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Exchange Rate Fluctuation and Real Sector Output in Nigeria: A Disaggregated Analysis (1986 – 2021)

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ABSTRACT

This study examined the effect of exchange rate fluctuation on real sector output in Nigeria. It is the goal of every economy to have a stable rate of exchange with its trading partners. In Nigeria, this goal was not attained in spite of the fact that the country embarked on devaluation to promote export and stabilize the rate of exchange. Despite various efforts by the government to maintain a stable exchange rate, the Naira has depreciated throughout the 1980s to date. It is worrisome to note that Nigerian economy is under industrialized and its capacity utilization is also low. Specifically, this study examined the effect of exchange rate fluctuation on agricultural, industrial, building and construction, and trade sector outputs. It employed an ex-post facto research design and the main statistical was the Auto-Regressive Distributive Lag (ARDL) estimation technique using secondary data sourced from the Central bank of Nigeria statistical bulletins from 1986-2021. The result of the analyses revealed that exchange rate fluctuation had significant negative effect on agricultural sector output. Also, exchange rate was found to have a significant and negative effect on industrial, building and construction, and also trade sector output in Nigeria even though these effects were negative. The study concludes that although foreign exchange had significant effect on the real sector, such effect were negative thus displaying an inverse relationship. Sequel to these findings, there is a need for government at all levels (federal, state, and local) to actually invest in agriculture in an effort to match domestic demand and export to compete with crude oil for foreign exchange earnings. The Central Bank of Nigeria (CBN) is to provide foreign exchange relief measures for the acquisition of raw commodities that the nation naturally lacks while maintaining minimal exchange rate fluctuation to encourage local production by industries.

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1. INTRODUCTION

One of the most significant prices in an open economy that regulates the flow of goods, services, and capital within a country and places significant pressure on the balance of payments, inflation, and other macroeconomic variables is the exchange rate, which is the price of one country's currency in relation to another country. In order to protect economic growth, macroeconomic stability, and competitiveness, it is crucial to choose and administer an exchange rate regime. It is the quantity of a currency that must be present in order to purchase an equal quantity of another currency. Demand and supply for foreign exchange interact to set exchange rates; as a result, if demand for a currency increases but supply remains constant, the value of that currency will rise in value. According to Aliyu (2014), Aliyu made the observation that an increase in the exchange rate causes a decrease in exports and an increase in imports, whereas a depreciation would increase exports and discourage imports. On the other hand, a depreciation tends to cause a shift from imported goods to domestic goods. As a result, there

is a shift in the terms of trade, which causes wealth from nations that import to be diverted to countries that export, potentially affecting both countries' economic growth.

The Central Bank of Nigeria (CBN) has acknowledge catalytic role played by the government through various policy initiatives to elevate the sector to levels that would make Nigeria an economic hub and driver of Africa's economic renaissance because the real sector of the Nigerian economy has evolved over time into an emerging industrial workhorse and is arguably the engine of the nation's economic transformation. Real sector development difficulties in Nigeria are complex and comprise a blend of local and global elements. Nigeria's real sector development challenges continue to be complex and represent a blend of regional and global traits. Agriculture, industry, building and construction, wholesale and retail, and services make up the real estate market on the domestic front, while global financial activities have an impact on developments in the oil and gas and international oil markets on the international front. Thus, the policy environment must be adequately focused towards enhancing the capacity of the private sector to drive real sector activities and hence, achieve desirable levels of growth. There is no gainsaying the fact that the complex interactions of agents and economic activities pose the challenge of clearly understanding the adjustment mechanisms required to attain optimal levels of output. Although not exhaustive, econometric models are helpful tools that could be used in the determination of quantitative signposts to assists policy makers in formulating and implementing sound policies. Formulation and implementation of sound economic policies had made differences between developed, emerging and developing economies, and econometric models have played a part in these differences.

The current state of economic affairs in the country is one marked with rising prices; rising cost of living; infrastructural collapse (as evidenced in the epileptic power supply across the country); political frictions (as evidenced in the hounding of politicians and former public servants on the basis of allegations of corruption) has threatened productivity in sectors dependent on imported inputs; speculative attacks on the weakening naira and the divergence between the interbank exchange rate and the rate charged by Bureau De Change. The previous studies of Oleka, Eyisi and Mgbodile (2014) and Oyibo and Rekwot (2014) on exchange rate focused on the growth of the economy. On the other hand, Falana (2019), and Aliyu (2014) centred on the aggregate of the real sector vide the use of real gross domestic product. That notwithstanding, results emanating from empirical studies on exchange rate fluctuation and real sector growth are mixed and conflicting (Falana, 2019). By dividing the real sector production into the sectors of agriculture, industrial, building and construction, and trade, this study fills the gap observed in literature.

