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TÜRKİYE'DE DIŞ BORÇLANMANIN EKONOMİK BÜYÜMEYE ETKİSİ: ARDL SINIR TESTİ YAKLAŞIMI

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Abstract:

Developing countries can choose the way of having external debt to positively affect their economic development and growth. However, not using the external debt effectively and choosing the way of having external debt during its repayment might affect the economic growth negatively. This paper attempts to analyze the effect of external debt on economic growth in Turkey, utilizing annual data for the period 1971–2011. In the paper, the existence of the long run equilibrium relationship between economic growth and external debt is investigated by applying the bounds test approach to cointegration developed by Pesaran et al. (2001). The findings obtained from long-run analysis reveal that the external debt has a negative and statistically insignificant effect on economic growth. On the other hand, the results of error correction model show that the external debt, in the short run, has a negative and statistically significant effect on economic growth. The significance of these empirical results is that the external debt did not affect the economic growth in the long run while the external debt which was not used in effective areas affected the economic growth negatively in the short run.

Key Words: *External Debt, Economic Growth, ARDL Approach*

Özet:

Gelişmekte olan ülkeler ekonomik kalkınma ve büyümelerine olumlu etkide bulunmak için dış borçlanma yoluna gidebilmektedirler. Ancak alınan dış borçlar etkili kullanılamayıp ve geri ödeme sürecinde tekrar borçlanma yoluna gidilmesi ekonomik büyümeyi olumsuz yönde etkileyebilmektedir. Çalışmada Türkiye için dış borcun ekonomik büyüme üzerindeki etkisi 1971-2011 dönemi için analiz edilmiştir. Pesaran vd. (2001) tarafından geliştirilen sınır testi yaklaşımı ile dış borcun ekonomik büyüme üzerindeki kısa ve uzun dönemli ilişkileri belirlenmiştir. Uzun dönemli analizden elde edilen bulgular, dış borcun ekonomik büyüme üzerinde negatif ve istatistiksel olarak anlamsız bir etki yarattığını ortaya koymuştur. Diğer taraftan hata düzeltme modeli sonuçları dış borcun büyümeyi negatif ve istatistiksel olarak anlamlı etkilediğini göstermiştir. Bu ampirik sonucun önemi; alınan dış borçların uzun dönemde büyümeye etki edemediğini ancak kısa dönemde ise dış borçların etkin alanlarda değerlendirilemeyip büyümeyi olumsuz yönde etkilediğini ortaya koymuş olmasıdır.

Anahtar Kelimeler: *Dış Borç, Ekonomik Büyüme, ARDL Yaklaşımı*

1. INTRODUCTION

Domestic savings are the most important local source required for financing of economic growth. External sources become necessary when domestic savings are not adequate for financing investments. In this regard, external debt is one of the most important methods in decreasing savings deficit. It is targeted that handling the problem of inadequate financing with external debt is supposed to have a positive impact on economic development and growth. The sustainability of external debt is negatively affected unless external debt obtained for financing investments can be effectively directed to investments. In other words, having external debt during its repayment may deteriorate economic growth by increasing savings deficit. Moreover, money sources transferred to the national economy via external debt can cause monetary expansion which may also lead to increase inflation. Uncertainty about future monetary situation in an inflationary environment has a negative impact on economic growth due to its detrimental effects on investments. Consequently, this may negatively affect economic growth.

Debt overhang hypothesis is among the approaches[1] that theoretically analyze the relationship between economic growth and external debt. Brown and Lane (2011) stated that the literature related to debt overhang problem is divided into two as microeconomic[2] and macroeconomic. It is a common belief that macroeconomic studies in literature have started with Krugman (1988) and Sachs (1989). Krugman (1988:225) defined debt overhang problem as a situation where "the expected present value of future country transfers is less than the current face value of its debt". The more external debt occurs, the less advancers expect a repayment. Ultimately, a reduction in access to credits decreases the ability of capital accumulation in a country; and concerning this fact, its economic growth may slow down (Clements,

[1] This relation between external debt and economic growth is also explained by approaches which are Debt Sustainability, Intertemporal Borrowing Model, and Growth-Cum-Debt Model in literature. See, for example, Çöğürcü and Çoban (2011) and Bilginoğlu and Aysu (2008).
[2] See Myers (1977), Olney (1999), Mulligan (2008), Melzer (2010), and Philippon and Schnabl (2009).

