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THE IMPACT OF GOVERNMENT EXPENDITURE ON THE SUSTAINABILITY OF PUBLIC DEBT IN WESTERN BALKAN COUNTRIES: PANEL EVIDENCE 2008-2024

Abstract

This study examines the impact of government expenditure on public debt dynamics in five Western Balkan countries over the period 2008–2024. The analysis applies panel regression techniques, including pooled OLS, random effects, and fixed effects models, supported by diagnostic and panel unit root tests. Since public debt is found to be non-stationary, the final specification is estimated using a fixed effects model with first-differenced variables. The results identify changes in interest costs as the main determinant of short-run public debt dynamics, while government expenditure has a positive effect, significant only at the 10% level. Inflation, real GDP growth, and the primary balance are not statistically significant. The study contributes to the literature by isolating the effect of government expenditure while controlling for key macroeconomic determinants and financing costs, providing region-specific evidence that may support the design of sustainable fiscal policies in the Western Balkans.

***Key words**: government expenditure, public debt, fiscal sustainability, Western Balkan countries*

***JEL classification**: H50, H62, H63, C23, E62*

УТИЦАЈ ДРЖАВНЕ ПОТРОШЊЕ НА ОДРЖИВОСТ ЈАВНОГ ДУГА У ЗЕМЉАМА ЗАПАДНОГ БАЛКАНА: ПАНЕЛ АНАЛИЗА 2008-2024

Апстракт

Ово истраживање испитује утицај државних расхода на динамику јавног дуга у пет земаља Западног Балкана у периоду од 2008. до 2024. године. Анализа се заснива на примени панел регресионих техника, укључујући обједињену OLS регресију (pooled OLS), модел случајних ефеката и модел фиксних ефеката, уз спровођење дијагностичких тестова и панел тестова јединичног корена. Будући да је утврђено да јавни дуг није стационаран, коначна спецификација процењена је применом модела фиксних ефеката на првим диференцама свих варијабли. Резултати показују да промене трошкова камата

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представљају главну детерминанту краткорочне динамике јавног дуга, док промене државних расхода имају слабији позитиван ефекат, статистички значајан само на нивоу од 10%. Инфлација, реални раст БДП-а и примарни биланс нису статистички значајни. Истраживање доприноси постојећој литератури издвајањем ефекта државних расхода уз истовремену контролу кључних макроекономских детерминанти и трошкова финансирања, пружајући емпиријске доказе специфичне за земље Западног Балкана који могу допринети креирању одрживих фискалних политика.

***Кључне речи*:** *државна потрошња, јавни дуг, фискална одрживост, земље Западног Балкана*

Introduction

The issue of public debt sustainability represents one of the central questions of contemporary macroeconomic policy, particularly in developing and transition economies characterized by limited fiscal capacities and increased exposure to external economic shocks. The global financial crisis of 2008, followed by the consequences of the COVID-19 pandemic, led to a significant increase in public debt in a large number of countries, including the Western Balkan states (Stojadinović Jovanović et al., 2020). Under such circumstances, the relationship between government expenditure and public debt sustainability has become the subject of intensive theoretical and empirical debate (Reinhart & Rogoff, 2010; IMF, 2013; 2021).

Economic literature frequently emphasizes that the growth of government expenditure may contribute to the deterioration of the fiscal position and the increase in public debt, especially in conditions of budget deficits and slow economic growth (Alesina & Ardagna, 2011). However, contemporary theoretical approaches indicate that public debt sustainability does not depend solely on the level of public expenditure, but also on financing costs, economic growth dynamics, inflation, and the quality of fiscal policy (Reinhart & Rogoff, 2010; IMF, 2021). In this context, an important question arises as to whether the problem of fiscal sustainability in the Western Balkan countries is the result of the size of government expenditure itself or of the structure of expenditures and the methods of their financing.

The Western Balkan countries represent a specific subject of analysis due to the combination of relatively high levels of public debt, pronounced dependence on external financing, limited institutional capacities, and frequent macroeconomic instabilities. At the same time, most of these countries face problems related to the inefficient implementation of public investments and increased sensitivity to changes in borrowing conditions on the international financial market. These characteristics further increase the importance of researching the factors affecting public debt sustainability in the region (WBG, 2025).

