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THE EFFECT OF EXTERNAL DEBT ON REAL ECONOMIC SECTOR IN SELECTED CESEE COUNTRIES

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Abstract

Previous studies indicated different results regarding the impact of external debt on economic growth in various countries. These different results may be due to the non-linear impact of external debt on real economic sector. The investigation of a non-linear and dynamic relationship can help governments make appropriate policies versus external debt. In this regard, this paper investigates the impact of external debt on real economic sector in selected countries from central, eastern and south-eastern Europe countries during the period 2000-2014. Investigation in this paper contributes to the literature by covering the non-linear and dynamic relationship to know whether external debt affects the real economic sector of selected CESEE countries. The results of the Generalized Method of Moments based on a dynamic panel data indicate that the impact of external debt on gross domestic product was negative and significant in mentioned countries. Therefore, external debt should be properly applied in which increase the investments with high rate of return. Our empirical findings send a warning about the need to keep the external debts under control.

Keywords: external debt, real economic sector, dynamic panel data, CESEE.

JEL Classification: C33, F34, H62

Introduction

External debts bear special importance in economic, political and managerial aspects. External debt means getting different foreign loans requested by the government or the private sector (World Development Report, 1993, p.316). In developing countries, this action is taken to lift the constraints on government's financial gap and capital formation in order to facilitate the process of economic growth (Karakoy, Kabadayi and Emsen, 2012, p.491).

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It should be taken into account that increased external debt can have undesirable consequences. Generally, two viewpoints can be presented about the external debt. According to the first viewpoint, countries can increase their economic growth and capacity through external debt. However, the second viewpoint states that the impact of external debt on economic growth and capacity of countries is negative (Ogunmuyiwa, 2011, p.29). There is also another viewpoint stating that the impact of external debt on real economic sector is vague in a way which is not explainable by linear models (Oleksander, 2003, p.4).

Therefore, the non-linear impact of external debt on real economic sector should also be tested in empirical studies. In this regard, the current paper uses GMM approach based on a dynamic panel data to investigate the non-linear impact of external debt on GDP of selected CESEE countries during the period 2000-2014.

The financial crisis of 2008 made tangible changes in the ratio of external debt to GDP in CESEE countries. Figure no. 1 illustrates that the external debt burden has increased in the wake of crisis amid currency devaluations and widening government deficits, based on data from IMF (International Monetary Fund).

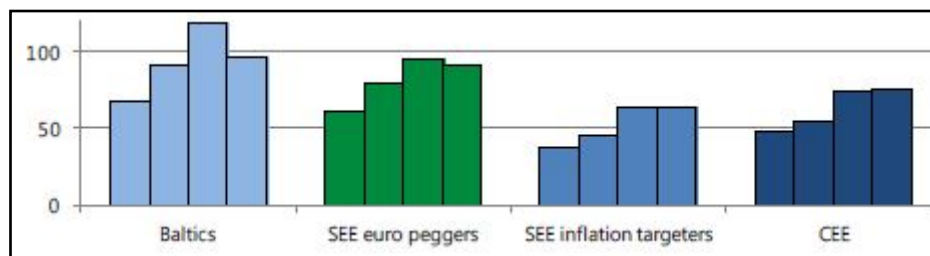


Figure no. 1: External debt (Ratio to GDP, percent)

Source: IMF, 2015

Table no. 1 gives us the information regarding in real GDP growth in selected CESEE countries.

Table no. 1: Real GDP Growth (%)

Countries	2013	2014	2015	2016
Albania	1.4	2.1	3.0	4.0
Belarus	1.0	1.6	-2.3	-0.1
Bosnia	2.5	0.8	2.3	3.1
Bulgaria	1.1	1.7	1.2	1.5
Croatia	-0.9	-0.4	0.5	1.0
Czech Republic	-0.7	2.0	2.5	2.7
Estonia	1.6	2.1	2.5	3.4
Hungary	1.5	3.6	2.7	2.3
Latvia	4.2	2.4	2.3	3.3
Lithuania	3.3	2.9	2.8	3.2
Macedonia	2.7	3.8	3.8	3.9
Moldova	9.4	4.6	-1.0	3.0

Countries	2013	2014	2015	2016
Montenegro	3.3	1.1	4.7	3.5
Poland	1.7	3.3	3.5	3.5
Romania	3.4	2.9	2.7	2.9
Serbia	2.6	-1.8	-0.5	1.5
Slovak Republic	1.4	2.4	2.9	3.3
Slovenia	-1.0	2.6	2.1	1.9
Ukraine	0.0	-6.8	-5.5	2.0
CESEE	1.8	1.4	-0.4	1.3
EU	0.1	1.4	1.8	1.9

Source: IMF, 2015

The main objective of this study is to undertake an empirical investigation about the effect of external debt on real economic sector. Investigation in this paper contributes to the literature by covering the non-linear and dynamic relationship to know whether external debt affects the real economic sector of selected CESEE countries. This study hypothesizes that external debt of mentioned countries has a negative relationship with GDP through a non-linear and dynamic approach. While the previous literature is not entirely clear on the link between external debts and real economic sector, this study might send a warning about the need to keep the external debts under control.

