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The Impact of Public Debt on Economic Growth: Evidence for Balkan Countries

Introduction

The macroeconomic implications of public debt gained huge public attention in the last two decades in many countries and regions around the world, especially in European countries, as a result of the enormous and continuously growing level of indebtedness that occurred after the financial crisis in 2008. The crisis began in late 2007 as a combination of liquidity crunch, expansionary fiscal stimulus programs and recapitalisation of banks, which led to a dramatic increase in the public debt level. These implications have raised serious concerns about fiscal sustainability and the potential negative impact of public debt on financial markets and economic growth in all European countries.

Although the global financial crisis in 2008 prompted vast academic and economic debate on the relationship between public debt and economic growth, most of the empirical studies that investigate the impact of public debt on economic growth focus mainly on the most indebted peripheral Eurozone countries, while other countries from Central and Southeast Europe remained slightly neglected. In that regard, the specific aim of this paper is to empirically examine the impact of public debt on economic growth in the sample of five countries from the Western Balkans (Albania, Kosovo, Macedonia, Montenegro, and Serbia)[1] in the period 2008–2017. The time series cover the period of occurrence and immediate aftermath of the crisis. We also estimate the nonlinear impact of public debt on GDP growth. Based on the studies of Mencinger, Aristovnik and Verbič (2014), and Checherita and Rother (2010), we have applied a dynamic panel data approach to explain the impact of public debt on economic growth. In order to provide consistent and unbiased results, we used two alternative estimation

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[1] Although Bosnia and Hercegovina are Western Balkan countries, they are excluded from the sample due to the unavailability of data.

techniques – the fixed effects model and the difference generalized method of moments (GMM) models.

This paper's main contribution is its geographical coverage, with a small stock of empirical literature on the subject for the region of Western Balkans. According to the knowledge of the author, it is the first study to analyse the effect of public debt on economic growth for this region using a panel investigation. Furthermore, it expands the volume of literature on economic growth by applying a theoretical model with instrumental variables in square regression with the assumed sustainability of public finances in relation to government debt. Finally, the paper's findings can be useful in the further analysis of economic growth and the creation of policies for effective debt management.

The structure of the paper is as follows. Following the introduction, section 1 provides an overview of the empirical literature dealing with this issue. Section 2 presents the sources of the data employed, as well as the study methodology. Section 3 presents the empirical results and the last section concludes and gives policy recommendations.

1. Literature review

This section presents a brief overview of empirical literature concerning the relationship between public debt and economic growth. There are empirical studies that analyse the impact of public debt on economic growth of both individual countries (e.g. Smyth and Hsing (1995) for the United States, Balassone et al. (2011) for Italy) and in a panel set of countries (e.g. Clements, Bhattachary, and Nguyen (2003), Reinhart and Rogoff (2010), and Schclarek (2004), among others).

According to Bilan and Ihnatov (2015), the empirical literature dealing directly with the effects of public debt on economic growth became more consistent only in recent years, in the context of the adverse European and international developments. Previous empirical studies focussed on developing countries, especially those with low incomes, due to their dependency on foreign capital investment (Krugman 1988, Weeks 2000, Patillo et al. 2002, Karagol 2002, Schclarek 2004). Abbas and Christensen (2007) pointed out several reasons that explain this situation: (a) until recently the size of public debt has not been assessed as problematic in most developed countries; (b) there are no comparable data for a large number of countries; and (c) public debt was mainly considered as an endogenous rather than exogenous variable, whose size affects macroeconomic outcomes.

The results of most empirical studies are mixed and inconsistent, differing according to the group of countries studied, the timeframe of the analysis, and the research methodology. While the first studies on public debt and economic growth, such as Modigliani (1961) and Diamond (1965), maintained that an increase of public debt always contributed to economic growth, more recent works

(Pescatori, Sandri, and Simon 2014, Eberhardt and Presbitero 2015) present different results.

This paper will focus on studies that primarily cover the countries of Western Balkans. Empirical literature on the relationship of public debt and growth in the countries of Eastern and Southeast Europe is quite scarce (Časni, Badurina, and Sertić 2014, Gál and Babos 2014, Bilan 2015).

Časni, Badurina and Sertić (2014) found, employing dynamic panel analysis of a sample of 14 countries in Middle, East, and Southeast Europe for the period 2000–2011, that public debt has a statistically significant negative impact on the rates of economic growth, both in the short and the long term. Based on their findings, they recommend the creation of policies directed at increasing exports and long-term investments, but also support fiscal consolidation to stimulate the economic growth.

