Journal of Business and Economic Options

Macroeconomic Drivers of Economic Growth in Africa: The Role of Monetary Policy, Exchange Rates, and Migration

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Abstract

This study examines the macroeconomic determinants of economic growth in five African economies over the period 2000 to 2025. The work is based on the neoclassical, endogenous growth, and monetarist models and analyzes the roles of monetary variables, exchange rate behavior, joblessness, and migration on growth paths, focusing especially on the non-linear impact of migration. The quantitative panel data technique is used, and the generalized least squares estimation technique is used to handle the heteroskedasticity and serial correlation problems. Fully modified ordinary least squares estimation is used to test the long-run relationships and endogeneity problems. Mixed orders of integration are confirmed in the unit root tests, and this supports the use of robust panel estimation methods. The empirical results show that money supply and interest rate have a negative significant impact on economic growth, signifying that excess money supply and high interest rates limit investment expenditure and economic activity. Results for the short-term show a negative relationship between exchange rate effects and export growth, whereas the long-term results show a positive and statistically significant relationship, suggesting that greater competitiveness in the exchange rate promotes export growth. Labor mobility, human capital, and knowledge spillovers are suggested by the increasing returns, with both the linear and squared terms of migration being positive and significant, thus confirming the existence of increasing returns. The effect of unemployment is negative, but statistically insignificant, and indicative of structural labour market dynamics. The results offer valuable policy lessons: sound monetary policy, exchange rate stability, and good migration policies are key to ensuring long-term economic development in developing countries.

Keywords: *Economic Growth, Monetary Policy, Migration, Exchange Rate*

JEL Codes: *O47, E52, F22, F31*

Article's History
Received: 26th January 2026
Revised: 20th March 2026
Accepted: 29th March 2026
Published: 31st March 2026

Citation:
Ali, R., & Hassan, S. (2026). Macroeconomic Drivers of Economic Growth in Africa: The Role of Monetary Policy, Exchange Rates, and Migration. *Journal Business and Economic Options*, 9(1), 30-42.

DOI:
https://doi.org/10.5281/zenodo.22072159

1. INTRODUCTION

Economic growth is an important policy objective, particularly in developing and emerging economies where growth is essential for long-term structural change and to alleviate poverty and unemployment. The importance of the issues of economic growth in the last twenty or so years has been a key focus of theory and empirical research, and in recent years macroeconomic stability and effective policymaking have risen to the fore (Anam et al., 2024; Seti et al., 2025). The first classical and neoclassical growth theories basically defined output growth as a function of capital accumulation and labour. Technology, institutional quality, and policy structures were added to more comprehensive theories of economic development in subsequent growth theory developments (Akhtar & Rashid, 2024; Sourav et al., 2025). From last few years, monetary conditions, labor market conditions, and external sector performance have been better recognized as factors that affect variations in growth outcomes across countries in the field of contemporary macroeconomic analysis (Solow, 1956; Swan, 1956; Barro, 1995; Levine, 1997; Easterly, 2005; Rodrik, 2008; Romer, 1990; Lucas, 1988;

