THE IMPACT OF BUDGET DEFICIT ON ECONOMIC GROWTH: EVIDENCE FROM NORTH MACEDONIA (1999–2024)

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Abstract

This study aims to examine the relationship between the budget deficit and economic growth in North Macedonia over the period 1999–2024. The study employs Ordinary Least Squares (OLS) regression analysis using annual data to investigate the relationship between the budget deficit indicator and economic growth. To assess the robustness of the empirical findings, the baseline model is extended by incorporating unemployment, inflation, and foreign direct investment (FDI) as control variables.

The empirical results reveal a positive and statistically significant relationship between the budget deficit indicator and economic growth in North Macedonia. Given that the indicator is measured using a sign convention in which negative values represent budget deficits and positive values represent budget surpluses, the positive coefficient suggests that an improvement in the budget deficit, reflected by a reduction in the budget deficit, is associated with higher economic growth. Furthermore, the extended model confirms that this positive and statistically significant relationship remains consistent after controlling for unemployment, inflation, and foreign direct investment. However, none of the control variables demonstrates an individually statistically significant relationship with economic growth in the extended model.

The findings highlight the importance of sound fiscal management and fiscal sustainability in supporting economic performance. The study contributes to the empirical literature by providing updated evidence on the relationship between budget deficit and economic growth in North Macedonia, covering a period that includes several important macroeconomic developments.

Keywords: Budget Deficit; Economic Growth; OLS Regression; North Macedonia.

1. Introduction

As a small open economy, North Macedonia faces structural constraints in mobilizing sufficient domestic financial resources. Consequently, the financing and management of the government budget, particularly the budget deficit, represent important components of the country's macroeconomic policy. Maintaining a sustainable fiscal position is essential for supporting macroeconomic stability and creating favorable conditions for long-term economic growth.

The budget deficit is closely linked to aggregate demand and may influence economic growth through the government's revenue and expenditure policies. The government budget represents one of the most important instruments of fiscal policy, as it encompasses both public revenues and public expenditures. The effective management of these two components is essential for maintaining macroeconomic stability and influencing key macroeconomic indicators, including unemployment, inflation, and economic growth. In this context, the relationship between the budget deficit and economic growth is particularly relevant for understanding the role of fiscal policy in the economic development of North Macedonia.

Government revenues can be broadly classified into sustainable and non-sustainable sources. Sustainable revenues are primarily generated through taxes, social security contributions, value-added tax (VAT), and other recurring revenue sources. A higher proportion of stable and recurring revenues generally contributes to a stronger and more predictable fiscal position. On the expenditure side, government spending can be classified according to its economic and developmental contribution. Productive expenditures include investments in education, healthcare, research and development, technology, and infrastructure, which may strengthen productive capacity and support long-term economic growth. In contrast, inefficient

administrative spending, poorly designed public projects, and expenditures associated with corruption may generate limited economic and social returns.

In addition to the budget deficit indicator, this study incorporates unemployment, inflation, and foreign direct investment (FDI) as control variables to provide a broader assessment of the macroeconomic factors associated with economic growth. Their inclusion allows the analysis to account for additional macroeconomic conditions that may influence economic performance alongside fiscal policy.

Although North Macedonia is not yet a member of the European Union, its fiscal framework has gradually been aligned with EU fiscal standards, particularly the Maastricht convergence criteria, which establish reference values of 3% of GDP for the general government budget deficit and 60% of GDP for public debt. Within the context of the country's EU accession process, maintaining fiscal discipline and pursuing sustainable public finances are important for strengthening macroeconomic stability and supporting long-term economic development. These fiscal benchmarks further underline the relevance of examining the relationship between the budget deficit and economic growth in North Macedonia.

2. Literature Review

According to the theoretical literature, two main perspectives explain the relationship between fiscal policy and economic growth: Keynesian theory and neoclassical theory.

