlanan Yeşil Ekonomi İlerleme Ölçüm Çerçevesi (GEP) benimsenerek

Türkiye ve 27 AB ülkesi için bir GEP endeksi oluşturulmuştur. Bu endeks AB ülkeleri ile Türkiye arasında sıralama ve karşılaştırmalar yapılmasına olanak tanımıştır. Analizde aşağıdaki sorulara cevap aranmıştır: (1) Türkiye, 2011 iklim stratejisinin tanıtımından bu yana yeşil ekonomi uygulamasında ilerleme kaydetmiş midir? (2) Türkiye, yeşil ekonomiye geçiş sürecinde hangi göstergelerde zorluklarla karşı karşıyadır? (3) AB ülkelerinden hangileri yeşil ekonomi konusunda daha iyi performans göstermektedir? (4) Türkiye'nin yeşil ekonomi performansı AB ülkelerine göre hangi konumdadır?

Bu makalenin iki teorik katkısı bulunmaktadır. İlk olarak kapsamlı bir yeşil ekonomi ilerleme ölçüm çerçevesi kullanarak (GEP) Türkiye ve 27 AB ülkesi için yeşil ekonomi performans analizi gerçekleştirilmiştir. Daha önceki çalışmalar çoğunlukla Türkiye'nin sürdürülebilir kalkınma performansına odaklanmış ve yalnızca ekonomik faktörler ile çevresel faktörler arasındaki bağlantıyı dikkate almışlardır. Sosyal kapsayıcılığı temsil eden göstergeleri dışarıda bırakmışlardır. Bu çalışmada, Türkiye'nin ve AB devletlerinin analizini sağlamak için ekonomik, çevresel ve sosyal boyutları içeren kapsamlı göstergeler seçilmiştir. İkinci olarak, yeşil ekonomiye geçiş sürecini AYM uyum bağlamında Türkiye ve 27 AB ülkesi için karşılaştırmalı olarak sunmaktadır.

Makale şu şekilde düzenlenmiştir: İkinci bölüm, Türkiye'nin yeşil ekonomi değerlendirmesi araştırmalarını kapsayan bir literatür taramasından oluşmaktadır. Daha sonra, Yeşil ekonominin tanımı ve çalışmada kullanılan yeşil ekonomi ilerleme (GEP) ölçüm çerçevesi açıklanmaktadır. Üçüncü bölümde AYM ve unsurları ayrıntılı şekilde açıklanmaktadır. Dördüncü bölümde, Türkiye'nin günümüze kadar uyguladığı yeşil ekonomi politikaları incelenmiştir. Sonraki bölümde, çalışmada kullanılan yöntem açıklanmıştır. Altıncı bölümde ise GEP kullanılarak Türkiye ve 27 AB ülkesi için GEP endeksi hesaplanmış ve analiz edilmiştir. Son bölün analizlerden elde edilen sonuçları sunmaktadır.

2. Literatür

Geçtiğimiz on yılda yeşil ekonomi ve Türkiye'nin yeşil ekonomi performansının değerlendirildiği çalışma sayısı önemli ölçüde artmış ve artmaya da devam etmektedir. Bu araştırmalar temel olarak şunları araştırmıştır: yeşil ekonomi politikaları (Aşıcı & Şahin, 2017; Demirtaş, 2017; Georgeson et al., 2017; Acet & Şakalak, 2020), yeşil ekonomi ve sürdürülebilir kalkınma (Yıkmaz, 2011; Kuşat, 2013; Özçağ & Hotunoğlu, 2015; Abdıraımov, 2016; Akagündüz, 2022), yeşil işler (Özsoy, 2016; Görmüş, 2019; Azazi & Uzma, 2022), yeşil ekonomi ve mali politikalar (Yalçın, 2016; Ağcakaya & Işıl, 2022), yeşil ekonomi ve yenilenebilir enerji (Özen vd., 2015; Sohag et al., 2019; Koyuncu & Karabulut, 2021; Tüysüz & Öncel, 2022), AB ve yeşil ekonomi (Lavrinenko et al., 2019; Kasztelan, 2021; Gevher & Acet, 2023), yeşil ekonomi ve küreselleşme (Çiloğlu, 2018), yeşil ekonomi ve iklim adaleti (Özgültekin, 2022), yeşil ekonomi endeksi (Ryszawska, 2015; Nahman et al., 2016; Global Green Growth Institute, 2020; Dual Citizen, 2022;). Türkiye'nin yeşil ekonomi performansı (Okumuş, 2013; Al, 2019).

Literatürde, Türkiye ve AB'nin AYM'yi kullanarak yeşil ekonomi performansını değerlendiren ve karşılaştıran çalışmaya saptanabildiği kadarıyla rastlanmamıştır. Var olan çalışmalardan Sayın & Utkulu (2023)'nun çalışması bir döngüsellik endeksi kullanarak Türkiye'nin döngüsellik performansını AB ülkeleri ile karşılaştırmıştır. Türkiye ve AYM'ye odaklanan çalışmalar da daha çok Sınırda Karbon Düzenleme Mekanizmasının (SKDM) Türkiye'nin dış ticaretine etkisi üzerinden bir değerlendirme yapmıştır (Ertunga & Seyhun, 2022; Koç & Kaynak, 2023).

Türkiye'nin yeşil ekonomi performansını yeşil ekonomi göstergeleriyle belirlemeye çalışan çalışmalarda hedef değerler hesaplamaya dahil edilmemiştir. Bu çalışmalardan sırasıyla Okumuş (2018), ekolojik ayak izi göstergelerini kullanarak Türkiye'nin 1990-2008 yılları arasındaki performansını değerlendirmiştir. İbrahim Al (2019) çalışmasında, Türkiye'nin yeşil ekonomideki performansını değerlendirmek için 22 göstergeye dayanan bir endeks önermiştir. Analize dahil edilen yıllar 2002-2015 yılları arasıdır. Çalışmanın sonuçlarına göre Türkiye'nin yeşil ekonomi performansı bu dönemde artış göstermesine rağmen çevresel göstergelerdeki ilerleme sınırlı kalmıştır.

3. Yeşil Ekonomi

Ekolojik ekonomi olarak da bilinen yeşil ekonomi, ilk olarak çevre ekonomistleri Pearce, Markandya & Barbier (1989) tarafından Birleşik Krallık hükümeti için hazırladıkları Blueprint for a Green Economy raporunda ortaya çıkmıştır. Raporda sadece başlık olarak kullanılan kavram, çevresel sürdürülebilirlik ve ekonomik kalkınma arasındaki ilişkiye odaklanmıştır. 2008 küresel ekonomik krizinin etkisiyle yeşil ekonomi, ana akım politika tartışmalarında daha fazla gündeme gelmeye başlamıştır. Karar vericiler tarafından kriz sonrası toparlanmada çevresel krizlere çözüm üretmenin ve ekonomik iyileşmenin bir aracı olarak sunulmuş ve yeşil ekonomi girişimleri başlatılmıştır.

Yeşil ekonomi, ekonomik refah ile çevresel ve sosyal refah arasında olumlu bir ilişki yaratan bir ekonomik modeldir. UNEP (2011), yeşil ekonomiyi "çevresel riskleri ve ekolojik kıtlıkları önemli ölçüde azaltırken, refah ve sosyal eşitliği iyileştiren bir ekonomi" modeli olarak tanımlamaktadır (UNEP, 2011: 1). UNEP'in tanımlamasından bu yana yeşil ekonomi, birçok kuruluş, hükümet ve akademisyen tarafından aynı ana fikir etrafında açıklanmaya çalışılmıştır. Yeşil ekonomi, küresel yoksulluğun ortadan kaldırılması ve sosyal eşitsizliklerin giderilmesinin bir yolu olarak sunulmuştur (UNCTAD, 2011; International Chamber of Commerce, 2012). Aynı zamanda, doğal kaynakların niteliği ve niceliği üzerinde sürdürülemez baskıları azaltırken yeni ekonomik büyüme kaynakları yaratmaktadır (European Environment Agency, 2011: 93).

Diğer yandan, literatürde yeşil ekonomi kavramı ile yeşil büyüme kavramının birbirinin yerine kullanıldığı da görülmektedir. Her iki kavram birbirleriyle ilişkilidir ancak tam olarak aynı şeyi ifade etmemektedirler. OECD Yeşil büyümeyi, "doğal varlıkların refahımızın dayandığı kaynakları ve çevresel hizmetleri sağlamaya devam etmesini sağlarken ekonomik büyümeyi ve gelişmeyi teşvik etmesi" olarak açıklamaktadır (OECD,

2011: 9). Yeşil büyüme, daha çok ekonomik büyüme ve doğal kaynakların sürdürülebilirliğine odaklanırken yeşil ekonomi, çevreyi korurken insan refahını ve sosyal adaleti artırmayı hedefler. Başka bir deyişle yeşil ekonomi, çevresel, ekonomik ve sosyal boyutları içeren üç ayrı hedefe odaklanmaktadır. Çevresel hedeflerde, iklim değişikliğiyle mücadele, CO_2 emisyonlarının ve atıkların azaltılması gibi hedefler yer almaktadır. Ekonomik hedeflerde, refah artışı, yenilik ve istihdamı teşvik etme, insana yakışır işlerin yaratılması gibi hedefler yer almaktadır. Sosyal hedeflerde ise yoksulluğun azaltılması, adil geçiş, refahın adil paylaşımı, cinsiyet eşitliği gibi hedefler yer almaktadır.

Yeşil ekonomiye geçişin kolay sağlanması için dünya çapında çeşitli kurum ve kuruluşlar tarafından birkaç temel ilke geliştirilmiştir. Yeşil ekonominin temelini oluşturan bu ilkeler, daha yeşil, kapsayıcı ve sürdürülebilir bir ekonomik modele geçişte büyük önem taşımaktadır. Bu ilkeler arasında, tüm insanlar için refah yaratılması, adalet, ekolojik sınırların aşılmaması, kaynak verimliliği, sürdürülebilirlik, döngüsel ekonomi, yeşil iş ve beceri, adil geçiş, iyi yönetişim ve hesap verebilirlik ilkeleri yer almaktadır (Stakeholder Forum, 2012; International Chamber of Commerce, 2012; Green Economy Coalition, 2020).

