THE RELATIONSHIP BETWEEN THE PUBLIC DEBT AND ECONOMIC GROWTH: THE CASE OF UPPER-MIDDLE-INCOME EUROPEAN COUNTRIES

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Abstract

Most results from numerous studies show that the public debt rate has a negative effect on economic growth (Misztal, 2021; Panizza & Presbitero, 2014; Afonso & Alves, 2015; Reinhart & Rogoff, 2010a). Therefore, the aim of this paper is to empirically analyze the relationship between the public debt and economic growth for 16 upper-middle-income European countries for the period from 2000 to 2020. Our sample consists of three subgroups: the countries of the Western Balkans, upper-middle-income countries states members of the European Union (EU), and other developing European countries. The study employs panel regression models such as ordinary least squares (OLS), fixed-effects, and random-effects models, in order to test the relationship of the public debt-to-gross domestic product (GDP). Almost all models indicate that the relationship between debt-to-GDP is weakly negatively correlated with economic growth, where a 1% increase in debt-to-GDP decreases economic growth by 0.034%, even the average debt-to-GDP of our sample is 35.02%. Moreover, the findings of this study contribute to the literature regarding the public debt ratio and economic growth in developing countries.

Keywords: Public Debt, Economic Growth, Panel Analyses, European Upper-Middle Countries

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1. INTRODUCTION

Considering the role of public debt in economic growth and the dilemmas among scholars about this relationship, this paper aims to analyze the relationship between public debt and economic growth for upper-middle-income European countries, due to the fact that based on literature reviews, very little research has been done on the public debt ratio and economic growth for middle-income countries.

Public and private sector debt plays an important role in financing the economic activities of a national economy. Both public and private debt are important financial flows for the functioning and development of a national economy. As for the private sector, borrowing is very important and necessary for the development and expansion of business activities, otherwise, for the public sector, borrowing can have beneficial effects on the realization of productive public

investments and stimulate economic growth. Advanced economies are in an era characterized by a significant overload of public and private debt (Reinhart, Reinhart, & Rogoff, 2012). But if the level of the public debt is too high and the capacity of government revenues and policies to manage debt is insufficient, this can negatively affect a country's economy.

Historically, the public debt initially appeared as a need to finance wars, natural disasters, economic and financial crises, and pandemics, further to finance public infrastructure investments, budget deficits, the realization of growing needs to ensure welfare economic, and social benefits for citizens. In this way, the global public debt levels marked a significant increase during the COVID-19 pandemic period. Countries created large budget deficits to recover and support individuals, businesses, and institutions affected by COVID-19, so many countries recorded negative growth, likely to a slowdown in the gross domestic product (GDP) growth in the future. This triggered debt-to-GDP ratios to increase significantly in all countries in 2020 with an increasing trend in 2021. At the end of 2020, the average level of the public debt for European Union (EU) countries reached 90.1% of GDP (Eurostat, 2022). Japan is the country that has the highest debt-to-GDP in the world, i.e., 257% of GDP for 2020, which is a specific case of the highest level of debt. The structure of Japanese public debt, which consist of a large number of foreign assets, has influenced investors not to calculate high risk even though debt-to-GDP is very high and interest rates on government bonds are zero and in some cases even negative (East Asia Forum, 2022). At the end of 2020, gross public debt averaged over 125% of GDP in advanced economies, 62% in developing economies, and 49% in low-income developing economies (Rogoff, 2021).

The above-mentioned factors and others have influenced the governments of almost all countries of the globe, whether developed, developing, or underdeveloped, in the realization of their public activities and services to create higher budgetary and public expenditures in comparison with the possibility of creating and collecting public revenues, thus influencing the continuous increase of budget deficits. The public debt is created by financing the budget deficit and borrowing from other public enterprises. Public debt has an important political, economic and social reflection on a country. We can say that the public debt for countries is "a necessary evil". Almost every country on the globe has a level of public debt, either low or high as a result of mismatching national revenues and public spending. The questions that have wake the curiosity of many different scholars are the effect of the public debt on the economic growth, the degree to which the public debt would positively or negatively affect the economic growth; the ratio between the public debt and the economic growth, the impact of the economic growth on the public debt, etc. From a theoretical and practical point of view, the effects of public debt on an economy depend on several factors: the level of debt-to-GDP, the trajectory of borrowing, maturity, structure, instruments, cost, purpose and expenditure, and management of borrowed assets, fiscal and monetary policies, etc.

