

Applied Econometrics and International Development

Volume 26, Issue 1 (2026)

An Empirical Analysis of the Impact of Government Expenditure on Economic Growth in Botswana

Henry Muleya¹, Kealeboga Taboka Sekgopa², Leward Jeke³, Robson Manenge⁴ and Sanderson Abel⁵

¹Lupane State University, Department of Accounting and Finance, Bulawayo, Zimbabwe; ²Department of Agricultural and Applied Economics, Botswana University of Agriculture and Natural Resources; ³Department of Economics, Nelson Mandela University, Port Elizabeth, South Africa; ⁴Midlands State University, Gweru, Zimbabwe; ⁵Department of Economics, Nelson Mandela University, Port Elizabeth, South Africa & Department of Agricultural and Applied Economics, Botswana University of Agriculture and Natural Resources

CORRESPONDING AUTHOR

*Address correspondence to this author at the Nelson Mandela University, Department of Economics, Port Elizabeth, South Africa & Department of Agricultural and Applied Economics, Botswana University of Agriculture and Natural Resources

Received: June 05, 2026

Accepted: June 08, 2026

Published: Oct 09, 2026

ABSTRACT:

Government expenditure plays a critical role in promoting economic growth through the provision of public goods, infrastructure development, education, healthcare, and social protection services. In developing economies, public spending is often regarded as an important policy instrument for stimulating economic activity and enhancing long-term development. Botswana has experienced remarkable economic growth since independence, driven by prudent fiscal management and effective utilisation of mineral revenues. Despite this success, concerns remain regarding the efficiency and sustainability of government expenditure in supporting economic growth, particularly in the face of declining diamond revenues and increasing fiscal pressures. This study investigates the impact of government expenditure on economic growth in Botswana. Annual time-series data covering the period 1980-2025 are utilised. The study employs the Autoregressive Distributed Lag (ARDL) model to examine both short-run and long-run relationships between government expenditure and economic growth. Gross fixed capital formation, foreign direct investment, trade openness, and inflation are incorporated as control variables. The findings reveal that government expenditure exerts a significant negative effect on economic growth in both the short run and long run, while trade openness positively influences growth. Gross fixed capital formation contributes positively to growth, whereas foreign direct investment and inflation have insignificant effects.

Keywords: Government Expenditure, Economic Growth, Botswana, ARDL, Fiscal Policy, Public Spending.

1. INTRODUCTION

Government expenditure remains one of the most important fiscal policy instruments available to governments for promoting economic growth, reducing poverty, and enhancing socio-economic development. Through investments in infrastructure, education, healthcare, public administration, and social protection, governments create conditions that facilitate private sector development, improve productivity, and stimu-

late economic activity. Consequently, the relationship between government expenditure and economic growth has received considerable attention in both theoretical and empirical literature. While Keynesian economists argue that increased government spending stimulates aggregate demand and economic growth (Keynes, 1936), other scholars contend that excessive public expenditure may crowd out private investment, generate fiscal imbalances, and reduce economic efficiency (Nguyen & Su, 2022).

Botswana presents an interesting case for examining the relationship between government expenditure and economic growth. Since gaining independence in 1966, Botswana has transformed from one of the poorest countries in the world into an upper-middle-income economy. This remarkable economic transformation has largely been attributed to prudent macroeconomic management, political stability, effective institutions, and the successful utilisation of diamond revenues (IMF, 2025). Government expenditure has played a vital role in this development process through sustained investments in infrastructure, healthcare, education, and institutional development. As a result, Botswana has consistently been recognised as one of Africa's best-performing economies, characterised by relatively strong governance structures and sound fiscal management practices (World Bank, 2024).

Historically, Botswana's economic growth has been heavily dependent on the diamond mining sector, which contributes significantly to export earnings, government revenue, and foreign exchange receipts. Diamonds traditionally account for approximately one-third of government revenue and nearly three-quarters of foreign exchange earnings, making the economy highly vulnerable to fluctuations in global diamond demand (Reuters, 2025). The strong performance of the mining sector enabled the government to maintain relatively high levels of public expenditure aimed at improving infrastructure, expanding access to education and healthcare services, and supporting social welfare programmes.

However, recent developments have exposed the vulnerability of Botswana's growth model. Weak global demand for natural diamonds, increasing competition from synthetic diamonds, and declining mineral revenues have significantly affected economic performance. Botswana's economy contracted by approximately 3 percent in 2024 following a sharp decline in diamond production and exports. Recent IMF projections further indicate that economic activity remained weak in 2025 as the diamond sector continued to experience subdued demand and production challenges (IMF, 2025). The downturn in the diamond industry has negatively affected government revenues, export earnings, and overall economic performance.