3.1. Yeşil Ekonominin Ölçülmesi: Yeşil Ekonomi İlerleme Ölçüm Çerçevesi

Yeşil ekonomiye geçişin giderek daha fazla uygulanması ve daha fazla yeşil politikaların benimsenmesi yeşil ekonominin kaydettiği ilerlemenin ölçülmesi ihtiyacını ortaya çıkarmıştır. Bu ihtiyaca cevap vermek ve politika karar vericilerini bilgilendirmek amacıyla yeşil ekonomi göstergeleri geliştirilmiştir. Göstergeler, öncelikli konulara dikkat çekmek, hedefler belirlemek ve ilerlemeyi takip etmek için kullanılmaktadır. Aynı zamanda, çevresel bozulma, sosyal eşitlik ve insan refahı boyutlarındaki durumu göstermektedirler (UNEP, 2012: 17-22).

Yeşil ekonomiye geçişte kaydedilen ilerlemenin ölçülmesi için tek bir evrensel ölçü bulunmamaktadır. Yeşil ekonominin ölçülmesi için bir çerçeve oluşturma süreci zorludur ve somut, temsili, ölçülebilir başarı göstergeleri ile net bir metodoloji gerektirmektedir. Bu ihtiyacı karşılamak için UNEP PAGE (2017) tarafından Yeşil Ekonomi İlerleme Ölçüm Çerçevesi (GEP) adında yeşil ekonomi performans endeksi geliştirilmiştir.

GEP (Yeşil Ekonomi İlerleme) Ölçüm Çerçevesi, Birleşmiş Milletler Çevre Programı (UNEP) ve PAGE (Yeşil Ekonomi İçin Küresel Ortaklık) tarafından geliştirilmiş bir araçtır. Bu çerçeve, yeşil ekonomideki ilerlemeyi ölçmek için GEP Endeksi ve Sürdürülebilirlik Gösterge Tablosundan oluşmaktadır. Ölçüm çerçevesinin ana amacı, yoksulluk, gezegen sınırlarının aşılması ve refahın eşitsiz dağılımı gibi sorunları ele almaktır. Ayrıca, ülkelerin kendi yeşil ekonomi ilerlemelerini diğer ülkelerle karşılaştırmalarına da olanak sağlamaktadır. (PAGE, 2017: 3).

GEP Endeksi, bir ülkenin aşılmaması gereken sınırları temsil eden küresel eşiğe doğru konumunu ölçer ve yeşil ekonomi performansını belirlemek için kritik eşikleri temel

olarak kullanır. Bu kritik eşikler, bilimsel kaynaklardan ve verilerden elde edilen uluslararası kabul görmüş gösterge değerlerine dayanmaktadır (PAGE, 2017: 25).

3.2. Yeşil Ekonomi İlerleme Ölçüm Çerçevesi Göstergeleri

Yeşil Ekonomi İlerleme Ölçüm Çerçevesi Göstergeleri, yeşil ekonomiye geçişin çevresel, sosyal ve ekonomik boyutlarını kapsayacak şekilde oluşturulmuştur. Ancak doğrudan ekonomik göstergelerle bağlantısı yoktur (PAGE, 2017: 10). Aynı zamanda GEP ölçüm çerçevesi göstergeleri iyi ve kötü olmak üzere iki gruba ayırarak değerlendirmektedir (PAGE, 2017: 11). İyi göstergeler grubunda çevrenin korunmasına, toplumsal refaha ve eşitliğe katkı sağlayan göstergeler yer almaktadır. Öte yandan, çevre ve doğal kaynaklar üzerinde baskının devam etmesine neden olan göstergeler kötü göstergeler grubundadır. Bu göstergelerin değerindeki artış ya da azalış yeşil kalkınmadaki ilerlemeyi göstermektedir.

Her gösterge, bir ülkenin yeşil ekonomi hedeflerine yönelik ilerlemesinin farklı bir yönünü yansıtır ve belirli bir alandaki performans hakkında veri sağlar. Bu verilere ek olarak hedef değerler ve küresel eşikler kullanılarak yeşil ekonomi ilerleme endeksi oluşturulur. Hedef değerler ulaşılması gereken değerler, eşik değerler ise aşılmaması gereken değerlerdir (PAGE, 2017: 11-12). Bir ülkenin GEP endeksi için hedef değerleri, iyi göstergeler için nihai (y1) ve başlangıç (y0) değerlerinin oranı olarak ifade edilir. Eşikler, tüm ülkeler için geçerli olan veya bir ekonomik kalkınma grubundaki tüm ülkeler tarafından paylaşılan gezegensel sınırlardır. Şekil 1. GEP ölçüm çerçevesinde yer alan yeşil ekonomi göstergelerini göstermektedir.

Şekil: 1
Yeşil Ekonomi İlerleme Ölçüm Çerçevesi
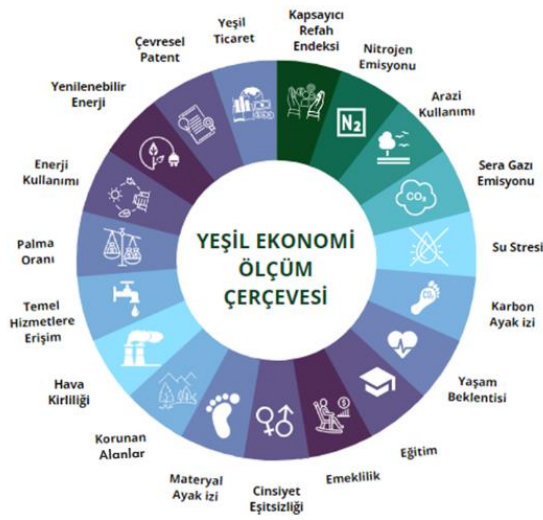
Kaynak: UNEP PAGE, 2021: 14.

4. Avrupa Yeşil Mutabakatı: AB'nin İklim Hedeflerine Ulaşmak İçin Yeşil Yol Haritası

2019 yılında AB Komisyonu, Avrupa Yeşil Mutabakatı'nı yayınlayarak iklim ve çevresel zorluklarla mücadele etmek ve AB ekonomisini daha rekabetçi hale getirmek için bir yol haritası oluşturmuştur. Bu yol haritasıyla birlikte tüm politika alanlarında özellikle iklim, enerji, ulaşım, tarım ve sanayi alanlarında kapsamlı yeşil dönüşüm başlatılmıştır. Avrupa Yeşil Mutabakatı, Avrupa'nın emisyonlarını 2030'a kadar en az %55 ve 2050 yılında %100 azaltarak Avrupa'yı dünyanın ilk iklim nötr kıtası haline getirmeyi hedeflemektedir (European Commission, 2019: 4).

Mutabakatın temel amacı AB'yi kaynak verimli, temiz ve döngüsel ekonomiye sahip rekabetçi bir ekonomiye dönüştürmektir. Ayrıca, Rusya'nın Ukrayna işgalinin neden olduğu küresel enerji piyasasının bozulması gibi durumlarına yanıt olarak Avrupa'nın enerji güvenliğinin sağlanması ve enerjide dışa bağımlılığın azaltılması amaçlanmaktadır (European Parliament, 2023: 2).

Avrupa Komisyonu, 2030 İklim ve Enerji Çerçevesi ile 2030 yılına kadar ulaşılması gereken üç ana hedef belirlemiştir (European Commission, 2021a):

- 1990 seviyelerine göre sera gazı emisyonlarını en az %55 oranında azaltmak,
- AB enerji üretiminde yenilenebilir enerji payını en az %32'ye artırma ve
- AB genelinde enerji verimliliğinde %32,5 iyileşmenin sağlanması.

Bu hedeflere ulaşılabilmesi için AYM kapsamında çeşitli politika adımları ve eylem planları oluşturulmuştur. Bu eylem alanları Şekil:2'de gösterilmiştir.

Şekil: 2
Avrupa Yeşil Mutabakatı Eylem Alanları

İklim yasası	Sağlıklı ve uygun fiyatlı gıda	Herkes için adil geçiş	Akıllı, temiz ve sürdürülebilir ulaşım
Temiz enerji	Enerji verimli binalar	Rekabetçi ve yeşil endüstri	Yeşil projeleri finanse etmek
Çevreyi Korumak	Küresel iklim liderliği	Kirliliğin azaltılması	Döngüsel ekonomi

Avrupa Birliği'nin sera gazı emisyonlarının %75'i enerji üretimi ve tüketiminden, %25'i ise ulaşımdan kaynaklanmaktadır (European Council, 2022; European Environment Agency, 2022). Bu nedenle, AB'nin 2050 yılına kadar karbon sıfır hedefine ulaşması için enerji sistemlerinin karbondan ayrıştırılması büyük önem taşımaktadır. AYM ile enerji sistemlerinin karbondan ayrıştırılması ve ulaşımdan kaynaklanan emisyonlarda %90'lık bir azalma hedeflemektedir (European Environment Agency, 2022: 13). Bu hedeflere ulaşabilmek için Komisyon tarafından 55'e uygun paketi ve bu kapsamda Sınırda Karbon Düzenleme Mekanizması (SKDM) oluşturulmuştur.

4.1. 55'e Uygun Paketi

Avrupa Komisyonu, 2030 ve 2050 yılları için belirlenen iklim hedeflerine ulaşmak amacıyla 55 için uygun paketini yayınlamıştır. Güçlendirilmiş bir yasama paketi olan 55'e uygun paketi, iklim, enerji, ulaştırma, binalar, arazi kullanımı ve ormancılıkla ilgili beş yeni mevzuattan oluşmaktadır. Ayrıca 55'e uygun paketi'yle yenilenebilir enerji, enerji verimliliği ve karbon sınır mekanizması ve sosyal iklim fonu gibi kilit alanlara ilişkin düzenlemeler getirilmiştir (European Parliament, 2022: 1-4) 55'e uygun paketinde yer alan mevzuatlar, AB'nin 2030 hedeflerine ulaşmasını uyumlu hale getirmeye çalışmaktadır. Pakette yer alan teklifler şunlardır (European Parliament, 2022: 1-4):

- AB Emisyon Ticaret Sistemi'ni reform ederek havacılık sektörünün de emisyon azaltma sistemine dahil edilmesi ve sistemin daha iddialı çalışmasını sağlamak.
- Sınırda Karbon Düzenleme Mekanizması ile karbon kaçağı riskini azaltarak AB dışındaki emisyonların azaltılmasını sağlamak.
- Arazi kullanımı ve ormancılık sektörlerinde emisyonları azaltmak için her üye devlet için bağlayıcılık getirilmesi.
- 2030 yılı ve sonrası için otomobiller ve kamyonetlerden kaynaklanan emisyonları %100'e kadar azaltmak.
- Enerji sektöründeki metan emisyonlarını 2030 yılına kadar %30 oranında azaltmak.
- Havacılık ve denizcilik sektörlerinde çevresel ayak izini azaltma ve çevreci yakıtların kullanımını artırmak.
- Sosyal iklim fonu ile geçişten en çok etkilenen vatandaşları ve işletmeleri desteklemek.
- AB yenilenebilir enerji hedefini %32'den %40'a çıkarmak.
- AB binaları daha yeşil hale getirmek için tüm yeni binaların 2030 yılına kadar sıfır emisyonlu inşa edilmesini sağlamak.
- Hidrojen ve karbondan arındırılmış gaz piyasası oluşturmak.