Relying on economic theory and empirical results from the classics to the present days for analyzing the impact of the public debt on indicators of economic development and economic growth, numerous research and studies have been and are mostly focused on what impact does the level of the public debt have on economic growth? What is the acceptable level of the public debt that would positively or negatively affect the threshold effect of the public debt on economic growth, etc.? Many studies have been done by many researchers on the effect of the public debt on economic growth, especially in developed economies, and few studies have been done on developing economies. Therefore, the purpose of this research is to focus on an empirical analysis of the impact of the public debt on the economic growth of European upper-middle-income countries, as these countries are defined as upper-middle-income countries according to the World Bank economic classification for 2020, based on gross national income (GNI) per capita which are characterized by budget deficits and increasing the public debt, but below the level of developed European countries. On the other hand, these economies are characterized by a low level of national capital accumulation and a low level of investment, which face difficulties in promoting economic growth. As a result of insufficient budget revenues to provide public services, these countries need more financial funds to achieve development objectives, so they need to be burdened with internal and external debt. But the question is if these countries have the managerial capacity to manage the public debt efficiently to improve the economic growth?

This research will be an additional contribution to the existing empirical literature by analyzing another case of assessing the impact of public debt levels on current economic growth in upper-middle-income European countries. The results of the work are also important for the policymakers of these countries during the process of creating and implementing fiscal policies to take into account the effects of public debt on economic growth. In this context, governments need to pay attention to the quality of debt management and the use of borrowed funds to finance productive capital projects that would create new value and stimulate economic growth. Because the economic growth spontaneously reduces the ratio of public debt-to-GDP, generating income and lower social spending to lower deficits.

Western Balkan countries (included in the group of European upper-middle-income countries), as well as other countries, have a public debt that has been growing steadily for decades. During this period of the COVID-19 pandemic, the need for borrowing increased even more, which also caused a significant increase in the public debt. Except for Kosovo, all Western Balkan countries are expected to have significantly higher deficits in 2021 compared to pre-pandemic levels (World Bank, 2021). Lately, the public debt of the Western Balkan countries has significantly increased, due to borrowing from international financial institutions and the issuance of Eurobonds as external borrowing as well as domestic borrowing by the issuance of treasury bonds to finance deficits. The level of the public debt in 2020 reaches 61% of the countries' GDP

which is also the maximum debt burden ceiling under the Maastricht Treaty. In recent years, the increase in the level of the public debt of the Western Balkan countries has been to finance growing deficits and to repay preliminary debts and the cost of debt.

The structure of the paper is as follows. Section 2 includes a review of adequate literature on the relationship between public debt and economic growth. The third section presents the methodology and data sources used to examine the effects of public debt on economic growth. The fourth section outlines the results of the panel analysis and presents the fixed-effects regression and random-effects regression for three subgroups of countries. While the last section includes the summary and conclusions of the research results and also underlines some research limitations.

2. LITERATURE REVIEW

The effects of the public debt on economic growth from the classics, Keynesians, and monetarists to the present day have been discussing and researching the impact of the budget deficit and the ways of financing how they have affected the economic stimulus in the short and long term.

Theoretical and empirical research have highlighted many different discussions regarding the impact, ratios, and effects of public borrowing on the economic growth of a national economy. Many studies have been carried out in many countries, including developed countries and developing countries. Various authors have also used different methods and data to conduct their research. The results on the impact of the public debt on economic growth and the relationship between the public debt and GDP are different and often contradictory: where a group of authors (Mizstal, 2021; Panizza & Presbitero, 2014; Cochrane, 2011; Afonso & Alves, 2015; Snieška & Burksaintiene, 2018; Reinhart & Rogoff, 2010a) have come to a conclusion that the public debt negatively affects economic growth. While the empirical results of some others (Gómez-Puig & Sosvilla-Rivero, 2017) show that the public debt has a positive impact and promotes the economic development of the country at a certain level of borrowers. There are also researches, although few, that have concluded that the impact of the public debt is insignificant on economic growth (Kempa & Khan, 2017; Arčabić, Tica, Lee, & Sonora, 2018).