Gál and Babos (2014) conducted a comparative analysis of the effects of public debt on economic growth in the Western EU and among new EU member states for the period 2000–2013 and concluded that, although the new member states are less indebted, they are more harmed by high levels of public debt, thereby making debt control particularly important for these countries.

Bilan (2015) applied a panel analysis to estimate the effect of public indebtedness on economic growth in 11 Central and Eastern European countries in the period 1994–2013, through which she found the presence of an oversized debt threshold at the level of 45–55% of GDP. She concluded that the breaking threshold was lower in less-developed countries of the analysed group (e.g. Bulgaria and Romania), and it is entirely lower than this in the more developed countries of the European Union.

2. Methodology

2.1 Model specification

In this study we followed the research directions of Bilan and Ihnatov (2015) and Checherita and Rother (2010), and adopted the quadratic form. The general model to be estimated is as follows:

$$Y_{c,t} = \alpha + \beta_1 b_{c,t} + \beta_2 b_{c,t}^2 + \varphi k_{c,t} + \sum\nolimits_{i=1} \mu_i \mathbf{Z}_{c,t} + \gamma_c + \varepsilon_{c,t}\,, \tag{1}$$

where:

$Y_{c,t}$ – the annual percentage of GDP growth,
b_{ct}, b_{ct}^2 – the linear and square regressors of public debt as a percentage of GDP,
$\mathbf{Z}_{c,t} = \{eb_{c,t}, cab_{c,t}, ob_{c,t}, pb_{c,t}\}$ – a set of control variables,
γ_c – a set of fixed effects of years,
$\beta_1, \beta_2, \varphi, \sum_{i=1}\mu_i$ – the regression coefficients,
α – an intercept,
$\varepsilon_{c,t}$ – the error term.

Hereinafter, we develop the basic regression model (1) and present it in the model, as follows:

$$\begin{aligned} \text{GDPPCG}_t = \beta_0 + \beta_1(\text{PD})t + \beta_2(\text{PD}^2)t + \beta_3(\text{INV})t + \\ + \beta_4(\text{OPEN})t + \beta_5(\text{CAB})t + \beta_6(\text{PB})t + \varepsilon t, \end{aligned} \tag{2}$$

where:

GDPPCG – GDP per capita growth,
PD – public debt (as a share of GDP),
INV – the ratio of total investment (as a percentage of GDP),
OPEN – the sum of export and import shares in GDP,
CAB – current account balance,
PB – primary budget balance.

The dependent variable in our model is represented by the growth rate of per capita GDP of the same year. Factors used as control determinants include public debt, investment, trade openness, current account balance, and budget balance.

Public debt. The interaction between public debt and economic growth is complex because public debt influences economic growth dynamics and economic growth rates affect the size of public debt (Časni, Badurina, and Sertić 2014). According to Cantor and Packer (1996), higher rates of economic growth facilitate the public debt burden. Public debt sustainability depends on the ability to raise revenue, which decreases when the economy experiences a downturn. The private sector default has an adverse effect on economic activity and increases public debt when private borrowing is backed by discretionary fiscal policy (Cecchetti, Madhusudan, and Zampolli 2011). Public debt may have positive as well as negative impacts on economic growth. In less-developed countries, governments use public debt as an imperative tool to finance expenditures. Economic growth can be increased by effective and proficient utilisation of resources to achieve macroeconomic goals. However, if public debt is not properly utilised, it can restrict economic growth and become the biggest curse for the economy.

Investment. Investment is the second determinant used in our model. For this determinant, we expect a positive impact on economic growth. According to Ugochukwu and Chinyere (2013), capital accumulation "refers to the process of amassing or stocking of assets of value, the increase in wealth or the creation of further wealth". Namely, investment in capital stock increases the capacity for production, which also increases national income. In macroeconomics, consumption and fixed investment are the main indicators that encourage the aggregate expenditure. Thus, the increased aggregate expenditure will fuel the growth.

Trade openness. The third determinant used is trade openness. The economic growth literature sometimes used trade openness as a major determinant of growth performance (Sachs and Warner 1995). According to Edwards (1997), trade affects economic growth through several channels – technology transfer, exploitation of comparative advantage, and diffusion of knowledge – increasing scale economies and exposure to competition. Romer (1993) claimed that the countries that are more open to trade have a higher probability of implementing

leading technologies than countries that are not. Furthermore, Chang, Kaltani and Loayza (2009) emphasised that trade promotes the efficient allocation of resources through comparative advantage, allows the dissemination of knowledge and technological progress, and encourages competition in domestic and international markets. Bearing this in mind, we expected a positive effect on economic growth for this determinant.