The Keynesian perspective emphasizes the role of expansionary fiscal policy in stimulating aggregate demand and economic activity. From this perspective, an increase in government expenditure and, under certain circumstances, a budget deficit can have a positive effect on economic growth, particularly when an economy operates below its productive capacity. Higher public spending can stimulate aggregate demand, increase production, and generate employment, thereby contributing to higher GDP growth. The effectiveness of fiscal expansion, however, depends on the composition and efficiency of government expenditure, particularly the extent to which public resources are directed toward productive investments.

In contrast, neoclassical theory emphasizes the potential adverse effects of persistent budget deficits and increased public expenditure on economic growth. A central mechanism underlying this perspective is the crowding-out effect. When the government finances a budget deficit through borrowing, increased demand for loanable funds may place upward pressure on interest rates. Higher interest rates can increase the cost of borrowing for private firms, potentially reducing private investment. Lower private investment may subsequently reduce capital accumulation and productive capacity, ultimately constraining long-term economic growth. Therefore, from the neoclassical perspective, sustained fiscal deficits may have a negative effect on economic growth, particularly when they are financed through extensive domestic borrowing.

A considerable body of empirical literature has examined the relationship between fiscal policy and economic growth, including studies focusing specifically on North Macedonia. Lazarov and Simeonovski (2023), in their study *Macroeconomic Stability and Economic Growth: An Empirical Estimation for North Macedonia*, examine four major macroeconomic dimensions affecting economic growth: output volatility, price volatility, fiscal volatility, and financial stability. Their findings indicate that fiscal volatility does not have a statistically significant impact on economic growth. The authors associate this result with the composition of government expenditure, arguing that the increase in current expenditure, rather than capital expenditure, limits the potential contribution of fiscal policy to economic growth. In particular, insufficient capital expenditure may constrain productive capacity and, consequently, limit improvements in economic output.

Velickovska and Sadiku (2019) investigate the relationship between government expenditure and economic growth in North Macedonia using a linear regression model and a Vector Autoregression (VAR) model for the period from 2000Q1 to 2016Q4. Their findings indicate a positive and statistically significant relationship between government expenditure and economic growth. Furthermore, the authors identify a long-run relationship between the two variables, providing empirical support for the view that government expenditure can contribute to economic growth over an extended period.

Similarly, Gramatikova and Spirkoski (2017) examine the impact of the budget deficit on economic growth and find a positive relationship between the two variables. Their findings provide support for the Keynesian perspective, according to which fiscal expansion can stimulate economic activity and contribute to higher economic growth.

Evidence from other developing and emerging economies also provides mixed results regarding the relationship between fiscal deficits and economic growth. Nimpagaritse et al. (2025) examine the relationship between the budget deficit and economic growth in Burundi over the period 1990–2022 using an Autoregressive Distributed Lag (ARDL) model. Their findings indicate that the budget deficit has a positive and statistically significant effect on economic growth in the long run, while no statistically significant effect is identified in the short run. These findings suggest that the impact of fiscal deficits may vary across different time horizons.

Onwioduokit and Inam (2018), in their study of Liberia, examine the impact of the budget deficit on economic growth and find a positive relationship between the two variables. Their results indicate that a 1% increase in the budget deficit is associated with approximately a 0.4% increase in economic growth, providing further empirical support for the Keynesian view in the context of a developing economy.

In contrast, Amwaama (2018), in a study of Namibia, finds a negative and statistically significant relationship between the budget deficit and economic growth in both the short run and the long run. This finding is consistent with the neoclassical perspective, suggesting that persistent fiscal deficits may constrain economic performance through mechanisms such as increased borrowing costs and reduced private investment.

Glogjani and Balaj (2021) examine the impact of the fiscal deficit on economic growth in Southeastern European countries over the period 2005–2019. Their findings support the Keynesian perspective, identifying a positive and statistically significant relationship between the fiscal deficit and economic growth. The results suggest that fiscal expansion may play an important role in stimulating economic activity in the countries examined.

A comprehensive empirical study by Ahuja and Pandit (2020), covering 59 developing countries over the period 1990–2019, also provides support for the Keynesian perspective. Their findings indicate that expansionary fiscal policy plays a significant role in promoting economic development. More specifically, the empirical analysis identifies a unidirectional relationship running from government expenditure to economic growth, implying that increases in public expenditure contribute to higher GDP growth, rather than higher economic growth necessarily leading to increased government expenditure.