The aim of this paper is to empirically analyze the impact of government expenditure on short-run public debt dynamics in the Western Balkan countries during the period from 2008 to 2024. By examining the determinants of annual changes in the public debt-to-GDP ratio, the study provides empirical evidence relevant for assessing public

debt sustainability in the region. In addition to government expenditure, the analysis includes key macroeconomic factors such as inflation, real GDP growth, the primary fiscal balance, and interest costs. The empirical analysis is based on the application of panel regression models, accompanied by appropriate diagnostic and stationarity tests in order to ensure the methodological validity of the results.

Based on the research objective and the theoretical framework, the following research hypotheses are formulated:

H1: Government expenditure has no statistically significant effect on public debt dynamics after controlling for macroeconomic and fiscal factors.

H2: Interest costs have a statistically significant positive effect on public debt dynamics.

H3: Inflation has a statistically significant negative effect on public debt dynamics.

H4: Real GDP growth has a statistically significant negative effect on public debt dynamics.

H5: The primary fiscal balance has a statistically significant negative effect on public debt dynamics.

The remainder of the paper is organized as follows. Following the introduction, a review of the relevant theoretical and empirical literature is presented. The next section outlines the data, variable construction, and methodological framework of the research. This is followed by the results of the descriptive and empirical analysis. The subsequent section discusses the main limitations of the study, while the final section presents the conclusions and their implications for fiscal policy in the Western Balkan countries.

Literature Review

Economic literature dealing with public debt sustainability and the role of fiscal policy has evolved through several complementary theoretical and empirical approaches encompassing the analysis of fiscal discipline, public debt dynamics, and the macroeconomic determinants of debt stability. Contemporary research increasingly emphasizes an integrated approach in which public debt sustainability is viewed as the result of the interaction between fiscal policy, economic growth, inflation, and borrowing costs.

From a theoretical perspective, the foundation of public debt sustainability analysis lies in the intertemporal government budget constraint, according to which the long-term stability of public debt depends on the relationship between the interest rate and the economic growth rate. Blanchard (1990) points out that debt sustainability does not necessarily imply debt reduction, but rather the government's ability to service its obligations without the need for unsustainable fiscal adjustments. Similarly, Bohn (1998) empirically confirms that fiscal authorities respond to rising public debt by improving the primary balance, thereby ensuring long-term sustainability.

Within the domain of fiscal policy, particular attention has been devoted to the role of government expenditure in shaping public debt dynamics. Barro (1979), within the framework of the tax-smoothing theory, demonstrates that governments use borrowing to smooth tax distortions over time, while Alesina and Perotti (1995) emphasize that

the structure and composition of fiscal adjustments play a crucial role in stabilizing public debt. Empirical studies, such as Alesina and Ardagna (2011), indicate that fiscal consolidations based on expenditure reductions are more likely to successfully stabilize debt compared to those relying primarily on tax increases. The structure of public expenditure therefore plays a significant role in the formation of public debt.

Research conducted by the International Monetary Fund (Gupta et al., 2025) suggests that fiscal consolidation programs based on reducing current expenditures, particularly public sector wages, are generally more effective in reducing deficits and consequently public debt than measures primarily focused on reducing capital expenditures. In the Western Balkan countries, a long-standing tendency of underrealization of planned capital investments can be observed, indicating limited efficiency in the implementation of public investment projects. Such a phenomenon further complicates public debt management, as inefficient public spending undermines confidence in fiscal policy (IMF, 2018).

Interest costs represent one of the key factors in public debt dynamics (Van Bon, 2025). Reinhart and Rogoff (2010) argue that high levels of indebtedness may lead to an increase in risk premiums and interest rates, thereby further worsening debt sustainability. Similarly, Laubach (2009) demonstrates that an increase in public debt leads to higher long-term interest rates, which raises financing costs and slows economic growth. These findings confirm the importance of the interest rate channel as a mechanism through which public debt may become self-reinforcing.

