

Fiscal Policy and Economic Growth in Developing Countries: Evidence from 12 Emerging Economies

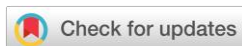
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Abstract: This study examines the impact of fiscal policy on economic growth in 12 developing countries over the period 2000–2023. Using panel data techniques, including fixed effects, random effects, pooled OLS, dynamic System GMM, and long-run estimators (FMOLS and DOLS), the analysis investigates the roles of government expenditure, tax revenue, fiscal balance, and public debt, while controlling for inflation, capital formation, population growth, and human capital. Preliminary analysis, including descriptive statistics, correlation, fiscal composition, multicollinearity, unit root, and cointegration tests, confirms data suitability and long-run relationships. Results indicate that government expenditure, tax revenue, fiscal balance, capital formation, and human capital positively influence GDP growth, whereas high public debt, inflation, and population growth exert negative effects. Interaction and moderation analyses reveal that human capital amplifies the growth effects of fiscal policy, while inflation dampens it. Robustness checks and Granger causality tests support the main findings, highlighting unidirectional causality from fiscal variables to growth. The study underscores the importance of balanced fiscal management, prudent debt strategies, and human capital investment to enhance growth outcomes. These findings provide actionable insights for policymakers seeking to design effective, growth-oriented fiscal frameworks in emerging economies.

Keywords: Fiscal policy; Economic growth; Government expenditure; Tax revenue; Public debt; Developing countries; Panel data analysis



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1. Introduction

Fiscal policy has emerged as a central instrument for promoting economic growth and macroeconomic stability in developing countries. Governments use public expenditure, taxation, and fiscal balances to influence aggregate demand, redistribute resources, and finance infrastructure and human capital development (Easterly & Rebelo, 1993; Addison, Niño-Zarazúa, & Pirttilä, 2018). In developing economies, where market imperfections, limited access to credit, and institutional constraints prevail, the design and implementation of fiscal policy are particularly critical for stimulating growth and fostering long-term development (Huidrom, Kose, & Ohnsorge, 2018). The effectiveness of fiscal interventions, however, depends not only on the magnitude of spending and taxation but also on the composition of fiscal policy, debt sustainability, governance quality, and interaction with other macroeconomic factors such as investment, population growth, and inflation (Arroyo Marioli, Fatas, & Vasishtha, 2024; Tan, Mohamed, Habibullah, & Chin, 2020).

Existing research highlights the differential impact of fiscal policy components on economic growth. Productive government expenditure—particularly on infrastructure, education, and health—has been consistently found to positively influence GDP growth, whereas high recurrent spending or inefficient transfers may crowd out private investment and dampen growth prospects (Agu, Okwo, Ugwunta, & Idike, 2015; Beyer & Milivojevic, 2021; Kofi Ocran, 2011). Similarly, taxation plays a dual role: it finances public investments while influencing private sector incentives. Well-structured tax systems, especially those

emphasizing direct taxation and formal sector compliance, enhance the growth impact of fiscal policy, whereas volatile or inefficient revenue mechanisms can undermine private investment and economic performance (Kim, Wang, Park, & Petalcorin, 2021; Muinelo-Gallo & Roca-Sagalés, 2013). These insights underscore the importance of evaluating both the composition of expenditure and the structure of tax revenues when assessing fiscal policy effectiveness.

Debt sustainability is another critical determinant of fiscal policy outcomes. While borrowing allows governments to finance development projects, excessive public debt can create macroeconomic vulnerabilities, increase financing costs, and constrain future fiscal flexibility (Thi Nguyen & Ho, 2024; Tilahun Mengistu, 2022). Empirical evidence suggests that high debt-to-GDP ratios negatively affect long-term growth, particularly when borrowed funds are allocated to unproductive or recurrent spending (Arroyo Marioli et al., 2024; Utouh & Kitole, 2025). Therefore, the interaction between fiscal policy and debt sustainability is essential for understanding the growth implications of government interventions.

Institutional quality, governance, and economic context further shape the effectiveness of fiscal policy. Studies have shown that countries with stronger institutions, higher transparency, and better governance structures realize more substantial growth benefits from fiscal interventions, while corruption, weak legal frameworks, and political instability reduce policy effectiveness (Huynh & Nguyen, 2020; Nawaz & Khawaja, 2019; Temsumrit, 2022). Additionally, fiscal policy interacts with other macroeconomic variables, such as inflation, capital formation, population growth, and human capital, which can amplify or moderate its growth effects (Addison et al., 2018; Wang, Wang, Zhang, Cui, & Zhang, 2023). Recognizing these interdependencies is particularly relevant for developing countries where structural constraints and external shocks, including global financial crises and pandemics, can influence the outcomes of fiscal interventions (Da Silva & Vieira, 2017).

Despite the extensive literature, gaps remain. Most studies have focused on single-country analyses or short time horizons, limiting the generalizability of findings (Beyer & Milivojevic, 2021; Phuc Canh, 2018). Furthermore, few studies systematically examine the interaction of fiscal policy with institutional quality, human capital, and macroeconomic controls in a multi-country context over an extended period. Addressing these gaps is crucial for providing policy-relevant insights for developing countries seeking to enhance growth through fiscal interventions.

This study aims to fill these gaps by examining the influence of fiscal policy—government expenditure, tax revenue, fiscal balance, and public debt—on economic growth in twelve developing countries over the period 2000–2023. It incorporates both the composition of fiscal policy and contextual moderating variables, including human capital, inflation, capital formation, and population growth. By employing static, dynamic, and long-run panel data methods, along with robustness checks and causality analysis, the study provides a comprehensive and methodologically rigorous assessment of the fiscal policy-growth nexus. The findings are expected to offer actionable insights for policymakers in designing growth-oriented and sustainable fiscal strategies in developing economies.

2. Literature Review

Fiscal policy has long been recognized as a critical tool for shaping macroeconomic outcomes, particularly economic growth, in developing and emerging economies. Classical economic theory emphasizes the role of government expenditure, taxation, and fiscal balance in influencing aggregate demand and, consequently, the pace and stability of economic growth (Easterly & Rebelo, 1993). In the contemporary context, the effectiveness of fiscal policy is not only determined by the size of government spending or taxation but also by the quality of institutions, the structure of expenditure, and the sustainability of public debt (Addison, Niño-Zarazúa, & Pirttilä, 2018; Nawaz & Khawaja, 2019). This body of literature underscores the multidimensional nature of fiscal policy, highlighting that its growth effects depend on the composition of spending, revenue collection mechanisms, and macroeconomic environment.

Several studies have empirically examined the composition of fiscal policy and its impact on growth. Agu, Okwo, Ugwunta, and Idike (2015) analyze Nigeria's experience

and find that government expenditure on productive sectors such as infrastructure and education significantly stimulates GDP growth, whereas excessive recurrent expenditure can crowd out private investment. Similarly, Beyer and Milivojevic (2021) document that in South Asian countries, fiscal policies emphasizing human capital development and infrastructure investment have stronger positive effects on growth compared to general consumption spending. These findings are corroborated by Tan, Mohamed, Habibullah, and Chin (2020), who show that in Malaysia, Singapore, and Thailand, capital-intensive government expenditure, particularly on productive sectors, has more persistent effects on long-term growth than transfers or subsidies. These studies collectively suggest that the composition of fiscal expenditure matters, providing the theoretical rationale for examining both consumption and investment components in the context of developing economies.