Continental European scholars and politicians see fiscal consolidation as a precondition for stability and sustainable economic development, while Anglo-Saxon scholars and politicians consider that the public debt has a small contribution to economic stimulus and that other fiscal drivers need to be found. Of course, the effect and relation of the public debt on economic growth are influenced by many factors, such as the level of per capita income, the way in which the borrowed funds are spent, corruption, the debt amortization period, the interest rate, internal or external debt, debt management strategies, fiscal and monetary policies, democratic level of institutions, etc. When a country's institutions are below a particular quality level then more public debt leads to lower growth. However, if a country's institutions are of sufficiently high

quality then public debt is growth neutral (Kourtellos, Stengos, & Tan, 2013). Imaginário and Guedes (2020) researched the relationship between the quality of government and government debt and concluded that the quality of government has a significant negative impact on government debt. While for low-income countries their results showed that better governance is associated with lower levels of public debt but this does not apply to high-income countries as well.

The fundamental relationship between public debt and economic growth varies between highly developed economies. In this regard, economic systems are relevant, as the types of institutions in a country constitute a source of heterogeneity in the effects of increasing public debt (Ahlborn & Schweickert, 2018).

Other researchers point out that high levels of public debt have a negative impact on economic growth and that fiscal consolidation is needed to raise expectations and restore confidence. (Cochrane, 2011). Afonso and Alves (2015) for 14 European countries from the period from 1970 to 2012 have analyzed the effect that government debt has on real GDP growth per capita. The authors have come to the conclusion that public debt has a negative effect on economic growth in the short and long term.

Kumar and Woo (2010) have analyzed the effect of public debt on the economic growth of 38 countries with developed and developing economies, where the results reveal a 10% increase in debt-to-GDP followed by a slow growth rate of 0.2 percentage points per year of real GDP per capita, the impact is more pronounced in developing countries and less in developed countries. Misztal (2021) has researched the effect of public debt on economic growth for EU member states for the period 2000 to 2010 and has concluded that a 1% increase in public debt has reduced GDP by 0.3% on average, while a GDP growth of 1% has affected the reduction of public debt by an average of 0.4%.

In their empirical research on the impact of the public debt, private debt, and house price in GDP in the European Union counties, Snieška and Burksaintiene (2018) have confirmed the strong negative impact of the public debt with zero, one, and two-year arrears in GDP. While private debt has a certain positive impact on GDP, the house price in the short run has a similar positive impact on GDP. However, house prices, in the long run, have a negative impact on GDP. Chiu and Lee (2017) analyze the impact of debt on economic growth for 61 countries for the period before and during the financial crisis (1985–2009). Their results show different debt links to economic growth depending on different levels of risk in the country. In a high-risk environment, increasing the public debt damages a country's economic growth. In low-risk economic, political, and financial environments, the negative effects of public debt on economic growth are less intense and may help stimulate economic growth. In addition, Chiu and Lee (2017) conclude that differences that countries have in the level of income and in the level of debt affect the different effects of the debt-to-growth ratio, suggesting that borrowing is commensurate with economic counties circumstances and to improve economic development.

Discussions and debates focus on calculating a threshold or level of the public debt that will positively or negatively affect economic growth. Thus, Grennes, Caner, and Koehler-Geib (2010) in their research, conducted on 101 countries (developing and developed) for the period 1980–2008, conclude that the threshold level of the average ratio of long-term the public debt-to-GDP on GDP growth is 77% for all countries analyzed, while 64% for developing countries. Exceeding these limits negatively affects economic growth. The study on the impact of the public debt on GDP (Reinhart & Rogoff, 2010b) shows that in developed and developing countries, high levels of debt-to-GDP, over 90%, result in significantly low growth results. While lower than 60% levels of external debt-to-GDP result in negative growth in developing economies.