The role of economic growth in public debt sustainability is particularly emphasized in contemporary literature. Snowdon and Vane (2005) point out that higher growth rates facilitate debt stabilization through increased fiscal revenues and reduced relative debt burden compared to GDP. Likewise, the IMF (2013) stresses that favorable macroeconomic conditions, including stable growth and low interest rates, represent key determinants of public debt sustainability, especially in developing countries. Real GDP growth constitutes one of the main factors of fiscal sustainability, as it directly affects the ratio of public debt to gross domestic product. Higher economic growth rates contribute to increased fiscal revenues and a reduction in the relative debt burden, while economic slowdown operates in the opposite direction. Escolano (2010) shows that public debt dynamics largely depend on the relationship between real growth and interest rates, whereas Blanchard and Leigh (2013) indicate that weaker growth following fiscal consolidation may lead to an increase in public debt even under conditions of fiscal discipline. Similar conclusions are presented by Reinhart and Rogoff (2010), who emphasize that periods of low economic growth are often accompanied by rising debt levels and slower fiscal adjustment.

Inflation represents one of the key macroeconomic determinants directly affecting the movement and sustainability of public debt. From a theoretical standpoint, moderate inflation may contribute to reducing the real value of debt through the so-called "inflation tax," as nominal GDP growth lowers the ratio of public debt to economic activity (Reinhart & Rogoff, 2010). However, if inflation reaches high or unstable levels, its effect becomes negative, as it leads to increased risk premiums, reduced investor confidence, and higher debt servicing costs, particularly in economies characterized by significant euroization and a large share of external borrowing (Escolano, 2010). Blanchard (2019) emphasizes that in an environment of low interest rates, inflation may temporarily ease the fiscal burden, but without structural reforms it cannot improve fiscal sustainability in the long run. In the context of the Western Balkan countries, inflation has an ambivalent

effect – while it may reduce the public debt-to-GDP ratio in the short run (in the long term) due to structural constraints and import dependence, it may contribute to rising public expenditures and interest costs.

Although numerous studies have examined public debt sustainability, empirical evidence focusing specifically on the role of government expenditure in Western Balkan countries remains limited. Existing studies have generally emphasized fiscal deficits, debt levels, or broader macroeconomic determinants, while relatively little attention has been devoted to assessing the independent contribution of government expenditure after controlling for key fiscal and macroeconomic factors within a unified panel framework. By addressing this gap, the present study extends the empirical literature on transition economies by providing evidence on the relative importance of government expenditure and financing costs for short-run public debt dynamics in the Western Balkans.

From a methodological perspective, panel econometrics represents the standard approach in the analysis of public debt and fiscal policy because it enables the simultaneous observation of temporal and cross-country differences. Wooldridge (2010) emphasizes that panel models allow for the control of unobserved heterogeneity and increase the reliability of estimates, which is particularly important in analyses involving countries with similar, though not identical, economic structures, such as the Western Balkan countries.

Contemporary literature suggests that public debt sustainability does not depend exclusively on the level of government expenditure, but rather on the complex interaction between fiscal policy, economic growth, inflation, and borrowing costs. The intensity and direction of these effects depend on the structural characteristics of the economy, the institutional framework, and financing conditions, which further justifies the application of panel methodology in analyzing the impact of government expenditure on short-run public debt dynamics, thereby providing evidence relevant to public debt sustainability.

Data, Variable Construction, and Methodological Framework

The empirical analysis in this paper is based on panel data for five Western Balkan countries: Serbia, Montenegro, North Macedonia, Bosnia and Herzegovina, and Albania. The observed period covers the years from 2008 to 2024, resulting in a balanced panel dataset with a total of 85 observations. The data were obtained from the International Monetary Fund (IMF) database, specifically from the DataMapper tool, which contains comparable macroeconomic indicators for a large number of countries. The observed variables include public debt expressed as a percentage of gross domestic product (GDP), government expenditure as a percentage of GDP, the inflation rate, real GDP growth, and the primary fiscal balance.

The variable related to interest costs is not directly available in the utilized database and was therefore constructed as the difference between the primary fiscal balance and the overall fiscal balance, thereby obtaining government interest expenditures expressed as a percentage of GDP. Since the primary balance excludes interest payments while the overall balance includes them, this construction yields positive values for interest expenditures (IMF, 2014). Furthermore, all variables in the model are expressed as percentages, enabling comparability between countries of different economic sizes and

allowing for an adequate assessment of public debt sustainability relative to the economic capacity of the economy. This approach also eliminates the scaling problem that would arise if nominal values were used.

