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DYNAMICAL RELATIONSHIP BETWEEN ECONOMIC GROWTH AND EXTERNAL DEBT THE CASE OF TURKEY: (1987-2014)

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Abstract

Usage of foreign sources becomes unavoidable in the countries where country sources and domestic savings are not sufficient to finance economic growth and development. From this point of view, like in the economy of developed or developing countries, external debt is an important finance in Turkey's economy. The main purpose of this work is to try to show the relationship between economic growth and external debt, in Turkey. For this aim, the annual data which shows the external debt and GDP of Turkey economy, between 1987 and 2014, were used. The variations which existed from 1987 to 2014, were obtained as annual data from the World Bank database. The stationarity of time series, which were used in the analyses, were examined with Augmented Dickey Fuller (ADF) tests. As a result of the ADF unit root test, it was seen that; external debt and economic growth variables have a unit root, with constant and constant-trend, in the level; and, they are both stationary in the first difference. The Granger Causality test was applied to investigate the causality relationship between variables. According to the result of the analysis, it is determined that there is a bi-directional causality relation from economic growth to foreign debt and fixed capital investments.

Key Words: *External Debt, Economic Growth, Unit Root, Causality Test..*

Jel Classification: *H, H6*

EKONOMİK BÜYÜME İLE DIŞ BORÇ ARASINDAKİ DİNAMİK İLİŞKİNİN TÜRKİYE ÖRNEĞİ (1987-2014)

Özet

Gelişmekte olan ülke ekonomilerinde ekonomik büyüme ve kalkınmanın finansmanı için ülke kaynaklarının ve yurtiçi tasarrufların yetersiz oluşu yabancı kaynak kullanımını kaçınılmaz hale getirmektedir. Bu açıdan bakıldığında gerek gelişmiş gerekse gelişmekte olan ülke ekonomilerinde olduğu gibi Türkiye ekonomisi için de dış borç önemli bir finansal kaynak olmaktadır. Bu çalışmanın temel amacı, Türkiye'de dış borçlar ve ekonomik büyüme arasındaki ilişkiyi ortaya koymaya çalışmaktır. Bu amaçla Türkiye ekonomisine ait 1987-2014 yılları arasındaki dış borçlar ve GSYH'ya ilişkin yıllık veriler kullanılmıştır. 1987-2014 yılları arasını kapsayan değişkenler yıllık veriler olarak Dünya Bankası veri tabanından elde edilmiştir. Analizde kullanılan zaman serilerinin ADF birim kök testi ile durağanlığı incelenmiştir. Yapılan ADF birim kök testi ve sonucunda dış borçlar ve ekonomik büyüme değişkenlerinin sabitli ve sabitli-trendli olmak üzere düzey itibariyle birim kök içerdiği, birinci farklarında ise her ikisinin de durağan hale geldiği görülmektedir. Değişkenler arasındaki Nedensellik ilişkisini araştırmak amacıyla Granger Nedensellik testi uygulanmıştır. Yapılan analiz sonucuna göre ekonomik büyümeden dış borçlara ve sabit sermaye yatırımlarına doğru çift yönlü nedensellik ilişkisi tespit edilmiştir.

