# External Debt and Economic Growth in Emerging Economies: Panel Causality Analysis

*Tuba GÜLCEMAL (https://orcid.org/0000-0003-4806-8568), Sivas Cumhuriyet University, Turkey; tgulcemal@cumhuriyet.edu.tr*

## Gelişmekte Olan Ülkelerde Dış Borç ve Ekonomik Büyüme: Panel Nedensellik İlişkisi

## Abstract

This paper is conducted to obtain information about the explanation power of GDP, consumer price index, and trade openness variables on total external debt and the relationship between these variables for six emerging countries: Argentina, Brazil, Russia, Turkey, Philippines, and South Africa. To control for cross-sectional dependency heterogeneity across cross-sectional units, using panel data on six emerging economies for the period 1990-2019, panel unit root tests, panel cointegration tests such as Gengenbach, Urbain and Westerlund, and Pedroni's PDOLS, DOLSMG, and Heterogenous Dumistrescu & Hurlin Causality Test and Heterogenous VAR Model applied. The empirical results by appropriate estimators show the different effects of GDP, inflation and trade openness on long-run total external debt in the sample countries for the analysis period. There is also a causality from the total external debt to the GDP variable for all panel data. When the VAR model results for the units are examined, the lagged total external debt variable is meaningful in explaining the GDP in Russia and South Africa. In addition, it has been concluded that causality from the total external debt to the inflation and the total external debt variable is meaningful in explaining the inflation in the Philippines, South Africa, and Turkey.

**Keywords**        :    External Debt, Economic Growth, Panel Co-integration Test, Panel Causality Test.

**JEL Classification Codes** :    O11, O57, C33.

## Öz

Bu makale GSYH, enflasyon ve ticari açıklık değişkenlerinin toplam dış borç üzerindeki açıklama gücünü ve bu değişkenler arasındaki ilişkinin yönü ve nedenselliği hakkında bilgi edinmek için yapılmıştır. Analize dahil olan gelişmekte olan ülkeler Arjantin, Brezilya, Rusya, Türkiye, Filipinler ve Güney Afrika'dır. Kesitsel birimler arası potansiyel heterojenlik, dinamikler, geri besleme etkileri ve yatay kesit bağımlılığı gibi panel veri modelleriyle ilgili zaman serisi analizlerinin eksikliklerini kontrol etmek için, 1990-2019 dönemi için altı gelişmekte olan ekonomiye ait panel veriyi kullanarak panel birim kök testlerine ek olarak, Gengenbach, Urbain ve Westerlund ve Pedroni'nin PDOLS, DOLSMG ve Heterojen Dumitrescu & Hurlin Nedensellik Testi ve Heterojen VAR Modeli gibi panel eşbütünleşme testleri uygulanmıştır. Seçilmiş tahmin ediciler tarafından elde edilen ampirik kanıtlar, çalışma dönemi için seçilen ülkelerdeki toplam dış borç üzerinde GSYH, enflasyon ve ticari açıklığın uzun dönemde farklı etkilerini göstermektedir. Ayrıca tüm panel veriler için toplam dış borç değişkeninden GSYİH değişkenine bir nedensellik vardır. Birimler için VAR modeli sonuçları incelendiğinde, gecikmeli toplam dış borç değişkeni Rusya ve Güney Afrika'da GSYİH'yi açıklamada anlamlıdır. Ayrıca Filipinler, Güney Afrika ve Türkiye'de toplam dış borçtan enflasyona bir nedensellik ilişkisi olduğu ve dış borç değişkeninin enflasyonu açıklamada anlamlı olduğu sonucuna varılmıştır.

## 1. Introduction

Ensuring the country's economic growth is one of the most important national priorities, a guarantee of the country's independence, a condition of the stability and effective life of society. In 2019, the increase in external debt of low and middle-income countries was based on a decline in the global economy in sync with the 2008 financial crisis, when global gross domestic product (GDP) growth fell to about 2.4%. Increasing trade barriers, ongoing trade disputes, and growing geopolitical tensions are the main factors affecting the global economy in 2019. External debt stocks exceeded $8 trillion by the end of 2019. The total accumulation rate (5.4%) was unchanged from 2018. Long-term external debt increased 7% to $6 trillion, equalling 73% of the entire external debt stock. Short-term foreign debt stocks increased to $2.2 trillion by the end of 2019 (1.5%) (<https://openknowledge.worldbank.org/>).