Overall, the empirical literature provides mixed evidence regarding the relationship between fiscal policy and economic growth. While several studies support the Keynesian view by identifying a positive relationship between government expenditure, budget deficits, and economic growth, other studies provide evidence consistent with the neoclassical perspective, particularly by identifying negative effects of fiscal deficits on economic performance. The differences in empirical findings may be attributed to variations in country characteristics, fiscal structures, expenditure composition, financing mechanisms, institutional quality, and the time horizon considered. These mixed results highlight the need for further country-specific empirical analysis, particularly for North Macedonia, where the effectiveness of fiscal policy

may depend not only on the size of the budget deficit but also on the broader macroeconomic environment.

Table 1: Summary of Previous Empirical Studies

Authors	Analyzed Period	Place Analyzed	Econometric Model	Main Findings
Nimpagaritse et al. (2025)	1990–2022	Burundi	ARDL model	In the long run, the budget deficit has a positive and statistically significant effect on economic growth. In the short run, the effect is not statistically significant.
Lazarov & Simeonovski (2023)	2007Q1–2022Q4	North Macedonia	ARDL model	Fiscal volatility does not have a statistically significant impact on economic growth.
Glogjani & Balaj (2021)	2005–2019	Southeastern Europe	Fixed-effects model and dynamic linear regression model	The findings indicate a positive relationship between the fiscal deficit and economic growth.
Velickovska & Sadiku (2019)	2000Q1–2016Q4	North Macedonia	Linear regression model and Vector Autoregression (VAR) model	The findings indicate a positive and statistically significant relationship between government expenditure and economic growth.
Gramatikova & Spirkoski (2017)	1993–2016	North Macedonia	OLS	The findings support the Keynesian view of fiscal policy, indicating a positive relationship between the budget deficit and economic growth.
Onwioduokit & Inam (2018)	—	Liberia	OLS, Augmented Dickey-Fuller (ADF) and Phillips-Perron unit root tests, Engle-Granger cointegration test, and Error Correction Model (ECM)	The findings indicate that a 1% increase in the budget deficit is associated with approximately a 0.4% increase in economic growth.
Amwaama (2018)	1993Q4–2015Q4	Namibia	ARDL	The findings indicate that the budget deficit has a negative and statistically significant effect on economic growth.

Authors	Analyzed Period	Place Analyzed	Econometric Model	Main Findings
Ahuja & Pandit (2020)	1990–2019	59 developing countries	Fixed-effects model and Granger causality test	The findings indicate that government expenditure has a positive effect on economic growth and provide support for the Keynesian perspective.

Although several studies have examined the relationship between fiscal policy and economic growth in North Macedonia, the existing literature remains limited in several respects. First, relatively few studies have specifically investigated the impact of the budget deficit on economic growth in North Macedonia. Second, previous empirical analyses generally cover earlier periods and do not fully capture recent economic developments, including the COVID-19 pandemic and the subsequent period of economic recovery. Third, limited attention has been given to assessing the robustness of the estimated relationship by incorporating additional macroeconomic control variables.

This study addresses these gaps by providing updated empirical evidence on the relationship between the budget deficit and economic growth in North Macedonia over the period 1999–2024. In addition to examining the direct relationship between the budget deficit and economic growth, the study conducts a robustness analysis by incorporating inflation, unemployment, and foreign direct investment (FDI) as additional control variables. By extending the analysis to a more recent period and accounting for broader macroeconomic conditions, the study aims to provide a more comprehensive assessment of the role of fiscal policy in determining economic growth in North Macedonia.

3. Methodology

3.1 Research Design

The aim of this study is to examine the impact of the budget deficit on economic growth in North Macedonia with the help of secondary data for the period 1999–2024. To achieve this objective, the study employs descriptive statistical analysis and the Ordinary Least Squares (OLS) regression method to examine the relationship between the budget deficit and economic growth and to assess the effects of the selected explanatory variables on economic performance.

