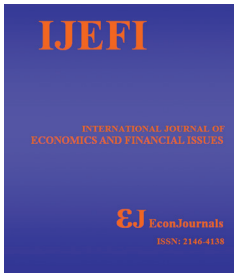

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Modelling Drivers of Economic Growth in SADC Region

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ABSTRACT

The debate on the drivers of economic growth remains inconclusive despite many years' scholarly research. Countries continue to grapple with the economic growth dilemma experimenting with diverse policies to spur growth in their countries. The objective of the study is to examine the key drivers of economic growth in five African countries; Botswana, Namibia, South Africa, Zambia, and Zimbabwe using panel data from 2010 to 2024. Employing the generalized least squares method with robustness tests via fully modified ordinary least squares, the research findings reveal that macroeconomic variables significantly influence economic growth, with money supply and interest rates having a negative impact, while exchange rates positive influence, with a notable threshold effect. These findings have crucial policy implications, suggesting that policymakers should carefully manage monetary variables, maintain competitive exchange rates, and aim for optimal levels of economic growth drivers to foster sustainable economic development.

Keywords: Inflation, Money Supply, Economic Growth, FMOLS, GMM
JEL Classifications: 04, 043, 047

1. INTRODUCTION

Economic growth is a fundamental objective of macroeconomic policy, profoundly impacting individual and societal well-being. It drives poverty reduction, improves living standards, and increases economic opportunities. As an economy grows, new jobs are created, incomes rise, and governments can invest in essential public services like healthcare, education, and infrastructure. Economic growth enables individuals to improve their economic circumstances, invest in their future, and enjoy a higher quality of life. It also generates government revenue, which can fund public goods and services benefiting society (Besley and Ghatak, 2006). Furthermore, economic growth reduces poverty and inequality by creating opportunities for marginalized groups to participate in the economy. Growth is essential for achieving sustainable development, enabling investments in sustainable infrastructure, renewable energy, and green technologies (Oyebowale and Algarhi, 2020). It provides resources to address pressing social and environmental challenges, such as improving access to education and healthcare, and promoting sustainable agriculture and resource management. Understanding the determinants of economic growth is crucial for policymakers, researchers, and practitioners seeking to promote sustainable economic development and improve well-being. This study aims to contribute to this understanding by examining the determinants of economic growth in selected African countries.

This study makes a novel contribution to the existing literature on economic growth in the Southern African Development Community (SADC) region by examining the determinants of economic growth in a specific set of countries (Botswana, Namibia, South Africa, Zambia, and Zimbabwe) using recent panel data from 2010 to 2024. These countries are the major players in the region with South Africa, the economic hub of the region. Unlike

previous studies that have focused on broader regional analyses or single-country case studies, this research provides a nuanced understanding of the economic growth dynamics in these specific SADC countries. By exploring the impact of macroeconomic variables such as money supply, interest rates, and exchange rates on economic growth, this study sheds new light on the complex relationships between these variables and economic growth in the SADC region. Furthermore, the study's use of advanced econometric techniques, including the Generalized Least Squares (GLS) method and Fully Modified Ordinary Least Squares (FMOLS), provides robust and reliable estimates of the determinants of economic growth in the region. The findings of this study will contribute to the development of more effective economic policies and strategies that are tailored to the specific needs and challenges of the SADC region.

Economic growth has been a persistent challenge for many African countries, despite the implementation of various macroeconomic policies and strategies. Empirical evidence suggests that economic growth in Africa has been volatile and unsustainable, with many countries experiencing fluctuations in growth rates over the years. For instance, some countries have experienced periods of rapid growth, only to be followed by sharp declines, highlighting the need for a more nuanced understanding of the determinants of economic growth in the region (Chandra, 2022). Furthermore, the growth experiences of African countries have been heterogeneous, with some countries achieving sustained growth while others have struggled to achieve consistent growth.

The empirical literature has identified several factors that contribute to the challenges of achieving sustainable economic growth in Africa, including inadequate infrastructure, poor governance, and limited access to finance. Additionally, external shocks, such as terms of trade volatility and global economic downturns, have also been shown to have a significant impact on economic growth in African countries. Despite the importance of understanding the determinants of economic growth, there is still limited consensus on the key drivers of growth in Africa, highlighting the need for further research in this area (Abdulai, 2023). By examining the determinants of economic growth in selected African countries, this study aims to contribute to the existing body of knowledge and provide insights that can inform policy decisions.

The African continent has experienced varied economic growth rates over the past few decades, with some countries making progress while others continue to face significant development challenges, including poverty, inequality, and limited economic opportunities. Economic growth is crucial for addressing these challenges and improving African citizens' well-being. Various factors have influenced economic growth in Africa, including natural resource endowments, institutional quality, and global economic trends.