2. REVIEW OF RELATED LITERATURE

Conceptual Clarification

The price at which a unit of one country's currency is exchanged for a unit of another country's currency at any given time is known as the exchange rate. The exchange rate is the cost at which one Nigerian N1 is exchanged for one US dollar. According to Ibenta (2012), an exchange rate is the price of a unit of one currency quoted in terms of another currency. It is the mathematical, qualitative, or quantitative expression of one currency in terms of another. According to Uddin, Rahman, and Quaosa (2014), exchange rate is the domestic cost of a unit of foreign currency and can be referred to as the conversion factor that affects how quickly currencies change. Exchange rate is the cost of one nation's currency relative to another nation's currency or the quantity of one currency's units needed to purchase one currency's quantity of units of another. Due to its significant impact on the functioning of the external sector, the administration of the exchange rate system has been a priority for all governments in the modern era. A favourable exchange rate is expected to lower cost of living, especially for developing countries who rely heavily on imports for consumption like Nigeria, for instance, the exchange rate of the Nigerian Naira against the US dollar affects and sharps the production activities in Nigeria. Nigeria would experience a shock if the value of the US dollar changed because we depend on it for imports. Some financial analysts and professionals are urging the government to forge an alliance with China in order to reduce overdependence on the US currency and strengthen the Naira as a result of the devaluation of the Nigerian Naira against the US dollar. In lieu of the significance of exchange rate on domestic and foreign economic activities, business owners appear convinced that its fluctuations have real effects especially on oil prices and economic performance of a country (Osigwe, 2015). Azu and Nasiri (2015) rhetorically ask “can one be right to say that change in exchange has account to more improvement in Nigerian economy, how about the recent decline in growth and currency values”? According to Azu and Nasiri (2015), the government's export promotion plan is responsible for Nigeria's recent increase in exports and positive balance of payments.

Theoretical Underpinning

Exchange rate moves up and down due to dynamic nature of business environment coupled with fluctuation other macroeconomic factors. A downward movement indicates a loss in value (depreciation) while an upward movement indicates a gain in value (appreciation) against other foreign currency (Ibenta, 2012). Many theories have been put out to explain this fluctuation in exchange rates, including purchasing power parity, interest rate parity theory, conventional flow theory, portfolio balance model, etc. The purchasing power parity idea, however, serves as the foundation for the study. Only traditional flow theory and purchasing power parity were briefly examined for the purposes of this work. The focus of the conventional flow theory of exchange rates is on the trade balance between two nations. The price at which a unit of one country's currency is exchanged for another country's currency depends on the volume of products and services that are traded. Current account balance controls the relationship between real exchange rate and the flow of commodities and services. The country with a trade surplus will accumulate more foreign currency in situations where exchange rates are adjusted based on the demand and supply of goods and services within two countries. In these circumstances, the local currency of the surplus trade country will appreciate while the foreign currency of the deficit trade country depreciates. The belief in the potential of exchange rate or domestic price changes to affect a change in relative price and the balance of payments is a typical element of the conventional flow theory of exchange rate determination to the balance of payments (Ayodele, 2004). The buying power parity idea was created by Guster Cassel in 1981. The purchasing power parity hypothesis was created as a response to the collapse of the fixed exchange rate system and to demand a replacement mechanism for determining exchange rates. According to the theory, the movement of demand and supply factors alone ultimately determines the exchange rate between two currencies. The basis of the theory is that, if any pair of currency is set at par, then, the exchange rate differential should reflect variations arising from the purchasing powers of the relative currency in relation to the Base Exchange rates (Ibenta, 2012). Mimicking the example of Ibenta (2012), the price of semolina in Nigerian and Ghanaian markets should trade at the same price (after adjusting for exchange rate). If the price is semolina is lower in Nigeria, then purchasers will buy wheat in Ghana so far as the price is cheaper (after taking into account transportation costs). This will result in fall in demand in Nigeria and rise in Ghana. From this explanation, a favourable/appreciative exchange rate (local currency against foreign currency) will spur economic growth as demand for goods and services would increase production, which eventually lead to rise in gross domestic product. The purchasing power parity theory has undergone reforms over time and general accepted by international financial market operators in determining exchange rate between two currencies.