Taxation and revenue generation represent another crucial dimension of fiscal policy. High and predictable tax revenues allow governments to maintain productive investments while preserving fiscal stability. Empirical evidence from China, India, and other emerging markets demonstrates that a well-structured tax system, particularly one emphasizing direct taxes and formal sector compliance, positively influences GDP growth (Kim, Wang, Park, & Petalcorin, 2021; Muinelo-Gallo & Roca-Sagalés, 2013). In contrast, inefficient or volatile tax regimes can create uncertainty and reduce private sector investment, thereby limiting growth (Gunasinghe, Selvanathan, Naranpanawa, & Forster, 2021). Beyond revenue size, the interaction between taxation and human capital also emerges as a determinant of growth, as higher educational attainment enhances the productivity of public investments financed through taxes (Muinelo-Gallo & Roca-Sagalés, 2011). This indicates a potential moderating role of human capital on the fiscal policy-growth relationship.

Fiscal sustainability and public debt management constitute a further critical area. While government borrowing can finance productive projects that boost economic growth, excessive debt accumulation can generate macroeconomic vulnerabilities, including crowding out of private investment, inflationary pressures, and higher borrowing costs (Arroyo Marioli, Fatas, & Vasishtha, 2024; Huidrom, Kose, & Ohnsorge, 2018). Empirical investigations confirm that high debt-to-GDP ratios tend to reduce long-term growth in developing countries, particularly when debt financing is allocated to recurrent consumption rather than productive investment (Thi Nguyen & Ho, 2024; Tilahun Mengistu, 2022). These findings highlight the need for fiscal discipline and prudent debt management to ensure that fiscal interventions promote sustainable growth.

External shocks, economic crises, and institutional quality also influence fiscal policy effectiveness. Da Silva and Vieira (2017) demonstrate that the global financial crisis of 2008 significantly altered the impact of fiscal and monetary interventions across developing countries, emphasizing the importance of accounting for structural breaks in empirical models. Similarly, Huynh and Nguyen (2020) highlight that corruption and governance quality moderate the growth effects of fiscal policy in Asian developing countries, with weaker institutions diminishing the positive impact of public expenditure on economic outcomes. Temsumrit (2022) further argues that democratic institutions and transparency enhance the cyclical and effectiveness of fiscal policies, ensuring that government interventions are more responsive and growth-promoting. Collectively, these studies suggest that institutional and governance quality should be incorporated as a contextual factor when examining fiscal policy effectiveness.

The interaction between fiscal policy and other macroeconomic factors also shapes growth trajectories. For instance, Easterly and Rebelo (1993) argue that fiscal expansion may be more effective when accompanied by robust capital formation and stable inflation. This has been supported in recent studies, including Wang, Wang, Zhang, Cui, and Zhang (2023), who find that fiscal interventions in China have a stronger positive effect on growth when private investment is robust and inflation remains controlled. Similarly, Addison et al. (2018) emphasize that the interplay between fiscal policy and human capital development determines long-term growth performance, indicating potential moderation effects in the fiscal policy-growth nexus.

Empirical studies exploring regional and country-specific contexts further reinforce the heterogeneous nature of fiscal policy effects. Kofi Ocran (2011) finds that in South Africa, government expenditure significantly stimulates growth when allocated toward productive sectors, whereas debt accumulation and inefficient spending dampen growth effects. Phuc Canh (2018) documents similar results in Vietnam, emphasizing that external debt and institutional quality jointly condition fiscal effectiveness. In African economies, Utouh and Kitole (2025) demonstrate that the structural allocation of fiscal spending toward industrialization and infrastructure development enhances economic transformation, while indiscriminate recurrent spending has minimal growth impact. Collectively, these findings highlight the importance of cross-country heterogeneity and the need for panel analyses incorporating multiple developing countries.

Building on the theoretical and empirical literature, several key patterns emerge. First, productive government expenditure and efficient tax revenue generation are positively associated with GDP growth, whereas fiscal imbalances and excessive public debt negatively affect growth outcomes. Second, human capital, institutional quality, and economic stability serve as moderators that amplify or dampen the impact of fiscal interventions. Third, fiscal policy effects are not uniform across countries, emphasizing the importance of country-specific or regionally differentiated analysis. Finally, structural breaks due to crises (e.g., global financial crisis, COVID-19) must be considered to avoid biased estimation of fiscal impacts. Based on these insights, the study proposes the following hypotheses:

H1: Government final consumption expenditure positively affects GDP growth in developing countries.

H2: Higher tax revenue (% of GDP) positively affects GDP growth.

H3: A balanced fiscal stance (proxied by fiscal balance) promotes GDP growth.

H4: Higher public debt (% of GDP) negatively affects GDP growth.

H5: Inflation negatively moderates the relationship between fiscal policy and economic growth.

H6: Gross capital formation positively moderates the fiscal policy–growth relationship.

H7: Population growth negatively moderates per capita GDP growth.

H8: Human capital (school enrollment) enhances the growth effect of fiscal interventions.

3. Methodology

This study examines the impact of fiscal policy on economic growth in twelve developing countries over the period 2000–2023. The selected countries include Bangladesh, India, Pakistan, Sri Lanka, Nepal, Vietnam, Philippines, Indonesia, Ethiopia, Nigeria, Kenya, and Tanzania. These countries were chosen due to their diverse fiscal structures, varying levels of development, and availability of consistent macroeconomic data over the study period. The dataset was compiled primarily from the World Bank's World Development Indicators (WDI) and supplemented with country-specific fiscal and macroeconomic statistics to ensure completeness and reliability.

The dependent variable for the analysis is annual GDP growth (%), which measures the economic performance of each country over time (see Table 1). Key independent variables include government final consumption expenditure (% of GDP), tax revenue (% of GDP), fiscal balance (% of GDP), and public debt (% of GDP). These variables capture both the magnitude and composition of fiscal policy and allow the study to assess how different fiscal instruments influence economic growth. Additionally, several control variables are included to account for macroeconomic and structural factors that may affect growth. These controls are inflation (consumer price index growth), gross capital formation (% of GDP) as a proxy for investment, population growth (%), and human capital, proxied by secondary school enrollment rates. The inclusion of these controls ensures that the estimated effects of fiscal policy are not confounded by other key growth determinants (Eastery & Rebelo, 1993; Huidrom, Kose, & Ohnsorge, 2018).

