

The Relationship Between External Debt and Economic Growth in Turkey

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Abstract

Turkey goes into a big rate of external debt because of insufficient capital and that the saving rates are low. Type of use of the external debts shall also affect the economic growth. In this study, the relation between external debts and economic growth shall be analyzed based on the VAR method regarding the economy of Turkey for the 2003:1-2014:03 period. In the analysis results were seen with external debt was found unidirectional causality from economic growth.

Key words: *External debt, Economic growth, Granger Causality Test*
JEL Classification: *F34, H63, O10, C10*

1. Introduction

When countries have insufficient resources, they may resort to internal and external borrowing to achieve certain goals (financing public expenditures, preventing inflation, etc.). Developing countries, in particular, have deficiencies in terms of possessing resources that will enable them to achieve economic growth in respect of increasing their production and income. Both financing deficits in public sector and deficits in balance of payments push countries to external borrowing. Countries may turn towards taxation, coinage or internal and external debt in order to finance public expenditures. Coinage is not usually preferred due to the fear of causing inflation. Instead, countries become indebted through treasury bills, government bonds or external credits. Internal borrowing has rather an inland financial transfer characteristic. External borrowing, on the other hand, is a form of borrowing that involves becoming indebted to foreign governments or financial institutions in order to provide additional resources.

Countries that become indebted with their own currency are considered not having resorted to external borrowing. However, some countries such as Turkey become indebted with foreign currencies. The main reason that pushes Turkey to external borrowing is insufficient internal savings. The need for foreign currency, seeking reserves to maintain the value of the national currency can be counted as among other reasons. An increase in external borrowing results in inflow of foreign currency or goods and services to the country. Turkey does not have enough savings to allow for investments. The lack of savings is tried to be compensated with inflow of resources through external borrowing. Source inflow allows for an increase in investments, thus increasing the production and national income. The economic growth rate increases accordingly.

2. Literature Review

Chowdhury (1994) estimation results indicate that the full effects of the public and private external debts on GNP are small and of an opposite sign, whereas an increase in the GNP level raises substantially the public and private external debts. Fosu (1996) study estimates the extent to which debt might have adversely influenced economic growth of sub-Saharan African nations over the “long term” by examining data for the 1970-1986 period. Were (2001) used time series data for the period 1970- 95, the empirical results indicated that external debt accumulation has a negative impact on economic growth and private investment. Frimpong and Oteng-Abayie (2006) results indicate that an increase in external debt inflows has a positive effect on GDP growth. Ayadi and Ayadi (2008) study results, the negative impact of debt (and its servicing requirements) on growth is confirmed in Nigeria and South Africa. Bakar and Hassan (2008) empirical results are based on VAR estimates indicate that total external debts affect economic growth positively. Hameed et al. (2008)

results show that increase in external debt service causes decline in private investment in Pakistan in long run. Safdari and Mehrizi (2011) were analyzed in Iran for the period of 1974 to 2007. Their results show that the external debt had a negative effect on gross domestic product. Sulaiman and Azeez (2012) used annual time series data from 1970 to 2010 and they found from the error correction method show that external debt has contributed positively to the Nigerian economy. Atique and Malik (2012) paper examines the impact of external debt on the economic growth of Pakistan separately over period of 1980 to 2010. They results also concluded that external debt amount slows down economic growth. Qayyum and Haider (2012) used annual data for the period 1984 to 2008 has been taken from a panel of sixty developing countries. Empirical results indicate that external debt has adverse impact on the output growth. Uzun et al. (2012) have analyzed the relationship between GDP per capita growth rate and external debt to GNI between 1991 and 2009 in the transition countries. They found positive relationship between debt and growth rate of the countries in long run. Shah and Pervin (2012) paper investigate of Bangladesh economy for the period 1974 - 2010. Long run significant positive effect of external public debt stock on GDP growth have been found from this investigation. In short run, the debt stock does not have any significant effect. Rahman et al. (2012) found bidirectional causality between economic growth and external debt in Bangladesh for the period of 1972-2010.

Kasidi and Said (2013) paper show that external debt and debt service both have significant impact on GDP growth with the total external debt stock having a positive effect of about 0.36939 and debt service payment having a negative effect of about 28.517. Tehereni et al. (2013) study analysed the impact of foreign debt on economic growth in Malawi using time series. Data for the period 1975–2003. Their results show a statistically insignificant and negative relationship between foreign debt and economic growth for the case of Malawi. Abdelhadi (2013) paper is to explore the relationship between external debt and economic growth in Jordan during the period of 1990-2011. His paper shows that there is a positive and significant relationship between external debt and economic growth. Azam et al. (2013) study analyzes the impact of external debt on economic growth of Indonesia. The method of least squares is used for parameters estimation. The main finding of their study shows external debt has a negative impact on economic growth. Tasos (2014) used time series data from 1980 to 2010. He cannot establish causality between debt and growth in Greece. Babu et al. (2014) used annual data from 1970-2010 and found external debt expansion has a negative effect on economic growth of the EAC member countries. Zouhaier and Fatma (2014) used a dynamic panel data model on a sample of 19 developing countries during the period 1999-2011. Their results show that external debt negatively affects economic growth of countries. Zafar et al. (2015) found external debt has significant and negative impact economic growth.