Some African countries have achieved rapid economic growth driven by natural resource extraction, while others have struggled to sustain growth. Understanding economic growth determinants in Africa is vital for policymakers seeking to promote sustainable development and improve living standards. Economic growth is essential for development and poverty reduction, creating opportunities for employment, income generation, and human capital investment.

Moreover, economic growth enables governments to invest in essential public services like healthcare, education, and infrastructure, critical for human development. Despite its importance, the factors driving economic growth in Africa remain poorly understood (Achdut, 2019). Existing studies have identified potential determinants, including institutional quality, human capital, and infrastructure, but evidence is inconsistent, and further research is needed.

Notably, previous studies have overlooked the influence macroeconomic variables and their interactions on economic growth. This study addresses this gap by examining the impact of selected macroeconomic variables like money supply, interest rates, unemployment, and exchange rate and their interactions on economic growth in selected African countries. The study's findings can inform policy decisions promoting economic growth and development in Africa and contribute to more effective economic development strategies (Khan and Senhadji, 2003).

Guided by the neoclassical growth model, this study will analyze relationships between macroeconomic variables and economic growth, identifying potential policy implications for sustainable economic development in selected African countries.

2. LITERATURE REVIEW

Economic growth theories, including classical, neoclassical, and endogenous growth models, aim to explain the drivers of economic development. These theories share similarities in their emphasis on factors such as capital accumulation, labour, and technological progress as crucial elements in promoting economic growth (Khan and Senhadji, 2003). Additionally, they acknowledge the role of knowledge and innovation in enhancing productivity and driving growth (Aghion et al.., 2009).

However, differences lie in their approaches and assumptions. Neoclassical growth theory attributes technological progress to exogenous factors (Romer, 1994), while endogenous growth theory posits that it is driven by internal factors like human capital and knowledge (Widarni and Bawono, 2021). Theories like the supply-leading and demand-following hypotheses also differ in their views on the relationship between financial development and economic growth (Loayza et al.., 2005).

Ultimately, economic growth theories aim to inform policy decisions and promote sustainable economic development. By understanding the factors that drive economic growth, policymakers can design effective policies to promote sustainable economic development and improve living standards (Armeanu et al.., 2017). The goal is to promote sustainable economic development and improve living standards.

Economic growth theories originated in developed nations, with few explorations done in developing countries, which may limit

their direct applicability due to differences in institutional contexts, factor endowments, and stages of development. Despite these limitations, these theories can still provide valuable insights if adapted to the unique challenges and opportunities of developing countries. Notable economists like (Aghion et al.., 2009; Khan and Senhadji, 2003) have emphasized the need for context-specific theories, highlighting the importance of institutional factors, human capabilities, and freedoms in promoting economic growth and development. By acknowledging these limitations and incorporating context-specific insights, policymakers can develop more effective strategies for promoting economic growth in diverse contexts.

Economic growth can be measured in several ways, including Gross Domestic Product (GDP), which represents the total value of goods and services produced within a country's borders; GDP per capita, which measures average income per person; GDP growth rate, which tracks the percentage change in GDP over time; and real GDP, which adjusts for inflation to provide a more accurate picture of economic growth. Additionally, national income and value added are also used to capture specific aspects of economic activity. These measures provide different perspectives on economic growth, each with its own strengths and limitations.

Studies on the monetary determinants of economic growth have mushroomed over the past years (Chugunov et al.., 2021; Challoumis, 2024; Zia et al.., 2025; Ozili et al..,2023; Liu et al.., 2021; Tien,2021). These studies are fueling further debates on the determinants of economic growth and how monetary and financial variable are influencing the growth narrative in different jurisdictions. A structural-functional model that emphasizes the influence of monetary and fiscal policy on aggregate demand was created by Chugunov et al.. in 2021. The findings demonstrated that general government spending had no beneficial effects on the development of GDP per capita in 19 emerging economies between 1995 and 2018. It was also discovered that monetary policy should, in the long term, provide a full set of inflation targeting requirements, as well as the flexible employment of instruments to accomplish intermediate and final goals. The complex relationship between the money cycle and its impact on taxation and economic growth was assessed by Challoumis (2024). The study also evaluated the flow of funds within a banking system and highlights the critical role that regulations play in optimizing economic potential. The study found that a more thorough comprehension of the money cycle offers important insights on promoting strong economic growth. Using an Auto Regressive Distributed Lag (ARDL) model, Zia et al.. (2025) examined the impacts of GDP, FDI, inflation, interest rates, and currency rates on Pakistan's economic growth. The results show that whereas inflation and the real interest rate have a negative and insignificant effect on economic growth, foreign direct investment (FDI) and the exchange rate have a positive and significant impact over the long term. Ozili et al.. (2023) assessed research on the relationship between financial inclusion and economic growth conducted after 2016. They found that research has not applied pertinent theories to explain how financial inclusion affects economic growth. Few studies indicate that financial inclusion has a detrimental effect on economic growth, while the majority suggest that it has a beneficial effect. Greater access to financial products and services provided by financial institutions, which boosts financial intermediation and results in positive economic growth, is the most frequent way that financial inclusion influences economic growth. Liu et al.. (2021) proposes the amount of Internet development as a threshold variable, evaluates the influence of digital financial inclusion on economic growth based on province panel data from 2011 to 2019 in China. The findings demonstrate that the growth of digital financial inclusion significantly boosts economic expansion. The development of digital financial inclusion has a substantial Internet threshold effect on economic growth. Tien (2021) looks into Vietnam's GDP growth criterion in relation to inflation. Inflation is considered to have a nonlinear connection with GDP growth. The results confirm the presence of the threshold at 6 per cent inflation point, and the detrimental impacts on GDP growth of hyperinflation beyond the threshold and too low inflation beyond the threshold. When considering inflation's overall influence on GDP growth, the results are adverse.

