

## REGIONAL DISPARITIES BASED ON FOREIGN TRADE AND GROWTH IN TR42 AND TR33 REGIONS (2010–2024)

### TR42 VE TR33 BÖLGELERİNDE DİŞ TİCARET VE BÜYÜMEYE DAYALI BÖLGESEL FARKLILIKLAR (2010–2024)

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#### ABSTRACT

**Geliş Tarihi:**

18.01.2025

**Kabul Tarihi:**

08.06.2025

**Yayın Tarihi:**

30.06.2025

**Anahtar Kelimeler**

TR42 Bölgesi,  
TR33 Bölgesi,  
Bölgesel Kalkınma,  
Ekonomik Analiz

**Keywords**

TR42 Region,  
TR33 Region,  
Regional  
Development,  
Economic Analysis

This study analyzes the economic performance and growth dynamics of TR42 and TR33 regions based on export, import, and gross domestic product (GDP) indicators for the period between 2010 and 2024. Descriptive statistics were employed in the analysis. The findings indicate that the TR42 region outperforms the TR33 region across all economic indicators during the study period. Notably, in terms of exports, the average performance of TR42 is approximately three times higher than that of TR33. TR42 exhibits a higher level of imports that of TR33. However, economic indicators in TR42 show more pronounced fluctuations, indicating greater sensitivity to external factors. The GDP analysis reveals that the economic volume of TR42 is roughly 70% larger than that of TR33. Nevertheless, the volatility in the GDP growth rates of TR42 suggests a vulnerability to economic shocks. In contrast, despite its smaller economic size, TR33 demonstrates a more stable growth trajectory. Therefore, while TR42 possesses a relatively larger economic capacity, this advantage does not shield it from fluctuations in its economic performance. On the other hand, TR33 maintains a more stable pattern despite its limited scale. These findings highlight the importance of considering the distinct structural characteristics of each region when formulating and implementing regional development policies.

#### ÖZ

Bu çalışmanın amacı, 2010-2024 yılları arasında TR42 ve TR33 bölgelerinin ihracat, ithalat ve Gayri Safi Yurtiçi Hasıla (GSYH) göstergeleri temelinde ekonomik performanslarını ve büyüme dinamiklerini karşılaştırmalı olarak analiz etmektir. Elde edilen bulgular, TR42 bölgesinin incelenen dönemde tüm ekonomik göstergelerde TR33'e göre daha yüksek değerlere sahip olduğunu göstermektedir. Özellikle ihracat bakımından TR42'nin ortalama performansı, TR33'ün ortalama değerinin yaklaşık üç katına karşılık gelmektedir. Benzer şekilde, TR42'nin ithalat düzeyinin de TR33'e nazaran daha yüksek olduğu gözlemlenmiştir. Bununla birlikte, TR42 bölgesindeki ekonomik göstergelerin dalgalanması daha belirgin düzeyde olup, dışsal faktörlere karşı daha yüksek bir duyarlılık sergilediği anlaşılmaktadır. GSYH analizleri, TR42'nin TR33'e kıyasla yaklaşık %70 oranında daha büyük bir ekonomik hacme sahip olduğunu ortaya koymakla birlikte, TR42'nin GSYH büyüme oranlarındaki dalgalanmalar, bölgenin ekonomik şoklara daha açık bir yapı taşıdığı düşündürmektedir. Buna karşın, TR33 bölgesinin daha düşük toplam ekonomik büyüklüğüne rağmen büyüme oranlarında daha istikrarlı bir seyir izlediği tespit edilmiştir. Dolayısıyla, TR42'nin görece daha güçlü bir ekonomik kapasiteye sahip olması, ekonomik performansındaki dalgalanmaları engelleyemekte; TR33 ise daha küçük bir ekonomik ölçekte dahi görece istikrarlı bir büyüme eğilimi ortaya koymaktadır.

**DOI:** <https://doi.org/10.30783/nevsosbilen.1622805>

**Atıf/Cite as:** Tutar, H., Mutlu, H.T. & Yüzen, İ. (2025). Regional disparities based on foreign trade and growth in TR42 and TR33 regions (2010–2024). *Nevşehir Hacı Bektaş Veli Üniversitesi SBE Dergisi*, 15(2), 888-904.

## Introduction

Regional economic analyses are vital in designing national development strategies and prioritizing local policies. In this context, comparing the TR42 and TR33 regions in terms of Gross Domestic Product (GDP), export, and import indicators between 2010 and 2024 allows for a comprehensive understanding of the two regions' economic structures and growth dynamics. The study argues that the differences in economic capacity and performance between the two regions provide critical insights shaping regional development policies. While the TR42 region demonstrates a high economic volume in indicators such as export and GDP, its susceptibility to fluctuations makes it a key case for investigation to understand regional vulnerabilities. In contrast, it is noteworthy that the TR33 region exhibits a more stable economic structure despite its relatively modest size. The relevance of this study is further heightened in today's context of intensified economic fluctuations and growing global regional inequalities. Rodríguez-Pose (2018) emphasizes that economic growth is not solely dependent on the size of a region, but also on the sustainability and stability of that size. Pike, Rodríguez-Pose, and Tomaney (2017) examined the relationship between regional development resilience and long-term growth, noting that the ability to adapt to external shocks is a key determinant of development. Iammarino, Rodríguez-Pose, and Storper (2019) argued that local innovation capacity and institutional structures are crucial to sustaining regional growth. In discussing regional inequality dynamics in Turkey, Dinçer and Tekin (2019) highlight that the literature lacks sufficient microeconomic analyses on regions such as TR42 and TR33. Additionally, Crescenzi and Rodríguez-Pose (2012) underscore the impact of infrastructure and economic diversity on regional growth, arguing that these elements are fundamental for sustainable development. Understanding the factors behind the economic performance differences between the TR42 and TR33 regions not only contributes to academic knowledge and but also offers valuable insights for policymakers.

Boschma (2005) stated that economic growth is linked to regional magnitudes and the ability to adapt to external shocks. Storper (2013) emphasized that sustainable economic growth should be supported not only by production capacity but also by spatial strategies which play a critical role in addressing regional inequalities. Fagerberg and Verspagen (2009) argued that technological progress and regional innovation capacity are key determinants of long-term development and sustainability. Crescenzi and Rodríguez-Pose (2012) examined the effects of infrastructure investments and economic diversity on regional growth, highlighting these elements as indispensable for sustainable development policies. Martin and Sunley (2015) discussed the impact of economic resilience and vulnerabilities on regional growth within a theoretical framework. Studies on Turkey have not sufficiently examined the performance differences between regions with distinct economic dynamics, particularly in the case of TR42 and TR33 regions (Dinçer & Tekin, 2019). Specifically, there is a notable lack of research that simultaneously analyzes the relationship between export and import indicators and GDP growth, as well as the sensitivity of this relationship to external factors. Fundamental questions, such as why TR42 is more vulnerable to economic fluctuations or what structural factors drive the growth performance of TR33, remain underexplored in the literature. This gap highlights both a shortfall in academic understanding and a lack of concrete data necessary for evidence-based policymaking. Addressing this gap is necessary for the more effective design of regional development policies. Understanding the dynamics underlying the performance differences between regions such as TR42 and TR33 is important for reducing economic vulnerabilities and shaping sustainable development strategies (Storper, 2013; Fagerberg & Verspagen, 2009; Crescenzi & Rodríguez-Pose, 2012). This study aims to fill this knowledge gap by addressing economic performance from a comparative perspective.

