

Public Debt and Economic Growth in the Western Balkan Countries

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Abstract The paper empirically examines the relationship between public debt and economic growth in the Western Balkan countries during the period from 1995 to 2017 (both years inclusive). The study attempts to identify and determine the threshold values or the extent to which public debt-to-GDP ratio has a positive effect on economic growth, and beyond which point debt has a negative effect on the economic growth in Western Balkans countries. For this purpose, we employ different econometric models and techniques such as pooled OLS, fixed and random effects models, and GMM (Generalized Method of Moments). The results are consistent with the theoretical hypothesis that lower level of public debt has a positive effect on economic growth, and beyond certain threshold level it inverts into a negative effect on economic growth. The results show that the debt-to-GDP ratio *turning point is between 50% and 60%, which means that any increase of public debt up to this point has a positive impact on economic growth, however, it inverts to a negative effect beyond this point.* The findings of this study are useful for governments of Western Balkans countries, since it provides them with useful information about the level of public debt, i.e. the point at which the positive effects of public debt on economic growth turn negative.

Keywords: Economic Growth, Public Debt, Turning Point, Panel Date, the Western Balkans.

JEL Classification: E60, E69, E011, H63

1. Introduction

There is a mountain of empirical studies that have investigated the relationship between public debt and economic growth. However, the empirical evidence is still inconclusive and debatable regarding the threshold of the public debt. Most of the

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studies show that lower public debt or debt below a certain threshold value has positive effect on economic growth (Reinhart and Rogoff 2010, Baum et al. 2013, Woo and Kumar 2015, Taylor et al. 2012, Irons and Bivens 2010, Pescatori et al. 2014, Rankin and Roffia 2003). Surprisingly, only a few studies have examined the issue of public debt, and how the threshold value of public debt affects economic growth in transition countries, particularly in Western Balkan countries (Mencinger, Aristovnik & Verbic, 2015; Checherita & Rother, 2010). Western Balkan countries have been faced with several problems including war, political instability, hyperinflation, high public debt and the collapse of their financial sector. In the process of transitioning, these countries now offer an interesting case study, particularly with regard to relationships between public debt and economic growth. Therefore, the aim of this paper is to examine the public debt threshold value and its effect on economic growth in the Western Balkan countries. To examine the relationships between public debt and economic growth we propose the following research hypothesis:

H1: Debt-to-GDP ratio below certain point of threshold value for Western Balkan countries has a positive impact on economic growth.

H2: Debt-to-GDP ratio over certain point of threshold value for Western Balkan countries has a negative impact on economic growth.

To test the hypotheses we employ different econometric models and techniques such as pooled OLS, fixed and random effects model, and GMM (Generalized Method of Moments). The data, for this paper have been collected from World Bank (WB), International Monetary Fund (IMF), **European Union (EU), Open Data Portal (EU ODP)**, and European Bank for Reconstruction and Development (EBRD).

The main argument for this study is that only a few studies have examined the threshold value of public debt and its effect on economic growth in Western Balkans countries, hence a gap exists in the literature that this study seeks to fill.

To summarize, the findings of this study show that the debt-to-GDP ratio *turning point is between 50% and 60%, which means that any increase of public debt up to this interval has a positive impact on economic growth, and higher than this interval, the positive effect inverts and higher debt-to-GDP ratio has a negative effect on economic growth*. This means that any increase of public debt in Western Balkan countries up to 50% will positively impact economic growth. Another interesting issue is that, squaring debt will also negatively affect economic growth in the Western Balkan countries.

The remainder of this paper is organized as follows: Section 2 reviews of literature; Section 3 presents research methodology and data; Section 4 provides the results and discussion, and Section 5 provides the findings and conclusion.