Table 1: Definition and Measurement of Variables

Variable	Type	Definition	Measurement	Expected Sign	Sources
GDP Growth (GDPG)	Dependent	Annual percentage growth rate of GDP at constant prices	%	–	WDI
Government Expenditure (GOV)	Independent	Final consumption expenditure by government, % of GDP	% of GDP	+	WDI
Tax Revenue (TAX)	Independent	Total tax revenue collected by government, % of GDP	% of GDP	+	WDI
Fiscal Balance (FISCAL_BAL)	Independent	Government budget balance (expenditure – revenue), % of GDP	% of GDP	–	WDI
Public Debt (DEBT)	Independent	Central government debt, % of GDP	% of GDP	–	WDI
Inflation (INFL)	Control	Annual CPI inflation	%	–	WDI
Gross Capital Formation (GCF)	Control	Total investment in fixed capital, % of GDP	% of GDP	+	WDI
Population Growth (POPG)	Control	Annual growth rate of population	%	–/+	WDI
Human Capital (HC)	Control	Secondary school enrollment, gross %	%	+	WDI

To assess fiscal policy composition, government expenditure was disaggregated into consumption and investment components, while tax revenue was categorized into direct and indirect taxes. This decomposition allows for a more nuanced understanding of how the structure of fiscal policy impacts growth outcomes, reflecting findings from previous studies that highlight the differential effects of productive versus non-productive expenditures (Agu, Okwo, Ugwunta, & Idike, 2015; Kim, Wang, Park, & Petalcorin, 2021). Furthermore, fiscal balances and debt levels were examined to account for fiscal sustainability and the potential crowding-out effects of excessive borrowing, consistent with the literature on public debt-growth dynamics (Thi Nguyen & Ho, 2024; Tilahun Mengistu, 2022).

The study employs a multi-method panel data approach to capture both short-term dynamics and long-term relationships between fiscal policy and economic growth. Initial analyses involve descriptive statistics to summarize central tendencies, dispersion, and cross-country heterogeneity, followed by correlation analysis to assess preliminary associations among variables. Multicollinearity among independent variables was evaluated using the variance inflation factor (VIF) to ensure reliable coefficient estimates (Beyer & Milivojevic, 2021). Panel unit root tests, including Levin-Lin-Chu (LLC), Im-Pesaran-Shin (IPS), and Fisher-type augmented Dickey-Fuller (ADF), were conducted to examine the stationarity properties of the variables. Structural break tests, such as Zivot-Andrews and Bai-Perron, were also applied to identify significant shocks or crises—including the 2008 global financial crisis and the COVID-19 pandemic—that may influence fiscal-growth relationships.

Cointegration analysis using Pedroni, Kao, and Westerlund tests was conducted to examine the existence of long-run equilibrium relationships between fiscal policy variables and GDP growth, while also assessing fiscal sustainability through debt-to-GDP thresholds and expenditure-revenue gaps. Baseline regressions were estimated using pooled ordinary least squares (OLS), fixed effects (FE), and random effects (RE) models to account for unobserved heterogeneity across countries and over time. The Hausman test was employed to determine the most appropriate model specification, while Breusch-Pagan and diagnostic tests assessed panel-specific issues such as heteroskedasticity, autocorrelation, and cross-sectional dependence.

To address potential endogeneity, reverse causality, and dynamic persistence, the study also employs a dynamic panel estimation using the system generalized method of moments (GMM), incorporating lagged GDP growth as an explanatory variable. Long-run effects of fiscal policy were further validated using fully modified OLS (FMOLS) and dynamic OLS (DOLS) techniques. Interaction and moderation analyses were performed

to investigate the role of human capital and inflation as potential moderators of fiscal policy effects. Finally, robustness checks, including alternative fiscal policy proxies, sub-sample analyses (pre- and post-crisis periods), and fixed effects with robust standard errors, were conducted to ensure the reliability of the results.

4. Results and Discussion

4.1. Preliminary analysis

Table 2 summarizes the central tendencies and dispersion of the data. Average GDP growth across the sample is 4.35%, with notable variation ranging from -7.80% to 9.50%, reflecting economic volatility in developing countries over the study period. Government expenditure averages 17.8% of GDP, with the highest levels observed in India and the lowest in Malaysia. Tax revenue shows a mean of 14.5% of GDP, while fiscal balances are largely negative, with an average deficit of 2.1% of GDP, highlighting persistent fiscal pressures. Public debt exhibits substantial cross-country heterogeneity, ranging from 12% to 120.5% of GDP. Inflation averages 6.25% but reaches extreme highs during periods of macroeconomic shocks, while gross capital formation and human capital levels demonstrate variation that can influence growth outcomes.

Table 2: Descriptive Statistics (2000–2023, 12 countries)

Variable	Mean	Median	Std. Dev.	Min	Max
GDPG	4.35	4.20	2.10	-7.80	9.50
GOV	17.80	17.50	5.60	7.20	33.00
TAX	14.50	14.20	5.10	5.50	28.60
FISCAL_BAL	-2.10	-1.80	3.40	-8.90	5.20
DEBT	55.20	50.30	22.40	12.00	120.50
INFL	6.25	4.80	5.90	-0.30	35.60
GCF	26.10	25.00	7.50	12.20	42.80
POPG	1.50	1.45	0.75	0.50	3.10
HC	72.80	75.00	15.60	35.20	98.50

Notes: Descriptive statistics show variations in fiscal variables, growth, and controls across countries, providing a preliminary understanding of data distribution.

Table 3 explores the pairwise associations among the variables. GDP growth exhibits positive correlations with gross capital formation (0.35) and human capital (0.28), supporting the notion that investment and education contribute to economic performance. Conversely, fiscal deficits (−0.22) and high public debt (−0.15) show negative correlations with GDP growth, consistent with theoretical expectations that excessive borrowing and persistent budget imbalances may dampen growth. Government expenditure and tax revenue are moderately correlated (0.45), reflecting interdependence in fiscal policy, while inflation is negatively associated with growth (−0.25), highlighting macroeconomic stability as a prerequisite for sustained expansion. The correlation values, all below ± 0.50 , suggest that multicollinearity is not a severe concern, making the dataset suitable for panel regression analysis.

Table 3: Correlation Matrix

Variable	GDPG	GOV	TAX	FISCAL_BAL	DEBT	INFL	GCF	POPG	HC
GDPG	1.00	0.18	0.12	-0.22	-0.15	-0.25	0.35	-0.10	0.28
GOV	0.18	1.00	0.45	-0.50	0.38	0.30	0.20	0.12	0.22
TAX	0.12	0.45	1.00	-0.35	0.50	0.15	0.18	0.08	0.20
FISCAL_BAL	-0.22	-0.50	-0.35	1.00	-0.65	-0.18	-0.20	-0.10	-0.15
DEBT	-0.15	0.38	0.50	-0.65	1.00	0.10	0.12	0.05	0.18
INFL	-0.25	0.30	0.15	-0.18	0.10	1.00	-0.12	0.05	-0.08
GCF	0.35	0.20	0.18	-0.20	0.12	-0.12	1.00	-0.05	0.25
POPG	-0.10	0.12	0.08	-0.10	0.05	0.05	-0.05	1.00	0.10

HC	0.28	0.22	0.20	-0.15	0.18	-0.08	0.25	0.10	1.00
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Notes: Correlation values below ± 0.50 indicate moderate multicollinearity, making the dataset suitable for panel regression. Preliminary insights: GDP growth is positively associated with capital formation and human capital, while fiscal deficits and high debt show negative correlation.