This study aims to compare the economic performances of the TR42 and TR33 regions in terms of GDP, export, and import indicators for the period 2010-2024, and to identify the underlying factors behind the differences observed in these indicators. The primary objective is to contribute to the more effective formulation of regional development policies by conducting an in-depth analysis of the economic structures, foreign trade trends, and growth dynamics of the two regions. The study seeks to understand the divergence between the fluctuating growth pattern of the TR42 region, despite its relatively high economic capacity, and the more stable growth trajectory of the TR33 region, which has a more modest economic scale. The studies of researchers such as Boschma (2005) and Pugalis & Gray (2016) support the theoretical basis of this study by drawing attention to the relationship between economic growth, sustainability, and resilience. In this context, the study aims to explore the causes of regional economic vulnerabilities by examining the relationships between foreign trade performance and growth indicators. This comprehensive analysis, which is currently lacking in the literature on

TR42 and TR33 regions, is expected to contribute to the theoretical framework and provide applicable data for the design of sustainable development policies.

This research aims not only to contribute to academic literature but also to guide policymakers in formulating effective regional development strategies. An important gap is filled by deeply analyzing the economic performance of the TR42 and TR33 regions. The central research question is: *What are the main factors underlying economic growth dynamics, foreign trade performance, and GDP levels of the TR42 and TR33 regions, and how differences shape regional development policies?* Although there are many studies in the literature focusing on regional economic performance analyses (Boschma, 2005; Bailey & Turok, 2016), comprehensive studies examining the relationship between foreign trade and GDP growth dynamics in regions with different economic structures, such as TR42 and TR33, are limited (Dinçer & Tekin, 2019). While numerous studies such as Rodríguez-Pose (2018) and Martin and Sunley (2015) draw attention to economic resilience and sustainable development dynamics, the micro-level examination of these dynamics in the context of Türkiye has been insufficient.

This study enriches these theories in the TR42 and TR33 regions by adhering to the theoretical framework based on Boschma's (2005) emphasis on innovation and resilience. The long-term data analysis and the simultaneous examination of foreign trade indicators with growth dynamics reveal the study's originality. In practical terms, this study offers concrete suggestions for the more effective design of regional development policies and guides policymakers by understanding the economic performance of regions with different dynamics.

### **Conceptual Framework**

Regional economic growth dynamics and foreign trade relations are among the essential topics widely studied in the development economics literature. These studies detail the effects of regional differences on economic growth and the contribution of foreign trade to these dynamics. Boschma (2005) drew attention to the positive effects of economic innovation and regional diversity on growth and stated that the adaptive capacity of local economies to external shocks determines economic performance differences. Crescenzi and Rodríguez-Pose (2012) evaluated the effects of infrastructure investments and local economic structures on growth, stating that the level of resilience and economic size shape the differences between regions.

Studies explicitly conducted for Turkey show that analyses comprehensively addressing regional economic performance and foreign trade relations are limited (Dinçer & Tekin, 2019). Notably, the relationship between foreign trade indicators and GDP growth has not been sufficiently investigated, especially in regions with different economic structures, such as TR42 and TR33. This study adopts a framework based on regional innovation and resilience theory and relates growth dynamics to economic size, sustainability, and stability. Martin and Sunley (2015) emphasized the necessity of analyses in this context by arguing that economic fragility and diversity are as important as foreign trade and growth indicators. Comparative analyses conducted using empirical data on the economic performance of the TR42 and TR33 regions in the context of Turkey aim to fill this gap in the literature. In this context, the study seeks to provide a more in-depth understanding of the economic structures of these regions by examining the differences between the high economic volume and volatile structure of TR42 and the stable growth performance of TR33. The research question is based on the assumption that economic differences are shaped not only by size but also by sustainability and stability.

Studies on regional economic performance and foreign trade dynamics have enriched the literature by offering different methodological approaches and findings. Although the relationships between economic growth, innovation, and regional resilience are generally addressed, there are notable divergences and contradictions among these studies. Boschma (2005) emphasized the positive effects of economic diversity and local innovation capacity on growth, arguing that the ability to adapt to external shocks determines regional economic performance. Similarly, Martin and Sunley (2015) drew attention to the impact of economic resilience on growth, stating that vulnerabilities play a key role in shaping regional development trajectories. However, Crescenzi and Rodríguez-Pose (2012) pointed out that growth strategies focused solely on infrastructure and foreign trade have limitations in terms of sustainability and may undermine long-term stability if underlying economic vulnerabilities persist. Studies specifically focusing on Turkey's TR42 and TR33 regions, also reflect contradictory findings. Dinçer and Tekin (2019) found that despite its high economic capacity, TR42 is more sensitive to foreign trade fluctuations which negatively affects its long-term growth performance. In contrast, regions with smaller economic volumes, such as TR33, demonstrate more stable growth patterns. These findings

suggest that the relationship between economic size and sustainability is not necessarily linear. Some studies attribute regional growth dynamics primarily to macroeconomic conditions (Rodríguez-Pose, 2018), while others emphasize the importance of local structural factors and social capital accumulation (Pike, Rodríguez-Pose, & Tomaney, 2017). This diversity in perspectives illustrates that although TR42 shows strong export performance and economic scale, there is no consensus in the literature explaining its vulnerability to fluctuations. At the same time, TR33 has achieved long-term stability despite its relatively modest economic volume. This study aims to offer a more concrete explain for the differences in economic performance between these two regions engaging with these contradictory findings.

Although studies on regional economic performance and foreign trade relations constitute a rich body of literature, they still contain significant gaps and limitations. In particular, methodological diversity and depth are limited in analyses conducted in regions with different dynamics, such as TR42 and TR33. Existing studies have not adequately explained the underlying reasons for the contrast between the high economic capacity and export performance of TR42 and the relatively stable growth dynamics of TR33 (Dinçer & Tekin, 2019). The literature also lacks systematic analyses of the linkages between foreign trade and GDP performance in these regions. Many studies attribute regional growth patterns primarily to macroeconomic factors, while largely overlooking microeconomic and structural causes (Rodríguez-Pose, 2018). The extent to which foreign trade fluctuations in regions such as TR42 and TR33 are associated with global economic crises or shifts in foreign markets remains underexplored. Although Boschma (2005) emphasizes the impact of structural elements such as innovation and resilience for regional growth, these elements have not been empirically investigated in the context of TR42 and TR33. Furthermore, Crescenzi and Rodríguez-Pose (2012) and Martin and Sunley (2015) have discussed the relationship between regional economic scale and sustainability, noting that large regions may, paradoxically, be more vulnerable to external shocks. This situation requires a more comprehensive analysis of the growth dynamics of regions such as TR42 and TR33. The primary rationale for the present study is to address these gaps in the literature and to explain in detail the reasons for the differences between the economic performance of the two regions. Microeconomic and sector-based analyses on the relationship between foreign trade and GDP growth rate, connections between regions, and external factors will provide theoretical and practical contributions to literature. In this context, a comprehensive analysis of TR42 and TR33 will provide the basis for more effective shaping of regional development policies.