This paper makes a significant contribution to the existing literature on economic growth by exploring the previously under examined interactions between money supply, interest rate, and GDP growth rate as determinants of economic growth. By investigating the complex relationships between these macroeconomic variables, this study provides new insights into the dynamics of economic growth. This novel approach extends theoretical models of economic growth and offers a more comprehensive understanding of the factors driving economic expansion.

The study's focus on interaction effects between money supply, interest rate, and GDP growth rate fills a critical gap in the literature. Previous studies have largely examined these variables in isolation, neglecting the potential interactions and synergies between them. By examining these interactions, this paper provides a more nuanced understanding of the relationships between these macroeconomic variables and economic growth. The empirical evidence presented in this study sheds new light on the impact of these interactions on economic growth, contributing to a deeper understanding of the determinants of economic expansion.

The findings of this paper have important implications for policymakers and researchers. By highlighting the significance of interaction effects between money supply, interest rate, and GDP growth rate, this study informs policy decisions aimed at promoting economic growth and stability. The study's results can be used to develop more effective monetary and fiscal policies that take into account the complex relationships between these macroeconomic variables. Overall, this paper contributes to a better understanding of the determinants of economic growth and provides valuable insights for policymakers and researchers seeking to promote sustainable economic development.

3. MATERIALS AND METHODS

The study used GLS method to explore the determinants of economic growth in Africa. The method was used to address potential issues with heteroscedasticity and autocorrelation in the data, ensuring efficient and reliable estimates. GLS is particularly suitable for economic data, where variance often

varies across observations Damodar (2021). Recent studies, have also employed GLS in similar contexts, demonstrating its effectiveness in providing accurate estimates of relationships between macroeconomic variables and economic growth.

The research sample consists of 5 countries (Botswana, Namibia, South Africa, Zambia, and Zimbabwe) selected from the Southern African region, utilizing a purposive sampling technique based on data availability. The data collection technique involved gathering annual macroeconomic data from the World Economic Forum's datasets, covering a period of 15 years (2010-2024), to analyze the determinants of economic growth in these countries.

This study used a purposive sampling approach to select 5 African countries based on data availability and economic relevance. While randomization was not feasible in this context, the selected countries represented a diverse range of economic profiles and experiences. However, the findings might not be generalizable to all African countries or regions. Future research could explore the use of alternative sampling methods or expand the sample to include more countries.

This study employed the Generalized Least Squares (GLS) method and Fully Modified Ordinary Least Squares (FMOLS) technique to analyze the determinants of economic growth. GLS accounted for potential heteroscedasticity and autocorrelation in the panel data, while FMOLS addressed issues of endogeneity, serial correlation, and non-stationarity, providing robust and reliable estimates. Hypotheses were tested based on coefficient significance (t-statistics and p values), with a 5% significance level threshold. Model fit was evaluated using R-squared and diagnostic tests. FMOLS served as a robustness check to verify GLS results, consistent with recent studies (Adam and Bevan, 2005; Aliero and Olarinde, 2019; Pedroni, 2001; Phillips and Hansen, 1990).