Anahtar Kelimeler: *Dış Borç, Ekonomik Büyüme, Birim Kök, Nedensellik Testi.*

Jel Sınıflandırılması: *H, H6*

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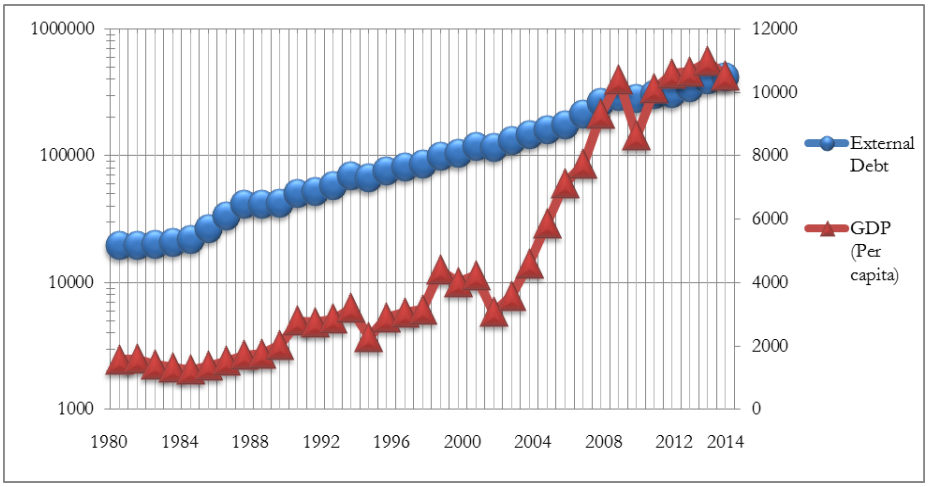
INTRODUCTION

Because of the reasons like unequal resource allocation and different levels of development among the countries, internal resources of the countries are insufficient to finance economic development. In developing countries, need of external debt is increasing. One of the reasons behind this situation is that the necessary investment to accelerate economic growth cannot be supplied by domestic sources. In developing countries, inadequate savings are limiting the investments to develop the country. While savings are the sources of the planned investments, they make the investments happen. While it stimulates the demand of foreign consumer goods, it increases the import of the investment goods and raw materials. It is necessary to allow the foreign currency in to the country or finance the external debt in order to meet increasing demand of import. External debts make the necessary import for developing happen and satisfy the insufficiency of savings (Zerenler, 2012:187).

However, debt is not only the source of income of developing countries but also advanced countries. Although debt should be a source of income only in the case extreme conditions, it became a continuous source of income for countries (Akdoğan, 1993).

In this study, firstly, the theoretical work from literature was summarized in order to explain the relationship between economic growth and external debt. The aim of study is to test if there is a long-term relationship between external debt and economic growth, and to present the possible contribution related to economic growth of this sector. In this context, the existence of the relationship between economic growth and external debt has been important in terms of contributing the literature. In accordance with this purpose. In the second part of the study, the previous studies that have been discussed. In the third part, the information about methods, models, variables and data that have been used in this study has been given.

Table 1. External Debt and GDP per capita in Turkey 1980-2014



Resource: World Bank, http://www.worldbank.org

Turkey's external debt and GDP per capita is shown in Table 1. According to Table 1; the GDP per capita and external debt in Turkey had increasingly continued by years 1980s. However, when reached to 1995 as the GDP per capita decreased, external debt continued to increase. Since 2002 when GDP per capita and external debt increased very rapidly from 2008 levels tend to decrease and since 2010 continues to increase.

The purpose of this study is to analyze the relationship between economic growth and external debt. In this manner, the studies which investigate the relationship between external debt and economic growth in the world and in Turkey are taken into account in that part of our study. There are several empirical works on the effect of external debt on economic growth in developed and developing countries.

Mohammed used data of the dates in between 1978 – 2001 and Ordinary Least Squares (OLS) method while investigating the relationship between external debt and economic growth in Sudan. Findings show that the relationship between external debt and economic growth is negative. The study concluded that external debt and inflation deter economic growth, while export earnings have positive impacts. Thus, the findings of this study support the need of Sudan to be considered for comprehensive debt relief measures.

Schclarek (2004), He analyzed this relationship by sampling 59 developing countries and 24 industrialized countries. Schclarek identified in his research that for industrialized and developing countries low external debt is related to high growth rate and this is not because of external debt of private sector but because of external debt of public.

Babu et al. (2014) have used annual data from 1970-2010, this paper employs a panel fixed-effects model to estimate the effect of external debt, as a share of Gross Domestic Product (GDP), on economic growth in East Africa Community. The findings suggest that external debt has a negative significant effect on per capita GDP growth rate in the EAC.