Bhattacharya & Nguyen, 2005). In literature, this relationship is also represented[3] by 'The Debt-Laffer Curve'.

Economic growth might be negatively affected through the channel of interest and tax. That is to say, countries can raise tax rates in order to pay external debts back. Such a tax rise can be resulted in a decrease of investment demands of investors. Simultaneously, internal debt can be used as a solution for meeting external debt payments. In capital market, government demand for capital bids up the interest rates, and high interest rates decrease the demand for investment of private investors. Both the rises of tax and interest rates cause the decreases in investment and economic growth is affected negatively by the decreases. Consequently, exceeding the threshold level of external debt leads to escalation of debt and creating a snowball effect. Depending on this issue, high external debt both decreases capability of capital accumulation and affects economic growth in a negative way due to crowding out effect.

The aim of this study is to analyze the effect of external debt on economic growth in Turkey between the years of 1971–2011. The empirical literature between external debt and economic growth is reviewed in section 2. Section 3 presents data set. Econometric method and findings are introduced in section 4. The last section evaluates the results of the study.

2. SUMMARY OF LITERATURE REVIEW

The impact of external debt on economic growth as well as its economic effects is an important issue which has been investigated by many researchers so far. Most of their studies have claimed the negative impact of external debt while few have supported the contrary view. In addition, very few studies in the literature have found out that there is no relationship between external debt and economic growth. For instance, Sichula (2012) aimed at explaining the paradox of external debt overhang for South African Development Community and heavily indebted poor

[3] See Bachvarova (2008), Pattilo (2002), and Bilginoğlu and Aysu (2008).

Ocak/January 2015, Cilt/Vol: 11, Sayı/Num: 1
ISSN: 1305-7979

countries by using Granger Causality test with panel data analyses. The analyses conducted for the time period from 1970 to 2011 maintain that there was a negative correlation between external debt service and economic growth of these countries. According to this, an increase in economic growth was found when the external debt service payment decreased. Moreover, the results of Granger Causality test showed that there was uni-directional causality running from economic growth to the external debt service. By using panel data analysis, Pattillo, Poirson and Ricci (2002) conducted a research on 93 developing countries in terms of a relationship between their economic growth and external debts. According to panel data analysis for the period 1969-1998, external debt affected economic growth in those 93 countries in a positive way up to a level; however, its effect turned out to be negative when the debt went beyond this level. In this context, when the external debt exceeded 160% and 170% of import as well as 35% and 40% of gross national product, economic growth was affected negatively. The level under these rates, this effect was founded out as positive. Similarly, Karagöl (2006) had a research on a relationship between external debt and economic growth in Turkey by using methods of co-integration, cause and effect, and value at risk (VAR). The results of the analyses for the years of 1960-2002 indicated a positive relationship between economic growth and external debt. Çöğürcü and Çoban (2011) conducted the same research in Turkey for 1980 and 2009 by using of cointegration test. They found that external debt had a negative effect on economic growth.

There is a wide literature on the relationship between external debt and economic growth. The studies in such literature are classified according to their methods, fields, and results in appendix 1. The studies in literature generally put that the time series analyses use cointegration and causality tests. In this regard, it is found out that the applied studies on Turkish case have conducted cointegration and causality tests and reached at the results that external debt had negative effect on economic growth mostly. However, it was not witnessed that the cointegration test

developed by Pesaran et al. (2001) was used before for Turkey in literature. So, the study aims at filling the gap in the literature.