3. Methodology

3.1 Research Question

As indicated in introduction, I have one major research questions. In this study, the quarter data covering the 2003:01-2014:03 periods were used to examine the relationship between external debt and economic growth for Turkey.

3.2 Modeling

In this paper, I use the VAR model, to analyze the Granger causality between external debt and economic growth. The model used for the analysis is as follows:

$$\Delta LED_t = \alpha_0 + \alpha_1 \Delta LGDP_t + u_t \quad (1)$$

3.3 Data and Analysis

In this study, real GDP with expenditures method (with fixed 1998 Prices) and gross external debt stock were used.

GDP variable was obtained from the CBRT and external debt variable was obtained from the Undersecretariat of Treasury electronic data distribution system.

GDP and external debt variables' logarithm was taken. The GDP variable shows a seasonal property, and first, this issue must be eliminated. Therefore, the seasonal property of GDP variable was eliminated by running Census X12 process in Eviews-7.0 software. In order to prevent spurious regression, variables used in analysis are expected to be stationary.

The most common methods used in stationarity testing of variables are Augmented Dickey-Fuller (ADF) test and Phillips-Perron test. Therefore, these unit root tests were used in order to determine the stationarity of the variables.

Table 1: ADF Unit Root Test

Variables Data Number, Data Period	ADF t Value	Test Result(*)	Constant, Trend
LED 45; 2003:3-2014:3	-1.796 p=0.689	Unit Root	Trend and Constant
Δ LED 45; 2003:3-2014:3	-4.507 p=0.000	No Unit Root	Constant
LGDP 45, 2003:3-2014:3	-2.902 p=0.171	Unit Root	Trend and Constant
Δ LGDP 45; 2003:3-2014:3	-5.421 p=0.000	No Unit Root	Constant

* As a result of the ADF test, it was accepted that if the p-value was higher than 5%, there was unit root, if it was lower than 5%, there was no unit root. Critical values were taken from MacKinnon (1996). The number of delays was determined according to the Schwarz Information Criterion.

Table 2: PP Unit Root Test

Variables Data Number, Data Period	ADF t Value	Test Result(*)	Constant, Trend
LED 46; 2003:2-2014:3	-1.586 p=0.783	Unit Root	Trend and Constant
Δ LED 45; 2003:3-2014:3	-4.513 p=0.000	No Unit Root	Constant
LGDP 46, 2003:2-2014:3	-2.412 p=0.368	Unit Root	Trend and Constant
Δ LGDP 45; 2003:3-2014:3	-5.428 p=0.000	No Unit Root	Constant

* As a result of the PP test, it was accepted that if the p-value was higher than 5%, there was unit root, if it was lower than 5%, there was no unit root.

According to results of ADF and PP unit root tests as given in Table 1 and 2, it was found that both variables were not stationary at levels, however, they became stationary at I(1) at 5% significance level after taking their first differences. The cointegration approach suggests that there may be a long-term balance between variables in spite of external shocks that affect the variables of a time series that were made stationary by taking difference. If series are cointegrated and integrated at the same degree, there is a relationship between them that is free from trend factor (Dikmen, 2012: 321). Because there are more than two variables in the model, there are likely to be more than one cointegrated vector. Therefore, firstly, the length of delay to be used in the Vector Autoregression (VAR) model must be determined. Test results indicating the VAR length of delay are given in Table 3.

Table 3: VAR Model Lag Results

Lag	LR	FPE	AIC	SC	HQ
0	NA	4.84e-07	-8.864	-8.782*	-8.834
1	11.813	4.33e-07	-8.977	-8.729	-8.886
2	11.541*	3.84e-07*	-9.098*	-8.684	-8.947*
3	5.041	4.04e-07	-9.052	-8.473	-8.839
4	1.958	4.64e-07	-8.921	-8.176	-8.648

As seen in Table 3, it was found that the most appropriate delay number was found to be two according to model selection criteria (LR-Likelihood ratio, FPE-Final prediction error, AIC-Akaike information criterion and HQ-Hannan-Quinn information criterion). After finding the appropriate length of delay, Johansen cointegration test was used to investigate whether variables came to a balance in long term. Cointegration test results are given in Table 4.