As for Turkey's economy Karagöl (2002) examined the interaction among economic growth, external debt service and capital inflow using time series data for Turkey and using a multi-equation model. The results show that the relationship between debt service and economic growth should be analyzed with a simultaneous equation model, because there is a two-way relationship between debt service and growth.

Erataş and Başçı Nur have studied the relationship between external debt and economic growth for 10 countries which they named as emerging market economies. According to the empirical model in which Panel Data Analysis have been used, they have concluded that external debt has negative effect on economic growth as excessive indebtedness occurs.

Çöğürcü and Çoban (2011) have showed the effects of external debt and population growth rate on economic growth in Turkey, by using Regression Analysis. According to the results of this analysis they have concluded that external debt and population growth rate in Turkey have a negative effect on economic growth.

Table 2. External Debt-Economic Growth Literature Summary

Writer(s)	**Country(s)**	**Term**	**Methods and Findings**
Lin and Sosin (2001)	77 African countries		They have revealed that there is negative relationship in high significance level between external debt and increase of GDP per capita for African countries. This relationship is negative but statistically insignificant for industrialized countries and Latin American countries, and it is positive but has no important result for Asian and other developing countries.

Pattilo, Poirson and Ricci (2002)	93 countries	1969-1998	The relationship between external debt and economic growth has been analyzed by using Panel Data Analysis. According to the results, they have concluded that external debts have a negative effect on economic growth as if the amount of external debt exceeds the debt limit rates which are 35% and 40%.
Frimpong and Oteng-Abayie (2006)	Ghana,	1970-1999	They have empirically studied the relationship between external debt and economic growth. ADF, PP and KPSS tests have been used and it has been concluded that economic growth is positively affected from external indebtedness.
Safdari and Mehrizi (2011)	Iran	1974-2007	They have studied the relationship between external debt and economic growth by using VAR model and concluded that importation and external debt have a negative effect on economic growth.
Ogunmuyiva (2011)	Nigeria	1970-2007	They have used various econometric techniques such as Augmented Dickey Fuller (ADF) test, Granger causality test, Johansen co-integration test and Vector Error Correction Method (VECM). Empirical results have revealed that causality does not exist between external debt and economic growth as causation between debt and growth was also found to be weak and insignificant in Nigeria.
Shah and Pervin (2012)	Bangladesh	1974-2010	In this study which external debt and economic growth relationship has been investigated, long run significant negative effect of external public debt service and positive effect of external public debt stock on GDP growth have been found. In short run, only external debt service has negative effect but the debt stock does not have any significant effect.
Kasidi and Said (2013)	Tanzania	1990-210	They have empirically investigated the relationship between external debt and economic growth. The study has revealed that there is significant impact of the external debt and debt service on GDP growth. The total external debt stock has a positive effect and debt service payment has a negative effect.

Zouhaier and Fatma (2014)	19 developing countries	1990-2011	They studied the effect of debt on economic growth of 19 developing countries over the period 1990-2011, through the use of a dynamic panel data model. This paper issued from these two empirical tests stipulate a negative effect of the total external debt to GDP and external debt as a percentage of GNI ratio on economic growth and a negative interaction between these two debt measures and investment.
Iyoha (1999)	African countries	1970-1994	He examined the impact of external debt on growth in African countries south of the Sahara from 1970 to 1994 using empirical analysis. He noted that the variables related to the external debt have a negative effect on investment, showing that an accumulation of outstanding debt discourages investment through two effects: the discouragement and eviction.
Ajao and Ogiemudia (2013)	Nigeria	1979-2009	This paper reviews the effect of foreign debt management on sustainable economic development with specific emphasis on Nigeria over the period of 1979–2009. The result shows that there is a significant relationship between external debt and economic development in Nigeria, external debt stock contributes significantly to Nigeria GDP while debt servicing had a negative but insignificant impact on Nigeria GDP.