2. Literature Review

There are several authors who have examined the effect of public debt threshold value on economic growth, both developed, and countries in transition (Meade 1958, Checherita and Rother 2010, Baldacci and Kumar 2010, Egert 2013, Wigger 2009, Baum et al 2013, Schclarek 2004, Modigliani 1961, Buchanan 1958, Adam and Bevan 2005). However,

there are only few studies that have examined the public debt threshold value and its effect on economic growth in countries in transition, particularly the Western Balkan countries. Noted is the fact that the empirical evidence does show consensus relating to the public debt threshold value and its effect on economic growth. The study by Mencinger, Aristovnik, Verbic (2015) found that the public debt threshold in developed countries is ranged from 90% to 94%, which means that above this public debt threshold, it will have a negative effect on economic growth. However, the public debt threshold below 90% will have a positive effect on economic growth. In addition, the findings show that public debt threshold limit in developing countries is ranged from 44% to 45%, below this limit the public debt will have positive effects on economic growth, while above this limit it will have a negative impact on economic growth. These findings suggest that there is a difference between developed and developing countries with regard to the relationship between public debt and threshold value.

Checherita and Rother (2010) examined the public debt threshold in the EU countries and found that the public debt threshold value ranged from 82% to 91%. If the public debt is above this threshold, it will have a negative effect on economic growth in EU countries. On the other hand, if the public debt remains below the threshold value of 82%, it will have a positive impact on economic growth, and will foster the economic growth on these countries.

The study by Baum and Rogoff (2010) investigated the impact of public debt on real long-term GDP growth rates, taking into account a sample of 24 developing countries, over a period of nearly 200 years (1790-2010). They have found that the public debt may have positive effect on economic growth in the short run, while in the long run the public debt has been rated as negative by systematically curbing the growth and economic development of these countries. Baldacci and Kumar (2010) examined the impact of fiscal deficits and public debt on long-term interest rates during 1980–2008, taking into account a wide range of country-specific factors for a panel of 31 advanced and emerging market economies. The authors found that higher deficits and public debt lead to a significant increase in long-term interest rates, which in turn lead to decrease of economic growth.

Panizza and Presbitero (2014), and Afonso and Alves (2014) analyzed the linkages between growth, public debt and productivity in the 155 countries over the period 1970-2008. The authors found that there is a negative effect of debt ratio to GDP and financial crisis on economic growth. Afonso and Alves (2015) analyzed the effects of sovereign debt-to-GDP ratio on economic growth for 14 European countries over 43 years (1970-2012). The study concluded that government debt has a negative effect on economic growth, both, in the short and long-term. This contrast with Panizza and Presbitero (2013) who showed that there is no evidence that debt has an effect on economic growth and there are different ways through which a large public debt may harm the economy.

Ghosh et al. (2013) examined empirically a sample of 23 advanced economies over 1970–2007 and found robust empirical support for the fiscal fatigue characteristic. They found that the marginal response of primary budget balance to lagged debt is nonlinear, remaining positive at moderate debt levels but starting to decline when debt reaches

around 90-100 percent of GDP. Furthermore, they found that the estimated debt limits and corresponding fiscal space vary considerably across countries. For example, the debt limit obtained for countries in the sample ranges between 150 to 250 percent of GDP, while the fiscal space estimates indicate limited or no available fiscal space for Greece, Iceland, Italy, Japan and Portugal, and ample space for Australia, Korea and the Nordic countries.

Gnegne and Jawadi (2013) analyzed public debt and its dynamics for the UK and the USA, and public debt proved to be asymmetric and nonlinear making the authors conclude that public debt seems to be based on several threshold effects, which helps to understand its dynamics with more accuracy. Schclarek (2004) found that a significant relation between the government debt and economic growth could not be identified for the industrialized countries. For the developing countries, low levels of external debt are associated with higher growth rates. The reverse, is not caused by private external debt, but rather by the incidence of public external debt.

To summarize, it is clear that a considerable number of studies have analyzed the effect of the public debt on economic growth in developed countries. However, there are very few empirical studies addressing the relationship between public debt and economic growth in countries in transition, especially in countries of the Western Balkans. This paper will attempt to contribute to the issue, by investigating how growth of public debt, will affect the economic growth in the Western Balkan countries. This research will also attempt to determine the optimal threshold value, and to what level does the increase of public debt to GDP ratio affects positively the economic growth of the Western Balkan countries.