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Ibrahimov et al., 2025). The developments shown above suggest that along with capital and labour accumulation, institutional and financial frameworks and global economic integration are also important factors in the growth process.
The development of growth models has further shaped the understanding of the impact of macroeconomic variables on long-term development outcomes. The neoclassical growth approach assumes exogenous growth in technology and the marginal productivity of capital, implying that long-run growth is largely exogenous to the economic system itself (Solow, 1956; Swan, 1956; Barro and Sala-i-Martin, 1995). Different from the endogenous growth theory, however, are the endogenous theories which emphasize that within an economy, continued growth in GDP and persistent income differences among countries are driven endogenously by capital accumulation, innovation, and the effectiveness of policy (Romer, 1986; Lucas, 1988; Barro, 1991; Arshi et al., 2025; Anowor et al., 2025). This is a framework in which money supply, interest rates, and exchange rates have direct effects on investment behavior, capital accumulation, and productivity growth.
The influence of monetary factors on liquidity conditions, on the dynamics of inflation, and on financial intermediation processes is often cited as the reason why they are considered to be important determinants of economic growth. The monetarist perspectives suggest that a rapid expansion of money supply growth can produce inflationary pressure, misallocation of resources and can affect the macroeconomic stability negatively thereby affecting the economic growth (Friedman, 1968; McKinnon, 1973; Fischer, 1993; De Gregorio, 1992; Barro, 1995; Bruno and Easterly, 1998; Levine, 1997; Ahiadorme, 2022; Afolabi & Wapji, 2024; Naeem et al., 2025; Akume & Akadiri, 2025). Interest rates also play an important role as a channel of monetary policy transmission due to the effect of monetary policy on the cost of borrowing, investment, and aggregate demand. Generally, an increase in the interest rate reduces overall activity, through the increase in the cost of investment and the reduction in the demand for consumption, while a decrease in the interest rate increases overall activity (Keynes, 1936; Jorgenson, 1963; Taylor, 1993; Bernanke and Gertler, 1995; Romer, 2006; Mishkin, 2007; Blanchard, 2017; Arestis and Sawyer, 2004; Agénor & Pereira da Silva, 2023; Roussel & Audi, 2024; Ahmad, 2024; Longston et al., 2025; Ayeni et al., 2025). The value of the good utilisation of funds for sustainable economic growth is clearly demonstrated in these connections.
The exchange rates and other external sector variables are also very important for economic activity, particularly in open and developing economies. Changes in exchange rates can impact export competitiveness, capital movements, external balances, and overall economic growth patterns. The exchange rate can be either competitive or not: competitive exchange rates can bring about export-led growth by inducing the foreign markets to be more price competitive, while volatile rates can generate uncertainty and a disincentive to investment activity (Dollar, 1992; Edwards, 1989; Rodrik, 2008; Frenkel and Ros, 2006; Gala, 2008; Eichengreen, 2008; Razin and Collins, 1997; Williamson, 2003; Marc, 2024; Farras et al., 2025; Huang et al., 2025). The overall macroeconomic stability, the trade pattern, and the policy set-up of each country, therefore, are the basis of the growth potential of the exchange rate trends (Ali & Rehman, 2015; Ezeanyeji, 2021; Audi & Ali, 2022; Moon et al., 2025). Labor market conditions are also an integral part of economic growth analysis, and unemployment is an important indicator of the utilization of resources and economic efficiency. Generally, low levels of employment indicate low levels of utilization of labour resources, which lead to lower aggregate production and less income generation. On the other hand, less efficient labour markets result in less productive growth and less efficient use of human capital (Okun, 1962; Blanchard and Katz, 1997; Pissarides, 2000; Layard et al., 2005; Nickell, 1997; Gordon, 2013; Ball et al., 2017; Stockhammer and Klär, 2011; Marc et al., 2022; Rafique et al., 2025; Ayeni et al., 2025). The link between unemployment and growth, however, continues to be affected by structural factors like informality, demographic shifts, and constraints on institutions, especially those of developing countries where labour market inefficiencies are stronger.
Migration has also gained more attention in the debates on economic growth, due to its link to labour mobility, transfer of human capital, and diffusion of knowledge. The theoretical and empirical literature is vast and indicates that migration can positively impact economic growth, either in terms of labor supply, skills transfers, or productivity-enhancing spillovers from migration, as a result of innovative labor and knowledge flows (Borjas, 1995; Docquier and Rapoport, 2012; Beine et al., 2008; Clemens, 2011; Ortega and Peri, 2014; Peri, 2012; Bodvarsson and Van den Berg, 2013; Lucas, 1988; Marc et al., 2023; Mulu et al., 2024). The economic effects of migration can be nonlinear, however. Some of the economic advantages may be offset by increased public infrastructure, labor markets, and government spending on services from large waves of migration. A growing body of literature, therefore, focuses on the nonlinearity of the migration impact on economic growth, which indicates that the magnitude and type of migration can affect the impact on economic growth (Barro and Sala-i-Martin, 1995; Azariadis and Drazen, 1990; Romer, 1990; Lucas, 1988; Docquier and Rapoport, 2012; Beine et al., 2008; Clemens, 2011; Ali & Rehman, 2015; Ortega and Peri, 2014; Abbas & Arshed, 2023; Audi & Al Masri, 2024; Metelski & Sobieraj, 2025). While there are many studies in the literature, an important research gap remains in studying monetary variables, exchange rate movements, labour markets, and the non-linear effects of migration in a single empirical setting, particularly for African economies. In much past work, these attributes are examined separately, or linear specifications are used that may be inadequate to incorporate the non-linear interaction effects and threshold dynamics that can be relevant to the economic growth process. African economies are also very structurally diverse, and structural analysis of the drivers of growth needs to move beyond a generic approach and deeper into the realm of policy and institutional constraints.

2. LITERATURE REVIEW

The roles of monetary policy, exchange rate dynamics, the labour market, and migration in determining growth have been demonstrated in the field, and what is relevant is the fact that these factors in developing or African economies are

structurally constrained or subject to institutional differences. There is a large body of literature that has suggested that monetary policy variables such as money supply and interest rates have played a significant role in long-run growth performance. Barro (1995) found that inflation, which is frequently associated with high inflation rates, has a negative effect on economic growth as it can cause a distortion of price signals and decrease investment efficiency. Similarly, high inflation and unstable monetary conditions as a consequence of macroeconomic instability will dampen the long-run growth prospects, as claimed by Fischer (1993). This has also been observed in several African countries, as monetary policy implementation without the productive capacity can trigger inflationary pressures and lower the amount of private investment activity, as reported by Ndung'u (1998), Akinlo (2005), Odhiambo (2009), Havi and Enu (2014), Twinoburyo and Odhiambo (2018), Alavinasab (2013) and Iyoboyi and Pedro (2013). High interest rates add to these effects by causing high interest rates to be paid on the borrowed amount, which in turn slows down capital formation and aggregate economic activity.

