



What Influences Economic Growth in Developing Countries? A Panel Data Study

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Abstract: The global economy faces multiple crises that undermine stability and hinder growth, with developing countries being particularly vulnerable. For policymakers in these nations, achieving sustainable development is a top priority to foster long-term progress. The research attempts to establish the primary factors influencing economic growth across 11 developing countries, analyzing data spanning from 2013 to 2022. Using a fixed-effects approach in the panel data regression model, we employ GDP as a proxy for economic growth and include key variables such as public debt, trade openness, gross fixed capital formation, inflation, and population growth. The results indicate that public debt, trade openness, and gross fixed capital formation positively and significantly impact economic growth. These findings emphasize the role of capital accumulation and an open trade policy in fostering development. Conversely, inflation and population growth have significant negative effects on growth, highlighting the need for price stabilization and effective population management to avoid resource strain and inflationary pressures. Based on these results, the study recommends structural reforms and regulatory frameworks to enhance positive growth factors while addressing negative influences. Policies that encourage capital investment, maintain balanced public debt levels, and support trade openness, combined with efforts to control inflation and manage population growth, can provide a foundation for sustainable economic stability. The study ultimately underscores the importance of proactive strategies for sustaining growth and enhancing the resilience of developing countries amid global economic challenges.

Keywords: Anti-Economic Growth; Public Debt; Trade Openness; Developing Countries; Panel Data Analysis

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INTRODUCTION

The discourse on economic growth has garnered significant attention from researchers and policymakers, leading to numerous studies in developed, developing, and fast-growing countries. As a key indicator of social progress, economic growth serves as a fundamental measure of a country's economic performance and development trajectory (Batrancea et al., 2021). Understanding the key factors driving economic growth is particularly important for developing countries, which often face structural challenges such as inadequate infrastructure, low productivity, and institutional weaknesses that hinder sustainable development.

In recent decades, global economic policies have prioritized accelerating growth to improve welfare and reduce inequality (Gatsi & Appiah, 2020; Han & Jiang, 2023). Economic expansion has played a crucial role in poverty alleviation, improving living standards, and advancing overall social welfare, particularly in developing countries where governments are striving for sustainable growth (Erlando et al., 2020). However, despite a strong recovery following the pandemic— with global economic growth reaching a peak of 5.9 percent in 2021, the fastest rate in eight decades—many developing countries have experienced a slowdown, with growth decreasing from 6.4 percent in 2021 to 5.1 percent in 2022 (World Bank, 2023). This decline surpasses the direct effects of the COVID-

19 pandemic and is driven by structural challenges such as rising public debt, declining investment levels, and outflows of capital to developed markets due to higher interest rates and increased borrowing costs. These factors exacerbate stagnation in productivity and trade deficits, further constraining the economic prospects of developing countries (Rehman & Hysa, 2021).

To better understand the complexities of economic growth, various economic theories have examined the relationship between public debt and growth outcomes. According to neoclassical economic theory, public debt can hinder growth by reducing private investment, increasing borrowing costs, and eroding economic confidence (Asteriou et al., 2021). Conversely, endogenous growth theory posits that when public debt is strategically allocated—particularly to productive sectors such as infrastructure, education, and technological innovation—it can stimulate long-term growth (Abille & Kiliç, 2023; Ueshina & Nakamura, 2019). Empirical studies have shown a non-linear relationship between public debt and growth, where moderate levels of debt can support economic expansion, while excessive debt leads to financial instability and reduced growth potential (Augustine & Rafi, 2023). This study aims to examine the impact of public debt on economic growth in developing countries, contributing to the debate on optimal debt levels and government borrowing utilization.

Another major driver of economic growth is trade liberalization, which has facilitated the transition from closed economies to open market systems in many developing countries (Zahonogo, 2017). Global trade has enabled technology transfer, the spread of innovation, and the expansion of markets, which theoretically supports economic growth (Grossman & Helpman, 1991). Several studies have shown the positive impact of trade openness on economic performance (Doan, 2019; Manwa & Wijeweera, 2016; Sakyi et al., 2015), while others caution that excessive liberalization can result in economic volatility, deindustrialization, and dependence on external markets (Malefane & Odhiambo, 2021; SenGupta, 2020). Additionally, some empirical analyses have found no significant correlation between trade openness and growth, highlighting the importance of country-specific contexts (Trejos & Barboza, 2015). This study explores the extent to which trade liberalization influences economic growth in developing countries, considering national contexts and the policies implemented.