Table 2. Analysis of the variables

VARIABLE	DESCRIPTION
GDP	Annual GDP growth rate (%)
BD	Budget deficit in proportion to GDP
INF	Consumer prices (annual %)
UNE	% of total labour force

FDI	Net inflows (% of GDP)

3.2 Research Hypotheses

The study is based on two competing hypotheses concerning the relationship between the budget deficit and economic growth:

H1: There is a statistically significant relationship between the budget deficit and economic growth in North Macedonia.

H0: There is no statistically significant relationship between the budget deficit and economic growth in North Macedonia.

The expected relationship between the budget deficit and economic growth can be explained through two main theoretical perspectives: the Keynesian and neoclassical approaches. From the Keynesian perspective, government intervention plays an important role in stabilizing economic activity, particularly during periods of economic downturns. Keynes (1936) emphasized the role of aggregate demand and the importance of fiscal policy in supporting economic activity when private demand is insufficient. Within this framework, budget deficits can serve as a countercyclical fiscal instrument by enabling the government to increase public expenditure, stimulate aggregate demand, support production, and maintain employment during economic downturns.

An increase in government expenditure may generate a multiplier effect, whereby an initial increase in public spending leads to subsequent increases in income, consumption, and output. Consequently, deficit-financed public expenditure, particularly when directed toward productive investment, may contribute positively to economic growth, especially when an economy operates below its productive capacity. This perspective therefore provides a theoretical basis for expecting a positive relationship between the budget deficit and economic growth.

In contrast, the neoclassical perspective suggests that persistent government budget deficits may have adverse effects on long-term economic growth. When deficits are financed through government borrowing, increased demand for loanable funds may place upward pressure on interest rates. Higher interest rates can increase the cost of borrowing for private firms and households, potentially reducing private investment. This mechanism, commonly referred to as the **crowding-out effect**, may reduce capital accumulation and productive capacity and, consequently, constrain long-term economic growth (Elmendorf & Mankiw, 1999).

Therefore, the empirical relationship between the budget deficit and economic growth is theoretically ambiguous. The Keynesian perspective predicts a potentially positive effect, particularly in periods of economic slack, whereas the neoclassical perspective emphasizes the possibility of a negative long-run effect arising from higher borrowing costs and reduced private investment. The empirical analysis in this study tests whether the relationship observed in North Macedonia over the period 1999–2024 is statistically significant.

3.3 Econometric Model

To examine the impact of the budget deficit on economic growth, the study employs a linear regression model estimated using the Ordinary Least Squares (OLS) method. The dependent variable in the baseline model is economic growth, measured by the annual GDP growth rate, while the budget deficit is the main independent variable.

In addition to the baseline model, a robustness check is conducted to assess the stability of the estimated relationship. Specifically, an alternative model specification is estimated by incorporating additional macroeconomic control variables, namely foreign direct investment,

inflation, and unemployment. The purpose of this alternative specification is to determine whether the estimated effect of the budget deficit on economic growth remains stable after controlling for other relevant macroeconomic factors.

The baseline econometric model is specified as follows:

$GDP = \beta_0 + \beta_1 BD + \varepsilon$

where:

- GDP represents economic growth, measured by the annual GDP growth rate in year *t*;
- BD represents the budget deficit as a percentage of GDP in year *t*;
- β_0 represents the intercept (constant), indicating the expected value of economic growth when the budget deficit is equal to zero;
- β_1 represents the estimated coefficient of the budget deficit and indicates the expected change in economic growth associated with a one-unit change in the budget deficit, holding other factors constant;
- ε represents the error term, capturing other factors that may affect economic growth but are not explicitly included in the model.

For the robustness analysis, the baseline model is extended by incorporating foreign direct investment, inflation, and unemployment as additional explanatory variables:

$$GDP_t = \beta_0 + \beta_1 BD_t + \beta_2 FDI_t + \beta_3 INF_t + \beta_4 UNE_t + \varepsilon_t$$

The empirical analysis begins with descriptive statistics, which provide an overview of the distribution and main characteristics of the variables included in the study. The descriptive statistics results are presented below.