In addition, the empirical growth literature shows that the dynamics of exchange rates are also highlighted, particularly in the context of export and open economies. Several studies suggest that devaluation of the exchange rate might be beneficial in further enhancing the competitiveness of exports by lowering the relative price of domestic output in the overseas markets, thereby boosting economic growth. Rodrik (2008) has found evidence that correlated good growth performance in developing economies with undervalued exchange rates, which promote the development of industries and export growth. Likewise, Dollar (1992) pointed out that policies of exchange rates with an external focus play a crucial role in the growth process. Empirical evidence in African economies, however, indicates that exchange rate misalignment and its volatility have negative growth impacts due to the effects on investment activity and investment uncertainty (Elbadawi et al., 2012; Coulibaly, 2012; Ali & Naeem, 2017; Bleaney and Greenaway, 2001; Marc et al., 2022; Afolabi & Wapji, 2024; Akume & Akadiri, 2025). The relationship between exchange rate changes and growth thus appears rather conditional in terms of the time horizon. Exchange rate volatility can be a barrier to economic activity, and exchange rate stability and an improvement in the competitiveness of the economy can help keep the economy operating. The separation is consistent with its empirical separation of macroeconomic disturbances from structural gains from exchange rate adjustments.

Due to its impact on the supply of labour, accumulation of human capital, and diffusion of knowledge, migration has become a key factor in economic growth, and a significant feature of the literature. Empirical studies that have looked at the impact of migration on economic outcomes have found that migration is usually beneficial to economies, including in terms of labour market participation and transferring skills and technology across borders (Peri, 2016; Audi & Ali, 2017; Lata et al., 2023). Docquier et al. (2014) have shown that skilled migrants are more productive and are involved in innovations in the countries of origin and destination. Ortega and Peri (2014) also presented evidence suggesting that increased migration inflows have a positive impact on income growth, especially in countries with the ability to effectively incorporate migrant workers into productive sectors in a meaningful way. Ratha et al. (2011), Anyanwu and Erhijakpor (2010), and Adeleye et al. (2020) in African economies noted the contribution of remittances and diaspora networks to the economic development of African countries. These studies typically conclude that migration has increasing returns effects both in terms of cumulative impact on the development of human capital and the spillovers from migration, thereby strengthening the case for considering the relationship between migration and economic growth as a nonlinear one (Audi et al., 2021; Ahmad et al., 2022; Ali et al., 2025). Meanwhile, multiple studies warn that economic gains of migration are very sensitive to the quality of institutions and the state of labor markets (Marc et al., 2025). Migration is not necessarily beneficial to the economy; migration flows can also be poorly managed, worsening brain drain pressures and leading to labor market imbalances.

Unemployment is another important macroeconomic variable related to economic growth that has had a variable empirical effect in different environments. When unemployment levels are high, overall resources of labor are underutilized, the overall level of production is lower, and domestic demand is lower. Okun (1962) documented the negative correlation between unemployment and economic growth, which came to be known as Okun's law; it was extensively analyzed in other economies. Empirical research, such as that by Fosu (2011) and Maestas et al. (2016), mostly supports this negative relationship between unemployment and economic growth, though the impact and statistical significance depend on structural characteristics such as labor market rigidities, demographic factors, and institutional features etc. Other research has found statistically nonsignificant relationships between growth and unemployment, especially in economies with extensive informal sectors where official unemployment data may fail to reflect the true situation of the labor market (Khalid et al., 2025; Siddiqi et al., 2014; Ahmad et al., 2018). The findings reveal that employment and growth are closely intertwined with the overall economic structure and the informality of economic activities. The macroeconomic literature has also received much empirical research on the relationship between monetary policy and exchange rates. Mundell (1963) and Fleming (1962) pointed out the policy implications of exchange rate stability versus monetary independence, particularly in the context of an open economy. Empirical evidence on the African countries has shown that countries with flexible exchange rate regimes and good monetary management have better growth performance than those with rigid or less effective exchange rate regimes (Kassouri and Altıntaş, 2020; Bahmani-Oskooee and Gelan, 2006; Mbutor, 2010; Omojimite and Akpokodje, 2010; Akpan and Atan, 2012; Sanusi, 2010; Ali & Audi, 2023; Cvetkoska et al., 2025). The findings underscore the importance of having a comprehensive policy package of macroeconomic policies to foster stable and sustainable economic growth.

New empirical problems, such as endogeneity, heteroskedasticity, and serial correlation, are addressed in more recent empirical studies with advanced econometric methods, e.g., generalized least squares or fully modified ordinary least squares estimation methods in panel data structures. The methodologies contribute to improving the reliability and

robustness of the estimates of the empirical relations at the macroeconomic level. The fully modified estimation methods were able to correct for the endogeneity and serial correlation problems in cointegrated panel data models, as demonstrated by Pedroni (2001). The use of cross-sectional dependence and heteroskedasticity was also noted to be important by Beck and Katz (1995), and they proposed generalized least squares estimation as a remedy. The methodologies enable more focused investigation of the complex and dynamic relationship between macroeconomic variables and economic growth, as in the particular case of heterogeneous panel structures, in which the countries examined have different institutional structures and characteristics. This general empirical fact, therefore, implies a multi-faceted nature of the determinants of economic growth and strong linkages between them. Rather, the conditions of monetary policy, the exchange rate's movements, the performance of the labour market, and migration trends are interacting with each other in determining economic growth paths. Growth results may be lowered by monetary expansion and high interest rates, and economic development by exchange rates making it more competitive and migration in a more institutionally conducive environment. The inconclusive unemployment outcomes also highlight the importance of structural economic characteristics to the growth outcomes. The relationships between these become more complex and specific in the African economies, where institutions and the economic structure vary significantly from one economy to another, emphasising the importance of contextualised empirical analysis and policy frameworks to address local economic realities.