Researchers have also been interested in finding out which level of the public debt for developed countries, which also have high rates of the public debt-to-GDP, has a positive impact on economic growth. Mencinger, Aristovnik, and Verbic (2014) examine this in relation to the EU countries, and the results show that the threshold turning point for "old" EU countries is between 80% and 94%, whereas this threshold in the "new" countries is significantly lower, even between 53% and 54%. Low debt turns out to be growth-neutral, but the high public debt is harmful to growth. The debt threshold for countries with medium and intensive resources is estimated at 58–63%. There have also been studies that have found that the debt threshold has been lower than 50% for European countries (Gómez-Puig & Sosvilla-Rivero, 2017) and advanced economies such as the United Kingdom, Canada, the USA, and Belgium (Chiu & Lee, 2017).

Some studies have reached interesting conclusions that the debt trajectory has a significant role in the impact of the public debt on economic growth, where although debt-to-GDP for a country may be high the trend of the debt trajectory is down, and that affects economic growth. Thus, Pescatori, Sandri, and Simon (2014), in their study, showed that the debt trajectory significantly influences the relationship between debt level and growth, where countries with high debt levels but with a downward trend have recorded economic growth with the same intensity as other countries. Pescatori et al. (2014) also show that higher debt is associated with unsustainable growth. Similarly, Pegkas (2018) analyzes the issue of the effects of the breakdown between government debt and the economic growth of Greece and concludes that the relationship between debt and growth depends on debt defaults. According to the author, before 2000, the increased government debt-to-GDP had no impact on economic growth. Burriel, Checherita-Westphal, Jacquinot, Schonlau, and Stähler (2020), using simulations with three dynamic stochastic general equilibrium (DSGE) models to assess the economic effects of high debt, conclude that the economic consequences of reducing high levels of public debt in European countries are twofold. First, high debt reduces economic resilience to cyclical economic conjunctures and lowers the opportunities for applying fiscal policies. Second, in the long-run, debt growth can exert the opposite pressure on the economy through multiple channels.

Based on the literature review, it can be concluded that there is a lack of common consensus on the relationship between public debt and economic growth. Relationships can be negative, positive, or even insignificant. There are different results among research on the fact that countries have different levels of economic growth and incompatible spending purposes of funds derived from public borrowing. Moreover, economic growth can be negative if borrowing funds are not managed properly. The different models and time periods used in the research have reflected the research results on this issue. In public policy, public borrowing is a prone issue for many misunderstandings and abuses, whereas the essence of the matter is likely to be lost between methodology and ideology (Abbas, Pienkowski, & Rogoff, 2020).

3. RESEARCH METHODOLOGY

To research and analyze the relationship between total public debt and economic growth, we first based our analysis on the wider international literature review, which analyzed the most cited papers published in relevant indexed journals. To analyze the ratio and effect of the total public debt for 16 upper-middle-income European countries on GDP growth for the period 2000–2020, we used several models: the ordinary least squares (OLS) method, the fixed-effects and random-effects regressions, and the Hausman-Taylor model. In addition, the Hausman-Taylor test is applied to determine the choice between fixed-effects and random-effects models.

To address the problem of endogeneity that emerges from the phenomenon of the opposite causality between economic growth and the level of public debt ratios, we have included the technique of estimating the instrumental variable (IV) proposed by Checherita-Westphal and Rother (2012). This problem arises from the possibility that low economic growth may affect high debt growth (Kumar & Woo, 2010; Pattillo, Poirson, & Ricci, 2004). The target is to be researched the relationship between public debt and GDP growth for upper-middle-income European countries (emerging and developing European countries). Fixed-effects model is used to analyse the ratio between debt-to-GDP and GDP percent change in emerging and developing European countries. According to previous literature and the data availability of the countries in our sample, the fixed-effects model is used as below:

$$Y_{it} = \alpha_i + \beta_k X_{k,it} + \varepsilon_{it} \tag{1}$$

The fixed-effects model data in our cases is as follows:

$$GDP_{it} = \alpha + \beta_1 PD_{it} + \beta_2 TINV_{it} + \beta_3 GNS_{it} + \beta_4 INF_{it} + + \beta_5 EXP_{it} + \beta_6 GOV\_EXP_{it} + \varepsilon_i \tag{2}$$

where,
Y_{it} = the dependent variable (GDP percent change);
α_i = unknown intercept for each entity;
it = entity and time;
β_k = coefficient for respective independent and control variables;
$X_{k,it}$ = the explanatory variables;
ε_{it} = error term.