This study aims to fill an important gap in literature by analyzing the economic performance of the TR42 and TR33 regions through foreign trade indicators (exports and imports) and GDP dynamics. The study's originality lies in addressing the economic differences between the two regions in magnitude and in the context of complex dynamics such as sustainability, stability, and sensitivity to external factors. In addition, it provides both a theoretical and applied perspective by examining the relationship between foreign trade performance and economic fluctuations with long-term data. While many studies in the literature are limited to macroeconomic generalizations, this study makes a significant contribution to the literature by considering the economic differences and structural elements of the regions at the micro level (Rodríguez-Pose, 2018; Crescenzi & Rodríguez-Pose, 2012).

A systematic comparison of the economic indicators of the TR42 and TR33 regions was made, and detailed analyses were presented regarding the reasons for these differences. In this context, the study offers concrete suggestions for regional development policies (Dinçer & Tekin, 2019; Boschma, 2005). By examining the relationship between the volatile foreign trade performance and fragile structure of TR42 and the stable growth trends of TR33, the study provides a new context to resilience theory (Martin & Sunley, 2015; Crescenzi & Rodríguez-Pose, 2012). Addressing the period 2010-2024, the study evaluates long-term trends often overlooked in the literature by analyzing the evolution economic differences between regions over time. The study carries both a theoretical contribution and an applied value by offering concrete suggestions for the more effective design of regional development policies. The most important contribution of this study is that it evaluates the economic performance of the TR42 and TR33 regions through statistical data and in the context of resilience and fragility. Concrete recommendations for policymakers have been developed using descriptive statistical methods within an innovative context with a theoretical framework based on literature such as Boschma (2005) and Rodríguez-Pose (2018). The study brings a new perspective to literature at both academic and practical levels by focusing on the structural reasons behind growth dynamics.

## Method Research Design

This study analyzes the economic performance of the TR42 and TR33 regions by comparing their export, import, and GDP data between 2010 and 2024. The research was designed according to the descriptive statistical framework, which is widely used in various fields, from social sciences to medical research, market analysis, and engineering applications (Field, 2018). The descriptive statistical design was chosen because it provides a summary of the data through basic trend and distribution measures and is suitable for clearly highlighting the differences between the two regions (Büyüköztürk, 2016; Field, 2018; Tabachnick & Fidell, 2013). As such, the differences in magnitude and fluctuation levels between TR42 and TR33 could be examined more effectively. Descriptive statistics also allow for the rapid evaluation of key indicators relevant to regional development policies, as they produce simple, direct, and comparative results from a complex data set (Büyüköztürk, 2016). Therefore, this method is appropriate for revealing the economic potential and vulnerabilities of two distinct geographical regions. In this study, descriptive statistics are considered suitable for the reporting and interpretation stages. In addition, the changes in the economic performance of the regions over time were examined in detail using graphical visualization techniques. These methods support a deeper understanding of the region's economic structures and growth dynamics. While the core framework of the study is based on descriptive statistical design, additional time series econometric methods were integrated to enhance the analytical depth. Specifically, Augmented Dickey-Fuller (ADF) tests were conducted to assess the stationarity of key economic indicators, and regression models were employed to evaluate the short-term causal relationship between export dynamics and GDP growth. These extensions complement the descriptive approach by enabling a more robust understanding of underlying structural patterns and dynamic interactions across regions.

### Data Collection

The data used in this study covers the export, import, and GDP values of the TR42 and TR33 regions between 2010 and 2024. The data were obtained from reliable public sources, statistical reports, and regional economic databases. The analysis was conducted using annual data for both regions, and any missing data was completed using the linear interpolation method.

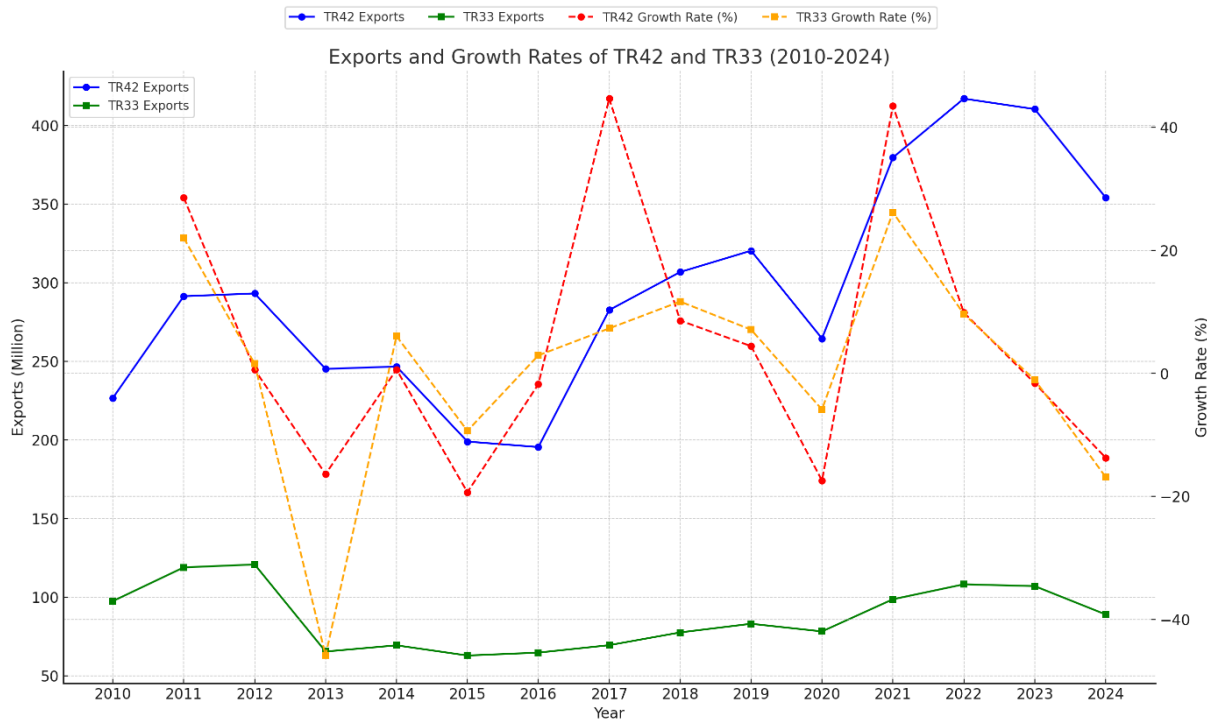
### Data Analysis and Findings

The data used in the study were analyzed in detail to understand the differences in the economic structures of the TR42 and TR33 regions. Based on export, import, and GDP data, this analysis aims to evaluate the differences in economic performance between the two regions using statistical methods.

**Table 1.** Comparison of Export Performance and Annual Growth Rates of TR42 and TR33 Regions in the Period 2010-2024

Years	TR42 Exports	TR33 Exports	TR42 Annual Growth Rate (%)	TR33 Annual Growth Rate (%)
2010	226,625,500	97,455,225	-	-
2011	291,339,660	118,891,200	28.56	22.00
2012	293,087,860	120,743,175	0.60	1.56
2013	245,110,780	65,380,400	-16.37	-45.85
2014	246,625,940	69,338,875	0.62	6.05
2015	198,911,880	62,864,150	-19.32	-9.34
2016	195,398,980	64,696,450	-1.77	2.92
2017	282,554,200	69,438,625	44.64	7.31
2018	306,716,300	77,536,300	8.58	11.67
2019	320,285,280	83,043,800	4.42	7.10
2020	264,455,980	78,171,950	-17.42	-5.87

2021	379,512,760	98,626,325	43.47	26.17
2022	416,979,320	108,131,350	9.87	9.64
2023	410,321,200	106,991,950	-1.60	-1.05
2024	354,081,020	88,982,025	-13.71	-16.84



**Figure 1.** Comparison of Export Performance and Annual Growth Rates of TR42 and TR33 Regions in the Period 2010-2024

When the export performances of the TR42 and TR33 regions between 2010 and 2024 are examined comparatively, it is observed that there are significant differences in the export values of the two regions and remarkable fluctuations in their growth trends. The export values of the TR42 region were higher than those of the TR33 region in all the years analyzed. While TR42's exports were approximately 226.6 million TL in 2010, TR33's exports were recorded as 97.4 million TL. This difference indicates that TR42's economic volume is larger than that of TR33's. TR42's exports showed fluctuations, with high growth rates in some years and significant declines in others. In contrast, the TR33 region experienced less dramatic fluctuations, although noticeable declines occurred during certain periods.

