MACROECONOMIC DYNAMICS AND THE REAL ECONOMY IN SUB -SAHARAN AFRICAN COUNTRIES: A STUDY OF NIGERIA, SOUTH AFRICA AND GHANA

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Abstract

This research examined the impact of macroeconomic dynamics on the real economy of three sub-Saharan African nations over a forty-year period, spanning from 1981 to 2020. The Augmented Dickey-Fuller (ADF) test revealed that the dataset exhibited a combination of integrated levels and first difference variables, necessitating the utilization of the autoregressive distributed lag (ARDL) model. Primarily, the findings indicate that the effect of macroeconomic indicators on GDP differed across Nigeria, South Africa, and Ghana. In the prolonged term, Nigeria's economy experienced a substantial negative impact from the exchange rate and discount rate, with inflation displaying a negative and inconsequential effect, while the unemployment rate had a positive yet insignificant influence on Nigeria's GDP. South Africa's GDP was significantly and adversely affected by the exchange rate and inflation in the long run, whereas the discount rate and unemployment rate had a negative and insignificant impact on South Africa's GDP over time. Ghana's long-term GDP was notably and negatively influenced by the exchange rate, discount rate, and unemployment rate, while inflation had a negative and inconsequential effect. The error correction mechanism within the ARDL model indicated that GDP in all the examined countries was influenced in varying manners by the chosen macroeconomic indicators. In the short term, the exchange rate, inflation rate, discount rate, and unemployment rate were significant factors affecting Nigeria's GDP; for South Africa, GDP was notably influenced by the exchange rate, discount rate, and unemployment rate in the short term, while Ghana's GDP was significantly impacted by inflation, discount rate, and unemployment rate in the short term. From a policy standpoint, these results are particularly relevant to governmental bodies tasked with the management of the economy.

INTRODUCTION

There exists overwhelming evidence indicating a transfer of economic influence from developed nations to emerging ones. Recent findings by Price-Waterhouse Cooper (2015) suggest that the purchasing power of emerging markets is poised to surpass that of the G7 nations (Canada, France, Germany, Italy, Japan, the UK, and the US) in the foreseeable future. Sullivan (2012) also notes a growing inclination among global investors to engage with developing markets, particularly in the aftermath of the financial crisis that crippled developed economies and disrupted their macroeconomic landscapes significantly. The International Monetary Fund (IMF) underscores a sustained shift towards emerging markets, with a particular emphasis on the Sub-Saharan Africa (SSA) region, which is identified as one of the fastest-growing regions in terms of real gross domestic product, following the Asian Pacific region (IMF, 2019). Notably, the SSA region has garnered substantial attention due to its abundant natural resources, escalating living costs, and increasing foreign direct investment (FDI) from other developing nations seeking opportunities in emerging markets (Adebayo et al., 2021). This heightened interest can be attributed to the demographic dividend present in the SSA region, which serves as a critical driver for long-term economic expansion. Projections by the International Monetary Fund (IMF) indicate a 17% growth in the region by 2030, fueled by a burgeoning middle-class population and an urbanization rate expected to surge by 28% during the same period (IMF, 2019). Nevertheless, impediments persist in investing in the SSA region, primarily due to factors like insecurity, corruption, and notably, governmental shortcomings in establishing a conducive macroeconomic environment necessary for fostering thriving investments in the real economy. Studies on sub-Saharan Africa (SSA) have unveiled a concerning trend whereby the economies of many countries in the region grapple with volatile macroeconomic indicators. A significant number of nations in SSA find themselves mired in heavy debt burdens and are confronted with challenges in managing soaring exchange rates, exorbitant interest rates, escalating inflation rates, high unemployment levels, substantial capital flight, and diminished domestic output (Onyele et al., 2023). Consequently, these countries are compelled by their unfavorable macroeconomic conditions to undertake arduous economic reforms, including resorting to foreign borrowing, in a bid to stabilize their ailing economies. Paradoxically, such measures exacerbate the macroeconomic woes as domestic resources are redirected towards servicing debts. The World Bank (2019) has highlighted the vulnerability of SSA countries to the spillover effects of financial crises originating from developed nations, underscoring the region's susceptibility to frequent exchange rate depreciations that erode global competitiveness. Moreover, the region grapples with soaring interest rates on bank loans, reaching double digits, thereby amplifying production costs and impeding effective financial intermediation crucial for sustainable growth. Unemployment rates have soared, and

inflation has breached double digits in recent times, culminating in sluggish economic performance (Worlu & Omodero, 2017).

Despite fluctuations in the global economy, Sub-Saharan Africa (SSA) has consistently experienced robust economic activity, particularly in 2011. During this year, the regional output surged by 5% compared to the period before the crisis (2004–2008), when the average output stood at 6.5% (Mandeya & Ho, 2021). The World Bank (2019) highlighted moderate growth in SSA in 2014 amidst various challenges such as the Ebola outbreak, substantial budget deficits from increased public spending in Ghana and Zambia, the Boko Haram insurgency in Nigeria, political conflicts in South Sudan and the Central African Republic, and a decline in crude oil prices. This decrease in oil prices resulted in heightened inflation rates and reduced government revenue, leading to the devaluation of currencies in oil-producing countries like Nigeria, Ghana, and Angola. In 2014, the Nigerian Naira weakened against the U.S. dollar, prompting the central bank to tighten monetary policies. Similar actions were taken by Ghana and Angola due to the impact of falling oil prices.

In major economies within SSA, such as Nigeria, South Africa, and Ghana, governments have implemented various macroeconomic strategies over time, encompassing both monetary and fiscal policies. These policies play a significant role in shaping the macroeconomic landscape and influencing economic growth across SSA countries differently. For example, Nigeria's adoption of a floating exchange rate system has led to fluctuations in the value of its currency (Nwoye et al., 2015). A similar situation is observed in South Africa and Ghana, where the use of floating exchange rates has also influenced currency fluctuations over time. Government decisions regarding interest rates have also introduced dynamism in the rates charged by commercial banks for loans in these countries. Moreover, inflation rates in Nigeria and South Africa have displayed variability due to government macroeconomic interventions (Vermeulen, 2017). Nigeria and South Africa are recognized as the largest and second-largest economies in Africa, respectively, showcasing the impact of macroeconomic dynamics on these nations. Investigating how these dynamics have affected Nigeria, South Africa, and Ghana's economies is therefore crucial.

Numerous research endeavors have been conducted concerning the influence of macroeconomic indicators on the actual economy in Nigeria, South Africa, and Ghana. Anochie et al. (2023) illustrated that disturbances to macroeconomic fundamentals such as the exchange rate, interest rate, inflation, and money supply exert significant impacts on the trajectory of real economic sectors such as agriculture. Hackland (2015) also determined that inflation and prime lending exhibited a negative correlation with growth in South Africa. Moreover, Onakoya (2018) identified that prevailing exchange rates, interest rates, inflation, and money supply have impeded economic production in Nigeria. In Ghana, Ho and Iyke (2018), Mwinlaaru and Ofori (2017) discovered that the exchange rate emerged as a crucial determinant of Ghanaian economic growth. Additional studies on this topic encompass, among others, Anochie et al.

(2023), Worlu and Omodero (2015) who affirmed a notable association between macroeconomic dynamics and economic performance. The conundrum within the scholarly literature is the varied responses of countries worldwide to the fluctuations of the macroeconomic landscape. This divergence explains why scholars from different nations highlighted diverse macroeconomic indicators, leading to a heterogeneous compilation of findings. This study's focal point is to empirically scrutinize the macroeconomic variables impacting Sub-Saharan African (SSA) countries by contrasting the results from Nigeria, South Africa, and Ghana. The uncertainty and nation-specific factors influencing the behavior of macroeconomic indicators in SSA countries validate the necessity for empirical assessment to explore and contrast how changes in these macroeconomic aggregates influence the actual economies of Nigeria, South Africa, and Ghana.

LITERATURE REVIEW

Conceptual Framework

To provide a comprehensive understanding of macroeconomic dynamics and economic growth, the conceptual framework for this study was developed as displayed in Figure 1.
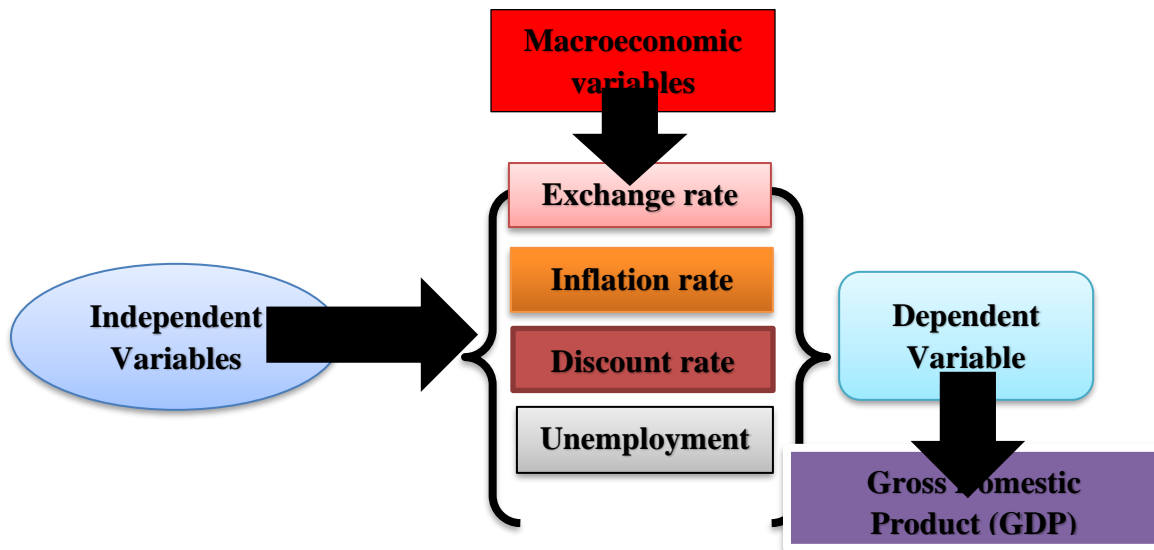
Figure 1: Conceptual Framework

Macroeconomic variables are determinants that play a significant role in shaping the trajectory of an economy, whether it experiences a period of growth or contraction, on a national, regional, or global scale. These variables, such as GDP, unemployment levels, inflation rates, savings, and investments, are crucial factors that influence the actual economic performance and are meticulously scrutinized by various

economic stakeholders, including investors, governments, and consumers, to assess the prevailing economic conditions at a specific point in time (Gay, 2016). The intricate interconnection and correlation among different macroeconomic variables represent a focal point of extensive research within the realm of macroeconomics (Ali et al., 2019). Key macroeconomic factors encompass GDP, exchange rates, inflation, discount rates, and unemployment rates. The impact of these macroeconomic factors, such as inflation rates, extends to pricing dynamics for both inputs and outputs in the short term, while exerting influence on interest rates in the long term within an economy. Interest rates, in turn, have repercussions on the cost of capital, which comprises interest expenses, subsequently affecting income levels, demand patterns, foreign exchange earnings, and the stability of exchange rates (Onyele et al., 2020).