To choose if the fixed-effects model is the appropriate model for our sample, we tested both fixed-effects and random-effects regressions models. To choose between two models, we used the Hausman test or the Durbin-Wu-Hausman (DWH) test. The Hausman test reveals significant results, which confirm that the fixed-effects model is more suitable for our analysis. To obtain a significant Hausman test, we reject the random-effects model and choose the fixed-effects model as the most suitable for our sample. Then we also calculated the Lagrange multiplier (LM) model, where the results are significant and that dictates us not to use the pooled OLS model. The heteroskedasticity test has shown that there is a problem with heteroskedasticity, finally, we used the robust fixed-effects model to test the relationship between public debt and economic growth.

Based on economic growth determinants, we selected control variables according to the study by Checherita and Rother (2010). Exogenous variables are total investments, gross savings, inflation, and general government spending.

4. RESULTS AND DATA ANALYSIS

4.1. Descriptive statistics

In this section, we present and interpret through graphs and tables the secondary data collected from the database of World Economic Outlook (WEO) and results obtained from the econometric analysis. Table 1 shows the variables used in the econometric model and the related meanings and data sources.

**Table 1.** The variables used, meanings, and the source

No.	Variables	Name of the variables	The meaning of the variable	Data source
1	GDP	GDP growth	Annual percent change growth rate of GDP according to constant price based on year-on-year change.	IMF, WEO database, October 2021
2	PD	Public debt	General government debt as a percent of GDP. General government gross debt comprises total liabilities including interest rates and principal from the debtor to the creditor.	IMF, WEO database, October 2021
3	GOV_EXP	General government total expenditure	General government total expenditure as a percent of GDP.	IMF, WEO database, October 2021
4	TINV	Total investment	The annual ratio of total investment in local currency as a percent of GDP.	IMF, WEO database, October 2021
5	GNS	Gross national saving	The ratio of gross national saving in current local currency as a percent of GDP in current local currency.	IMF, WEO database, October 2021
6	INF	Inflation, average consumer prices	Annual percentages of average consumer prices are year-on-year changes (percent change).	IMF, WEO database, October 2021
7	EXP	The volume of exports of goods and services	Percent change of volume of exports of goods.	IMF, WEO database, October 2021

The total variables used in the econometric model is seven, where the GDP annual ratio is taken as the dependent variable, while the independent variables are: general government debt; general government expenditure as a percent of GDP; the total expenditure of general government as a percent of GDP; total investment as a percent of GDP; gross national saving as a percent of GDP; inflation percent change; the volume of exports of goods. The variables are selected according to their importance in testing the ratio of debt to economic growth.

Figure 1 presents the public debt trend of some selected groups for the period 2000–2020.

According to the data expressed in the figure, developed economies have a very high percentage of the public debt exceeding 120% of GDP, while developing economies have the trend of load with a slight increase from 2014 reaching the level above 60% of GDP in 2020. The same trend, but at a lower level followed by the developing countries of Europe, with a maximum level for 2020 that reaches 40%. The financial crisis of 2008 created a turning point in the growth of public debt on economic growth for all groups of countries, and recently, the crisis caused by COVID-19 significantly increased public debt in all groups of countries.