The decline in mineral revenues has also placed considerable pressure on public finances. Recent IMF estimates indicate that Botswana's fiscal deficit increased to approximately 7.1 percent of GDP during the 2024/25 fiscal year due to declining mineral revenues and rising expenditure pressures. Public debt has also risen above 30 percent of GDP, reflecting increased borrowing requirements to finance fiscal deficits (IMF, 2025). Similarly, the African Development Bank reported that Botswana's fiscal deficit widened to approximately 8.9 percent of GDP in 2024, highlighting growing concerns regarding fiscal sustainability and expenditure efficiency.

These developments have intensified policy debates regarding the effectiveness, sustainability, and growth-enhancing role of government expenditure in Botswana. On one hand, government spending remains essential for supporting

economic diversification, stimulating aggregate demand, improving infrastructure, and promoting human capital development. On the other hand, persistent fiscal deficits and declining mineral revenues raise concerns regarding the efficiency and long-term sustainability of public expenditure. The challenge facing policymakers is therefore not only maintaining expenditure levels but also ensuring that public resources are allocated towards productive sectors capable of generating sustainable economic growth.

Empirical evidence regarding the relationship between government expenditure and economic growth remains inconclusive. Afonso and Jalles (2021) found that productive public expenditure positively influences economic growth through improvements in infrastructure and human capital development. Similarly, Chirwa and Odhiambo (2022) reported that government expenditure stimulates investment and productivity growth in developing economies. In contrast, Nguyen and Su (2022) found that excessive government expenditure may generate diminishing returns and reduce economic efficiency when expenditure exceeds optimal levels. These findings suggest that the impact of government expenditure on economic growth depends largely on expenditure composition, efficiency, and institutional quality.

In Botswana, existing studies have produced mixed findings. Amusa and Oyinlola (2019) found that government expenditure negatively affects economic growth in the short run but contributes positively to economic growth in the long run. Maluleke, Odhiambo and Nyasha (2023) further reported that various categories of public expenditure have varying effects on investment and economic growth, emphasising the importance of expenditure composition rather than expenditure size alone.

Despite the importance of public expenditure in Botswana's development strategy, empirical evidence on its impact on economic growth remains limited. Existing studies have largely focused on specific expenditure categories such as health, education, and infrastructure, while limited attention has been devoted to examining the aggregate effects of government expenditure on economic growth using recent data. Furthermore, the significant fiscal and economic challenges associated with declining diamond revenues, widening fiscal deficits, and ongoing economic diversification efforts necessitate a re-examination of the expenditure-growth relationship. Consequently, there remains a knowledge gap regarding whether government expenditure continues to serve as an effective instrument for promoting economic growth under Botswana's current economic conditions.

It is against this background that this study investigates the impact of government expenditure on economic growth in Botswana using annual time-series data covering the period 1980–2025. The study employs the Autoregressive Distributed Lag (ARDL) modelling framework to examine both the short-run and long-run effects of government expenditure on economic growth while controlling for gross fixed capital formation, foreign direct investment, trade openness, and inflation.

2. LITERATURE REVIEW

This study is anchored on Keynesian Theory, Wagner's Law, and Endogenous Growth Theory. Keynesian Theory developed by Keynes (1936) posits that government expenditure stimulates aggregate demand, employment, investment, and economic growth, particularly during periods of weak private sector demand. The theory suggests that increased public expenditure can raise output through the multiplier effect, making fiscal policy a crucial tool for economic stabilisation and growth.

Wagner's Law developed by Wagner (1893) argues that government expenditure increases as economies develop. Economic growth creates increased demand for public goods and services such as infrastructure, education, healthcare, and social protection, leading to expansion in government activities and expenditure. Unlike Keynesian Theory, Wagner's Law suggests that causality runs from economic growth to government expenditure.

Endogenous Growth Theory developed by Romer (1990) emphasises the role of productive government expenditure in promoting long-run economic growth. Public investment in infrastructure, education, technology, and human capital enhances productivity and innovation, thereby generating sustained economic growth. The theory suggests that government expenditure can directly influence the long-run growth trajectory of an economy.

These theories provide a useful framework for analysing the relationship between government expenditure and economic growth in Botswana. While Keynesian Theory explains the demand-side effects of public expenditure, Wagner's Law highlights the influence of economic growth on public spending, and Endogenous Growth Theory emphasises the productivity-enhancing role of government investment.

The relationship between government expenditure and economic growth has attracted considerable attention in both developed and developing economies. However, empirical evidence remains inconclusive, with studies reporting positive, negative, insignificant, and non-linear effects depending on expenditure composition, institutional quality, and country-specific economic conditions.