Current account balance. The next determinant used is current account balance. The current account balance is itself a part of a broader measure, the balance of payments. The balance of payments is the sum of all transactions between a nation its international trading partners. In addition to the trade deficit, the current account deficit includes factor income and financial transfers.

Budget balance. The last determinant is budget balance. It is expressed in percentage of GDP. Fatima, Ahmed and Rehman (2012) claimed that a balanced fiscal budget is a necessary condition to the achievement of sustainable economic growth. According to the Keynesian model, budget deficit would have a positive impact on economic growth. Namely, if increased government expenditure or tax cuts are the reasons for budget deficit, then consumers would have more money and the marginal propensity to consume would increase. This leads to an increase in output and demand for money.

Given the strong potential for endogeneity of the debt variable, especially reverse causation (Bilan and Ihnatov 2015), where low or negative growth rates of GDP per capita are likely to induce higher debt burdens, we resorted to instrumental variable estimation techniques. More specifically, the estimators we used are GMM estimators. Based on previous studies (Patillo et al. 2004, Checherita and Rother 2010), we have instrumented the debt and debt-squared variables through their time lags (up to the fifth lag). The Hansen test allowed us to test the statistical significance of the instruments selected.

Consider that the model above is a square and it assumes a non-linear influence of the debt on the economic growth, i.e. the existence of a threshold of debt in which the direction of the influence of the debt on economic growth changes: it may have positive effects on economic growth to a critical level of public debt, and above this level the relationship is expected to reverse, which depends exclusively on the values of the coefficients β_1 and β_2. Namely, we consider the possibility that the relationship between public debt and economic growth is not linear, but rather a concave curve type (Laffer's type). This allows us to determine the maximum affordable level of public debt that does not have a negative impact on economic growth, according to the relation:

$$b^* = -\beta_1/2\beta_2. \tag{3}$$

2.2 Data source and sample characteristics

Our study dataset consists of the yearly data from the Western Balkan countries for the period 2008–2017. The selected determinants are those often used in the literature (Clements et al. 2003, Kumar and Woo 2010, Checherita and Rother 2010).

We used GDP per capita growth (GDPPCG) as a measure of economic growth. As control determinants we used investment, trade, current account balance, and budget balance. Data were obtained from various sources. Data on GDP per capita, public debt, investments, trade, and unemployment was taken from the websites of the World Bank. Current account balance and budget balance were taken from the websites of the central banks for the selected countries. Key figures, including mean, standard deviation, minimum and maximum values were also calculated. This data set was generated to provide an overall picture of the data used in the model and served as data screening tool to spot unreasonable figures.

Table 1
Descriptive statistics

Specification	PD	GDPPCG	INV	TRADE	PB	CAB
Mean	43.54021	2.39560	26.44810	91.77130	–3.29545	–10.20206
Median	45.30000	2.63637	27.06950	88.85097	–3.30000	–8.91641
Maximum	74.70000	8.32806	41.18154	132.34030	1.50000	–0.62987
Minimum	5.51000	–6.00187	17.49403	69.02644	–7.20000	–49.66300
Std. dev.	21.77299	2.42552	5.42447	17.12018	1.94026	8.04939
Observations	47	50	50	50	44	50

Source: own calculations.

Table 1 shows that during the analysed period, the Western Balkan countries noted continuous growth, measured by GDPPC. Public debt shows differences ranging from the minimum 5.5% of GDP to 74.7% of GDP. The remaining determinants during the analysed period do not have any significant deviations, with the exception of current account balance, which ranges from –0.62% to –49.6% of GDP.

Table 2
Correlation matrix

Variables	PD	GDPPCG	INV	TRADE	DEFICIT	CAB
PD	1	–0.41193	–0.47139	–0.24015	–0.48431	–0.15015
GDPPCG	–0.41193	1	0.23871	–0.10124	0.22319	0.27355
GCF	–0.47139	0.23871	1	–0.117	0.24886	0.11707
TRADE	–0.24015	–0.10124	–0.11700	1	–0.12468	0.13083
PB	–0.48431	0.22319	0.24886	–0.12468	1	0.30556
CAB	–0.15015	0.27355	0.11707	0.13083	0.30556	1

Source: own calculations.