Empirical Review

Exchange Rate and Agricultural Sector

Ibekwe (2020) examined the impact of the nominal exchange rate, the money supply, the interest rate, and the inflation rate on the output of the agricultural sector in Nigeria. She also examined the impact of each factor on the output of the agricultural sector in Nigeria. Econometric methods utilizing the Ordinary Least Square (OLS) and Augmented Dickey Fuller tests for Unit Roots were utilized to analyse the data. Regression analysis' findings show that nominal exchange rate and money supply have a positive and large impact on the production of the agricultural sector, whereas interest rate and inflation rate have a neutral or negligible impact. The study therefore draws the conclusion that the performance of the agricultural sector output is negatively impacted by currency rates, which also have not helped to increase the rate of investment in agriculture in Nigeria.

Awolaja and Okedina (2020) investigated how real exchange rate appreciation and depreciation affected Nigeria's overall and sectoral agriculture output. Using the nonlinear Auto-Regressive Distributed Lag (ARDL) co-integration framework, the paper analyses the long-run and short-run asymmetric relations between real exchange rate and aggregate and sectoral agricultural output. The findings indicate the existence of co-integration between real exchange rate and aggregate and sectoral agricultural output. In the long-run, real exchange rate appreciation has significant positive effect on aggregate and sectoral agricultural output, while the effect of real exchange rate depreciation is negative and significant. The long run estimates also indicate that the effects on agricultural output of real exchange rate increases are greater than that of real exchange rate decreases. Findings from this empirical analysis indicate the need for an appropriate exchange rate policy to promote agricultural sector development.

Based on data gathered between 1999 and 2016, Iliyasu (2019) looked into the relationship between currency rate and agricultural activities. Using actual and nominal values, the study discovered a statistically significant positive association between exchange rates and activity in the agricultural sector. Increased activity within the industry was connected

with both a higher and a weaker exchange rate. In order to reap the benefits and because the agricultural sector has the potential to be a source of both domestic and foreign income, this study advised the government to increase investment in the sector while taking advantage of the weaker exchange rates that make Nigerian agricultural produce more affordable. This could be a crucial step towards restoring the industry.

Ikpesu and Okpe (2019) used the autoregressive distributed lag (ARDL) technique to analyze how the exchange rate and capital inflows impacted Nigerian agriculture between 1981 and 2016. The technique was chosen since the sample size is quite small and the variables are integrated at both 1(1) and 1(0). Agricultural output (AO), private capital inflow (PRCI), public capital inflow (PUBCI), investment (INV), labor (L), and real effective exchange rate are the variables considered in the study. The variables are co-integrated, according to the empirical research results. The study's findings also show that both private and public capital inflows have a favourable long- and short-term impact on the nation's agricultural output. The analysis also showed that exchange rate depreciation will result in a short-term and long-term drop in agricultural output.

Orji, Ogbuabor, Okeke, and Anthony-Orji (2019) looked at how exchange rate changes affected Nigeria's agriculture industry. This study used time series data and the Ordinary Least Square (OLS) estimate approach to address the stated purpose. Exchange rate, agricultural GDP, capital expenditures by the government, foreign direct investment, credit to the private sector, and lending interest rates were the variables used in this study. The outcome demonstrated that the performance of Nigeria's agricultural industry is significantly influenced by changes in exchange rates. In particular, the results demonstrated that while credit to the private sector was adversely correlated with agricultural GDP, exchange rate, government capital expenditure, foreign direct investment, and lending interest rates were positively correlated. To ascertain the long-term relationship between the variables, the co-integration method was also used. The findings showed that the factors had a long-term, statistically significant impact on the agricultural sector.

Due to a lack of data, Adekunle, Tiamiyu, and Odugbemi (2019) looked into the potential asymmetric impact of real exchange rate changes on agricultural performance in Nigeria from 1981 to 2016. NARDL, or Nonlinear Autoregressive Distributed Lag, was used. The ADF unit root test confirmed that the study used a mix of stationary and nonstationary variables. Real exchange rate and agricultural output did not have a long-run relationship when other factors were taken into consideration, according to the Bounds test for cointegration. The major fundamentals in the short term were demonstrated to be the real exchange rate (log levels), real appreciation and depreciation (after some lags), industrial capacity utilization rate, and government expenditure on agriculture (after some lags). ACGSF financing had a slight but positive impact on agricultural output. Additionally, despite the fact that the impact of real appreciation was greater than that of real depreciation during the study period, this research was unable to establish any evidence for the asymmetric impact of real exchange rate dynamics on agricultural performance in the Nigerian economy.