The fluctuations in exchange rates serve as indicators of the relative strength or weakness of a currency vis-à-vis foreign currencies, serving as a common yardstick for elucidating the competitiveness of domestic industries in the global marketplace. Instances where the exchange rate deviates over time from its equilibrium are termed as exchange rate volatility, signaling a state of imbalance or misalignment in cases where multiple rates, such as official and parallel rates, coexist. The primary objectives of exchange rate policy revolve around establishing an optimal and steady rate through the deployment of various strategies and mechanisms to enhance efficacy in the foreign exchange market. Despite the broad-ranging impact of currency instability on the real economy, the majority of investors do not closely monitor fluctuations in the exchange rate as their business operations predominantly transpire in local currency. For consumers, exchange rates predominantly impact sporadic transactions like international travel expenses, imports, or cross-border remittances. Economists view the exchange rate as a policy tool that can foster a country's economic growth (Vyshnavi & Manoj, 2014). Nevertheless, the mechanisms through which exchange rate fluctuations influence economic production are still a topic of contention among economists, with the exchange rate being deemed a pivotal gauge of a country's products' international competitiveness.

Moreover, the impact of inflation on the economy is multifaceted, encompassing both positive and negative aspects. Undesirable consequences involve a decline in the actual value of currency alongside other monetary indicators over time. Undeniably, one of the key macroeconomic objectives pursued by policymakers is maintaining price stability. Striving for this goal serves to mitigate the expenses associated with price fluctuations and the economic instabilities that may result from price volatility (Osuala & Onyeike, 2013). The connections between inflation and economic growth in reality remain contentious, both theoretically and empirically. This matter has sparked an enduring debate between monetarist and structuralist perspectives. Structuralists argue that inflation is essential for actual output, whereas monetarists consider inflation a detrimental factor for economic advancement (Gay, 2016). An elevated inflation rate (e.g., double-digit inflation) introduces distortions in economic operations and affects decisions on savings and investments when the tax regime does not fully adjust to inflation. During periods

of high inflation, holding currency and non-interest-bearing checking accounts becomes unattractive due to their continual reduction in purchasing power. Heightened inflation levels can instigate uncertainties among individuals regarding future economic outcomes, potentially impeding economic development. This situation results in an inflation risk premium being added to long-term interest rates, complicating planning and agreements by businesses and labor, crucial aspects for capital accumulation and economic productivity.

Additionally, the transmission mechanism of the discount rate involves the process by which the Central Bank's policy rate influences domestic economic activities. A comprehensive comprehension of the diverse pathways through which the discount rate affects the economy aids in grasping the interconnection between macroeconomic indicators and the real sectors of the economy (Maiga, 2017). It also enables policymakers to elucidate fluctuations in financial aggregates. Moreover, a thorough understanding of the transmission mechanisms of discount rates facilitates a more informed selection of policy instruments. The literature identifies several monetary policy transmission channels, including the interest rate channel, exchange rate channel, asset price channel, and credit channel (Haacker et al., 2020).

a)   Interest rate channel

Changes in the policy rate of the central bank (also known as the discount rate) have a direct impact on short-term market rates. Alterations in the policy rate set by the central bank are anticipated to influence other rates in the short-term segment of the money market. This connection exists because the policy rate represents the interest rate at which central banks provide loans to deposit money banks or commercial banks (Eleje & Ani, 2013). Modification of the central bank's discount rate results in fluctuations in short-term interest rates such as the inter-bank call rate, 30-day and 90-day securities rates, among others. Nevertheless, an increase in this rate generally leads to a rise in lending rates, with no corresponding adjustment in the opposite scenario. In addition to impacting short-term market rates, an elevation in the discount rate also has repercussions on long-term interest rates like those observed in the bond market. Consequently, as nominal interest rates climb, the real interest rate follows suit, prompting decreased borrowing and spending activities by economic entities like households and businesses (Maiga, 2017).

b)   Exchange rate channel

The transmission mechanism known as the exchange rate channel elucidates the relationship between the exchange rate and the central bank's discount rate. One of the primary factors influencing the exchange rate is the variance in interest rates among nations. Consequently, when domestic interest rates dip below foreign interest rates due to adjustments in the discount rate, the exchange rate undergoes depreciation to reestablish balance in the market and diminish arbitrage opportunities (Maiga, 2017). Additionally, the devalued exchange rate renders domestic products more affordable than imported goods, stimulating the demand for local products and overall output expansion, possibly leading to an uptick in the general price level

(Jiakponna et al., 2024). Generally, the impact of the exchange rate channel is more conspicuous in open economies that operate under flexible exchange rate regimes.

c)   Asset price channel

A widely acknowledged economic theory posits that alterations in asset prices impact the consumption and investment choices made by households and businesses. Typically, economic entities allocate their surplus funds towards procuring various assets such as stocks, bonds, foreign currency, and real estate. For instance, banks may occasionally utilize their extra reserves for acquiring assets (Irabor, 2012). Furthermore, numerous households invest in specific assets that often yield a positive wealth effect for the holders; as the prices of these assets rise, their financial positions improve. Regarding businesses, stock prices influence investment determinations, and both outcomes can transmit through the credit mechanism. Given that these assets are owned by economic entities, their financial positions are influenced. The asset price mechanism delineates the relationship between asset prices and the discount rate set by Central Banks. Essentially, it elucidates the impact of discount rates on asset prices and the broader economy (Ajah & Eniang, 2016). For instance, in a scenario where the central bank discount rate is raised (indicating a restrictive monetary policy), investors may prefer investing in bonds over stocks mainly due to the appealing interest rates offered in the bond market. As investors opt to channel their excess funds into purchasing bonds, the stock prices would decline (Bhunia, 2016). Consequently, the financial wealth of stockholders would diminish due to the reassessment of their stock portfolio, significantly influencing their consumption choices, output, and prices.

d)   Credit channel

The transmission mechanism of the discount rate through the credit channel refers to the manner in which the policy decisions of central banks impact the capacity of banks to create credit, the credit market, or the ability of banks to provide loans (Jhingan, 2009). It is evident that alterations in the stance of the central bank's discount rate play a significant role in determining the fluctuations in the accessibility or provision of credit, consequently influencing the overall economy. The credit channel can be segmented into two distinct components based on the impact of adjustments in the discount rate on either bank lending or the balance sheet. When examining the credit channel, it is imperative to take into account important variables such as the savings rate and the lending rate.

e)   Bank lending channel

Banks play a pivotal role in the process of financial intermediation. The lending rate is typically influenced by both the discount rate and the bank's cost of funds. When there is a reduction in the discount rate as part of an expansionary monetary policy, banks can increase their deposits and expand their available loanable funds. Consequently, the cost of funds is anticipated to decrease, leading to lower calculated lending rates. This scenario enables banks to provide loans to a larger number of households and businesses, thereby

boosting aggregate demand and output (Iwedi, 2017). Conversely, an increase in the discount rate by the central bank or an elevation in the cash reserve ratio (CRR) raises the commercial banks' cost of funds. Consequently, higher lending rates are imposed on customers. This situation discourages borrowing by both firms and households, potentially dampening aggregate demand and output through reduced consumption and investments (Egoro & Obah, 2017).

f)   Balance sheet channel

The modification in the discount rate often impacts the financial status of economic stakeholders. This phenomenon is primarily attributed to the influence of policy changes on not only market interest rates but also on private economic entities like banks, companies' assets, cash flows, and consumers. Consequently, the balance sheet channel elucidates the impact of the discount rate on the loan portfolios of banks and other economic actors (Ani & Okelue, 2012). For example, an increase in the policy rate will lead to diminished cash flow, decreased net worth, a rise in lending rates, and a reduction in overall expenditure. Moreover, a restrictive monetary policy characterized by an elevated discount rate will hinder banks' capacity to offer loans, resulting in credit rationing and elevated lending rates (Maiga, 2017). Credit rationing signifies that borrowers, especially those lacking sufficient collateral for their loan requests, will encounter challenges in accessing credit. Consequently, the decrease in banks' ability to create credit may give rise to adverse selection. In essence, alterations in the discount rate impact the market valuation and cash flow of specific financial instruments as well as the capital costs necessary for productive endeavors.

Furthermore, the attainment of full employment, alongside other macroeconomic goals, holds significant importance for numerous developing nations grappling with rising underemployment, unemployment, and poverty levels. Despite the crucial nature of employment, efforts to foster job creation through policy measures have not yielded the desired outcomes, with job availability falling short of the number of unemployed individuals. As per Ashika (2015), unemployment denotes a state of joblessness where job seekers are unable to secure desired employment opportunities. Unemployment is quantified as the proportion of total unemployed persons in the overall labor force (unemployed + employed). Prolonged unemployment within a country triggers brain drain (human capital flight) as skilled workers migrate to developed nations in search of better work prospects (Idris, 2021). Similarly, unemployment, whether direct or indirect, shapes the future plans of workers; enduring spells of unemployment breed heightened doubt and cynicism regarding the value of education and training, discouraging workers from investing in further skill development as some positions necessitate. Additionally, the financial constraints stemming from unemployment may compel families to postpone their children's educational pursuits, undermining the potential economic value of those forthcoming skills. Gay (2016) contended that unregulated unemployment, particularly graduate unemployment, in developing nations stems from the absence of

cooperation between entrepreneurs and educational institutions. It is argued that the deficiency in this collaborative synergy elucidates the inadequacies of educational policies in Sub-Saharan Africa in achieving full employment (Agyapong et al., 2016).

Description of the Real Economy

The authentic economy of any nation pertains to the creation and circulation of commodities and services within the economic system (Batko, 2013). Consequently, it suggests that the tangible sector directly encompasses the manufacturing of commodities and services utilizing accessible resources, such as labor and capital. It is commonly juxtaposed with the financial economy, which focuses on the segments of the economy solely involved in transactions of fiat money and other financial instruments that signify ownership claims to commodities and services. Mordi (2016) demonstrates that the real economy encompasses households, businesses, and other entities involved in the production of commodities and services that can be either presently consumed or utilized to yield more output in the future. Economic output is denoted as 'real' resources (e.g., raw materials, human capital, etc., quantifiable in monetary terms) utilized in the economic production process.

A productive tangible sector, particularly agriculture and manufacturing, establishes connections in the economy more extensively than any other sector, thereby alleviating economic strains on the external sector. Furthermore, expansion in the real sector leads to heightened employment opportunities and income generation. Consequently, the effectiveness of any macroeconomic strategy can be gauged by its favorable influence on economic activities, particularly the production of commodities and services, which enhances the overall well-being of the populace. It indicates that the real economy involves the manufacture of commodities and services, often delineated by the gross domestic product. Nominal GDP represents the market worth of commodities and services generated in an economy, without adjusting for inflation. Real GDP pertains to the inflation-adjusted nominal GDP, specifically, nominal GDP adjusted for inflation (CBN, 2014). In practice, both RGDP and nominal GDP have been utilized to evaluate the real economy, although the selection between the two depends on the model's specification.

Theoretical Underpinning

The examination's theoretical foundation is based on the endogenous growth model, which entails long-term output growth influenced by internal factors, specifically macroeconomic aggregates that shape incentives and opportunities for developing technological knowledge. Scholars like Romer (1990) and Lucas (1988) have contributed to this theory, suggesting that government interventions are crucial for sustained economic growth. These interventions encompass policies on interest rates, exchange rates, money supply, and government spending, among others, aiming to boost investment and foster economic

growth. The endogenous growth theory highlights the significance of government involvement in ensuring macroeconomic stability and ultimately enhancing economic growth, making it pertinent to studies conducted in countries like Nigeria, South Africa, and Ghana. In these nations, governmental macroeconomic policies regarding exchange rates, inflation rates, interest rates, and unemployment rates are expected to mitigate volatilities associated with these economic instruments and stimulate overall economic growth.