According to the International Debt Statistics (2021), 2019 year-end to the highest amount of external debt in the top 10 countries are Argentina, Brazil, China, India, Indonesia, Mexico, Russia, Thailand, Turkey, and South Africa. The problem with external debt is the amount of debt and the time to repay it. Borrowing is due to the need to finance rising current account deficits. So, the problem lies in the difficulty of repayment, as the indebted country will demand a positive current account surplus with creditor countries. Economic growth is the production and income increase that occurs in a given period in a country. Economic growth is reflected as more of a quantitative increase. The effect of debt on economic growth is possible by increasing time factor productivity, capital accumulation, and savings rates. However, external loans can be used not for investment projects but also for short-term goals such as closing the gaps in developing economies. Economic growth theories also have a different perspective on borrowing. Neoclassical growth models argue that external debt positively affects economic growth. It is claimed that borrowing is one of the sources that finance capital formation and stimulate economic growth. However, proponents of the counter-theory are aware that there is always a decrease in countries' economic growth due to the debt overhang.

Countries in Latin America recorded the smallest increase in external debt stocks in 2019, 2.3%, reflecting a general slowdown in economic activity across the Latin American region, with moderate debt accumulation by Brazil and Mexico (on average, 3%), but offset by a 1.5% contraction in Argentina's external debt stock. According to the International Debt Statistics 2021 of the World Bank, the percentage of low- and middle-income countries with a debt-to-GNI ratio below 30% fell 23% over the last ten years. 32% of low- and middle-income countries had external debt-to-GNI ratios above 60% at end-2019, compared with 23% in 2010. In 9% of countries, the percentage surpassed 100%, one-third more than the share of countries with a comparable ratio in 2010-Turkey's total external debt stocks by

2019, 440,783$ million. Turkey's use of IMF credit in 2019 is 1.481 $ million. The public sector external debt stock is understood by adding the debt stock of municipalities, state-owned enterprises, funds, and other public sector segments that can borrow on their own to the Treasury's debt stock, which carries out the government's borrowing. The private sector and the Central Bank's external debt stock give Turkey's total foreign debt stock.

The primary goal of this empirical investigation is to determine the impact of economic growth and other macroeconomic variables on external debt in emerging countries and the relationship between them. The macroeconomic variables and public revenues and expenditures of emerging markets are highly volatile and thus difficult to forecast. These countries included in this research come from various regions and differ in terms of their initial fiscal situation as well as their level of risk exposure. The analysis included emerging countries with data access. The theoretical and empirical literature is presented in Section 2 of the study. The methodology and data are presented in Section 3, the findings are presented in section 4, and the results are shown in the last section.

## 2. Literature

According to Chenery and Strout (1966), the primary reason developing and emerging countries accumulate external debt is a lack of savings and investment. Countries with insufficient savings will seek to borrow money from the local or international debt markets to smooth consumption and maintain economic growth. It has been demonstrated in the literature that the impact of external debt on economic growth can be both positive-negative and non-linear. Three groups of theoretical models describe this interaction. According to neoclassical and internal growth models, a reasonable external debt can stimulate economic growth by funding capital accumulation and increasing investments. However, high levels of external debt can hinder economic development by discouraging savings and investments, a phenomenon known as the 'debt overhang effect' (Krugman, 1998). A high level of external debt acts as a tax for future production, reduces the return on investments, deters high-risk, long-term productive private investments, and encourages low risk but short-term inefficient investments (Serven, 1997; Clements et al., 2003). External debt accumulation can also reduce incentives for a government to implement fiscal and structural reforms. Barro's (1989) Ricardian equivalence hypothesis examines the effect of taxes or government bonds on capital accumulation. Especially when the marginal net wealth impact of government borrowing is close to zero, there is no change in the public's debt stocks due to the lack of foreign currency stocks. As a result, changes in the amount of taxes or government bonds received do not affect total demand, interest rates, or capital accumulation as a source of financing for public expenditures. Cline (1985) argued that external debt promotes economic growth. Suppose the marginal yield of each current unit of external debt is equal to or greater than the principal and interest payment. In that case, the external debt will positively affect the borrowing country's economy.