3. Research Methodology And Data

3.1. Research Methodology

The empirical analysis contains panel data over the time period from 1995 to 2017 (approximately 22 years) for Western Balkans countries. These countries are Albania, Kosovo, Montenegro, Serbia, Macedonia, Croatia, and Bosnia and Herzegovina. The dynamic panel model (GMM) are employed to test the relationships between debt to GDP and GDP per capita and other independent variables in the Western Balkans. We apply Arellano and Bond (1991), Blundell and Bond (1998), Blundell and Bond and Windmeijer (2000) GMM estimator as it is proper estimator. The GMM procedure also allows us to control for problem of endogeneity bias caused by reverse causality running from GDP per capita to debt to GDP and other explanatory variables. In order to deal with endogeneity problem we employ instrumental variable (IV) or two steps GMM estimators instrumental (IV). It is relatively common practice with macroeconomics data to use the lagged debt to GDP ratio and the lagged debt to GDP ratio squared as instruments with two lags. This instrument has the advantage of not having a direct causation effect on the growth rate, if it is assumed that there are not spillover effects between debt levels in Western Balkans countries. The endogeneity problem is also avoided in our specification because independent variables are all lagged 1 or 2 years compared to the dependant variable. For the comparison purpose, we apply and OLS,

fixed effect model and random effect model. The reliability of the GMM estimator depends on the validity of its instrument sets. To address this issue, we consider two specification tests suggested by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1997). The first is the Sargan test that tests the null hypothesis of over-identification restrictions apply or instruments as group are exogenous.

This test proves or rejects the overall validity of instruments by analyzing the sample analog of moment conditions used in the estimation process. The second test examines the null hypothesis that autocorrelation does not exist, which means that the error terms are not serially correlated. In the difference regression, we test whether the differenced error term is in first order or in second-order serially uncorrelated.

The specification of dynamic panel data model (GMM) is as follows:

$$GDP_{it} = \mu + GDP_{(it-1)} + B_1 DEBT_{it} + B_2 DEBT_SQUARE_{it} + B_3 FINANCIAL_CONSUM_{it} + B_4 EXPORT_{it} + B_5 DEFICIT_{it} + B_6 BRUTO_SAV_{it} + B_7 CURRENT_{it} + B_8 FINAL_GOVERNMENT_{it} \gamma_i + \delta_i + \gamma_i + \varepsilon_{it}$$

The dependent variable is GDP per capita growth rate for each country i and t represents years, μ is term of constant; explanatory variables include $GDP_{(it-1)}$ is the first lag of dependent variable, $DEBT_{it}$ is debt and $DEBT_SQUARE_{it}$ represents debt square assuming a non-linear relationship between government debt and economic growth. Based on the theoretical assumption that the relationships between public debt and economic growth is non-linear, we expect lower debt to have a positive effect and debt in square to have negative effect on economic growth. We also include and control variables in order to enhance the performance of model and to provide robust result. The control variables are selected based on the main determinants of economic growth (see Sala-i-Martin, 2004; Kumar and Woo, 2010; Checherita and Rother, 2010). The control variables are final consumption, exports, deficit budget, gross savings, current account and government expenditures.

The term δ_i is the country fixed effect that enables us to control for time-invariant unobservable factors that may affect economic growth which otherwise may lead to bias coefficients. The term γ_i is the common time effect that covers business cycle effect which otherwise may lead to spurious regression between dependent variable and explanatory variables. The term ε_{it} represent standard error.

3.2. Descriptive Statistics

We provide summary statistics for the paper in Table 1. The tables A1 and A2 contain information on data and data source.

Table 1. Statistical description of exogenous and endogenous variables

Variables	OBS	Std.Dev	Min	Max
Gdp	137	9.6838	-12.1466	88.9577
Gdplag	117	10.39864	-10.2	88.9577

Variables	OBS	Std.Dev	Min	Max
Debt	137	25.92949	18.71	202.807
Debt_Square	137	5472.188	350.0641	41130.68
Exsport	137	9.203267	9.85325	49.3784
Final_Consum	137	12.46817	76.6059	138.533
Budget_Deficit	121	26.46458	-240.777	8.84207
Bruto_Saving	137	19.00817	-9.99257	180.22
Current_Account	137	23.31612	-194.547	87.8242
Final_Government_Expenditure	137	4.808863	6.48292	29.9406