To examine the impact of macroeconomic variables on economic growth, this study adapts and modifies the methodological framework proposed by Al-Mulali et al.. (2015), with the relationship specified in Equation 1.

$$EG_{it} = \S_1 + \S_2\, MS_{it} + \S_3\, UNE_{it} + \S_4\, INTR_{it} + \S_5\, EXR_{it} + \S_6\, MIG_{it} + \S_7\, MIG_{it}^2 + \S_8\, \varepsilon_{it} \quad (1)$$

The variables are defined as follows: EG represents Economic Growth, MS is Money Supply, UNE is the annual Unemployment Rate, INTR is the annual Interest Rate, EXR is the Exchange Rate, MIG is the Money Supply-Interest Rate Index, ε is the error term capturing random shocks, t denotes the time period, i represents the country index in the sample, and $\S_1$ up to $\S_8$ are the coefficients of respective parameters. The variables are discussed below:

3.1. Variable Description

Economic growth, measured as the percentage change in real Gross Domestic Product (GDP), represents the expansion of a country's economy (Kuznets, 1971). It is a crucial indicator of a nation's economic performance and standard of living (Armeanu et al.., 2017). Economic growth is important as it reflects the increase in production and consumption of goods and services, leading to improved living standards and reduced poverty (Dollar and Kraay, 2002). Understanding the determinants of economic growth is vital for policymakers to formulate effective strategies for sustainable development.

Money supply refers to the total amount of money circulating in an economy, including currency in circulation and bank deposits. It is typically measured using monetary aggregates such as M2. Money supply is important as it affects inflation, interest rates, and economic activity (Kremer et al.., 2013). An increase in money supply can stimulate economic growth by increasing aggregate demand, but excessive money supply can lead to inflation. Central banks use monetary policy tools to regulate money supply and achieve macroeconomic objectives.

Unemployment rate, measured as the percentage of the labour force that is unemployed and actively seeking work, reflects the underutilization of labour resources. Unemployment is important as it has significant social and economic implications, including reduced economic output, increased poverty, and decreased living standards. High unemployment rates can lead to social unrest and decreased economic growth (Agénor and Montiel, 2008). Policymakers aim to achieve full employment through fiscal and monetary policies that stimulate economic activity and job creation.

Interest rate, measured as the cost of borrowing or the return on savings, influences consumption, investment, and savings decisions (Petrakis, 2020). Interest rates are important as they affect the cost of capital, influencing investment and economic growth. Low interest rates can stimulate economic activity by increasing borrowing and spending, while high interest rates can reduce borrowing and spending, curbing inflation. Central banks use interest rates as a monetary policy tool to regulate economic activity and control inflation.

Exchange rate, measured as the price of one currency in terms of another, affects international trade and investment (Aye and Edoja, 2017; Krugman et al.., 2012). Exchange rates are important as they influence the competitiveness of a country's exports and imports. A depreciation of the exchange rate can increase exports and reduce imports, while an appreciation can have the opposite effect. Exchange rates also affect foreign investment and capital flows. Policymakers aim to maintain a stable exchange rate to promote international trade and investment.

The interaction variable, measured using the multiplicative approach, captures the combined effect of money supply, interest rate, and GDP growth rate, allowing for the examination of complex relationships and non-linear effects. This approach is suitable in this study as it provides a nuanced understanding of how these variables interact and influence each other, which is crucial for informing monetary policy design. By incorporating this interaction term, the study can better capture the contextual influence of these variables on the economy, ultimately providing more robust and policy-relevant insights.

This research utilized a balanced panel dataset from the World Economic Forum database, covering 5 African countries from 2010 to 2024. The panel data approach was chosen for its ability to capture dynamic relationships, account for individual differences, and provide more accurate estimates. The balanced structure allows for robust estimations, and the use of panel data enhances precision, improves model specification, and controls for omitted variables, offering a comprehensive understanding of the relationships being studied

4. RESULTS PRESENTATION AND ANALYSIS

This section presents the results of the study. Firstly, descriptive statistics are presented in Table 1.

The GDP growth rate data exhibits a mean of 5.969 and a median of 4.080, suggesting a growth trend with potential skewness. The standard deviation of 9.405 reveals significant variability, with growth rates ranging from -8.1 to 60.900, indicating substantial fluctuations. The data is positively skewed (4.185), indicating that the distribution has a longer tail on the right side, suggesting that the economy experiences occasional periods of rapid growth that are significantly higher than the average growth rate. This skewness implies that while most growth rates cluster around the median (4.080), there are outliers of exceptionally high growth rates that pull the mean (5.969) above the median.

The annual inflation rate data exhibits extreme variability and non-normality, with a mean of 24.812 and a median of 5.710, differing significantly due to skewness. The high standard deviation (86.912) reflects substantial fluctuations, with a wide range between the maximum (667.4) and minimum (-2.430) values. The data is positively skewed (6.016), indicating that the distribution has a long tail on the right side, suggesting that there are occasional episodes of extremely high inflation rates that significantly exceed the average inflation rate. This skewness implies that while most inflation rates are relatively low and cluster around the median (5.710), there are outliers of very high inflation rates that pull the mean (24.812) far above the median. The fat tails (kurtosis of 42.301) further indicate that extreme inflation rates, both high and low, occur more frequently than would be expected in a normal distribution.

