The Impact of Public Debt on Economic Growth in the Republic of North Macedonia

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Abstract

This study examines the relationship between public debt and economic growth in the Republic of North Macedonia over the period 2007–2021. In recent decades, public debt has become a central issue in macroeconomic policy, particularly following major economic shocks such as the global financial crisis and the COVID-19 pandemic. While public borrowing may support economic growth by financing productive investment and stabilizing aggregate demand, excessive debt accumulation can undermine long-term growth and fiscal sustainability. Using annual time-series data obtained from the World Bank, the International Monetary Fund, the National Bank of the Republic of North Macedonia, and the Ministry of Finance, this study applies an econometric model based on the Ordinary Least Squares (OLS) method. Economic growth, measured by GDP per capita growth, is specified as the dependent variable. Public debt, expressed as a percentage of GDP, and its squared term are included as key explanatory variables in order to capture potential nonlinear effects. Additional control variables include exports, final consumption expenditure, government expenditure, gross savings, and the current account balance.The empirical results provide evidence of a nonlinear relationship between public debt and economic growth. At relatively low levels, public debt has a positive and statistically significant impact on economic growth, whereas higher levels of public debt exert a negative and statistically significant effect. These findings support the existence of an optimal public debt threshold and highlight important policy implications for fiscal sustainability and debt management in developing and transition economies.

Keywords: Public debt, Economic growth, Debt threshold, Fiscal sustainability; North Macedonia.

1. Introduction

Public debt has become one of the most debated topics in macroeconomic policy over the past two decades. Governments across the world increasingly rely on public borrowing to finance budget deficits, stabilize economic activity, and respond to unexpected shocks such as financial crises, natural disasters, and health emergencies. The global financial crisis of 2008 and the COVID-19 pandemic further intensified this trend, leading to a significant increase in public debt levels in both developed and developing economies.

From a policy perspective, public debt represents a double-edged sword. On the one hand, government borrowing allows the financing of public investment, supports aggregate demand, and contributes to economic stabilization during periods of recession. On the other hand, excessive debt accumulation may weaken fiscal sustainability, increase debt servicing costs,

and reduce the government's ability to respond to future economic shocks. As a result, understanding the relationship between public debt and economic growth remains a key concern for policymakers and researchers.

The relationship between public debt and economic growth is particularly important for developing and transition economies. These countries often face limited fiscal space, weaker institutional frameworks, and greater exposure to external shocks. Consequently, the potential growth-enhancing effects of public borrowing may be constrained, while the risks associated with excessive debt accumulation may be amplified. In this context, identifying the level of public debt that supports economic growth without jeopardizing fiscal sustainability is of crucial importance.

The Republic of North Macedonia provides an interesting case study for examining the debt–growth relationship. Since the early 2000s, the country has undergone significant economic and institutional transformations, including structural reforms and gradual integration into regional and international markets. During this period, public debt has increased steadily, particularly after the global financial crisis and during the COVID-19 pandemic. Although public debt remains below the European Union average, its rapid growth has raised concerns regarding long-term fiscal sustainability and economic performance.

The main objective of this study is to examine the impact of public debt on economic growth in the Republic of North Macedonia over the period 2007–2021. Specifically, the study investigates whether public debt contributes positively to economic growth at low levels and whether higher levels of debt exert a negative effect. By employing a nonlinear econometric framework, this paper contributes to the existing literature by providing country-specific empirical evidence and offering policy-relevant insights for sustainable fiscal management.

The remainder of the paper is structured as follows. Section 2 presents the theoretical background on public debt and economic growth. Section 3 reviews the relevant empirical literature. Section 4 describes the data and provides a descriptive analysis of the main variables. Section 5 outlines the econometric methodology. Section 6 presents and discusses the empirical results. Section 7 discusses policy implications, and Section 8 concludes.

Research Expectations / Hypotheses

Based on the theoretical framework and the existing empirical literature, this study expects public debt to influence economic growth in a nonlinear manner. In particular, public debt is expected to support economic growth at moderate levels, while excessive debt accumulation is anticipated to exert a negative effect due to increased debt servicing costs and fiscal constraints. Furthermore, macroeconomic control variables such as exports, consumption, and government expenditure are expected to play a significant role in shaping economic growth dynamics in the Republic of North Macedonia.

2. Theoretical Background: Public Debt and Economic Growth

From a theoretical perspective, the relationship between public debt and economic growth has been examined through various economic frameworks, each offering different explanations regarding the effects of government borrowing. One of the most influential approaches is the Keynesian framework, which emphasizes the role of fiscal policy in stabilizing economic activity. According to Keynesian theory, public debt can have a positive impact on economic

growth, particularly during periods of economic downturn or when resources are underutilized. Government borrowing enables increased public spending, which stimulates aggregate demand, supports employment, and promotes economic recovery.