According to Imbs and Ranciere (2005), debt overhang, on average, arises when the debt face value reaches 200% (and 140%) of exports or 60% (and 40%) of GDP in their

analysis of 87 emerging economies. They also argue that institutions, the rule of law, government effectiveness, and bureaucratic quality limit debt growth or stimulate economic growth. On the other hand, another study by Benli (2020) examined the effects of external debt growth and inflation on economic growth in the long run. They use panel data on 35 developing economies from 1987-2017 with panel data estimators (DFE, MG, and PMG) and employ static CCE and dynamic CCE (CS-ARDL and CS-DL) estimators to check whether the results are consistent. Panel data estimators reveal the negative effect of external debt on long-run economic growth in the countries included in the analysis. According to the econometric analysis results of the study, an inverse relationship between inflation and long-run economic growth is consistently observed with negative coefficients from panel data estimators. Another study by Calderón and Fuentes (2013) in Latin America revealed the negative impact of external debt on economic growth over the period 1970-2010.

Celasun et al. (2006) model debt pathways for emerging market countries, considering the exchange rate when calculating the debt ratio and how much of their public debt is denominated in foreign currency. Ehikioya et al. (2020) use the Johansen Cointegration test and the Generalised system Method of Moments to investigate the dynamic relationships between external debt and economic growth in 43 African countries from 2001 to 2018. The findings support a long-run equilibrium relationship between external debt and African economic growth. The result shows that, beyond a specific capacity, the short-run converges to long-run equilibrium, and external debt begins to have a negative impact on African economic growth. On the other hand, Brida, Gómez, and Seijas (2017) used three groups (clubs) of countries obtained for sixteen countries: highly indebted, moderately indebted, and lowly indebted. The employed debt-to-GDP threshold drives economic dynamics for the selected countries between 1977 and 2015. Their findings support the existence of a negative relationship between debt and growth. According to Reinhart and Rogoff (2010), countries with debt-to-GDP ratios greater than 90% limit their ability to grow their economy significantly. Fiscal expansionary policies, even if they are effective in the short term at fostering economic growth, because the corresponding increase in the level of debt may reduce growth in the long run. Eberhardt and Presbitero (2013) and Akram (2011) also found a negative non-linear correlation between debt and growth. Presbitero (2012) discovered that developed countries are better than developing countries at using debt productively. As a result, developed countries are better at managing the side effects of high debt, such as crowding-out effects, a disincentive environment for investment, market and policy volatility, and capital fleeing the country due to currency depreciation fears.

Furthermore, when we look at the studies that investigate the causality relationship between external debt and economic growth, Jilenga and colleagues (2016), Ogunmuyiwa (2011), and Panizza and Presbitero (2014) couldn't find any causality.

### 3. Data and Methodology

This study analyses the total external debt stock impact on economic growth from 1990 to 2019 for Turkey and the other five emerging countries. The variables used in the analysis are annual data on GDP, total external debt stock (% of GDP), trade openness (exports and imports as % of GDP), and consumer price index (2010=100). All variables used are annual and included in the analysis by taking their logarithmic forms, as seen in Table 1.

**Table: 1**
**Variables and Sources**

| Symbol | Definition Source | |
|---|---|---|
| GDP | Annual GDP (fixed with 2010$) | World Bank, National account data |
| EXT.DEBT (%GDP) | Total external debt (% GDP) | World Bank, International debt statistics |
| TRADE | Total export and import (% GDP) | World Bank, National Account Data |
| CPI | Consumer Price Index (2010=100) | IMF, International Financial Statistics |

To control for the shortcomings of time series analyses and problems related to the panel data models, such as potential heterogeneity across cross-sectional units, dynamics, feedback effects using panel data on six emerging economies for the period 1990-2019, in addition to traditional panel data estimators; second generation unit root tests, panel cointegration tests such as Gengenbach, Urbain and Westerlund and Pedroni's PDOLS, DOLSMG and Heterogenous Dumistrescu & Hurlin Causality Test and Heterogenous VAR Model applied by explaining the reasons.

