

# The Impacts of External Debt on Economic Growth in Transition Economies<sup>\*</sup>

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The 1989 and following years were the periods in which many important economic and political turnovers took place in the world. That was the time when Berlin Wall fell down with scattering the Eastern block and many politically independent states came into being, at the same time, ongoing about 70 years socialist system also started to change into liberal system. The constituted 27 states in 1991 were tended to liberal economic system instead of socialist economy, and these states were called as transition economies. In this study, the relationship between indebtedness and growth rate of transition countries were analyzed by panel autoregressive distributed lag model (ARDL). Before panel ARDL application, stationary properties of the variables have been checked with first and second generation unit root test. For the second generation unit root tests, CADF tests have been used. Also cross section dependency has been examined by LM tests.

*Keywords:* transition economies, foreign debts, panel ARDL, CADF

## Introduction

One of the economic problems in developing countries is the debt problem. It is clear that, the remainder of revenue after consumption is named as savings and these residuals are canalized to the investment. Consequently, more revenues and employments are created by canalizing more savings to the investments. On the other hand, because of insufficient domestic economic resources and less tendency of saving, countries have difficulties to finance economic development especially in the less developed and developing countries. Hence, investments not provided by domestic sources sufficiently are necessary to accelerate economic growth in developing countries. The more need of investment is quite increasing the need for external debts also (Bilginoglu & Aysu, 2008, p. 2). Even domestic saving rates are high enough, requirement of foreign exchange is still inevitable because of

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<sup>\*</sup> This article is revised form of the proceedings of The Changes in Foreign Debt For The Transition Economies presented at International Conference on Eurasian Economies, 12-14 October 2011, Bishkek, Kyrgyzstan.

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necessity of importing investment goods. In this context for the lack of savings and foreign exchange, the needs for external sources come into being so this event makes the external debts inevitable.

Before starting to borrow from foreign world, the benefits of borrowing are examined. Especially the countries where marginal productivity is relatively high, which means the capital is scarce production factors in those countries, are stressed with benefits of external debt. There are two conflicting views for borrowing; while one of these views argues that countries can increase their economic potential by borrowing, the other one states that borrowing cannot increase the countries' economic potential (Ogunmuyiwa, 2011, p. 29). If the cost of borrowings is greater than its benefits and the gap between costs and benefits of borrowings makes pressure on debt payment, the authorities of the debtor countries may restrict new borrowings. The optimum amount of borrowing to keep sustainable growth depends on suction capacity of economy, balance of payment, term of debts and cost of borrowing. At this point, according to the suction capacity of economies, countries should borrow as they increase their real production (Kozali, 2007, p. 62).

If a country exceeds the debt limit possibly, it will be categorized as a HIPC (Heavily Indebted Poor Countries) and in this case there occur three problems (Presbitero, 2005, pp. 6-8). These are:

(1) Debt overhang problem: As Krugman (1988) and Sachs (1989) stated, if high debt ratios damage economic performance of the countries, it is called as debt overhang problem. High debt ratio can be understood as a tax on created revenue in domestic that is issued by foreigners;

(2) Crowding out effect: As stated before, debt flows can ruin economic performance of debtors. In the study of Chowdhury (2004), Clements, Bhattacharya and Nguyen (2003), and Elbadawi, Benno, and Njuguna Ndung'u (1997), it is specified that in the HIPC countries, the high level of debt ratios can crowd out economic growth because of net assets outflow. So, high levels of debt ratios have deterrent effect on investors;

(3) Uncertainty: The high level of debt ratio indicates high level of risk in debtor countries and the high level of risk discourages foreign and local investors to invest. And also, the high level of debt ratio ruins macroeconomic stability of debtor countries. High level of inflation and interest rate can be experienced in debtors.

In this study, we are trying to analyze the relationships between indebtedness and the openness on the growth rates of transition countries. There are 29 transition countries listed by IMF in 2000. These are Albania, Armenia, Azerbaijan, Belarus, Bulgaria, Cambodia, China, Croatia, Check Republic, Estonia, Georgia, Hungary, Latvia, Lithuania, Kazakhstan, Kyrgyz Republic, Laos, Republic of Macedonia, Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, and Vietnam. The transition countries are the countries who transform their economic structure from social economic structure to liberal one. Transition economies need high level of external resources to build up market oriented institutions and organizations while transforming. Especially, after the structure of internal demand, supported and pressured by government, was released in 1990s, a demand boom was experienced in transition countries. Imported goods and services demand increased enormously. Here, the need for foreign liquidity was also increased in huge amount. In fact, the transition countries under SSR (Soviet Socialist Republic) directorship had zero percent indebtedness until 1991, the year they declared independency from SSR. After 1991, the level of debt ratio started to increase. Generally, the structural reformist economical politics in Soviet countries and the other transition countries aimed to keep sustainable growth and to increase life standards by borrowing outside (Presbitero, 2005, p. 5).