Source: Authors' calculations

4. Empirical Results

Table 2 shows the estimation results from equation (1). The results show that all calculated dynamic panel models are well modeled, as the coefficients of lagged real GDP per capita are statistically significant. Furthermore, the Sargan -test for identification restrictions in the presence of heteroscedasticity with the associated p-value which examines the validity of the instrumental variables is accepted (obtained in the second steps result) as healthy instruments for all estimated equations. Therefore, the results from GMM estimator proves the hypothesis that instrumental variables are not correlated with the set of residuals. As a result, Arellano – Bond test AR(1) and AR(2) tests with associated p-values are rejected in the first order while, it is accepted in the second order, which confirms that there is no autocorrelation in the second order between the errors term (by construction, the differenced error term is first-order serially correlated even if the original error term is not).

Both are asymptotically normally distributed. The confidence intervals (CI) of the debt turning point are generated through bootstrapping based on a normal distribution. The bootstrap method is based on simulations used to derive the coefficients and calculate the turning points. Confidence intervals are subsequently calculated based on the resulting distribution of the turning points. The result shows that turning points or threshold value is ranged in the intervals between 47 and 62 % of GDP.

Table 2. Results from regression analysis

Variables	OLS Model 1	Fixed Effects Model 2	Random Effects Model 3	GMM Model 4
Gdp_Lag	0.0203***	-0.041**	0.013**	-0.0419*
Se	(0.00598)	(0.00286)	(0.0076)	(0.00295)

Debt	0.014*	0.0849**	0.0183*	0.0846**
Se	(0.00816)	(0.00170)	(0.0076)	(0.00215)
Debt_Square	-0.02*	-0.04***	-0.002*	-0.0004**
Se	(-0.0004)	(-0.0075)	(-0.001)	(-0.0001)
Export	-0.0257**	0.7009*	-0.02**	0.0794*
Se	(-0.0011)	(0.00323)	(-0.007)	(0.00310)
Final_Consum	0.0951**	0.1212*	0.09***	0.1264**
Se	(0.0050)	(0.004)	(0.037)	(0.006)
Budget_Deficit	-0.057*	-0.0975**	-0.06**	-0.089*
Se	(0.00326)	(0.0045)	(-0.002)	(-0.0083)
Bruto_Saving	0.254**	0.2355***	0.247*	0.252***
Se	(0.001)	(0.000)	(0.000)	(0.000)
Current_Account	-0.1524***	-0.1083**	-0.14**	-0.1064*
Se	(0.000)	(0.000)	(0.000)	(0.000)
Final_Government_Exp	0.1081*	0.0979***	0.096**	0.1382**
Se	(0.00615)	(0.00554)	(0.0063)	(0.0465)
Constant	-12.4185**	-19.64**	-12.29*	--
Se	(0.157)	(0.026)	(0.145)	--
Observation	102	102	102	83
Arellano - Bond test for AR (1)	--	(0.000)	--	(0.000)
Arellano - Bond test for AR (2)	--	(0.363)	--	(0.363)
Sargan Test	--	-	-	(24.543)
$\chi^2_{(56)prob}$				(0.8123)
Turning Point				53,37
95% CI bootstrap				(47;62)
- normal-based CI				

Source: Authors' calculations

Note: GDP Per capita (Economic Growth) is a dependent variable. In all GMM regression are used with robust standard error. Robust standard error in parenthesis, *, **, ***, denote significance at the 10%, 5% and 1% respectively. Sargan test shows the p-value for null hypothesis of the validity of instruments (obtained second steps result). The AR (1) and AR (2) are p-values for first and second order of auto correlated of errors term (obtained in the second order). The confidence intervals (CI) of the debt turning point are generated through bootstrapping based on a normal distribution.