3. DATA SET

In this study, the impact of external debt on economic growth for the period 1971-2011 was investigated through three variables such as economic growth (EG), external debt (ED), and Inflation (INF). INF was used as a control variable in estimations. The detailed description of the variables is illustrated in Table 1.

Table 1: Sources and Definitions of the Data

Variables	Description of data	Sources
EG	EG was calculated with this equation: [BO=(lnRGDP$_t$-lnRGDP$_{t-1}$)*100]. RGDP is based on the year of 2005 .	WDI
ED	ED was calculated with this equation [(ED=External Debt Service/GDP)*100].	WDI
INF	INF was the annual percentage change based on Consumer Price Index (CPI)	WDI

4. THE ECONOMETRIC METHODS AND FINDINGS

In the analyses of time series, whether the series have a unit root or not is tested. In this regard, Augmented Dickey–Fuller (ADF) unit root test is used to determine the order of integration of EG, ED and INF series. Results of this unit root test are presented in Table 2.

Table 2: ADF Unit Root Test

Variables	At Level		At 1 st Difference	
	Constant	Constant-Trend	Constant	Constant-Trend
EG	-6.211865[a] (0)	-6.123547[a] (0)	------	------
ED	-1.759406 (0)	-2.533620 (0)	-6.604282[a] (0)	-6.576666[a] (0)
INF	-1.994177 (0)	-2.004129 (0)	-7.394626[a] (0)	-7.552836[a] (0)

Note: a denotes rejection of the null hypothesis at the 1 percent level of significance. The values in the parantehesis indicate optimal lag length.

Ocak/January 2015, Cilt/Vol: 11, Sayı/Num: 1
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The null hypothesis of non-stationary was rejected in level only for the EG series. ED and INF series are stationary after first difference. The autoregressive distributed lag (ARDL) bounds test approach developed by Pesaran et al. (2001) was employed because these series were not integrated of the same order. The ARDL approach can be employed to the series which are I(0) and I(1). Determining cointegration in the ARDL approach requires estimating the unconditional error correction (UECM) model which is described as follows:

$$\Delta EG_t = \alpha_0 + \sum_{i=1}^{m} \alpha_1 \Delta EG_{t-i} + \sum_{i=0}^{m} \alpha_2 \Delta ED_{t-i} + \sum_{i=0}^{m} \alpha_3 \Delta INF_{t-i} + \alpha_4 EG_{t-1} + \alpha_5 ED_{t-1} + \alpha_6 INF_{t-1} + u_t \qquad (1)$$

where α_0 is drift component, Δ is the difference operator, m is the optimal lag, and u_t is the white noise residuals. In order to determine optimal lag length for equation (1) maximum lag length is chosen as five. The optimal lag length was selected on the basis of Akaike's Information Criteria (AIC). Equation (1) was estimated from first lag length to fifth lag length and the results are presented in Table 3. According to Lagrange multiplier (LM) statistics for testing serial correlation null hypothesis of no residual serial correlation was not rejected for all lag length. It was determined that optimal lag is 2 because the smallest AIC value is determined for the lag length is five.

Table:3 Statistics for Selection The Lag Length

m	AIC	χ^2 Serial	Prob.value of χ^2 Serial
1	5.493928	0.114725	0.7348
2	**5.492354**	**0.171944**	**0.6784**
3	6.157735	0.403806	0.5251
4	5.780428	1.642147	0.2000
5	5.616237	1.848027	0.1740

Note: m and χ^2 Serial denote lag length and Breusch-Godfrey serial correlation tests statistic, respectively.

ARDL bounds testing approach has three stages. The first stage is that lung-run relationship among the series is determined by using F-tests. The null hypothesis of no cointegration in Equation (1) is H_0: $\alpha_4=\alpha_5=\alpha_6=0$. If the calculated F-statistic exceeds upper critical value, the null hypothesis is rejected and it is concluded that

there is a long run relationship among variables. If the calculated F-statistic below lower critical value then the null hypothesis cannot be rejected. On the other hand, if the calculated F statistic falls inside between critical values, it cannot be decided on the test of cointegration. Lower and upper critical values are generated by Pesaran et. al (2001). Equation (1) was estimated for two lags. The calculated F statistic was obtained from this estimation equation and the critical values in Pesaran et. al (2001) was presented in Table 4.