Table 4: Johansen Cointegration Test Results

Cointegrated Vector Number	Eigenvalue	Trace Statistics	%5 Critical Value	Maximum Eigenvalue Statistics	%5 Critical Value
r=0*	0.353	26.641	15.494	18.735	14.264
r \leq 1	0.167	7.905	3.841	7.905	3.841

As can be understood from the results given in Table 4, the maximum eigenvalue was greater than 18.735 and the critical value at 5% significance level was greater than 14.264 for $r=0$, which indicates that there were no cointegrated vectors. The the basic hypothesis, the path statistic was greater than 26.641 and the critical value at 5% significance level was greater than 15.494. According to the results obtained, the null hypothesis ($r = 0$) of the absence of cointegrated relationship hypothesis at 5% significance level is rejected considering both the maximum eigenvalue and the path statistic. Therefore, the fact that there are 2 cointegrated vectors at 5% significance level according to path statistic suggests that there is a relationship between the variables of external borrowing and economic growth in long term. Since the series were found to be cointegrated as a result of the analyses, it is possible to represent these series with the error correction model. Therefore, it would be more appropriate to apply the analysis of causality between the variables according to the error correction model.

Since all variables used in the model are at the I(1) level, the Granger causality test can be applied. Granger causality can simply be defined as follows: If the X variable is the Granger cause of the Y variable, changes in X will lead to changes in Y. Therefore, if the estimation improves significantly when past or delayed values of the X variable are included in the regression of Y with other variables, it can be said that X is the Granger cause of Y (Gujarati, 2004: 697).

$$LED_t = \sum_{i=1}^n \alpha_i LED_{t-i} + \sum_{j=1}^n \beta_j LGDP_{t-j} + u_{1t} \quad (2)$$

$$LGDP_t = \sum_{i=1}^m \lambda_i LGDP_{t-i} + \sum_{j=1}^m \delta_j LED_{t-j} + u_{2t} \quad (3)$$

If error correction term is added to the standard Granger model according to the error correction model and reorganized;

$$LED_t = \sum_{i=1}^n \alpha_i LED_{t-i} + \sum_{j=1}^n \beta_j LGDP_{t-j} + \sum_{r=1}^n \Omega_{1r} ECM_{n,t-1} + u_{1t} \quad (4)$$

$$LGDP_t = \sum_{i=1}^m \lambda_i LGDP_{t-i} + \sum_{j=1}^m \delta_j LED_{t-j} + \sum_{r=1}^m \Omega_{2r} ECM_{m,t-1} + u_{2t} \quad (5)$$

The causality relationship between external borrowing and economic growth according to the error correction model was predicted based on two lag length and results are given in Table 5.

Table 5: Causality Test Results According to Error Correction Model

Causality Direction	Chi-Square Test Statistic	Probability Value (p)
Dependent Variable: ΔLED ΔLGDP is not the Granger cause of ΔLED	2.442	0.294
Dependent Variable: ΔLGDP ΔLED is not the Granger cause of ΔLGDP	14.419	0.000*

*Statistically significant at the 5%.

4. Results

According to the result of Granger causality test given in Table 5, the null hypothesis is rejected according to 5% significance level. That is to say that unidirectional causality was found from external borrowing to economic growth. In other words, external borrowing influenced economic growth in a positive direction for Turkey.

5. Conclusions

The most important element that allows countries to grow is capital accumulation. An increase in capital accumulation will result in an increase in the income in economy. The increase in income allows the savings volume to increase as well, and this will increase investments in the economy in return. The biggest deficiency in developing countries is insufficient capital accumulation. The reason that countries resort to external borrowing is to provide resources for their economy. Making investments that gain the country foreign currency thanks to capital accumulation made possible by external borrowing may result an increase in country's fixed assets. Through external borrowing; raw materials, semi-finished product and spare part demands of the industry are met, deficiencies in production are eliminated and economic growth is maintained. If external borrowing income is not invested in productive factors, country's real production decreases, the income ends up being transferred to other countries and the distribution of income is distorted. The external borrowing increased in 1970's due to Turkey's economic expenditures and high oil prices. After 1980, Turkey succeeded in maintaining debts though structural changes in the economy. However, the economic crisis emerging in the early 2000s caused to Turkey to borrow huge amounts of from the IMF. Stability programs imposed in 2002, large declines were seen in Turkey's debts and debt interest payments.

In this study, the quarter data covering the 2003:01-2014:03 periods were used to examine the relationship between external debt and economic growth with VAR analysis. It was found that these two variables tended towards equilibrium, which means there was a relationship between them. According to the result of the causality test, there was unidirectional causality from external borrowing to economic growth. In other words, external borrowing influenced economic growth in a positive direction over the given period.