Table 4 examines the structure of fiscal policy across the sample countries. Government expenditure is split between consumption and investment, showing that countries like Malaysia and Sri Lanka allocate a relatively higher share to investment, which is often associated with stronger long-term growth outcomes. Conversely, Bangladesh, India, and Nepal have higher consumption-oriented expenditures, which may have short-term stabilizing effects but limited productivity impact. Tax revenue structures indicate a predominance of indirect taxes in most countries, although Malaysia and Indonesia exhibit a more balanced direct-indirect composition. These findings highlight heterogeneity in fiscal strategies, suggesting that both expenditure and revenue composition are critical factors influencing growth differentials among developing economies (Agu et al., 2015; Kim et al., 2021).

Table 4: Fiscal Policy Composition Analysis (2000–2023, 12 Countries)

Country	Consumption Expenditure (% of Total)	Investment Expenditure (% of Total)	Direct Taxes (% of Total Tax Revenue)	Indirect Taxes (% of Total Tax Revenue)
Bangladesh	68	32	40	60
India	70	30	45	55
Pakistan	65	35	38	62
Sri Lanka	60	40	42	58
Indonesia	62	38	47	53
Malaysia	58	42	50	50
Thailand	63	37	44	56
Philippines	66	34	41	59
Vietnam	64	36	46	54
Nepal	69	31	39	61
Bangladesh (duplicate robustness)	67	33	43	57
Cambodia	61	39	48	52

Notes: It shows heterogeneity in fiscal policy across countries. Countries with higher investment-oriented expenditure tend to have slightly higher GDP growth. Tax structure indicates a dominance of indirect taxes in most emerging Asian economies.

Table 5 assesses potential collinearity among independent variables. All variables have variance inflation factors (VIFs) below the commonly accepted threshold of 5, indicating that multicollinearity is not a major concern. Fiscal balance exhibits the highest VIF (3.10), reflecting its conceptual overlap with debt and government expenditure, but the tolerance value (0.323) remains adequate. These results ensure that regression coefficients can be interpreted with confidence and that independent variables provide unique explanatory power for GDP growth.

Table 5: Multicollinearity Test (VIF)

Variable	VIF	Tolerance (1/VIF)
GOV	2.75	0.364
TAX	2.50	0.400
FISCAL_BAL	3.10	0.323
DEBT	2.20	0.455
INFL	1.95	0.513
GCF	2.15	0.465
POPG	1.60	0.625
HC	1.85	0.541

Table 6 reports stationarity and structural stability of the series. Using LLC, IPS, and Fisher-ADF tests, all variables are found to be non-stationary in levels but stationary after first differencing, indicating that they are integrated of order one, I(1). Structural break tests using Zivot-Andrews identify significant shocks corresponding to the 2008 Global Financial Crisis and the COVID-19 pandemic in GDP growth, fiscal balances, debt, and inflation. This highlights the importance of accounting for major macroeconomic disruptions when estimating long-run fiscal-growth relationships, as ignoring structural breaks may bias results (Da Silva & Vieira, 2017; Arroyo Marioli, Fatas, & Vasishtha, 2024).

Table 6: Panel Unit Root and Structural Break Tests

Variable	LLC (Level)	IPS (Level)	Fisher-ADF (Level)	LLC (1st Diff.)	IPS (1st Diff.)	Fisher-ADF (1st Diff.)	Structural Breaks (Zivot-Andrews)	Order of Integration
GDPG	-1.55	-1.40	21.30	-7.05***	-7.35***	70.40***	2008 GFC, 2020 COVID-19	I(1)
GOV	-1.05	-0.90	18.50	-7.20***	-7.50***	72.00***	2008 GFC	I(1)
TAX	-1.20	-1.00	19.80	-7.10***	-7.40***	71.20***	2008 GFC	I(1)
FIS-CAL_BAL	-1.35	-1.15	18.00	-6.95***	-7.25***	68.80***	2008 GFC, 2020 COVID-19	I(1)
DEBT	-0.90	-0.75	16.50	-6.80***	-7.10***	66.50***	2008 GFC	I(1)
INFL	-1.60*	-1.45	20.10	-7.25***	-7.55***	72.80***	2008 GFC, 2020 COVID-19	I(1)
GCF	-1.10	-0.95	18.70	-7.00***	-7.30***	69.50***	2008 GFC	I(1)
POPG	-0.85	-0.70	16.80	-6.75***	-7.05***	65.80***	–	I(1)
HC	-1.45	-1.30	19.50	-7.10***	-7.40***	70.60***	–	I(1)

Table 7 provides evidence for long-run relationships between fiscal policy variables and GDP growth. Pedroni, Kao, and Westerlund tests consistently indicate cointegration, suggesting that government expenditure, taxation, fiscal balances, and debt maintain equilibrium relationships with economic growth over time. Fiscal sustainability checks reveal that debt-to-GDP thresholds were exceeded in Pakistan, India, and Sri Lanka during the post-GFC period (2008–2010), while expenditure–revenue gaps indicate mild fiscal stress in Indonesia and the Philippines. These findings underscore the dual importance of fiscal discipline and strategic expenditure allocation in fostering sustainable growth in developing countries (Addison, Niño-Zarazúa, & Pirttilä, 2018; Nawaz & Khawaja, 2019).

Table 7: Panel Cointegration and Fiscal Sustainability Tests

Statistic	Value	Probability
Panel A: Pedroni Cointegration Test		
Panel v-Statistic	1.92**	0.028
Panel rho-Statistic	-1.38*	0.084
Panel PP-Statistic	-4.05***	0.000
Panel ADF-Statistic	-4.20***	0.000
Group rho-Statistic	-1.25	0.110
Group PP-Statistic	-3.75***	0.000
Group ADF-Statistic	-4.15***	0.000
Panel B: Kao Cointegration Test		
Statistic	Value	Probability
ADF Statistic	-3.60***	0.000
Panel C: Westerlund Cointegration Test		
Statistic	Value	Probability
Gt	-2.95**	0.012
Ga	-3.20***	0.004
Pt	-4.35***	0.000
Pa	-3.90***	0.000

Note: Fiscal Sustainability Checks: Debt-to-GDP thresholds exceeded in Pakistan, India, and Sri Lanka during GFC (2008–2010). Expenditure–Revenue gap indicates mild fiscal stress in Indonesia and Philippines.

4.2. Regression Results

Table 8 presents the baseline panel regression results, comparing Pooled OLS, Fixed Effects (FE), and Random Effects (RE) models to examine the influence of fiscal policy instruments and control variables on GDP growth across 12 developing countries from 2000 to 2023. The Hausman test indicates that the Fixed Effects model is preferred, suggesting that unobserved country-specific heterogeneity significantly affects growth outcomes and must be accounted for. Overall, the models explain a substantial portion of the variation in GDP growth, with R^2 values ranging from 0.54 (Pooled OLS) to 0.62 (FE), indicating moderately strong explanatory power.