A substantial body of literature supports the view that government expenditure promotes economic growth. Using a panel of developed and developing countries, Afonso and Jalles (2021) found that productive public expenditure positively influences economic growth through improvements in infrastructure, education, and human capital development. The authors argued that government spending enhances productivity by reducing transaction costs and improving the efficiency of private sector activities. Similarly, Chirwa and Odhiambo (2022), using data from selected developing countries, reported that government expenditure stimulates economic growth by encouraging investment, improving public service delivery, and supporting economic diversification. Their findings suggest that fiscal policy remains an important instrument for promoting sustainable economic development.

Likewise, Ahmed and Miller (2021) found that public infrastructure expenditure contributes positively to economic growth by complementing private investment and improving

the business environment. The study argued that investments in transport networks, energy infrastructure, and communication systems increase productivity and facilitate economic expansion. In a study focusing on African economies, Musah et al. (2023) concluded that productive government expenditure directed towards infrastructure, education, and healthcare significantly enhances economic growth. The authors emphasized that expenditure efficiency is critical in determining the extent to which public spending translates into economic development outcomes.

Despite the generally positive evidence, an increasing number of studies suggest that government expenditure may negatively affect economic growth when expenditure becomes excessive or inefficiently allocated. Nguyen and Su (2022) examined the relationship between government expenditure and economic growth across emerging economies and found evidence of a non-linear relationship. Their findings revealed that while moderate levels of government expenditure may stimulate growth, excessive public spending generates diminishing returns and reduces economic efficiency. The study concluded that expenditure composition and quality are more important than expenditure size. Similarly, Barro (1990) argued that beyond a certain threshold, government expenditure may crowd out private investment, increase taxation, and reduce overall economic productivity, thereby constraining economic growth.

Further evidence of the adverse effects of government expenditure is provided by Bose, Haque and Osborn (2007), who found that certain categories of public expenditure have limited growth-enhancing effects, particularly when resources are allocated towards consumption-oriented activities rather than productive investment. The study emphasized that recurrent expenditure often generates weaker growth outcomes than capital expenditure. Similarly, Devarajan, Swaroop and Zou (1996) found that excessive spending on unproductive sectors may negatively affect economic growth in developing economies. These findings suggest that public expenditure can become a burden on economic performance when resources are not efficiently allocated.

Empirical evidence from Botswana also presents mixed findings. Amusa and Oyinlola (2019) investigated the relationship between government expenditure and economic growth in Botswana and found that public expenditure negatively affects economic growth in the short run but contributes positively to growth in the long run. The authors attributed the short-run negative effects to implementation lags, expenditure inefficiencies, and adjustment costs associated with public investment projects. Similarly, Maluleke, Odhiambo and Nyasha (2023) reported that different categories of government expenditure exert varying effects on economic growth and investment. Their findings revealed that infrastructure expenditure may crowd out private investment in the short run, while spending on education and healthcare tends to stimulate growth through improvements in human capital and productivity.

Sector-specific studies have also produced varying results. Sinha and Mbulawa (2023) found a positive long-run relationship between health expenditure and economic growth in Botswana, arguing that improvements in healthcare enhance la-

bour productivity and economic performance. In contrast, Bopueng (2015) found no significant long-run relationship between education expenditure and economic growth, suggesting that expenditure effectiveness may be more important than expenditure levels. These contrasting findings highlight the importance of expenditure composition in determining growth outcomes.

Beyond government expenditure, several studies have examined the role of other macroeconomic variables commonly associated with economic growth. Chirwa and Odhiambo (2022) found that foreign direct investment contributes positively to economic growth through technology transfer, capital accumulation, and employment creation. Similarly, Ahmed and Miller (2021) reported that trade openness enhances economic growth by improving access to international markets and facilitating technology diffusion. Musah et al. (2023) further found that gross fixed capital formation positively influences economic growth through increased productive capacity and infrastructure development. However, the growth effects of inflation remain inconclusive, with some studies reporting negative effects due to macroeconomic instability, while others find insignificant effects when inflation remains moderate and predictable.

Recent assessments by the International Monetary Fund (2025) and the World Bank (2024) have raised concerns regarding Botswana's fiscal sustainability following declining diamond revenues, widening fiscal deficits, and increasing public expenditure pressures. Both institutions emphasize the need to improve expenditure efficiency and prioritize productive public investment capable of supporting economic diversification and long-term economic growth. These developments suggest that the effectiveness of government expenditure in Botswana may depend not only on the level of spending but also on its composition, efficiency, and ability to stimulate productive economic activity.

Overall, the empirical literature suggests that the relationship between government expenditure and economic growth is far from straightforward. While many studies support the growth-enhancing role of productive public expenditure, others indicate that excessive or inefficient government spending may hinder economic growth. The mixed evidence from Botswana and other developing economies highlights the importance of examining country-specific experiences. Consequently, this study contributes to the literature by re-examining the impact of government expenditure on economic growth in Botswana using recent data covering the period 1980-2025 and the ARDL modelling framework, while controlling for foreign direct investment, trade openness, inflation, and gross fixed capital formation. This approach provides a more comprehensive assessment of the expenditure-growth nexus under Botswana's current fiscal and economic conditions.