The initial empirical specification of the relationship between public debt and its determinants can be expressed as follows:

$$PD_{i,t} = \beta_0 + \beta_1 GOV_EXP_{i,t} + \beta_2 INF_{i,t} + \beta_3 GDPG_{i,t} + \beta_4 PB_{i,t} + \beta_5 INT_{i,t} + \mu_i + \varepsilon_{i,t}$$

Where $PD_{i,t}$ represents public debt expressed as a percentage of GDP for country i in time period t, $GOV_EXP_{i,t}$ denotes government expenditure, $INF_{i,t}$ the inflation rate, $GDPG_{i,t}$ real GDP growth, $PB_{i,t}$ the primary fiscal balance, while $INT_{i,t}$ indicates the interest cost on public debt. The component μi represents unobserved individual effects specific to each country, whereas εi,t symbolizes the random error term. This specification represents a standard framework in panel data analysis, enabling the separation of individual and time effects (Wooldridge, 2010).

The methodological framework of the research is based on the application of panel regression models, which enable the simultaneous observation of the temporal and cross-sectional dimensions of the data. In the first step, pooled OLS, random effects, and fixed effects models were estimated, after which appropriate specification tests were conducted to identify the most suitable panel model. To ensure the validity of the estimated model, diagnostic tests for heteroskedasticity and multicollinearity, as well as panel unit root tests, were performed. Since the dependent variable was found to be non-stationary and one explanatory variable produced mixed evidence, all variables were transformed into first differences to ensure methodological consistency. This approach reduces the risk of spurious regression and enables the estimated coefficients to be interpreted as the effects of changes in the explanatory variables on annual changes in the public debt-to-GDP ratio, while controlling for country-specific unobserved heterogeneity.

Descriptive Statistics of the Overall Sample and Comparative Analysis by Country

To gain insight into the basic characteristics of the data, this section presents a descriptive analysis of the key variables. Descriptive statistics enable a preliminary examination of data distribution, variability, and potential differences among the observed countries. Particular attention is devoted to identifying the main trends and deviations that may play a significant role in the subsequent empirical analysis. In this context, descriptive statistics for the overall sample are presented first.

Table 1. Descriptive Statistics of the Overall Sample

Variable	Mean	Std. Dev.	Min	Max
PD	51.58	16.16	20.64	108.4
GOV_EXP	39.04	6.90	28.23	54.95
INF	3.39	3.72	-1.60	14.2

GDPG	2.50	3.54	-15.00	13
PB	-1.57	2.37	-8.18	3.76
INT	1.60	0.80	0.00	3.32

Source: Authors' calculations based on the statistical software Stata.

The descriptive analysis presented in Table 1 provides a basic insight into the distribution of key macroeconomic variables within the observed sample. The average level of public debt amounts to 51.6% of GDP, accompanied by a relatively high standard deviation, indicating significant differences among countries. The range of public debt values, from approximately 21% to more than 100% of GDP, confirms the presence of substantial heterogeneity in fiscal positions across the region.

Government expenditure averages around 39% of GDP, while considerably lower variability is observed compared to public debt. This finding suggests that the level of government expenditures in the observed countries moves within a relatively narrow range despite pronounced differences in public debt levels. This may indicate that the size of government expenditure alone is insufficient to explain differences in indebtedness, and that its effect depends on the broader macroeconomic context, including economic growth dynamics and financing costs.

Inflation and real GDP growth exhibit greater variability compared to the other observed variables, indicating higher sensitivity of these indicators to changes in the economic environment. The average primary balance is negative, pointing to the presence of fiscal deficits in most observed years, while interest costs amount to approximately 1.6% of GDP, which further burdens public debt dynamics.

In order to provide a more detailed overview of the relationship between public debt and government expenditure, Table 2 presents the average values of variables for individual countries.