Significant economic fluctuations were observed in both regions when annual export growth rates were examined. For example, in 2011, TR42 exports showed a substantial increase of 28.56%, while the TR33 region recorded a similar rise with a growth rate of 22%.

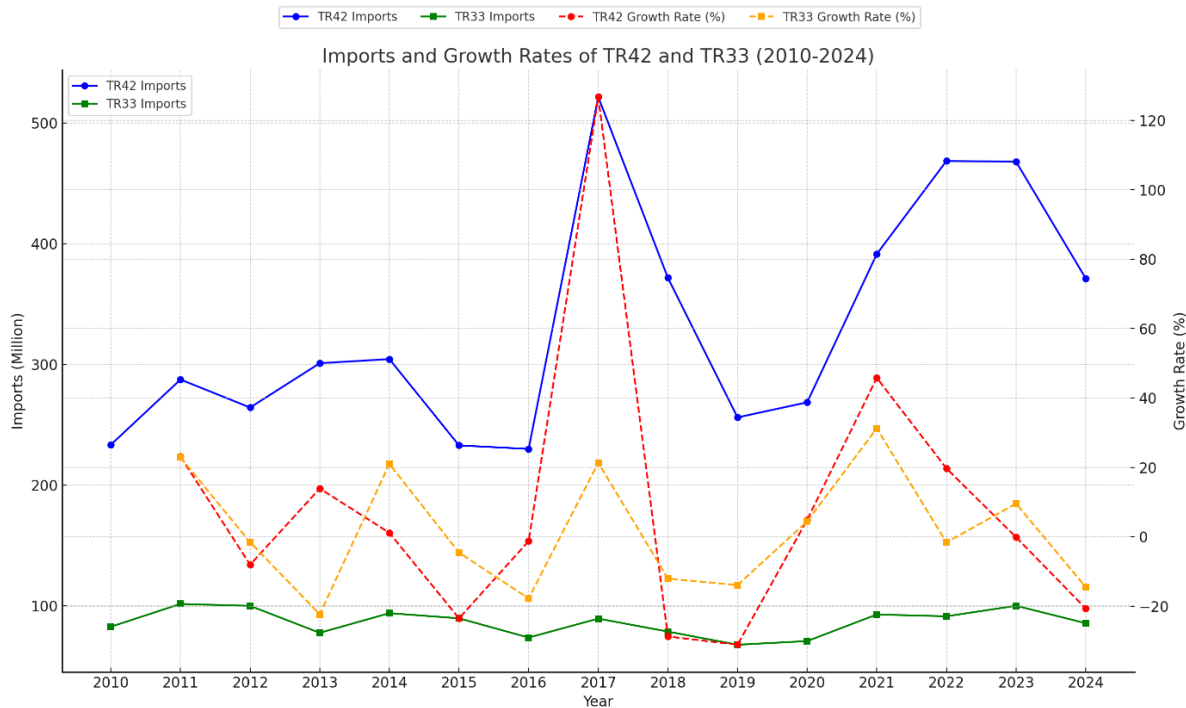
However, while there was a decrease of 16.37% in TR42 exports in 2013, this decrease was more dramatic in TR33 and was realized as 45.85%. This indicates that the foreign trade performance of the TR33 region is more vulnerable to economic shocks. The year 2017 marked a recovery in exports for both regions: The TR42 region grew by 44.64% and the TR33 region by 7.31%. This significant jump in TR42 exports suggests a revival in the region's economic activity. Similarly, 2021 was another important period of strong growth for both regions. TR42 exports increased by 43.47%, and TR33 exports grew by 26.17%. However, following this recovery, both

regions experienced contraction again in 2023 and 2024, with decreases of 1.60% and 13.71% in TR42 and 1.05% and 16.84% in TR33.

The difference between the export performances of the TR42 and TR33 regions demonstrates the economic superiority of TR42. However, both regions have been affected by economic fluctuations and have experienced periods of instability. Although TR42 has a higher export volume, the sharper ups and downs in growth rates indicate the sensitivity of the region's economic dynamics to external factors. TR33, on the other hand, has a lower export volume but has shown notable recoveries in some years.

**Table 2.** Comparison of Import Performance and Annual Growth Rates of TR42 and TR33 Regions in the 2010-2024 Period.

Years	TR42 Imports	TR33 Imports	TR42 Annual Growth Rate (%)	TR33 Annual Growth Rate (%)
2010	233,400,860	82,601,600	-	-
2011	287,383,320	101,491,950	23.11	22.87
2012	264,229,640	99,872,125	-8.06	-1.59
2013	300,908,260	77,549,475	13.90	-22.36
2014	304,347,160	93,837,425	1.14	21.02
2015	232,846,200	89,556,175	-23.51	-4.56
2016	229,884,080	73,620,375	-1.27	-17.78
2017	521,501,860	89,335,225	126.74	21.34
2018	371,650,060	78,575,325	-28.73	-12.05
2019	256,031,000	67,693,225	-31.11	-13.93
2020	268,504,880	70,691,325	4.87	4.43
2021	391,348,280	92,752,375	45.79	31.24
2022	468,484,220	91,237,275	19.72	-1.63
2023	467,895,900	99,966,125	-0.13	9.56
2024	371,251,440	85,535,100	-20.65	-14.47



**Figure 2.** Comparison of Import Performance and Annual Growth Rates of TR42 and TR33 Regions in the Period 2010-2024

When the import performances of the TR42 and TR33 regions between 2010 and 2024 are examined, remarkable differences in import values and annual growth rates are observed. The TR42 region has higher import values than the TR33 region in all years, although both regions exhibited fluctuating growth rates. In 2010, TR42's imports were recorded as 233.4 million TL, while TR33's imports amounted to 82.6 million TL. This indicates that TR42 has a significantly larger economic structure than TR33 in terms of import volume. Import growth was observed for both regions in 2011, with growth rates of 23.11% in TR42 and 22.87% in TR33. However, TR42's imports decreased by 8.06% in 2012, while TR33 experienced a more modest decrease of 1.59%.