In the Keynesian view, public debt is not inherently harmful, especially when it is used to finance productive public investment or countercyclical fiscal policies. During recessions, increased public borrowing can help offset declines in private consumption and investment, thereby supporting economic growth. However, this positive effect is generally expected to be temporary and depends on the efficiency of public spending and the overall macroeconomic environment.

In contrast, neoclassical economic theory highlights the potential negative effects of public debt on economic growth. According to this perspective, high levels of government borrowing may lead to higher interest rates, as increased demand for loanable funds raises the cost of borrowing. Higher interest rates can crowd out private investment, reducing capital accumulation and slowing economic growth. Furthermore, expectations of future tax increases required to service public debt may discourage consumption and investment, thereby further constraining economic activity.

Endogenous growth theory provides additional insights by emphasizing the role of public investment in promoting long-term economic growth. When public debt is used to finance investments in human capital, infrastructure, education, research, and innovation, it may increase productivity and support sustainable growth. However, if public borrowing is directed toward unproductive expenditures or inefficient public spending, the growth-enhancing effects of public debt are likely to be limited or even negative.

More recent theoretical contributions emphasize the nonlinear nature of the relationship between public debt and economic growth. According to this approach, public debt may support economic growth up to a certain threshold, beyond which its negative effects dominate. At low levels, public debt can stimulate growth by financing productive investment and stabilizing economic activity. At high levels, however, rising debt servicing costs, increased fiscal uncertainty, and reduced policy flexibility may outweigh these benefits. This nonlinear framework provides the theoretical foundation for the empirical analysis conducted in this study.

3. Literature Review

The empirical literature on public debt and economic growth is extensive and diverse, covering a wide range of countries, time periods, and methodological approaches. Early empirical studies primarily focused on advanced economies, while more recent research has increasingly examined developing and emerging economies. Despite the growing body of research, empirical findings remain mixed, reflecting differences in data, methodology, and country characteristics.

One of the most influential contributions to the literature is Reinhart and Rogoff (2010), who analyze historical data for a large number of countries and find that high public debt levels are associated with significantly lower economic growth. Their study suggests the existence of a debt threshold beyond which economic growth declines sharply. Although their findings have been subject to methodological criticism, the study sparked renewed interest in the debt–growth nexus and inspired numerous subsequent empirical investigations.

Kumar and Woo (2010) examine the relationship between public debt and economic growth using panel data for a large sample of countries. Their results indicate that higher public debt is associated with lower long-term economic growth, particularly in developing economies. The authors find that a 10-percentage-point increase in the debt-to-GDP ratio is associated with a reduction in annual growth rates, and they argue that the negative impact of public debt on growth is stronger in countries with weaker institutional frameworks.

Afonso and Alves (2015) analyze the role of government debt in economic growth and find that rising public debt negatively affects economic performance through its impact on private investment and interest rates. Similarly, Baum et al. (2013) provide evidence of nonlinear effects of public debt on economic growth in European economies, supporting the hypothesis that public debt becomes harmful beyond a certain threshold.

Despite the extensive empirical literature, evidence on small transition economies remains limited. Many studies rely on cross-country panel data, which may mask important country-specific dynamics. This study contributes to the literature by providing a country-specific analysis of the relationship between public debt and economic growth in the Republic of North Macedonia using time-series data and a nonlinear econometric framework.

4. Data and Descriptive Analysis

4.1 Data Sources and Variable Definition

This study employs annual time-series data for the Republic of North Macedonia covering the period 2007–2021. The data are obtained from reliable international and national sources, including the World Bank, the International Monetary Fund, the National Bank of the Republic of North Macedonia, and the Ministry of Finance. These sources ensure data consistency and comparability across time.

Economic growth is measured by the annual growth rate of GDP per capita and serves as the dependent variable. Public debt, expressed as a percentage of GDP, represents the main explanatory variable. To capture the potential nonlinear relationship between public debt and economic growth, the squared term of public debt is included in the econometric model. Additional control variables include exports (as a percentage of GDP), final consumption expenditure, government expenditure, gross savings, and the current account balance. These variables are commonly used in empirical studies examining the determinants of economic growth and fiscal performance.

4.2 Economic Growth Trends in North Macedonia

Economic growth in North Macedonia has exhibited significant volatility over the sample period. Periods of relatively strong growth have been interrupted by economic downturns associated with external shocks, most notably the global financial crisis in 2009 and the COVID-19 pandemic in 2020.