4.2. Analiz Sonuçları

SKDM, AYM'nin iklim hedeflerine ulaşmasına yardımcı olan önemli araçlarından birisidir. SKDM, bir karbon sınır vergisidir. Mekanizmanın temel amacı ve AB'nin ticaret ortağı olan ülkelerde esnek emisyon uygulamalarından kaynaklanan karbon kaçağını

önlemek ve AB dışındaki ülkelerin karbon fiyatlandırma politikalarını benimsemesini teşvik etmektir. Diğer bir amacı da AB Emisyon Ticaret Sistemi (AB ETS)'de yer alan ücretsiz tahsisatları SKDM ile yavaş yavaş kaldırmaktır (European Commission, 2023: 1-5). AB ETS, enerji yoğun üretim sektörü ve havacılık sektöründe emisyon tahsisatlarının üst sınırına ve ticaretine dayanan bir karbon piyasasıdır. SKDM, AB ETS kapsamında çalışmaktadır ve karbon ücretleri AB ETS'deki haftalık ortalamaya göre belirlenmektedir (European Commission, 2023: 1-5).

SKDM, AB'nin emisyon artışına en çok katkıda bulunan çimento, alüminyum, gübre, elektrik enerjisi üretimi, demir ve çelik gibi sektörleri kapsamaktadır (European Commission, Directorate-General for Taxation and Customs Union, 2021: 1-2). Temmuz 2021 tarihinde yayınlanan SKDM yönetmeliğine göre, SKDM, başlangıçta yüksek karbon kaçağı riski taşıyan bu beş sektöre odaklanacaktır. İlk etapta, karbon emisyonu kaçak riskinin belirlenmesi için veri toplama süreci oluşturulacaktır. İkinci etapta ise sektör kapsamının elektrik gibi diğer sektörlere genişletilmesi planlanmaktadır (European Commission, 2021b: 10) SKDM, Dünya Ticaret Örgütü'nün (WTO) gerekliliklerine uygun olarak, AB'de faaliyet gösteren ithalatçıların ithal ettikleri ürünlerdeki karbon miktarına bağlı olarak karbon sertifikaları satın almalarını gerektiren bir sistemdir (European Commission, 2021b: 3). Sistemin kesin olarak uygulanması 2026 yılı olarak belirlenmiştir (European Commission, 2021b: 9).

5. Türkiye'nin Yeşil Ekonomi Politikaları

Türkiye, aşırı kuraklık, deniz seviyesi yükselmesi, biyoçeşitlilik kaybı gibi iklim değişikliğinin olumsuz etkileri ile karşı karşıyadır. Türkiye, OECD tarafından hazırlanan 10 iklim savunmasızlık boyutunda OECD ülkeleri arasında 9'unda savunmasızlık göstermektedir (World Bank Group, 2022: 8) Bu nedenle, Türkiye'nin iklim değişikliğine uyumu ve mücadelesi önemli öncelikler arasında yer almaktadır.

Türkiye, uluslararası yükümlülüklerini yerine getirmek ve iklim değişikliğiyle mücadelede daha aktif bir rol almak için 2000 yılından itibaren çeşitli yasal düzenlemeler yapmaktadır. Bu doğrultuda, 2001-2005 yıllarını kapsayan Sekizinci Beş Yıllık Kalkınma Planı'yla enerji, imalat ve ulaştırma sektörlerinde sera gazı emisyonlarının azaltılmasına ve çevre dostu teknolojilere yatırım yapılmasına yönelik politikalar önerilmiştir (Devlet Planlama Teşkilatı, 2000: 189). 2006 yılında kabul edilen Dokuzuncu Kalkınma Planı'yla iklim değişikliğinin daha geniş bir çevre koruma ve sürdürülebilir kentsel kalkınma bağlamında ele alınması gerektiği vurgulanmıştır. Bu planda vurgulanan temel stratejiler arasında yenilenebilir enerji kaynaklarının geliştirilmesi, enerji verimliliğinin artırılması, sanayide çevre dostu teknolojilerin kullanımının teşvik edilmesi ve yeni bir işgücü piyasasının oluşturulması yer almıştır (Dokuzuncu Kalkınma Planı, 2007-2013, 2006: 29). 2010 yılında kabul edilen Ulusal İklim Değişikliği Stratejisi ve 2011-2023 dönemini kapsayan İklim Değişikliği Eylem Planı (İDEP)'yla iklim değişikliğiyle mücadelede önemli adımlar atılmıştır (Cumhurbaşkanlığı İletişim Başkanlığı, 2021: 77).

İDEP, Türkiye'nin sera gazı emisyonlarını azaltmak ve iklim değişikliğinden kaynaklanan olumsuz etkilere hazırlanmak için yapması gereken 541 eylemi ana hatlarıyla ortaya koymaktadır. Bu eylemler enerji, sanayi, ulaştırma, binalar, atık, tarım, arazi kullanımı ve ormancılık gibi birçok sektörde gerçekleştirilmektedir. 2011 yılında kabul edilen İklim Değişikliğine Uyum Stratejisi ve Eylem Planı'yla (İDUSEP) da ekosistem hizmetlerinin iyileştirilmesi amacıyla biyolojik çeşitlilik ve ormancılık, tarım sektörü ve gıda güvencesi ve su kaynakları yönetimi alanlarında politikalar oluşturulmuştur (UNDP ve T.C. Çevre ve Şehircilik Bakanlığı, 2012: 5).

İklim değişikliği ile mücadele etmek, her bölgenin ekonomik, fiziksel ve sosyal koşullarına uygun politikaların geliştirilmesini gerektirir. Bu doğrultuda, Türkiye'nin 7 bölgesi için Çevre ve Şehircilik Bakanlığı tarafından Bölgesel İklim Değişikliği Eylem Planları (BİDEP) geliştirilerek kapsamlı eylem planları oluşturulmuştur (T.C. Çevre ve Şehircilik Bakanlığı, 2020: 5).

Çevre ve Şehircilik Bakanlığı tarafından İklim Değişikliğiyle Mücadele Toplantısında yapılan konuşmada 2023 yılında tüm binaların enerji belgesine sahip olacağı ve binalarda kullanılan fosil yakıtların %25 oranında azaltılacağı taahhüt edilmiştir (T.C. Çevre, Şehircilik ve İklim Değişikliği Bakanlığı, 2022a).

Tablo: 1
Türkiye'nin İklim Değişikliğiyle Mücadelede Attığı Politika Adımları

Yıllar	Politikalar
2000	Sekizinci Beş Yıllık Kalkınma Planı'na enerji, imalat ve ulaştırma sektörlerinde sera gazı emisyonlarının azaltılması önerilerinin eklendi.
2004	Türkiye, BM İklim Değişikliği Çerçeve Sözleşmesi'ne katıldı.
2004	Biyolojik Çeşitlilik Sözleşmesi'nin Biyogüvenlik Kartagena Protokolü'ne taraf olundu.
2009	Türkiye, Kyoto Protokolü'nün tarafı oldu.
2010	Ulusal İklim Değişikliği Stratejisi onayladı.
2011	İklim Değişikliğine Uyum Stratejisi ve Eylem Planı'yla (İDUSEP) kabul edildi.
2016	Türkiye Paris Anlaşması'nı imzaladı ancak onaylamadı.
2020	Yeni Ekonomi Programı'na (2021-2023) sürdürülebilir büyüme politikaları dahil edilmiştir.
2021	Paris Anlaşması'nın iç hukuk onay süreci tamamlandı.
2021	T.C. Ticaret Bakanlığı tarafından Yeşil Mutabakat Eylem Planı yayınlandı.

Kaynak: Yazar tarafından oluşturulmuştur.

Türkiye, Birleşmiş Milletler İklim Değişikliği Çerçeve Sözleşmesi ve Kyoto Protokolü'ne taraftır. Ancak, 2015 yılında imzaladığı Paris İklim Anlaşmasını yükümlülük sınıflandırmasını adil bulmadığı için 2021 yılına kadar onaylamamıştır. 2021 yılında anlaşmanın onaylanmasıyla Türkiye, 2030'a kadar %41 oranında bir emisyon azaltma taahhüdünde bulunmuştur. Ancak bu taahhüt, artıştan azaltım olarak belirlenmiştir (T.C. Çevre, Şehircilik ve İklim Değişikliği Bakanlığı, 2022b).

AB'nin AYM ile tüm politika alanlarında başlattığı yeşil dönüşüm, Türkiye'nin AYM'ye uyumunu zorunlu kılmıştır. Bu kapsamda, T.C. Ticaret Bakanlığı tarafından yeşil ve rekabetçi ekonomi dönüşümüne uyum sağlamak ve AYM etkilerini azaltmak amacıyla "Yeşil Mutabakat Eylem Planı" yayınlanmıştır. Eylem planında sınırda karbon düzenlemeleri, yeşil ve döngüsel bir ekonomi, yeşil finansman, temiz, ekonomik ve güvenli enerji arzı, sürdürülebilir tarım, sürdürülebilir akıllı ulaşım, iklim değişikliği ile mücadele,

diplomasi ve AYM bilgilendirme ve bilinçlendirme faaliyetleri olmak üzere 9 başlıkta politikalar belirlenmiştir (T.C. Ticaret Bakanlığı, 2021: 9). Ayrıca Türkiye, Yeni Ekonomi Programında (2021-2023) "Büyüme" başlığı altında sürdürülebilir büyüme ve katma değerli ürünlerin üretim ve ihracatına odaklan politikaların hızlandırılması kararına yer vermiştir (Yeni Ekonomi Programı-Orta Vadeli Program 2021-2023, 2020: 17). Bu amaçla AR-GE çalışmalarının geliştirilmesi, dijital dönüşümün sağlanması, yeşil üretim süreçlerinin yaygınlaştırılması, sürdürülebilir ulaşım ve altyapı geliştirilmesi ve enerji verimliliğinin artırılması alanlarında eylem planları oluşturulmuştur.

