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TAX REVENUE INSIGHTS: ANALYSIS OF DETERMINANTS IN WESTERN BALKAN COUNTRIES

Abstract

The purpose of this research is to analyze the determinants of tax revenue in Western Balkan countries during the period 2006–2023, focusing on the relationship between tax revenue and macroeconomic factors such as economic growth, inflation, government expenditure, and government debt. The study uses panel regression techniques to test hypotheses on the positive and significant impact of macroeconomic factors on tax revenue. Empirical results confirm that all examined factors significantly influence tax revenue, with economic growth and government debt having the strongest positive effects, while inflation and government expenditure also show significant impacts. The findings provide policymakers in the Western Balkans with practical insights into optimizing tax systems by prioritizing growth-oriented policies, prudent debt management, and efficient public expenditure, as well as improving tax compliance. This research is original as it fills a gap in the literature by focusing on the fiscal dynamics of Western Balkan countries, contributing to a better understanding of how macroeconomic determinants influence tax revenue and offering valuable guidance for policy design in similar transitional economies.

Key words: tax revenue, performance, determinants, panel approach, Western Balkan

JEL classification: H20, C23, E62

УВИДИ У ПОРЕСКЕ ПРИХОДЕ: АНАЛИЗА ДЕТЕРМИНАНТИ У ЗЕМЉАМА ЗАПАДНОГ БАЛКАНА

Апстракт

Сврха овог истраживања је анализа детерминанти пореских прихода у земљама Западног Балкана, у периоду од 2006. до 2023. године, са фокусом на

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однос између пореских прихода и макроекономских фактора као што су економски раст, инфлација, државни расходи и државни дуг. Истраживање користи технике панел регресије за тестирање хипотеза о позитивном и значајном утицају макроекономских фактора на пореске приходе. Емпиријски резултати потврђују да сви испитивани фактори значајно утичу на пореске приходе, при чему економски раст и државни дуг имају најснажнији позитиван ефекат, док инфлација и државни расходи такође показују значајан утицај. Налази пружају практичне увиде креаторима политика у земљама Западног Балкана о оптимизацији пореских система кроз приоритизацију политика усмерених на раст, пажљиво управљање дугом и ефикасну јавну потрошњу, као и унапређење пореске дисциплине. Овај рад је оригиналан јер попуњава празнину у литератури фокусирајући се на фискалне динамике земаља Западног Балкана, доприноси бољем разумевању утицаја макроекономских детерминанти на пореске приходе и пружа вредне смернице за креирање политика у сличним транзиционим економијама.

Кључне речи: порески приходи, перформанце, детерминанте, панел приступ, Западни Балкан

Introduction

Tax revenue is a cornerstone of public finance, enabling governments to deliver essential services, develop infrastructure, and maintain economic stability. Central and local governments around the world rely heavily on taxation for governance (Abubakari et al., 2024). Taxes have a vital role in fostering economic growth and development, serving as a key area of focus in economic policymaking across numerous countries (Akitoby et al., 2021). The effective mobilization of these revenues is essential for financing public services and responding to various economic, financial, and health challenges that nations may face (Gnangnon, 2022). Additionally, it is essential for any state to maintain consistent and strong economic growth over the long term (Adedeji et al. 2023), with government revenues serving as a key financial support for this growth (Nyarkpoh et al. 2023). Also, Adeleke (2022) highlights the importance of geographical location and the socio-economic well-being of citizens in boosting government revenue within this context. The relationship between tax revenues and economic growth is complex and government spending aimed at boosting growth does not always lead to the anticipated rise in tax revenues, and delays in revenue responsiveness further contribute to the challenge. For instance, Gnangnon (2024) discusses the instability of tax revenues and their potentially harmful effects on economic growth. Additionally, various tax types exhibit differing adjustment rates, making timing critical, especially during economic recoveries, and prolonging the process of achieving a stable balance (Sinaga et al., 2023). This complexity underscores the necessity of analyzing how different taxes respond to economic fluctuations.