This paper is structured as follows. In the next section, related literature has been reviewed. Section (3) explains the research methodology. Empirical analysis has been presented in fourth section. Finally, section (5) concludes the paper.

1. Literature review

The theoretical literature on the impact of external debt on macroeconomic sector can be divided into three main groups. The first group believes that the optimal level of external debt has a positive impact on economic growth. According to the second group, the accumulation and excess of external debt would result in a negative impact on economic growth. Finally, the third group combines the theories provided by the first and second groups to state that the impact of external debt on economic growth has a non-linear nature (Oleksander, 2003, p.4). The last theory can also be explained by Laffer curve assuming that the larger amounts of debt decrease the likelihood of repayment after a specific level. This curve can be seen in figure no. 2.

Pattillo, Poirson and Ricci (2011, p.1) indicate that the peak of the Laffer curve, after which the impact of external debt on economic growth would be negative, was equal to 35-40% of the debt share of GDP in developing countries.

An expanding number of empirical studies have investigated the impact of external debt on macroeconomic variables. In many different studies, the conventionally used economic growth has been analysed for several decades. Cohen (1992) argues that there is a non-linear relationship between foreign borrowing and investment, and in consequence on growth. Were (2001) used time series data for the period 1970-1995 and revealed that external debt accumulation has a negative impact on economic growth and private

investment. Dao (2011) used a sample of 27 heavily indebted countries and found that external debt as a percent of GDP exerts a negative impact on growth. Safdari and Mehrizi (2011) analysed the effect of external debt on real economic sector in Iran for the period of 1974 to 2007. Their results show that the external debt had a negative effect on gross domestic product. Uzun et al. (2012) analysed 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 in long-run. 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 affects economic growth negatively. Mihut and Calea (2015) analysed the relationship between economic growth and external debt, concentrating upon the channels through which this factor influences the evolution of this process. Using a sample of data for 28 member states of the European Union revealed that there is a negative relationship between economic growth and the external debt service.

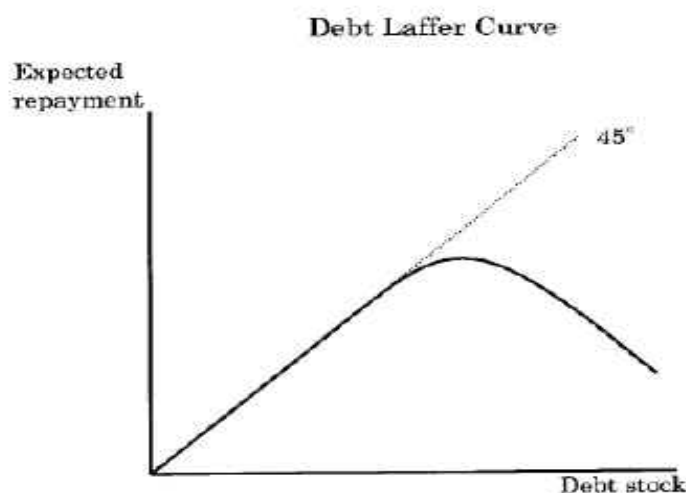


Figure no. 2: Debt Laffer Curve
Source: Osinubi and Olaleru, 2006, p. 175

2. Methodology

This is an applied study in which the statistical population included 19 CESEE countries[‡] from 2000 until 2014. All data were extracted from the World Bank Database (WDI) and econometric methods have been employed based on a dynamic panel data.

The application of common econometric methods to estimate the coefficients of the model using panel data are also based on this assumption that the variables are stationary. A variable is stationary when the mean, variance, covariance, and autocorrelation coefficients remain constant over the time. The fact that the distribution function of variables may

[†] This is an index represents the income distribution among a nation's residents.

[‡] Albania, Belarus, Bosnia, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Moldova, Montenegro, Poland, Romania, Serbia, Slovak Republic, Slovenia, Ukraine.

change by time indicates the necessity of investigating the stationarity of this function in different analyses. Perhaps, neglecting this problem in different models would result in coefficients leading to both the impact of change in distribution function and change in the value of variable. In other words, it may result in spurious regression. In recent years, it has been especially important to investigate the stationarity and co-integration in panel data models. In this regard, studies conducted by Hadri (2000), Im, Pesaran and Shin (2003), and Levin, Lin, and Chu (2002) can be pointed out. In fact, since one dimension of panel data models is time, it is essential to investigate the stationarity of variables used in the model before estimating the coefficients.