Table 2. Average Values of Variables by Country

Countries	**PD**	**GOV_EXP**	**INF**	**GDPG**	**PB**	**INT**
SRB	51.31	41.56	5.84	2.08	-0.93	1.80
MNE	64.28	46.65	3.28	2.60	-2.65	1.89
MCD	38.68	33.13	3.08	2.33	-2.48	1.08
BiH	37.89	43.84	2.19	2.48	-0.79	0.72
ALB	65.75	30.02	2.58	3.24	-0.98	2.52

Source: Authors' calculations based on the statistical software Stata

The country-level analysis further confirms the absence of a simple relationship between the level of government expenditure and public debt. Albania and Montenegro record the highest levels of public debt, with Montenegro simultaneously exhibiting the highest government expenditure, while Albania records a relatively lower level of public spending. On the other hand, Bosnia and Herzegovina and North Macedonia have significantly lower levels of public debt despite differing levels of government expenditure.

From the perspective of fiscal balance, most countries record negative primary balances, with the largest deficits observed in Montenegro and North Macedonia. At

the same time, interest costs vary across countries, which may indicate differences in borrowing conditions and perceptions of fiscal risk. These findings suggest that public debt sustainability does not depend solely on the level of government expenditure, but also on the manner in which it is financed and the overall macroeconomic environment.

Such a data structure indicates the presence of significant heterogeneity among the observed countries, which further justifies the application of panel methodology in the subsequent analysis in order to more precisely examine the impact of government expenditure on public debt sustainability while controlling for other relevant factors.

Empirical Estimation and Model Validation

After the descriptive analysis, the next step involves estimating the relationship between the observed variables using panel regression models. In the first stage, pooled OLS, random effects, and fixed effects models were estimated in order to obtain insights into the stability and consistency of the results.

Table 3. Results of Pooled OLS, Random Effects, and Fixed Effects Models

Variable	**Pooled OLS**	**Random effects**	**Fixed effects**
GOV_EXP	0.4563	0.4563	0.4814
	(0.004)	(0.003)	(0.411)
INF	-0.1831	-0.1831	-0.0902
	(0.508)	(0.506)	(0.765)
GDPG	0.0351	0.0351	-0.2507
	(0.917)	(0.917)	(0.460)
PB	-0.8417	-0.8417	-0.3539
	(0.098)	(0.094)	(0.629)
INT	17.3674	17.3674	13.9105
	(0.000)	(0.000)	(0.000)
Number of countries	5	5	5
Number of observations	85	85	85
R^2	0.7058	0.7058	0.6977

Source: Authors' calculations based on the statistical software Stata.

Note: Values in parentheses represent p-values.

The results presented in Table 3 indicate relatively stable coefficients between the pooled OLS and random effects models, which is expected given that the preliminary results do not indicate significant variation across panel units. On the other hand, certain differences are observed within the fixed effects model, suggesting the presence of heterogeneity across countries that may affect the estimates.

Looking at the individual variables, government expenditure exhibits a positive coefficient across all estimated models and is statistically significant in the pooled

OLS and random effects specifications, while it loses statistical significance in the fixed effects model. This suggests that the estimated effect of government expenditure is sensitive to the treatment of unobserved country-specific heterogeneity. Inflation displays a negative coefficient in all model specifications, although without statistical significance. Real GDP growth does not have a statistically significant effect in any of the estimated models; however, its coefficient changes sign in the fixed effects model compared with the pooled OLS and random effects models. The primary balance exhibits a negative coefficient across all model specifications and is statistically significant at the 10% significance level in the pooled OLS and random effects models, while it loses statistical significance in the fixed effects specification. In contrast, interest costs have a positive and statistically significant effect across all estimated models, indicating that they represent the most consistently significant determinant of public debt among the variables considered.

The observed differences between the estimates further indicate the need for formal testing of model adequacy in order to determine whether it is justified to use pooled OLS, random effects, or fixed effects approaches.

Table 4. Model Selection Test Results

Test	**Null hypothesis**	**Statistic test**	**p-value**	**Decision**	**Conclusion**
Breusch-Pagan LM	Variance of the individual effect = 0	$\chi^2(1) = 0.000$	1.000	Not rejected H_0	There is no evidence in favor of the Random Effects model.
F test	All intercepts are equal	$F(4,75) = 3.040$	0.022	Rejected H_0	Fixed effects are present (FEM is justified).