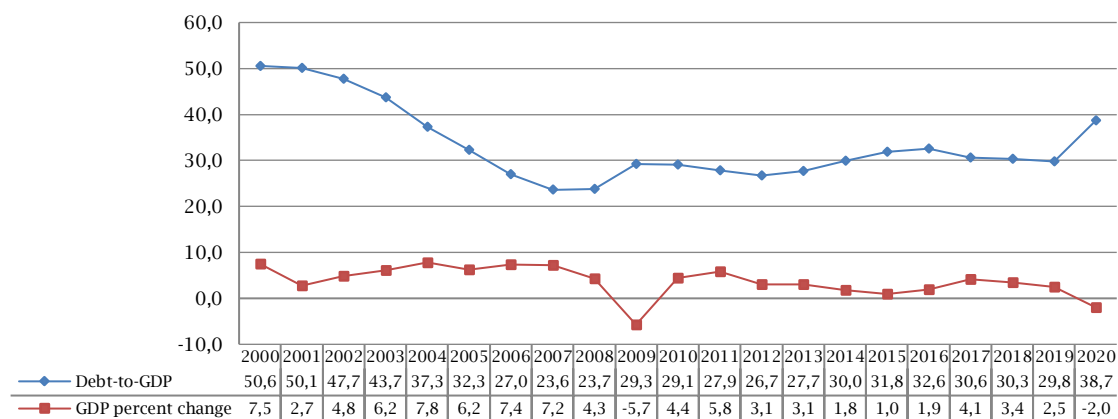**Figure 1.** Debt-to-GDP ratio for a selected group of countries (2000–2020)
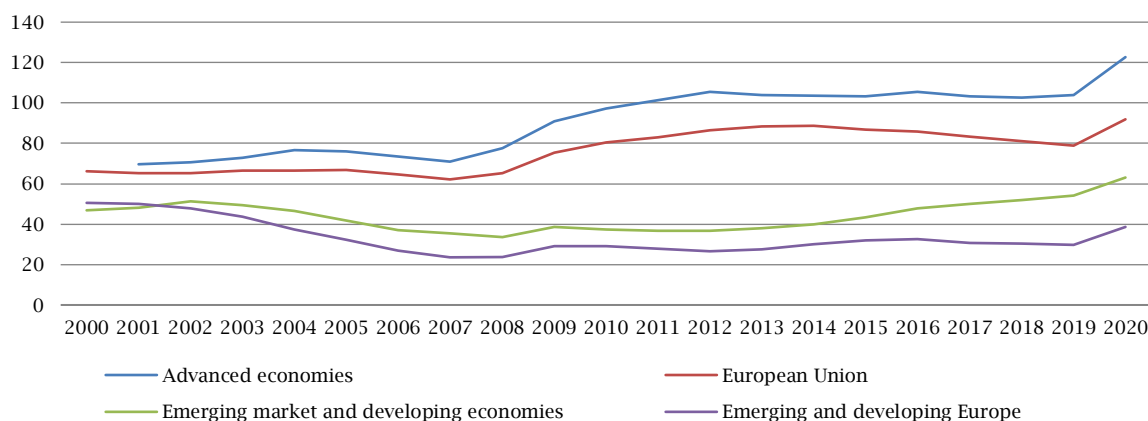
Source: WOE database (https://www.imf.org/en/Publications/WEO/weo-database/2021/October), author's calculations.

Furthermore, Figure 2 shows GDP percent change and debt-to-GDP cross years, for emerging and developing European countries for the period 2000-2020, where there is a nonlinear relationship between debt-to-GDP and GDP percent change. Before the financial crisis of 2007–2008, the trajectory of debt-to-GDP is descending as GDP percent change increased. The data show that the financial crisis and COVID-19 crisis caused economic growth to be negative: -5% in 2009, and -2% in 2020, while public debt in the same period increased due to the need for the government to recover from crises.

Figure 2. GDP percent change and debt-to-GDP cross years for emerging and developing European countries (2000–2020)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Debt-to-GDP	50,6	50,1	47,7	43,7	37,3	32,3	27,0	23,6	23,7	29,3	29,1	27,9	26,7	27,7	30,0	31,8	32,6	30,6	30,3	29,8	38,7
GDP percent change	7,5	2,7	4,8	6,2	7,8	6,2	7,4	7,2	4,3	-5,7	4,4	5,8	3,1	3,1	1,8	1,0	1,9	4,1	3,4	2,5	-2,0

Source: IMF, WEO database (October 2021), author's calculation.