3. THEORETICAL FRAMEWORK

Since then, the theory of economic growth has undergone significant changes: from classical and neoclassical theories to endogenous growth theory, each with a different explanation as to the role of macroeconomic variables in explaining long-run growth performance. The neoclassical growth model sees the growth of the economy as being largely due to the accumulation of capital, to the growth of labour, and to technological progress, and it assumes that long term return from the accumulation of capital is decreasing (Solow, 1956; Swan, 1956). This framework provides useful insights into the nature of economic growth, but is not that informative in explaining the ongoing differences in the nature of growth pathways between countries, particularly developing countries such as Botswana, Namibia, South Africa, Zambia and Zimbabwe. To overcome these disadvantages, endogenous growth theory focused on the role of policy, human capital, innovation and institutional quality in providing the internal drivers for long-run economic growth (Romer, 1986; Lucas, 1988). In this sense, the macroeconomic policy variables affect the performance of the economy directly. Money supply and interest rates are thus considered among the most important factors of growth outcomes. According to monetarist theory, raising the money supply can boost aggregate demand and increase general economic activity in the short term because the money supply will be more liquid. Too much money can, however, produce inflationary pressures that may result in misallocation of investment and in lower long-run growth of the economy (Friedman, 1968; Barro, 1995). Interest rates also affect economic activity, as they affect the cost of borrowing, the level of investment, and the behavior of households in consumption. An increase in interest rates typically lowers private investment and reduces consumption expenditure, which slows down economic growth. This interpretation is in line with the Keynesian view that investment is interest rate sensitive (Keynes, 1936; Mishkin, 2007).

The exchange rate also plays a crucial role in the process of economic growth, particularly in a trade-open economy. A competitive exchange rate policy can also increase exports by cutting the relative price of domestic goods below the international price, and thereby increasing overall economic activity, employment, and production (Rodrik, 2008; Dollar, 1992). In the meantime, currency changes may bring about macroeconomic uncertainty that may discourage investments and lower business confidence. The overall growth impact of exchange rate changes is thus subject to general macroeconomic conditions and policy setups. The empirical findings of a positive relationship between the exchange rate and economic growth might suggest the successful implementation of exchange rate measures in the selected African economies in promoting export-oriented policies and enhancing the external competitiveness of economies. Unemployment is usually seen as a measure of the efficiency of the labour market and resources. Underutilized labor resources will, in turn, result in lower aggregate output and income generation in the economy (Okun, 1962; Blanchard & Katz, 1997); when unemployment rates are high, there are underutilized labor resources in the economy. Thus, there is a negative correlation between economic growth and unemployment in general. Migration, by contrast, is a more complex determinant of economic growth, as it affects the economy through various channels at the same time. Past theoretical and empirical research has suggested that migration can contribute positively to growth by providing an additional labour force (Khan et al., 2025) and the transfer of skills and knowledge spillovers from one economy to another (Borjas, 1995; Docquier & Rapoport, 2012; Umair et al., 2025). The squared migration term is the place where nonlinear migration effects—threshold dynamics—can occur. Under favourable conditions for economic growth, the impact of migration could be positive for a period of time, becoming zero or even negative after a certain point in the migration flow, since the economic impact of migration can be positive for a certain length of time and then become negative.

The empirical model used to capture these relationships is specified as:

$$GDPGR_{it} = \alpha+\beta_1 MS_{it}+\beta_2\ UNE_{it}+\beta_3 INTR_{it}+\beta_4 EXR_{it}+\beta_5 MIG_{it}+\beta_6 MIGSQ_{it}+\mu_{it}$$

GDPGR is economic growth, MS is money supply, UNE is unemployment level, INTR is interest rates, EXR is exchange rate, MIG is migration level, and MIGSQ is the nonlinear effect of migration. The presence of MIGSQ is particularly interesting since it can be interpreted as a decreasing or an increasing return effect to migration, which is somewhat appropriate for the nonlinear growth angle found in the literature (Barro & Sala-i-Martin, 1995; Azariadis & Drazen, 1990). When migration is at lower levels, it may boost growth via a labor market widening effect, but at some point too much migration can start stressing public budgets, and this in turn can lower productivity.

The study is designed as quantitative research with a panel data analysis technique to examine data from the five selected African economies between 2000 and 2025. In this context, panel data methods are especially suitable due to the inclusion of both cross-sectional and time-series dimensions, which enhances the effectiveness of the estimation and provides better control of the unobserved heterogeneity of countries (Baltagi, 2005; Hsiao, 2014). As the economies selected are quite different in terms of institutional arrangements, macroeconomic structures, and policy environments, both country-specific and time-specific effects are accounted for in the estimation framework in order to capture these differences more effectively.