In a panel data framework, our variables include GDP representing the real economic sector, total labor force, gross fixed capital formation as an index for investment, and the ratio of external debt to GNI coefficient as an index of external debt[§].

In this paper, the econometric analyses based on dynamic panel data were used to test the relationship between external debt and real economic sector in selected CESEE countries. In addition, the impacts of some control variables were taken into account. Given the research objectives, this paper is going to investigate the impact of explanatory and control variables on real economic sector^{**}. The definition of variables can be found in table no. 2.

Table no. 2: Definition of Variables

Variable	Type	Definition
GDP	dependent	gross domestic product (constant 2005 US\$)
L	independent	total labor force
K	independent	gross fixed capital formation (constant 2005 US\$)
ED	independent	ratio of external debt to GNI coefficient (%)

Source: World Bank's World Development Indicators, 2015

Inspired by the theoretical framework, the specified model is as below:

$$GDP_{it} = \alpha_0 + \alpha_1 GDP_{it-1} + \alpha_2 L_{it} + \alpha_3 K_{it} + \alpha_4 ED_{it} + \varepsilon_t \quad (1)$$

where:

i – refers to countries while t represents the time period;

ε – indicates the error term. GDP stands for gross domestic product which is the dependent variable;

ED – represents the ratio of external debt to GNI coefficient.

Other variables influencing GDP , considered in the equation including in L and K representing the total labor force and gross fixed capital formation, respectively. α_0 represents constant for the model. α_1 , α_2 , α_3 , α_4 represent the coefficients of the regression equation.

[§] We took External debt as a percentage of GNI in which a high ratio means that a particular country would face difficulties in generating enough income to service its external obligations. And the reverse is true for a low External Debt % of GNI.

^{**} The statistical description of variables can be found in next section.

It sounds that the real economy has emerged as a result of many economic factors over the time. Therefore, it is highly probable that GDP follows a dynamic approach. This dynamism will produce reliable results if it is considered in the model. Thus, the current study considered the lag of gross domestic product (GDP_{it-1}) to create the necessary dynamism in the regression model.

Although considering the lagged dependent variable to be the explanatory variable in the panel regression model results in dynamism, it leads to the contravention of non-autocorrelation assumption among explanatory variables and residuals. In such circumstance, using the Ordinary Least Squares (OLS) model would have incompatible and biased results. We use Generalized Method of Moments (GMM) estimator, developed by Arellano and Bond (1991), and Arellano and Bover (1995) for dynamic panel regression models, to solve this problem. This method uses the lag of variables as an instrumental variable to remove the autocorrelation among dependent variable and residuals. Therefore, the current study employed GMM procedure based on a dynamic panel data approach to achieve the research objectives. In this regard, the instrumental matrix is employed to remove the correlation of lagged variable and other explanatory variables. The Sargan test is applied to investigate the validity of instrumental matrix. The null hypothesis of Sargan test indicates the non-correlation of instruments with residuals.

3. Empirical findings

Our data pertaining to the following variables were collected from WDI (World Bank database) during the period 2000-2014. The statistical description of variables provides us a better look at the model before estimation. The relevant information can be found in table no. 3.

Table no. 3: Descriptive Statistics

	GDP	L	K	ED
Mean	4.48E+10	5884879	1.08E+10	70.25303
Median	3.01E+10	3429375	7.40E+09	65.59591
Maximum	1.24E+11	23685095	4.27E+10	198.0724
Minimum	2.12E+09	243762.0	4.17E+08	17.48351
Std. Dev.	4.06E+10	6877407	1.02E+10	35.37948

Source: Research findings

According to table no. 3, all the variables have positive means. GDP has the highest mean, median, maximum, and minimum among the variables. The median indicates that 50% of data are above the middle number in the set and 50% of data are below the middle number in the set. Therefore, half of the observations pertaining to external debt are ≤ 65.59591 . The highest standard deviation belongs to GDP because of different sizes of sample economies. On average, there were 5884879 labor forces in the geographical territory of this study.

Like time series, the econometric modelling with panel data was based on the stationarity of variables. Therefore, it was necessary to test if the variables were stationary before estimating the research model. Because the existence of unit roots whether in time series data or panel data could result in spurious regression. In this study, the unit root test, introduced by Levin, Lin and Chu (2002), was used to investigate if the variables are

stationary. The Levin, Lin and Chu (2002) test examines the null hypothesis indicating there is a unit root (non-stationary). The unit root test results can be seen in table no. 4.