While insufficiency in production comes into existence because of the problems on the link among input-output-market in transition countries, the boosts of import occur because of low production and import

rates. This event reflects itself to the current account with gradually increased gaps. When current account deficits start to increase year by year, sustainable needed capital inflows and applicable stabilization programs have been questioned (Wachtel, 1998, pp. 2-3).

In the study, firstly, we checked the literature then we applied regression models. The data for transition economies are provided from World Bank data base. Our dependent variable is GDP per capita growth rates of transition countries. We analyzed 19 transition countries. These countries are Armenia, Azerbaijan, Belarus, Bulgaria, Cambodia, China, Georgia, Lithuania, Kazakhstan, Kyrgyz, Lao, Macedonia, Moldova, Romania, Russia, Tajikistan, Turkmenistan, Ukraine, and Vietnam. We excluded 10 transition countries from the analysis because of insufficient data. As explanatory variables, external debt to GNI and openness are used. Before regression analysis, we checked the stationary properties of the variables with first and second generation unit root tests. Then, panel autoregressive distributed lag (ARDL) models were applied. The data set are collected between 1991 and 2009 yearly. At last, we discussed the estimation outputs.

### **Theoretical Framework**

One of the studies in literature is Presbitero's (2005, pp. 9-23) study in which 152 developing countries' data between 1977 and 2002 analyzed. He checked the relationship between external debt and GDP per capita growth rate. As control variables, he used lagged term of revenue and other macroeconomic, social and political variables. Negative relationship between external debt and GDP per capita growth rate were found as a result of the study. In addition, growth of the economies is interrupted by crowding out effect which is created by debt service. Growth of the economies declines 0.1% if there is 10% increase in debt ratio. In HPIIC countries, as one percent increase in the debt service, it will cause 0.1% decline in the growth rate.

One of the other articles of Presbitero (2008, pp. 5-20) checked the relationships between external debt to GDP and growth of GDP per capita; and external debt to export and growth of GDP per capita. In the article, population growth rate, openness, inflation rate, term of trade and primary school enrolment were used as control variables. He collected the data between 1980 and 2004 for 114 countries. He found reverse relationship between external debt and growth and he also stated that the countries (in HIPC) who disciplined their debt management can create new external sources.

The article of Uysal, Hüseyin, and Mehmet (2009, pp. 166-176) focused on Turkish economy between 1965 and 2007. They used time series analysis for their study and they tried to analyzed relationship between external debt and growth rate of Turkish economy. As a result of their study, they found negative effect of external debt on the growth rate. The transferred resources from outside is not used in productive field of Turkish economy. It is stated in the article that unproductive consumptions of the country are financed by external debt on the other aspect.

Another study about Turkish economy is Kozali's (2007, pp. 92-116) article that encloses the years between 1970 and 2005. The variables used in the article are GDP, external debt, debt service, public and private investments. In the empirical analysis of the study, cointegration tests that include structural break tests have been applied. Both of external debt and debt service having negative effect on GDP has been reached. Foreign debts used by Turkey are not allocated efficiently and have privative impact on real economy while Turkish economy have excessive external debt problem. Kozali stated that the basic reason of excessive external debt problem of Turkish economy is less domestic saving rate. He suggests that the economical policies enhancing savings should be applied by Turkish governors.

A study about Nigeria's economy was put down on the paper by Ogunmuyiwa (2011, pp. 31-33). He tested the hypothesis of "external debt encourages growth". He collected the data between 1970 and 2007 and he used time series data in the article. Ogunmuyiwa does not accept the hypothesis and as a result it is found that there is reverse but weak relationship between external debt and growth found. He asserted in the study that less growth rate in Nigeria is because of fiscal instability and wastefulness of the government. He suggests to Nigeria's authorities to apply hard fiscal policies and to diverse the government funds to the productive field of Nigerian economy.

The impact of indebtedness on GDP per capita between 1976 and 2003 was examined in 24 countries in Safia's study (2008, pp. 10-16). The explanatory variables used in the model are debt service to export, openness, and domestic investments. Negative coefficient was found for debt service to export in the study. According to the estimation output of the study, openness effects growth positively and as commonly known investment has positive effect on growth.