Dünya Bankası Grubu tarafından hazırlanan Türkiye İklim ve Kalkınma Raporu, Türkiye'nin enerji sisteminin AB ortalamasından daha az enerji verimli olduğunu ve üretimin daha fazla karbon salımına neden olduğunu belirtmektedir (World Bank Group, 2022: 8). Bu durum da SKDM'nin uygulanmasıyla Türkiye'yi risk altına sokmaktadır. Türkiye, Sınırda Karbon Düzenlemesinin etkilerini azaltmak amacıyla başta çimento, çelik ve alüminyum sektörlerinde karbon azaltma çalışmalarını gerçekleştirmektedir. (T.C. Ticaret Bakanlığı, 2022: 17).

6. Yöntem

Bu çalışmada, Avrupa Yeşil Mutabakatına uyum bağlamında Türkiye'nin yeşil ekonomi performansı belirlenmektedir. Bu amaçla, çalışmada UNEP PAGE tarafından hazırlanan yeşil ekonomi performansı ölçüm çerçevesi kullanılarak yeşil ekonomi performansı endeksi oluşturulmuştur. Türkiye'nin zaman içindeki yeşil ekonomi değişimini belirlemek için kapsayıcı göstergelere sahip olduğu ve veri bulunabilirliği daha kolay olabileceği düşünüldüğü için Yeşil Ekonomi İlerleme Ölçüm Çerçevesi tercih edilmiştir. Aynı zamanda Yeşil Ekonomi İlerleme Ölçüm Çerçevesi, yeşil ekonomi ölçüm çerçevelerinin temelini oluşturmaktadır ve bağımsız uzmanlar tarafından geliştirilmiştir.

GEP endeksinin oluşturulması yönelik kavramsal çerçeve aşağıdaki adımları içermektedir:

- Başlangıç değerler ve nihai değerlerin belirlenmesi.
- Her bir gösterge grubu için yıllara göre veri mevcudiyetinin incelenmesi.
- Hedefler ve eşik değerlerin belirlenmesi.
- Başlangıç değerler ve nihai değerlerin ortalamasının hesaplanması.
- İyi ve kötü göstergelere göre ilerlemenin ölçülmesi.
- Ağırlıkların hesaplanması ve normalleştirilmiş ağırlıkların oluşturulması.
- GEP endeksinin oluşturulması.

Yeşil Ekonomi Endeksi'nin oluşturulmasının ilk aşamasında, başlangıç değeri y0, 2011-2015 yılları ortalaması ve 2016-2020 yılları ortalaması nihai değeri y1, olarak belirlenmiştir. Bu yılların seçilmesinin nedeni veri mevcudiyetinin ve etkili yeşil ekonomi politikalarının 2011 yılından itibaren uygulanmaya başladığının belirlenmesidir. İkinci aşama, ilerleme çerçevesinde yer alan her bir göstergeye göre Türkiye için veri

mevcudiyetinin kontrol edilmesiydi. Kapsayıcı refah endeksi göstergesine ait verilere erişilemediğinden GEP endeksi hesaplamasına dahil edilmemiştir. Çalışma kapsamında, UN PAGE 2017 ve 2020 versiyonlarında yer alan yeşil ekonomi göstergelerine ait 2011 ile 2020 yılları arasındaki veriler kullanılmıştır. Göstergelere ait veriler, OECD, Dünya Bankası, UNIDO, Avrupa Birliği İstatistik Ofisi ve Eurostat gibi uluslararası kuruluşların veri setlerinden elde edilmiştir. Tablo 2'de GEP Endeksi oluşturmak için toplanan göstergelere ait veriler ve kaynakları listelenmiştir.

Tablo: 2
GEP Endeksi Göstergeleri ve Veri Kaynakları

Gösterge	Veri Kaynağı	Kaynak
Materyel Ayak İzi	International Resource Panel	https://www.resourcepanel.org/
Hava Kirliliği	OECD Data Europe Sustainable Development Report 2022	https://data.oecd.org/air/air-pollution-exposure.htm https://eu-dashboards.sdgindex.org/
Korunan Alanlar Kara ve Deniz	World Database on Protected Areas (WDPA) T.C. Tarım ve Orman Bakanlığı	https://www.iucn.org/theme/protected-areas/our-work/world-databaseprotected-areas https://www.tarimorman.gov.tr/DKMP/Menu/36/Korunan-Alan-Ve-Tabiati-Koruma-Faaliyetleri-Istatistik-Raporlari
Enerji Kullanımı	Eurostat	https://ec.europa.eu/eurostat/en/
Yeşil Ticaret	IMF Climate Change Dashboard	https://climatedata.imf.org/datasets/8636ce866c8a404b8d9baeaffa2c6cb3/explore?filters=eyJDb3VudHRJbElpppbIlR1cmtleSJdfQ%3D%3D
Çevresel Patent	World Intellectual Property Organisation (WIPO)	https://www3.wipo.int/ipstats/index.htm?tab=patent
Yenilenebilir Enerji Kullanımı	EU Dashboards	Europe Sustainable Development Report 2022. https://eudashboards.sdgindex.org/
Palma Oranı	EU Dashboards	Europe Sustainable Development Report 2022. https://eudashboards.sdgindex.org/
Cinsiyet Eşitsizliği	Human Development Index (HDI)	https://hdr.undp.org/data-center/country-insights#/ranks
Temel Hizmetlere Erişim	The World Bank Data United Nations Statistics	https://data.worldbank.org/indicator https://unstats.un.org/sdgs/indicators/database/
Ortalama Eğitim Yılı	HDI	https://hdr.undp.org/data-center/country-insights#/ranks
Emeklilik Kapsamı	Eurostat	https://ec.europa.eu/eurostat/en/
Yaşam Beklentisi	HDI	https://hdr.undp.org/data-center/country-insights#/ranks
Su Stresi	UN Water, SDG 6 Data Portal	https://sdg6data.org/
Ekolojik Ayak İzi	Global Footprint Network	https://data.footprintnetwork.org/#/
Arazi Kullanımı	WB Data	https://data.worldbank.org/indicator
Sera Gazı Kullanımı	Climate Watch	https://www.climatewatchdata.org/ghg-emissions
Nitrojen Emisyonu	Climate Watch	https://www.climatewatchdata.org/ghg-emissions
Karbon Ayak İzi	SCP Hotspots Analysis Tool	http://scp-hat.lifecycleinitiative.org/module-1-country-profile/

Kaynak: Küçük, 2022.

Çalışmada, hedefler ve eşik değerler GEP uygulama çerçevesinin 2021 yılı versiyonunda yer alan değerlerden elde edilmiştir. Bunun nedeni doğru hedef değerlerinin kullanılmasını sağlamaktır. Elde edilen veriler, UN PAGE 2017 GEP endeksi metodolojisinde yer alan istatistiksel hesaplamalar takip edilerek Excel üzerinden işlenmiştir.

6.1. İlerlemenin Ölçülmesi

Bir ülkenin yeşil ekonomi ilerlemesi iyi ve kötü göstergelerdeki ilerlemesine göre değişmektedir. İyi göstergeler yeşil bir ekonomiye doğru katkıda bulunurken, kötü göstergelerde ilerleme yeşil ekonomi yolundan uzaklaşıldığını göstermektedir. İyi göstergelerdeki ilerleme ne kadar yüksekse ülke yeşil ekonomi yolunda iyi performans göstermektedir. Buna karşın yeşil ekonomi yolunda kötü göstergelerde gerileme olması

beklenmektedir. Yeşil ekonomi ilerlemesi İyi ve kötü göstergeler üzerinden aşağıdaki formül kullanılarak hesaplanmaktadır:

$$\text{İlerleme} = \text{İyi} \left\{ \frac{y^1 - y^0}{y^* - y^0} \right. \tag{1}$$

$$\text{İlerleme} = \text{Kötü} \left\{ \frac{y^0 - y^1}{y^0 - y^*} \right. \tag{2}$$

İlerleme değeri göstergenin zaman içindeki değişimini yansıtır; 0 değişim olmadığını, 1 hedefe ulaşıldığını ve 1'den büyük değerler hedefin aşıldığını gösterir. İlerleme değeri 0 ile 1 arasındaysa ilerleme kaydedilmiştir ancak hedefe henüz ulaşılmamıştır.

6.2. Ağırlıkların Hesaplanması

Ağırlıkların hesaplanması iyi ve kötü göstergelere göre iki adımda gerçekleşmektedir. İlk adımda tek gösterge için ağırlık hesaplaması yapılmaktadır. İyi gösterge için kritik eşik (t) ile göstergenin başlangıç değeri (y_j^0) arasındaki oran hesaplanır. Kötü göstergeler içinse tam tersi, başlangıç değeri ile göstergenin kritik eşiği arasındaki oran hesaplanır.

$$(\hat{\pi}_j) = \begin{cases} \frac{t_j}{y_j^0} \\ \frac{y_j^0}{t_j} \end{cases} \tag{3}$$

İkinci adımda ise bir göstergedeki ilerlemenin diğer göstergelere göre ilerlemesini belirlemek için ağırlıklar normalleştirilir. Ağırlıkların normalleştirilmesi aşağıdaki formül ile hesaplanır:

$$\pi_j = \frac{\hat{\pi}_j}{\sum_{j \in j} \hat{\pi}_j} \tag{4}$$

6.3. GEP Endeksinin Hesaplanması

GEP endeksinin hesaplanmasının ilk aşaması her bir göstergenin ilerlemesi ve ilk ağırlığı çarpılır. Daha sonra elde edilen sonuçların ortalaması alınarak bir GEP endeksi oluşturulur. Bir sonraki adımda, GEP endeksi denklemi kullanılarak önce normalleştirilmiş GEP endeksi hesaplanır sonra da bu değerlerin ortalaması alınarak nihai GEP endeksi hesaplanarak ülkenin yeşil ekonomi ilerlemesi belirlenir. GEP endeksinin nihai değeri 1'e eşitse ülke yeşil ekonomi hedeflerine ulaşmış demektir. GEP endeksi değeri 0<x<1 ise ilerleme yolunda; x<0 ise yeşil ekonomi yolundan uzaklaşmıştır.