3. METHODOLOGY

This study investigates the impact of government spending on economic growth in Botswana. The study employs a time-series research design using annual data covering the period 1980-2025. Data was obtained from the World Development

Indicators (WDI), International Monetary Fund (IMF), Botswana Statistics Agency, and Bank of Botswana publications.

The functional relationship among the variables is expressed as:

$$GDP = f(GOVEXP, GFCF, FDI, TOP, INF) \quad (1)$$

The estimable model is specified as:

$$GDP_t = \beta_0 + \beta_1 GOVEXP_t + \beta_2 GFCF_t + \beta_3 FDI_t + \beta_4 TOP_t + \beta_5 INF_t + \varepsilon_t \quad (2)$$

The study employs the Autoregressive Distributed Lag (ARDL) model developed by Pesaran *et al.* (2001). The ARDL approach is preferred because it can accommodate variables integrated at level I (0), first difference I (1), or a combination of both. In addition, the technique estimates both short-run and long-run relationships simultaneously and performs well in small samples.

The ARDL model is specified as:

$$\Delta GDP_t = \alpha_0 + \sum_{i=1}^p \alpha_1 \Delta GDP_{t-i} + \sum_{i=0}^q \alpha_2 \Delta GOVEXP_{t-i} + \sum_{i=0}^q \alpha_3 \Delta GFCF_{t-i} + \sum_{i=0}^q \alpha_4 \Delta FDI_{t-i} + \sum_{i=0}^q \alpha_5 \Delta TOP_{t-i} + \sum_{i=0}^q \alpha_6 \Delta INF_{t-i} + \lambda ECT_{t-1} + \mu_t \quad (3)$$

Where: Δ = First difference operator; ECT = Error correction term; λ = Speed of adjustment coefficient and μ = White noise error term

Economic Growth (GDP): Measured by annual GDP growth rate and used as the dependent variable. It reflects the overall performance of the economy.

Government Expenditure (GOVEXP): The principal explanatory variable measured as government final consumption expenditure (% of GDP). Government spending on infrastructure, health, education, and public services is expected to stimulate economic growth. A positive coefficient is expected.

Gross Fixed Capital Formation (GFCF): Proxy for investment. Increased investment enhances productive capacity and economic growth. A positive relationship is expected.

Foreign Direct Investment (FDI): Captures external capital inflows that promote technology transfer, employment creation, and productivity growth. A positive coefficient is expected.

Trade Openness (TOP): Measured as the ratio of exports and imports to GDP. Trade openness promotes market expansion and efficiency gains. A positive relationship is expected.

Inflation (CPI): Represents macroeconomic stability. High inflation increases uncertainty and reduces investment and purchasing power. A negative coefficient is expected.

The study first applies the Augmented Dickey-Fuller (ADF) test (Dickey & Fuller, 1979) and the Phillips-Perron (PP) test (Phillips & Perron, 1988) to determine stationarity properties of the variables. The estimation procedures follow standard econometric approaches recommended by Gujarati and Porter (2021) and Wooldridge (2020). The ARDL Bounds Test is then employed to examine the existence of a long-run relationship among the variables. Thereafter, long-run and short-run coefficients are estimated using the Error Correction Model (ECM).

Table 1. Descriptive statistics.

Statistic	CPI	FDI	GDPG	GFCF	GVTEX	TOP
Mean	8.695993	2.885167	6.068503	27.36669	98.17159	100.9075
Median	8.601485	2.062560	6.772822	26.97763	96.61588	98.96147
Maximum	16.42803	15.59414	19.44997	35.77629	121.8253	125.7830
Minimum	1.890359	-6.897609	-14.14423	20.26153	73.31262	68.80336
Std. Dev.	3.515257	3.332933	5.955993	3.065589	12.33296	15.59139
Skewness	-0.032233	0.955982	-0.910438	0.500189	0.071199	0.023087
Kurtosis	2.604850	7.126485	4.925529	3.464754	2.128029	1.880184
Jarque-Bera	0.327277	42.22878	14.33914	2.484201	1.593747	2.564580
Probability	0.849049	0.000000	0.000770	0.288777	0.450736	0.277401
Observations	49	49	49	49	49	49

Source: Author's Computation (STATA).

To ensure robustness, diagnostic tests including the Breusch-Godfrey LM test for serial correlation, ARCH test for heteroscedasticity, Jarque-Bera normality test, and CUSUM stability tests are conducted. These tests ensure that the estimated model satisfies the classical regression assumptions and that the results are reliable for policy recommendations.