The descriptive statistics for exchange rates reveal a large difference between the mean (65.260) and median (13.250), indicating significant skewness due to extreme values. The distribution is right-skewed (skewness =1.962), suggesting that there are occasional episodes of extremely high exchange rates that significantly exceed the average exchange rate. This skewness implies that while most exchange rates cluster around the median, there are outliers of very high exchange rates that pull the mean above the median.

The descriptive statistics for unemployment show a mean of 16.351% and median of 19.420%. The distribution is slightly negatively skewed (-0.148), indicating a minor asymmetry with a longer tail on the left side. This slight negative skewness suggests that there might be a few instances of lower-than-average unemployment rates, but the effect is not substantial.

The money supply growth rate (M3) data shows a mean of 0.582 and a median of 0.550, indicating a relatively stable growth trend. The data is slightly right-skewed (skewness =0.281), suggesting a minor asymmetry with a longer tail on the right side. This slight positive skewness implies that there might be occasional instances of slightly higher-than-average money supply growth rates.

The descriptive statistics for interest rates reveal a mean of 0.127 and a median of 0.110. The distribution is right-skewed (skewness =1.799), indicating a significant asymmetry with a longer tail on the right side. This skewness suggests that there are occasional episodes of higher-than-average interest rates that pull the mean above the median.

The MIG Index data exhibits a mean of 0.369 and a median of 0.200, indicating a positive central tendency with potential skewness. The distribution is positively skewed (2.844), suggesting a significant asymmetry with a longer tail on the right side. This skewness implies that there are occasional episodes of high MIG Index values that significantly exceed the average, indicating potential extreme events or outliers in the data.

The study employed the Pearson correlation method to test for the problem of multicollinearity, the results are in Table 2 below. The results are rounded to three decimal places.

The Pearson correlation matrix reveals relatively low multicollinearity among most variables, with coefficients below 0.8. However, the interaction term and its quadratic component exhibit high correlation (0.92), potentially leading to unstable estimates (Gujarati et al.., 2012). Despite this, the study adopts a "do nothing" approach, justified by the model's robust predictive performance and stable coefficients. This decision is supported by

Table 1: Descriptive statistics results

Statistic	GDPGR	EXR	MS	UNE	INTR	MIG
Mean	5.969	65.260	0.582	16.351	0.127	0.369
Median	4.080	13.250	0.550	19.420	0.110	0.200
Maximum	60.900	373.330	1.050	33.050	0.350	2.800
Minimum	−8.100	2.540	0.210	4.770	0.040	−0.370
Std. Dev.	9.405	124.870	0.229	7.958	0.069	0.511
Skewness	4.185	1.962	0.281	−0.148	1.799	2.844
Kurtosis	23.141	4.901	1.962	1.668	5.956	12.259
Observations	75	75	75	75	75	75

Source: Own Computations (2025)

Table 2: Results for Pearson Correlation Matrix

Variable	GDPGR	MS	INTR	UNE	EXR	MIG	MIGSQ
GDPGR	1.00						
MS	−0.13	1.00					
INTR	−0.06	−0.15	1.00				
UNE	0.092	0.521	−0.511	1.00			
EXR	0.03	−0.05	0.76	−0.466	1.00		
MIG	0.86	0.02	0.31	−0.202	0.25	1.00	
MIGSQ	0.07	0.45	0.12	0.33	0.21	0.92	1.00

Source: Own Computations (2025)

Table 3: Unit root test- ADF (Im-Peseran-Shin)

Variable	With intercept at level				At first difference				Order of integration
	t-statistics	1% Critical value	5% Critical value	P- value	t-statistics	1% Critical value	5% Critical value	P-value	I (d)
MS	−2.2699	−2.020	−1.870	0.0013***	−3.3833	−2.020	−1.870	0.0000*	I (0)
UNE	−1.2295	−2.020	−1.870	0.1128	−4.0787	−2.020	−1.870	0.0000*	I (1)
INTR	−2.4733	−2.020	−1.870	0.0124**	−3.7726	−2.020	−1.870	0.0000*	I (0)
EXR	−1.6972	−2.020	−1.870	0.2754	−3.0452	−2.020	−1.870	0.0000*	I (1)
MIG	−0.6107	−2.020	−1.870	0.3430	−2.9091	−2.020	−1.870	0.0000*	I (1)

literature suggesting that high correlations between variables may not necessarily compromise model validity when prediction is the primary goal allowing the model to maintain its predictive power.

The study's panel-based unit root tests revealed mixed stationarity results, with interest rates and money supply being stationary at level I(0) and other variables stationary after first differencing I(1). The FMOLS is suitable in this study, as it effectively handles cointegrated relationships involving variables with different integration orders (Pedroni, 2001; Baltagi et al.., 2003)

The study used Generalised Least squares method and the results are displayed in Table 4.