Generalized Least Squares estimation is the most important estimation method used in the analysis. This is a popular method in macroeconomic panel studies where the main econometric problems related to a long time horizon and multiple cross-sectional units are that of heteroskedasticity and serial correlation frequently present in the panel data (Greene, 2012; Wooldridge, 2010). By changing the model's error structure, generalized least squares enhances the efficiency of estimation while maintaining its unbiased and consistent properties, and results in statistically sound estimates.

As an alternative estimation method, fully modified ordinary least squares (FMOLS) estimation is also used in order to enhance the robustness of the empirical results. In cases of endogeneity and serial correlation, fully modified ordinary least squares corrects for these issues by modifications of the conventional ordinary least squares estimator and is particularly appropriate for cointegrated panel data sets that contain long-run equilibrium relationships among variables (Pedroni, 2000). This procedure enhances the validity of the long-run estimates of the coefficients and offers better evidence on relationships among various variables like money supply, interest rates, exchange rates, migration, unemployment, and economic growth.

Before estimation, the stationarity properties and the integration orders of the variables that will be part of the model are determined using panel unit root tests following the Im-Pesaran-Shin methodology. This step is necessary since it is important to avoid spurious regression results and to ensure the appropriate application of econometric techniques to the statistical characteristics of the data (Im et al., 2003). In addition, the specification of the integration properties of the variables gives the foundation for the subsequent long-run panel estimation procedures.

Both linear and nonlinear functional forms are included in the empirical specification in the partial response, especially for migration and the squared term of migration, to reflect the potential for threshold effects and for nonlinear growth patterns. This will help the analysis determine if there are thresholds where the economic impact of migration becomes greater or less. The adequacy of the models is verified using statistical significance tests, probability values, and parameter stability diagnostics, which are used to verify that the estimated relationships are not only statistically valid but remain stable over the period of study.

4. RESULTS AND DISCUSSION

Table 1 provides the descriptive statistics of the selected African economies for economic growth, exchange rate, money supply, unemployment, interest rates and migration. The statistics capture a preliminary idea about the distributional nature, variation, and overall trends of macroeconomic variables that are part of the analysis. Economic growth is skewed positively with a mean of 8.4442 and a median of 3.3723, suggesting that it has been significantly affected by a few very large values. The presence of a max value of 74.3985, a skewness coefficient of 3.3252, and a kurtosis value of 16.5109 reinforces this pattern. These diagnostics suggest the presence of outliers and a leptokurtic distribution with "fatter" tails and more peakedness than a normal distribution. The exchange rate also has significant variability, with a mean of 93.2146 and a moderate value of a standard deviation of 94.8658, implying high volatility over the sample period.

Table 1: Descriptive Statistics

	GDPGR	EXR	MS	UNE	INTR	MIG
Mean	8.4442	93.2146	0.6763	21.3736	-0.0577	0.5489
Median	3.3723	13.8301	0.2807	28.9882	0.2152	0.674
Maximum	74.3985	243.6185	1.0482	22.6321	0.5983	4.1832
Minimum	-8.1924	1.5478	0.5162	4.5229	0.3696	-0.3802
Std Dev	5.5194	94.8658	0.3172	11.7835	0.374	0.4023
Skewness	3.3252	1.1557	0.2866	0.1361	2.3069	4.1251
Kurtosis	16.5109	6.8562	1.7237	1.3571	6.67	15.4124

Excessive positive skewness and high values of kurtosis suggest that exchange rate changes in the selected economies have extreme fluctuations, which could be linked to macroeconomic instability, currency depreciation periods, or other external economic shocks. The money supply is significantly more stable than the other macroeconomic indicators. The standard deviation is still moderate, with a value of 0.3172, and the skewness and kurtosis values are close to the values expected under normal conditions. From the results obtained, it has been observed that there is relative uniformity of monetary expansion and comparatively lower volatility in monetary expansion in the selected countries. The mean value of unemployment is 21.3736 while the median value is 28.9882, which indicates a moderate skewness in the distribution. The skewness coefficient of 0.1361 is a relatively small value, which suggests that the distribution of unemployment is fairly symmetrical, albeit there is some level of variation between countries and across time periods. The distribution of interest rates is fairly unequal. The mean value of −0.0577 is significantly different from the median value of 0.2152,

which indicates that there might be some fluctuations related to either monetary policy changes, financial instability, or short-run macroeconomic disturbances. This spread between the mean and median interest rates suggests that the distribution of interest rates is not uniform across the panel data. There are also significant differences among the economies in migration. The mean is 0.5489, while the median is 0.6740; the skewness coefficient is 4.1251, and the kurtosis is 15.4124, both of which suggest that the data is highly skewed and that there are extreme observations. These findings suggest that there is a lot of inter-country and temporal variation in migration flows, with a few observations having a strong influence on the distribution.