In Partillo, Hélène, and Luca (2002, pp. 7-20) 92 countries' data were studied between 1969 and 1998. In the article, non-linear effects of indebtedness on growth have been analyzed. As a result, it is concluded that when indebtedness ratio increases hundred percent, GDP per capita growth rate will decrease between 0.5% and 1% in those countries. Also, the decreased GDP per capita growth rate difference is 2% between the countries having external debt less than their export rate and the countries are having external debt ratio more than 300% of their export.

### Empirical Framework

According to the economics literature, indebtedness has positive effect on economies up to a threshold point. After that threshold point, excessive indebtedness starts to effect economies negatively. Because of this, private investments are excluded and financial outflows can be experienced. The relationship between growth and indebtedness reminds optimization problems of debt. Optimization problems of debts are referred as "debt Laffer curve" (Presbitero, 2008, p. 3) (see Figure 1). Expected return on debt increases up to a threshold point as well as the increase of debt stocks. After the threshold point, excessive debt ratios start to effect economies negatively so expected return on debt starts to decline (Bilginoğlu & Aysu, 2008, p. 8). In this part of the study, we have analyzed linear relationship between indebtedness and growth regardless of threshold point. We assume transition countries did not reach threshold point yet.

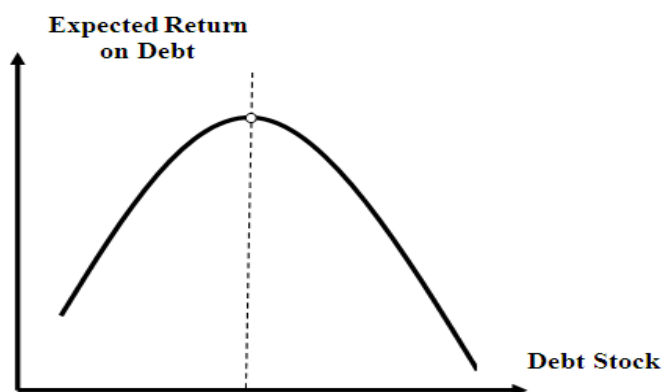


Figure 1. Laffer debt curve (Bilginoğlu & Aysu, 2008, p. 9).

In the empirical framework of the study, we have tried to explain the effect of external debt on transition economies growth rate. As control variables, we have used openness of economies which is calculated as sum of export and import over GDP (Makin, 2001, p. 8). The relationship between dependent and independent variables is stated as:

$$GRWT_{it} = DTGNI_{it} + OPEN_{it} + \varepsilon_{it}, i = 1, 2, \dots, 19 (t = 1991, 1992, \dots, 2010)$$

where, “*GWT*” represents GDP per capita growth rate time series, “*DTX*” represents external debt to export, “*OPEN*” represent openness.

In the empirical part of the study, we checked the stationary properties of the variables, then we regress to static panel data and then we calculate error correction coefficient by panel ARDL model.

### Panel Unit Root Tests

For the first step of the empirical research, we have examined stationary properties of the data. To precede panel ARDL for our model, variables should be stationary or integrated of first order at most (Erdem, Guloglu, & Nazlioglu, 2010, p. 374). Firstly, we have applied first generation unit root tests disregarding cross sectional dependency. The tests are Levin, Lin, Chu, and Im, Pesaran, Shin tests (Levin, Lin, & Chu, 2002; Im, Pesaran, & Shin, 2003). The test results are illustrated in Table 1. To lessen possible cross section dependency among series, we take average of the dependent and independent variables and reduce the average from observation at point (Erdem et al., 2010, p. 375).

Table 1

#### First Generation Panel Unit Root Tests

Variable	LLC		IPS	
	Constant	Constant trend	Constant	Constant trend
<i>GRWT</i>	-6.84***	2.45	-5.65***	1.32
<i>GTGNI</i>	-6.21***	-4.294***	-1.436*	-5.581***
<i>GPEN</i>	-5.09***	-7.83***	-5.02***	-4.97***
$\Delta$ <i>GRWT</i>	0.55	0.83	-5.66***	-4.57***
$\Delta$ <i>DTGNI</i>	-3.787***	-1.469*	-5.581***	-2.752***
$\Delta$ <i>OPEN</i>	-9.75***	-7.03***	-11.01***	-8.3***

Notes.  $\Delta$  is first difference operator; \* is the level of significance at 10%, and \*\*\* is the level of significance at 1%. Newey-West bandwidth selection with Bartlett kernel is used both LLC and IPS. To determine optimal lags, Schwarz info criteria are selected.