The results indicate that money supply has a significant negative impact on economic growth, with a coefficient of -1.0443 suggesting that a 1% increase in money supply is associated with a 1.0443% decrease in economic growth. The relationship is highly statistically significant implying that excessive money supply can hinder economic growth, potentially due to inflationary pressures or inefficient resource allocation. These findings have important implications for monetary policy, highlighting the need for careful management of money supply to promote economic growth. These results corroborate with the views of monetarists who emphasise the importance of controlling money supply to prevent economic instability but contradicts Keynesian views that advocate for expansionary monetary policies to stimulate economic growth.

The results indicate that interest rate has a significant negative impact on economic growth, with a coefficient of -4.487 suggesting that a 1% increase in interest rate is associated with a 4.487% decrease in economic growth. The relationship is highly statistically significant confirms that the coefficient is significantly different from zero. This finding implies that higher interest rates can substantially hinder economic growth, likely by increasing borrowing costs and reducing investment and consumption. These results are similar to those of Baccaro and Pontusson (2016) who found that monetary policy shocks, including interest rate changes, can have significant effects on economic activity. However, they contradict the views of Klofsten et al.. (2019) who emphasize the importance of interest rates in controlling inflation and stabilizing the economy, potentially at the cost of short-term economic growth.

The results indicate that exchange rate has a significant positive impact on economic growth, with a coefficient of 0.014 suggesting that a 1% increase in exchange rate (depreciation) is associated with a 0.014% increase in economic growth. The relationship

Table 4: GLS regression results

Variable	Coefficient	Probability
C	2.028	0.000
MS	−1.0443	0.000
UNE	−0.078	0.165
INTR	−4.487	0.000
EXR	0.014	0.000
MIG	1.405	0.000
MIGSQ	1.796	0.023

Test of parameter constancy: Chi^2 (75)=7196.47 Prob>Chi^2=0.5603. Source: Own Computations. (2025)

Table 5: FMOLS regression results

Variable	Coefficient	Probability
MS	−1.533	0.000
UNE	0.122	0.263
INTR	−3.800	0.000
EXR	0.020	0.000
MIG	14.540	0.000
MIGSQ	1.714	0.016

Source: Own Computations (2025)

is highly statistically significant confirms that the coefficient is significantly different from zero. These findings are supported by authors such as (Gala, 2007) who argue that exchange rate depreciation can promote economic growth through increased exports and competitiveness. However, they contradict the views of Hashmi and Alam (2019) who suggest that exchange rate volatility or misalignment can negatively impact economic growth, highlighting the complexity of the relationship between exchange rates and economic growth.

The results indicate that the interaction of money supply, interest rate, and GDP growth rate has a significant positive impact on economic growth, with a coefficient of 1.405 suggesting a substantial increase in economic growth resulting from the combined effects of these variables. The relationship is highly statistically significant confirms the importance of this interaction. These findings corroborate with studies such as those by Gala (2007) who found that monetary policy interactions can have significant effects on economic growth.

The results indicate that the squared component of the interaction between money supply, interest rate, and GDP growth rate has a significant positive impact on economic growth, with a coefficient of 1.796. The relationship is statistically significant confirms that the coefficient is significantly different from zero. This suggests that the interaction between these variables has a nonlinear effect on economic growth, with increasing returns to scale.

Furthermore, this nonlinear effect may imply a threshold effect, where the interaction between these variables only starts to have a significant positive impact on economic growth after reaching a certain threshold.

These findings are like those of Kremer et al.. (2013) who found nonlinear effects of monetary policy on economic growth. They also corroborate with studies by Aghion et al.. (2009) who highlighted the importance of nonlinear relationships in macroeconomic policy. However, the results contradict the views of Beck et al. (2000) who argued that the relationship between monetary policy and economic growth is linear. The findings also align with the threshold effect hypothesis proposed by Aisen and Veiga (2013) but differ from the findings of Dellink et al.. (2017) who found no evidence of threshold effects in the relationship between monetary policy and economic growth. Additionally, the results are consistent with more recent studies like those of Fourie et al. (2016) who found nonlinear effects of monetary policy interactions on economic growth.

The results also show that the parameters of the model are stable over time evidenced by the test of parameter constancy whose chi-square p value is 0.5603 above the 5 percent threshold confirming constancy of the parameters.