In addition to trade policies, gross fixed capital formation (GFCF) is seen as a critical factor in economic expansion. The Solow growth model (1956) emphasizes the importance of capital accumulation—including investments in physical assets, infrastructure, and industrial development—as a driver of long-term production capacity and economic progress. However, many developing countries face capital constraints that hinder their ability to sustain strong economic growth (Onyinye et al., 2017). While some empirical studies confirm the positive impact of fixed capital investment on economic expansion (Mongi & Saidi, 2023; Rinosha & Mustafa, 2021), others provide mixed findings, with some analyses revealing negative or insignificant effects due to inefficiencies in investment allocation, corruption, and a lack of absorptive capacity (Imoughele & Mohammed, 2015; Nweke et al., 2017). This study aims to provide a deeper understanding of the role of fixed capital investment in economic growth across selected developing countries.

Inflation is another significant macroeconomic factor influencing economic performance (Akinsola & Odhiambo, 2017). High inflation erodes purchasing power, distorts investment decisions, and creates economic instability, while very low inflation can restrict economic activity and suppress investment (Koirala, 2008; Karki et al., 2020). While conventional economic theory asserts that inflation negatively impacts growth (Baharumshah & Soon, 2014; Uddin & Rahman, 2023), some scholars argue that its effects vary depending on the level of economic development and monetary policy frameworks (Ekinci et al., 2020; Ezako, 2023). Furthermore, some studies have found no significant relationship between inflation and growth, highlighting the importance of inflation targeting and macroeconomic stability (Mukoka, 2018). This study examines the relationship between inflation and growth in developing countries to identify the optimal inflation range that supports sustainable economic development.

Another debated factor influencing economic growth is population growth. Classical economic theory often views rapid population growth as a burden on resources, potentially reducing per capita income and leading to economic stagnation (Linden, 2017). However, recent studies suggest that a growing population can stimulate economic activity by expanding the workforce and increasing market size (Chirwa & Odhiambo, 2019; Tumwebaze & Ijjo, 2015). Empirical findings remain inconsistent—some studies associate high population growth with negative economic outcomes due to unemployment pressures and resource depletion (Fetahi-Vehapi et al., 2015; Furuoka, 2018), while others find no significant correlation (Effiong, 2022; Hadush et al., 2023). This study aims to clarify the role of population dynamics in shaping economic growth trajectories in developing countries.

While much research has explored macroeconomic determinants of economic growth, there remains a research gap that needs to be addressed. For instance, Rahman and Alam (2021) analyzed the drivers of growth in 20 major economies from 1980 to 2018 using ARDL models and heterogeneous causality tests. However, their study did not include the effects of public debt and demographic changes, leaving an important gap in understanding the full spectrum of growth determinants.

To address this gap, this study aims to examine the impact of public debt, trade liberalization, gross fixed capital formation, inflation, and population growth on economic growth in developing countries, identifying key policy implications. Using a panel data approach, this study provides a comprehensive insight into the interactions between these macroeconomic variables and offers relevant policy recommendations for enhancing economic resilience and promoting sustainable development in developing countries.

METHODOLOGY

This study employs panel data from the period 2013 to 2022, covering a sample of 11 developing countries: Albania, Belarus, Brazil, Bulgaria, Colombia, Georgia, Indonesia, Jamaica, Moldova, Peru, and Thailand. These countries represent upper-middle-income developing countries. GDP, measured in constant local currency, is the dependent variable and economic growth indicator. Public debt, also measured in constant local currency, is included as an independent variable. In addition to public debt, other independent variables used to analyze the factors influencing economic growth include trade openness, gross fixed capital formation (measured in constant local currency), inflation rate, and population. The World Development Indicators provide all the variables' data. Equation function utilized in this study:

$$GDP = f(CGD, TO, GFCF, INF, POP) \dots \dots \dots (1)$$

The relationship between public debt (CGD), trade openness (TO), gross fixed capital formation (GFCF), inflation (INF), and population (POP) with GDP is expressed as:

$$\begin{aligned} \text{Log}(GDP)_{it} = & \beta_0 + \beta_1 \text{Log}(CGD)_{it} + \beta_2 \text{Log}(TO)_{it} + \beta_3 \text{Log}(GFCF)_{it} + \beta_4 \text{INF}_{it} + \beta_5 \text{Log}(POP)_{it} \\ & + \varepsilon_{it} \dots \dots \dots (2) \end{aligned}$$

in this equation, $\text{Log}(GDP)_{it}$ represents the logarithmic form of GDP as a measure of economic growth; $\text{Log}(CGD)_{it}$ is the logarithmic form of public debt; $\text{Log}(TO)_{it}$ represents trade openness; $\text{Log}(GFCF)_{it}$ denotes gross fixed capital formation; INF_{it} refers to inflation; and $\text{Log}(POP)_{it}$ represents population. Here, i refers to the observed country, t denotes time, and ε_{it} represents the error term accounting for both cross-sectional and time-series effects.