Table 3: Descriptive statistics

Varialble	**Mean**	**Std. Dev.**
GDP	2.69	2.53
BD	-2.64	2.44

Source: Authors calculations

The descriptive statistics presented in the table indicate that the average annual economic growth in North Macedonia over the period 1999–2024 was **2.69%**. The average budget deficit during the same period was **–2.64% of GDP**, which is relatively close to the **3% of GDP reference value established under the EU fiscal rules**.

Regarding the variability of the variables, the standard deviation of economic growth was **2.53 percentage points**, while the standard deviation of the budget deficit was **2.44 percentage points**. These relatively high levels of variation indicate that both economic growth and the budget deficit fluctuated considerably during the analyzed period. Such fluctuations can partly be attributed to major economic shocks, particularly the **COVID-19 pandemic**, which significantly affected economic activity and fiscal conditions in North Macedonia and globally. The pandemic sharply reduced economic activity and increased fiscal pressures, contributing to greater variation in both economic growth and the budget deficit during the study period.

Table 4: Model Summary

R	**R²**	**Adjusted R²**	**Std. Error**	**F-stat**	**Sig.**	**DW**
0.678	0.459	0.437	1.905	20.383	0.000	1.962

Source: Authors calculations

The regression results indicate that the budget deficit explains approximately **45.9% of the variation in economic growth** in North Macedonia during the analyzed period. The model is statistically significant, indicating that the budget deficit has a statistically significant relationship with economic growth.
Furthermore, the **Durbin–Watson statistic is close to 2**, suggesting that there is no evidence of substantial first-order autocorrelation in the residuals. This indicates that the residuals are not systematically correlated over time, supporting the reliability of the OLS estimates with respect to this diagnostic criterion.

Table 5 : Regression results

Variable	Coefficient (B)	Std. Error	t-stat	Sig.	VIF
Constant	4.563	0.557	8.193	0.000	
Budget Deficit (BD)	0.705	0.156	4.515	0.000	1.000

Dependent variable: GDP Growth
Source: Authors calculations

The empirical findings indicate a statistically significant positive relationship between the budget deficit indicator and economic growth in North Macedonia. The estimated regression coefficient is positive ($B = 0.705$) and statistically significant at the 1% level ($p < 0.001$). Therefore, the null hypothesis (H0), which assumes no statistically significant relationship between the budget deficit and economic growth, is rejected, while the alternative hypothesis (H1) is supported.
It is important to note that the budget deficit indicator is measured using a sign convention in which negative values represent budget deficits and positive values represent budget surpluses. Consequently, the positive coefficient indicates that an improvement in the budget deficit, reflected by a reduction in the budget deficit, is associated with higher economic growth. Specifically, a one-percentage-point increase in the budget deficit indicator is associated with a 0.705-percentage-point increase in GDP growth, according to the estimated model.

3.4 Robustness check

To assess the robustness of the baseline model presented above, a robustness check is conducted by incorporating additional macroeconomic control variables, namely inflation, unemployment, and foreign direct investment (FDI). The purpose of this alternative model specification is to determine whether the estimated relationship between the budget deficit and economic growth remains stable after controlling for other relevant macroeconomic factors.

Table 6: Model Summary

R	R^2	Adjusted R^2	F	p-value	Durbin–Watson
0.728	**0.530**	**0.440**	**5.916**	**0.002**	**2.051**

The regression results indicate a relatively strong positive association between the independent variables and economic growth, with an **R value of 0.728**. The coefficient of determination (**R^2 = 0.530**) indicates that approximately **53.0% of the variation in GDP growth** is explained by the independent variables included in the model. The **Adjusted R^2 of 0.440** indicates that, after accounting for the number of predictors and the sample size, the model explains approximately **44.0% of the variation in economic growth**.