$$GEP = \sum J \in G\,\hat{\pi}_j \frac{dy_j}{dy^*_j} + \sum j \epsilon B\,\hat{\pi}_j \frac{d(-y_j)}{d(-y^*_j)}$$

$$ (5) $$

$$GEP = \sum J \in G\,\pi_j \frac{dy_j}{dy^*_j} + \sum j \epsilon B\,\pi_j \frac{d(-y_j)}{d(-y^*_j)}$$

7. Bulgular

Çalışmada, yeşil ekonomi göstergeleri kullanılarak Türkiye'nin 2011-2020 yılları arasındaki yeşil ekonomi ilerlemesi ölçülmüştür. Analiz sonuçları, Türkiye'nin kapsayıcı bir yeşil ekonomiye doğru ilerleme gerçekleştirdiğini göstermektedir. Örneğin, yeşil ticaret göstergesinde gerçekleşen ilerleme, yeşil ekonomi açısından potansiyel ekonomik ve istihdam fırsatları sunmaktadır. Türkiye, göstergelere göre en fazla ilerlemeyi cinsiyet eşitsizliği, eğitim, yeşil ticaret ve temel hizmetlere erişimde gerçekleştirmiştir. Ancak bu ilerlemeler istenilen hedeflerden uzaktır. Özellikle çevrenin korunması ve doğal kaynakların sürdürülebilir kullanılması konusunda istenilen ilerleme gerçekleştirilememiştir. Enerji kullanımı ve materyal ayak izi göstergelerinde gerçekleşen az ilerleme Türkiye'nin çevre üzerindeki baskısının devam ettiğini ve enerji verimliği konusunda daha fazla çaba sarf etmesi gerektiğini göstermektedir. Yeşil ekonomi herkes için refah sağlayan adil bir toplum oluşturmayı hedefler. Bu kapsamda Türkiye'nin palma oranında ve emeklilik kapsamında yaşadığı gerileme yeşil ekonomiye geçişe olumsuz katkı sunmaktadır. Türkiye'nin 2011-2020 yılları arasındaki ilerlemelerine göre GEP Endeksi sonucu 0,06 olarak hesaplanmıştır. Bu sonuç, Türkiye'nin henüz yeşil ekonomiye geçişte yeterli ilerleme göstermediğini belirtmektedir. Türkiye'nin yeşil ekonomi ilerlemesi ve yeşil ekonomi endeksi, Tablo 3'te sunulmuştur.

Tablo: 3
Türkiye'nin Yeşil Ekonomi İlerlemesi ve GEP Endeksi

Yeşil Ekonomi İlerlemesi (GEP)	Malzeme ayak izi	Hava kirliliği	Korunan alanlar (kara)	Korunan alanlar (deniz)	Enerji kullanımı	Yeşil ticaret	Çevresel patent
İlk değer (y0)	17,54	28,79	5,39	2,00	164,65	5,122	0,01
Son değer (y1)	16,79	27,45	6,72	2,21	160,35	6,81	0,01
Hedef	5	10	41,05	15,13	49,47	12,89	0,03
Eşik	5	10	17,00	10,00	161,46	0,47	0,01
Ağırlık	3,51	2,88	3,15	4,99	1,02	0,09	0,71
Ağırlık (N)	2,27	1,86	2,04	2,60	0,66	0,06	0,46
İlerleme	0,05	0,07	0,04	0,02	0,04	0,22	0,09

Yeşil Ekonomi İlerlemesi (GEP)	Yenilenebilir enerji	Palma oranı	Toplumsal Cinsiyet eşitsizliği	T. hizmetlere erişim	Ortalama Eğitim	Emeklilik	Yaşam beklentisi	GEP Endeksi
İlk değer (y0)	10,79	1,85	0,37	86	7,36	5,56	77,84	
Son değer (y1)	14,00	1,85	0,32	88,6	8,02	5,08	78,51	
Hedef	40,77	0,8	0,25	100	8,72	100	83,39	0,06
Eşik	5,15	1,5	0,62	41,66	4,63	6	60,91	
Ağırlık	0,48	1,23	0,60	0,48	0,63	1,08	0,78	
Ağırlık (N)	0,31	0,80	0,39	0,31	0,41	0,70	0,51	
İlerleme	0,11	- 0,00	0,42	0,19	0,49	- 0,01	0,12	

Kaynak: Küçük, 2022.

Başlangıç değerlerinden (y0), 2011-2015 ortalama değerlerini ve son değer (y1), 2016-2020 yılları ortalamaları göstermektedir. İlk ağırlık, göstergenin kritik eşikten ne kadar uzakta olduğunu belirlemektedir. İkinci ağırlık ise bu değerlerin normalleştirilmesidir. Normalleştirilmiş ağırlıklar, bir göstergeye ait ilerlemenin diğer göstergelere göre göreceli ilerlemesini belirtmektedir. Aşağıdaki Şekil 3 Türkiye'nin yeşil ekonomi göstergelerine göre ağırlıklı ilerlemesini göstermektedir.

Şekil: 3
Türkiye'nin Yeşil Ekonomi Göstergelerindeki İlerlemesinin Ağırlıklandırılması
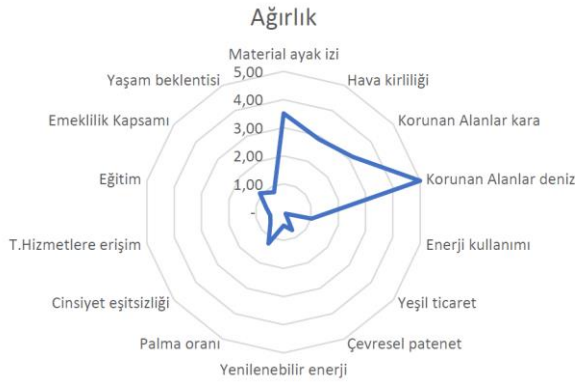
Türkiye'nin sürdürülebilir kalkınma göstergelerine göre ilerleme analiz sonuçları Türkiye'nin sürdürülebilirlikte ilerleme kaydedemediğini göstermektedir. Türkiye'nin sürdürülebilirlik GEP endeksi -0,07 olarak hesaplanmıştır. Özellikle, Türkiye'nin su stresi, arazi kullanımı ve sera gazı emisyonu göstergelerinde yaşadığı gerileme iklim değişikliğiyle mücadeleyi ve yeşil ekonomi ilerlemesini olumsuz etkilemektedir. Su stresi göstergesinde yaşanan gerileme ilerleyen yıllarda su kıtlığı riskini göstermektedir. Diğer yandan Türkiye, karbon ayak izi ve nitrojen emisyonu göstergelerinde ilerleme kaydetmiştir. Ancak bu ilerlemeler istenilen hedeflerden uzaktır.

Tablo: 4
Türkiye'nin Sürdürülebilirlik Göstergelerine Göre İlerlemesi ve GEP Endeksi

Sürdürülebilirlik göstergeleri	Karbon ayak izi kısa vadeli	Su stresi	Arazi kullanımı	Nitrojen emisyonları	Sera gazı emisyonu	GEP Endeksi
Başlangıç değeri (y0)	7,74	38,2	4,166	11,06	5,4	
Son değer (y1)	7,52	44,4	4,48	9,47	6,12	
Hedef	2	4,74	2,15	5	2	0,07
Eşik değer	2	6,47	15	5	2	
Ağırlık	3,87	5,90	0,28	2,21	2,70	
Ağırlık (N)	- 0,76	5,57	0,22	- 2,95	2,91	
İlerleme	0,04	- 0,19	- 0,15	0,26	- 0,21	

Kaynak: Küçük, 2022.

Tablo: 5
Türkiye ve AB Ülkelerinin Yeşil Ekonomi İlerlemesi ve GEP Endeksi

Ülkeler (İlerleme ve GEP endeksi)	Malzeme ayak izi	Hava kirliliği	Korunan alanlar arazi	protected areas sea	Temel hizmetlere erişim	Yeşil ticaret	Enerji kullanımı	Çevresel Patent	Yenilenebilir enerji	Palma oranı	Toplumsal cinsiyet eşitsizliği	Ortalama eğitim	Yaşam beklentisi	Emeklilik	GEP Endeksi
İsveç	- 0,01	- 0,19	0,04	0,07	0,10	0,10	0,32	8,43	0,10	0,90	0,19	0,07	0,33	0,00	0,56
Almanya	0	0,55	0,03	0	0,12	0,06	0,22		1,00		0,05	3,50	0,13	0	0,29
Macaristan	0,04	0,32	0		0,24	0,09	0,13	4,54	0,47	- 0,06	0,03	0,07	0,07	- 0,01	0,25
Bulgaristan	- 0,01	0,44			0,26	0,43	0,12	0,43	1,09	0,95	0,17	0,15	0,01	- 0,00	**0,72**
Portekiz	- 0,02	1,60	0,02	0,04	0,33	0,22	0,05	0,24	0,09	0,65	0,80	0,11	0,20	- 0,01	0,30
Kıbrıs	0,00	0,62		-	0,05	- 0,22	0,11	0	1,39		0,84	0,15	0,07	0,00	0,32
Hollanda	- 0,01	0,73	0,10	0,05	- 0,03	0,06	0,22	- 0,16	1,73	0,07	0,27	0,11	0,17	0,00	0,42
Lüksemburg	0	0,55	- 0,09		0,37	0,12	0,31	0,04	0,61		0,64	0,18	0,14	0,01	0,27
Estonya	- 0,03	- 0,91	0,01	0	-	0,15	0,24	1,18	0,21		0,85	1,04	0,21	0	0,09
Litvanya	- 0,00	1,20	0,00	0,04	0,47	0,31	0,15	0,02	0,07	- 0,13	0,28	0,49	0,15	- 0,00	0,27
İtalya	- 0,00	0,45	0,18	0,01	- 0,00	- 0,02	0,08	0,58	0,52	- 0,05	0,61	0,08	0,22	0,01	0,23
Fransa	- 0,00	0,75	0,09	0,08	0,03	0,03	0,22	- 0,24	0,17	- 0,02	1,17	0,09	0,11	0,00	0,23
Letonya	0,01	0,44	- 0,00	-	0,32	0,24	0,17	0,36	0,07	- 0,03	0,23	0,21	0,11	- 0,01	0,18
Danimarka	- 0,01	0,79	0,03	0,00	0,13	- 0,03	0,37	- 0,11	0,41	- 0,15	0,40	- 0,09	0,26	0,00	0,15
Yunanistan	- 0,03	0,36	- 0,09	-	0,30	0,06	0,10	0,08	0,34	0,35	0,16	0,04	0,15	0,00	0,16
Türkiye	0,05	0,07	0,04	0,02	0,04	0,22	0,04	0,09	0,11	-	0,42	0,49	0,12	- 0,01	0,06
İspanya	- 0,01	0,21	0,02	0,04	0,10	0,04	0,14	0,01	0,21	0,21	0,37	0,11	0,22	0,01	0,12
Avusturya	-	0,40	0,02		0,02	0,10	0,09	0	0,02	0,02	0,41	0,24	0,10	0,01	0,15
Malta	- 0,04				-							0,17	0,43	- 0,01	0,11
Polonya	- 0,03	0,22	0,00	0	0,31	0,11	0,15	- 0,14	0,17		0,30	0,17	0,04	0,00	0,13
Çekya	- 0,02	0,21		0	0,20	0,04	0,23	0,04	0,20		0,01	0,07	0,09	- 0,00	0,12
Slovenya	- 0,01	0,29	- 1,23		0,35	- 0,01	0,20	- 0,03	0,01	0,04	0,75	0,30	0,16	0,01	0,08
Hırvatistan	- 0,01	0,44		0,34	- 0,17	- 0,06	0,13	- 0,58	0,02		0,11	0,11	0,11	- 0,00	0,10
Finlandiya	- 0,01	- 0,57	0,11	0,03	0,08	- 0,01	0,13	0,02	0,08	- 0,12	0,39	0,02	0,33	0,01	0,03
Belçika	- 0,01	0,62	0,03	0	0,26	0,08	0,04	0,30	- 2,34		0,72	0,23	0,17	0,01	0,05
Romanya	- 0,03	0,25			0,22							0,06	0,06	- 0,00	- 0,06
İrlanda	- 0,01	- 0,10	0,02	0,01	- 0,03	- 0,01	0,29	0	- 1,22	0,16	- 0,09	0,39	0,48	- 0,02	0,28
Slovakya	- 0,02	0,51			- 0,01	0,31	0,24	0,00	- 5,46	0,57	0,01	0,22	0,10	0,00	- 0,07