The "gross domestic product" (GDP) is the aggregate economic worth of every final product and service created by the nation over time. Public debt (CGD) represents the overall amount of money a country owes to both external and internal creditors at a particular point in time. A nation's exports and imports determine its trade openness (TO). Gross fixed capital formation (GFCF) includes expenditures aimed at enhancing capital assets, as well as net changes in inventories. The CPI measures inflation by tracking the overall consumption for some standardized range of products and services, changing by percentage. Genuine individuals, regardless of their residency or constitutional position, are the basis of the POP.

Three main panel data methods—CEM, FEM, and REM—estimate the empirical model in equation (2). These methods evaluate the robustness and consistency of matches.

RESULTS

The objective of this paper is to investigate the elements affecting economic growth in eleven emerging nations over the years 2013–2022. Table 1 presents the estimation results derived from three different panel data models: The Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM).

Table 1. Estimation Results of the Model

Dependent Variable: Log(GDP)	Common Effect	Fixed Effect	Random Effect
Log(CGD)	0.185669 0.0000***	0.152186 0.0000***	0.167118 0.0000***
Log(TO)	0.03889 0.2343*	0.271332 0.0000***	0.292188 0.0000***
Log(GFCF)	0.740424 0.0000***	0.171898 0.0004***	0.490477 0.0000***
INF	-0.003948 0.1225	-0.002335 0.0454**	-0.003441 0.0054***
Log(POP)	0.064757 0.0000***	-0.292892 0.0350**	0.127554 0.0001***
Constant (C)	1.188176 0.0000***	16.8831 0.0000***	0.275999 0.5066*

R-squared	0.999106	0.999896	0.979565
F-Statistic	23246.51	60414.96	997.0486
Prob(F- statistic)	0	0	0

Note: *** significant at $\alpha = 1\%$ ** significant at $\alpha = 5\%$ * significant at $\alpha = 10\%$
Source: Authors' work (2024)

The following section outlines the results of the model specification tests, which were conducted to determine the most appropriate model for implementation. The selection of the panel data testing methodology was guided by the outcomes of the Chow and Hausman tests. Table 2 presents the results of the Chow Test, which evaluates whether the fixed or random effects model is more appropriate. The test statistic is significant, with a probability value of 0.0000, which is well below the 0.05 threshold. As a result, the null hypothesis (H_0) is rejected, indicating that the fixed effects model is the better choice for this analysis of the panel data. Additionally, the table provides the degrees of freedom and the corresponding probability values, further clarifying the robustness and significance of the test results.

Table 2. Chow Test Results

Effects Test	Statistic	d.f	Prob.
Cross-section F	72.46768	(10,94)	0

Source: Authors' work (2024)

It is crucial to determine whether the fixed effects or random effects model is more appropriate for the analysis. To make this assessment, Hausman's test was employed. Table 3 presents the results of the Hausman Test, which is used to compare the suitability of the fixed and random effects models. The test yields a chi-squared statistic of 97.308930 with a p-value of 0.0000, which is significantly below the 0.05 threshold. Consequently, the null hypothesis (H_0) is rejected, reinforcing the choice of the fixed effects model for this study. This result indicates that the fixed effects model offers more consistent and efficient estimations compared to the random effects model, making it the preferred approach for this study.

Table 3. Hausman Test Results

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	97.30893	5	0

Source: Authors' work (2024)

According to the statistical evaluations, the fixed effects model is considered the most suitable for panel data estimation in this study. The regression results derived from the Fixed Effect Model (FEM) are presented in Table 4, offering a comprehensive overview of the relationship between the dependent variable (Log(GDP)) and the explanatory variables: Log(CGD), Log(TO), Log(GFCF), INF, and Log(POP). These results provide meaningful insights into the impact of each independent variable on economic growth, highlighting their significance and contribution to explaining variations in GDP across the observed countries.

Table 4. Fixed Effect Model Estimation Results

Dependent Variable: Log(GDP)				
Variable	Coefficient	Std.Error	t-Statistic	Prob.
Constant (C)	16.8831	2.446553	6.900769	0.0000***
Log(CGD)	0.152186	0.018733	8.124063	0.0000***
Log(TO)	0.271332	0.042229	6.42524	0.0000***
Log(GFCF)	0.171898	0.046455	3.700274	0.0004***
INF	-0.002335	0.001151	-2.028274	0.0454**
Log(POP)	-0.292892	0.136927	-2.139038	0.0350**
R-squared		0.999896		
F-Statistic		60414.96		
Prob. F Stat			0	

Source: Authors' work (2024)

DISCUSSION

The results of this study reveal important insights into the relationship between macroeconomic variables and economic growth in developing countries. Public debt, contrary to some conventional views, demonstrates a positive and statistically significant effect on GDP growth. Specifically, a 1% increase in public debt corresponds

to a 0.152186% increase in GDP. This finding aligns with endogenous growth theory, which suggests that strategically allocated debt—particularly for infrastructure and human capital investment—can drive long-term growth. Previous studies, such as those by Shah and Pervin (2012), Musah (2023), and Poku et al. (2022), emphasize the role of well-managed public debt in stimulating economic activities and enhancing productivity. Debt-financed infrastructure projects reduce transportation costs and improve supply chains, which further contributes to economic expansion.