### 4. Findings

If there is a correlation between units in the series (cross-section dependency), second-generation tests should be used because first-generation tests do not account for this correlation. For this reason, the correlation between units should be tested first in determining which type of tests will be preferred in unit root analysis. There are several tests suggested in the literature for testing the inter-unit correlation. Pesaran's (2004) CD test and Breusch Pagan LM tests are used in this work.

**Table: 2**
**Cross Section Independence Test Results**

| | Variables Series Tested | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | LnGDP | | LnExt.Debt | | LnCPI | | LnTrade | |
| | Statistics | *P-value* | Statistics | *P-value* | Statistics | *P-value* | Statistics | *P-value* |
| CD test | 19.20 | 0.000*** | 3.41 | 0.001*** | 11.54 | 0.000*** | 6.10 | 0.000*** |

*\* p-value <0.10, \*\* p-value <0.05, \*\*\* p-value <0.01.*

According to Pesaran (2004) CD test probability results, the null hypothesis, which is no cross-sectional dependency, is rejected. And also, in Breusch Pagan's (1980) LM test results, the null hypothesis is rejected, so it is concluded that there is a correlation between units.

**Table: 3**
**Bias-adjusted LM Test of Error Cross-section Independence and Swamy S Test**

| Test | Statistics | p-value |
|---|---|---|
| LM | 94.19 | 0.000*** |
| LM adj* | 39.46 | 0.000*** |
| LM CD* | 8.938 | 0.000*** |
| *two sided test, H0: Cov(uit,ujt) = 0 for all t and i!=j | | |
| Swamy S test of parameter constancy chi2(25) = 59.36 Prob > chi2 = 0.0001 | | |

*\* p-value <0.10, \*\* p-value <0.05, \*\*\* p-value <0.01.*

According to the Swamy S homogeneity test, the null hypothesis is rejected, and the heterogeneity of the parameters is accepted. The cointegration test will be decided according to whether the constant and slope parameters are homogeneous or heterogeneous according to units. Therefore, estimators that do not consider the correlation between units will give biased results, so their use will not be appropriate. It is reasonable to use methods that assume the heterogeneity of parameters and the correlation between units.

Following the literature, the second-generation panel unit-root tests (Moon & Perron, 2004; Pesaran, 2007), which can be used under the presence of correlation between units, should be used. The multivariate Augmented Dickey-Fuller Panel unit root test (MADF), one of the panel unit root tests that consider the correlation between units based on SUR, is used in this section. It differs from homogeneous tests in that it allows for different degrees of integration rather than requiring that all units be integrated in the same order. For this reason, the MADF unit root test is applied to test the stationary of the series.

**Table: 4**
**Multivariate Augmented Dickey-Fuller Test (Madfuller)**

| Variables | MADF | Approx 5% CV |
|---|---|---|
| LnExt.Debt | 52.592 | 27.491 |
| LnGDP | 71.829 | 27.491 |
| LnCPI | 357.509 | 27.491 |
| LnTrade | 43.601 | 27.491 |
| *lags(1)* | | |

*H0: all six-time series in the panel are I(1) processes.*

According to the results, the null hypothesis could not be rejected because the test statistics remained above the critical value, and it is concluded that the series is stationary. Gengenbach, Urbain, and Westerlund's (2015) panel cointegration test based on the error correction model based on cross-section dependency and heterogeneity estimation according to probability values is used.

**Table: 5**
**Gengenbach, Urbain and Westerlund Panel Cointegration Test Results**

| Panel EC-Test: | | | |
|---|---|---|---|
| d.y | Coef. | T bar | P-val |
| Y(t-1) | -0.723 | -3.198 | > 0.1 |
| Long-run average coefficients: | | | |
| LnExt.Debt | Coef. | p>|z| | [95% Conf. Interval] |
| lngdp | -0.0106581 | 0.991 | -1.967317 1.946001 |
| lncpi | 0.3721476 | 0.121 | -.0978945 .8421897 |
| lntrade | 0.1914714 | 0.633 | -.5932902 .976233 |