Table 4: Results of ARDL cointegration test.

k	The calculated F statistic	lower critical value	upper critical value
2	6.115260	3.79	4.85

Note: k denotes number of independent variables in Equation (1). The critical values at the 5 percent level of significance in Pesaran et. al (2001:300) obtained from Table CI(iii).

As shown in Table 4, because the calculated F statistic is bigger than upper critical value, the null hypothesis of no cointegration was rejected. In other words, it is determined that there is a long run relationship among the variables of EG, ED, and INF. After determination of co-integration, the second stage comes trough. The second stage is the estimating of the long run coefficients in the ARDL model which is described as follows:

$$EG_t = \delta_0 + \sum_{i=1}^{n} \delta_1 EG_{t-i} + \sum_{i=0}^{q} \delta_2 ED_{t-i} + \sum_{i=0}^{z} \delta_3 INF_{t-i} + \varepsilon_t \qquad (2)$$

where n, q, and z are optimal lag length for related variables. It was determined that maximum lag length is five for identifying of optimal lags in Equation (2). The selection of the optimal lag lengths is specified by using AIC. The optimal lag length of EG, ED, and INF was 1, 1, and 0, respectively. Hence, model of ARDL (1, 1, 0) was estimated by OLS. The results of the estimation and long run coefficients were presented in Table 5.

Table 5: Results of ARDL (1, 1, 0) and Long Run Coefficients

Variables	Coefficient	t statistic
Constant	6.227129	3.777139[a]
EG_{t-1}	0.019512	0.146749
ED_t	-1.89939	-4.35118[a]
ED_{t-1}	1.827868	4.24912[a]
INF_t	-0.03267	-1.74565[c]
R^2: 0.44 Adj. R^2: 0.37 F Statistic.: 6.748 (0.00) DW: 1.911 χ^2White: 10.058 (0.757) χ^2 Serial: 0.148 (0.700)		
Long Run Coefficients		
Constant	6.3511	4.3693[a]
ED	-0.072942	-0.38791
INF	-0.033317	-1.7665[c]

Note: a and c denote statistically significant at the 1, and 10 percent levels of significance, respectively. Values in parenthesis state the levels of significance of related statistics. χ^2White and χ^2Serial show white heteroskedasticity test statistic and Breusch-Godfrey serial correlation tests statistic, respectively.

As shown in Table 5, the long run coefficients of ED and INF were, respectively, -0,073 and -0,033 and statistically significant at 10% level of significance only for INF. The long run coefficient of ED was statistically insignificant. After determination of lung run analyses, the third stage comes trough. The third stage is the estimating of the short run dynamics in the ARDL error correction model which is described as follows:

$$\Delta EG_t = \theta_0 + \theta_1 ECM_{t-1} + \sum_{i=1}^{n} \theta_2 \Delta EG_{t-i} + \sum_{i=0}^{q} \theta_3 \Delta ED_{t-i} + \sum_{i=0}^{z} \theta_4 \Delta INF_{t-i} + v_t \quad (3)$$

Where, ECM denotes series of error terms obtained from long run relationship as shown in Table 5, ECM_{t-1} named error correction parameter is one lag of error terms. The sign of the coefficient of error correction parameter must be negative and statically significant. Hence, the ARDL (1 1 0) error correction model was estimated by OLS. The results of the estimation are presented in Table 6.