Table 2 shows the correlation matrix between the variables. Between GDP per capita growth and public debt there is a negative correlation (–0.41), which is somewhat stronger between gross investment and public debt (–0.47). A negative correlation is also found between the government debt and openness of the

economy (–0.24), and between the public debt and the primary budget deficit (–0.48), which suggests that higher indebtedness leads to a larger budget deficit as a consequence of interest payments related to the repayment of debt.

3. Empirical results

Table 3 reports the empirical estimations of equations (2) and (3) for the effect of public debt on GDP growth in Kosovo during the 2008–2017 period, using the GMM. Noteworthy is the high robustness of our results, given that, in all specifications, variables generally retain their economic and statistical significance.

Table 3 shows that the coefficients of the public debt variable always have positive values, while those associated with public debt squared always have negative values, implying that the functional relationship linking the growth rate of

Table 3

Estimation results

Specification	(1)	(2)	(3)	(4)
PD	0.271* (0.977)	0.610* (0.462)	0.448** (0.148)	0.881** (0.462)
PD^2	–0.002* (0.005)	–0.004** (0.019)	–0.003** (0.088)	–0.007** (0.008)
INV	0.501*** (0.115)	1.269** (0.144)	0.522*** (0.088)	0.458** (0.080)
OPEN		0.256* (0.081)		
CAB			0.154* (0.096)	
PB				0.269*** (0.111)
α	–17.43*** (6.271)	–14.03*** (5.792)	–16.19** (4.356)	–14.46*** (3.098)
Maximum affordable public debt	67.75	76.25	74.67	62.92
AR1	0.094	0.079	0.042	0.068
AR2	0.250	0.295	0.211	0.124
Hansen test (*p*-value)	0.124	0.214	0.857	0.129

Notes:

AR1 – Arellano-Bond test that average auto-covariance in residuals of order 1 is 0 (HB0B: no autocorrelation).

AE2 – Arellano-Bond test that average auto-covariance in residuals of order 2 is 0 (HB0B: no autocorrelation).

Standard errors are in parenthesis.

*, **, *** show that the null hypothesis can be rejected at 10%, 5% and 1% significance levels respectively.

Source: own calculation.

GDP to the size of public debt is of the concave type, admitting the existence of a maximum value. According to the assumption of the oversized threshold of debt, its presence is determined in all regression equations. The results of our estimations confirm the findings of other recent empirical studies on the situation existing in developing countries, although the maximum public debt to GDP ratio identified herein is higher than that given by Greenidge et al. (2012), who found it to be about 55% of GDP, or Bilan and Ihnatov (2015), who found it to be about 44%. Of the statistically significant debt ratios, the positive influence ranges from 0.448 in equation (3), where the control variable is the current account balance, to 0.881 in equation (4), indicating that the rise in the level of government debt below the threshold of 1 pp. causes, on average, an increase in GDPPC of about 0.4–0.9%. The height of the positive influence is largely followed by the degree of concurrence of the growth function with respect to the debt, so the function expressed in equation (4) is characterised by the greatest concurrency, with the estimated regression coefficient being –0.007, while the function in equation (1) has the smallest concave, with a rated coefficient of –0.002. Gross investment has a statistically significant impact on economic growth in equations (1) – (4), but the intensity of the impact in each of these equations is different, largely due to the estimated effect of other variables included in the equations.

The ratio of the estimated debt coefficients was determined to indicate a higher concurrency in the conditions of its more pronounced positive impact, but it is not proportional. Hence, there are differences in the height of the break-even debt threshold, which ranges from 74.67% in equation (3), in which the current account balance is taken as the control variable, to 62.92% in equation (1), which is without control variables. This finding suggests that the inclusion of control variables leads to a division of the positive impact of multiple factors on GDP per capita growth, reducing the breakthrough threshold. In other words, knowledge of the positive influence of other growth factors significantly reduces the efficiency of borrowing; this is why it has a weaker effect and the breaking threshold is achieved at a lower level.

The models seem to fit the panel data reasonably well, having fairly stable coefficients. The Hansen test shows that the chosen instruments in all models are valid (with p-value of 0.12, 0.21, 0.86 and 0.13 respectively). The estimator ensures efficiency and consistency, provided that the residuals do not show serial correlation of order two. Even though the equations indicate that negative first-order autocorrelation is present, this does not imply that the estimates are inconsistent. Inconsistency would be implied if second-order autocorrelation was present (Arellano and Bond 1991), but this case is rejected in all four models by the test for AR(2) errors.