Source: Authors' calculations based on the statistical software Stata

In order to select the appropriate panel model specification, the Breusch–Pagan LM test and the F-test for fixed effects were conducted. The results of the LM test do not indicate the presence of random effects ($p = 1.000$), meaning that there is no statistically significant variation across panel units that would justify the use of a random effects approach. On the other hand, the results of the F-test indicate the presence of fixed effects ($p = 0.022$), implying that countries differ from each other and that the fixed effects model provides a more appropriate specification compared to the pooled OLS model.

Overall, the obtained results suggest that within the level model specification, the fixed effects approach is methodologically justified, while the random effects model is not supported by the empirical evidence.

Table 5. Diagnostic Tests

Field of validation	Test	Statistic	p-value	Conclusion
Homoskedasticity	Wald	$\chi^2 = 15.930$	0.000	Presence of heteroskedasticity
Multicollinearity	Variance Inflation Factors (max VIF)	max(VIF) = 1.460	/	No multicollinearity

Source: Authors' calculations based on the statistical software Stata

The diagnostic test results presented in Table 5 indicate certain limitations of the estimated level model. Specifically, the Wald test suggests the presence of heteroskedasticity ($p = 0.0001$), indicating that the error variance is not constant across panel units. This may affect the reliability of the estimated standard errors and, consequently, the statistical significance of the estimated coefficients. On the other hand, the multicollinearity analysis does not indicate any problems, as the VIF values are low, confirming that there is no high interdependence among the explanatory variables.

Overall, the diagnostic results indicate that, although the fixed effects specification is supported, the level model exhibits certain econometric limitations, particularly the presence of heteroskedasticity. In addition, before estimating the final model, it is necessary to examine the stationarity properties of the variables in order to avoid potential spurious regression and determine whether variable transformations are required.

Table 6. Panel data stationarity testing

Variable	LLC	Breitung	IPS	Conclusion
PD	-0.8865	0.2287	-0.3433	Non-stationary
	(0.1877)	(0.5905)	(0.3657)	
GOV_EXP	-3.2470	-2.4129	-1.9953	Stationary
	(0.001)***	(0.0079)***	(0.0230)**	
INF	-2.9235	-2.4577	-2.5603	Stationary
	(0.002)***	(0.007)***	(0.0052)***	
GDPG	-2.5501	-3.9843	-4.9958	Stationary
	(0.005)***	(0.000)***	(0.000)***	
PB	-2.7845	-2.9313	-2.6039	Stationary
	(0.003)***	(0.002)***	(0.0046)***	
INT	-2.1544	0.8075	0.7625	Mixed evidence
	(0.016)**	(0.7903)	(0.7771)	

Source: Authors' calculations based on the statistical software Stata

*Note: Values in parentheses represent p-values. *, **, and *** denote statistical significance at the 10%, 5%, and 1% significance levels, respectively.*

The results of the panel stationarity tests presented in Table 6 indicate different statistical properties of the observed variables. First, the public debt variable does not exhibit stationarity in any of the applied tests, indicating the presence of a unit root and a potential problem of spurious regression in the level model. This finding is particularly

important given that this is the dependent variable, as non-stationarity may lead to systematically biased estimates and unreliable conclusions. In contrast, government expenditure, inflation, real GDP growth, and the primary balance exhibit consistent stationarity across all applied tests, suggesting stable statistical properties of these series. This implies that their values fluctuate around a stable mean over time, without the presence of long-term trends that could undermine the validity of the regression analysis.

For the interest cost variable, mixed results are obtained. While the Levin–Lin–Chu test indicates stationarity, the Breitung and IPS tests do not confirm this finding, pointing to sensitivity of the results to the chosen methodology and potential instability of the series. This mixed outcome calls for additional caution in interpretation and justifies further testing.

The results indicate that the level model includes a combination of stationary and non-stationary variables, which may lead to methodological issues, particularly the risk of spurious regression and incorrect inference about the relationships between variables To ensure methodological consistency and eliminate potential biases associated with different orders of integration, additional panel unit root tests were conducted on the first differences of all variables. The results are reported in Table 6a.