The real sector, particularly agriculture and manufacturing, establishes vital linkages within the economy, alleviating pressures on the external sector significantly. Additionally, growth in the real sector contributes to job creation and income generation. Therefore, the effectiveness of any macroeconomic policy can be gauged by its favorable impact on economic activities, particularly the production of goods and services, which ultimately enhance the welfare of the populace. The real economy involves the production of goods and services, typically measured by the gross domestic product. Nominal GDP represents the market value of goods and services produced in an economy without adjusting for inflation, while real GDP indicates inflation-adjusted nominal GDP, essentially deflated for inflation. Both real GDP and nominal GDP have been employed empirically to evaluate the real economy, depending on the specific model under consideration.

The endogenous growth model is substantiated by Keynesian economic theory. As posited by Keynes (1936), in the short term, particularly in times of economic downturn, the economic output is significantly impacted by aggregate demand (the total spending in the economy). In this context, aggregate demand does not necessarily align with the economic productive capacity; instead, it is influenced by various factors and can be unpredictable, leading to fluctuations in output, employment, and prices. Keynesian economists contend that the decisions made by the private sector can sometimes yield inefficient macroeconomic outcomes, necessitating proactive public interventions, notably through monetary policy actions by the central bank and fiscal measures by the government, to enhance output across all production levels. These policies often prioritize immediate requirements and highlight how macroeconomic strategies can promptly address a nation's economic challenges. Furthermore, by employing monetary and/or fiscal policies, the government is perceived to counteract economic recessions and bolster overall demand to boost output levels, supported by steady interest rates that foster ongoing economic stability. Subsequently, Keynes (1936) advocated for an alternative approach that involves direct government involvement in domestic investment and suggested that financial expansion might result from increased government spending. Given that elevated interest rates dampen private investment, a rise in government expenditure is expected to spur investments while concurrently reducing private investment.

Empirical Investigation

Commencing with an investigation conducted by Anochie et al. (2023) in Nigeria, the impact of macroeconomic factors such as the exchange rate, interest rate, and inflation rate on the productivity of the manufacturing sector was examined. Utilizing secondary data derived from annual time series spanning from 1980 to 2020 sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin, the study employed ordinary least squares, cointegration, and regression statistics for data analysis. The findings revealed a significant influence of the exchange rate and interest rate on Nigeria's manufacturing sector productivity, while the inflation rate did not exhibit a significant effect.

Similarly, Nwachukwu et al. (2023) delved into the macroeconomic determinants impacting SME output in Nigeria over the period from 1986 to 2021. The study disaggregated SMEs into wholesale and retail sectors concerning GDP contributions and utilized the autoregressive distributed lag (ARDL) model for estimation. The results indicated that the interest rate had an insignificant effect on wholesale and retail trade contributions to Nigeria's GDP, with the exchange rate predominantly exerting a negative impact on SME performance. Furthermore, general private consumption was found to positively influence SME performance, while inflation had a negative impact on SME performance in Nigeria.

In a similar vein, Lawal et al. (2022) scrutinized the influence of macroeconomic variables alongside pertinent socio-economic and political factors on the manufacturing sub-sector of the Nigerian economy. Employing the ARDL method to analyze data spanning from 1986 to 2019 within the framework of the Solow growth and endogenous growth theories, the study highlighted the validity of both theories in the short run, with only the endogenous growth model proving valid in the long run. The study emphasized the necessity of aligning macroeconomic variables with socio-political factors to foster sustainable economic growth driven by a robust manufacturing sector.

Furthermore, in a study conducted in South Africa, Ajeigbe et al. (2022) explored the enduring and immediate repercussions of macroeconomic volatility on company performance, particularly in light of the recent global pandemic. By employing the panel ARDL model to scrutinize annual panel data from 2010 to 2020, the study unveiled the positive influence of economic growth, exchange rate, and share price on asset returns, while economic growth and share price were found to bolster a company's equity return over the long term.

Similarly, Baloi and Dagume (2022) conducted an analysis on the macroeconomic determinants of economic growth in South Africa during the time frame of 1994–2016. The research employed the Johansen cointegration approach, indicating the presence of cointegration and a long-term connection between real

GDP per capita and the variables under consideration. Furthermore, the study conducted estimations using the vector autoregressive (VAR) model, demonstrating the robustness and appropriate behavior of the residuals. Additionally, the vector error correction model (VECM) confirmed a short-term relationship among the variables, highlighting the positive influence of physical capital and inflation on economic growth in South Africa.

A comparable investigation by Saeed (2022) scrutinized the impact of macroeconomic variables like price and money supply on GDP growth in Ghana utilizing four decades of time series data from 1980 to 2020. The empirical analysis incorporated VECM, cumulative impulse response functions (IRFs) within the VAR framework, and causality testing methods to evaluate both short-term and long-term relationships among price level, broad money supply, interest rate, and GDP. Examination of VECM short-term estimations unveiled a significant effect of broad money supply on GDP. Moreover, the findings suggested that previous year's income and price level negatively and significantly influenced the current year's output. Nevertheless, the long-term estimates from the co-integrating vector indicated an absence of statistically significant impact of money supply on GDP. Furthermore, the study decisively concluded a two-way relationship between inflation and money supply in Ghana.

In a related context, Tom et al. (2021) explored the influence of crucial macroeconomic determinants on the economic growth of Bangladesh spanning from 1990 to 2020 utilizing the ARDL model. The outcomes from the ARDL model demonstrated that inflation rate, exchange rate, and trade openness positively and significantly affected the economic growth of Bangladesh. Economic growth was observed to enhance living standards and alleviate poverty, underscoring the integral role of economic development in this process.

Moreover, Ozuah (2021) investigated the impact of macroeconomic variables on the manufacturing sector in Nigeria within the liberalized economic period from 1986 to 2018. The analysis employed the ARDL model, with the explanatory variables indicating positive impacts of money supply, interest rate, and credit to the private sector on manufacturing sector output in the short term. The research posited varying degrees of effects of macroeconomic variables on the manufacturing sectors in Nigeria.

Likewise, Ac-Ogbonna (2021) assessed the repercussions of fluctuations in macroeconomic variables such as exchange rates, lending rates, and inflation rates on manufacturing output in Nigeria. The study utilized descriptive analysis to explore the correlation between manufacturing output and macroeconomic stability in Nigeria, revealing a detrimental effect of macroeconomic instability on manufacturing output.

In Ghana, the study conducted by Kankpeyeng et al. (2021) focused on exploring the effects of macroeconomic variables on GDP growth within the timeframe of 1986–2018, utilizing VAR methodology for the analysis. The findings revealed a positive and statistically significant impact on GDP growth from low inflation rates, physical capital, and money supply, while conversely, government expenditure and high inflation exhibited a negative and significant influence on GDP growth. The research concluded that GDP experienced positive growth under moderate and low inflation levels but displayed a negative trend when faced with high inflation rates in the context of Ghana.

Furthermore, Memmon et al. (2021) conducted a study to scrutinize the influence of macroeconomic variables on the economic growth of Pakistan, using GDP as a proxy for economic growth during the period spanning from 1991 to 2020. The investigation included the application of the Johansen Cointegration test to ascertain the integrating equation in the model, resulting in the identification of six cointegrated equations. Additionally, the study employed the Ordinary Least Squares (OLS) technique to either validate or refute the hypotheses. The OLS analysis demonstrated a positive and significant impact on economic growth from government expenditure, household consumption, and net exports, while revealing a noteworthy negative influence of inflation on economic growth. Moreover, a positive and significant relationship between investment and economic growth was established.

In a separate study, Oke and Onyokwonu (2021) delved into analyzing the interconnection among inflation, exchange rate movements, and sectoral output in Nigeria. The research methodology involved the utilization of a multivariate cointegration approach. The results unveiled that inflation coupled with a depreciating exchange rate had contractionary repercussions on the industrial, agricultural, and trade sectors in Nigeria. Conversely, the service, building, and construction sectors did not exhibit a significant susceptibility to inflation. The study identified a threshold inflation rate of 9 percent for Nigeria.

Moreover, Idris (2021) investigated the correlations between inflation, unemployment, and economic growth in Nigeria utilizing annual data from 1986 to 2020. The research employed the Ordinary Least Squares (OLS) technique for data analysis. The study findings suggested that escalating unemployment notably hindered domestic production, while inflation triggered an amplifying effect.

Lastly, in South Africa, Asiya and Mgeni (2021) evaluated the macro- and micro-economic implications of employment policies, concentrating on youth unemployment. Employing the dynamic computable general equilibrium model (DCGEM), the researchers calibrated the 2015 South African Social Accounting Matrix to assess the effects of employment policy on youth unemployment and overall economic outcomes. The research results indicated a surge in the demand for youth labor over time, consequently reducing the

unemployment rate. Additionally, the inflation rate experienced a more substantial decrease compared to nominal income, leading to an enhancement in household purchasing power and a mitigation of poverty.

Similarly, Seoela (2020) employed a structural vector autoregressive (SVAR) model to investigate the reactions of economic output, inflation, narrow money supply, domestic credit, and lending rate spread in individual member countries to shocks in the South African repo rate. Monthly data spanning from 2000M2 to 2018M12 was utilized for this analysis. The findings revealed that a positive shock to the repo rate led to decreased economic output and increased price levels. Moreover, the results demonstrated asymmetric responses in money supply, credit, and lending rates following a positive shock to the repo rate.

Likewise, in Ghana, Allor (2020) explored the connections between inflation and monetary policy. The study employed ARDL and the Toda and Yamamoto Granger causality test to examine the short- and long-term variations in monetary policy and inflation on exchange rates, using data from 1970 to 2017. The research unveiled a diminishing impact of contractionary monetary policy on exchange rate fluctuations, reflecting the exchange rate puzzle. Long-term outcomes indicated an appreciation effect, while inflation was found to devalue currency rates in both short and long terms. Causality tests disclosed a bi-directional link between exchange rates and inflation rates, with a one-way causal relationship from monetary policy to exchange rates.

Additionally, Chowdhury et al. (2019) scrutinized the influence of macroeconomic variables on the economic growth of Bangladesh, employing the GDP growth rate as a measure of economic growth. Inflation, real interest rate, exchange rate, and household consumption spending were selected to represent macroeconomic aggregates from 1987 to 2015. Correlation and OLS analyses were conducted for data examination, revealing a positive correlation between GDP and other variables except the interest rate. The OLS estimation indicated that macroeconomic variables accounted for a substantial portion of GDP variability, highlighting their significant impact on Bangladesh's economic output.

In a separate study, Onakoya (2018) assessed the effects of macroeconomic aggregates on Nigeria's manufacturing sector between 1981 and 2015. Initially, unit root tests indicated differing order integration, necessitating the usage of VECM. The model did not exhibit any short-term connections. An inverse correlation was identified between inflation, interest rate, exchange rate, broad money supply, and manufacturing output. Despite the lack of statistical significance in inflation and interest rate, a significant and positive relationship was observed between the previous year's GDP, unemployment, and manufacturing output.

The research conducted by Juwala (2017) focused on examining the impact of exchange rates, inflation, and interest rates on the economic growth of Ghana. Utilizing data sourced from the world development indicators of the World Bank spanning from 1980 to 2015, the investigation utilized the autoregressive distributed lag (ARDL) method for model estimation. The outcomes indicated that the depreciation of exchange rates exhibited a statistically significant positive influence on long-term economic growth, while displaying a negative and insignificant effect in the short term. Conversely, the analysis proposed an insignificant statistical effect of inflation on long-term economic growth, yet a negative and statistically significant impact in the short run. Interestingly, the interest rate demonstrated a negative and significant impact on both short-term and long-term economic growth.