The robustness results in Table 5, estimated using the FMOLS technique, provide confirming evidence that supports the GLS findings in Table 3. Specifically, the FMOLS results corroborate that money supply and interest rate have a negative impact on economic growth, while exchange rate and the interaction of money supply, interest rate, and GDP growth rate have a positive influence on economic growth. The consistency of these findings across different estimation techniques increases confidence in the validity and reliability of the results, suggesting that the relationships identified in Table 1 are robust and not sensitive to the choice of estimation method. The FMOLS results thus provide additional support for the conclusions drawn from the original analysis.

5. CONCLUSION AND RECOMMENDATIONS

This study provides robust evidence on the impact of monetary policy variables on economic growth. The findings indicate that money supply and interest rate have a negative effect on economic growth, while exchange rate has a positive influence. The interaction between money supply, interest rate, and GDP growth rate has a statistically significant and positive coefficient, suggesting synergistic effects that stimulate economic growth. The quadratic term of this interaction is also positive and significant, indicating a nonlinear relationship with increasing returns to scale.

These findings have important implications for policymakers. A judicious calibration of monetary policy variables is essential to harness their collective growth-enhancing potential. Policymakers should exercise prudence in modulating money supply and interest rates to avoid deleterious effects on economic growth. A delicate balance between economic growth and price stability is necessary.

To optimize the growth-enhancing potential of monetary policy, fiscal authorities should implement complementary fiscal policies. Targeted government expenditures and tax policies can stimulate aggregate demand, foster investment, and promote economic growth. Investments in infrastructure, education, and innovation can enhance the economy's productive capacity and competitiveness.

Policymakers should consider the following recommendations: Implement a monetary policy framework that accounts for the complex interactions between money supply, interest rates, and GDP growth rate; promote macroeconomic stability by fostering a stable and predictable environment; invest in human capital and infrastructure to enhance productive capacity and competitiveness; and implement structural reforms to improve the business environment, promote investment, and drive innovation.

One of the limitations of the study is that it is based on 5 SADC and may not be generalizable to other contexts. The analysis may also overlook other potential determinants of economic growth. Future research could expand the sample size, explore additional factors, or examine longer timeframes to provide further insights. Future research endeavours could profitably explore the dynamics of economic growth in Africa by incorporating additional macroeconomic and institutional variables, such as human capital, governance quality, and external shocks. Moreover, investigating the nonlinear relationships and threshold effects of monetary policy variables on economic growth could provide valuable insights for policymakers. Extending the analysis to a broader sample of countries or employing alternative econometric techniques, such as panel vector autoregression or dynamic panel threshold models, could further elucidate the complex relationships between macroeconomic variables and economic growth, ultimately informing more effective policy interventions.

REFERENCES

Abdulai, D. N. (2023), Corruption and economic growth in Africa: The impact on development. Routledge.

Achdut, L. (2019), Private expenditures on healthcare: determinants, patterns and progressivity aspects. Israel Journal of Health Policy Research, 8(1), 87.

Adam, C.S., Bevan, D.L. (2005), Fiscal deficits and growth in developing countries. Journal of public economics, 89(4), 571-597.

Agénor, P.R., Montiel, P.J. (2008), Monetary policy analysis in a small open credit-based economy. Open Economies Review, 19(4), 423-455.

Aghion, P., Boustan, L., Hoxby, C., Vandenbussche, J. (2009), The causal impact of education on economic growth: Evidence from US. Brookings Papers on Economic Activity, 1(1), 1-73.

Aisen, A., Veiga, F.J. (2013), How does political instability affect economic growth? European Journal of Political Economy, 29, 151-167.

Aliero, H.M., Olarinde, M.O. (2019), Institutions, macroeconomic policies and economic growth in Africa: Evidence from panel data. Journal of Asian Development, 5(2), 112-132.

Al-Mulali, U., Ozturk, I., Lean, H.H. (2015), The influence of economic

growth, urbanization, trade openness, financial development, and renewable energy on pollution in Europe. Natural Hazards, 79(1), 621-644.

Armeanu, D.Ş., Vintilă, G., Gherghina, Ş.C. (2017), Does renewable energy drive sustainable economic growth? Multivariate panel data evidence for EU-28 countries. Energies, 10(3), 381.

Aye, G.C., Edoja, P.E. (2017), Effect of economic growth on CO_2 emission in developing countries: Evidence from a dynamic panel threshold model. Cogent Economics and Finance, 5(1), 1379239.

Baccaro, L., Pontusson, J. (2016), Rethinking comparative political economy: The growth model perspective. Politics and Society, 44(2), 175-207.

Baltagi, B.H., Fomby, T.B., Carter Hill, R., editors. (2001), Nonstationary Panels, Panel Cointegration, and Dynamic Panels. England: Emerald Group Publishing Limited.

Beck, T., Levine, R., Loayza, N. (2000), Finance and the Sources of Growth. Journal of financial economics, 58(1-2), 261-300.

Besley, T., Ghatak, M. (2006), Public goods and economic development. Understanding poverty, 19, 285-303.