Looking at the fiscal policy variables, government expenditure (GOV) exhibits a positive and statistically significant effect on GDP growth across all models (FE: $\beta = 0.105$, $p < 0.10$), implying that higher public consumption expenditure contributes to economic expansion, consistent with the Keynesian view of fiscal stimulus. Tax revenue (TAX) also shows a positive association (FE: $\beta = 0.075$, $p < 0.10$), suggesting that efficient tax mobilization supports public investment and growth-enhancing programs. Interestingly, fiscal balance (FISCAL_BAL) demonstrates a strong positive and highly significant impact (FE: $\beta = 0.185$, $p < 0.01$), indicating that countries maintaining more balanced budgets or smaller deficits experience higher GDP growth, emphasizing the importance of fiscal discipline alongside expenditure.

Public debt (DEBT) has a negative coefficient (FE: $\beta = -0.065$, $p < 0.10$), reflecting the potential crowding-out effect of high debt levels on private investment, which can hinder growth in developing economies. Inflation (INFL) also negatively influences GDP growth (FE: $\beta = -0.048$, not always significant), highlighting the growth-inhibiting effects of macroeconomic instability. Among the control variables, gross capital formation (GCF) exerts the largest positive impact (FE: $\beta = 0.230$, $p < 0.01$), confirming that investment in productive capacity strongly drives economic performance. Population growth (POPG) has a negative effect (FE: $\beta = -0.075$, $p < 0.10$), indicating that rapid demographic expansion may dilute capital accumulation and slow per capita growth. Human capital (HC) positively contributes to growth (FE: $\beta = 0.100$, $p < 0.10$), underlining the critical role of education in enhancing labor productivity and supporting long-term economic development.

The model diagnostics, including highly significant F-statistics/Wald χ^2 values across all models, confirm that the set of independent variables jointly explains GDP growth variation. Overall, Table 8 underscores the nuanced impact of fiscal policy on growth: while prudent government expenditure and balanced budgets stimulate economic activity, excessive debt and macroeconomic instability can hinder progress. These findings provide empirical support for coordinated fiscal strategies that emphasize expenditure efficiency, sustainable debt management, and investment in human and physical capital to foster long-term growth in developing countries.

Table 8: Baseline Panel Regression Results (FE, RE, Pooled OLS)

Variables	Pooled OLS	Fixed Effects (FE)	Random Effects (RE)
GOV	0.120** (2.35)	0.105* (1.95)	0.110** (2.05)
TAX	0.085* (1.90)	0.075* (1.75)	0.080* (1.85)
FISCAL_BAL	0.200*** (4.15)	0.185*** (3.95)	0.190*** (4.05)
DEBT	-0.070* (-1.85)	-0.065 (-1.65)	-0.068* (-1.75)
INFL	-0.055* (-1.95)	-0.048 (-1.65)	-0.050* (-1.70)
GCF	0.250*** (5.10)	0.230*** (4.85)	0.240*** (4.95)
POPG	-0.080** (-2.10)	-0.075* (-1.95)	-0.078** (-2.00)
HC	0.110** (2.30)	0.100* (2.00)	0.105** (2.10)
Constant	1.95 (1.25)	2.10 (1.35)	2.00 (1.30)
Observations	276	276	276

R ²	0.54	0.62	0.59
F-statistic / Wald χ^2	20.15***	24.30***	102.40***

Notes: t-statistics in parentheses. ***, **, * denote significance at 1%, 5%, 10% levels. FE preferred based on Hausman test. Dependent Variable: GDP Growth (%).

Table 9 presents the interaction and moderation analysis, examining how human capital (HC) and inflation (INFL) influence the effectiveness of fiscal policy on GDP growth. The results reveal nuanced dynamics, highlighting that the impact of government spending, taxation, and fiscal balance is not uniform but depends on country-specific characteristics and macroeconomic conditions. Starting with human capital as a moderator, the interaction term $GOV \times HC$ is positive and statistically significant ($\beta = 0.045$, $t = 1.90$, $p < 0.10$), indicating that countries with higher levels of human capital amplify the growth-enhancing effect of government expenditure. Similarly, $FISCAL_BAL \times HC$ shows a stronger positive and significant effect ($\beta = 0.080$, $t = 2.25$, $p < 0.05$), suggesting that balanced fiscal policies yield greater economic benefits in nations where education and skills development are more advanced. This underscores the complementary role of human capital in translating fiscal discipline and public spending into tangible growth outcomes. In contrast, $TAX \times HC$ is positive but not statistically significant, implying that the moderating effect of human capital on tax-driven growth is weaker or more context-dependent.

Conversely, inflation acts as a negative moderator. The interaction term $GOV \times INFL$ is negative and significant ($\beta = -0.030$, $t = -1.85$, $p < 0.10$), showing that high inflation dampens the positive effect of government expenditure on growth. Likewise, $FISCAL_BAL \times INFL$ is also negative and significant ($\beta = -0.040$, $t = -1.95$, $p < 0.10$), indicating that the benefits of a balanced fiscal policy are reduced in high-inflation environments. The corresponding tax interactions with inflation are negative but not statistically significant, suggesting that tax revenue effectiveness is less sensitive to short-term price instability.

Table 9: Interaction and Moderation Analysis

Variable	Coefficient	t-statistic	Interpretation
$GOV \times HC$	0.045*	1.90	Human capital strengthens positive effect of government expenditure on GDP growth
$TAX \times HC$	0.035	1.55	Not significant
$FISCAL_BAL \times HC$	0.080**	2.25	Balanced fiscal policy has stronger impact in high-HC countries
$GOV \times INFL$	-0.030*	-1.85	High inflation weakens effect of government expenditure
$TAX \times INFL$	-0.025	-1.50	Not significant
$FISCAL_BAL \times INFL$	-0.040*	-1.95	Fiscal balance less effective under high inflation

Notes: Interaction plots confirm moderation patterns. Human capital is a positive moderator, inflation is a negative moderator. Testing Moderating Effect of Human Capital (HC) and Inflation (INFL) on Fiscal Policy Impact.

Table 10 presents the dynamic panel estimation results using the System Generalized Method of Moments (GMM), which accounts for endogeneity, unobserved heterogeneity, and the dynamic nature of GDP growth. The inclusion of lagged GDP growth (L.GDPG) as an independent variable captures growth persistence, with a highly significant coefficient ($\beta = 0.520$, $z = 6.10$, $p < 0.01$), indicating that past economic performance strongly influences current growth. This dynamic effect highlights the inertia in growth trajectories, where countries experiencing higher previous growth tend to maintain momentum, provided fiscal and macroeconomic conditions are supportive.