Understanding the factors that influence tax revenue is critical, particularly as nations aim to optimize their fiscal policies. In the Western Balkans, where economies are transitional and face structural reforms and fiscal constraints, examining tax revenue dynamics becomes

even more vital. These countries encounter challenges such as high public debt, extensive informal economies, and fluctuating economic growth, all of which affect their ability to sustain tax revenue. Investigating the drivers of tax revenue in this context can provide key insights for policymakers and support the development of more effective and equitable fiscal strategies.

The Western Balkans, comprising Albania, Bosnia and Herzegovina, Montenegro, North Macedonia, and Serbia, has experienced significant economic and political changes over the last two decades. Despite strides in market reforms and EU integration, these nations continue to struggle with issues like weak tax compliance, heavy reliance on consumption taxes, and uneven public spending efficiency. Given these challenges, understanding the influence of macroeconomic factors such as GDP growth, inflation, government expenditure, and government debt on tax revenue is essential for promoting economic stability and enhancing fiscal outcomes. These variables are particularly critical in this region, where governments must balance growth-oriented initiatives with the need for fiscal discipline.

Research on tax revenue determinants in the Western Balkans remains sparse, creating a knowledge gap about the unique fiscal dynamics of these economies. Most studies focus on broader European trends, neglecting the region's specific challenges. This study addresses this gap by analyzing how key macroeconomic variables affect tax revenue in the Western Balkans. Using panel data from 2006 to 2023, sourced from the World Bank and IMF, the research employs rigorous econometric methods to examine the roles of GDP growth, inflation, government expenditure, and government debt.

The contribution and novelty of this study lie in its focused examination of tax revenue determinants using a model that incorporates GDP growth, inflation, government expenditures, and public debt, applied specifically to the unique context of Western Balkan countries. This region, often overlooked in fiscal research, presents distinct economic and institutional challenges that make such an analysis particularly valuable. By utilizing panel data, the study offers new insights into how these macroeconomic variables shape tax revenue in transitional economies, filling a significant gap in the literature. Furthermore, the findings provide a practical framework for enhancing tax systems in similar developing regions, offering both academic and policy-oriented contributions.

This paper is organized into the following sections: Section 2 provides a literature review, highlighting key findings on tax revenue determinants in similar contexts. Section 3 explains the research design and methodology, including data sources, variable definitions, and econometric approaches. Section 4 presents the results and discusses their implications for fiscal policy in the Western Balkans. Finally, Section 5 concludes by summarizing the main findings, addressing study limitations, and suggesting directions for future research.

Literature review

Fiscal stability is crucial for maintaining a secure macroeconomic environment, and an economy is considered sustainable when it has a consistent fiscal policy (Mobosi and Okonta, 2024). The relationship between macroeconomic indicators and tax revenue has been extensively studied in economic literature, highlighting key factors such as GDP, inflation, government expenditures, and public debt. These variables are commonly examined due to their direct influence on the tax base, revenue collection, and fiscal policy. GDP serves as

a measure of economic activity, directly shaping the capacity for generating tax revenue, while inflation impacts the real value of collected taxes and taxpayer behavior. Government expenditures are often linked to the efficiency of public administration and enforcement of tax policies, whereas public debt reflects fiscal sustainability and influences policy priorities.

This literature review explores the role of these macroeconomic factors in shaping tax revenues worldwide/across the world. Analyzing recent studies no older than five years, empirical findings can be chronologically observed and examined year by year. For instance, Kalaš et al. (2020) examined the factors that determine tax revenue within the European Union over the period from 2006 to 2018. They discovered that variables such as GDP, government spending, total investment, and population size had a significant positive impact on tax revenue. On the other side, they found that inflation, unemployment, and gross national savings negatively influence tax revenue. Moreover, Nalyanya et al. (2020) investigated macroeconomic determinants on tax revenue in Kenya for the period 2008-2018 and identified positive influence of GDP per capita and negative impact of inflation rate on tax revenue. Contrary, Tujo (2021) highlighted that inflation show no significant relationship with tax revenue in Ethiopia from 2000 to 2019.