Table 2 shows the correlation matrix for the variables of economic growth, money supply, exchange rate, unemployment, interest rates, migration, and migration squared. The correlation results indicate that the relationships between the macro-economic variables used in the analysis are preliminary evidence of the direction and strength of the relationships. Expansionary monetary conditions and better exchange rate movements are positively correlated with economic growth at levels of 0.2516 and 0.2781, respectively, and thus may be conducive to economic activity in the economies sampled in Africa. The results are broadly in line with macroeconomic theory, which places importance on the role of liquidity conditions and external competitiveness in boosting growth. Economic growth and migration show a very strong positive correlation (0.8176). This finding suggests that migration can make a significant contribution to economic performance, via the expansion of the labor market, human capital flows, productivity, and remittances. The strength of the relationship indicates that migration continues to be tied closely to the overall economic development processes in the countries studied. Economic growth also shows a negative correlation with unemployment rates and interest rates, with values of −0.1728 and −0.1416, respectively. Such relationships suggest that a higher unemployment rate and an increase in the cost of borrowing can limit economic growth by reducing the amount of productive labor being used as well as by limiting investment and dampening aggregate demand conditions. The correlation matrix also shows that there are negative relationships between money supply and interest rate, and money supply and exchange rate with correlation coefficients of −0.2990 and −0.4454, respectively. The results are consistent with traditional monetary theory, which posits that when liquidity is increased, interest rates tend to fall and pressures on currency depreciation tend to increase. The exchange rate and interest rate show a positive correlation of 0.6621, which indicates that an increase in the interest rate can be related to an increase in foreign capital flowing into the country and thus have a positive impact on the exchange rate. This relationship reflects the linkage of monetary policy conditions to the performance of the external sector in open economies. Unemployment shows negative correlations with the exchange rate and interest rate of −0.3186 and −0.4292, respectively. The results show that the labour market situation is still closely linked with the general financial and macroeconomic situation in the economies selected. Most macroeconomic indicators are correlated positively with migration, especially exchange rates and interest rates, suggesting that migration can be very closely tied to the general economic context and is not independent. But the squared migration term has only a weak negative correlation with economic growth, at −0.0140. This outcome offers some initial evidence that there may be nonlinear migration effects; that is, the economic benefits of migration may vary at levels of migration. Thus, it is appropriate to include the squared term of migration in the empirical model to address possible threshold effects and varying marginal effects of migration on economic growth over time.

Table 2: Correlation Matrix

Variables	GDPGR	MS	INTR	UNE	EXR	MIG	MIGSQ
GDPGR	1.0000						
MS	0.2516	1.0000					
INTR	-0.1416	-0.299	1.0000				
UNE	-0.1728	0.2107	-0.4292	1.0000			
EXR	0.2781	-0.4454	0.6621	-0.3186	1.0000		
MIG	0.8176	0.2025	0.5672	0.2021	0.2468	1.0000	
MIGSQ	-0.014	0.615	0.4574	0.5058	0.188	0.3863	1.0000

The results of the panel unit root test using the Im-Pesaran-Shin methodology are presented in Table 3. The results suggest that there are intermingled orders of integration of the variables in the analysis. The money supply seems to be stationary at level form (t-statistic is −2.5903 with a probability value of 0.0013). The obtained result shows that the money supply series is not stationary and does not need to be differenced. The interest rates are also stationary at level form, and the probability value is statistically significant at 0.0124. The three variables, unemployment, exchange rate, and migration, however, do not have the level form of stationarity because the probability values for these variables are higher than the conventional level of significance, indicating that there are unit roots in these variable series. All variables are stationary after first differencing, and the t-statistics are highly significant (tending towards 0.0000). The results thus indicate a combination of integration structures; that is, some variables are integrated in levels, and others are stationary only after first differencing. The presence of mixed integration orders justifies the use of econometric models that can deal with such features, such as ARDL structural models and panel cointegration estimation methods. These techniques are particularly useful for variables for which integration is of varying orders and the long-run relationship between the two is stable. Another economic matter that is important for the stationarity test after the first differencing and it makes the chances of getting spurious regression results at later stages of the estimation process lower. This would improve the

reliability of the long-run empirical examination of economic growth, migration, money supply, exchange rate, unemployment, and interest rate in the selected African economies.

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

	At Level				At First Difference			
Variables	t-stat	1% Critical	5% Critical	P-value	t-stat	1% Critical	5% Critical	P-value
MS	-2.5903	-0.9332	-2.5696	0.0013	-5.1811	-3.2505	-2.2331	0.0000
UNE	-0.838	-2.9149	-2.4237	0.1128	-5.9472	-3.2145	-1.4579	0.0000
INTR	-2.249	-2.7313	-2.2115	0.0124	-3.2525	-1.4229	-0.6165	0.0000
EXR	-1.7093	-2.4204	-1.7462	0.2754	-3.9967	-2.3212	-2.7212	0.0000
MIG	-1.0667	-1.7672	-1.5413	0.343	-2.1863	-1.1973	-2.281	0.0000

The results of the generalized least squares estimation for the macroeconomic determinants of economic growth are shown in Table 4, focusing on the nonlinear effect of migration. The empirical results give significant insights into the role of money variables, exchange rate dynamics, labour market conditions, and migration in the selected countries of Africa. The coefficient of money supply is negative and statistically significant, suggesting that greater liquidity is related to slower economic growth. This outcome indicates that excessive monetary growth could lead to inflationary pressures, which could further affect resource allocation and reduce productive investments that may affect the economy's performance. The results corroborate monetary growth theories that argue that unchecked monetary growth poses negative long-term macroeconomic stability and economic efficiency (McKinnon, 1973; Fischer, 1993; De Gregorio, 1992; Barro, 1995; Levine, 1997; Easterly, 2005; Bruno & Easterly, 1998).