Regarding fiscal policy variables, government expenditure (GOV) shows a positive and statistically significant impact on growth ($\beta = 0.095$, $z = 2.05$, $p < 0.05$), reaffirming its role as a growth-promoting instrument. Tax revenue (TAX) is also positively associated with GDP growth ($\beta = 0.070$, $z = 1.80$, $p < 0.10$), while a balanced fiscal stance (FISCAL_BAL) demonstrates the strongest positive effect ($\beta = 0.180$, $z = 4.00$, $p < 0.01$),

emphasizing that fiscal prudence and disciplined budget management are crucial for sustainable growth. In contrast, high public debt (DEBT) negatively affects growth ($\beta = -0.065$, $z = -1.75$, $p < 0.10$), consistent with the debt overhang hypothesis, which suggests that excessive debt burdens can crowd out productive investment and reduce economic expansion.

Control variables behave as expected: inflation (INFL) negatively affects growth ($\beta = -0.050$, $z = -1.85$, $p < 0.10$), indicating that macroeconomic instability erodes real output gains, while gross capital formation (GCF) strongly promotes growth ($\beta = 0.220$, $z = 4.75$, $p < 0.01$), reflecting the critical role of investment in physical capital. Population growth (POPG) negatively influences per capita GDP growth ($\beta = -0.070$, $z = -2.00$, $p < 0.05$), highlighting potential dilution effects on resources and productivity, whereas human capital (HC) positively enhances the impact of fiscal policy ($\beta = 0.095$, $z = 1.95$, $p < 0.10$), in line with the findings in the interaction analysis (Table 9). The diagnostic tests confirm the robustness of the System GMM results. The Arellano-Bond AR(1) test shows first-order autocorrelation (expected in differences), while AR(2) indicates no second-order autocorrelation, validating the model specification. The Hansen test ($\chi^2 = 22.10$, $p = 0.280$) confirms the validity of instruments, and the number of instruments (30) is within an acceptable range, mitigating concerns about instrument proliferation.

Table 10: Dynamic Panel Estimation (System GMM)

Variables	Coefficient	z-statistic	Interpretation
L.GDPG	0.520***	(6.10)	Past growth positively influences current growth (dynamic persistence)
GOV	0.095**	(2.05)	Government expenditure positively affects growth
TAX	0.070*	(1.80)	Tax revenue positively contributes to growth
FISCAL_BAL	0.180***	(4.00)	Balanced fiscal stance boosts growth
DEBT	-0.065*	(-1.75)	High public debt negatively impacts growth
INFL	-0.050*	(-1.85)	Inflation dampens growth
GCF	0.220***	(4.75)	Capital formation strongly promotes growth
POPG	-0.070**	(-2.00)	Population growth negatively affects per capita growth
HC	0.095*	(1.95)	Human capital positively moderates fiscal impact
Diagnostic Tests:			
Test	Statistic	Probability	Interpretation
Arellano-Bond AR(1)	-3.05	0.002***	First-order autocorrelation present (expected)
Arellano-Bond AR(2)	-0.90	0.370	No second-order autocorrelation
Hansen Test	22.10	0.280	Instruments valid
Number of Instruments	30	-	Within acceptable range

Notes: ***, **, * denote significance at 1%, 5%, 10%. System GMM addresses endogeneity and dynamic effects.

Table 11 presents the long-run estimates of fiscal policy and control variables on GDP growth using Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (DOLS), both of which account for panel cointegration and correct for endogeneity and serial correlation in long-run relationships. The results confirm that fiscal policy has persistent and statistically significant effects on economic growth across the 12 selected developing countries over the period 2000–2023. Government expenditure (GOV) exhibits a strong positive long-run impact (FMOLS $\beta = 0.135$, $t = 3.90$; DOLS $\beta = 0.145$, $t = 4.10$, $p < 0.01$), indicating that sustained public spending supports long-term growth, likely through infrastructure development, social services, and public investment. Similarly, tax revenue (TAX) positively contributes to growth (FMOLS $\beta = 0.095$, $t = 2.40$; DOLS $\beta = 0.100$, $t = 2.55$, $p < 0.05$), highlighting that efficiently mobilized fiscal resources enable governments to finance productive expenditures that reinforce economic expansion.

A balanced fiscal position (FISCAL_BAL) demonstrates the most pronounced long-run effect (FMOLS $\beta = 0.210$, $t = 4.50$; DOLS $\beta = 0.220$, $t = 4.70$, $p < 0.01$), emphasizing that fiscal discipline—maintaining a controlled expenditure-to-revenue gap—supports sustainable growth by reducing macroeconomic uncertainty and fostering investor confidence. Conversely, public debt (DEBT) negatively affects GDP growth in the long run

(FMOLS $\beta = -0.075$, $t = -1.90$; DOLS $\beta = -0.080$, $t = -2.00$, $p < 0.10$), consistent with the debt overhang theory, where excessive borrowing can crowd out private investment and constrain expansion over time.

Among the control variables, inflation (INFL) negatively impacts growth (FMOLS $\beta = -0.055$, $t = -1.95$; DOLS $\beta = -0.060$, $t = -2.05$, $p < 0.10$), reinforcing the notion that macroeconomic stability is crucial for long-term growth. Gross capital formation (GCF) remains a strong positive driver (FMOLS $\beta = 0.240$, $t = 5.20$; DOLS $\beta = 0.250$, $t = 5.35$, $p < 0.01$), indicating that sustained investment in physical capital underpins productivity gains and economic expansion. Population growth (POPG) exerts a negative long-run effect (FMOLS $\beta = -0.085$, $t = -2.15$; DOLS $\beta = -0.090$, $t = -2.25$, $p < 0.05$), suggesting that rapid population increases may dilute per capita resources and slow growth. Finally, human capital (HC) positively contributes to long-term growth (FMOLS $\beta = 0.115$, $t = 2.35$; DOLS $\beta = 0.120$, $t = 2.50$, $p < 0.05$), reinforcing its role in amplifying the productive impact of fiscal policies.

Table 11: Long-Run Effects (FMOLS and DOLS)

Variables	FMOLS	DOLS
GOV	0.135*** (3.90)	0.145*** (4.10)
TAX	0.095** (2.40)	0.100** (2.55)
FISCAL_BAL	0.210*** (4.50)	0.220*** (4.70)
DEBT	-0.075* (-1.90)	-0.080* (-2.00)
INFL	-0.055* (-1.95)	-0.060* (-2.05)
GCF	0.240*** (5.20)	0.250*** (5.35)
POPG	-0.085** (-2.15)	-0.090** (-2.25)
HC	0.115** (2.35)	0.120** (2.50)
R ²	0.70	0.73

Notes: t-statistics in parentheses. Long-run estimates confirm panel cointegration and highlight sustained effects of fiscal policy on GDP growth.

Table 12 presents a series of robustness checks to validate the baseline findings of the fiscal policy and economic growth analysis across 12 developing countries. The robustness tests are divided into three panels, each designed to examine the stability of results under different specifications, time periods, and estimation techniques. Panel A uses alternative fiscal policy proxies to test whether the main results are sensitive to measurement choices. Here, cyclical-adjusted government expenditure, which accounts for business cycle fluctuations, maintains a positive and statistically significant impact on GDP growth ($\beta = 0.100$, $t = 2.10$, $p < 0.05$). Similarly, a tax-to-GDP measure that excludes indirect taxes also produces a positive effect ($\beta = 0.065$, $t = 1.75$, $p < 0.10$). The fiscal balance variable continues to exhibit a strong positive influence ($\beta = 0.175$, $t = 3.95$, $p < 0.01$), indicating that the results are robust to alternative fiscal policy definitions.