As a result of LLC and IPS test, *GRWT*, *DTGNI* and *OPEN* variables are stationary in level. The possible shock on these variables will not cause any bias on the trends. If a shock occurs, it will tend to previous trend level.

Table 2

#### Cross Section Dependence Test Results

	CD LM1	CD LM2	CD LM
<i>GRWT</i>	495.65***	17.55***	-2.95
<i>DTGNI</i>	365.98***	10.54***	3.6***
<i>OPEN</i>	359.68***	10.20***	-3.7*

Notes. \* and \*\*\* indicate rejection of null hypothesis at 10, and 1 percent level of significance. Critical values obtained from Pesaran (2006) Table C. The critical values at 1, 5, and 10 percent level of significance are -4.96, -4.00, and -3.55. We thank to Bulent Guloglu for sharing Gauss codes for CADF test.

We have also checked second generation unit root test that regard cross section dependency. For those types of tests we have applied Pesaran's CADF test (Pesaran, 2006). Firstly, we have checked the cross section dependency by LM tests. Three LM tests have been applied to check cross sectional dependency. One of them, LM1 was developed by Breusch Pagan (1980). Other LM tests are LM2 and LM tests that were developed by Pesaran (2004). LM1 test is useful when N is fixed and T goes to infinity. LM is better to use when N is larger and T is smaller. LM2 test is useful when T and N are larger enough (Guloglu & Ivrendi, 2008, p. 4). LM tests are illustrated in Table 2. The null hypothesis for LM tests is that there is no cross section dependency.

As a consequence of cross dependency tests, we reject the null hypothesis so there is cross sectional dependency among the transitions countries. Thus, we have used the series which the cross sectional dependency have been lessened by taking average of the dependent and independent variables and reduced the average from observation at point  $t$ .

The CADF unit root test is illustrated in Table 3.

Table 3

*CADF Unit Root Test Results.*

	<i>GRWT</i>		<i>OPEN</i>		<i>DTGNI</i>	
	Cadf Stat	Lag	Cadf Stat	Lag	Cadf Stat	Lag
Armenia	-5.828***	1	-5.5789***	1	-5.481***	1
Azerbaijan	-5.295***	2	-2.629	4	-5.345***	1
Belarus	-7.447***	4	-3.8214*	3	-3.749*	2
Bulgaria	-2.419	2	-4.6925**	3	-2.972	3
Cambodia	-3.846*	5	-3.3662	4	-1.788	4
China	-1.531	5	-3.4758	5	-3.292	5
Georgia	-2.104	3	-5.8965***	1	-3.651	5
Lithuania	-2.801	4	-4.9036**	3	-3.988*	1
Kazakhstan	-8.068***	1	-6.6655***	1	-2.7	1
Kyrgyz	-1.387	3	-5.7988***	3	-2.888	4
Lao	-3.217	4	-6.0797***	1	-4.533**	1
Macedonia	-3.924*	5	-7.0416***	2	-4.852**	1
Moldova	-6.24***	5	-6.2155***	1	-5.818***	1
Romania	-2.495	3	-4.9562**	1	-7.152***	1
Russian	-3.744*	1	-5.1102***	2	-4.724**	3
Tajikistan	-2.247	5	-3.8721*	3	-5.285***	4
Turkmenistan	-3.339	5	-4.3004**	3	-3.307	3
Ukraine	-5.904***	1	-5.2399***	1	-4.732**	1
Vietnam	-10.22***	1	-2.8089	5	-3.409	5
CIPS stat for all $i$	-4.32**		-4.87**		-4.193**	

Notes. \*, \*\* and \*\*\* indicate rejection of null hypothesis at 10, 5, and 1 percent level of significance. Lags length selected according to SIC. Critical values obtained from Pesaran (2006) Table C. The critical values at 1, 5, and 10 percent level of significance are -4.96, -4.00, and -3.55.

As a result of LLC, IPS and CADF tests, we decided that the series of *GRWT*, *DTX* and *OPEN* are stationary.