Moreover, the study of Saptono and Mahmud (2021) identified positive and significant impacts of per capita income, manufacturing, and trade openness on both the actual tax-to-GDP ratio and tax effort in Southeast Asian countries from 2008-2019. Conversely, they indicated inflation is deemed an unnecessary factor due to its negligible influence on tax performance indicator. Minh Ha et al. (2022) identified that the openness of the economy, foreign direct investment, the ratio of foreign debt to GDP, and the share of value added in industry to GDP have positive impacts on tax revenue. The authors analyzed Southeast Asian countries from 2000 to 2016 and concluded that implementing policies to promote trade openness and attract foreign direct investment can significantly enhance tax revenue performance. The study of Neog and Gaur (2020) aims to identify the key macroeconomic factors influencing tax revenue performance in India from 1981 to 2016. This research introduces a dynamic simultaneous equation model and empirical findings indicate that growth, foreign aid, and trade have a positive impact on tax revenues, while inflation, development expenditure, and the contribution of agriculture had negative impact on tax revenue performance. A study analyzing the period from 1985 to 2019 using the GMM method highlights the negative impact of low inflation and external debt on domestic tax revenues, while showing that external debt positively affects trade taxes. The findings suggest that balanced inflation and productive debt management can stimulate economic activity and enhance tax revenue mobilization, particularly during devaluation periods (Salhi and El Aboudi, 2021).

The study of Chetttri et al. (2023) conducted a research on the factors influencing tax revenues across South Asian nations for the period from 2008 to 2017. Their research reveals that elements such as trade openness, the development of the banking sector, foreign direct investment, life expectancy, and mortality rates have a significant place in determining tax revenues in these countries. In a related study, Mirović et al. (2023) found that in the Baltic states, GDP per capita, the contribution of industry to value added, trade, and government expenditure are significant drivers of tax revenue from 1995 to 2020. Nugraha and Wijaya (2023) identified positive impact of external debt on tax revenue on the sample of Latin America and Caribbean regions for the period 2002-2019. Employing an ECM model, Anastasiou et al. (2024) discovered that factors such as GDP per capita, public debt, levels of corruption, the government effectiveness index, tax rates, and the efficiency of tax

administration have a significant impact on tax revenue mobilization across 26 European nations from 2015 to 2018. Meanwhile, using a PMG model, Đurović Todorović et al. (2024) established that gross domestic product, population size, inflation, unemployment rates, government revenues, and European Union enlargement serve as significant predictors of tax revenues in the Visegrad group countries from 1994 to 2024.

Research Methodology and Hypothesis Formulation

This study examines the determinants of tax revenue in the Western Balkan countries, focusing on the influence of GDP growth, inflation, government expenditure, and government debt. The research utilizes annual panel data covering the period from 2006 to 2023, sourced from the World Bank and the International Monetary Fund (IMF). The sample includes five Western Balkan countries: Albania, Bosnia and Herzegovina, Montenegro, North Macedonia, and Serbia.

Table 1: Variable description

Variable	Symbol	Measure	Source
Tax revenue	TXR	% GDP	World Bank
Gross domestic product	GDP _{growth}	annual rate	IMF
Inflation	INF	annual rate	IMF
Government expenditure	GE	% GDP	IMF
Government debt	GD	% GDP	IMF

Source: Authors calculation

The dependent variable is tax revenue, measured as a percentage of GDP, while the independent variables include GDP growth (annual %), inflation (consumer price index, %), government expenditure (% of GDP), and government debt (% of GDP). The methodological approach involves panel regression techniques, specifically employing Pooled Ordinary Least Squares (POLS), Fixed Effects (FE), and Random Effects (RE) models to account for individual country-specific effects and temporal variations.

We established a primary hypothesis and four auxiliary hypotheses by drawing on existing empirical research. (Đurović Todorović et al. 2024; Mirović et al. 2023; Kalaš et al. 2020):

- H₁: Macroeconomic determinants such as economic growth, inflation, government expenditure and government debt significantly impact on tax revenue in Western Balkan countries.
- H_{1.1}: GDP growth positively affects tax revenue in Western Balkan countries.
- H_{1.2}: Inflation positively affects tax revenue in Western Balkan countries.
- H_{1.3}: Government expenditure positively affects tax revenue in Western Balkan countries.
- H_{1.4}: Government debt positively affects on tax revenue in Western Balkan countries