Furthermore, Okonkwo and Chigbu (2016) delved into exploring the repercussions of inflation and exchange rate fluctuations on the manufacturing output in Nigeria over the period from 1981 to 2013. The discoveries of the research indicated that an abrupt change in the inflation rate negatively affected manufacturing capacity utilization in the short term, but gradually transitioned to have a positive impact on manufacturing capacity utilization in Nigeria in the long run. Short-term fluctuations in the foreign exchange rate originated from inflation, while long-term variations were primarily influenced by manufacturing capacity utilization, with the inflation rate being predominantly influenced by manufacturing capacity utilization in Nigeria.

Moreover, Okoye et al. (2015) conducted a study to evaluate the impact of financial and macroeconomic factors on manufacturing capacity utilization in Nigeria. The research encompassed the timeline from 1975 to 2012. The data analysis was performed using the error correction mechanism (ECM) technique. The results unveiled that the exchange rate, interest rate, and terms of trade possessed a positive yet statistically insignificant effect on the capacity utilization of the manufacturing sector in Nigeria. Conversely, the inflation rate, external debt, and trade openness exhibited a negative and statistically insignificant influence on the capacity utilization of the manufacturing sector in Nigeria.

Knowledge Gap

There exist numerous researches examining the influence of macroeconomic factors on genuine economic growth across various nations. These researches have explored a variety of macroeconomic factors that influence the genuine economic growth of diverse nations. A significant portion of these studies has compared the macroeconomic fundamentals of Sub-Saharan Africa in relation to their impact on genuine economic output. To address this disparity, the current study concentrated on a comparative analysis of Nigeria, South Africa, and Ghana.

Another deficiency in the empirical literature pertains to the choice of macroeconomic aggregates. This suggests that the selection of macroeconomic factors is contingent upon the economic circumstances of individual countries. To mitigate this gap, the present study formulated a model that encompasses macroeconomic dynamics represented by variables such as the exchange rate, discount rate, inflation rate, and unemployment rate, which have been frequently discussed in scholarly works by various researchers.

METHODOLOGY

Research Design

A research design is a framework employed by a researcher to systematically apply the scientific method in the examination of issues. The study adopted an *ex-post facto* research design methodology. This choice was made as the researcher did not intend to manipulate any of the variables being studied, opting instead to observe events from 1980 to 2020. An additional rationale for the chosen research design was the researcher's interest in utilizing pre-existing data to investigate the correlation between the variables in question. These data are already in existence and therefore beyond the researcher's manipulation.

Nature and Sources of Data

The data utilized in this research comprises time series data ranging from 1980 to 2020 for Nigeria, South Africa, and Ghana. These secondary data were obtained from reputable sources such as the Central Bank of Nigeria Statistical Bulletin, World Development Indicators (WDI), and Federal Reserve Economic Data (FRED), with the exception of the discount rate sourced from the FRED database, while all other variables were derived from the WDI database.

Model Specification

The theoretical framework employed in this study was grounded in the endogenous growth theory, emphasizing that economic growth is reliant on endogenous macroeconomic factors. According to Onakoya (2018), macroeconomic fundamentals including interest rate, inflation, exchange rate, and unemployment rate play a significant role in influencing investments, thus impacting economic growth. Consequently, the study adopted the model proposed by Onakoya (2018) with certain adjustments delineated in equation (1).

$$MANU = \beta_0 + \beta_1(M2) + \beta_2(INF) + \beta_3(INT) + \beta_4(REER) + \beta_5(UNEMP) + \varepsilon \qquad (1)$$

Where,

MANU = Manufacturing sector contribution to GDP

M2 = Broad money supply

INT = Interest rate

REER = Real exchange rate

UNEMP = Unemployment rate

The aforementioned model was adapted by excluding MANU, M2, and REER to align with the study's

objectives. For example, MANU was substituted with the GDP growth rate as the research focuses on the overall economies of Nigeria, South Africa, and Ghana. Similarly, M2 was eliminated due to the unavailability of broad money supply data for South Africa during the research period. Furthermore, REER was replaced by a nominal exchange rate, considering the model already incorporates an inflation rate, aiming to mitigate multicollinearity issues. Additionally, the interest rate was substituted by the discount rate associated with the monetary frameworks of Nigeria, Ghana, and South Africa. The model for this study was precisely delineated as shown in equation (2).

$$GDP_{it} = \beta_0 + \beta_1(EXR)_{it} + \beta_2(IFR)_{it} + \beta_3(DCR)_{it} + \beta_4(UPR)_{it} + \varepsilon \qquad (2)$$

Where,

GDP = Nominal GDP

EXR = Exchange rate

IFR = Inflation rate

DCR = Discount rate

UPR = Unemployment rate

β_0 = Constant parameter

$\beta_1 - \beta_4$ = Coefficient of the independent variables

ε = Stochastic term

t = time period

i = Country i starting from 1 to 3

Operationalization of Model Variables

Various macroeconomic variables exert influence on economic growth. Nevertheless, this study specifically chose to focus on inflation, exchange rate, discount rate, and unemployment based on the endogenous growth theory and relevant empirical studies. The operationalization of these variables is succinctly summarized in Table 1.

Table 1: Operationalization of variables

Variable	Description	Measurement	A priori Sign	Source
Dependent variable:				
GDP	Gross domestic product	Quantity of all goods and services produced, multiplying them by their prices, and summing the total.	nil	Chowdhury et al. (2019)
Independent variables:				
EXR	Exchange rate	Bilateral exchange rate of Naira to US dollar (USD).	-	Onakoya (2018)
IFR	Inflation rate	The well-known measure of the inflation rate is the consumer price index, which measures the percentage change in the price of a basket of goods and services.	-	Anochie et al. (2023)

| DCR | Discount rate | Monetary policy rate in Nigeria; *Central Bank* policy rate in Ghana and Reserve Bank repo rate in South Africa. | + | Allor (2020) |
| UPR | Unemployment rate | Measured by dividing the number of unemployed individuals by the number of individuals currently employed in the workforce. | - | Asiya and Mgeni (2021) |

Source: Researchers compilation

Technique of Data Analysis

The study employed the autoregressive distributed lag (ARDL) bounds test methodology. In cases where the variables exhibit cointegration, the long-run ARDL model is estimated, along with determining the speed of adjustment. Through ARDL analysis, both long-run and short-run coefficients are concurrently estimated, and the model was formulated and applied for cointegration testing even if not all variables were stationary after initial differencing 1(1) or at level, i.e., 1(0). The ARDL model was utilized when the variables displayed mixed integration at order one, 1(1), and at level 1(0), with none being integrated at second differencing, 1(2) (Pesaran et al., 2001). The specification of the ARDL bounds testing equation (2) was represented by equation (3).

$$\Delta GDP_t = \delta_0 + \sum_{i=1}^{p} \delta_1 \Delta GDP_{t-i} + \sum_{i=0}^{p} \delta_2 EXR_{t-i} + \sum_{i=0}^{p} \delta_3 IFR_{t-i} + \sum_{i=0}^{p} \delta_4 DCR_{t-i} + \sum_{i=0}^{p} \delta_5 UPR_{t-i} +$$
$$\beta_1 EXR_{t-1} + \beta_2 IFR_{t-1} + \beta_3 DCR_{t-1} + \beta_4 UPR_{t-1} + \mu_t \tag{3}$$

After cointegration is established, the estimation of the long-run relationship is specified, thus:

$$\Delta GDP_t = \delta_0 + \beta_1 GDP_{t-1} + \beta_2 EXR_{t-1} + \beta_3 IFR_{t-1} + \beta_4 DCR_{t-1} + \beta_5 UPR_{t-1} + \mu_t \tag{4}$$

The short-run relationship was estimated using an error correction mechanism as shown in equation (5):

$$\Delta GDP_t = \delta_0 + \sum_{i=1}^{p} \delta_1 \Delta GDP_{t-i} + \sum_{i=0}^{p} \delta_2 \Delta EXR_{t-i} + \sum_{i=0}^{p} \delta_3 \Delta IFR_{t-i} + \sum_{i=0}^{p} \delta_4 \Delta DCR_{t-i} +$$
$$\sum_{i=0}^{p} \delta_5 \Delta UPR_{t-i} + \theta ecm_{t-i} + \mu_t \tag{5}$$

Where,

δ_0 = Constant

δ_1 - δ_6 = short-run elasticities (coefficients of the first-differenced explanatory variables)

β_1 - β_6 = long-run elasticites (coefficients of the explanatory variables)

θ = Speed of adjustment

ecm_{t-i} = Error correction term lagged for one period

Δ = First difference operator

p = Lag length

Before ARDL estimation, the time series data was tested for stationarity. The test for stationarity of data was carried out with the Augmented Dickey-Fuller (ADF) unit root test. This particular stage is very

necessary because most macroeconomic time series contain unit roots, and any regression involving non-stationary series almost always produces significant relationships where no relationship exists between the variables. The general model for the ADF unit root test could be represented by equation (6):

$$\Delta y_t = \beta_0 + \beta_1 t + \beta\lambda y_{t-1} + \sum_{j-1}^{p} \delta_j \Delta y_{t-j} + \mu_t \tag{6}$$

Where,

y_{t-1} = Lagged value of y_t at first difference

Δy_{t-j} = A change in lagged value

δ = Measure of lag length

Δy_t = First difference of y_t

μ_t = Error term

ANALYSIS AND DISCUSSIONS

Trend Analysis of the Data

Figure 2 illustrates that during the period spanning from 1980 to 2011, the South African economy exhibited a more substantial growth in GDP compared to Nigeria and Ghana. It is noteworthy that Ghana displayed the lowest GDP value within this timeframe. This observation suggests that South Africa boasted the most extensive economy among the trio throughout the years from 1980 to 2010. Nevertheless, in 2011, South Africa and Nigeria approached similar GDP values, standing at $382 billion and $387.70 billion, respectively, whereas Ghana's GDP was reported at $36.7 billion. Subsequent to 2011, Nigeria's economy surpassed that of South Africa, emerging with the highest GDP from 2012 to 2018, while Ghana's GDP remained relatively low. One plausible explanation for Nigeria's GDP outpacing South Africa's in 2011 could be attributed to the surge in crude oil prices, exceeding $100 per barrel for three consecutive years from 2011 to 2013. Following this period, Nigeria's GDP growth rate decelerated, yet it remained superior to that of South Africa and Ghana. The notable GDP figures recorded for Nigeria and South Africa can be ascribed to their possession of more abundant economic resources, such as petroleum and labor, in comparison to Ghana. Moreover, the recalibration of Nigeria's economy resulted in a surge in GDP from USD 270 billion to USD 510 billion in 2013, encompassing previously underreported sectors like telecommunications, cinema, and retail. Consequently, Nigeria emerged as the largest economy on the African continent and the 26th largest globally (PWC, 2015). However, in 2020, the GDP of the three nations under consideration experienced a decline due to the repercussions of the COVID-19 pandemic and the ensuing nationwide lockdowns, with South Africa encountering the most significant downturn, followed by Nigeria and Ghana. The substantial drop in GDP for Nigeria, South Africa, and Ghana in 2020 was primarily a result of the complete halt in global commodity markets, given these countries' reliance on revenues from oil and gold exports.