4. RESULTS AND CONCLUSION

Table 1 presents the descriptive statistics of the variables employed in the study. The results indicate that GDP growth (GDPG) averaged 6.07% over the study period, while foreign direct investment (FDI) recorded a mean value of 2.89%. Gross fixed capital formation (GFCF), government expenditure (GVTEX), and trade openness (TOP) reported average values of 27.37%, 98.17%, and 100.91%, respectively. The relatively high standard deviations of GDPG (5.96) and FDI (3.33) suggest considerable fluctuations in economic growth, exchange rates, and foreign investment inflows, reflecting the susceptibility of the economy to both domestic and external shocks. Similar volatility in growth and foreign investment variables has been reported by Chirwa and Odhiambo (2022), who argue that developing economies are particularly vulnerable to external economic disturbances, commodity price fluctuations, and capital flow reversals.

The distributional properties further reveal that most variables are approximately symmetric, as evidenced by skewness values close to zero. However, FDI (0.96) and GDPG (-0.91) exhibit noticeable positive and negative skewness, respectively, suggesting the occurrence of extreme investment inflows and periods of economic contraction. The Jarque-Bera statistics indicate that CPI, GFCF, GVTEX, and TOP are normally distributed ($p > 0.05$), whereas FDI and GDPG deviate significantly from normality ($p < 0.05$). The high kurtosis values for FDI (7.13) and GDPG (4.93) further confirm the presence of extreme observations and volatility in these variables.

These findings are consistent with Musah et al. (2023), who found that growth and investment variables in African economies often exhibit non-normal distributions due to economic shocks, policy changes, and external market uncertainties.

The correlation results reveal that economic growth in Botswana is positively associated with trade openness, inflation, foreign direct investment, and gross fixed capital formation, with trade openness exhibiting the strongest relationship ($r = 0.5778$). The positive relationship between trade openness and economic growth suggests that greater integration into international markets enhances economic performance through increased exports, technology transfer, and improved productivity. This finding is consistent with Ahmed and Miller (2021), who reported that trade liberalisation promotes economic growth by facilitating market expansion and efficiency gains.

Conversely, government expenditure displays a weak negative association with economic growth ($r = -0.1979$), suggesting that increases in public expenditure alone may not be sufficient to stimulate growth unless resources are efficiently allocated to productive sectors. This result supports the findings of Nguyen and Su (2022), who argue that the effectiveness of government expenditure depends more on expenditure quality and composition than on expenditure size. Furthermore, the absence of high correlations among the explanatory variables indicates that multicollinearity is unlikely to pose a significant problem in the subsequent econometric analysis, thereby enhancing the reliability of the estimated regression results.

The ARDL bounds test results indicate the existence of a long-run equilibrium relationship among economic growth, government expenditure, foreign direct investment, trade openness, inflation, and gross fixed capital formation. The estimated F-statistic (6.626) exceeds the upper critical bounds at the 1%, 5%, and 10% significance levels, while the t-statistic (-6.155) is also more negative than the corresponding upper

Table 2. Correlation analysis.

Variables	GDPG	FDI	TOP	GFCF	CPI	GVTEX
GDPG	1.0000					
FDI	0.2636	1.0000				
TOP	0.5778	0.3726	1.0000			
GFCF	0.1276	0.2038	0.2880	1.0000		
CPI	0.3903	0.1928	0.3331	0.2917	1.0000	
GVTEX	-0.1979	0.1511	0.1225	0.4507	-0.0046	1.0000

Source: Author's Computation (STATA).

Table 3. ARDL Bounds Test.

Test Statistic	Calculated Value	10% I (0)	10% I (1)	5% I (0)	5% I (1)	1% I (0)	1% I (1)
F-statistic	6.626	2.439	3.710	2.929	4.359	4.087	5.876
t-statistic	-6.155	-2.518	-3.825	-2.869	-4.242	-3.582	-5.080

Source: Author's Computation (STATA).

Table 4. ARDL long-run and short-run estimation.

Variable	Coefficient	Std. Error	t-Statistic	p-value	Decision
Error Correction Term					
ECT (-1)	-0.8968	0.1457	-6.16	0.000	Significant
Long-Run Estimates					
FDI	0.2184	0.2586	0.84	0.404	Not Significant
TOP	0.1231	0.0587	2.10	0.043	Significant
GFCF	0.6154	0.3110	1.98	0.056	Significant
CPI	0.0241	0.2572	0.09	0.926	Not Significant
GVTEX	-0.2068	0.0730	-2.84	0.008	Significant
Short-Run Estimates					
D(CPI)	0.4971	0.2927	1.70	0.099	Significant at 10%
D (CPI (-1))	-0.1465	0.2825	-0.52	0.607	Not Significant
D (CPI (-2))	0.6853	0.2855	2.40	0.022	Significant
D(GVTEX)	-0.2762	0.0931	-2.97	0.005	Significant
Model Summary					
R ² 0.7975		Adjusted R ² 0.7379		Root MSE 3.8884	

Source: Author's Computation (STATA).

bound critical values. Consequently, the null hypothesis of no long-run relationship is rejected.