Table 6: Results of Error Correction Model

Variables	Coefficient	t statistic
Constant	-0.04291	-0.07727
ECM_{t-1}	-0.90070	-4.04954[a]
ΔEG_{t-1}	-0.02152	-0.15719
ΔED	-1.84226	-4.31545[a]
ΔED_{t-1}	0.056501	0.106994
ΔINF	-0.05982	-1.97302[c]
R^2: 0.73 Adj. R^2: 0.70 F Statistic: 17.775 (0.00) DW: 1.965 χ^2White: 12.918 (0.881) χ^2 Serial: 0.019 (0.891)		

Note: a and c denote statistically significant at the 1, and 10 percent levels of significance, respectively. Values in parenthesis state level of significance related statistics. χ^2White and χ^2Serial show white heteroskedasticity test statistic and Breusch-Godfrey serial correlation tests statistic, respectively.

As shown in Table 6, the sign of short run coefficients of ED and INF were negative and statistically significant at 1% and 10% levels of significance, respectively. The coefficient of error correction term was identified to be statically significant at 1% level of significance. At the same time the sign of the coefficient of error correction parameter was negative and fallen inside between 0 and 1 in line with expectations. It was found that the previous year's shock was corrected by 91% in current year. It means that there is an adjustment mechanism from short run to long-run. In order to control stability of the ARDL error correction model cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests developed by Brown et al. (1975) were used. As shown in Appendix (2), that the calculated CUSUM and CUSUMS of squares statistics stay within the critical values demonstrated the stability of the model.

5. CONCLUSION

Developing countries which are in pursuit of increasing production resources might choose the way of having external debt in case of inadequate savings. The ultimate purpose is the efficient use of external debt by creating positive effects on the process of economic development and growth. Countries may encounter a heavy debt burden when the cost of external debt repayment exceeds the return of external

debt. This situation is resulted with going into more foreign debt. On such cases, increase of external debt is inevitable by creating a snowball effect. Therefore, excessive foreign indebtment might have a negative impact on economic development and growth. In literature, this relationship is defined and analyzed as "Debt Overhang Hypothesis".

In this study, the impact of external debt on economic growth in Turkey for the period 1971–2011 was analyzed. The series of economic growth used in the analysis was identified as level stationary while inflation and external debt series were found as difference stationary. Therefore, the analysis was carried out by applying bounds test approach developed by Pesaran et al. (2001), which can also help analyzing the cointegration relationship of level and difference stationary series. The long run analysis obtained from ARDL model established for determining long run relationship revealed that the external debt has a negative and statistically insignificant effect on economic growth. On the other hand, the results of error correction method based on ARDL model established for determining short run relationship indicated that the external debt, in the short run, has a negative and statistically significant effect on economic growth. The findings obtained for this period showed that Turkey faced the burden of heavy debt in the short time. This result draws the attention to the facts that external debt was not able to be used in efficient areas and it had a negative impact on economic growth. Returning of external debt is less than its cost decreases repayment ability of external debt and lead to a new foreign indebtment for financing of present debt. Depending on this, having external debt for the sustainability of existing debts caused negative effects on economic growth.

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Appendix 1: The summary of literature review on the relationship between External debt and Economic Growth

Studies	Study Field and Period	Research Method	Findings
Ulusoy and Küçükkale (1996)	Turkey (1950-1992)	Granger Causality Test and Regression Analysis	There was one-way causality from external debt to economic growth. Regression estimation also shows that external debt had a negative impact on economic growth.
Chowdhury (2001)	60 Developing Countries Two Sub-Group of Countries: 35 Heavily-Indebted Poor Countries and 25 Poor Countries which are not heavily indebted (1982-1999)	Panel Data	According to findings obtained, for both sub-group of countries, there was a negative causal relationship from external debt to economic growth.
Were (2001)	Kenya (1970-1995)	Engle-Granger Cointegration Test and Error Correction Model	In Kenya, external debt was found to have a negative effect on economic growth.
Söyler (2001)	Turkey (1996-2000)	Theoretical	The focus was on the requirement of efficient use of external debts in Turkey, its being in the list of heavily-indebted countries due to existing foreign debt amount, and the necessity of privatization.
Kara (2001)	Turkey	Theoretical	It is a known fact that using the method of government debt to finance foreign debt payment negatively affects private investments by increasing credit costs. In Turkey, external debts are used in inefficient areas, and increasing the efficiency of such expenditures is of high importance in terms of economic growth.
Hansen (2002)	50 Developing Countries (1974-1993)	Panel Data	A negative relationship was found out between external debt and economic growth.
Clements et al. (2003)	55 Lower-Income Countries (1970-1999)	Panel Data	The external debt was found to have a negative effect on economic growth when the share of it in low-income countries exceeds 50 percent of GDP.
Karagöl	Turkey	Johansen Cointegration and	In Turkey, one-way causal relationship from economic growth to external debt was