Table 6a. Additional panel unit root tests for first-differenced variables

Variable	**LLC**	**Breitung**	**IPS**	**Conclusion**
ΔPD	-3.7289	-2.9964	-2.9265	Stationary
	(0.000)***	(0.001)***	(0.001)***	
ΔGOV_EXP	-4.5810	-5.5086	-4.7178	Stationary
	(0.000)***	(0.000)***	(0.000)***	
ΔINF	-3.9165	-3.2918	-4.0210	Stationary
	(0.000)***	(0.000)***	(0.000)***	
ΔGDPG	-7.1231	-3.5752	-5.9693	Stationary
	(0.000)***	(0.000)***	(0.000)***	
ΔPB	-3.5059	-5.1319	-4.9510	Stationary
	(0.000)***	(0.000)***	(0.000)***	
ΔINT	-1.4394	-3.5683	-2.5782	Stationary
	(0.075)*	(0.000)***	(0.005)***	Stationary

Source: Authors' calculations based on the statistical software Stata

*Note: Values in parentheses represent p-values. *, **, and *** denote statistical significance at the 10%, 5%, and 1% significance levels, respectively.*

The results of the additional panel unit root tests presented in Table 6a indicate that the first differences of all observed variables satisfy the stationarity assumption. For five of the six variables, stationarity is confirmed by all three applied tests (LLC, Breitung, and IPS) at a high level of statistical significance. For the ΔINT variable, the Breitung and IPS tests confirm stationarity at the 1% significance level, while the Levin–Lin–Chu test also supports stationarity at the 10% significance level. These findings indicate that first differencing successfully eliminates the problem of non-stationarity in the panel and ensures that the assumptions required for valid panel regression analysis are satisfied.

Based on these findings, the final model specification is estimated using the first differences of all variables. This approach ensures methodological consistency, eliminates the risk of spurious regression, and allows the estimated coefficients to be interpreted as the effects of changes in the explanatory variables on annual changes in the public debt-to-GDP ratio.

Table 7. Fixed Effects Model Estimated Using First-Differenced Variables

Variable	**FEM**
ΔGOV_EXP	0.7163*
	(0.075)
ΔINF	-0.0720
	(0.642)
ΔGDPG	-0.1638
	(0.207)
ΔPB	-0.3472
	(0.396)
ΔINT	9.4094***
	(0.001)
Number of observations	80
Number of countries	5
R^2 (within)	0.5356
R^2 (overall)	0.5382

Source: Authors' calculations based on the statistical software Stata

*Note: Values in parentheses represent p-values. *, **, and *** denote statistical significance at the 10%, 5%, and 1% significance levels, respectively.*

The results of the final model specification, presented in Table 7, are based on a fixed effects model estimated using the first differences of all variables. This specification enables the analysis of short-run changes in public debt and its determinants, with the estimated coefficients interpreted as the effects of changes in the explanatory variables on annual changes in the public debt-to-GDP ratio.

Compared with the level specification presented in Table 3, the estimated coefficient of interest costs decreases in the final model estimated using first-differenced variables, although it remains positive and highly statistically significant. This result suggests that part of the long-run variation captured in the level model is removed after first differencing, while changes in interest costs continue to represent the strongest determinant of short-run public debt dynamics. The persistence of statistical significance across both specifications further confirms the robustness of the interest-cost channel in explaining public debt dynamics.

With respect to the main research question, the results indicate that changes in government expenditure have a positive effect on changes in public debt, with the estimated coefficient being statistically significant at the 10% significance level. This finding suggests that increases in government expenditure may contribute to higher public

debt in the short run, although the relatively weak level of statistical significance calls for caution in interpreting the result. This outcome is partially consistent with theoretical approaches emphasizing the importance of fiscal discipline and expenditure control for maintaining fiscal sustainability (Alesina & Ardagna, 2011; Alesina & Perotti, 1995). At the same time, it suggests that the effect of government expenditure is not dominant relative to other fiscal and financial factors.

In contrast, changes in interest costs exert a positive and highly statistically significant effect on changes in public debt. The estimated coefficient indicates that increases in borrowing costs represent the most important driver of public debt growth in the observed Western Balkan countries. This finding is consistent with the results of Reinhart and Rogoff (2010), who argue that rising public debt increases risk premia and borrowing costs, as well as with the findings of Laubach (2009), according to which higher public debt leads to higher government financing costs.