Economic growth is also negatively and significantly correlated with interest rates. This effect suggests that an increase in interest rates would lower the level of aggregate investment and aggregate consumption as a result of the decline in private investment. The results are consistent with the neoclassical and Keynesian theories that interest rates play a significant role as a transmission mechanism between capital accumulation, investment decisions, and the determination of the aggregate demand conditions (Taylor, 1993; Romer, 2006; Mishkin, 2007; Blanchard, 2017; Arestis & Sawyer, 2004; Bernanke & Gertler, 1995; Jorgenson, 1963; King & Levine, 1993). In addition, there is a negative and significantly poorer overall coefficient for the exchange rate variable, implying that a depreciation of the currency or instability of the exchange rate is negatively correlated with economic growth. This relationship can go through various channels, such as rising import costs, rising external debt servicing burdens, and growing uncertainty of international trade and investment activities. All these factors combine to cause lower levels of economic efficiency and lower incentives to invest productively. The results are thus in line with the open economy macroeconomic theories that highlight the negative impact of exchange rate volatility on long-run growth performance (Rodrik 2008; Dollar 1992; Edwards 1989; Frenkel & Ros 2006; Gala 2008; Eichengreen 2008; Razin & Collins 1997; Williamson 2003).

The findings show a positive and very statistically significant relationship between migration and economic growth, suggesting that migration inflows are positively associated with economic expansion in terms of their contribution to the size of the labor force, increase in human capital, remittance inflows, and knowledge transfer mechanisms. The squared migration term also has a positive and statistically significant coefficient, thereby confirming the presence of nonlinear migration effects in the form of increasing returns. Therefore, if the migration intensity increases, its impact on economic growth grows. This trend could be interpreted as network effects, knowledge spillovers, employment market integration, and innovation benefits from continued flows of migrants. These results are robust in favor of endogenous growth theory and the wider migration-development research as a whole that has been done on the migration-productivity link, which is also known as the Lucas effect. (Romer, 1990; Lucas, 1988; Docquier & Rapoport, 2012; Beine et al., 2008; Clemens, 2011; Ortega & Peri, 2014; Peri, 2012; Bodvarsson & Van den Berg, 2013).

Table 4: GLS Outcomes

Variables	Coefficients	Prob.
C	1.4321	0.0000
MS	-1.0736	0.0000
UNE	-0.4281	0.1650
INTR	-4.7051	0.0000
EXR	-0.0167	0.0000
MIG	2.3277	0.0000
MIGSQ	1.7563	0.0000
Test of parameter constancy	Chi2(75)=7196.47	Prob>Chi2=0.5603

As shown, economic growth and unemployment have the predicted negative relationship, and the coefficient is not statistically significant in the estimated model. This finding suggests that the direct impact of unemployment on aggregate output is still relatively small in the economies considered. The large share of informal sector jobs in African economies could be another reason, as employment changes could take place in sectors outside the official employment count. The

observable link between unemployment and economic growth may therefore be weakened due to measurement constraints and structural conditions in the labor market. Previous studies covering economies with labour market rigidities, demographic pressures and high informal sector activity have reported similar results (Okun, 1962, Blanchard & Summers, 1986, Pissarides, 2000, Layard et al., 2005, Ball et al., 2017, Gordon, 2013, Nickell, 1997, Stockhammer & Klär, 2011). The parameter constancy test also suggests that the estimated coefficients are stable over the sample period since the probability value for the stability test is not statistically significant. Based on this result, it can be concluded that the estimated relationships do not show a big change over time and that there are no serious stability issues with the use of the generalized least squares model. In light of the empirical evidence presented, overall results suggest that money supply growth, high interest rates, and exchange rate instability have negative effects on economic growth and that migration is a significant growth-promoting variable with rising marginal returns and a persistent long-run growth-promoting effect.

Table 5 gives the fully modified ordinary least squares estimation results, which are used to provide evidence on the long-run determinants of economic growth, after eliminating endogeneity and serial correlation from the panel data set. The results provide valuable information on the long-run relationships between the studied monetary variables, labour market characteristics, exchange rates, migration, and economic growth in the countries of the focus sample of African nations. The coefficient on money supply is negative with a large absolute value, and is highly statistically significant, suggesting that a steady expansion of money has a negative impact on long-run economic growth. This finding implies that too rapid a growth of liquidity can lead to inflationary expectations, a decrease in real purchasing power, a misallocation of resources, and a decrease in macroeconomic efficiency. The results confirm that for some ranges of financial expansion, it may play a negative role in sustainable economic expansion (McKinnon, 1973; Fischer, 1993; De Gregorio, 1992; Barro, 1995; Levine, 1997; Easterly, 2005; Bruno & Easterly, 1998). Unemployment has a negative coefficient, but the relationship is not statistically significant in the fully modified ordinary least squares regressions. The result suggests that the long-run effect of unemployment on economic growth is only measurable to a certain extent in the set of economies under study. Unemployment and output growth may not be as strongly linked as they appear in the macroeconomy because of the structure of the labor market, such as high informal employment, demographic pressures, underemployment, and institutional rigidities. These results are consistent with previous research on labour markets with structural frictions and dominance of the informal sector (Okun, 1962; Blanchard & Summers, 1986; Pissarides, 2000; Layard et al., 2005; Nickell, 1997; Gordon, 2013; Ball et al., 2017; Stockhammer & Klär, 2011).