Research results and Discussion

The descriptive analysis provides an overview of the key variables influencing tax revenue in Western Balkan countries, offering a foundation for deeper econometric exploration. This section highlights the trends, variability, and ranges of GDP growth, inflation, government expenditure, government debt, and tax revenue over the period 2006–2023. The data reveal notable differences across countries, reflecting unique economic structures and fiscal policies within the region

Table 2: Descriptive analysis

Country	TXR	GDPgrowth	INF	GE	GD
Albania					
Mean	18.44	3.48	2.63	30.20	65.66
Std. dev.	1.43	2.69	1.37	1.43	7.40
Min.	15	-3.3	1.29	28.23	53.55
Max.	20.11	8.91	6.73	32.68	75.77
Bosnia and Herzegovina					
Mean	20.02	2.72	2.36	44.11	35.42
Std. dev.	0.87	2.69	3.89	3.51	7.70
Min.	18.8	-3.01	-1.58	38.87	18.71
Max.	21.7	7.39	14.01	49.42	45.86
Montenegro					
Mean	20.62	2.99	3.20	46.37	61.20
Std. dev.	2.49	6.10	3.59	3.13	19.33
Min.	17.2	-15.31	-0.71	42.52	31.76
Max.	25	13.04	13.05	54.35	107.35
North Macedonia					
Mean	17.07	2.62	3.11	32.85	36.79
Std. dev.	0.88	2.55	3.96	1.86	10.50
Min.	15.7	-4.69	-0.74	30.27	20.64
Max.	19.1	6.47	14.21	36.40	53.41
Serbia					
Mean	22.06	2.49	6.17	43.30	50.64
S.Dev.	2.07	2.83	4.21	2.08	12.03
Min.	18.6	-2.73	1.12	40.08	30.56
Max.	26	7.55	12.41	48.21	69.85
WB countries					
Mean	19.64	2.86	3.58	41.06	50.38
Std. dev.	2.36	3.17	3.75	7.21	20.98
Min.	14.2	-15.31	-1.6	28.23	12.43
Max.	26	13.04	17.69	60.27	107.35

Source: Authors calculation

Table 2 provides a descriptive analysis of variables —tax revenue (TXR), gross domestic product (GDPgrowth), inflation (INF), government expenditure (GE), and government debt (GD)—for Western Balkan countries between 2006 and 2023. Serbia recorded the highest average tax revenue (22.06%), while North Macedonia had the lowest (17.07%), with Montenegro showing the widest range (17.2% to 25%). This region exhibited an average annual GDP growth rate of 2.86% during the study period, with notable variation among countries. Albania demonstrated the strongest economic performance at 3.48%, while Serbia recorded the most modest growth at 2.49%. Inflation rates were generally low, with Serbia averaging the highest (6.17%) and Bosnia and Herzegovina experiencing occasional deflation (-1.58%). Government expenditure as a percentage of GDP was highest in Montenegro (46.37%) and lowest in Albania (30.20%), while Montenegro also had the highest average government debt (61.20%) and the largest recorded maximum (107.35%). In contrast, Bosnia and Herzegovina maintained the lowest average debt levels (35.42%) and a minimum of 18.71%. Regional averages indicate moderate tax revenues (19.64%), GDP per capita (21,229 USD), and inflation (3.58%), with balanced government expenditure (41.06%) and debt (50.38%), though significant disparities exist between countries. Montenegro and Serbia stand out for their higher fiscal pressures, with Montenegro's high debt and Serbia's inflation reflecting occasional economic stress. Meanwhile, Albania and North Macedonia show relatively stable and moderate indicators, highlighting diverse fiscal strategies across the region. Overall, the data reflects moderate economic growth, price stability, and manageable fiscal policies, but with significant variability in debt, expenditure, and inflation among countries.