Kaynak: Küçük, 2022.

Tablo: 5, 2011-2020 yılları arasında 27 AB üye devletinin ve Türkiye'nin yeşil ekonomi göstergelerine göre ilerlemelerini ve GEP endeksi sonuçlarını göstermektedir. GEP endeksindeki puanlar 0,72 ile -0,07 arasında değişmektedir. Bulgaristan, 0,72'lik GEP endeksi ile en fazla ilerlemeyi kaydetmiştir. Her bir göstergeye göre ilerleme hesaplandığında İsveç, Almanya, Macaristan ve Bulgaristan en iyi performansı göstermiştir. Yeşil ekonomi ilerlemesinde en az performans gösteren ülkeler ise Slovakya, İrlanda ve Belçika olmuştur. Yeşil ekonomi göstergelerindeki ilerlemeye göre tüm ülkelerde ortalama yaşam beklentisi artmış; Cinsiyet eşitsizliğinde ve enerji kullanımında azalma yaşanmıştır.

Türkiye'nin yeşil ekonomi performansını 27 AB ülkesi ile karşılaştırıldığında Türkiye 0,06 GEP endeksi ile 16. sırada yer almaktadır. Malta ve Romanya ülkelerinin yeşil

ekonomi ilerlemeleri hesaplamaya dahil edilmemiştir. Çünkü bir ülkenin GEP endeksinin değerlendirilmesi için 13 GEP endeksi göstergesinden 10'u için veriye sahip olması gerekmektedir (PAGE, 2017: 26). Romanya ve Malta için yeterli veriye ulaşılamamıştır.

8. Sonuç

Bu çalışmada, Türkiye'nin yeşil ekonomide nerede olduğu sorusuna geçerli bir yanıt aranmıştır. Çalışmada, UN PAGE tarafından hazırlanan GEP ölçüm çerçevesi kullanılarak Türkiye'nin 2011-2020 yılları arasındaki yeşil ekonomi ilerlemesi ölçülmüştür. Sonuçlar, Türkiye'nin yeşil ekonomi performansının ilerleme kaydettiğini ancak bu ilerlemenin hedeflenen düzeyde olmadığı göstermektedir. Bununla birlikte, sürdürülebilirlik göstergelerinde yaşanılan gerileme Türkiye'nin sürdürülebilir kaynak kullanımında önemli iyileştirme yapması gerektiğini göstermektedir. Özellikle AYM uyum kapsamında Türkiye, yenilenebilir enerji kaynaklarının kullanımının artırılması, enerji verimliliğinin geliştirilerek enerji tüketiminin azaltılması, sera gazı emisyonlarının azaltılması ve kaynakların sürdürülebilir kullanımı için arazi kullanımının iyileştirilmesi alanlarına öncelik vermelidir. Ayrıca, AYM ile Avrupa'da başlayan yeşil dönüşümün Türkiye ekonomisine olumsuz etkilerinin azaltılması için strateji ve politikalar geliştirilmelidir. Bu stratejilerin başında Türkiye'de karbon fiyatlandırma politikasının desteklenmesi ve daha fazla geç olmadan uygulanması yer almaktadır. Başka bir strateji, yeşil teknolojilerin geliştirilmesi ve benimsenmesinin teşvik edilmesi olabilir. İşletmeleri daha sürdürülebilir uygulamaları benimsemeye teşvik etmek için, çevre dostu malzemelerin kullanımında vergi indirimleri veya sübvansiyonlar sunulabilir. Buna ek olarak, temiz enerjiye geçişin hızlandırılması için fosil yakıtların kullanımı yasal olarak kademeli şekilde sonlandırılabilir. Bir diğer etkili strateji de yenilenebilir enerji sektörlerine daha fazla yatırım yapılarak vatandaşlar için iş fırsatları sağlanması ve karbon emisyonlarının etkili bir şekilde azaltılmasıdır. Bu politikaların uygulanması için de finans kurumları ile işbirliği yapılarak yeşil projeleri destekleyen yeşil yatırım fonları ve finansal araçlar geliştirilebilir.

Çalışmanın sonuçları, PAGE 2017 ve PAGE 2021 yıllarındaki GEP Endeksi sonuçları ile karşılaştırıldığında farklar bulunmaktadır. PAGE 2017 sonuçlarına göre 2000 ve 2014 yılları arasındaki Türkiye'nin GEP endeksi 0,08 olarak hesaplanmıştır. PAGE 2021 yeşil ekonomi 2000- 2019 yıları performansına göre ise Türkiye'nin GEP Endeksi -0,11 olarak hesaplamıştır. Çalışmanın bu iki çalışmadaki endeks değerlerinin farklı olması analizde kullanılan göstergeler, zaman aralığı ve sınırlı veri kaynaklarından kaynaklanmaktadır.

Türkiye'nin yeşil ekonomi performansını ölçen literatürdeki çalışmalardan Al (2019), çalışmasında Türkiye'nin yeşil ekonomi performans endeksini 0,81 olarak bulmuştur. Al çalışmasında Türkiye'nin 2002-2015 yılları arasındaki ilerlemesini değerlendirmiştir. Ayrıca, yeşil ekonomi göstergelerini kullanarak Türkiye'nin yeşil ekonomideki konumunu açıklayan sadece birkaç çalışma (Al, 2019) mevcuttur. Yeşil ekonomi göstergelerini kullanarak Türkiye'nin ilerlemesini ölçen çalışmaların çoğu

(Yıkmaz, 2011; Okumuş, 2013) ağırlıklı olarak yeşil ekonomiyi sürdürülebilir kalkınma ile değerlendirmiştir.

Araştırma sorusuna literatürde çeşitli yanıtlar bulunabilir. Ancak bu yanıtlar aşağıdaki nedenlerden dolayı konuyu açıklamakta eksik kalmaktadır. İlk olarak literatürdeki çalışmalar daha çok AYM'nın Türkiye'ye ekonomik etkileri üzerine odaklanmıştır. Diriöz (2021), AYM'nın başlattığı yeşil devrimin Gümrük Birliği aracılığıyla Türkiye ile AB arasındaki ilişki üzerindeki olası etkisini incelemiştir. Ecer, Güner ve Çetin (2021) tarafından yapılan farklı bir araştırmada, Döngüsel Ekonomi Eylem Planı ve AYM'nın Türkiye üzerindeki olası ekonomik sonuçları incelenmiş ve politika yapıcılara öneriler sunulmuştur. İkinci olarak, güncel ve önemli bir konu olan AYM'nın Türkiye'nin uyumuna ilişkin güncel veriler içeren karşılaştırmalı çalışmaların eksikliği, bu çalışmaya ihtiyaç duyulmasına neden olmuştur. UNEP ve PAGE tarafından geliştirilen GEP Ölçüm Çerçevesini kullanan bu çalışma, Türkiye'nin yeşil ekonomi performansını AYM uyumu ile ilişkili olarak ölçerek mevcut literatürden farklı ve özgün bir argüman sunmaktadır.

Yeşil Mutabakat Eylem Planında belirtilen stratejilerin etkili bir şekilde uygulanabilmesi için yeşil ekonominin mevcut durumu ve kaydettiği ilerleme hakkında kapsamlı bir anlayışa sahip olmak çok önemlidir. Somut ve ölçülebilir hedefler ve göstergeler, AYM'nın stratejik vizyonuna ulaşmak için politika oluşturma ve planlama konusunda rehberlik sağlayabilir. Bu çalışma, Türkiye'nin yeşil ekonomi performansı ve Yeşil Mutabakat ilkelerine uyumu hakkında bilgiler ve veriler sunarak bu bağlamda değerli bir araç görevi görmekte ve Yeşil Mutabakatın hedeflerine ulaşılmasına yönelik politika kararlarına ve planlamalara bilgi sağlayabilmektedir.