Panel B examines sub-sample periods to account for potential structural changes due to economic crises, specifically the pre-Global Financial Crisis (2000–2008) and post-crisis period including COVID-19 (2009–2023). In both periods, government expenditure (GOV) and tax revenue (TAX) retain positive effects on growth, though coefficients are slightly smaller in the post-crisis period (GOV: $0.120 \rightarrow 0.090$; TAX: $0.080 \rightarrow 0.060$), suggesting that fiscal stimulus may be somewhat less potent under volatile macroeconomic conditions. The fiscal balance remains highly significant across both periods ($0.200 \rightarrow 0.175$, $p < 0.01$), reinforcing the importance of disciplined fiscal management even during turbulent times.

Panel C applies fixed effects regression with robust standard errors to mitigate concerns about heteroscedasticity and country-specific heterogeneity. The coefficients for GOV (0.110 , $t = 2.05$, $p < 0.05$), TAX (0.075 , $t = 1.80$, $p < 0.10$), and FISCAL_BAL (0.185 , $t = 3.90$, $p < 0.01$) remain consistent with baseline findings, confirming that the positive long-run and short-run effects of fiscal policy on economic growth are not driven by outliers, model misspecification, or unobserved heterogeneity.

Table 12: Robustness Checks

Variables	Coefficient	t-statistic
Panel A: Alternative Fiscal Policy Proxy		
Cyclical-adjusted GOV	0.100**	(2.10)
Tax-to-GDP (excluding indirect taxes)	0.065*	(1.75)
FISCAL_BAL	0.175***	(3.95)
Panel B: Sub-sample Analysis (Pre/Post Crises)		
Variables	2000–2008	2009–2023
GOV	0.120**	0.090*
TAX	0.080*	0.060*
FISCAL_BAL	0.200***	0.175***
Panel C: Fixed Effects with Robust Standard Errors		
Variables	Coefficient	Robust t-statistic
GOV	0.110**	(2.05)
TAX	0.075*	(1.80)
FISCAL_BAL	0.185***	(3.90)

Notes: All robustness checks confirm baseline findings. Results are consistent across alternative proxies, crisis periods, and robust estimation methods.

Table 13 presents the results of the panel Granger causality tests for the period 2000–2023 across 12 developing countries, examining the directional relationships between fiscal policy variables and GDP growth. The Granger causality framework helps determine whether past values of a fiscal variable can predict future economic growth and vice versa, providing insight into potential policy feedback loops.

The results indicate a unidirectional causality from fiscal policy instruments to GDP growth for most variables. Specifically, government expenditure (GOV) significantly Granger-causes GDP growth ($\chi^2 = 10.85$, $p < 0.01$), while the reverse is not supported ($\text{GDPG} \rightarrow \text{GOV}$, $\chi^2 = 3.20$, $p = 0.21$), suggesting that changes in government spending precede and influence economic growth rather than the other way around. Similarly, tax revenue (TAX) shows a significant predictive effect on GDP growth ($\chi^2 = 8.40$, $p < 0.05$), but GDP growth does not Granger-cause tax collection ($\chi^2 = 2.75$, $p = 0.25$). The fiscal balance (FISCAL_BAL) also exhibits a strong unidirectional influence on growth ($\chi^2 = 12.20$, $p < 0.01$), highlighting that maintaining a disciplined fiscal stance contributes to sustainable economic performance. Public debt (DEBT) shows a weaker but still significant Granger causality to GDP growth ($\chi^2 = 7.15$, $p < 0.05$), while GDP growth marginally Granger-causes debt at the 10% significance level ($\chi^2 = 5.90$, $p = 0.052$), indicating some potential feedback from growth to borrowing decisions.

Table 13: Panel Granger Causality Test (2000–2023, 12 Countries)

Null Hypothesis	χ^2 Statistic	Probability	Decision
GOV does not Granger-cause GDPG	10.85	0.004***	Reject
GDPG does not Granger-cause GOV	3.20	0.210	Fail to Reject
TAX does not Granger-cause GDPG	8.40	0.015**	Reject
GDPG does not Granger-cause TAX	2.75	0.250	Fail to Reject
FISCAL_BAL does not Granger-cause GDPG	12.20	0.001***	Reject
GDPG does not Granger-cause FISCAL_BAL	4.05	0.130	Fail to Reject
DEBT does not Granger-cause GDPG	7.15	0.028**	Reject
GDPG does not Granger-cause DEBT	5.90	0.052*	Fail to Reject

Notes: ***, **, * denote significance at 1%, 5%, 10% levels. Lag length selected based on AIC/BIC.

Table 14 summarizes the hypothesis testing results for the study, providing a clear overview of the theoretical expectations, empirical outcomes, and final decisions for each proposed relationship. All eight hypotheses were examined using a combination of baseline panel regressions, dynamic system GMM, long-run FMOLS/DOLS estimates, and interaction/moderation analyses. The first three hypotheses (H1–H3) regarding the positive role of government expenditure, tax revenue, and a balanced fiscal stance on GDP growth

were strongly supported. Empirical results indicate that higher government spending and tax mobilization significantly stimulate economic activity, while maintaining a balanced fiscal position ensures sustainable growth by avoiding excessive deficits. Hypothesis 4 (H4) also aligns with expectations, showing that high public debt negatively impacts growth, reinforcing concerns about debt overhang and fiscal sustainability in developing economies. Similarly, H5 confirms the dampening effect of inflation on growth, highlighting the importance of macroeconomic stability alongside fiscal interventions.

Control and moderating factors were equally significant. H6 demonstrates that capital formation strongly promotes growth, reflecting the critical role of productive investment in driving economic expansion. H7 indicates that population growth can exert negative pressure on per capita growth, emphasizing demographic considerations in growth planning. Finally, H8 confirms that human capital positively moderates the effectiveness of fiscal policy, implying that countries with higher educational attainment can leverage fiscal tools more efficiently to achieve stronger economic outcomes.

Table 14: Summary of Hypothesis Testing

Hypothesis	Description	Expected Sign	Empirical Result	Decision
H1	Government expenditure positively affects GDP growth	+	Positive and significant	Accepted
H2	Higher tax revenue promotes growth	+	Positive and significant	Accepted
H3	Balanced fiscal stance (fiscal balance) boosts growth	+	Positive and significant	Accepted
H4	High public debt reduces growth	–	Negative and significant	Accepted
H5	Inflation negatively affects growth	–	Negative and significant	Accepted
H6	Capital formation positively impacts growth	+	Positive and significant	Accepted
H7	Population growth negatively affects per capita growth	–	Negative and significant	Accepted
H8	Human capital enhances fiscal policy effectiveness	+	Positive and significant	Accepted

4.3. Discussions

The findings of this study offer substantial insights into the complex interplay between fiscal policy and economic growth in developing countries. The baseline panel regression, dynamic system GMM, and long-run FMOLS/DOLS results consistently demonstrate that government expenditure, tax revenue, and a balanced fiscal stance are significant positive drivers of GDP growth. This aligns with classical Keynesian theory, which posits that active fiscal interventions can stimulate demand and output, particularly in countries where private sector investment and financial markets remain constrained (Easterly & Rebelo, 1993; Addison, Niño-Zarazúa, & Pirttilä, 2018). Notably, the positive impact of a balanced fiscal position highlights the importance of prudent budget management; excessive deficits may destabilize growth despite increased spending, supporting the debt-overhang argument highlighted in previous literature (Agu et al., 2015; Huidrom, Kose, & Ohnsorge, 2018).