The finding suggests that these macroeconomic variables move together in the long run despite short-run fluctuations. This result is consistent with Endogenous Growth Theory, which argues that fiscal policy, investment, and openness jointly influence long-term economic growth. Similar evidence was reported by Afonso and Jalles (2021), who found a

stable long-run relationship between government expenditure and economic growth across both developed and developing economies. The result also supports Amusa and Oyinlola (2019), who documented cointegration between fiscal variables and economic growth in Botswana.

Table 4 show that model explains approximately 79.8% of the variation in economic growth, as indicated by the R-squared value of 0.7975, while the adjusted R-squared of

0.7379 suggests strong explanatory power after accounting for the number of regressors. The error correction term is negative and statistically significant ($ECT = -0.8968$, $p < 0.01$), confirming the existence of a stable long-run equilibrium relationship among the variables. The coefficient implies that approximately 89.7% of short-run disequilibrium is corrected within one year. This rapid speed of adjustment suggests that economic shocks are quickly absorbed within the Botswana economy. The finding is consistent with Amusa and Oyinlola (2019), who reported strong adjustment dynamics between fiscal policy variables and economic growth in Botswana.

Government expenditure exhibits a negative and statistically significant effect on economic growth in the long run. This implies that a one-unit increase in government expenditure reduces economic growth by approximately 0.21 units. The finding contradicts Keynesian Theory and Endogenous Growth Theory, which predict positive growth effect from productive public expenditure. However, the result partially supports Wagner's Law by suggesting that increased public expenditure does not automatically generate growth unless expenditure is efficiently allocated. The results also support Nguyen and Su (2022), who found that excessive government expenditure may reduce economic efficiency when spending is directed towards non-productive activities. The finding also supports IMF (2025) concerns regarding rising fiscal deficits and expenditure inefficiencies in Botswana. Although a positive coefficient was expected based on Keynesian and Endogenous Growth theories, the empirical results reveal a significant negative relationship. This suggests that the composition and efficiency of government expenditure may be more important than the size of expenditure itself. A substantial proportion of expenditure may have been allocated towards recurrent spending rather than productive investment.

Trade openness has a positive and statistically significant effect on economic growth. This implies that increased openness promotes economic growth through enhanced export opportunities, technology transfer, and productivity improvements. The finding is consistent with Ahmed and Miller (2021) and Chirwa and Odhiambo (2022), who found that trade liberalisation enhances economic performance in developing economies. The result suggests that Botswana's continued participation in regional and global markets remains important for achieving sustainable economic growth.

Gross fixed capital formation records a positive coefficient, indicating that investment contributes positively to economic growth. Although only marginally significant, the finding supports Endogenous Growth Theory and is consistent with Musah et al. (2023), who found that capital accumulation and infrastructure development are critical drivers of economic growth in African economies. The result highlights the importance of promoting both public and private investment to strengthen productive capacity.

Foreign direct investment records a positive but statistically insignificant coefficient. Although the positive sign conforms to theoretical expectations, the insignificant effect suggests that FDI has not significantly contributed to economic growth during the study period. This finding differs from Chirwa and Odhiambo (2022), who reported a significant positive relationship between FDI and growth. A plausible explanation is that FDI in Botswana has largely been concentrated

in the mining sector, limiting spill-over effects to other productive sectors of the economy.

Inflation exhibits a positive but statistically insignificant effect on economic growth. This result suggests that inflation has not significantly influenced long-run economic growth in Botswana. The finding is consistent with studies that argue moderate inflation may coexist with economic growth when macroeconomic stability is maintained. Botswana's prudent monetary policy framework may have helped minimise the adverse growth effects associated with inflation.

In the short run, government expenditure continues to exert a negative and statistically significant effect on economic growth. This finding reinforces the long-run results and suggests that increases in government expenditure do not immediately translate into higher economic growth. The result supports Amusa and Oyinlola (2019), who found that government expenditure negatively affects economic growth in the short run due to implementation inefficiencies and expenditure rigidities. Similarly, the significant positive effect of lagged inflation suggests that moderate inflation may stimulate production and investment activities in the short run.

Table 5. Diagnostic tests.