When the significance of $Y_{t-1}$ is examined for the panel cointegration test, the null hypothesis is rejected. It indicates a long-term relationship between the variables, that is, cointegrated. In estimating the long-term relationship, the heterogeneous panel of the second-generation estimators, the DOLSMG Group-Mean Dynamic Least Squares Estimator, and the DOLS heterogeneous estimators are used. Kao and Chiang (2000) and Pedroni (2001) propose extensions of the Stock and Watson (1993) DOLS estimator to panel data settings. DOLS estimator may be more promising than OLS or fully modified (FM) estimators in estimating the cointegrated panel regressions like our panel (Baltagi, 253). Panel DOLS involves augmenting the panel cointegrating regression equation with cross-section specific lags *and leads* of $\Delta X_{it}$ to eliminate the asymptotic endogeneity and serial correlation. Pedroni (2001) extends the grouped estimator concept to DOLS estimation by averaging over the individual cross-section DOLS estimator.

The cointegration parameters are estimated by Pedroni's (2000 and 2001) DOLSMG estimator for the whole panel after transforming by taking the difference from the cross-section averages. The panel DOLS estimator requires estimating the following model by the group mean average OLS (DOLSMG) and (DOLS) for each country. The results are presented in Table 6 for the model where the dependent variable is LnExt.Debt. The long-term relationship between variables is estimated with DOLSMG, and the long-term parameters are statistically significant.

GDP, CPI, and trade openness variables affect total external debt in the long run. The panel DOLSMG estimator shows that a 1% increase in the LnGDP decreases LnExt.Debt -0.86% and 1% increase in LnCPI and LnTrade respectively stimulate LnExt.Debt by 0.10 and 1.06%.

**Table: 6**
**Pedroni's PDOLS - Group Mean Dynamic Least Squares (DOLSMG) Estimator**

| Variables | Beta | t-stat |
|---|---|---|
| No. of Panel units: 6 | | |
| Variables | Beta | t-stat |
| LnGDP_td | -0.8655 | -3.616 |
| LnCPI_td | 0.1029 | 2.478 |
| LnTrade_td | 1.067 | 9.907 |

*\* Data has been time demeaned.*

According to DOLS results for all units (countries), there is a long-term relationship between external debt, GDP and trade openness in the Philippines and South Africa. While GDP affects total external debt negatively in both countries, trade openness affects external debt positively. In Russia, GDP, CPI, and trade openness positively affect external debt. In Turkey, trade openness affects external debt positively, while inflation (CPI) affects total external debt negatively.

The new panel non-causality tests should be developed to explicitly take into account general forms of dependencies among the individuals of the panel (Dumitrescu & Hurlin, 2012: 9). As in panel unit root test literature, this test statistic is defined as the cross-section average of individual Wald statistics associated with the standard Granger causality tests

based on single time series. This study examines the causality by Heterogenous Dumistrescu & Hurlin Causality Test. The results are presented in Table 6 for all the models where the dependent variable (*y*) is lnExtdebt. Under the Heterogeneous Causality hypothesis, we assume that N causality relationships exist, as in the HC case, but the dynamics of y are heterogeneous. However, the heterogeneity does not affect the causality result. Considering the Heterogeneous Non-Causality hypothesis, it is assumed that there is a causal relationship running from x to y for a subgroup of individuals. Symmetrically, there is at least one N-1 noncausal relationship in the model. In this case, the heterogeneity deals with causality from x to y (Dumitrescu & Hurlin, 2012: 2).

Let us denote by x and y, two stationary variables observed for N individuals on T periods. For each individual i=1,...,N, at time t=1,..,T, we consider the following linear model:

$$Y_{i,t} = \alpha_i + \sum_{k=1}^{K} \Upsilon_i^{(k)} Y_{i,t-k} + \sum_{k=1}^{K} \beta_i^{(k)} X_{i,t-k} + \varepsilon_{i,t}$$

with $K \in N$ and $\beta i=(\beta i^{(1)},...,\beta i^{(K)})'$. For simplicity, the individual effects $\alpha_i$ are supposed to be fixed in the time dimension. Initial conditions $(y_{i,-K},...,y_{i,0})$ and $(x_{i,-K},...,x_{i,0})$ of both individual processes $y_{i,t}$ and $x_{i,t}$ are given and observable. It is assumed that lag orders K are identical for all cross-section units of the panel, and the panel is balanced.