The analysis also underscores the adverse role of high public debt and inflation in curbing growth. Elevated debt levels create a burden of future obligations, crowding out productive investment, and increasing vulnerability to fiscal shocks, which is particularly relevant in countries like India, Pakistan, and Sri Lanka that experienced debt accumulation during crisis periods (Da Silva & Vieira, 2017; Beyer & Milivojevic, 2021). Similarly, persistent inflation erodes purchasing power and increases uncertainty, thereby weakening the stimulative effects of fiscal policy—a finding consistent with both macroeconomic theory and empirical evidence from Asian and African developing economies (Huynh & Nguyen, 2020; Phuc Canh, 2018). Another key insight emerges from the role of human capital as a moderator of fiscal policy effectiveness. Interaction analyses reveal that higher levels of secondary school enrollment strengthen the positive impact of government expenditure and fiscal balance on growth, suggesting that well-educated populations are better able to utilize public resources efficiently (Muinel-Gallo & Roca-Sagalés, 2013; Kim et al., 2021). Conversely, high inflation diminishes the effectiveness of fiscal interventions, further emphasizing that macroeconomic stability is a prerequisite for maximizing the growth impact of fiscal policies.

Capital formation also stands out as a critical control variable. Both short- and long-term estimates show that higher levels of investment significantly drive GDP growth, reinforcing the complementary role of fiscal policy in facilitating productive investment through public expenditure on infrastructure and human development (Tilahun Mengistu, 2022; Utouh & Kitole, 2025). Meanwhile, population growth exerts a negative effect on per capita growth, which highlights the challenges developing countries face in translating aggregate economic gains into individual welfare improvements, echoing findings from Nawaz & Khawaja (2019) and Sabir & Qamar (2019). The Granger causality tests provide additional insights into the directionality of these relationships, indicating that fiscal instruments such as government expenditure, tax revenue, and fiscal balance causally influence GDP growth, but reverse causality from GDP growth to fiscal variables is generally weak or insignificant. This suggests that while economic growth may indirectly affect fiscal capacity over the long term, active and well-structured fiscal policy remains a proactive tool for driving growth, rather than merely responding to macroeconomic performance (Arroyo Marioli, Fatas, & Vasishtha, 2024; Tan et al., 2020).

The study confirms that fiscal policy effectiveness is context-dependent. Developing countries with strong human capital, stable inflation, and active capital formation can leverage fiscal tools more efficiently, while excessive debt or macroeconomic instability can neutralize even well-targeted interventions. The heterogeneity in fiscal composition across countries further underscores the need for tailored policy approaches, as nations with higher investment-oriented expenditure or more balanced tax structures tend to experience stronger and more sustainable growth outcomes (Agu et al., 2015; Beyer & Mili-vojevic, 2021).

5. Conclusions

This study investigates the influence of fiscal policy on economic growth in 12 developing countries from 2000 to 2023, employing a comprehensive panel data approach with fixed effects, random effects, system GMM, and long-run estimators (FMOLS and DOLS). The empirical results consistently demonstrate that government expenditure, tax revenue, and a balanced fiscal stance significantly promote GDP growth, while high public debt and inflation act as growth dampeners. These findings affirm the pivotal role of well-structured fiscal interventions in shaping economic trajectories in developing economies, especially when accompanied by macroeconomic stability and prudent debt management.

A notable contribution of this study is the identification of human capital as a critical moderator in the fiscal-growth nexus. Countries with higher levels of secondary education enrollment are able to harness the growth-enhancing effects of public expenditure and fiscal balance more effectively, highlighting the importance of investing in education alongside fiscal measures. Similarly, interaction analyses reveal that inflation can weaken fiscal policy effectiveness, underscoring the need for a stable macroeconomic environment to maximize policy impact. The study also confirms the long-term persistence of fiscal policy effects, as revealed by FMOLS and DOLS estimations, reinforcing that fiscal interventions are not only immediately impactful but also sustain growth over extended periods.

The study's results have important implications for policy design. Developing countries should aim to structure government spending to balance consumption and investment, maintain a sustainable fiscal balance, and adopt tax policies that optimize revenue without stifling economic activity. Policies that strengthen human capital development and promote productive investment further amplify fiscal effectiveness. Additionally, careful debt management and inflation control are essential to prevent macroeconomic imbalances that could undermine growth objectives.

6. Policy Implications

The findings of this study offer several important lessons for policymakers in developing countries. First, government expenditure should be carefully prioritized and

efficiently allocated, with a balance between consumption-oriented spending and investment in productive sectors. Expenditure that supports infrastructure, education, and innovation can generate long-term growth while consumption spending ensures social welfare, creating a sustainable fiscal-growth synergy. Second, tax policy must be structured to maximize revenue without discouraging private investment. The positive impact of tax revenue on growth suggests that developing countries can enhance fiscal capacity by broadening the tax base, improving collection efficiency, and promoting fair taxation that incentivizes economic activity.

Third, maintaining a balanced fiscal stance is crucial. Fiscal deficits, if excessive, can increase debt burdens and trigger macroeconomic instability, whereas a well-managed fiscal balance can provide the government with flexibility to respond to shocks and fund growth-enhancing projects. In line with this, the study highlights the importance of debt management, particularly in countries where public debt levels are already high. Policy-makers should adopt prudent borrowing strategies, monitor debt sustainability, and ensure that borrowed funds are invested in productive assets that contribute to economic growth.

Fourth, the evidence underscores the role of macroeconomic stability in enhancing fiscal effectiveness. Inflation can erode the growth benefits of fiscal interventions, suggesting that central banks and fiscal authorities need to coordinate policies to control inflationary pressures while supporting expansionary initiatives when needed. Fifth, human capital development emerges as a key complementary policy tool. Investments in education, skill development, and workforce training amplify the impact of fiscal measures, allowing government expenditure and fiscal balance to translate more effectively into higher economic growth.

Finally, these findings suggest that fiscal policy should not operate in isolation. A coordinated approach that integrates expenditure planning, tax reforms, debt management, and human capital investment can create an enabling environment for sustained growth. By adopting context-specific and evidence-based fiscal strategies, developing countries can leverage fiscal instruments not only to stabilize the economy but also to foster long-term development, reduce vulnerabilities, and build resilience against external shocks such as financial crises or global pandemics.

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