Challoumis, C. (2024), Understanding the cycle of money-its impact on tax policy and economic growth. SSRN Electronic Journal.

Chandra, R. (2022), Endogenous Growth in Historical Perspective: From Adam smith to Paul Romer. London: Palgrave Macmillan.

Chugunov, I., Pasichnyi, M., Koroviy, V., Kaneva, T., Nikitishin, A. (2021), Fiscal and monetary policy of economic development. European Journal of Sustainable Development, 10(1), 42.

Damodar, N.G. (2021), Basic Econometrics. United States: McGraw-Hill Higher Education.

Dellink, R., Chateau, J., Lanzi, E., Magné, B. (2017), Long-term economic growth projections in the shared socioeconomic pathways. Global Environmental Change, 42, 200-214.

Dollar, D., Kraay, A. (2002), Growth is good for the poor. Journal of Economic Growth, 7(3), 195-225.

Fourie, J., Pretorius, T., Harvey, R., Henrico, V.N., Phiri, A. (2016), Nonlinear relationship between exchange rate volatility and economic growth: A South African perspective.

Gala, P. (2007), Real exchange rate levels and economic development: Theoretical analysis and econometric evidence. Cambridge Journal of Economics, 32(2), 273-288.

Gujarati, D.N., Porter, D.C., Gunasekar, S. (2012), Basic Econometrics (5e [ed.]). Chennai: McGraw hill Education (India) Private Limited.

Hashmi, R., Alam, K. (2019), Dynamic relationship among environmental regulation, innovation, CO_2 emissions, population, and economic growth in OECD countries: A panel investigation. Journal of Cleaner Production, 231, 1100-1109.

Khan, M.S., Senhadji, A.S. (2003), Financial development and economic growth: A review and new evidence. Journal of African Economies, 12(suppl_2), ii89-ii110.

Klofsten, M., Fayolle, A., Guerrero, M., Mian, S., Urbano, D., Wright, M. (2019), The entrepreneurial university as driver for economic growth and social change-Key strategic challenges. Technological Forecasting and Social Change, 141, 149-158.

Kremer, S., Bick, A., Nautz, D. (2013), Inflation and growth: New evidence from a dynamic panel threshold analysis. Empirical Economics, 44(2), 861-878.

Krugman, P.R., Obstfeld, M., Melitz, M.J. (2012), Economía internacional. Teoría y política. Pearson educación.

Kuznets, S. (1971), Economic Growth of Nations: Total Output and Production Structure. Cambridge: Harvard University Press.

Liu, Y., Luan, L., Wu, W., Zhang, Z., Hsu, Y. (2021), Can digital financial inclusion promote China's economic growth? International Review of Financial Analysis, 78, 101889.

Loayza, N., Fajnzylber, P. (2005), Economic Growth in Latin America and the Caribbean: Stylized Facts, Explanations, and Forecasts. Washington, DC: World Bank Publications.

Ozili, P.K., Ademiju, A., Rachid, S. (2023), Impact of financial inclusion on economic growth: Review of existing literature and directions for future research. International Journal of Social Economics, 50(8), 1105-1122.

Oyebowale, A.Y., Algarhi, A.S. (2020), Macroeconomic determinants of economic growth in Africa. International Review of Applied Economics, 34(6), 839-857.

Pedroni, P. (2001), Fully modified OLS for heterogeneous cointegrated panels. In Nonstationary panels, panel cointegration, and dynamic panels (pp. 93-130). Emerald Group Publishing Limited.

Petrakis, P.E. (2020), Economic and Development Policy in the Age of Low Growth Rates, Low Inflation, and Low Employment in the Greek Economy until 2019. In The New Political Economy of Greece up to 2030 (pp. 267-293). Cham: Springer International Publishing.

Phillips, P.C., Hansen, B.E. (1990), Statistical inference in instrumental variables regression with I (1) processes. The review of economic studies, 57(1), 99-125.

Romer, P. M. (1994). The origins of endogenous growth. Journal of Economic perspectives, 8(1), 3-22.

Tien, N.H. (2021), Relationship between inflation and economic growth in Vietnam. Turkish Journal of Computer and Mathematics Education, 12(14), 5134-5139.

Widarni, E.L., Bawono, S. (2021), The Impact of Combination of Human Capital and Financial Literacy in Encouraging Economic Growth in Indonesia. In: 6th International Conference of Graduate School On Sustainability (ICGSS). Vol. 121.

Zia, A., Ali, M.Z., Jamil, M.N., Mukhtar, Z., Yaqub, K.Q., Javed, K. (2025), The impact of financial monetary economic variables on economic growth. Kashf Journal of Multidisciplinary Research, 2(01), 1-18.