**Table: 7**
**Heterogenous Dumistrescu & Hurlin Causality Test and Heterogenous VAR Model**

| Countries | Model 1 LnGDP≠>LnExt.Debt | Model2 LnExt.Debt≠>LnGDP | Model3 LnCPI≠>LnExt.Debt | Model 4 LnExt.Debt≠>LnCPI |
|---|---|---|---|---|
| | Prob. | Prob. | Prob. | Prob. |
| Argentina | 0.803 | 0.407 | 0.057 | 0.949 |
| Brazil | 0.995 | 0.527 | 0.781 | 0.469 |
| Russia | 0.053 | 0.000*** | 0.315 | 0.156 |
| Philippines | 0.218 | 0.914 | 0.192 | 0.049** |
| South Africa | 0.013** | 0.001*** | 0.044 | 0.002*** |
| Turkey | 0.249 | 0.465 | 0.802 | 0.006*** |
| | Z-bar = 2.4019 (p-value = 0.0163) Z-bar tilde = 1.9549 (p-value = 0.0506) | Z-bar = 13.8265 (p-value =0.0000) Z-bar tilde = 11.8477 (p value = 0.0000) | Z-bar = 1.5647 (p-value =0.1177) Z-bar tilde =1.2299 (p-value = 0.2187) | Z-bar = 6.2830 (p-value = 0.0000) Z-bar tilde = 5.3156 (p-value = 0.0000) |
| | Model 5 LnTrade≠>LnExt.Debt | Model 6 LnExt.Debt≠>LnTrade | | |
| | Prob. | Prob. | | |
| Argentina | 0.254 | 0.209 | | |
| Brazil | 0.181 | 0.299 | | |
| Russia | 0.364 | 0.349 | | |
| Philippines | 0.494 | 0.189 | | |
| South Africa | 0.100 | 0.538 | | |
| Turkey | 0.541 | 0.290 | | |
| | Z-bar = 0.5408 (p-value = 0.5886) Z-bar tilde = 0.3433 (p-value = 0.7314) | Z-bar = 0.3075 (p-value = 0.7585) Z-bar tilde = 0.1413 (p-value = 0.8876) | | |

*\* p-value <0.10, \*\* p-value <0.05, \*\*\* p-value <0.01. (H0: Variable1 does not Granger-cause variable2, H1: Variable1 does Granger-cause variable2 for at least one panelvar (id)).*

The table above shows the estimation of the heterogeneous panel var model used in the Dumitrescu and Hurlin causality analysis and the causality test results below. According

to the causality test results, the null hypothesis is rejected in Models 2 and 4. There is causality from the total external debt to the GDP variable. When the VAR model results for the units are examined, the lagged external debt variable is meaningful in explaining the GDP in Russia and South Africa. In addition, it has been concluded that there is causality from the external debt to the CPI variable. According to the VAR model results for the units, the lagged external debt variable is meaningful in explaining the CPI variable in the Philippines, South Africa, and Turkey.

## 5. Conclusion

While many studies examine the impact of external debt on economic growth, this study attempted to determine which factors influence external debt and how in some emerging market countries. The variables used in the analysis have a long-term relationship, known as cointegration. In estimating the long-term relationship, the heterogeneous panel of the second-generation estimators, the DOLSMG Group-Mean Dynamic Least Squares Estimator, and the DOLS heterogeneous estimators are used. The model results show that GDP, CPI, and trade openness variables affect external debt in the long run. The panel DOLSMG estimator shows that a 1% increase in the LnGDP decreases LnExt.Debt -0.86% and 1% increase in LnCPI and LnTrade respectively stimulate LnExt.Debt by 0.10 and 1.06%.

According to DOLS results for all units (countries), there is a long-term relationship between total external debt, GDP and trade openness in the Philippines and South Africa. While GDP affects total external debt negatively in both countries, trade openness affects external debt positively. In Russia, GDP, CPI, and trade openness positively affect external debt. In Turkey, trade openness affects external debt positively, while inflation (CPI) affects external debt negatively. There is causality from the external debt to the GDP variable. When the VAR model results for the units are examined, the lagged external debt explains the GDP in Russia and South Africa. Furthermore, it has been determined that there is a causal relationship between total external debt and inflation. According to the VAR model results for the units, the lagged external debt variable is significant in explaining inflation in the Philippines, South Africa, and Turkey.