Table no. 4: Unit Root Test

	GDP	L	K	ED
Statistic	-3.46039	-3.89657	-3.29348	-3.18412
Prob.	0.0003	0.0000	0.0005	0.0007

Source: Research findings

As it is obvious, the null hypothesis stating the variables are non-stationary is not confirmed at statistical significance level. In other words, according to the test results, all variables are stationary.

The results of panel GMM estimation can be seen in table no. 5.

Table no. 5: Panel GMM Estimation Results

	GDP(-1)	L	K	ED
Coefficient	0.183798	-3761.747	1.035832	-21378388
t-Statistic	2.918483	-1.525028	10.01646	-2.043046
Prob.	0.0044	0.1305	0.0000	0.0438
J-statistic: 90.22611 Instrument rank: 80 Sargan rest: 0.126692				

Source: Research findings

It appears that the real economic sector is influenced by many economic factors over the time. Therefore, it is highly probable that the real economic sector follows a dynamic model. Hence, reliable results will be produced in this dynamism. As expected, the lagged variable of GDP has a positive and significant relationship with dependent variable. On the other hand, if GDP was increased in the previous period, GDP is increased in the current period, too. This can be interpreted in this way that increased economic growth in the current period will increase economic growth in the future or in the next period. The variable of labor force having a negative coefficient indicates that the level of labor force did not have a significant relationship with GDP. However, this finding is inconsistent with the theoretical framework. It appears that this problem is influenced by the institutional and economic structures of studied countries.

According to the results, the variable of gross fixed capital formation, meaning the investment index, has a direct and significant impact on real economic sector. In other words, if the investment is increased, GDP soars. This result is consistent with the theory. As observed, this is a considerable impact with respect to the estimated coefficient. In line with the formulated hypothesis, it can be understood from estimation results that external debt has a negative and significant impact on real economic sector. This obtained result is aligned with Safdari and Mehrizi (2011) and Zouhaier and Fatma (2014). The negative impact of external debt on GDP can be justified in this way that if external debt is increased, the income status of firms is decreased, a fact which reduces GDP. It can also be pointed out that paying attention to the economic growth of CESEE countries has dropped down as much as external debt.

Many economic theories and previous empirical studies indicated that external debt of developing countries has a negative relationship with GDP, considering the negative impact it has on gross domestic investment. According to Krugman (1988, pp. 6-7), if the debt of a country exceeds its ability of repayment, the cost of debt service will become more than production level. It is obvious that the great deal of debt decreases GDP along with reduction in investment. Although borrowing money from foreign countries and spending it to compensate the budget deficit can have good impacts in short-run, it will produce negative impacts in long-run if the money is not spent on infrastructure investments and impetuses before the due date.

The Sargan test was used to estimate the validity of instrumental matrix. In this test, the null hypothesis states the non-correlation of instruments with residuals. The value of probability of Sargan test statistic was calculated to be almost 0.13. Therefore, it can be concluded that the instruments used for estimation are valid enough.

Conclusions

In this study, GMM approach based on dynamic panel data was used to investigate the impact of external debt on real economic sector in selected CESEE countries. In this regard, the needed data were extracted from WDI database from 2000 until 2014. The results of the unit root test indicated that all the variables used in this study were stationary at level.

The results obtained from estimation showed that if GDP is increased in the previous period, it also increases in the current period. The variable of labor force having a negative coefficient indicated that the level of labor force did not have a significant relationship with GDP. However, this finding is inconsistent with the theoretical framework. It appears that this problem is influenced by the institutional and economic structures in studied countries. The variable of gross fixed capital formation, meaning the investment index, has a direct and significant impact on real economic sector. In consistent with the theory, GDP soars if investment is increased. As observed and given the estimation coefficient, this impact was considerable. According to the estimation results, it can be understood that external debt has a negative and significant impact on real economic sector as expected. The negative impact of external debt on GDP can be justified in this way that if external debt increases, the income status of firms will decrease. On the other hand, this fact reduces GDP. It also points out that the external debt has been decreased in selected CESEE countries with respect to their economic growth.

According to the results, it appears that the physical capital stock is an important factor having a positive and significant impact on real economic sector. Therefore, one of the main purposes of governments by borrowing money from foreign countries should be increasing investment. In this regard, foreign loans should be invested in sectors in which the return period is matched with the repayment period. Moreover, loans should also be invested in economic sectors in which rate of return is higher than interest rate. However, our findings send a warning that high external debts might be dangerous for real economic sector. These findings should be taken as a signal to policy makers in selected CESEE countries to pay more attention on their external debts.

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