Using annual data from 1980 to 2015, Akinbode and Ojo (2018) assessed the impact of exchange rate fluctuation on Nigeria's agricultural export performance. To identify factors influencing agricultural exports, the Autoregressive Distributed Lag (ARDL) Model was utilized to create the exchange rate volatility series using the Generalized Autoregressive Conditional Heteroscedasticity (GARCH-1, 1) model (cocoa and rubber). The Bounds Test identified the long-term relationships between the variables. According to the findings, exports were not considerably impacted by exchange rate fluctuation in either the short- or long-term. This may be partially due to the supply of agricultural commodities, especially in the short term, being inelastic. The relationship between the exchange rate, inflation, GDP, domestic prices, global prices, and agricultural exports was also proven to be positive and significant.

By gathering information from secondary sources, Adekunle and Ndukwe (2018) evaluated the potential asymmetric impact of real exchange rate changes on agricultural output performance in Nigeria between 1981 and 2016. The ADF unit root test revealed that the study used a mix of stationary and nonstationary variables. Regardless of the criteria, the Bounds test for cointegration revealed that there was no long-run link between the real exchange rate and agricultural output. According to model estimation results, real exchange rate (log-levels), real appreciation and depreciation (after certain lags), industrial capacity utilization rate, and government spending on agriculture are the main factors influencing agricultural production (after some lags). ACGSF loan had a moderately beneficial impact on agricultural output. Additionally, despite the fact that real appreciation had a greater impact than real

depreciation on agricultural output performance in the Nigerian economy, the current study was unable to locate any evidence to corroborate this.

Gatawa and Mahmud (2017) examined the immediate and long-term effects of exchange rate changes on the volume of agricultural exports from Nigeria. The secondary sources used to compile the statistics, which span 34 years, are the websites of the National Bureau of Statistics, the International Monetary Fund (IMF), and the Central Bank of Nigeria Statistical Bulletin (1981-2014). ARDL was utilized as the analysis method; the dependent variable is agricultural export volume, while the independent variables are the official exchange rate, agricultural loans, and relative pricing of agricultural exports. Along with other diagnostic procedures, GARCH was utilized to evaluate the volatility of exchange rates. The short-run results showed that relative prices of agricultural exports have a significant negative impact on agricultural export volume, which also has the effect of contracting the dependent variable, while official exchange rate and agricultural loans have a significant positive impact on agricultural export volumes. With the exception of the official exchange rate, which has a statistically significant negative impact on the volume of agricultural exports, the long-run results showed comparable conclusions. Contrary to what might be expected.

Oyinbo, Abraham, and Rekwot (2014) used time series data over a period of 26 years to analyze the causal relationship between exchange rate deregulation and the agricultural proportion of gross domestic product in Nigeria (1986 – 2011). Utilizing the augmented dickey fuller unit root test, unconstrained vector autoregression, pairwise granger causality, and vector error correction model, data on the exchange rate and gross domestic product were analyzed. The findings demonstrated a one-way causal relationship between exchange rate and agricultural proportion of GDP as well as a detrimental impact of exchange rate deregulation on Nigeria's agricultural share of GDP. This suggests that the trend of Nigeria's agricultural component of GDP has been negatively impacted by market-driven exchange rate policies.

Exchange Rate and Industrial Sector

Asher (2012) looked at the effects of exchange rate changes on Nigeria's economic growth from 1980 to 2010. The outcome suggested that the real exchange rate influenced the expansion of the Nigerian economy in a favourable way. He discovered a beneficial association between the exchange rate and economic expansion. Exchange rate changes have a favorable impact on Nigeria's industrial sector.

Ayodele (2014) used the Ordinary Least Squares (OLS) approach to analyse how the exchange rate affected Nigeria's economic performance. The study, which covered the 13-year period from 2000 to 2012, found a negative correlation between exchange rate and GDP. King-George (2013) used annual time series data from 1986 to 2010 to investigate the impact of exchange rate variations on the Nigerian manufacturing sector. The results of using Ordinary Least Square (OLS) methodologies revealed that the exchange rate had no discernible impact on the expansion of the Nigerian economy.