The overall regression model is statistically significant, as indicated by the **F-statistic of 5.916 and a p-value of 0.002**. This result indicates that the independent variables, when considered jointly, have a statistically significant relationship with GDP growth.
Furthermore, the **Durbin–Watson statistic of 2.051** is very close to the benchmark value of 2, suggesting that there is no evidence of substantial first-order autocorrelation in the residuals. Overall, these results indicate that the alternative model provides a statistically significant specification and explains a substantial proportion of the variation in economic growth.

Table 7: Regression Results (Robustness Check)

Variable	Coefficient (B)	Std. Error	t-stat	Sig.	VIF
Constant	7.468	2.274	3.285	0.004	
Budget Deficit (BD)	0.918	0.203	4.532	0.000	1.693
Foreign Direct Investment (FDI)	-0.031	0.169	-0.185	0.855	1.290
Inflation (INF)	0.079	0.128	0.617	0.544	1.442
Unemployment (UNE)	-0.088	0.063	-1.391	0.179	1.847

Source: Authors calculations

The robustness check results indicate that the budget deficit indicator remains statistically significant and positively associated with economic growth after including additional control variables, namely inflation, unemployment, and foreign direct investment (FDI). This finding suggests that the positive relationship between the budget deficit indicator and economic growth, identified in the baseline model, remains stable after controlling for other relevant macroeconomic factors. In particular, the positive and statistically significant coefficient indicates that an improvement in the budget deficit, reflected by a reduction in the budget deficit, is associated with higher economic growth. These results provide further support for the stability of the baseline model's findings.
In contrast, the additional control variables included in the robustness specification do not have statistically significant effects on economic growth at conventional significance levels. Therefore, their inclusion does not substantially alter the estimated relationship between the budget deficit and economic growth.
The **Variance Inflation Factor (VIF)** values range from **1.290 to 1.847**, indicating that multicollinearity does not represent a concern in the estimated model. All VIF values are well below the commonly used threshold of 5, suggesting that there is no substantial linear correlation among the independent variables. This result supports the reliability and stability of the coefficient estimates in the robustness specification.

Conclusion

This study contributes to the existing literature by providing updated empirical evidence on the relationship between the budget deficit and economic growth in North Macedonia, using annual data for the period 1999–2024. The empirical findings reveal a positive and statistically significant relationship between the budget deficit indicator and economic growth. Furthermore, the extended regression model, which incorporates inflation, unemployment, and foreign direct investment (FDI) as control variables, confirms that this positive and statistically significant relationship remains consistent after accounting for additional macroeconomic

factors. Given the measurement of the budget deficit indicator, whereby negative values represent budget deficits and positive values represent budget surpluses, the findings suggest that an improvement in the budget deficit, reflected in a reduction in the budget deficit, is positively associated with economic growth.

These findings highlight the importance of fiscal policy and sound fiscal management in supporting economic performance. From a policy perspective, the results suggest that policymakers should pursue a balanced fiscal approach that supports economic activity while maintaining long-term fiscal sustainability. In particular, public expenditure should be allocated efficiently and directed toward productive sectors, including infrastructure, education, healthcare, research and development, and innovation. Such an approach can strengthen the productive capacity of the economy and contribute to sustainable long-term economic growth. At the same time, maintaining fiscal discipline is essential to limit excessive public debt accumulation and preserve macroeconomic stability.

The study has some limitations. The relatively small sample of 26 annual observations and the focus on a single country may limit the generalizability of the findings. In addition, the analysis includes a limited number of explanatory variables. Finally, OLS regression identifies statistical relationships but does not establish causality.

Future research could address these limitations by extending the analysis to a broader group of countries through panel-data methods, particularly by focusing on economies with similar economic and institutional characteristics. Further studies could also incorporate additional explanatory variables, such as public debt, government expenditure, institutional quality, political stability, and the composition of public spending. Moreover, alternative econometric approaches, including methods that account for potential endogeneity and dynamic relationships, could provide further insights into the interaction between fiscal policy and economic growth. Extending the analysis to longer time periods and examining different economic conditions could also help determine whether the relationship between budget deficit and economic growth varies across countries and over time.

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