

The External Debt in the Context of Economic Growth: The Sample of Turkey

Ayşen Edirneligil, Mehmet Mucuk

Abstract—In developing countries, one of the most important restrictions about the economic growth is the lack of national savings which are supposed to finance the investments. In order to overcome this restriction and achieve the higher rate of economic growth by increasing the level of output, countries choose the external borrowing. However, there is a dispute in the literature over the correlation between external debt and economic growth. The aim of this study is to examine the effects of external debt on Turkish economic growth by using VAR analysis with the quarterly data over the period of 2002:01-2014:04. In this respect, Johansen Cointegration Test, Impulse- Response Function and Variance Decomposition Tests will be used for analyses. Empirical findings show that there is no cointegration in the long run.

Keywords—Economic growth, external debt, time series analysis, Turkish economy.

I. INTRODUCTION

POLITICAL and social development and increasing national income are two of the most important aim of the nations. To reach these aims, financing the related institutions has a significant role. At this point, especially developing countries use external debt for financing high budget institutionalizing enterprise which is necessary to ensure growth and development.

External debt which means that the money borrowed by a country (institutions or individuals) from foreign lenders, can be used to eliminate foreign trade gap and budget deficit, defense expenditures and other extraordinary expenditures. For this reason, external debt not only used by developing countries, but also used by developed countries.

On the other hand, nonpayment debts bring extra drain for the economics and can cause debt crises. This problem makes the countries' economy more fragile to the external shocks. Thereby, today external debt restricts become one of the most debated issues. In this study, the relationship between external debt and economic growth will be examined for Turkey. In this concept, in the first part of the study, the theoretical framework will be explained and in the second part the variables of Turkish economy will be analyzed.

II. THEORETICAL FRAMEWORK

There are different approaches about the effect of external debt on economic growth. According to classical growth model, the source of the economic growth is investments.

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Investments increase the efficiency of both labor force and the land and as a result production increases. The determinant of the investments is the rate of profit. According to classical economists, increase in population decrease the rate of profit and also decrease the investments [1].

A. Smith, D. Ricardo T. R Malthus, N. W. Senior and J. B. Say and the other members of Classical School of Economics defend the thought that the minimum government interference provides that the economic problems are solved by the market [2]. And also government expenditures must be minimum level and the taxes and related instruments must finance these expenditures. Ricardo is against the external debt for two reasons. 1. External debt hides the truth and people save less. 2. To pay the interest of the debt, governments increase the taxes and it can cause outflow of the capital [3].

According to Harrod-Domar model which is one of the most important modern growth models, the primary element of the economic growth is also investments. For this model, increase the amount of saving, which means the investments, means the increase the growth rate, so low saving coefficient is an obstacle for the growth. External debts in this situation increase the savings and also increase the growth rate. If the marginal saving propensity is bigger than the average saving propensity, the increase in national income increases the domestic investable resources. As a result, increase in domestic savings provides the financing of the external debt [4].

Neoclassical Models express that the only factor determine the growth rate is the capital growth rate and the only factor increases the capital growth is savings [5]. For this model, in the long run, payment of the interest rate of external debts causes the increase in taxes. As a result of this, individuals decrease their consumption and also savings which means that less capital stock is leaved to the next generation [6].

Today, it is accepted that the external debt at reasonable levels for developing countries have positive effect on growth rate because, developing countries have limited capital stock. However, increase in debt can cause crowding out effect on domestic and foreign investments and can affect the economic growth negatively [7].

Negative effect of high level debt stock on economic growth is explained by the debt overhang theories. According to this theory, if there is a probability that, in the future, debt will be larger than the country's repayment ability, expected debt-service costs will discourage further domestic and foreign investment and this situation harm growth. Potential investors will fear that the more a country produces, the more it will be taxed by creditors to service the external debt. For that reason

they will be less willing to incur costs today, for the sake of increased output in the future. This argument is represented in the debt "Laffer curve" (Fig. 1), which assumes that larger debt stocks tend to be associated with lower probabilities of debt repayment [8].

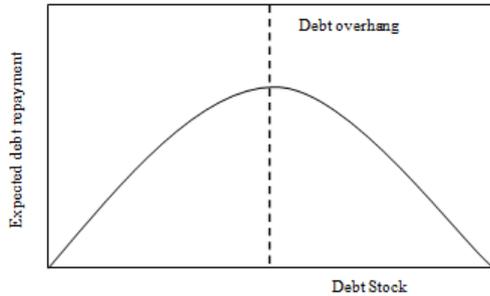


Fig. 1 Debt Laffer Curve

III. LITERATURE REVIEW

A number of empirical studies on the relationship between external debt and economic growth have been carried out using different estimation approaches. Table VII summarizes the various studies in this field.

IV. DATA AND METHODOLOGY

For analysis in this study it is used quarterly data for the period 1998 to 2014, coming from the Central Bank of the Republic of Turkey (CBRT). The data and resources are shown at Table I.