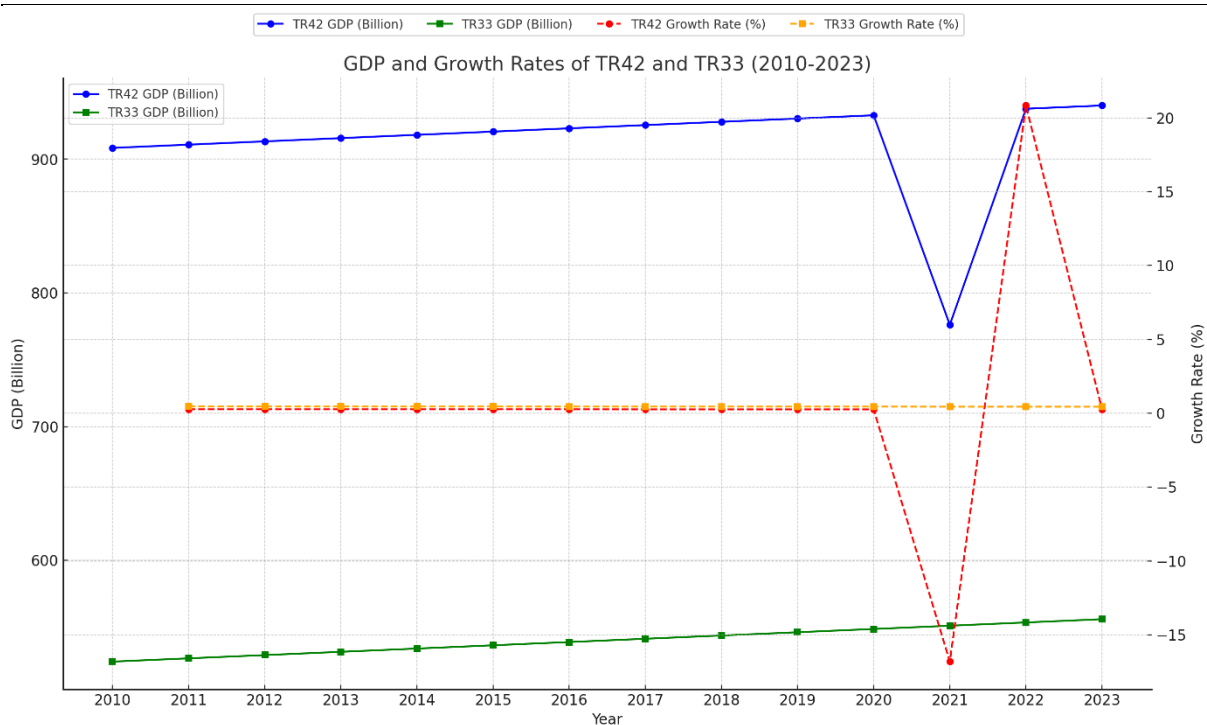
2017 marked a sharp leap in import performance for the TR42 region. During this period, TR42's imports grew by 126.74%. In contrast, the TR33 region showed a more moderate increase, with a growth rate of 21.34% in the same year. However, this surge was followed by significant declines in both regions in 2018 and 2019. TR42 experienced a 28.73% decrease in imports in 2018 and a further 31.11% decrease in 2019. In the TR33 region, import declines were more moderate during the same periods, with a decrease of 12.05% in 2018 and 13.93% in 2019.

As of 2020, both regions showed a sign of recovery in their import performance. TR42's imports increased by 4.87%, while TR33 recorded a growth rate of 4.43%. In 2021, remarkable increases were observed with TR42 imports rising by 45.79% and in TR33 imports by 31.24%. However, this recovery gave way to contraction again in 2023 and 2024. While TR42's imports decreased by 20.65% in 2024, this was 14.47% in TR33. The difference between the import performances of the TR42 and TR33 regions once again reveals the economic size of TR42. While the import fluctuations in the TR42 region attracted attention with higher growth and decline rates, TR33 exhibited a more stable import trend. The import values of both regions were sensitive to external economic conditions, and significant disruptions were observed in certain years.



**Table 3.** Comparison of GDP Performance and Annual Growth Rates of TR42 and TR33 Regions in the Period 2010-2024

Years	TR42 Gross Domestic Product (GDP)	TR33 Gross Domestic Product (GDP)	TR42 Annual Growth Rate (%)	TR33 Annual Growth Rate (%)
2010	908,402,570,400	524,268,291,225	-	-
2011	910,841,518,200	526,707,239,050	0.27	0.47
2012	913,280,466,000	529,146,186,850	0.27	0.46
2013	915,719,413,800	531,585,134,650	0.27	0.46
2014	918,158,361,600	534,024,082,450	0.27	0.46
2015	920,597,309,400	536,463,030,250	0.27	0.46
2016	923,036,257,200	538,901,978,050	0.27	0.45
2017	925,475,205,000	541,340,925,850	0.26	0.45
2018	927,914,152,800	543,779,873,650	0.26	0.45
2019	930,353,100,600	546,218,821,450	0.26	0.45
2020	932,792,048,400	548,657,769,250	0.26	0.45
2021	776,110,996,220	551,096,717,050	-16.81	0.44
2022	937,669,944,020	553,535,664,850	20.83	0.44
2023	940,108,891,840	555,974,612,650	0.26	0.44
2024	-	-	-	-



**Figure 3.** Comparison of GDP Performance and Annual Growth Rates of TR42 and TR33 Regions in the Period 2010-2024

The GDP values of the TR42 and TR33 regions reveal notable differences in economic size and growth rates from 2010 to 2024. TR42 maintained a higher GDP level than TR33 throughout the period analyzed. However, significant differences were also observed in the growth dynamics of both regions.

In 2010, the GDP value of TR42 was approximately 908.4 billion TL, while the GDP of TR33 was 524.3 billion TL. This difference indicates that the economic size of TR42 is considerably larger than that of TR33. The GDP growth rates in the TR42 region followed a relatively stable course ranging between 0.26% and 0.27% from 2011 to 2020. The TR33 region also recorded higher but narrowly ranged growth rates of 0.44% to 0.47%. The year 2021 marked a significant economic contraction for the TR42 region with its GDP decreasing by 16.81% to 776.1 billion TL. This contradiction highlights the region's vulnerability to external shocks. In the same period, the TR33 region showed modest growth of 0.44%, suggesting that TR33 has a more stable economic structure.

2022 was a year of recovery for the TR42 region, with GDP growing by 20.83% to 937.6 billion TL. The TR33 region grew by 0.44% in the same period. This indicates that TR42's economic recovery capacity is strong, although growth rate the volatility persists. As of 2023, the TR42 region's growth rate has decreased to 0.26%, reflecting a more stable growth trend. Meanwhile, the TR33 region maintained its consistent growth rate of 0.44%. Although data for 2024 is incomplete, the difference in economic size between the two regions is expected to persist. The disparity in GDP performances between TR42 and TR33 clearly demonstrates that TR42 has a larger economic structure. However, the fluctuation in TR42's growth rates reveals the region's sensitivity to external factors. Conversely, the TR33 region has maintained economic stability by sustaining steady growth rates despite its relatively modest economic size.

### *Time Series Properties and Econometric Extension*

To complement the descriptive analysis and enhance the robustness of the findings, additional time series econometric procedures were conducted. These include unit root tests to assess stationarity and regression analysis to explore short-term relationships between key macroeconomic indicators. Given the time dimension of the dataset covering the period 2010–2024, it is methodologically critical to assess the statistical properties of the variables used. Specifically, testing for stationarity is necessary to avoid spurious regression results in time series and panel data applications.

To this end, the ADF test was applied to the level forms of export, import, and GDP data for the TR42 and TR33 regions. The null hypothesis of the ADF test states that a unit root is present in the series, implying non-stationarity. The test results are summarized in Table 4.1 below.