### Static Panel Data Analysis and Testing for Time Fixed Effect

We use a specific country group (transition countries) in the study so fixed effect panel data analysis is useful (Baltagi, 2008, p. 14). We have tested time fixed effect by testparm and we could not reject the null

hypothesis that is “there is no time-fixed effect” so there is no time fixed effect for this analysis. The testparm statistic was obtained by Stata program. Thus, we have used “one way fixed effect panel data analysis” illustrated in Table 4.

As a result of one way fixed effect panel data analysis we got positive sign for *DTGNI* and *OPEN*. The coefficients of the independent variables are statistically significant. For transition countries, external debt has positive effect on growth rate

Table 4

*One Way Fixed Effect Panel Data Analysis Results.*

Dependent variables: <i>GRWT</i>		
Independent variables	Coefficient	Std. err.
<i>DTGNI</i>	0.0779***	0.015
<i>OPEN</i>	0.058***	0.0205
cons	0.473	0.449
<i>R</i> -sq.	0.08	
<i>F</i> stat.	15.98***	
Testparm	16.45***	

Note. \*\*\* is level of significance at 1 percent.

**Panel Autoregressive Distributed Lag Model**

Through having stationary in mixed order variables and to see long run relationships between dependent and independent variables we use panel ARDL model. It is convenient to work with following way as parameterized by Pesaran, Shin, and Smith (1999).

The equation form of the ARDL model stated like:

$$\Delta GRWT_{it} = \alpha_i + \phi_l GRWT_{i,t-1} + \delta_l^* DTX_{it} + \theta_l^* OPEN_{it} + \sum_{j=1}^{p_i-1} \beta_{ij}^{**} \Delta GRWT_{i,t-j} + \sum_{j=0}^{q_i} \delta_{ij}^{**} \Delta DTX_{i,t-j} + \sum_{j=0}^{k_i} \theta_{ij}^{**} \Delta OPEN_{i,t-j} + \varepsilon_{it}$$

where,

$$\phi_l = -(1 - \sum_{j=1}^{p_i} \beta_{ij}), \delta_l^* = \sum_{j=0}^{q_i} \delta_{ij}, \theta_l^* = \sum_{j=0}^{k_i} \theta_{ij}; n = 1, 2, \dots, 19; t = 1991, 1992, \dots, 2010.$$

Panel ARDL results were calculated by Stata 10 and estimation output stated at Table 5.

Table 5

*Panel ARDL Estimation Result*

Pooled mean group regression (PMG)			Mean group regression (MG)		
Independent variables	Coefficient	St. error	Independent variables	Coefficient	St. error
<i>DTGNI</i>	0.0726***	0.0191	<i>DTGNI</i>	-3.37	3.44
<i>OPEN</i>	0.0724***	0.0167	<i>OPEN</i>	0.949	0.73
<i>EC</i>	-0.553***	0.0719	<i>EC</i>	-0.668***	0.0944
$\Delta DTGNI$	-0.224***	0.0622	$\Delta DTGNI$	-0.213***	0.059
$\Delta OPEN$	0.0424**	0.0190	$\Delta OPEN$	0.029	0.029
Cons.	1.517***	0.352	Cons.	1.487***	0.38

Hausman test results: Chi2(2)= 1.98 and Prob>chi2 0.37

Notes. \*\* and \*\*\* indicate 5 and 1 percent level of significance.

As a result of Hausman test, we prefer PMG regression instead of MG. The long run coefficient of *DTGNI* variable has positive sign. That means external debt has positive effect on growth rate in long run. As theoretically expected, *OPEN* has positive sign. Both of explanatory variables are statistically significant.

External debt to *GNI* variable is statistically significant and has negative sign in short run. Open has positive sign and it is statistically significant. And also, we found error correction coefficient statistically significant and having negative sign. If possible shocks on debt and openness cause bias on equilibrium growth rate, it will tend to equilibrium at the level of 55% in a year. As a consequence, even debt has negative effect on growth rate of transition countries in short run; it has positive effect on growth in long run.

### Conclusion

The transition countries have started to have market oriented economy following 1991. In order to change economic structure into market based economy, transition countries need external sources. In addition, problems on the link between production-marketing and income-saving have enhanced need for external sources. In the study, we have analyzed the relationship between GDP per capita growth rate and external debt to GNI between 1991 and 2009 in the transition countries. As a result, we found positive relationship between debt and growth rate of the countries in long run. The transition countries are still at the positive slope side of the debt Laffer curve.

While following open market economic policies, the authorities in transition countries should take into account cost of using external debt. External debt has positive effect on the growth rate of transition countries just for now but they should perform disciplined fiscal and monetary policies, also they should balance current account.

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