TABLE I
THE DATA SET

Variables	Explanations	Resources
ED	External Debt	CBRT
GDP	Gross Domestic Product	CBRT

The following techniques are used for data analysis and evaluation:

1. Unit Root Test
2. Johansen Cointegration Test
3. Variance Decomposition

V. EMPIRICAL FINDINGS

Unit root tests are used to identify the stationary property of a time series data. For this purpose, Augmented Dickey Fuller (ADF), Phillips-Perron (PP) and NG Perron tests are applied in the study. The results of ADF and PP unit root tests are presented in Tables II and III. Also NG Perron Test findings are shown in Table VIII.

According to the results of these tests, each variable is no stationary in levels. Therefore it is taken first differencing of series and then it is seen that the series are stationary [I (1)]. This could mean that series move together in the long run.

At second stage, the VAR model is estimated to determine

the short run and long run relationships between budget deficit and current account deficit. For this, firstly, optimal lag length is determined using information criteria. Table IV shows the optimal lag length by different criteria.

TABLE II
RESULTS OF ADF UNIT ROOT TEST

Variables	t-statistic	Levels		t-statistic	First Difference	
		t-statistic	Test Critical Values		t-statistic	Test Critical Values
ED	-0.674802	1%	-3.533204	-6.669098	1%	-3.534868
		5%	-2.906210		5%	-2.906923
		10%	-2.590628		10%	-2.591006
GDP	-0.433346	1%	-3.536587	-8.942898	1%	-3.536587
		5%	-2.907660		5%	-2.907660
		10%	-2.591396		10%	-2.591396

TABLE III
RESULTS OF PP UNIT ROOT TEST

Variables	t-statistic	Levels		t-statistic	First Difference	
		t-statistic	Test Critical Values		t-statistic	Test Critical Values
ED	-0.662885	1%	-3.533204	-6.663137	1%	-3.534868
		5%	-2.906210		5%	-2.906923
		10%	-2.590628		10%	-2.591006
GDP	-0.732639	1%	-3.533204	-11.97309	1%	-3.534868
		5%	-2.906210		5%	-2.906923
		10%	-2.590628		10%	-2.591006

TABLE IV
VAR OPTIMAL LAG LENGTH

Lag	LR	FPE	AIC	SC	HQ
0	NA	0.000183	-2.930094	-2.860885	-2.902970
1	375.5564	3.22e-07	-9.274057	-9.066430*	-9.192686*
2	2.029923	3.54e-07	-9.179158	-8.833113	-9.043540
3	9.417457	3.39e-07	-9.222408	-8.737945	-9.032542
4	2.849891	3.67e-07	-9.146066	-8.523185	-8.901953
5	18.05553*	2.93e-07*	-9.376029*	-8.614730	-9.077669
6	2.048405	3.22e-07	-9.287556	-8.387840	-8.934949

* indicates lag order selected by the criterion, LR: sequential modified, LR test statistic (each test at 5% level), FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, HQ: Hannan-Quinn information criterion

According to Schwarz and Hannan-Quinn information criteria the optimal lag length is 1. In this context, the VAR model is estimated with one lag. Stationarity of the estimated model is tested by using inverse roots of AR characteristic polynomial. Fig. 2 shows the stationarity of the VAR model.

As shown in Fig. 2, all roots lie inside the unit circle. This implies that the VAR model satisfies the stability condition. After estimating VAR model, Johansen cointegration test is applied to examine the relationship between budget deficit and current account deficit in the long run. Table V shows the results of cointegration tests.

The results of cointegration test show that there is no relationship between these variables in the long run.

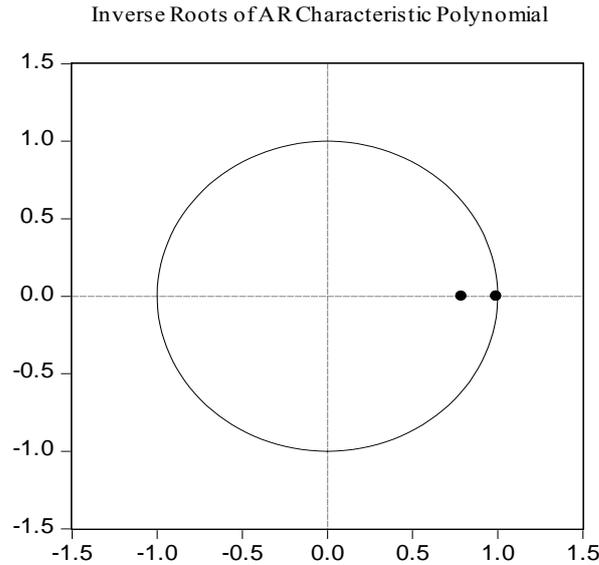


Fig. 2 Stationarity of the VAR (1) Model

TABLE V
RESULTS OF JOHANSEN COINTEGRATION TESTS

Hypothesized No. of CE(s)	Eigenvalue	Trace Test		Maximum Eigenvalue	
		Trace Statistic	0.05 Critical Value	Max-Eigen Statistic	0.05 Critical Value
None	0.166097	12.03329	15.49471	11.80646	14.26460
At most 1 *	0.003484	0.226833	3.841466	0.226833	3.841466

Trace test indicates no cointegration at the 0.05 level, Max-Eigen value test indicates any cointegration at the 0.05 level.