Table 1. GDP per Capita Growth in the Republic of North Macedonia (%)

Year	GDP per capita growth (%)
2007	6.30
2008	5.30
2009	-0.54

Year	
2010	3.14
2011	2.16
2012	-0.58
2013	2.78
2014	3.46
2015	3.72
2016	2.74
2017	0.98
2018	2.80
2019	3.89
2020	-5.92
2021	4.34

Source: World Bank, author's calculations

Table 1 illustrates the cyclical nature of economic growth in North Macedonia. The sharp contraction in 2009 reflects the impact of the global financial crisis, while the substantial decline in 2020 highlights the severe economic consequences of the COVID-19 pandemic. The subsequent recovery in 2021 suggests a partial rebound supported by fiscal and monetary policy measures.

4.3 Public Debt Trends

Public debt represents the key explanatory variable in this study. Over the past two decades, public debt in North Macedonia has increased steadily, reflecting rising fiscal deficits and increased government borrowing.

Table 2. Public Debt in North Macedonia (% of GDP)

Year	*Public debt (% of GDP)*
2016	48.8
2017	47.7
2018	48.4
2019	49.2
2020	61.0
2021	60.8
2022 (Q2)	55.4

Source: Ministry of Finance of the Republic of North Macedonia

As shown in Table 2, public debt increased sharply during the COVID-19 pandemic, exceeding 60 percent of GDP in 2020 and 2021. This increase reflects expansionary fiscal measures aimed at mitigating the economic impact of the crisis. Although public debt declined slightly in 2022, the elevated debt level raises concerns regarding long-term fiscal sustainability.

4.4 Structure of Public Debt

In addition to its overall level, the composition of public debt is an important determinant of fiscal risk. Table 3 presents the structure of public debt in North Macedonia, distinguishing between external and domestic debt.

Table 3. Structure of Public Debt in North Macedonia (million EUR)

Year	*Total Public Debt*	*External Debt*	*Domestic Debt*
2016	4,711.4	3,286.0	1,425.4
2018	5,202.2	3,537.8	1,664.4
2020	6,483.3	4,323.7	2,159.6
2021	7,135.3	4,668.9	2,466.4
2022 (Q2)	7,226.7	4,704.9	2,521.8

Source: Ministry of Finance, Public Debt Reports

The table shows that external debt accounts for the largest share of total public debt. A high reliance on external borrowing may increase vulnerability to exchange rate fluctuations and external financial conditions, underscoring the importance of prudent debt management.

5. Methodology

To analyze the relationship between public debt and economic growth, this study employs an econometric framework based on the Ordinary Least Squares (OLS) method. OLS is widely used in empirical macroeconomic research due to its simplicity, transparency, and ease of interpretation.

The baseline regression model is specified as follows:

$$GDPG_t = \beta_0 + \beta_1 Debt_t + \beta_2 Debt_t^2 + \beta_3 X_t + \varepsilon_t$$

where **GDPG$_t$** denotes GDP per capita growth, **Debt$_t$** represents public debt as a percentage of GDP, **Debt²$_t$** captures nonlinear effects, and **X$_t$** is a vector of control variables. The error term ε_t captures unobserved factors affecting economic growth. The inclusion of the squared debt term allows for the identification of a potential public debt threshold. While the OLS approach has certain limitations, including potential endogeneity and omitted variable bias, it provides a suitable baseline framework for examining the relationship between public debt and economic growth in the Republic of North Macedonia.

All variables are expressed in annual terms and the analysis is conducted using time-series data for the period under study. The estimation is carried out using the Ordinary Least Squares (OLS) technique, with the inclusion of control variables to reduce potential omitted variable bias. While the primary objective is to identify general patterns rather than establish strict causality, this approach provides a reliable and transparent framework for examining the relationship between public debt and economic growth in the Republic of North Macedonia.

6. Empirical Results and Discussion

This section presents the empirical results of the econometric analysis and discusses their implications for the relationship between public debt and economic growth in the Republic of North Macedonia. The analysis begins with descriptive statistics of the main variables, followed by the regression results obtained using the Ordinary Least Squares (OLS) method.

Table 4. Descriptive Statistics of Main Variables

Variable	Mean	Min	Max
GDP per capita growth (%)	2.15	-5.92	6.30
Public debt (% of GDP)	44.9	23.5	61.0
Exports (% of GDP)	50.2	30.5	65.9
Final consumption (% of GDP)	87.9	79.5	97.2
Government expenditure (% of GDP)	16.8	13.9	19.1

Source: World Bank, IMF, author's calculations

The descriptive statistics indicate substantial variation in economic growth and public debt over the sample period, reflecting changing macroeconomic conditions. GDP per capita growth ranges from a minimum of –5.92 percent to a maximum of 6.30 percent, highlighting the impact of major economic shocks. Public debt also exhibits considerable variation, increasing notably in recent years.