4.2. Regression analysis

For analysing the relationship between public debt and GDP, Table 2 presents the regression results for the defined using OLS, fixed-effects, random-effects, and Hausman-Taylor (IV). The Hausman test is used to detect endogenous regressors in a regression model. Endogenous variables have values that are defined by other variables in the model. Empirical findings show that the fixed-effects model is more suitable for our sample analysis compared with the random-effects model and Husman-Taylor model. We evaluated and commented on the results from the fixed- and random-effects models that are reported in Table 2. The Hausman test is used to compare estimators from fixed-effects and random-effects models.

Table 2. Result of regression analysis

GDP ratio	OLS	Fixed-effects model	Random-effects model	Hausman-Taylor
Debt	-0.022764* (0.011)	-0.0343383* (0.012)	-0.022764* (0.01)	-0.0115743
Investment	0.1418291* (0.000)	0.2140727 * (0.000)	0.1418291* (0.000)	0.0722436
Saving	0.0449626*** (0.132)	0.1051025** (0.032)	0.0449626*** (0.132)	0.0601399
Inflation	-0.0049062 (0.788)	-0.0110727 (0.595)	-0.0049062 (0.788)	-0.0061665
Export	0.2180906* (0.000)	0.1949608* (0.000)	0.2180906* (0.000)	-0.0231298
Gov. expenditure	-0.0398716*** (0.153)	-0.2410992 (0.000)*	-0.0398716*** (0.153)	-0.2012275
Obsevation	298	298	298	298
Hausman test		24.68 (0.0004)		
R-squared	0.4458	0.4772	0.4458	
Rho		0.36388911		

*Note: * statistically significant at 1% level, ** statistically significant at 5% level, *** statistically significant at 10% level.*

Table 2 presents the empirical findings from the fixed-effects model, the fixed-effects model is a more appropriate model than the random-effects. The variables that are considered to be endogenous are GDP annual ratio and public debt percent to GDP. The public debt coefficient is negative (-0.0343383), the p-value (0.012) is significant at the level of 5%, which means that public debt has a significant negative impact on GDP growth, where a 1% increase in public debt will cause negative growth of 0.034% of GDP. Our results are in line with Cochrane (2011), Afonso and Alves (2015), Snieska and Burksaintiene (2018), Reinhart and Rogoff (2010a). Government expenditures are statistically significant (p-value is 0.000) and have a negative effect on economic growth, where a 1% increase in public spending will decrease economic growth by 0.241. Additionally, gross savings, investment, export, and import of goods and services, have positive and significant coefficients. But inflation is statistically insignificant and has a negative impact on economic growth. The coefficient of

determination, R-squared value of 0.4772, indicates that 47.72% of the variance in the dependent variable (GDP ratio) can be predicted from independent variables (debt, government expenditure, investment saving, inflation, export and import). According to rho, 36.4% of the variance is due to differences across panels.

To detail and deepen our further analysis of the public debt ratio and economic growth, we divided the sample of 16 upper-middle-income European countries from 2000 to 2020 into three subgroups: 1) Western Balkan countries, 2) upper-middle-income countries state members of the EU, and 3) other developing European countries. The first group consists of Albania, Bosnia and Herzegovina, Kosovo, Montenegro, Northern Macedonia, and Serbia. The second group consists of Bulgaria, Hungary, Poland, Croatia, and Romania. The third group consists of Eastern European countries (Russia, Turkey, Ukraine, Belarus, and Moldova).

Table 3 presents the empirical findings from the random-effects model, according to the Hausman-Talyor test, the random-effects model has been shown to be more suitable for regression analysis among three subgroups. The results of the comparative regression analysis between the three subgroups reveal that public debt for the countries of the Western Balkans (subgroup 1) has a negative but significant coefficient (-0.0239717)

at the level of 5%, also the coefficient is negative but insignificant for the third group (-0.0109105), while public debt for upper-middle-income member states of the EU (subgroup 2) has insignificant positive coefficient (0.0279362). The coefficient of determination, R-squared value of 0.5586, indicates that 55.86% of the variance in the dependent variable (GDP ratio) can be predicted from independent variables (debt, government expenditure, investment saving, inflation, export and import) in the case of subgroup 1. While the coefficient of determination R-squared = 0.4648 reveals 46.48% in the case of subgroup 2, and the coefficient of determination R-squared = 0.5337 indicate that 53.37% of the variance in the dependent variable (GDP ratio) can be predicted from independent variables (debt, government expenditure, investment saving, inflation, export and import) in case of subgroup 3.