(2004)	(1965-2001)	Granger Causality Test	found out in the short run.
Schclarek (2004)	59 Developing Countries 24 Industrialized Country (1970-2002)	Panel Data	In developing countries, external debt was found to have a negative effect on economic growth. External debt in developing countries was investigated under two categories as public and private sector in order to analyze its effects on economic growth in a broader sense. Consequently, external debt of public sector had a negative impact on economic growth while external debt existing in private sector was found to have no significant effect on it. Also, it was discovered that in industrialized countries, gross national external debts had no effect on economic growth.
Presbitero (2006)	69 Countries (1977-2002)	Panel Data	The analysis results showed that external debt had a negative impact on economic growth.
Frimpong and Oteng -Abayie (2006)	Ghana (1970-1999)	Johansen Cointegration Test and Error Correction Model	The analysis of Johansen Cointegration Test andError Correction Modelfound out that external debt had a negative impact on economic growth both in short and long run. Investments-to-GDP ratio variable used for the estimations of models in which dependent variable is economic growthwas identified as negative in short and long run; and this proves the effect of debt overhang.
Şeker (2006)	General Theoretical Investigation	Theoretical	It was stated that the external debt can create an inflationist effect and it may cause deterioration in income distribution in situations where fair taxation system is not available. If external debt is efficiently used in investment projects, economic growth can be positively affected.
Uçak (2006)	Developing Country and Turkey	Theoretical	Countries can face economic and uneconomic problems due to external debt. Thus, the income derived by external debt should be used efficiently enough to pay interest amounts. It was also stated that the real production and income of the country would be transferred in an unfair way, the country would become poorer and there would be deterioration in its income distribution. For this reason, Turkey should have policies to decrease the burden of external debts and it should get rid of its debts as soon as possible.
Karagöl (2006)	Turkey (1960-2002)	Johansen Cointegration Test	It was identified that there was a co-integrationrelationship between gross national product and external debt, and in the long run, external debt can positively affect GDP.