Table 5. OLS Regression Results

Variable	Coefficient	Std. Error	Significance
Public debt (% GDP)	0.799	0.398	**
Public debt²	-0.012	0.005	**
Exports	0.177	0.067	**
Final consumption	0.768	0.100	***
Government expenditure	-1.900	0.345	***
Constant	-51.40	12.07	***
Observations	60		
R-squared	0.734		

Significance levels: **$p < 0.05$, *$p < 0.01$**

The regression results provide strong evidence of a nonlinear relationship between public debt and economic growth in the Republic of North Macedonia. The positive and statistically significant coefficient on public debt indicates that moderate levels of public borrowing are associated with higher economic growth. This finding suggests that public debt can support economic activity by financing productive investment and stabilizing aggregate demand.

However, the negative and statistically significant coefficient on the squared public debt term confirms the presence of an inverted U-shaped relationship. This result implies that beyond a certain threshold, higher levels of public debt exert a detrimental effect on economic growth. Excessive debt accumulation may increase debt servicing costs, constrain fiscal space, and reduce policy flexibility, thereby undermining long-term economic performance.

Regarding the control variables, exports exhibit a positive and statistically significant effect on economic growth, highlighting the importance of external demand and trade integration for a small open economy such as North Macedonia. Final consumption expenditure also shows a positive association with economic growth, reflecting the role of domestic demand in supporting economic activity. In contrast, government expenditure displays a negative and statistically significant effect, which may indicate inefficiencies in public spending allocation or a higher share of non-productive expenditure.

Overall, the empirical results are consistent with the theoretical framework and previous empirical studies, reinforcing the argument that public debt influences economic growth in a nonlinear manner. These findings underscore the importance of maintaining public debt within sustainable limits in order to support long-term economic growth and macroeconomic stability.

7. Policy Implications

The empirical findings of this study have important implications for fiscal policy and public debt management in the Republic of North Macedonia. The evidence of a nonlinear relationship between public debt and economic growth suggests that moderate levels of public debt can support economic growth, while excessive debt accumulation may hinder long-term economic performance. Therefore, policymakers should aim to maintain public debt within sustainable limits and avoid rapid debt accumulation, particularly during periods of economic expansion.

Fiscal policy should prioritize the efficient allocation of borrowed funds toward productive investments that enhance long-term growth potential. Public investments in infrastructure, education, healthcare, and technological innovation can increase productivity and support sustainable economic development. In contrast, excessive reliance on debt-financed current expenditure may weaken fiscal sustainability without generating long-term growth benefits.

Strengthening fiscal institutions is also essential for improving public debt management. Enhancing fiscal transparency, improving budget planning, and reinforcing fiscal rules can help reduce fiscal risks and increase investor confidence.

In addition, developing medium-term debt management strategies can support more effective monitoring and control of public debt dynamics.

Furthermore, policymakers should consider reducing reliance on external borrowing by promoting the development of domestic financial markets. A stronger domestic debt market can help mitigate risks associated with exchange rate volatility and external financial shocks.

At the same time, maintaining close coordination between fiscal and monetary policy can contribute to macroeconomic stability and support sustainable economic growth.

Overall, the results of this study highlight the importance of prudent fiscal policy and responsible public debt management in supporting long-term economic growth in the Republic of North Macedonia.

8. Conclusion

This study examined the relationship between public debt and economic growth in the Republic of North Macedonia over the period 2007–2021, with the aim of identifying whether public debt supports or constrains economic performance. Using an econometric framework based on the Ordinary Least Squares (OLS) method and incorporating a nonlinear specification, the analysis provides important insights into the debt–growth nexus in a small transition economy.

The empirical results indicate the existence of a nonlinear relationship between public debt and economic growth. At relatively low levels, public debt appears to have a positive effect on economic growth, suggesting that government borrowing can support economic activity by financing productive investment and stabilizing aggregate demand. However, as public debt increases beyond a certain level, its impact on economic growth becomes negative, reflecting higher debt servicing costs, increased fiscal uncertainty, and reduced policy flexibility.

These findings are consistent with both theoretical predictions and previous empirical studies, which emphasize the importance of maintaining public debt within sustainable limits. For North Macedonia, the results highlight the need for prudent fiscal policy and responsible debt management, particularly in the aftermath of major economic shocks such as the global financial crisis and the COVID-19 pandemic.

Despite its contributions, this study has certain limitations. The analysis is based on annual time-series data and does not explicitly address potential endogeneity or reverse causality between public debt and economic growth. Future research could extend this analysis by employing alternative econometric techniques, such as vector autoregression or instrumental variable approaches, and by incorporating additional variables related to institutional quality and fiscal governance.

Overall, the study contributes to the existing literature by providing country-specific evidence on the impact of public debt on economic growth and offers policy-relevant insights for sustainable fiscal management in the Republic of North Macedonia.

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