Figure 2: Trend of gross domestic product (GDP)
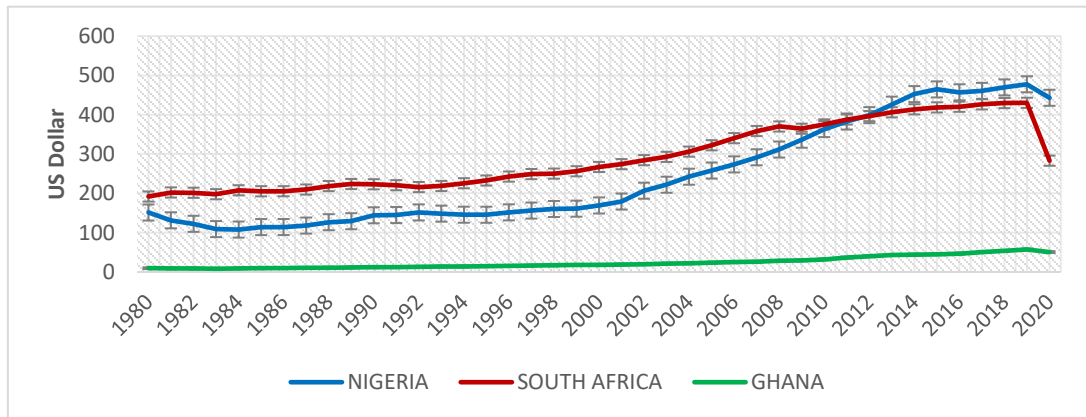
Source: Researcher's computations using MS Excel and WDI data

Figure 3 illustrates the trajectory of the exchange rate (EXR) for Nigeria, South Africa, and Ghana, indicating that Nigeria experienced significant volatility in its exchange rate with the US dollar in contrast to South Africa and Ghana. This phenomenon can be linked to the tendency of monetary authorities in Nigeria to rely on exchange rate devaluation to promote the export of crude oil and other petroleum products, which form the backbone of the Nigerian economy. In contrast, the economies of South Africa and Ghana are more diversified and not reliant on a single commodity for foreign exchange, leading to comparatively lower exchange rates for these countries (IMF, 2019). However, in the earlier period from 1980 to 1985, Nigeria's currency exhibited more stability compared to South Africa and Ghana, as Nigeria's economy was primarily agrarian with a thriving oil export sector. The COVID-19 crisis resulted in a depreciation of the exchange rates of these countries against the US dollar, particularly impacting Nigeria, heavily dependent on oil revenue, due to the collapse of the global oil market even before the 2020 lockdown.

Figure 3: Trend of exchange rate
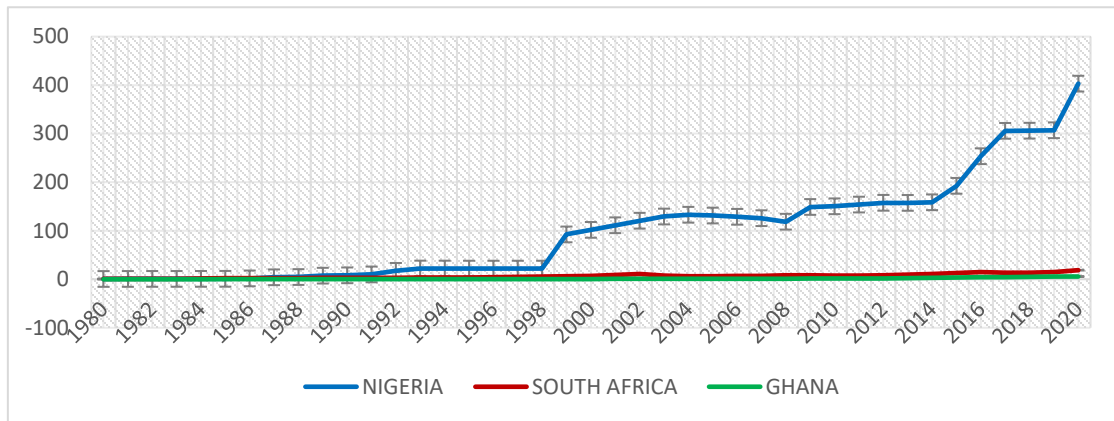
Source: Researcher's computations using MS Excel and WDI data

Figure 4 demonstrates that Ghana faced higher inflationary pressures than Nigeria and South Africa, particularly between 1980 and 1985, possibly stemming from low productivity exacerbated by high production costs in Ghana (Appienti et al., 2016). While South Africa maintained relatively stable inflation rates, Ghana and Nigeria experienced significant fluctuations, likely due to economic shocks resulting from changes in macroeconomic policies. Additionally, South Africa's lower inflation rates may be attributed to reduced costs of raw materials and borrowing interest rates compared to Nigeria and Ghana (IMF, 2014). In 2020, inflation rates surged in Nigeria and Ghana as both countries failed to lower their discount rates, while South Africa's reduction in discount rates potentially stimulated increased production and subsequently lowered overall prices.

Figure 4: Trend of inflation
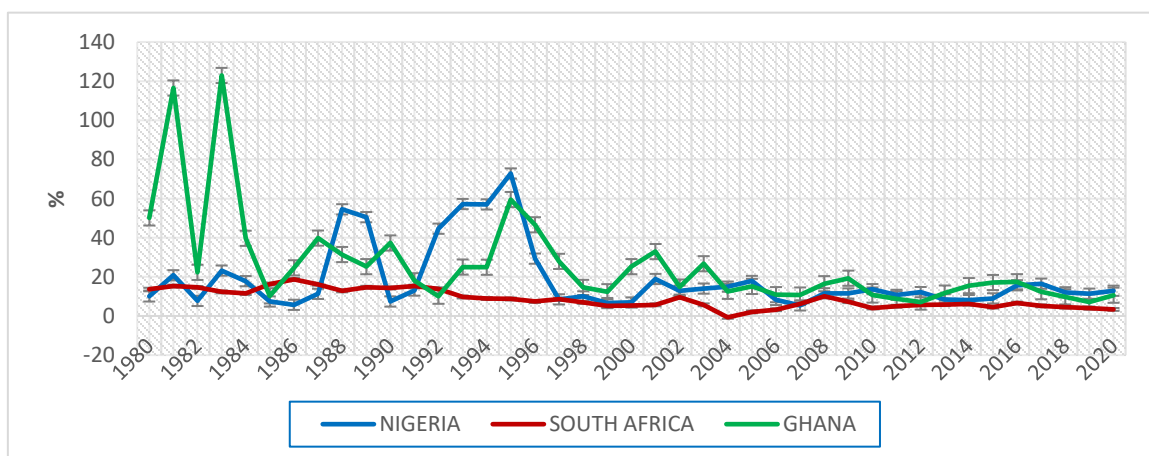
Source: Researcher's computations using MS Excel and WDI data

Figure 5 depicts the trend of the discount rate, synonymous with monetary policy, across the sampled countries, indicating that Ghana had the highest discount rate, followed by Nigeria and South Africa. This suggests that Ghana enforces a more stringent monetary policy compared to Nigeria and South Africa. The relatively low discount rates in Nigeria and South Africa may be linked to their pursuit of expansionary monetary policies to support significant investments in their large economies. Amid the challenges posed by the COVID-19 pandemic in 2020, South Africa decreased its discount rate, Nigeria maintained its rate at 13.50% from 2019, and Ghana increased its rate from 14.5% in 2019 to 15.43% in 2020. This adjustment explains the upward trend in the discount rate curve for Ghana, the stagnation observed for Nigeria, and the downward trend in the curve for South Africa.

Figure 5: Trend of discount rate
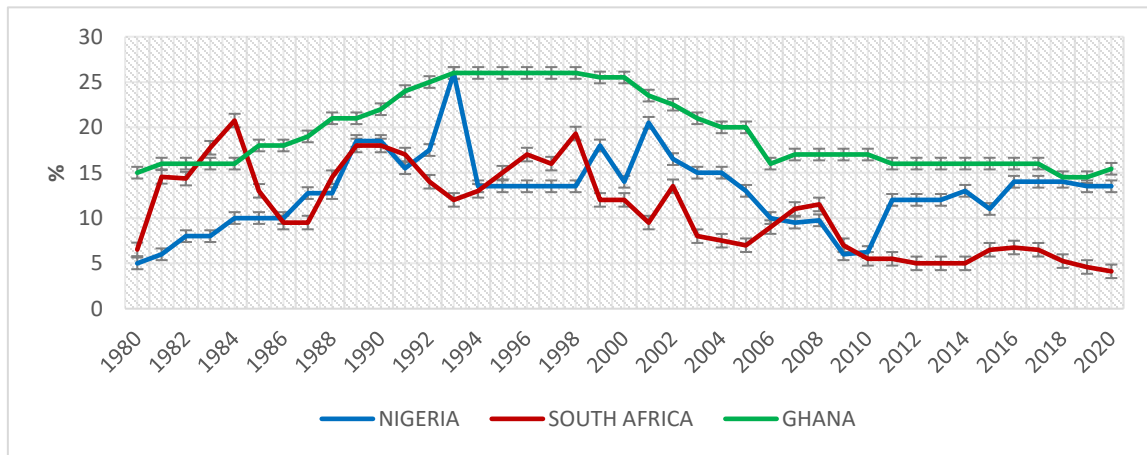
Source: Researcher's computations using MS Excel and WDI data

Figure 6 illustrates the comparison of unemployment rates between 1980 and 1999 in Nigeria, Ghana, and South Africa. During this period, Nigeria exhibited the lowest unemployment rate, followed by Ghana, and South Africa had the highest rate. The disparity can be attributed to the presence of numerous operational industries in the Nigerian economy such as textiles, cement, vehicle manufacturing, fertiliser production, and agro-allied industries. In contrast, South Africa was grappling with the challenges of apartheid, while Ghana was characterized by underdevelopment and a succession of political upheavals. Subsequently, starting from the year 2000, Nigeria experienced a more significant increase in unemployment compared to Ghana, potentially due to its larger population growth rate of 4.89% annually, in contrast to Ghana's rate of 0.45%. Furthermore, it is evident that all three countries experienced a surge in unemployment in 2020 as a result of the global health crisis caused by the COVID-19 pandemic.

Figure 6: Trend of unemployment rate
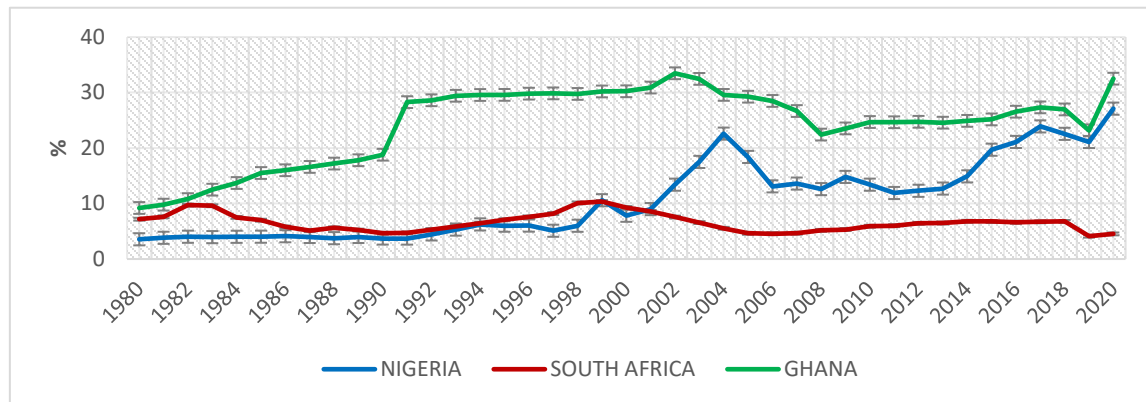
Source: Researcher's computations using MS Excel and WDI data

Descriptive Statistic

The summary statistics of the dataset used for the study are presented in Table 2, respectively. Hence, from the information contained in the tables, the macroeconomic variables and GDP of the selected countries were duly compared to show disparities between them.