Çalışmanın temel kısıtlığı, güncel verilere erişimdi. Özellikle, Türkiye'nin yeşil ekonomi göstergelerine ait resmi verilere erişimde kısıtlı kalınmıştır. İkinci bir kısıtlama da GEP ölçüm çerçevesinde yer alan Kapsayıcı Refah Endeksi göstergesine ve arazi kullanımına bağlı biyoçeşitlilik kaybı göstergelerine ait verilerine erişilememiştir. Bu doğrultuda, Kapsayıcı Refah Endeksi göstergesi çalışmaya dahil edilmemiştir. Arazi Kullanımına Bağlı Biyoçeşitlilik Kaybı göstergesi yerine ise 2017 yılına ait GEP ölçüm çerçevesinde yer alan Arazi Kullanım Oranı göstergesine ait veriler kullanılmıştır. Bu durum çalışmanın sonuçlarını daha az genellenebilir hale getirmektedir.

Gelecekteki çalışmalar, veri mevcudiyeti gelişmeye devam ettikçe bu çalışmayı küresel ölçekte geliştirme potansiyeline sahiptir. Birleşik endekslerin oluşturulması daha kapsamlı ve bilgilendirici sonuçların elde edilmesini sağlayabilir. Bulguların doğruluğunu ve geçerliliğini daha da artırmak için farklı metodolojiler benimsenebilir. Örneğin, veri toplamak için ilgili bakanlıklarla görüşülebilir. Farklı yeşil ekonomi göstergelerinin ve veri hesaplama yöntemlerinin farklı sonuçlara yol açabileceğini kabul etmek önemlidir. Bu nedenle, gelecekteki çalışmalar bu farklılıkları göz önünde bulundurmalı ve güvenilir ve karşılaştırılabilir sonuçlar elde etmek için uygun yöntemler kullanmalıdır.

Sonuç olarak, Türkiye düşük karbonlu ve kapsayıcı bir yeşil ekonomiye geçişte ilerleme kaydetmektedir, ancak 2053 karbon sıfır hedefine ulaşmak için daha fazla politika geliştirilmesi gerekmektedir. Türkiye'nin, yeşil dönüşümünü gerçekleştirmek ve AYM'nin ekonomi üzerindeki etkilerini azaltabilmesi için yenilenebilir enerji üretimi, enerji verimliliği ve sürdürülebilirlik alanlarında odaklanması gerekmektedir. AYM, Türkiye'nin yeşil ekonomiye yönelik hızlı tedbirler almasında önemli bir rol oynayabilir. Yeşil dönüşümün kaçırılmasının Türkiye'ye önemli maliyetleri olacaktır. Bu nedenle Türkiye'nin yeşil ekonomiye geçişini hızlandırması ve gelecekteki doğal kaynaklarını garanti altına alması hayati önem taşımaktadır.

Kaynaklar

Abdıraımov, M. (2016), "Sürdürülebilir Gelişme Yaklaşımında Yeşil Ekonominin Önemi", *Uluslararası Yönetim ve Sosyal Araştırmalar Dergisi*, 3(6), 29-39.

Acet, H. & A. Şakalak (2020), "Yeşil ekonomi kapsamında kamu politikaları ve çevre politikalarının değerlendirilmesi: Türkiye örneği", *Uluslararası Sosyal ve Beşeri Bilimler Araştırma Dergisi*, 7(56), 2136-2153.

Ağcakaya, S. & I. Kaya (2022), "Sürdürülebilir Kalkınma ve Yeşil Ekonomi Perspektifinden Yeşil Maliye Politikaları Uygulamaları", *Çukurova Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 31(2), 512-525.

Akagündüz, H.K. (2022), "Sürdürülebilir kalkınma yolunda yeşil ekonomi: Türkiye üzerine ampirik bir çalışma", *Yüksek lisans Tezi*, Bursa Uludağ Üniversitesi.

Al, İ. (2019), "Sürdürülebilir Kalkınma ve Yeşil Ekonomi: Türkiye İçin Bir Endeks Önerisi", *Hitit Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 12(1), 112-124.

Aşıcı, A. & Ü. Şahin (2017), *Yeşil Ekonomi*, II. Baskı, Yeni İnsan Yayınevi.

Aşıcı, A.A. (2021), "Türkiye ekonomisinin sera gazı kırılganlığı", *İPM-Mercator politika notu*, İstanbul Politikalar Merkezi, İstanbul, Türkiye.

Azazi, H. & O. Uzma (2022), "Türkiye'de Yeşil Ekonomi, Yeşil İşler ve Yeşil İstihdam", *Biga İktisadi ve İdari Bilimler Fakültesi Dergisi*, 3(2), 93-100.

Climate Watch (2019), *Global Historical Emissions*, <https://www.climatewatchdata.org/ghg-emissions?end_year=2019&start_year=1990>, 10.03.2023.

Cumhurbaşkanlığı İletişim Başkanlığı (2021), *Türkiye'nin Yeşil Kalkınma Devrimi*, Cumhurbaşkanlığı İletişim Başkanlığı Yayınları, Ankara.

Çiloğlu, T. (2018), "Yeşil Ekonomi ve Küreselleşme: Karşılıklı Etkileşim ve Dönüşümsel Süreç", *İzmir Katip Çelebi Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 1(1), 42-48.

Demirtaş, I. (2017), "Ekolojik ve Ekonomik Krizlere Alternatif Çözüm Olarak Yeşil Ekonomi Politikaları", *Alternatif Politika*, 9(Özel), 107-132.

Devlet Planlama Teşkilatı (2000), *Uzun Vadeli Strateji ve Sekizinci Beş Yıllık (2000-2005) Kalkınma Planı*, Karar N. 697.

Devlet Planlama Teşkilatı (2006), *Dokuzuncu Kalkınma Planı 2007-2013*, <https://www.sbb.gov.tr/wp-content/uploads/2022/07/Dokuzuncu_Kalkinma_Plani-2007-2013.pdf>, 08.04.2023.

Dual Citizen (2022), *Global Green Economy Index 2022*, <https://dualcitizeninc.com/global-green-economy-index/>, 08.02.2023.

Ertunga, İ.E. & Ö.K. Seyhun (2022), "Sınırda Karbon Düzenleme Mekanizması ve Türkiye'nin İhracatına Olası Etkileri", *Ege Stratejik Araştırmalar Dergisi*, 13(1), 1-13.

Europe Sustainable Development Report (2022), *EU-Dashboards*, <https://eu-dashboards.sdgindex.org/explorer>, 11.03.2023.

European Commission (2019), *The European Green Deal, Communication from The Commission to The European Parliament, The European Council, The Council, The European Economic and Social Committee and The Committee of the Regions*, COM(2019) 640 Final, Brussels.

European Commission (2021a), *2030 Climate and energy framework*, <https://ec.europa.eu/clima/eu-action/climate-strategies-targets_en>, 11.03.2023.

European Commission (2021b), *Proposal for a Regulatıon of The European Parliament And of The Council establishing a carbon border adjustment mechanism*, Brussels, COM(2021) 564 Final.

European Commission (2023), *Questions and Answers: Carbon Border Adjustment Mechanism (CBAM)*, Press release, May 10, Brussels.

European Commission Directorate-General for Taxation and Customs Union (2021), *Carbon border adjustment mechanism*, Publications Office of the European Union.

European Council (2022), *Fit for 55: Council agrees on higher targets for renewables and energy efficiency*, <https://www.consilium.europa.eu/en/press/press-releases/2022/06/27/fit-for-55-council-agrees-on-higher-targets-for-renewables-and-energy-efficiency/>, 11.03.2023.

European Environment Agency (2011), "Green Economy", in: *Europe's Environment An Assessment of Assessments* (93-137).

European Environment Agency (2022), "Transport and environment report 2021 Decarbonising road transport - the role of vehicles, fuels and transport demand", *EEA Report*, No 02. Luxembourg: Publications Office of the European Union.

European Environment Agency (2022), *Greenhouse gas emissions from transport*, <https://www.eea.europa.eu/ims/greenhouse-gas-emissions-from-transport>, 11.03.2023.

European Parliament (2022), *Fit for 55 package. Towards climate neutrality*, <https://www.europarl.europa.eu/RegData/etudes/BRIE/2022/733513/EPRS_BRI(2022)733513_EN.pdf>, 04.03.2023.

European Parliament (2023), *EU energy security and the war in Ukraine: From sprint to marathon*, <https://www.europarl.europa.eu/RegData/etudes/BRIE/2023/739362/EPRS_BRI(2023)739362_EN.pdf>, 10.04.2023.

Eurostat (2023), *EU Key Indicators*, <https://ec.europa.eu/eurostat/en/>, 10.03.2023.

Georgeson, L. et al. (2017), "The global green economy: a review of concepts, definitions, measurement methodologies and their interactions", *Geo: Geography and Environment,* 4(1), 1-23.

Gevher, R. & H. Acet (2023), "Avrupa Birliğinde Sürdürülebilir Kalkınma ve Yeşil Ekonominin Gelişimi", *Anadolu Üniversitesi İİBF Dergisi*, 24(1), 224-253.

Global Green Growth Institute (2020), "Green Growth Index 2020 - Measuring performance in achieving SDG targets", *GGGI Technical Report* No. 16, Green Growth Performance Measurement Program, Seoul, South Korea.

Görmüş, A. (2019), "Yeşil Ekonominin İstihdam Üzerindeki Yansımaları ve Yeşil İşler: Cinsiyet Temelli Bir Modelleme ile İngiliz İşgücü Anketinden Bulgular", *Journal of Social Policy Conferences*, (76), 29-66.

Green Economy Coalition (2020), *The 5 Principles of Green Economy*, <https://www.greeneconomycoalition.org/news-and-resources/the-5-principlesof-green economy>, 08.02.2023.

Human Development Report (2020), *Human Development Insights*, <https://hdr.undp.org/data-center/country-insights#/ranks>,10.03.2023.

IMF Climate Change Dashboard (2022), *Trade in Environmental Goods*, <https://climatedata.imf.org/datasets/8636ce866c8a404b8d9baeaffa2c6cb3/explore?filters=eyJDb3VudHJ5IjpbIlR1cmtleSJdfQ%3D%3D>, 10.03.2023.

Intergovernmental Panel on Climate Change (2022), *Climate Change 2022: Impacts, Adaptation and Vulnerability*, Cambridge University Press, Cambridge, UK and New York, NY, USA, 3056.

International Chamber of Commerce (2012), *Ten conditions for a transition toward a 'Green Economy'*, Document No. 213-18/7, ICC Commission on Environment and Energy.

International Resource Panel (2019), *Global Material Flows Database*, <https://www.resourcepanel.org/data-resources>, 11.03.2023.