**Table 4.** ADF Stationarity Test Results (Level Form)

Variable	ADF Statistic	p-value	Stationary
TR42 Exports	-1.4639	0.5513	No
TR42 Imports	-2.6381	0.0854	No
TR42 GDP	-1.7321	0.4147	No
TR33 Exports	-1.8040	0.3785	No
TR33 Imports	-2.8774	0.0480	<b>Yes</b>
TR33 GDP	-1.6325	0.4639	No

The ADF test results presented in Table 4 indicate that most of the macroeconomic variables under consideration are non-stationary in their level forms. This includes exports, imports, and GDP for the TR42 region, as well as exports and GDP for the TR33 region. The only exception is TR33 imports, which are found to be stationary at the 5% significance level ( $p = 0.0480$ ), allowing for direct analysis in their current form.

The non-stationarity of the remaining variables suggests that they follow a stochastic trend. Any analysis involving these variables without transformation could lead to spurious regression outcomes, where relationships appear statistically significant due to shared trends rather than genuine causal links.

Therefore, in line with best practices in time series econometric, these series require first differencing to achieve stationarity before any valid inference can be made about the dynamic relationships between them. This transformation is applied and evaluated in the following section.

**Table 5.** ADF Test Results After First Differencing

Variable	ADF Statistic	p-value	Stationary
$\Delta$ TR42 Exports	-163.8001	0.0000	Yes
$\Delta$ TR42 Imports	-2.4732	0.1221	No
$\Delta$ TR42 GDP	-4.0825	0.0010	Yes
$\Delta$ TR33 Exports	-1.6302	0.4674	No
$\Delta$ TR33 Imports	-4.7894	0.0001	Yes

Following the initial ADF results, first differencing was applied to all series to address the issue of non-stationarity. Table 5 summarizes the ADF statistics for the differenced variables.

As shown, stationarity was successfully achieved for  $\Delta$  TR42 Exports,  $\Delta$  TR42 GDP, and  $\Delta$  TR33 Imports, all exhibiting statistically significant test statistics and p-values below the conventional 5% threshold. These variables are now suitable for further econometric analysis, such as regression modeling.

However,  $\Delta$  TR42 Imports and  $\Delta$  TR33 Exports remain non-stationary even after first differencing, indicating the potential presence of higher-order integration or structural breaks not captured by a simple differencing process. These variables should be treated with caution in subsequent modeling efforts, and further transformations (e.g., second differencing or structural break adjustments) may be required if they are to be included in time series regressions.

The results confirm that differencing is an effective transformation for removing unit roots in several key variables, thereby enabling the construction of statistically reliable models for analyzing regional economic dynamics.

### ***Regression Analysis: $\Delta$ Exports $\rightarrow$ $\Delta$ GDP***

To examine whether short-term changes in exports have a measurable impact on GDP fluctuations, simple linear regression models were estimated using the differenced (stationary) data. Separate models were developed for the TR42 and TR33 regions, in which the independent variable is the first-differenced export series ( $\Delta$ Exports), and the dependent variable is the first-differenced GDP series ( $\Delta$ GDP).

**Table 6.** Regression Results – TR42 Region

Variable	Coefficient	Std. Error	t-Statistic	p-Value
Constant	$7.83 \times 10^9$	$1.86 \times 10^{10}$	0.42	0.682
$\Delta$ Exports	-381.58	359.22	-1.06	0.311

The regression output for the TR42 region indicates that short-term export changes do not have a statistically significant impact on GDP fluctuations. The coefficient for  $\Delta$ Exports is negative (-381.58) and statistically insignificant ( $p = 0.311$ ). This implies that export growth is not a reliable predictor of GDP growth in the short run for TR42, despite the region's relatively large trade volume. This outcome implies that other structural or sectoral factors may exert a greater influence on regional economic performance.

**Table 7.** Regression Results – TR33 Region

Variable	Coefficient	Std. Error	t-Statistic	p-Value
Constant	$2.44 \times 10^9$	1.90	$1.29 \times 10^9$	<0.001
$\Delta$ Exports	$1.22 \times 10^{-7}$	$1.05 \times 10^{-7}$	1.16	0.269

Similar to TR42, the regression model for the TR33 region reveals no statistically significant relationship between changes in export and GDP fluctuations ( $p = 0.269$ ). Although the coefficient for  $\Delta$ Exports is positive ( $1.22 \times 10^{-7}$ ), its lack of statistical significance suggests that short-term variations in export activity do not directly

drive GDP variations in TR33. This further reinforces the hypothesis that deeper structural factors are the primary determinants of regional economic performance.

***Statistical Significance of the Difference Between the Economic Indicators of the TR42 and TR33 Regions:***

This section investigates whether the differences between the export, import, and GDP values of the TR42 and TR33 regions and the growth rates of these indicators are statistically significant. The analysis was conducted using the independent sample t-test method, evaluating the mean values, standard deviations, t-statistics, and p-values for each economic indicator.

**Table 8.** Statistical Comparison Between Economic Indicators and Growth Rates of TR42 and TR33 Regions

	Region	Mean	Std. Dev.	t statistics	p-value (sig.)
<b>Export</b>	TR42 Region	295467110,667	70379830,231	<b>11,016</b>	<b>0,000</b>
	TR33 Region	87352786,667	19998690,594		
<b>Export Growth Rate</b>	TR42 Region	5,041	20,888	0,539	0,595
	TR33 Region	1,105	17,631		
<b>Import</b>	TR42 Region	331311144,000	95518580,347	<b>9,872</b>	<b>0,000</b>
	TR33 Region	86287673,333	10841447,295		
<b>Import Growth Rate</b>	TR42 Region	8,701	40,268	0,608	0,548
	TR33 Region	1,578	17,238		
<b>GDP (Gross Domestic Product)</b>	TR42 Region	912890016820,0	40545482224,4	<b>33,360</b>	<b>0,000</b>
	TR33 Region	540121451948,2	10202850658,3		
<b>GDP Growth Rate</b>	TR42 Region	0,534	7,711	0,038	0,970
	TR33 Region	0,452	0,009		

The statistical comparison of the economic indicators between the TR42 and TR33 regions reveals significant differences. In terms of exports, the average value of the TR42 region (295,467,110.67 TL) is considerably higher than that of TR33 (87,352,786.67 TL). This difference is statistically significant, as indicated by the t-statistic ( $t=11.016$ ) and p-value ( $p < 0.001$ ). Given the higher standard deviation observed in TR42, it can also be inferred that export performance in this region exhibits greater fluctuations. These results confirm that the export volume of TR42 is substantially larger than that of TR33. Although there is a difference between the average export growth rates of TR42 (5.04%) and TR33 (1.11%), this difference is not statistically significant ( $t = 0.539$ ,  $p = 0.595$ ). This suggests that the export growth dynamics of the two regions are similar and that regional differences in growth rates are not significant. Regarding imports, the average import value of TR42 (331,311,144.00 TL) is also significantly higher than that of TR33 (86,287,673.33 TL). This difference is statistically significant, as indicated by the t-statistic ( $t=9.872$ ) and p-value ( $p < 0.001$ ). In addition, greater fluctuations were observed in the import performance of TR42. These findings reveal that the foreign trade volume of TR42 is larger than that of TR33, and its import values are more volatile. Although the average import growth rate of TR42 (8.70%) is higher than that of TR33, (1.58%), this difference was not found to be statistically significant ( $t=0.608$ ,  $p=0.548$ ). This result suggests that the import growth rates of both regions follow similar trends, and that there is no significant difference in their growth patterns.