Table 2: Descriptive statistic

Panel A: Nigeria

	GDP	EXR	IFR	DCR	UPR
Mean	244.2907	98.82146	18.75122	12.84146	10.80244
Median	169.2000	101.7000	12.20000	13.00000	9.000000
Maximum	477.2200	379.5000	72.80000	26.00000	30.20000
Minimum	107.9000	0.550000	5.400000	5.000000	3.560000
Std. Dev.	130.6456	102.0667	16.72696	4.146443	7.190502
Skewness	0.664619	0.972904	1.861752	0.574840	0.790492
Kurtosis	1.839960	3.243001	5.306280	4.210665	2.660720
Jarque-Bera	5.317304	6.568911	32.77166	4.761932	4.466640
Probability	0.070043	0.037461	0.000000	0.092461	0.107172
Observations	41	41	41	41	41

Panel B: South Africa

	GDP	EXR	IFR	DCR	UPR
Mean	292.0783	6.367628	8.656098	10.89878	24.38268
Median	267.0000	6.360000	7.300000	11.00000	26.55000
Maximum	430.2000	16.47274	18.70000	20.75000	37.00000
Minimum	192.0000	0.780000	-0.700000	3.500000	9.200000
Std. Dev.	82.71678	4.293274	4.660475	4.806657	6.957950
Skewness	0.449519	0.627387	0.370672	0.265744	-0.693970
Kurtosis	1.656184	2.465563	2.152898	1.879529	2.549814
Jarque-Bera	4.465773	3.177635	2.164752	2.627304	3.637117
Probability	0.107218	0.204167	0.338790	0.268836	0.162259
Observations	41	41	41	41	41

Panel C: Ghana

	GDP	EXR	IFR	DCR	UPR
Mean	23.89024	1.160244	26.14829	19.54707	6.579024
Median	18.40000	0.540000	17.50000	18.00000	6.480000
Maximum	57.30000	5.860000	122.9000	26.00000	10.36000
Minimum	8.300000	0.000000	7.100000	14.50000	4.120000
Std. Dev.	14.75882	1.609411	24.80273	4.116959	1.633588
Skewness	0.863726	1.567743	2.726882	0.495507	0.677599
Kurtosis	2.411150	4.325067	10.63863	1.663935	2.748040
Jarque-Bera	5.690177	19.79458	150.4907	4.727262	3.245911
Probability	0.058129	0.000050	0.000000	0.094078	0.197315
Observations	41	41	41	41	41

Source: Author's computations using EViews 10.0

From Table 2, each of the series demonstrated a significant level of consistency, given that their mean and median values fell within the range of the series' maximum and minimum values. The data presented in the table suggests that all the variables followed a normal distribution pattern. The mean GDP values for Nigeria, South Africa, and Ghana were recorded at $244.2907 billion, $292.0783 billion, and $23.89024 billion, respectively, indicating that the economy of South Africa surpassed that of Nigeria and Ghana. Additionally, the GDP ranges for Nigeria, South Africa, and Ghana were $107.9000 billion to $477.2200 billion, $192.0000 billion to $430.2000 billion, and $8.3000 billion to $57.3000 billion, respectively. Notably, the GDP series for Ghana was the only one among the three countries that did not exhibit a normal distribution.

The analysis of mean scores revealed that Nigeria had the highest average exchange rate of 98.82146, followed by South Africa at 6.367628, and Ghana at 1.160244. The exchange rate values for Nigeria ranged from 0.550000 to 379.5000, while those of South Africa varied from 0.780000 to 16.47274, and Ghana's exchange rate fluctuated between 0.000275 and 5.860000. This indicates that Nigeria experienced more significant currency depreciation compared to South Africa and Ghana. Furthermore, the exchange rate series for Ghana did not follow a normal distribution pattern as observed in the data for Nigeria and South Africa.

Moreover, the average inflation rates for Nigeria, South Africa, and Ghana were found to be 18.75122%, 8.656098%, and 26.14829%, respectively. The inflation rates ranged from 5.400000 to 72.80000% for Nigeria, -0.700000 to 18.70000% for South Africa, and 7.100000 to 122.9000% for Ghana, highlighting higher inflationary pressures experienced by Ghana and Nigeria compared to South Africa. It is worth noting that only the data associated with South Africa displayed a normal distribution in terms of inflation rates.

In terms of the discount rate (DCR), the average values for Nigeria, South Africa, and Ghana were 12.84146%, 10.89878%, and 19.54707%, respectively. The range of discount rate values for each country

was from 5.000000 to 26.00000 for Nigeria, 5.000000 to 20.75000% for South Africa, and 14.50000 to 26.00000 for Ghana, showcasing Ghana's adoption of a more stringent monetary policy with a higher average discount rate of 19.54707%. Interestingly, the distribution of the discount rate series was found to be normal across all the countries included in the analysis.

In relation to unemployment rates (UPR), Nigeria, South Africa, and Ghana displayed an average growth rate of 10.80244%, 24.38268%, and 6.579024%, respectively. Upon examination of the minimum and maximum values, it was identified that the UPR series for Nigeria, South Africa, and Ghana varied from 3.560000 to 30.20000; 9.200000 to 37.00000; and 4.570000 to 10.36000, correspondingly. This unequivocally indicates that the prevalence of unemployment was most pronounced in South Africa, succeeded by Nigeria and Ghana. The distribution of UPR series among the countries exhibited normality as determined by the Jarque-Bera test's p-value, which signifies the likelihood of accepting the null hypothesis.

Stationarity Tests

The presence of stationarity is manifested by a scenario where the Augmented Dickey-Fuller (ADF) t-statistic exceeds the critical values established by McKinnon at either the 1% or 5% significance level (Mushtaq, 2011). In contrast, a variable is deemed stationary if its p-value falls below 0.05. The findings of the ADF unit root test are detailed in Table 3.

Table 3: Unit root test results

riables	Ɡeria		ꞁth Africa		ꞁana	
	)	)	)	)	)	)
ꞁP	72644 {7186}	58249 {0442}	58566 {0.9743}	0773 {0016}	34616 {0776}	55128 {0415}
R	00570 {9950}	51772 {0035}	26299 {4432}	55771 {0.0031}	59445 {2865}	09459 {0134}
ꞁ	76497 {0295}		35991 {1858}	38196 {0.0005}	56960 {0.0000}	
ꞁR	16336 {1063}	70285 {0000}	59750 {0.0038}		76334 {7036}	54556 {0003}

| R | 34781 | 71211 | 38953 | 78840 | 59871 | 37038 |
| | 1909} | 0027} | {0.6413} | 0022} | 2830} | 0067} |

st critical values:

| | | 211868 |
| | | 529758 |

Source: Author's computations using EViews 10.0

Note: Figures in parenthesis are probability values at 5% level of significance

The results of the ADF test indicate that the model variables utilized in the research displayed a diverse level of integration at I(0) and I(1). In the case of Nigeria, the variables IFR and UPR exhibited integration at the same level, whereas GDP, EXR, and DCR were stationary at the first difference. Concerning the variables of South Africa, solely DCR displayed stationarity at the same level, while the rest attained stationarity at the first difference. For Ghana, solely IFR was stationary at the same level, whereas the remaining variables were stationary at the first difference. Given that none of the variables demonstrated stationarity at the second difference, specifically I(2), and the integration order comprised a combination of I(0) and I(1), the Autoregressive Distributed Lag (ARDL) model was computed.

Diagnostic Tests for the ARDL Estimation

The diagnostic tests of serial correlation, heteroskedasticity, and normality of residuals were based on the following hypothesis at the 5% level of significance as summarized in Table 4.

H_o: Residuals are not serially correlation, residuals are homoscedastic and normally distributed.

H_1: Residuals are serially correlated, heteroskedastic and abnormally distributed.

Decision Rules: Reject H_o if p-value of the Chi-squared is less than α, which mean that there is an autocorrelation problem. Otherwise, do not reject H_o:

Table 4: Diagnostic test results

Breusch-Godfrey Serial Correlation LM Test:				
Nigeria	F-statistic	0.600024	Prob. $F_{(2,12)}$	0.5674
South Africa	F-statistic	0.030390	Prob. $F_{(2,18)}$	0.9701
Ghana	F-statistic	2.003313	Prob. $F_{(2,21)}$	0.1717
Heteroskedasticity Test: Breusch-Pagan-Godfrey:				
Nigeria	F-statistic	2.355702	Prob. $F_{(20,14)}$	0.0620
South Africa	F-statistic	1.649537	Prob. $F_{(14,20)}$	0.0936
Ghana	F-statistic	0.912275	Prob. $F_{(12,23)}$	0.5803

Normality Test:				
Nigeria	Jarque-Bera	0.7186	Prob.	0.6982
South Africa	Jarque-Bera	4.8239	Prob.	0.0896
Ghana	Jarque-Bera	1.3187	Prob.	0.5172

Source: Author's computations using EViews 10.0

Figure 7: Plots of CUSUM and CUSUMSQ
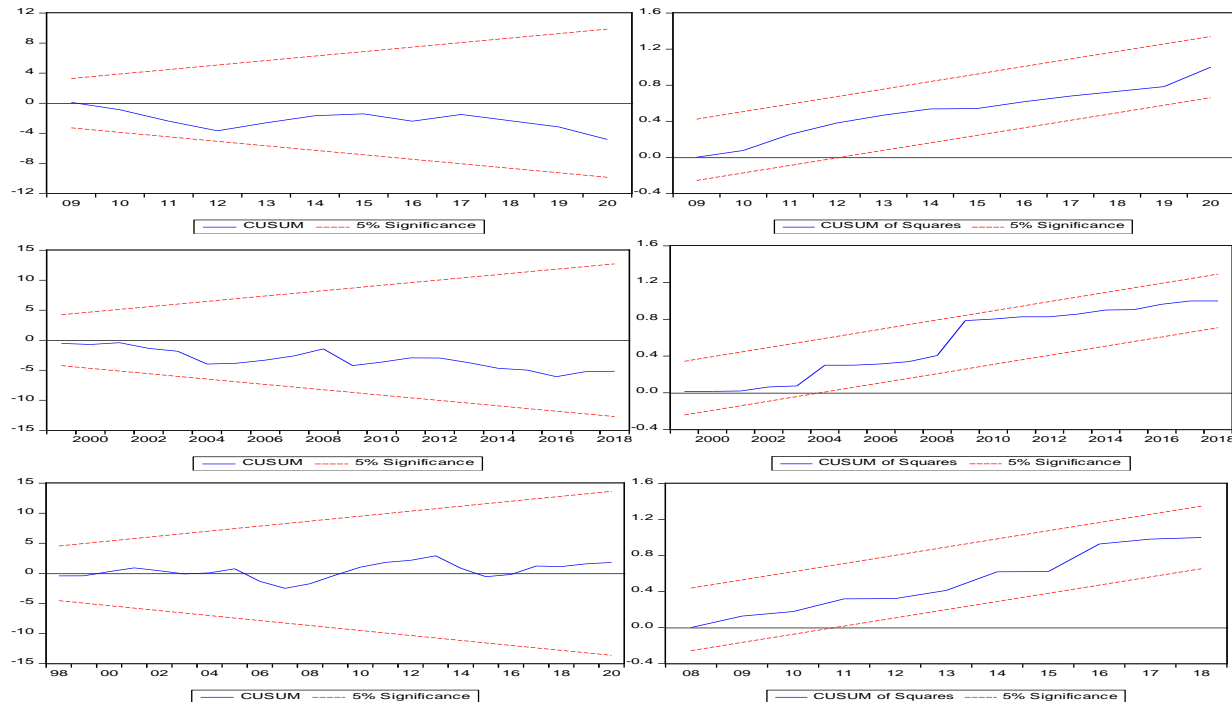
Source: EViews 10.0 output