International Union for Conservation of Nature (2023), *Protected areas and land use*, <https://www.iucn.org/our-work/protected-areas-and-land-use>, 10.03.2023.

İktisadi Kalkınma Vakfı (2021), *AB Yeşil Mutabakatı Temel Unsurları ve Yol Haritası*, No. 319.

Kasztelan, A. (2021), "On the road to a green economy: How do European Union countries 'do their homework'?", *Energies*, 14(18), 5941.

Koç, B.E. & S. Kaynak (2023), "Sınırda Karbon Düzenleme Mekanizmasının Türkiye-AB-27 Dış Ticaret İlişkisi Üzerine Olası Etkisi", *Verimlilik Dergisi*, 57(2), 273-288.

Koyuncu, T. & T. Karabulut (2021), "Türkiye'de Sürdürülebilir Kalkınma ve Yeşil Ekonomi Açısından Yenilenebilir Enerji: Ampirik Bir Çalışma", *Uluslararası Yönetim İktisat ve İşletme Dergisi*, 17(2), 466-482.

Kuşat, N. (2013), "Yeşil Sürdürülebilirlik İçin Yeşil Ekonomi: Avantaj ve Dezavantajlari-Türkiye İncelemesi", *Yaşar Üniversitesi E-Dergisi*, 8(29), 4896-4916.

Küçük, G. (2022), "Yeşil Ekonomiye Geçiş: Avrupa Yeşil Mutabakatı ve Türkiye'nin Yeşil Ekonomi Performansı", *Yüksek Lisans Tezi*, Anadolu Üniversitesi, Eskişehir.

Lavrinenko, O. et al. (2019), "The role of green economy in sustainable development (case study: the EU states)", *Entrepreneurship and Sustainability Issues*, 6, 1113-1126.

Nahman, A. et al. (2016), "Beyond GDP: Towards a green economy index", *Development Southern Africa*, 33(2), 215-233.

OECD (2011), *Towards Green Growth*, OECD Green Growth Studies, OECD Publishing, Paris.

OECD (2023), *Air pollution exposure (indicator)*, <https://data.oecd.org/air/air-pollution-exposure.htm>, 11.03.2023.

Okumuş, İ. (2013), "Yeşil Ekonomi Göstergeleri Açısından Türkiye'nin Sürdürülebilir Kalkınma Performansı", *Yüksek Lisans Tezi*, Gaziantep Üniversitesi.

Oxford Economics (2023), *The Global Green Economy Report 2023*, <https://www.oxfordeconomics.com/wp-content/uploads/2023/02/The-Global-Green-Economy-Report-2023_FINAL_10MB-version.pdf>, 15.04.2023.

Özçağ, M. & H. Hotunluoğlu (2015), "Kalkınma anlayışında yeni bir boyut: Yeşil ekonomi", *Manisa Celal Bayar Üniversitesi Sosyal Bilimler Dergisi*, 13(2), 303-324.

Özen, A. vd. (2015), "Türkiye'de Yeşil Ekonomi Açısından Yenilenebilir Bir Enerji Kaynağı: Rüzgâr Enerjisi", *Karamanoğlu Mehmetbey Üniversitesi Sosyal ve Ekonomik Araştırmalar Dergisi*, (1), 85-93.

Özgültekin, A. (2022), "Yeşil Ekonomide İklim Adaletinin ve Yoksulluğun Birlikte Ele Alınması Üzerine Bir İnceleme", *Yönetim Bilimleri Dergisi*, (Özel Sayı), 218-240.

Özsoy, C.E. (2016), "Yeşil işler ve istihdam olanakları üzerine bir tartışma", *Aksaray Üniversitesi İİBF Dergisi*, 8(1), 51-60.

PAGE (2017), *The Green Economy Progress Measurement Framework Methodology: Evaluating Progress Towards Poverty Eradication and Shared Prosperity Within Planetary Boundaries*, Geneva, Switzerland.

PAGE (2021), "Green Economy Progress Measurement Framework Application", Second Edition, *UNEP Technical Report: Evaluating national progress towards poverty eradication and shared prosperity within planetary boundaries*.

Pearce, D. et al. (1989), *Blueprint for Green Economy*, Routledge, London.

Ryszawska, B. (2015), "Green Economy Indicators", in: M. Burchard-Dziubińska (ed.), *Towards a green economy. From ideas to practice* (31-52), Wydawnictwo Uniwersytetu Łódzkiego, Łódź.

Sayın, F. & U. Utkulu (2023), "Türkiye'nin Döngüsellik Performansı: Avrupa Birliği Ülkeleri ile Karşılaştırmalı Bir Araştırma", *Verimlilik Dergisi*, (Özel Sayı), 187-204.

SCP Hotspots Analysis Tool (N/A), *Country Profile*, <http://scp-hat.lifecycleinitiative.org/module-1-country-profile/>, 10.03.2023.

Sohag, K. et al. (2019), "Green economic growth, cleaner energy and militarization: Evidence from Turkey", *Resources Policy*, 63, 101407.

Stakeholder Forum (2012), *Principles for the Green Economy: a collection of principles for the green economy in the context of sustainable development and poverty eradication*, <https://stakeholderforum.org/wp-content/uploads/2020/06/Earth-Summit-2012-Principles for-the-Green-Economy-1.pdf>, 08.02.2023.

T.C. Cumhurbaşkanlığı Strateji ve Bütçe Başkanlığı (2020), *Yeni Ekonomi Programı-Orta Vadeli Program 2021-2023*, <https://www.sbb.gov.tr/wpcontent/uploads/2021/08/YeniEkonomiProgrami_OVP_2021-2023.pdf>, 08.04.2023.

T.C. Çevre ve Şehircilik Bakanlığı (2012), *Türkiye'nin İklim Değişikliği Uyum Stratejisi ve Eylem Planı 2011-2023*, Ankara.

T.C. Çevre ve Şehircilik Bakanlığı (2020), *Bölgesel İklim Değişikliği Eylem Planları*, <https://webdosya.csb.gov.tr/db/ordu/menu/bidep_rapor_v14_maket-1_20210315075810.pdf>, 08.02.2023.

T.C. Çevre, Şehircilik ve İklim Değişikliği Bakanlığı (2022a), *Binalarda Yenilenebilir Enerji Zorunluluğu 1 Ocak'ta Başlıyor*, <https://www.csb.gov.tr/binalarda-yenilenebilir-enerji-zorunlulugu-1-ocakta-basliyor-bakanlik-faaliyetleri-37361>, 01.05.2023.

T.C. Çevre, Şehircilik ve İklim Değişikliği Bakanlığı (2022b), *Bakan Murat Kurum Türkiye'nin Ulusal Katkı Beyanı'nın Güncellendiğini Açıkladı*, <https://ab.csb.gov.tr/bakan-murat-kurum-turkiyenin-ulusal-katki-beyaninin-guncellendigini-acikladi-haber-279475>, 01.05.2023.

T.C. Tarım ve Orman Bakanlığı (2021), *Korunan Alan ve Tabiatı Koruma Faaliyetleri İstatistik Raporları*, <https://www.tarimorman.gov.tr/DKMP/Menu/36/Korunan-Alan-Ve-Tabiati-Koruma-Faaliyetleri-Istatistik-Raporlari>, 10.03.2023.

T.C. Ticaret Bakanlığı (2021), *Yeşil Mutabakat Eylem Planı 2021*, Ankara.

T.C. Ticaret Bakanlığı (2022), *Yeşil Mutabakat Çalışma Grubu Yıllık Faaliyet Raporu*, <https://ticaret.gov.tr/data/643ffd6a13b8767b208ca8e4/YMEP%202022%20Faaliyet%20Raporu.pdf>, 17.04.2023.

Tüysüz, Ş. & A. Öncel (2022), "Türkiye'de Yeşil Ekonomi Açısından Sürdürülebilir Enerji Kaynaklarının SWOT Analizi", *İktisadi İdari ve Siyasal Araştırmalar Dergisi*, 7(19), 644-661.

UNCTAD (2011), "Building a development-led green economy", *UNCTAD Policy Brief*, No. 23, UNCTAD Press.

UNEP (2011), *Towards a green economy: pathways to sustainable development and poverty eradication - a synthesis for policy makers*, Nairobi.

UNEP (2012), *Measuring Progress towards an Inclusive Green Economy*, <https://wedocs.unep.org/20.500.11822/32438>, 11.03.2023.

United Nations Statistics (2022), *SDG Indicators Database*, <https://unstats.un.org/sdgs/dataportal>, 10.03.2023.

UN-Water SDG 6 Data Portal. (2020), *Sustainable Development Goal 6 on water and sanitation*, <https://sdg6data.org/en/node/1>,10.03.2023.

World Bank (2022), *Türkiye Country Climate and Development Report*, CCDR Series, Washington DC, World Bank.

World Bank (N/A), *Indicators*, <https://data.worldbank.org/indicator>, 10.03.2023.

World Intellectual Property Organization (2023), *WIPO IP Statistics Data Center*, <https://www3.wipo.int/ipstats/index.htm?tab=patent>,10.03.2023.

Yalçın, A.Z. (2016), "Sürdürülebilir kalkınma için yeşil ekonomi düşüncesi ve mali politikalar", *Çankırı Karatekin Üniversitesi İİBF Dergisi*, 6(1), 749-775.

Yıkmaz, R.F. (2011), "Sürdürülebilir kalkınmanın ölçülmesi ve Türkiye için yöntem geliştirilmesi", *Uzmanlık Tezi*, Sosyal Sektörler ve Koordinasyon Genel Müdürlüğü, Ankara.

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<u>Articles in edited books:</u> Krugman, P. (1995), "The Move Toward Free Trade Zones", in: P. King (ed.), *International Economics and International Economic Policy: A Reader*, New York: McGraw-Hill, Inc., 163-82.

<u>Other sources:</u> Central Bank of the Republic of Turkey (2003), *Financial Stability*, Press Release, March 24, Ankara, <http://www.tcmb.gov.tr>.

Chang, R. (1998), "The Asian Crisis", *NBER Discussion Paper*, 4470, National Bureau of Economic Research, Cambridge, Mass.

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………………………………, <http://www.sosyoekonomijournal.org>, 18.12.2024.

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Derlemeler: Krugman, P. (1995), "The Move Toward Free Trade Zones", P. King (ed.), *International Economics and International Economic Policy: A Reader* içinde, New York: McGraw-Hill, Inc., 163-82.

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