Trade openness also emerges as a significant determinant of growth, with a 1% increase in trade openness leading to a 0.271332% rise in GDP. This supports findings from Hye and Lau (2014) and Brueckner and Lederman (2015), which highlight the positive effects of trade liberalization, including market access expansion, competition enhancement, and innovation stimulation. By reducing trade barriers, developing countries can capitalize on comparative advantages, scale production, and attract foreign investment—all of which fuel sustained growth.

Gross fixed capital formation (GFCF) proves to be another crucial driver, with a 1% increase in GFCF resulting in a 0.171898% rise in GDP. This is consistent with findings from Ncanywa and Makhenyane (2016), Boamah et al. (2018), and Rahman and Velayutham (2020), who demonstrate that investments in infrastructure and capital assets enhance productivity, create jobs, and stimulate sectoral growth. GFCF is essential for improving the efficiency and availability of resources, acting as a key catalyst for long-term economic development.

Inflation, however, demonstrates a negative relationship with economic growth, with a 1% increase in inflation leading to a 0.002335% decrease in GDP. This finding is consistent with the work of Mandeya and Ho (2021), Atigala et al. (2022), and Sanga et al. (2023), who argue that high inflation erodes purchasing power, increases economic uncertainty, and dampens investment. Increases in costs and unpredictability make it more difficult for businesses to plan for expansion, ultimately hindering growth.

Similarly, the study finds that population growth negatively affects economic development, with a 1% increase in population leading to a 0.292892% decrease in GDP. This is in line with the work of Huang and Xie (2013), Ahmed and Ahmad (2016), and Furuoka (2018), who suggest that rapid population growth puts a strain on resources, increases unemployment, and drives down wages. These dynamics reduce consumption and economic activity, contributing to environmental degradation and escalating development costs.

Taken together, these findings underline the complex interplay of macroeconomic factors and their impact on economic growth. While public debt, trade openness, and GFCF act as positive growth drivers, inflation and population growth present significant challenges that require careful management. Policymakers in developing countries must strike a delicate balance between leveraging debt for growth-enhancing investments and managing inflation and demographic pressures to ensure long-term economic stability and resilience.

This study contributes to the broader literature by addressing the effects of these key macroeconomic factors, offering new insights into how developing countries can navigate their growth trajectories. The findings suggest that developing countries must adopt integrated and strategic policies that harness the potential of debt, trade, and capital investment while controlling inflation and population growth to achieve sustainable economic development.

CONCLUSION

This study offers valuable insights into the factors that drive economic growth in developing countries, particularly focusing on public debt management, trade openness, and gross fixed capital formation. The research demonstrates that, when managed properly, public debt can be an essential tool for funding infrastructure and investments that enhance productivity and economic expansion. However, excessive reliance on debt could destabilize fiscal health in the long term. Therefore, governments must adopt effective debt management strategies and reinforce fiscal policies to curb the accumulation of unsustainable debt. In addition, trade openness contributes to increased competitiveness, broader market access, and the promotion of innovation, all of which can attract foreign investment and accelerate economic growth. Governments should continue to pursue policies that reduce trade barriers and support regional economic integration, as seen in initiatives like ASEAN. Furthermore, fostering a favorable investment climate through political and economic stability and the protection of property rights is vital for encouraging both domestic and foreign investments.

This study outlines several key policy implications. First, governments in developing countries need to implement effective debt management practices, ensuring that borrowing is strategically used to finance growth-enhancing projects while avoiding excessive debt that could undermine fiscal stability. Strengthening fiscal policies to control unproductive debt accumulation is critical. Additionally, advancing trade liberalization by reducing trade barriers and boosting regional economic integration will help open new markets, increase competition, and stimulate innovation. Governments must also prioritize creating an attractive investment environment by ensuring political stability, protecting property rights, and improving governance, which will promote both domestic and international investments, driving long-term economic growth.

Future research should consider incorporating additional variables, such as technological innovation, governance quality, and environmental sustainability, which are becoming increasingly important in understanding economic growth drivers. The impact of technological advancements on productivity and competitiveness will be essential in the context of the digital economy. Moreover, there is a need to explore the role of green economic policies and sustainable technologies, especially given the urgent need for climate change mitigation. Further studies

could also examine how these elements contribute to fostering inclusive and resilient growth, ensuring that economic development benefits all sectors of society and remains robust in the face of global challenges.

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