Monetary policies will determine whether or not the debt ratio approaches an exploding point. Monetary policies have an impact on the cost of debt service. If they are too stringent, they may jeopardise fiscal policy's viability. Fiscal policies must be implemented to prevent the debt ratio from rising. It is critical to maintain a healthy level of external debt while also using savings, investments, and reserves.

### References

Akram, N. (2011), "Impact of public debt on the economic growth of Pakistan", *The Pakistan Development Review*, 599-615.

Baltagi, B.H. (2001), *Econometric Analysis of Panel Data* (2nd ed.), England: John Willey and Sons Ltd.

Benli, M. (2020), "The effect of external debt on long-run economic growth in developing economies: Evidence from heterogeneous panel data models with cross sectional dependency", *Theoretical and Applied Economics*, Vol. XXVII, 3(624), pp. 127-138.

Brida, J.G. et al. (2017), "Debt and growth: A non-parametric approach", *Physica A*, 486, 883-894.

Calderón, C. & J.R. Fuentes (2013), *Government debt and economic growth*, Inter-American Development Bank.

Celasun, O. et al. (2006), "Primary Surplus Behavior and Risks to Fiscal Sustainability in Emerging Market Countries: A "Fan-Chart" Approach", *IMF Staff Papers*, 53(3), 401-425.

Chenery, H.B. & A.M. Strout (1966), "Foreign assistance and economic development", *The American Economic Review*, 679-733.

Dumitrescu, E.-I. & C. Hurlin (2012), "Testing for Granger non-causality in heterogeneous panels", *Economic Modelling*, 29(4), 1450-1460.

Eberhardt, M. & A. Presbitero (2013), "This time they are different: heterogeneity and nonlinearity in the relationship debt and growth", *IMF Working Paper*, WP/13/248.

Eğilmez, M. (2020), *Makro Ekonomi* (14. Basım), İstanbul: Remzi Kitabevi.

Eğilmez, M. (2020), *Türkiye Ekonomisi*, İstanbul: Remzi Kitabevi.

Ehikioya, B.I. et al. (2020), "Dynamic relations between public external debt and economic growth in African countries: a curse or blessing?", *Journal of Open Innovation: Technology, Market and Complexity*, 6(88), 1-16.

Imbs, J. & R. Ranciere (2005), *The overhang hangover*, The World Bank.

Jilenga, M.T. et al. (2016), "The impact of external debt and foreign direct investment on economic growth: Empirical evidence from Tanzania", *International Journal of Financial Research*, 7(2), 154-162.

Krugman, P. (1988), "Financing vs. forgiving a debt overhang", *Journal of Development Economics*, 29(3), 253-268.

Nazir M.R. et al. (2020), "Financial innovation and economic growth: Empirical evidence from China, India and Pakistan", *Int J Fin Econ*, 1-24, https://doi.org/10.1002/ijfe.2107

Ogunmuyiwa, M.S. (2011), "Does external debt promote economic growth in Nigeria?", *Current Research Journal of Economic Theory*, 3(1), 29-35.

Presbitero, A.F. (2012), "Total public debt and growth in developing countries", *The European Journal of Development Research*, 24(4), 606-626.

Reinhart, C.M. & K.S. Rogoff (2010), "Growth in a time of debt", *American Economic Review*, 100(2), 573-578.

T.C. Hazine ve Maliye Bakanlığı (2021), *Kamu Finansmanı İstatistikleri*, <https://www.hmb.gov.tr/kamu-finansmani-istatistikleri>, 05.03.2021.

TÜİK (2021), *Dış Ticaret İstatistikleri*, <https://data.tuik.gov.tr/Bulten/Index?p=Dis-Ticaret-Istatistikleri-Aralik-2020-37412&dil=1>, 02.02.2021.

World Bank (2021), *International Debt Statistics 2021*, World Bank Group, <https://openknowledge.worldbank.org/bitstream/handle/10986/34588/9781464816109.pdf>, 02.01.2021.