Diagnostic Test	Test Statistic	p-value	Decision
Breusch-Godfrey LM Test for Serial Correlation	$\chi^2 = 1.018$	0.3131	Fail to Reject H_0
ARCH LM Test for Heteroscedasticity	$\chi^2 = 0.387$	0.5338	Fail to Reject H_0

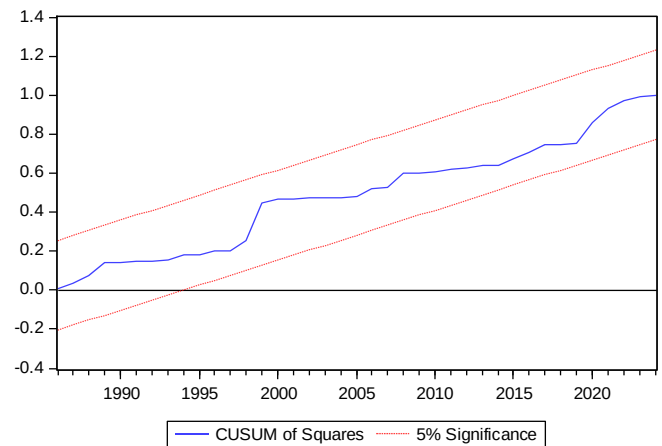
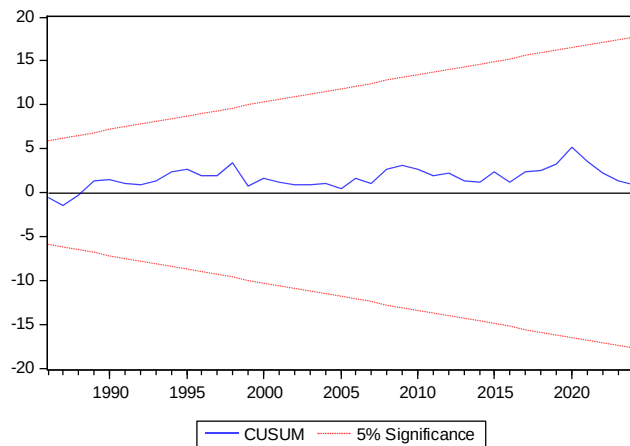
Source: Author's Computation (STATA)

The Breusch-Godfrey LM test fails to reject the null hypothesis of no serial correlation ($\chi^2 = 1.018$, $p = 0.3131$), indicating that the residuals are not autocorrelated. The ARCH LM test also fails to reject the null hypothesis of no heteroscedasticity ($\chi^2 = 0.387$, $p = 0.5338$), suggesting that the variance of the residuals remains constant throughout the study period. These findings imply that the estimated coefficients and associated statistical tests are reliable.

The results are consistent with the recommendations of Pesaran et al. (2001), who emphasised that ARDL estimates can only be considered robust when diagnostic tests confirm the absence of serial correlation and heteroscedasticity. Consequently, the estimated model satisfies the key assumptions required for valid statistical inference.

The CUSUM and CUSUM squared stability test indicates that the cumulative sum of recursive residuals remains within the 95% confidence bands throughout the sample period. This confirms the stability of the estimated parameters and indicates the absence of significant structural instability in the model. The finding is consistent with previous ARDL studies by Afonso and Jalles (2021) and Chirwa and Odhiambo (2022), which reported stable long-run relationships between fiscal variables and economic growth. The stability of the model suggests that the estimated coefficients are robust and can be relied upon for policy formulation and forecasting purposes.

Table 6. Model stability test.



Source: Author's Computation (STATA).

5. CONCLUSION AND RECOMMENDATIONS

This study investigated the impact of government expenditure on economic growth in Botswana using annual time-series data for the period 1980–2025 and the ARDL modelling framework. The results confirmed the existence of a long-run equilibrium relationship among economic growth, government expenditure, foreign direct investment, trade openness, gross fixed capital formation, and inflation. While trade openness and gross fixed capital formation positively contributed to economic growth, government expenditure was found to exert a significant negative effect in both the short run and long run. The findings suggest that the challenge facing Botswana is not necessarily the level of public expenditure but rather the efficiency, composition, and productivity of government spending. The findings validate concerns raised in the problem statement regarding fiscal sustainability and expenditure efficiency under declining diamond revenues. Overall, the study concludes that economic growth in Botswana is primarily driven by trade openness and capital formation, while aggregate government expenditure appears to constrain growth due to expenditure inefficiencies.

Based on the study findings, Botswana should prioritize improving the efficiency and productivity of government expenditure by reallocating resources from recurrent consumption towards growth-enhancing sectors such as infrastructure, education, technology, and industrial development. Given the positive contribution of trade openness and gross fixed capital formation to economic growth, policymakers should strengthen export diversification strategies, deepen regional and international trade integration, and create an enabling environment for both domestic and foreign investment. Furthermore, efforts should be directed towards attracting foreign direct investment into non-mining sectors to enhance economic diversification and maximize spill-over benefits. The government should also maintain sound fiscal and macroeconomic policies that promote investment, control inflation, and ensure fiscal sustainability, particularly in light of declining diamond revenues and increasing expenditure pressures. Overall, achieving sustainable economic growth in Botswana requires

a shift from expenditure expansion towards expenditure efficiency, productive investment, and private sector-led economic transformation.