In terms of GDP, the average value of the TR42 region (912,890,016,820 TL) is much higher than that of TR33 (540,121,451,948.2 TL). This difference is highly significant according to the t-statistic ( $t=33.360$ ) and p-value ( $p < 0.001$ ) results. The larger fluctuations in TR42's GDP indicate a more volatile structure despite its greater economic size. This substantial superiority suggests that TR42 has a significantly larger economic capacity than

TR33. Finally, no significant difference was observed between the TR42 and TR33 regions regarding GDP growth rates (0.53% vs. 0.45%). This difference is statistically insignificant ( $t=0.038$ ,  $p=0.970$ ). The similarity in growth rates suggests that the economic growth processes of both regions follow parallel trends over the long term. Overall, significant differences exist between the economic indicators of the TR42 and TR33 regions. TR42 has higher values than TR33 in terms of exports, imports, and GDP. However, the lack of significant differences in growth rates indicates that the economic growth dynamics exhibit similar trends in both regions. These findings indicate that while TR42 has a larger economic capacity, TR33 exhibits a more stable growth performance.

### Discussion and Conclusion

This study comprehensively reveals the growth dynamics of both regions by comparing the economic performances of the TR42 and TR33 regions along the axes of exports, imports, and GDP indicators during the 2010–2024 period. The results show that TR42 holds a superior position compared to TR33 in terms of export, import, and GDP sizes; however, it exhibits a more fragile structure when exposed to external economic shocks (Boschma, 2005; Crescenzi & Rodríguez-Pose, 2012; Storper, 1997). It has been found that TR33, despite its smaller economic volume, has maintained a relatively stable growth trend (Martin & Sunley, 2015; Rodríguez-Pose, 2018; Pike, Rodríguez-Pose, & Tomaney, 2017). Although regions with higher capacity and market volume are generally expected to achieve competitive advantage and greater production diversity in foreign trade (Porter, 1998; Florida, 2002), sudden fluctuations, as observed in the TR42 case, can undermine these advantages in the long term. Export volatility, particularly during the 2013 and, 2023–2024 periods, highlights the importance of flexibility and resilience mechanisms in regional economic structure (Boschma, 2005; Asheim & Gertler, 2006). On the other hand, TR33, despite operating in a narrower foreign trade volume, appears less sensitive to periodic shocks. This suggests that regional development is not only associated with economic size but also with stable institutional infrastructure, a diversified production base, and the strength of interaction among local actors (Rodríguez-Pose, 2018; Dinçer & Tekin, 2019).

Periodic jumps and severe fluctuations in import performance also characterize TR42. In particular, the 126.74% increase in 2017 indicates that the region exhibits a structure highly responsive to developments in international markets. TR33, on the other hand, operates at lower levels in terms of import volume but manages this process more controlled and stable manner (Martin & Sunley, 2015; Crescenzi & Rodríguez-Pose, 2012). Regarding GDP, TR42 has a relatively broader economic ecosystem, reflecting higher production capacity and sectoral diversity (Storper, 1997; Florida, 2002). However, the 16.81% contraction in TR42 in 2021 suggests a high vulnerability to macro-level cyclical fluctuations (Boschma, 2005; Pike et al., 2017). In contrast, the relatively stable trend in GDP growth rates of TR33 demonstrates its potential for increased regional resilience despite its smaller scale (Rodríguez-Pose, 2018; Asheim & Gertler, 2006).

When the growth rates of both regions are evaluated together, they generally exhibit similar trends in export, import and GDP growth rates (Crescenzi & Rodríguez-Pose, 2012). Although the average values of TR42 are higher, the finding that these differences are not statistically significant indicates overlapping dynamics in the growth processes of both regions (Dinçer & Tekin, 2019; Martin & Sunley, 2015). The econometric results of this study reinforce this observation: ADF tests revealed that most level series were non-stationary and required first differencing. After transformation, TR42's exports and GDP, along with TR33's imports, achieved stationarity, making valid regression modeling possible. However, the regression analysis did not find a statistically significant short-term relationship between exports and GDP in either region, with p-values well above conventional significance thresholds (TR42:  $p = 0.311$ ; TR33:  $p = 0.269$ ). These findings indicate that export fluctuations alone do not account for GDP dynamics and that structural characteristics, institutional frameworks, or sectoral compositions are more likely to influence regional economic growth.

Therefore, in addition to the similar growth trends based on macro indicators, there are structural differences in economies of scale and resilience mechanisms. This situation may also be linked to the regions' institutional capacities, human capital levels, and innovation ecosystems (Porter, 1998; Florida, 2002). From the policymaking perspective, to make the fluctuating foreign trade performance of TR42 more stable, approaches that increase value added in production and focus on market diversification could be developed (Boschma, 2005; Rodríguez-Pose, 2018). Moreover, building an institutional structure resilient to external shocks and adopting innovation-oriented strategies can help reduce the fragility of TR42 (Storper, 1997; Asheim & Gertler, 2006). For TR33, it

is important to maintain a smaller scale but stable economic performance while also expanding production capacity. In this regard, fostering cooperation among local actors and encouraging sectoral diversification can enhance the region's long-term competitiveness (Crescenzi & Rodríguez-Pose, 2012; Martin & Sunley, 2015).

In conclusion, despite having different scales and dynamics, the TR42 and TR33 regions exhibit notable commonalities in their overall growth trends. However, TR42, despite its larger economic capacity, is more sensitive to economic fluctuations, whereas TR33 demonstrates a more stable structure despite its relative scale disadvantage. These findings suggest that tailored policies, institutional reforms, and innovative-driven development strategies should be designed to address the unique characteristics of each region (Dinçer & Tekin, 2019; Pike et al., 2017; Porter, 1998). Therefore, in formulating a comprehensive regional development strategy, it is essential to adopt a holistic perspective, taking into account both economies of scale and institutional and structural factors.

### **Declaration of Conflicting Interests**

The authors declare no potential conflicts of interest concerning this article's research, authorship, and/or publication.

### **Funding**

The authors received no financial support for this article's research, writing, and/or publication.

### **Statements of Publication Ethics**

We declare that the study has no unethical issues and that research and publication ethics have been observed.

### **Researchers' Contribution Rate**

The study was conducted and reported with equal collaboration among the researchers.

### **Ethics Committee Approval Information**

This study does not require approval from the ethics committee.

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## GENİŞLETİLMİŞ ÖZET

TR42 ve TR33 bölgelerinin ekonomik performanslarının karşılaştırılması, Türkiye'nin bölgesel kalkınma politikalarının geliştirilmesinde önemli bir adım olarak karşımıza çıkmaktadır. Bu çalışma, iki bölgenin 2010-2024 dönemi boyunca ihracat, ithalat ve Gayri Safi Yurtiçi Hasıla (GSYH) gibi temel ekonomik göstergeler üzerinden incelenmesini ve bu göstergelerin büyüme dinamiklerine olan etkilerini ortaya koymayı amaçlamaktadır. TR42'nin yüksek ekonomik kapasitesine rağmen dışsal şoklara karşı kırılğan bir yapıya sahip olması ve TR33'ün daha mütevazı bir ekonomik hacimle istikrarlı büyüme performansı sergilemesi, her iki bölgenin ekonomik dinamiklerini anlamak ve bu dinamiklere uygun politikalar geliştirmek açısından önemli bir fırsat sunmaktadır.