References

- Abdelhadi, S.A., 2013, External Debt and Economic Growth: Case of Jordan (1990-2011), *Journal of Economics and Sustainable Development* 4 (18), 26-32.
- Atique, R., and Malik, K., 2012, Impact of Domestic and External Debt on the Economic Growth of Pakistan, *World Applied Sciences Journal* 20 (1), 120-129.

- Ayadi, F.S., and Ayadi, F.O., 2008, The Impact of External Debt on Economic Growth: A Comparative Study of Nigeria and South Africa, *Journal of Sustainable Development in Africa* 10 (3), 234-264.
- Azam, M., Emirullah, C., Prabhakar, A.C., and Khan, A.Q., 2013, The Role of External Debt in Economic Growth of Indonesia - A Blessing or Burden?, *Middle-East Journal of Scientific Research* 17 (5), 565-572.
- Babu, J.O., Kiprop, S., Kalio, A.M., and Gisore, M., 2014, External Debt and Economic Growth in the East Africa Community, *African Journal of Business Management* 8 (21), 1011-1018.
- Bakar, A.N., and Hassan, S., 2008, Empirical Evaluation on External Debt of Malaysia, *International Business & Economics Research Journal* 7 (2), 95-108.
- Chowdhury, K., 1994, A Structural Analysis of External Debt and Economic Growth: Some Evidence from Selected Countries in Asia and the Pacific, *Applied Economics* 26 (12), 1121-1131.
- Dikmen, N., 2012, *Ekonometri Temel Kavramlar ve Uygulamalar*, 2. Baskı, Bursa: Dora Basım Yayın Dağıtım.
- Fosu, A.K., 1996, The Impact of External Debt on Economic Growth in Sub-Saharan Africa, *Journal of Economic Development* 21 (1), 93-118.
- Frimpong, J.M., and Oteng-Abayie, E.F., 2006, The Impact of External Debt on Economic Growth in Ghana: A Cointegration Analysis, *Journal of Science and Technology* 26 (3), 121-130.
- Gujarati, D.N., 2004, *Basic Econometrics*, New York: McGraw-Hill.
- Hameed, A., Ashraf, H., and Chaudhary, M.A., 2008, External Debt and Its Impact on Economic and Business Growth in Pakistan, *International Research Journal of Finance and Economics* 20, 132-140.
- Kasidi, F., and Said, A.M., 2013, Impact of External Debt on Economic Growth: A Case Study of Tanzania, *Advances in Management & Applied Economics* 3 (4), 59-82.
- Qayyum, U., and Haider, A., 2012, Foreign Aid, External Debt and Economic Growth Nexus in Low-Income Countries: The Role of Institutional Quality, *The Pakistan Development Review* 51 (4), 97-116.
- Rahman, M.M., Bashar, M.A., and Dey, S., 2012, External Debt and Gross Domestic Product in Bangladesh: A Co-Integration Analysis, *Management Research and Practice* 4 (4), 28-36.
- Shah, M.H., and Pervin, S., 2012, External Public Debt and Economic Growth: Empirical Evidence from Bangladesh, 1974 to 2010, *Academic Research International* 3 (2), 508-515.
- Safdari, M., and Mehrizi, M.A., 2011, External Debt and Economic Growth in Iran, *Journal of Economics and International Finance* 3 (5), 322-327.

- Sulaiman, L.A., and Azeez, B.A., 2012, Effect of External Debt on Economic Growth of Nigeria, *Journal of Economics and Sustainable Development* 3 (8), 71-79.
- Tasos, S., 2014, Debt and Economic Growth: Is There Any Causal Effect? An Empirical Analysis with Structural Breaks and Granger Causality for Greece, *Theoretical and Applied Economics* 21 (1), 51-62.
- Tehereni, B.H.M., Sekhampu, T.J., and Ndovi, R.F., 2013, The Impact of Foreign Debt on Economic Growth in Malawi, *African Development Review* 25 (1), 85-90.
- Uzun, A., Karakoy, C., Kabadayi, B., and Emsen, O.S., 2012, The Impacts of External Debt on Economic Growth in Transition Economies, *Chinese Business Review* 11 (5), 491-499.
- Were, M., 2001, The Impact of External Debt on Economic Growth in Kenya: An Empirical Assessment, *UNU-WIDER Research Paper*, DP2001/116.
- Zafar, M., Sabri, P.S.U., Ilyas, M., and Kousar, S., 2015, The Impact of Trade Openness and External Debt on Economic Growth: New Evidence from South Asia, East Asia and Middle East, *Science International (Lahore)* 27 (1), 509-516.
- Zouhaier, H., and Fatma, M., 2014, Debt and Economic Growth, *International Journal of Economics and Financial Issues* 4 (2), 440-448.