Table 3. The Literature Summary of Empirical Studies about Turkey

Writer(s)	**Country(s)**	**Term**	**Methods and Findings**
Kırcı Çevik and Cural	Turkey	1989-2012	They have investigated the relationship between internal-external debt and economic growth by using Causality Analysis. According to this investigation there is a one-way causality from external debt to economic growth but it has not been proved that internal debt is a reason of economic growth.
Gül, Kamacı and Konya	6 Turkish Republics	1994-2010	Panel Data Analysis has been used in this work in which external debt and economic growth relationship have been investigated. It has been concluded that there is a one-way causality from external debt to economic growth in long run.
Bilginoğlu and Aysu (2008)	Turkey	1968-2005	The relationship between external debt and economic growth has been studied by using Regression Analysis. According to the results external debt have a negative effect on economic growth.

Uysal,Özer and Mucuk (2009)	Turkey	1965-2007	In this study, which has been conducted to investigate the relationship between external debt and economic growth for Turkey's economy, VAR method has been used and they have showed that external debts have negative effect on economic growth in short and long run.
Ulusoy and Küçükkale (1996)	Turkey	1950-1992	Ulusoy and Küçükkale investigated the relation between debt, economic growth and inflation by using the annual data of Turkey in between 1950 and 1992. The results indicated that external debts affect the countries' economic growth negatively.

I. EMPIRICAL METHOD

The main purpose of this work is to try to show the relationship between economic growth and external debt, and fixed capital in Turkey. For this aim, the annual data which shows the external debt and GDP of Turkey economy, between 1987 and 2014, were used. The variations which existed from 1987 to 2014 were obtained as annual data from the World Bank database. The variations are GDP per capita (current US$) and external debt stocks (ED), total (DOD, current US$), fixed capital (FC). Growth that is our primary interest in the study has been calculated by taking the primary spreads of logarithms of the external debt and fixed capital investments factors. In other words, the model that is wanted to be predicted is as follows:

$$Y_t = a + bED_t + cFC_t + \varepsilon_t \quad (1)$$

Here the terms are:
Y_t= growth rate
ED_t= external debt
FC_t= fixed capital
t= time

However, it is not true to look for the solution of this model directly in the analyses which time-series are used. Firstly, it has to be needed to examine whether the time series that are used in the model are stable or not. Stability analysis of time series undertaking in this study has been done by using the unit root test that is developed by Dickey and Fuller (1981). The stationarity of time series, which were used in the analyses, were examined with Augmented Dickey Fuller (ADF). The following equation has been used in this analysis:

$$\Delta Y_t = \alpha_0 + \delta Y_{t-1} + \alpha_1 \Delta Y_{t-1} + \alpha_2 \Delta Y_{t-2} + \cdots \alpha_k \Delta Y_{t-k} + \varepsilon_t \quad (2)$$

The alternative and null hypothesis for Augmented Dickey Fuller test,

H_0 : δ=0 (has unit roots)

H_1 :δ<0 (has not unit roots)

Table 4. Augmented Dickey-Fuller Unit Root Test Results

Variables	Constant		Constant-Trend	
	Test Statistic	Prob. Value	Test Statistic	Prob. Value
lnGDP	-0,9963	0,3286	-2,5588	0,3001
lnED	0,2228	0,9690	-3,1657	0,1123
lnFC	-1,0184	0,7319	-2,5350	0,3102
dln(GDP)	-5,7823	0,0001*	-5,6950	0,0005*
dln(ED)	-6,0417	0,0000*	-5,8968	0,0003*
dln(FC)	-5,8044	0,0001*	-5,6837	0,0005*

*Does not have any unit root in 1% significance level

According to the ADF unit root test results it is seen that external debt and economic growth variables have unit root as constant and constant-trend in the level and they become stationary in the first difference.