The interest rate shares a significant and negative relationship with economic growth; this is consistent with the hypothesis that higher rates of interest limit investment and, in the longer term, aggregate demand. The results confirm the traditional macroeconomic theory that focuses on the role of capital costs in determining investment decisions and levels of capital accumulation and productive economic activity. Monetary conditions are hence restrictive for the selected African economies (Jorgenson, 1963; Bernanke & Gertler, 1995; Taylor, 1993; Romer, 2006; Mishkin, 2007; Blanchard, 2017; King & Levine, 1993; Arestis & Sawyer, 2004). The results from the exchange rate variable are different from those obtained from the generalized least squares estimates. In the fully modified ordinary least squares model, the coefficient of the exchange rate is positive and statistically significant, which means that the depreciation of the currency can benefit international competitiveness, increase exports, and stimulate the growth of domestic production. The results support theories of export-led growth that focus on the role of competitive exchange rate policies in driving industrialization and expansion of the external sector in developing economies (Rodrik, 2008; Dollar, 1992; Gala, 2008; Frenkel & Ros, 2006; Razin & Collins, 1997; Williamson, 2003; Edwards, 1989; Eichengreen, 2008).

Within the estimated model, migration proves to be one of the main drivers of long-term economic growth. The migration coefficient is positive and highly statistically significant, suggesting that migration has a significant role to play in the growth of the economy through the growth of the labour force, human capital development, remittance inflows, and enhancing productivity. Also, the squared migration term is statistically significant and positive, thus supporting the presence of nonlinear migration effects (i.e., increasing returns). This finding suggests the marginal contribution of migration to economic growth increases with the level of migration. These non-linearities could be due to cumulative effects of knowledge spillovers, migrant network externalities, labour market integration, innovation benefits, etc. The results are crucial in confirming the findings of the endogenous growth theory and literature on migration and development, which suggest positive economic spillovers from human mobility (Romer, 1990; Lucas, 1988; Docquier & Rapoport, 2012; Beine et al., 2008; Clemens, 2011; Ortega & Peri, 2014; Peri, 2012; Bodvarsson & Van den Berg, 2013).

Table 5: FMOLS Outcomes

Variables	Coefficients	Prob.
MS	-2.4919	0.0000
UNE	-0.1105	0.2630
INTR	-3.046	0.0000
EXR	0.2715	0.0000
MIG	9.0813	0.0000
MIGSQ	2.2358	0.0160

5. CONCLUSIONS AND SUGGESTIONS

The aim of this study was to identify the most important macroeconomic determinants of economic growth for the five African economies of Botswana, Namibia, South Africa, Zambia, and Zimbabwe for the time span 2000-2025. Analysis was performed using a panel data framework, and generalized least squares estimation was employed as a robustness technique to address the issues of endogeneity, serial correlation, and heteroskedasticity. This joint econometric approach provided better substantiation of the short- and long-run relationships between the chosen macroeconomic variables. The simulation was also performed considering the nonlinear migration effects, which allowed the modelling of threshold dynamics of migration and economic growth. The empirical results are consistent with the relevance of monetary variables in influencing economic growth results. In both estimations, the money supply is negatively related to economic growth and statistically significant, meaning that an increase in money supply levels could result in an increase in inflationary pressures, misallocation of resources, and a negative impact on sustainable economic growth. The negative impact of interest rates on growth also comes to the fore, with the widely held view that a higher interest rate results in less investment and thus less aggregate demand. There appears to be a more conditional impact of exchange rates among the estimation methods. The generalized least squares estimate suggests that the depreciation of the exchange rate is detrimental to economic growth, while the fully modified ordinary least squares estimates suggest that the depreciation of the exchange rate is beneficial and statistically significant for economic growth. In both comparisons, competitive exchange rate regimes might offer an environment that facilitates export expansion and growth of the external sector in the countries under consideration in Africa in the longer term. Migration is also an important determinant of economic growth in the empirical analysis. Again, the linear term in migration and the squared term are positive and significant, suggesting that there are increasing returns to migration. The results revealed that labour mobility, knowledge spillovers, human capital accumulation, and remittances are important factors in long-term economic growth. The crossover effect of migration also suggests that the developmental impact of migration increases with the magnitude of migration and further suggests that the developmental impact of migration becomes more pronounced as the level of migration becomes higher, further emphasizing the need to consider cumulative benefits of migration in the process of development. The relationship between the level of unemployment and economic growth is negative but statistically insignificant, indicating that the structural and institutional characteristics of the economies studied may have a more direct effect on unemployment than the relationship between the unemployment-output rate. Unemployment affects the overall economic performance, which can be mitigated or tempered by the presence of informal labour markets, population, and underemployment.

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Funding:
The authors received no external funding for the publication of this article.

Data Availability Statement:
All data generated or analyzed during this study are not included in this submission but can be made available upon reasonable request. Additionally, the data are publicly available.

Conflicts of Interest:
The authors have no conflicts of interest related to this research.