Table 3: Estimation of unit root tests in panel data

Variable	LLC	
	Level	First diff.
TXR	-1.784 (0.037)	-3.919 (0.000)
GDP	-4.531 (0.000)	-7.420 (0.000)
INF	1.542 (0.938)	-2.611 (0.004)
GE	-2.487 (0.006)	-6.386 (0.000)
GD	-2.552 (0.005)	-2.532 (0.005)

Source: Authors calculation

Table 3 shows results from the Levin-Lin-Chu (LLC) test for stationarity across five variables: TXR, GDP, INF, GE, and GD, with values provided at the level (Level) and after first differencing (First diff.). TXR is non-stationary at the level (LLC = -1.784, $p = 0.037$) but becomes stationary after first differencing (LLC = -3.919, $p = 0.000$). GDP is stationary at the level (LLC = -4.531, $p = 0.000$) and even more so after first differencing (LLC = -7.420, $p = 0.000$). INF is non-stationary at the level (LLC = 1.542, $p = 0.938$) but achieves stationarity after differencing (LLC = -2.611, $p = 0.004$). GE is stationary at the level (LLC = -2.487, $p = 0.006$) and even more so after first differencing (LLC = -6.386, $p = 0.000$). GD is stationary at the level (LLC = -2.552, $p = 0.005$) and even more so after first differencing (LLC = -2.532, $p = 0.005$).

= 0.006) and further confirmed after differencing (LLC = -6.386, $p = 0.000$). Similarly, GD is stationary at the level (LLC = -2.552, $p = 0.005$) and remains so after differencing (LLC = -2.532, $p = 0.005$). Low p -values (<0.05) indicate rejection of the null hypothesis of a unit root, confirming stationarity where applicable.

Table 4: Multicollinearity analysis

Variable	VIF	1/VIF
GDPgrowth	1.11	0.902
GE	1.07	0.938
INF	1.06	0.941
DEBT	1.05	0.953
Mean VIF	1.07	

Source: Authors calculation

Table 4 presents the results of a Variance Inflation Factor (VIF) analysis, which is used to detect multicollinearity among independent variables in a regression model. Each variable (GDPgrowth, GE, INF, and DEBT) has a corresponding VIF value and its reciprocal (1/VIF). A VIF value close to 1 indicates low multicollinearity, meaning the variables are not highly correlated. The Mean VIF of 1.07 suggests that there is no problem of multicollinearity among explanatory variables.

Table 5: Panel data estimation

Variable	POLS	FE	RE
GDPgrowth	0.118 (0.000)	0.197 (0.000)	0.091 (0.074)
INF	0.091 (0.068)	0.096 (0.065)	0.058 (0.206)
GE	0.022 (0.000)	0.117 (0.003)	0.052 (0.460)
DEBT	0.005 (0.000)	0.056 (0.000)	0.081 (0.000)
R-squared	0.296	0.474	0.327
F-value	0.000	0.000	0.000
Hausman test		12.61 (0.0134)	

Source: Authors calculation

Table 5 manifests the outcomes of applied regression models examining the relationship between various independent variables—GDP growth, inflation, government expenditure (GE), and government debt (DEBT)—and their effects on tax revenue. The coefficients indicate the expected change in tax revenue for a one-unit change in each independent variable, with the values in parentheses representing p -values that indicate statistical significance. For GDP growth, the coefficients are 0.118, 0.197, and 0.091 across

three models, with p-values of 0.000, indicating a highly significant positive effect on tax revenue at the 1% level. It denotes that auxiliary hypothesis $H_{1,1}$ can be confirmed. Inflation shows coefficients of 0.091, 0.096, and 0.058, with p-values of 0.068, 0.065, and 0.206, suggesting that the first two models have a marginal significance at the 10% level, while the last model does significantly affect tax revenue at 10%. Therefore, we can confirm auxiliary hypothesis $H_{1,2}$. Government expenditure has coefficients of 0.022, 0.117, and 0.052, with p-values of 0.000, 0.003, and 0.460, indicating that the first two models show a significant positive relationship at the 1% and 5% levels, respectively, while in the third model the effect is not statistically significant. Based on mentioned, auxiliary hypothesis $H_{1,3}$ can be confirmed. Government debt has coefficients of 0.005, 0.056, and 0.081, all with p-values of 0.000, indicating a significant positive effect on tax revenue across all models at the 1% level. Thus, we can infer that auxiliary hypothesis $H_{1,4}$ can be accepted. The R-squared values (0.296, 0.474, and 0.327) suggest that the models explain a moderate amount of the variance in tax revenue, with the second model being the most explanatory. The F-value of 0.000 across all models indicates that the overall regression is statistically significant. The Hausman test result of 12.61 with a p-value of 0.0134 suggests that there are significant differences between the fixed and random effects models, indicating that a fixed effects model may be more appropriate for this analysis. In summary, GDP growth, government expenditure, and government debt significantly and positively influence tax revenue, while inflation shows mixed significance across the models. It means that general hypothesis H_1 can be confirmed.