Changes in inflation, real GDP growth, and the primary balance exhibit the expected negative coefficients; however, their effects are not statistically significant in the final model specification. This suggests that, after controlling for the remaining explanatory variables and unobserved country-specific heterogeneity, there is insufficient empirical evidence to confirm their independent contribution to changes in public debt during the observed period.

Overall, the empirical findings provide mixed support for the proposed hypotheses. H2 is confirmed, as interest costs exert a positive and highly statistically significant effect on public debt dynamics. H1 receives partial support, as government expenditure exhibits a positive effect that is statistically significant only at the 10% significance level, whereas it is not statistically significant at the conventional 5% and 1% significance levels. In contrast, H3, H4, and H5 are not supported, since inflation, real GDP growth, and the primary balance do not have statistically significant effects in the final model specification.

Study Limitations

This study has several limitations that should be considered when interpreting the results. The primary limitation is that the panel comprises only five Western Balkan countries. Although these countries provide a relevant sample for examining public debt dynamics in the region, the relatively small number of countries limits the generalizability of the findings beyond the observed sample. Consequently, the results should be interpreted as evidence specific to the Western Balkans rather than as conclusions applicable to other groups of countries.

Another limitation relates to the use of aggregate government expenditure, which does not distinguish between current and capital expenditure. Since different expenditure categories may have different effects on public debt dynamics, the estimated coefficients should be interpreted as reflecting the overall effect of government expenditure rather than the impact of its individual components. In addition, the analysis is limited to a selected set of fiscal and macroeconomic variables, while other factors, such as the maturity and currency structure of public debt, institutional quality, and political conditions, may also influence debt sustainability. Future research could extend the analysis by including a

larger sample of countries, distinguishing between current and capital expenditure, and incorporating additional institutional and financial variables in order to provide a more comprehensive assessment of the determinants of public debt sustainability.

Conclusion

The subject of this research was the analysis of the impact of government expenditure on short-run public debt dynamics in the Western Balkan countries during the period from 2008 to 2024, with the objective of providing empirical evidence relevant to public debt sustainability. The empirical analysis was conducted using panel regression models on a sample comprising Serbia, Montenegro, North Macedonia, Bosnia and Herzegovina, and Albania, supported by appropriate diagnostic and panel unit root tests to ensure the methodological validity of the results.

The research results indicate that government expenditure exerts a positive effect on changes in public debt, which is statistically significant only at the 10% significance level after controlling for macroeconomic and fiscal factors. Consequently, the findings do not support the view that government expenditure represents the primary determinant of short-run public debt dynamics in the observed countries. This result partially departs from approaches emphasizing expenditure-based fiscal consolidation, while supporting contemporary theoretical perspectives that public debt sustainability depends on a broader set of fiscal and macroeconomic determinants.

In contrast, interest costs exhibit a positive and highly statistically significant effect on changes in public debt, confirming the importance of financing conditions for fiscal sustainability. Although inflation, real GDP growth, and the primary balance display the expected negative coefficients, their effects are not statistically significant in the final model specification. This suggests that, after controlling for the remaining explanatory variables and country-specific effects, there is insufficient empirical evidence to confirm their independent contribution to short-run public debt dynamics.

The empirical findings provide partial support for the proposed research hypotheses. H2 is confirmed, as interest costs exert a positive and highly statistically significant effect on public debt dynamics. H1 is partially confirmed, as government expenditure exerts a positive effect that is statistically significant only at the 10% significance level after controlling for the remaining variables. In contrast, H3, H4, and H5 are not confirmed, since inflation, real GDP growth, and the primary balance do not have statistically significant effects in the final model specification.

Overall, the results indicate that short-run public debt dynamics in the Western Balkan countries are driven primarily by financing costs rather than by the overall level of government expenditure. These findings suggest that maintaining favorable borrowing conditions represents an important prerequisite for preserving fiscal sustainability in the region. At the same time, the limited effect of government expenditure indicates that future research should pay greater attention to the composition and efficiency of public expenditure, as well as to additional institutional and financial factors that may influence public debt dynamics.

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