Conclusion

The analysis we have conducted for a panel of 5 countries from Western Balkan over the period 2008–2018 confirmed the existence of an 'U-inverted' relationship between public debt and economic growth, with a maximum debt threshold

of about 62.92% to 76.25% of GDP. After this threshold, public debt is expected to negatively affect the economic growth rate, due to higher interest rates, fear of public debt unsustainability, and severe budgetary consolidation measures. In the basic model without control variables, the height of the break-even debt threshold was set at 67.75%, while when the controlling current account balance is used, it is 74.67%. In the equations with investments and primary budget balance as control variables for public finances, the break-even debt threshold is set at 62.92%.

Furthermore, the empirical results suggest a negative relationship between public debt and economic growth, controlling for other determinants of growth (trade openness, total investment, current account balance, and primary budget balance). This inverse debt–growth relationship is in line with previous empirical research and confirms the research hypothesis.

This study complements the existing economic literature by analysing the impact of public debt on economic growth and threshold effect in the five countries from Western Balkan. According to the knowledge of the author, it is the first empirical study that analyses these topics in this region.

A direction for future researchers dealing with this problem would be to examine the impact of other determinants that were not included in our model, such as population growth, inflation, and exchange rate. In addition, future researchers could use a longer or different time period and include other countries in order to compare the impact of public debt on economic growth.

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THE IMPACT OF PUBLIC DEBT ON ECONOMIC GROWTH: EVIDENCE FOR WESTERN BALKAN COUNTRIES

Abstract

The aim of this paper is to analyse the impact of public debt on economic growth in five Western Balkan countries using data for the period of 2008–2017. The author investigates whether there is a non-linear (quadratic) relationship between the public debt (measured by its proportion to GDP) and economic growth (measured by the growth rate of GDP per capita) in this group of countries. Empirical results suggest a negative relationship between public debt and economic growth, controlling for other determinants (trade openness, total investment, current account balance, and primary budget balance). The results confirmed the existence of a non-linear, 'U-inverted' relationship between public debt and economic growth, with maximum debt threshold at approximately 63–76% of GDP.

Keywords: public debt, economic growth, Western Balkans

JEL: H63, E60, O40

WPŁYW DŁUGU PUBLICZNEGO NA WZROST GOSPODARCZY W KRAJACH ZACHODNIOBAŁKAŃSKICH

Streszczenie

Celem artykułu jest zbadanie wpływu długu publicznego na wzrost gospodarczy w pięciu krajach zachodniobałkańskich na podstawie danych z okresu 2008–2017. Autor bada, czy w tej grupie krajów występuje nieliniowa (kwadratowa) zależność między wielkością długu publicznego (w relacji do PKB) a wzrostem gospodarczym (mierzonym stopą wzrostu PKB *per capita*). Wyniki obliczeń wskazują na ujemną zależność między wielkością długu publicznego a wzrostem gospodarczym, widoczną po uwzględnieniu innych czynników (otwartość gospodarki, stopa inwestycji, saldo obrotów bieżących i saldo budżetu państwa). Wyniki obliczeń potwierdzają istnienie nieliniowej zależności między relatywną wielkością długu publicznego a tempem wzrostu gospodarczego w kształcie odwróconej litery „U", przy czym próg zadłużenia hamujący wzrost gospodarczy wynosi około 63–76% PKB.

Słowa kluczowe: dług publiczny, wzrost gospodarczy, Bałkany Zachodnie

JEL: H63, E60, O40

ВЛИЯНИЕ ПУБЛИЧНОГО ДОЛГА НА ЭКОНОМИЧЕСКИЙ РОСТ В ЗАПАДНО-БАЛКАНСКИХ СТРАНАХ

Резюме

В статье исследуется влияние публичного долга на экономический рост в пяти западно-балканских странах на основании данных за период 2008–2017 гг. Автор выясняет, имеется ли в этой группе стран нелинейная (квадратная) зависимость между величиной

публичного долга (по отношению к ВВП) и экономическим ростом (измеряемым нормой роста ВВП на душу населения). Результаты расчетов указывают на отрицательную зависимость между величиной публичного долга и экономическим ростом, заметной после учета других факторов (открытость экономики, норма инвестиции, сальдо текущих оборотов и сальдо государственного бюджета). Результаты расчетов подтверждают наличие нелинейной зависимости между относительной величиной публичного долга и темпом экономического роста в виде перевернутой буквы „U", причем порог, тормозящий экономический рост, составляет около 63–76% ВВП.

Ключевые слова: публичный долг, экономический рост, Западные Балканы

JEL: H63, E60, O40