The findings indicate that the ARDL model successfully passed the necessary diagnostic examinations. Absence of autocorrelation is observed at a significance level of 5%, and the model satisfactorily met the normality test. Additionally, it has been verified that the error term follows a normal distribution. The model does not exhibit any signs of heteroscedasticity. In order to assess the durability of the long-term and short-term estimations, the application of Cumulative Sum (CUSUM) and Cumulative Sum of Squares (CUSUMSQ) was employed. Figure 7 provides a visual representation of CUSUM and CUSUMSQ. Both CUSUM and CUSUMSQ plots fall within the established limits, affirming the stability of the long-term coefficients of the variables influencing the GDP in Nigeria, South Africa, and Ghana. Given that neither of the two test statistics exceed the 5 percent significance level, the model is deemed to be stable and appropriately specified.

Bounds Test

In the context of ARDL estimation, bound testing represents a method employed to assess the existence of a long-term association among the variables within the model. It serves to explore the potential

cointegration of the variables in question. The findings of the bounds test are illustrated in Table 5.

Table 5: ARDL bounds testing results for cointegration

Panel A: Nigeria				
Test Statistic	**Value**	**Signif.**	**I(0)**	**I(1)**
F-statistic	4.890816	10%	2.2	3.09
k	4	5%	2.56	3.49
		1%	3.29	4.37
Panel B: South Africa				
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	4.288392	10%	2.2	3.09
k	4	5%	2.56	3.49
		1%	3.29	4.37
Panel C: Ghana				
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	18.07325	10%	2.2	3.09
k	4	5%	2.56	3.49
		1%	3.29	4.37

Source: Author's computations using EViews 10.0

The ARDL bounds testing for cointegration yielded a computed F-statistic of 4.890816 for Nigeria, 4.288392 for South Africa, and 18.07325 for Ghana, surpassing the critical values of the lower bound {I(0)} and the upper bound {I(1)} at the 1% and 5% levels of significance, resulting in the rejection of the null hypothesis of "no cointegration." This indicates a sustained relationship among the variables in Nigeria, South Africa, and Ghana over time. Thus, it can be inferred that GDP, EXR, IFR, DCR, and UPR are linked by a lasting association or adhere to a prolonged trajectory. This discovery is consistent with the endogenous growth paradigm, which attributes advancements to economic efficiency and macroeconomic essentials. Subsequently, upon confirming the cointegration of the variables, the ARDL long-run estimates were computed and are displayed in Table 6.

Table 6: Long-run estimates

	̴geria		ɪth Africa		ιana	
̴riables	**efficient**	**ɔb.**	**efficient**	**ɔb.**	**efficient**	**ɔb.**
R(-1)	̷457028	̷0424}	.03284	̷0014}	̷064687	̷0003}
R(-1)	̷030187	̷9314}	̷480976	̷0013}	̷006622	̷6810}
R(-1)	̷595201	̷0114}	̷264056	̷8029}	̷242080	̷0064}
R(-1)	̷46516	̷2014}	̷377797	̷7366}	̷435486	̷0309}

Source: Author's computations using EViews 10.0

The long-term estimates revealed in Table 6 indicate that the exchange rate coefficient (EXR) for the three nations exhibited a negative trend. This suggests that Nigeria, South Africa, and Ghana all saw a reduction

in GDP following a one-unit rise in EXR. In the case of Nigeria, the calculated coefficient of -0.457028 linked to its exchange rate signifies that a one-unit increase in the Naira-Dollar exchange rate led to a GDP decrease of 0.457 units in the long run. Similarly, the estimated coefficient of -11.03284 associated with South Africa's EXR indicates that a one-unit increase in the Rand-Dollar exchange rate corresponded to an approximately 11.033 unit rise in GDP in the long term. Furthermore, based on an estimated coefficient of -3.064687, it was noted that Ghana experienced a decrease of around 3.065 units in GDP due to a one-unit increase in the Cedis-Dollar exchange rate over the long term. Nevertheless, the adverse impact of the exchange rate was more pronounced in South Africa, followed by Ghana and Nigeria, as inferred from the magnitude of the estimates.

The negative coefficient of the Inflation Rate (IFR) for Nigeria, South Africa, and Ghana signifies that the Gross Domestic Product (GDP) of these chosen sub-Saharan African nations was adversely impacted by a one-unit rise in the inflation rate. The estimations of IFR coefficients reveal that Nigeria, South Africa, and Ghana experienced approximately 0.0302 units, 4.481 units, and 0.007 units decrease in GDP, respectively, following a one-unit increase in inflation. This analysis highlights the detrimental effects of increasing inflation rates on the economies of the surveyed countries over an extended period, particularly emphasizing South Africa's susceptibility to inflation due to the magnitude of its coefficient. The negative estimated coefficient of the Discount Rate (DCR) was consistent across the surveyed countries. Specifically, the DCR coefficients for Nigeria, South Africa, and Ghana were recorded as -0.595201, -0.264056, and -0.242080, respectively. These findings suggest that a one-unit increase in the discount rate corresponded to a decrease of about 0.595 units, 0.264 units, and 0.242 units in GDP for Nigeria, South Africa, and Ghana, respectively. Therefore, it can be inferred that the discount rate policies implemented by the monetary authorities of these nations have not yet yielded positive effects on their GDPs in the long term.

Upon examining the long-term coefficients of the Unemployment Rate (UPR) in the selected countries, it was noted that while South Africa and Ghana exhibited negative UPR coefficients, Nigeria displayed a positive coefficient. Notably, Nigeria's GDP witnessed an increase of approximately 2.847 units due to a one-unit rise in unemployment, as indicated by the coefficient of 2.846516. Conversely, the estimated coefficient of -0.377797 for South Africa illustrates that a rise in the unemployment rate led to a decrease of about 0.378 units in its GDP over the long term. Similarly, Ghana experienced a reduction of around 0.435 units in GDP following the estimated coefficient of -0.435486 associated with the long-term UPR.

Error Correction Mechanism (ECM) and Short-run Estimates

The focus of the ECM is to study the pressure of the estimated long-run equilibrium on the short-run dynamics, and the *a priori* is that error-correction coefficients, which examine the adjustment from shock, are expected to be statistically significant, negatively signed, and have a sizable range of values that has to be between zero and one. Table 7 presents the results of the ECM.

The Error Correction Coefficient (ECM), quantified at -0.071678, -0.228091, and -0.848074, holds substantial negative values as anticipated, indicating the pace at which adjustments transpire towards equilibrium. The ECM elucidates that around 7.17%, 22.81%, and 84.81% of the deviation in GDP from its long-term equilibrium level is rectified within a year for Nigeria, South Africa, and Ghana, respectively. These highly significant ECM values further validate the presence of a sustainable, long-term association between EXR, IFR, DCR, UPR, and GDP in Nigeria. Nonetheless, predicated on the ECM coefficient, the adjustment process exhibited a relatively sluggish pace in Nigeria and South Africa, whereas it manifested a swift adjustment in Ghana. This observation might suggest that macroeconomic instability endures for more extended periods in Nigeria and South Africa.

Table 7: Error correction mechanism (ECM) and short-run estimates

Variables	Nigeria Coefficient	Prob.	South Africa Coefficient	Prob.	Ghana Coefficient	P-value
ECM(-1)	-0.071678	0.0000**	-0.228091	0.0000**	-0.848074	0.0012**
D(EXR)	**-0.475049**	**0.0001****	**-7.892940**	**0.0033****	**0.845261**	**0.2367**
D(EXR(-1))	0.423838	0.0011**	11.42432	0.0007**	-0.225820	0.7930
D(EXR(-2))	0.596775	0.0001**	5.307370	0.0685	5.846035	0.0000**
D(EXR(-3))	0.595201	0.0008**	11.81913	0.0009**	4.532498	0.0001**
D(EXR(-4))	--	--	7.906757	0.0263*	5.844076	0.0000**
D(IFR)	**-0.313604**	**0.0037****	**0.392616**	**0.7130**	**-0.071577**	**0.0418***
D(IFR(-1))	-0.073261	0.3800	0.380172	0.7505	0.457071	0.0001**
D(IFR(-2))	-0.053498	0.5466	2.390129	0.0652	-0.194246	0.0038**
D(IFR(-3))	-0.394479	0.0012**	-2.570181	0.0128*	0.165433	0.0021**
D(DCR)	**-1.839075**	**0.0007****	**1.892718**	**0.0206***	**-0.405438**	**0.0049****
D(DCR(-1))	-0.266653	0.4730	--	--	-0.059472	0.6404
D(DCR(-2))	0.659841	0.0965	--	--	-0.101941	0.4119
D(DCR(-3))	0.887439	0.0274**	--	--	0.173744	0.1981
D(DCR(-4))					-0.270152	0.0561
D(UPR)	**2.277132**	**0.0065****	**-4.649378**	**0.0000****	**-0.562353**	**0.0089****
D(UPR(-1))	-1.648997	0.0238*	1.843530	0.0698	1.001961	0.0000**
D(UPR(-2))	-0.742410	0.2712	--	--	0.275733	0.2387
D(UPR(-3))	-2.284789	0.0047**	--	--	0.613738	0.0021**
R-sq.	0.906809		0.871424		0.912322	
Adj. R-sq.	0.802654		0.804341		0.853870	
F-stat.	619.1687		9.371615		26.36230	
Prob. (F-stat.)	0.000000		0.000008		0.00000	
Durbin-Watson	2.339577		1.785857		2.449570	

Source: Author's computations using EViews 10.0

Note: ** denote significance @ 1% level and * denote significance @ 5% level

The coefficient of determination, also known as the Adjusted R-squared (Adj. R-sq.), serves as a statistical metric for gauging the extent to which the variance in the dependent variables is collectively elucidated by the independent variables. Essentially, it indicates the degree of model fit, or the goodness of fit, to the data. The Adjusted R-squared linked with the regression model portrays the combined influence of macroeconomic factors on the Gross Domestic Product (GDP). Specifically, it denotes that macroeconomic variables such as Exchange Rate (EXR), Inflation Rate (IFR), Discount Rate (DCR), and Unemployment Rate (UPR) jointly expounded approximately 80.27%, 80.43%, and 85.39% of the overall GDP variations for Nigeria, South Africa, and Ghana, respectively.