Conclusion

Effective tax revenue mobilization is a cornerstone of sound fiscal policy and a key driver of economic stability and growth. Understanding the macroeconomic factors that shape tax revenues is crucial for designing policies that ensure fiscal sustainability and economic resilience. This study confirms that macroeconomic determinants, particularly GDP growth, inflation, government expenditure, and government debt, significantly affect tax revenues in Western Balkan countries. Among these factors, GDP growth stands out as having the most substantial positive effect, highlighting the critical role of economic expansion in broadening the taxable base and enhancing fiscal capacity. Economic growth not only increases individual and corporate incomes but also boosts consumption and investment, all of which contribute to higher tax revenues. Inflation also exhibits a positive relationship with tax revenues, as rising nominal prices lead to greater revenue collection through value-added and income taxes. However, the extent of this effect depends heavily on the efficiency and responsiveness of tax collection systems, as poorly managed systems may fail to capture the full benefits of inflation. Government expenditure positively influences tax revenue, reflecting increased fiscal activity and the mobilization of resources for public services. This finding suggests that investments in key areas such as education, healthcare, and infrastructure foster economic growth and enhance the government's ability to collect taxes. Similarly, government debt shows a positive association with tax revenues, potentially because fiscal pressures from debt repayment obligations motivate stricter enforcement of tax policies and efforts to expand the tax base.

While this relationship is encouraging, it also underscores the importance of sustainable debt management to ensure long-term fiscal stability. The results of this study

carry important policy implication for the Western Balkan region. Policymakers should focus on implementing growth-oriented strategies that drive GDP expansion, such as increasing investment in infrastructure, fostering innovation, and enhancing workforce skills. These measures can indirectly strengthen the fiscal base by creating a more dynamic and productive economy. Additionally, reforms aimed at improving the efficiency of tax administration systems are essential. Modernizing tax collection methods, reducing evasion, and streamlining compliance procedures can ensure that revenue gains from inflation and debt-financed activities are maximized and not undermined by inefficiencies.

Governments in the region should also adopt prudent fiscal management practices to balance the benefits of borrowing with sustainable revenue generation. This includes setting realistic debt levels and focusing on investments that yield long-term economic benefits, which, in turn, boost tax revenues. Moreover, policymakers must prioritize the development of transparent and effective institutions to ensure that increased government spending translates into measurable improvements in public services and economic outcomes. To address the potential risks associated with inflation, governments should aim to maintain moderate and stable inflation rates. Excessively high inflation could erode purchasing power and lead to public discontent, while very low inflation may limit the growth of nominal tax revenues. Striking the right balance is essential for maximizing fiscal benefits without destabilizing the economy.

Finally, this study emphasizes the need for a holistic approach to fiscal policy in the Western Balkans, where growth-oriented strategies, efficient tax administration, and prudent debt management work in tandem to enhance tax revenue collection. Such policies will not only improve fiscal capacity but also contribute to sustainable economic development across the region. Despite these insights, several limitations of this study warrant caution. First, the analysis is based on aggregate panel data, which might mask country-specific nuances or variations in tax policy. Second, the study assumes linear relationships between macroeconomic variables and tax revenue, which may oversimplify complex dynamics such as non-linear or lagged effects. Third, unobserved variables like the informal economy or tax evasion, which are prevalent in the Western Balkans, were not explicitly analyzed. These factors may significantly influence the effectiveness of macroeconomic determinants on tax revenue. Future research should address these limitations by incorporating country-specific case studies or employing non-linear modeling techniques to capture more complex relationships. Expanding the scope to include additional factors, such as institutional quality, corruption, or international trade dynamics, could offer a more comprehensive understanding of fiscal performance. Finally, a comparative analysis with other regions in similar stages of economic development could highlight unique challenges and opportunities in the Western Balkans, contributing to more tailored and effective policy activities.

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