REFERENCES

- Afonso, A., & Jalles, J. T. (2021). Fiscal policy and economic growth: Evidence from developed and developing countries. *Applied Economics*, 53(18), 2105–2121. <https://doi.org/10.1080/00036846.2020.1859457>
- African Development Bank. (2024). *African Economic Outlook 2024: Botswana country note*. African Development Bank. Retrieved from <https://www.afdb.org>
- Ahmed, H., & Miller, S. M. (2021). Public infrastructure expenditure and economic growth: Evidence from developing economies. *Journal of Economic Studies*, 48(5), 1001–1018. <https://doi.org/10.1108/JES-03-2020-0125>
- Amusa, K., & Oyinola, M. A. (2019). Government expenditure and economic growth nexus in Botswana: An ARDL approach. *African Journal of Economic Review*, 7(2), 52–69.
- Barro, R. J. (1990). Government spending in a simple model of endogenous growth. *Journal of Political Economy*, 98(5), S103–S125. <https://doi.org/10.1086/261726>
- Bose, N., Haque, M. E., & Osborn, D. R. (2007). Public expenditure and economic growth: A disaggregated analysis for developing countries. *Manchester School*, 75(5), 533–556. <https://doi.org/10.1111/j.1467-9957.2007.01028.x>
- Bosupeng, M. (2015). Education expenditure and economic growth in Botswana: An empirical investigation. *Botswana Journal of Economics*, 13(1), 21–36.
- Chirwa, T. G., & Odhiambo, N. M. (2022). Government expenditure and economic growth in developing economies: A panel data analysis. *Economics*, 10(4), 88. <https://doi.org/10.3390/economics10040088>
- Devarajan, S., Swaroop, V., & Zou, H. F. (1996). The composition of public expenditure and economic growth. *Journal of Monetary Economics*, 37(2), 313–344. [https://doi.org/10.1016/S0304-3932\(96\)90039-2](https://doi.org/10.1016/S0304-3932(96)90039-2)
- Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American Statistical Association*, 74(366), 427–431. <https://doi.org/10.1080/01621459.1979.10482531>
- Gujarati, D. N., & Porter, D. C. (2021). *Basic econometrics* (6th ed.). McGraw-Hill Education.
- International Monetary Fund. (2025). *Botswana: 2025 Article IV Consultation-Staff report*. International Monetary Fund. <https://www.imf.org>
- Keynes, J. M. (1936). *The general theory of employment, interest and money*. Macmillan.
- Maluleke, T., Odhiambo, N. M., & Nyasha, S. (2023). Public expenditure, investment and economic growth in Botswana. *International Journal of Economics and Finance Studies*, 15(2), 45–62.

- Musah, M., Kong, Y., Mensah, I. A., Antwi, S. K., & Donkor, M. (2023). Government expenditure and economic growth in Africa: The role of expenditure efficiency. *Cogent Economics & Finance*, 11(1), 2163891. <https://doi.org/10.1080/23322039.2023.2163891>
- Nguyen, C. P., & Su, T. D. (2022). Government expenditure and economic growth: Evidence of non-linear effects in emerging economies. *Economic Change and Restructuring*, 55(3), 1607-1630. <https://doi.org/10.1007/s10644-021-09337-4>
- Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3), 289-326. <https://doi.org/10.1002/jae.616>
- Phillips, P. C. B., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika*, 75(2), 335-346. <https://doi.org/10.1093/biomet/75.2.335>
- Reuters. (2025). *Botswana economy faces pressure from declining diamond demand and exports*. Reuters. Retrieved from <https://www.reuters.com>
- Romer, P. M. (1990). Endogenous technological change. *Journal of Political Economy*, 98(5), S71-S102. <https://doi.org/10.1086/261725>
- Sinha, A., & Mbulawa, S. (2023). Health expenditure and economic growth nexus in Botswana. *African Development Review*, 35(2), 285-298. <https://doi.org/10.1111/1467-8268.12645>
- Wagner, A. (1893). *Grundlegung der politischen Ökonomie* (3rd ed.). Winter.
- Wooldridge, J. M. (2020). *Introductory econometrics: A modern approach* (7th ed.). Cengage Learning.
- World Bank. (2024). *Botswana economic update: Enhancing productivity and economic diversification*. World Bank. <https://www.worldbank.org>
- World Bank. (2025). *World Development Indicators*. World Bank. Retrieved from <https://databank.worldbank.org/source/world-development-indicators>