TR42, ihracat ve ithalat hacmi bakımından TR33'e göre oldukça büyük bir avantaja sahiptir. 2010 yılında TR42'nin ihracatı 226,6 milyon TL olarak gerçekleşmişken, TR33'ün aynı yılki ihracatı 97,4 milyon TL düzeyinde kalmıştır. Bu fark, TR42'nin bölgesel ekonomik büyüklüğünü ve kapasitesini açıkça göstermektedir. Ancak, TR42'nin ihracat büyüme oranlarındaki dalgalanmalar, bu bölgenin ekonomik yapısının dışsal şoklara karşı daha hassas olduğunu ortaya koymaktadır. Örneğin, TR42'nin ihracatı 2017 yılında %44,64 gibi yüksek bir artış gösterirken, 2024 yılında %13,71 oranında bir düşüş yaşamıştır. Bu dalgalanmalar, TR42'nin dış ticaret performansında istikrarın sağlanması gerektiğini göstermektedir. Buna karşın, TR33 bölgesi daha düşük ihracat hacmine sahip olmasına rağmen büyüme oranlarında daha dengeli bir yapı sergilemiş ve dışsal ekonomik dalgalanmalara karşı daha dirençli bir ekonomik yapıya sahip olduğunu kanıtlamıştır.

İthalat performansı açısından da TR42, TR33'e göre daha büyük bir ekonomik hacme sahiptir. 2017 yılında TR42'nin ithalatı %126,74 oranında artış göstererek 521 milyon TL'yi aşmıştır. Ancak bu hızlı büyüme, ekonomik istikrar açısından sorunlar yaratmış ve sonraki yıllarda ciddi düşüşlerle dengelenmiştir. TR33 bölgesi ise ithalat hacmi açısından daha küçük bir yapıya sahip olmasına rağmen büyüme oranlarında daha tutarlı ve dengeli bir performans göstermiştir. Bu durum, TR33'ün dış ticaret ve ithalat performansında istikrarı koruyabildiğini ve dışsal şoklara karşı daha dirençli olduğunu göstermektedir.

GSYH analizinde, TR42'nin daha büyük bir ekonomik yapıya sahip olduğu görülmektedir. TR42'nin 2010 yılı GSYH değeri yaklaşık 908 milyar TL iken, TR33'ün aynı yılki değeri 524 milyar TL düzeyindedir. Ancak TR42, GSYH büyüme oranlarında önemli dalgalanmalar sergilemiş, özellikle 2021 yılında %16,81 oranında bir daralma yaşamıştır. Bu, TR42'nin makroekonomik dalgalanmalara karşı daha kırılğan olduğunu göstermektedir. Buna karşılık, TR33 bölgesi aynı dönemde %0,44 oranında sınırlı ancak istikrarlı bir büyüme kaydetmiştir. TR33'ün bu istikrarlı yapısı, bölgenin daha küçük ekonomik ölçeğine rağmen sürdürülebilir bir kalkınma yapısına sahip olduğunu ortaya koymaktadır.

Çalışmada, iki bölgenin ekonomik göstergelerindeki farklılıkların istatistiksel olarak anlamlı olduğu tespit edilmiştir. TR42'nin ihracat, ithalat ve GSYH değerleri açısından TR33'e göre üstün olduğu görülmekle birlikte, büyüme oranları açısından iki bölge arasında istatistiksel olarak anlamlı bir fark bulunmamıştır. Bu durum, her iki bölgenin büyüme dinamiklerinin genel olarak benzer olduğunu, ancak ekonomik ölçek ve istikrar açısından farklılıkların belirginleştiğini göstermektedir. Ayrıca, TR42 ve TR33'ün işsizlik oranları, sanayi üretim kapasiteleri ve yatırım eğilimleri gibi diğer makroekonomik göstergeleri de incelenerek, bölgelerin ekonomik sürdürülebilirliği konusunda daha derinlemesine bir analiz yapılabilir.

TR42 ve TR33 bölgelerinin ekonomik yapılarındaki farklılıklar, bölgesel kalkınma politikalarının tasarımında önemli ipuçları sunmaktadır. TR42'nin yüksek kapasitesine rağmen ekonomik dalgalanmalara açık yapısı, üretimde katma değeri artıran, pazar çeşitliliğini teşvik eden ve yenilik odaklı stratejileri ön plana çıkaran politikalarla dengelenebilir. Ayrıca, TR42'nin dışsal şoklara karşı direncini artırmak için kurumsal yapıların güçlendirilmesi ve yenilikçi teknolojilere yatırım yapılması büyük önem taşımaktadır. TR33 için ise istikrarlı ekonomik performansın korunması ve üretim kapasitesinin çeşitlendirilmesi gereklidir. Yerel aktörler arasındaki iş birliği ve sektörel çeşitlilik teşvik edilerek, TR33'ün rekabet gücünün artırılması sağlanabilir. Ayrıca, TR33 bölgesinde özellikle tarım ve turizm sektörlerinin daha verimli bir şekilde geliştirilmesi, bölgesel ekonomik büyümeyi daha sürdürülebilir hale getirebilir.

Bu analiz, bölgesel ekonomik farklılıkların nedenlerini anlamak ve bu farklılıkları gidermeye yönelik politikalar geliştirmek açısından literatürdeki önemli bir boşluğu doldurmaktadır. Hem teorik hem de uygulamalı düzeyde katkılar sunan bu çalışma, TR42 ve TR33 bölgelerinin ekonomik performanslarının derinlemesine analiz



edilmesini sağlayarak, Türkiye'nin sürdürülebilir kalkınma hedeflerine ulaşmasına katkıda bulunmaktadır. Çalışmanın sonuçları, bölgesel kalkınma politikalarının yalnızca ekonomik ölçeklerin büyüklüğüne değil, aynı zamanda istikrar, sürdürülebilirlik ve direnç gibi faktörlere de odaklanması gerektiğini göstermektedir. Aynı zamanda, bölgesel yatırım teşvik politikalarının daha etkin bir şekilde uygulanması, özellikle TR33 gibi gelişmekte olan bölgelerde sanayi ve hizmet sektörlerinin büyümesini destekleyerek bölgesel dengesizlikleri azaltmada etkili olabilir.

Sonuç olarak, bu çalışma, TR42 ve TR33 bölgelerinin ekonomik performanslarındaki farklılıkları anlamak için kapsamlı bir çerçeve sunmaktadır. Türkiye'nin bölgesel kalkınma stratejilerinin daha etkin bir şekilde tasarlanmasına olanak sağlayan bu çalışma, sürdürülebilir kalkınma hedeflerine ulaşılmasına katkıda bulunacak somut öneriler sunmaktadır. Her iki bölgenin ekonomik yapıları, politika yapıcılar için hem teorik hem de pratik düzeyde değerli dersler içermektedir. TR42 ve TR33'ün karşılaştırılması, bölgesel eşitsizliklerin azaltılmasına yönelik somut adımlar atılmasına ışık tutan bir model olarak değerlendirilebilir. Ayrıca, bu bölgelerde sosyal ve ekonomik refahın artırılmasına yönelik kamu yatırımlarının dengeli dağıtılması, bölgesel gelişmişlik farklarının azaltılmasında kilit bir rol oynayacaktır. Bu bağlamda, altyapı projeleri, sanayi bölgelerinin desteklenmesi ve eğitim yatırımları ile bölgelerin rekabet gücünün artırılması sağlanabilir.