Upon scrutinizing the short-term evaluations, it becomes apparent that the Exchange Rate (EXR) exerts a negative influence on GDP in Nigeria and South Africa, yet yields a positive effect in Ghana. In the immediate context, Inflation Rate (IFR) negatively impacts the Gross Domestic Product (GDP) in Nigeria and Ghana, while displaying a positive effect on GDP in South Africa. Similarly, the short-term repercussions of the Discount Rate (DCR) on GDP are adverse in Nigeria and Ghana, but favorable in South Africa. Conversely, the short-term effect of the Unemployment Rate (UPR) on GDP indicates a positive relationship for Nigeria, whereas a negative association is observed for South Africa and Ghana as the UPR escalates.

Hypotheses Testing

According to Gujarati (2004), the decision rule for hypothesis testing is as follows:

 a)　　Accept null hypothesis if p-value is greater than 0.05; and,

 b)　　Reject null hypothesis if p-value is less than 0.05.

The test of hypothesis are summarized in Tables 8 (A) and 8 (B).

Table 8 (A): Summary of hypotheses testing for the long-run estimates

	Prediction	Nigeria	South Africa	Ghana
Ho_1	Significantly positive	Exchange rate does not have significant impact on GDP in Nigeria.	Exchange rate does not have significant impact on GDP in South Africa.	Exchange rate does not have significant impact on GDP in Ghana.
	Outcome	Negative (Prob. 0.04 < 0.05)	Negative (Prob. 0.00 < 0.05)	Negative (Prob. 0.00 < 0.05)
	Decision	Significant: Reject Ho	Significant: Reject Ho	Significant: Reject Ho
Ho_2	Significantly negative	The impact of inflation rate on GDP in Nigeria is not significant.	The impact of inflation rate on GDP in South Africa is not significant.	The impact of inflation rate on GDP in Ghana is not significant.
	Outcome	Negative (Prob. 0.93 > 0.05)	Negative (Prob. 0.00 < 0.05)	Negative (Prob. 0.68 > 0.05)
	Decision	Non-significant: Accept Ho	Significant: Reject Ho	Non-significant: Accept Ho
Ho_3	Significantly positive	Discount rate has no statistical significant impact on GDP in Nigeria.	Discount rate has no statistical significant impact on GDP in South Africa.	Discount rate has no statistical significant impact on GDP in Ghana.
	Outcome	Negative (Prob. 0.01 < 0.05)	Negative (Prob. 0.80)	Negative (Prob. 0.00 < 0.05)
	Decision	Significant: Reject Ho	Non-significant: Accept Ho	Significant: Reject Ho

Ho4	Significantly negative	The impact of unemployment rate on gross domestic product is not significant in Nigeria. Positive (prob. 0.20 > 0.05)	The impact of unemployment rate on gross domestic product is not significant in, South Africa.	The impact of unemployment rate on gross domestic product is not significant in Ghana. Negative (Prob. 0.03 < 0.05)
	Outcome	Non-significant: Accept Ho	Negative (Prob. 0.73 > 0.05)	Significant: Reject Ho
	Decision		Non-significant: Accept Ho	

Source: Compiled by researchers

Table 8 (B): Summary of hypotheses testing for the short-run estimates

	Prediction	Nigeria	South Africa	Ghana
Ho1	Significantly positive	Exchange rate does not have significant impact on GDP in Nigeria.	Exchange rate does not have significant impact on GDP in South Africa.	Exchange rate does not have significant impact on GDP in Ghana.
	Outcome	Negative (Prob. 0.00 < 0.05)	Negative (Prob. 0.00 < 0.05)	Negative (Prob. 0.23 > 0.05)
	Decision	Significant: Reject Ho	Significant: Reject Ho	Non-significant: Accept Ho
Ho2	Significantly negative	The impact of inflation rate on GDP in Nigeria is not significant.	The impact of inflation rate on GDP in South Africa is not significant.	The impact of inflation rate on GDP in Ghana is not significant.
	Outcome	Negative (Prob. 0.00 < 0.05)	Negative (Prob. 0.73 > 0.05)	Negative (Prob. 0.04 < 0.05)
	Decision	Significant: Reject Ho	Non-significant: Accept Ho	Significant: Reject Ho
Ho3	Significantly positive	Discount rate has no statistical significant impact on GDP in Nigeria.	Discount rate has no statistical significant impact on GDP in South Africa.	Discount rate has no statistical significant impact on GDP in Ghana.
	Outcome	Negative (Prob. 0.00 < 0.05)	Negative (Prob. 0.02 < 0.05)	Negative (Prob. 0.00 < 0.05)
	Decision	Significant: Reject Ho	Significant: Reject Ho	Significant: Reject Ho
Ho4	Significantly negative	The impact of unemployment rate on gross domestic product is not significant in Nigeria. Positive (prob. 0.00 < 0.05)	The impact of unemployment rate on gross domestic product is not significant in, South Africa.	The impact of unemployment rate on gross domestic product is not significant in Ghana. Negative (Prob. 0.00 < 0.05)
	Outcome	Significant: Reject Ho	Negative (Prob. 0.00 < 0.05)	Significant: Reject Ho
	Decision		Significant: Reject Ho	

Source: Compiled by researchers

Discussion of Findings

The results suggest that the impact of exchange rate fluctuations on GDP in Nigeria, South Africa, and Ghana is consistent in both the long and short terms, with Ghana failing to show significance in the short term. This indicates that exchange rate variations affect these countries' domestic production capabilities over time, posing a common challenge for Sub-Saharan African nations. The reliance of these countries on imported capital goods for local manufacturing elevates production costs due to unstable exchange rates. Increased exchange rates raise import costs, consequently impacting production expenses as these nations struggle to obtain adequate foreign inputs crucial for domestic productivity. Nigeria and South Africa

experienced more pronounced effects of exchange rate movements in the short term, likely due to their close connections with global markets through crude oil and gold trade respectively. Previous studies by Onakoya (2018), Chizonde (2016), Darko (2015), and Antwi et al. (2013) align with these short-term findings, highlighting the substantial influence of exchange rates on domestic production.

Analysis of long-run coefficients reveals that inflation had a negative impact on GDP across the three countries, with significant effects observed in South Africa. In the short term, Nigeria and Ghana faced adverse and significant consequences of inflation, while South Africa exhibited a positive yet insignificant relationship. A comparison of long-term and short-term outcomes indicates varying effects of inflation on GDP in Nigeria, South Africa, and Ghana over time. Rising inflation in the long run may hinder production in the Sub-Saharan region, particularly impacting South Africa more than Nigeria and Ghana. This underscores the idea that high inflation rates diminish the value of money, escalating production costs and consequently leading to decreased GDP in Sub-Saharan Africa. These findings corroborate the empirical findings of Nwokoye et al. (2015), emphasizing that elevated inflation rates could deter domestic production in the long term within Sub-Saharan African countries. In SSA nations, inflationary pressures stem from substantial budget deficits, resulting in limited investable capital and sluggish GDP growth.

The adverse long-term coefficients of the discount rate observed in the selected nations suggest inadequacies in the management of monetary systems within SSA countries, particularly pronounced in Nigeria and Ghana compared to South Africa. During the immediate term, the Discount Rate (DCR) emerged as a noteworthy macroeconomic factor across these nations, displaying a negative impact on Nigeria and Ghana, potentially signifying a greater susceptibility of these countries to macroeconomic decisions in the early stages of production than South Africa. The disparity between the long-term and short-term effects could imply adjustments made by policymakers in monetary decisions in response to varying economic conditions over time, possibly indicating inefficiencies in the implementation of monetary policies in these selected countries. The substantial coefficient of DCR for Nigeria and Ghana suggests that the application of the discount rate for economic stabilization has led to significant alterations in domestic production, contrasting with South Africa where the DCR did not demonstrate significance. These results are in line with the findings of Johnson and Onakoya (2018), who identified the discount rate as a key determinant of economic growth. Additionally, if the discount rate produces a detrimental impact on GDP, as suggested by Shimu and Islam (2018), this negative influence may stem from constraints associated with simultaneously pursuing other primary economic goals. The choice between an expansionary or contractionary discount rate by monetary authorities, which affects interest rates and borrowing costs, subsequently influencing investment and consumer durable purchases, plays a crucial role. The short-term coefficients revealing a negative and substantial impact of DCR on GDP in Nigeria and

Ghana, while being positive and insignificant in South Africa, could imply inconsistencies between monetary policy and economic objectives in Nigeria and Ghana.

In the long term, the Unemployment Rate (UPR) has a positive yet insignificant effect on GDP in Nigeria, a negative and non-significant impact in South Africa, and a negative and significant impact in Ghana. In the short term, UPR significantly impacted GDP across the countries, albeit negatively in South Africa and Ghana. This could be attributed to Ghana's lower population compared to Nigeria and South Africa, potentially leading to the considerable negative impact of UPR on GDP in Ghana due to a less skilled labor force compared to the other nations. The positive and insignificant UPR in Nigeria might be due to a significant portion of the population engaging in the informal sector, often not considered in official job statistics. Consistent with the lack of significance of UPR for Nigeria and South Africa, research by Onakoya (2018) and Ho and Iyke (2018) suggests that the unemployment rate may not exert a noteworthy influence on economic growth when individuals can find employment in the informal sector or through self-employment.

CONCLUSIONS AND RECOMMENDATIONS

The examination explored the effects of the exchange rate, inflation rate, discount rate, and unemployment rate on the actual economies of Nigeria, South Africa, and Ghana. The findings indicated that in Nigeria, the Gross Domestic Product (GDP) was primarily influenced by the exchange rate and the discount rate. In the case of South Africa, the long-term GDP was predominantly determined by the exchange rate and inflation rate. As for Ghana, in the long term, the main factors affecting GDP were the exchange rate, discount rate, and unemployment. In the short term, the prominent determinants of economic growth were the exchange rate, inflation, discount rate, and unemployment. In South Africa, the significant determinants of GDP were the exchange rate, discount rate, and unemployment rate, while in Ghana, inflation, discount rate, and unemployment rate were the most crucial determinants of GDP in the short term. By comparing the long-term and short-term outcomes for the three nations, it was concluded that the impact of macroeconomic dynamics varied among countries and over time. Nonetheless, in the long term, the exchange rate proved to be the most critical variable across the countries, whereas the discount rate and unemployment were the most significant in the short term across the countries.

Numerous policy implications can be derived from the aforementioned discoveries and conclusions of the research, emphasizing the importance of effective management of macroeconomic variables by policymakers. Given the varying impact of the exchange rate on the real economy of Nigeria, South Africa, and Ghana over time, continuous utilization and management of the floating exchange rate system in these nations would significantly enhance economic activities, thus boosting domestic production. It was

observed that Nigeria, South Africa, and Ghana grappled with inflationary pressures, particularly in the short term. Therefore, monetary authorities should meticulously identify the root causes of such inflationary pressures and implement suitable policies (such as monetary and fiscal policies) to mitigate them, thereby fostering domestic economic productivity. With the discount rate emerging as a crucial variable for the actual economies of Nigeria, South Africa, and Ghana, it is advised that monetary authorities employ interest rates to regulate the demand and supply of goods and services within the economies as deemed necessary. For example, increasing the discount rate could help reduce unnecessary demand in the economy, thereby lowering inflation and promoting a more stable economic environment. The unemployment rate was observed to have the most significant impact in the short term across the countries under study. Therefore, it is recommended that all the nations examined concentrate on the training and education of their burgeoning population to ensure they acquire the requisite skills and competencies to engage in genuine economic production.

Conflicts of Interest

The authors have disclosed no conflicts of interest.

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