Table 5. Regression Analysis

Variable	Coefficient	Std.Error	t-Statistic	Prob
dlnFC	0,592384	0,078430	7,552978	0,0000
dlnED	0,365318	0,254380	1,436112	0,1639
C	-0,007766	0,022672	-0,342521	0,7349
R-Squared	0,842482	Mean dependent var		0,0674
Adjusted R-Squared	0,829355	S.D. dependent var		0,1669
S.E. of regression	0,068958	Akaike info criterion		-2,4061
Log likelihood	35,48369	Schwarz criterion		-2,2622
F-statisticProb(F-statistic)	64,18167 (0,00000)	Durbin-Watson stat		2,0765

Since Model Prob (F-statistics) < 0.05, it makes sense. R^2 value is equal to 0.84. Hence, the power of independent variable (fixed capital investments) to explain the dependent variable (GDP) is very high.

According to the Regression model, it has been discussed the positive relationship between the economic growth and fixed capital investments and external debts.

In order to investigate the existence of a long run relationship between the variables which become stationary in the same level, the co-integration test which was developed by Johansen was used and the results of the analysis is showed in Table 6.

Table 6. Johansen Co-integration Test

Hypothesis H_0	Hypothesis H_1	Eigen value	Trace Statistic	0,05 critical value	Max-Eigen Statistic	0,05 critical value
r = 0	r=1	0,567746	41,04812	29,79707	20,12981	21,13162
r ≤ 1	r=2	0,398258	20,91831	15,49471	12,19025	14,26460
		0,304879	8,728058	3,841466	8,728058	3,841466

r co-integration vector number

In the Johansen co- integration analysis that is placed in the Table-6, it has been discussed the long-term relation between the fixed capital investments, external debts and economic growth according to the path statistics and maximum eigenvalue statistics, in a sense H_0 hypothesis that has no co-integration for these variables has been rejected. Granger Causation Test results that is performed after Johansen co-integration analysis are located in the Table 7.

Table 7. Granger Causality Test

Hypotheses	F-statistic	Probability
ln FC-ln GDP	0,98288	0,3916
ln GDP-ln FC	0,31393	0,7341
ln ED- ln GDP	2,28195	0,1280
ln GDP-ln ED	1,45329	0,2575
ln ED-ln FC	2,89294	0,0788
ln FC-ln ED	6,94164	0,0051

As seen from the Table 7, any causation relation between fixed capital investments and GDP variables may not be determined. It is a matter of that there is two-way causation relation from external debts variable to fixed capital investments variable. In this case, it may be said that external debts affect the fixed capital investments.

CONCLUSION

Empirical studies which investigate the relationship between external debt and development are often seen in literature. Considered studies show that external debt increases or decreases the growth or does not have any effect on it. Table 3 and Table 4, some of these studies are given. In studies; Ulusoy and Küçükkale (1996), Iyoha (1999), Lin and Sosin (2001), Pattilo, Poirson and Ricci (2002), Bilginoğlu and Aysu (2008), Uysal, Özer and Mucuk (2009), Safdari and Mehrizi (2011), Ogunmuyiva (2011), Shah and Pervin (2012), Ajao and Ogiemudia (2013), Kasidi and Said (2013), Zouhaier and Fatma (2014) investigating the effects of foreign debt on economic growth of external debt it has reached a negative result. Frimgang and Oteng-Abayie (2006), Kırcı, Çevik and Cural, Gül, Gül, Kamacı and Konya found that economic growth is positively affected from external indebtedness. In this context, the main focus on this study was to establish the effect of external debt

on the economic growth in Turkey. According to result; external debt and economic development variables have unit root, with constant and constant-trend, in the level; and, they are both stationary in the first difference. In order to investigate Causality between the variables, Granger Causality test was applied. According to the results of the analysis, it was determined that there is two-way causation relation from external debts variable to fixed capital investments variable.

External debts are finance resources for especially developing countries. One of the reasons why these countries tend to get external debt is that inadequacy of savings and economic problems. External debts affect the economic growth of the country negatively. In order to eliminate this negative effect, managing of external debts is highly important. In countries like Turkey where there is high debt and heavy debt conditions, managing of external debts should be given priority. With the help of effective external debt managing, structure of external debts can be improved, service burden of external debts can be reduced, risks can be lowered and economic development can be financed. Some regulations and controls can be done about the external debts of private sector.

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