Table 2, shows the regression results. Applying different econometric techniques, the regression results show that all the models have almost same results regarding the effect of debt to GDP on GDP per capita growth. The important part of this research is the turning point of the public debt that is determined. The results show that the turning point of the effect of public debt to GDP ranged from 47% to 62%, more specifically, the turning point is 53.37%. An increase of debt to GDP over this limit would have a negative effect on GDP per capita in the Western Balkans. From the results of the GMM estimator (table 2), one will argue that if the debt to GDP is lower than the turning point, it will have a positive effect on GDP per capita in Western Balkan countries. Furthermore, Debt Square (debt^2) to GDP provides a non-linear impact of debt to GDP on GDP per capita in the Western Balkan countries, this produces a concave (inverted U-shape) relationship between the public debt and the economic growth. The coefficient is statistically significant. The result is consistent with result of Checherita et, al. (2010)

Based on the result, we find out that the turning point is 53.37%, which means that an increase of public debt to GDP below to this level (turning point) will have a positive impact on economic growth in Western Balkan countries. As results, supports H1 which is consistent with Keynesian Theory which posits that low level of public debt can lead to economic growth, but may be negatively influenced by the high level of public *indebtedness* which can be characterized by tax increases, fall in investment, and increased consumption spending. Based on the results of this study, we can conclude that, if public debt grows in Western Balkan countries for long periods, the effects will be negative on economic growth. This could occur because those countries are still in development stage and are facing with economic and financial instability.

Each excessive increase of public debt may exacerbate the economic system as well as economic growth in general. Based on the results, it can be seen that the threshold value or limit of the growth of public debt to GDP ranged from 47% up to 62%. So, the turning point is 53.73%, which means that overcoming of this level would have a negative impact on economic growth. So, the result supports H2.

As seen from the Table 2, export has a positive impact on economic growth in the Western Balkans countries. An increase of export by 1% its effect will be positive by 0.0794% on economic growth. Furthermore, if the final consumption increases by 1%, it will have a positive effect of 0.1264% on the economic growth. The budget deficit has a negative impact on economic growth and the coefficient is statistically significant. An increased budget deficit by 1%, it will have a negative impact on the economic growth by 0.089% in the Western Balkans countries. Current account has a negative impact on economic growth, whereas the gross saving has a positive impact on economic growth. These results are consistent with the theory of Harrod and Solow growth theory, which highlighted the positive impact of the gross savings on economic growth in the long term. In addition, government expenditures has a positive coefficient estimated by GMM estimator. If the government expenditures increased by

1% it will have 0.1382% effect on economic growth and the coefficient is statistically significant. The result is consistent with result of (Adam and Bevan (2005), Cohen (1993), Elmendorf and Mankiw (1999)).

5. Conclusions

Applying different econometric techniques, we examined the relationships between public debt and economic growth in seven Western Balkan countries (Kosovo, Albania, Macedonia, Montenegro, Serbia, Bosnia and Herzegovina, and Croatia). This investigation produces evidence of a non-linear impact of public debt on per-capita GDP growth rate in Western Balkan countries. It produces a concave (inverted U-shape) relationship between the public debt and the economic growth rate with the debt turning point at about 47-62% of GDP. This means that a higher public debt-to-GDP ratio is associated, on average, with lower long-term growth rates at debt levels above the range of 47-62% of GDP. On the other hand, if public debt to GDP is below the range of 47-62% of GDP is associated on average with higher long term economic growth in Western Balkan countries. The public debt threshold values of 47-62% of GDP is an average for all the countries in the Western Balkans. The results suggest that for many countries current debt levels already may have a negative impact on GDP growth, given that the average debt-to-GDP ratio (estimated 65.8%) is by now higher the threshold value of 53.37% of GDP. This study provides an additional warning signal to policy-makers.

In addition, government budget deficit and current account are found to be linearly and negatively associated with the economic growth. The evidence that the change in the debt and the budget deficit are linearly and negatively associated with growth (and with the long-term interest rates) may lead to a more negative effect of the public debt even below the threshold value. Hence, targeting a higher debt level to support growth is not a policy option. The other control variables such as *final consumption, export and saving are found to be associated positively with economic growth in the Western Balkans countries. All the coefficients are statistically significant.*

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Annexes

Table A1. The Western Balkan countries

Countries of the Western Balkans
Albania
Kosovo
Macedonia
Montenegro
Serbia
Bosnia and Herzegovina
Croatia

Table A2. Description of the variables

Variables	Code
Economic Growth (% of GDP)	Gdplag
Public Debt	Debt
Debt Square	debt_square
Export	Eksport
Final Consum	final_consup
Budget Deficits	Deficit
Bruto Saving	bruto_saving
Current_Account	current_account
Government Expenditure	final_goverment_expenditure