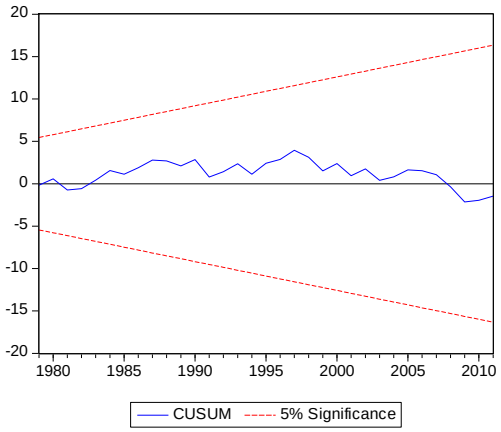
Bilginoğlu and Aysu (2008)	Turkey (1968-2005)	Regression Analysis	External debt was found to have a negative effect on economic growth.
Uysal et al. (2009)	Turkey (1965-2007)	Johansen Cointegration Test and Granger Causality Test	There was a cointegration relationship between economic growth and external debt. Both Granger causality testing and error correction model revealed the existence of a causal relationship from external debt to economic growth.
Çataloluk (2009)	Turkey (1990-2005)	Theoretical and Graphical Analysis	It was discovered that the rising tendency of public debt in Turkey (both internal and external) leads to Crowding Out Effect. Public debt occurs when savings and funds transferred into investments by private sector are inefficiently used in public, and it is known to affecteconomy in a negative way.
Çiçek et al. (2010)	Turkey (1990:1-2009:3)	Engle-Granger Cointegration Test and Regression Analysis	There was no cointegration relationship between economic growth and external debt. According to finding s of regression analysis, external debt had a negative impact on economic growth.
Çöğürcü and Çoban (2011)	Turkey (1980-2009)	Regression Analysis	External debt was found to have a negative impact on gross national product.
Ceylan and Durkaya (2011)	Turkey (1989-2007)	Engle-Granger, TAR and M-TAR Cointegration Test	There was linear and non-linear cointegration relationship between external debt and economic growth. The presence of long-run asymmetrical relationship was determined by TAR model. Consequently, negative impact of external debt on economic growth was proved.
Umutlu et al. (2011)	Turkey (1990-2008)	Regression Analysis and Granger Causality Test	External debt was found to have a positive impact on economic growth. There was no causal relationship between them.
Nawaz et al. (2012)	Pakistan (1980-2010)	Johansen Cointegration and Granger Causality Test	According to Johansen Cointegration Test, there was cointegration relationship between external debt and economic growth, and Granger causality testing proved one-way causal relationship from economic growth to external debt.
Muritala (2012)	Nigeria (1970-2010)	Regression Analysis	External debt was found to have a negative effect on economic growth.

Uzunet al. (2012)	19 Transition Economy Countries (1991-2009)	Panel ARDL	In transition economies, a positive relationship was found out between external debt and economic growth in the long run.
Saad (2012)	Lebanon (1970-2010)	Johansen Cointegration Test and Error Correction Model	Cointegration test put forward that, in the long run, external debt had a positive but statistically insignificant effect on economic growth. Granger causality testing based on error correction model identified two-way causal relationship between external debt and economic growth.
Erkan et al. (2012)	Turkey (1980-2012)	Theoretical	Since the burden of Turkey's foreign debt causes many problems in its economy, the need of an urgent solution was the focus of the study results. The use of external debt in inefficient areas as well as repayment of debt at a high cost and going into even more debt causesincreasing deterioration in general economic condition. Concerning this issue, inflation and foreign trade deficit increased and worn-out currency reservesand a decrease in economic growth occurred.
Gület al. (2012)	Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Turkey (1994-2010)	Panel Pedroni, Cointegration and Granger Causality Test	No relationship was found out between external debt and economic growth in the long run while there was one-way relationship from external debt to economic growth.
Umaruet al. (2013)	Nigeria (1970-2010)	Regression Analysis and Granger Causality Test	The regression analysis indicates that external debt negatively contributed to economic growth, and causality test proved that there was two-way causal relationship between external debt and economic growth.
Shabbir (2013)	70 Developing Countries (1976-2011)	Panel Data	The increase of external debt decreases the repayment of debts and negatively affects economic growth.
Çelik and Direkçi (2013)	Turkey (1991:1-2010:4; 1991:1-2000:4 and 2001:1-2010:4 sub terms)	Regression Analysis, Cointegration and Causality Tests	Cointegration testing for 1991-2010 period as well as regression analysis carried out for period of 1991-2000 and 2000-2010 put forward that total external debt stock had a positive impact on economic growth. Also, between the years of 1991-2010, one way causal relationship was recorded from external debt to economic growth.
Esener (2013)	Turkey (1980-2010)	Theoretical	The study results show that especially between the years of 1980-2000, the instability and financial crisis both in GOU and Turkey caused financial rises similar to external debt accumulation in the following periods. Besides, high real interest rates,

			inflation, foreign trade and balance of payments as well as distribution of income and crowding out effect were among the impacts of external debt on economic growth.

Appendix 2:

Cumulative Sum of Recursive Residuals



Cumulative Sum of Squares of Recursive Residuals