Finally, variance decomposition is used to analyze how important the change in one variable is due to change in another variable. The variance decomposition of the VAR was presented in Table VI.

According to variance decomposition, around 8 percent variation in GDP is explained by external debt in the 10th term. On the other hand, 68 percent variation in external debt

is explained by GDP.

TABLE VI
THE RESULTS OF VARIANCE DECOMPOSITION FOR ED AND GDP

Variance Decomposition of GDP: Period	GDP	ED	Variance Decomposition of ED: Period	GDP	ED
2	99.86812	0.131877	2	32.33592	67.66408
3	99.51109	0.488911	3	38.02835	61.97165
4	98.22797	1.772025	4	43.96268	56.03732
5	94.40740	5.592603	5	50.62949	49.37051
6	92.98683	7.013167	6	56.67036	43.32964
7	92.18758	7.812422	7	60.70905	39.29095
8	91.60184	8.398161	8	63.82342	36.17658
9	91.38875	8.611250	9	66.30470	33.69530
10	91.63546	8.364542	10	68.37760	31.62240

TABLE VII
OVERVIEW OF PREVIOUS STUDIES

Author(s)	Methodology	Period	Country	Results
Çevik and Cural (2013), [9]	VAR Analysis, Toda- Yamamoto Causality	1989:01-2012:04	Turkey	There is unidirectional causality that runs from external debt to economic growth.
Erataş and BaşçıNur (2013),[10]	Panel Data Analysis	1990-2010	Emerging Market Economies	External debt has a negative effect on the economic growth in parallel with the emergence of the phenomenon of over-indebtedness.
Gül, Kamacı, and Konya (2012), [11]	LLC and IPS Panel Unit Root Tests, Pedroni Cointegration Test and Panel Grange Causality Test	1994-2010	Turkish Republics and Turkey	There is unidirectional causality that runs from external debt to economic growth in the long run but there is no causality in the short run.
Ajayi and Oke (2012), [12]	Regression Analysis	1980-2007	Nigeria	External debt burden had an adverse effect on the nation income and per capital income of the nation.
Çöğürçü and Çoban (2011), [13]	Johansen Cointegration Analysis, Least-Square Regression Analysis	1980-2009	Turkey	Foreign debt in Turkey and population growth rate has a negative impact on economic growth.
Fosu (2011), [14]	Augmented production function	1980-1990	SSA Countries	The results reveal a substantial impact of net external debt on GDP growth.
Uysal, Özer and Mucuk (2009), [15]	VAR Analysis	1965-2007	Turkey	External debt has a negative influence on economic growth in the short and long term.
Bilginoğlu and Aysu (2008), [16]	Regression Analysis	1968-2005	Turkey	Foreign debts in Turkey negatively affect economic growth and therefore Turkey is facing the problem of overhang, that is, excessive debts.
Ulusoy and Küçükale (1996), [17]	Granger Causality Test	1965-1994	Turkey	The external debt has a negative impact on economic growth.

TABLE VIII
THE RESULTS OF NG PERRON UNIT ROOT TEST

ED	Levels				First Difference			
	MZa	MZt	MSB	MPT	MZa	MZt	MSB	MPT
t- statistics	1.48220	1.98752	1.34093	131.757	-29.3170	-3.75549	0.12810	1.06499
critical values	1%	-13.8000	-2.58000	0.17400	1.78000	-13.8000	-2.58000	0.17400
	5%	-8.10000	-1.98000	0.23300	3.17000	-8.10000	-1.98000	0.23300
	10%	-5.70000	-1.62000	0.27500	4.45000	-5.70000	-1.62000	0.27500
GDP	MZa	MZt	MSB	MPT	MZa	MZt	MSB	MPT
t- statistics	-0.45281	-0.24501	0.54108	19.4130	-77.3151	-6.21677	0.08041	0.31846
critical values	1%	-13.8000	-2.58000	0.17400	1.78000	-13.8000	-2.58000	0.17400
	5%	-8.10000	-1.98000	0.23300	3.17000	-8.10000	-1.98000	0.23300
	10%	-5.70000	-1.62000	0.27500	4.45000	-5.70000	-1.62000	0.27500

VI. CONCLUSION

In developing countries, one of the most important instruments of development is external debt. Most of the approaches assume that external debt is a driving force of economic growth. However, it is not possible to definite conclude about this relationship. In this study it is examined the effects of external debt on Turkish economic growth by using VAR analysis with the quarterly data over the period of 1998:01-2014:03. In this respect, Johansen Cointegration Test and Variance Decomposition Tests are used for analyses. Empirical findings show that there is no cointegration in the long run between external debt and economic growth for Turkish economy. It means that external debt is not used in productive areas in Turkey.

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