These findings are in line with the results of Gómez-Puig and Sosvilla-Rivero (2017, 2018) and Kourtellos et al. (2013). Differences in countries' incomes and debt levels have a different impact on public debt growth, suggesting that a country can be burdened with debt given the current economic, financial, and political risk of the country and taking action to maintain fiscal sustainability and more efficient debt management by improving economic performance.

Table 3. Results of regression analysis for subgroups

GDP ratio	Western Balkan countries (6 countries)	The EU member states (5 countries)	Other sample countries (5 countries)
	Subgroup 1	Subgroup 2	Subgroup 3
	Random-effects model	Random-effects model	Random-effects model
Debt	-0.0239717** (0.054)	0.0279362 (0.176)	-0.0109105 (0.626)
Investment	0.1396618* (0.004)	0.1732858** (0.017)	0.1135085 *** (0.092)
Saving	0.0063345 (0.891)	-0.1789946** (0.039)	0.2492322* (0.005)
Inflation	0.0897064* (0.003)	-0.0646137 (0.140)	-0.0946293** (0.008)
Export	0.1706494 (0.000)*	0.2388682 (0.000)*	0.317609 (0.000)*
Gov. expenditure	-0.0188978 (0.669)	-0.159221 (0.007)*	0.0306502 (0.656)
Obsevation	92	105	101
R-squared	0.5586	0.4648	0.5437

*Note: * statistically significant at 1% level, ** statistically significant at 5% level, *** statistically significant at 10% level.*

5. CONCLUSION

The results of this paper regarding the relationship of public debt-to-GDP for 16 emerging and developing European countries for the period 2000–2020, processed by models: OLS, fixed-effects, random-effects, and Hausman-Taylor, show that public debt levels for upper-middle-income European countries have a negative significant effect on economic growth. According to the fixed-effects model, the results show that a 1% increase in debt-to-GDP reduces economic growth by 0.034%. These results are in line with the empirical conclusions of most authors that a high level of debt slows down economic growth and that emerging economies have a lower threshold of positive debt impact than developed economies. The emerging and developing countries analyzed in this paper are developing countries that are not characterized by significant level of debt-to-GDP growth, where the average debt-

to-GDP is low and reach 35.02% for the analyzed period, this percentage is below the level of debt burden under the Maastricht Treaty (60% of GDP). Except for some countries, such as Croatia, Albania, Hungary, Serbia, Ukraine, and Northern Macedonia, that exceed the level set by the Maastricht Treaty. Within this group of countries, Kosovo has the lowest debt-to-GDP of 12.52% for the period 2015–2020. Empirical results for the Western Balkans countries reveal that the coefficient of public debt is negative and significant at 5%. The results of other European developing countries included in our sample also show a low negative impact of public debt on economic growth. Whereas, the empirical results for the developing countries included in our sample that are members of the EU show an insignificant positive debt-to-GDP relationship. The effect of public debt on economic growth is influenced by many factors, not just the percentage of debt in GDP. In the efficiency

of the public debt on economic growth, for risk countries, the main impact has the purpose of use and the strategies of debt management, as most of the countries analyzed in the work are charged with a debt to cover the current budget deficit and very little to finance investment project that would create new value and increase the state's ability to amortize debt. Also, other important factors are the level of the country's corruption, the aim of using funds for public debt, the structure of public debt, whether the debt is external or internal, the trend of the debt trajectory, etc.

As the limitation of this paper, we can emphasize that our research does not include all the elements of public debt that can affect economic growth like the structure of public debt, the purpose of borrowing, the level of corruption, financial stability, and debt management. We consider that to analyze and measure the effect of public debt on economic development in future studies, it would be useful to analyze the impact of these factors. Governments should make efforts to ensure that the level and rate of growth of the public debt is stable and can positively affect economic growth.

The results of this paper are an added contribution to existing empirical findings regarding the effect of public debt on European high-middle-income countries. The findings may also be useful references for fiscal policymakers in designing and implementing public debt management policies.

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