Oladipo (2012) did research on how exchange rate management affected Nigeria's industrial sector's expansion. The particular goals were to determine the degree to which exchange rate depreciation correlates with manufacturing sector productivity and to evaluate the degree to which exchange rate appreciation correlates with domestic output. Time-series data covering the years 1986 to 2010 were analyzed using the Ordinary Least Square (OLS) multiple regression method. The results showed that the dominant factor throughout the review period, exchange rate depreciation, had no discernible impact on the productivity of the manufacturing sector. And the increase in the exchange rate was significantly correlated with Nigeria's domestic output. The study recommended that the government should direct its exchange rate management policy toward exchange rate appreciation in order to lower the cost of production in the manufacturing sector, which heavily depends on foreign inputs, and that importation of consumer and intermediate goods that can be produced locally should be completely prohibited.

Ismaila (2016) examined the effects of the structural adjustment program (SAPS) on the performance of the Nigerian economy between 1986 and 2012. After performing the stationary test, the results of the Johasen co-integration test and error correlation model show that the broad money supply, net export, and total government expenditure have significant effects on real output performance over the long term, while the exchange rate has a direct and negligible impact on Nigeria's economic growth over the short and long terms. This suggests that the performance of Nigeria's economy is not significantly impacted by exchange rate depreciation during the SAP (structural adjustment program) era.

Using the time series econometric technique, Uddin, Rahman, and Quaosar (2014) investigated the link between the exchange rate (ER) and economic growth (EG), which was measured as real gross domestic product (RGDP), in Bangladesh for a 41-year period spanning 1973 to 2013. According to the empirical

findings, ER and EG have a very strong positive association. The findings support the existence of an ER and EG long-run equilibrium relationship. Granger's Causality Test demonstrates that there is a bi-directional causal relationship between ER and EG as well as EG and ER. Whether exchange rate volatility affects the West African Monetary Zone countries' economic performance was examined by Danladi and Uba (2016). For the time span from 1980 to 2013, case studies for Nigeria and Ghana were chosen. The GARCH method was used to measure exchange rate variability. The empirical findings support the notion that exchange rate volatility significantly reduces economic growth.

Akpan and Atan (2012) used quarterly series for the years 1986 to 2010 to analyze the impact of exchange rate changes on real output growth in Nigeria. It was investigated to use the Generalized Method of Moments (GMM) method. According to the estimation results, there isn't much proof that changes in the exchange rate have a significant direct impact on output growth. Rather, monetary factors have had a direct impact on Nigeria's economic growth. For the years 2000 to 2014, Oleka, Eyisi, and Mgbodile (2014) examined how the foreign exchange rate affected the expansion of the Nigerian economy. The dependent variable used to indicate Nigeria's economic growth is GDP. As indices of economic (performance), independent variables such as the money supply, the inflation rate, the employment rate, and the foreign exchange rates were used. The outcome showed that there are variations in the money supply and the value of the naira; as a result, monetary policy instruments were ineffective in achieving price and exchange rate stability in Nigeria.

Ismaila (2016) measured currency rate depreciation and economic expansion in Nigeria between 1986 and 2012, both during the SAP and after SAP eras. After performing the stationary test, the results of the Johansen co-integration test and error correction model analyses show that the broad money supply, net export, and total government expenditure have significant effects on real output performance over the long term, while the exchange rate has a direct and negligible impact on Nigeria's economic growth over the short and long terms.RER, GDP, EXP, IMP, FER, and FDI are all interrelated according to Azu and Nasiri's (2015) analysis of the relationship between real exchange rate and economic growth using the factors determined to make up equilibrium exchange rate. Using the VAR technique to analyze the data, one can infer that the RER variation was largely influenced by its positive relationship with real import as well as its negative relationship with real GDP and foreign direct investment. Similar to how exchange rate depreciation, rising prior GDP, FER, and FDI positively influence GDP. The sustained economic growth of Nigeria at this time was enhanced by the sustained rise in these components.

The impact of exchange rate fluctuation on investment and growth in Nigeria from 1986 to 2014 was examined by Adelowokan, Adesoye, and Balogun (2015). The interactions between the variables were captured using the vector error correction approach, impulse responses function, co-integration, and Augmented Dickey Fuller (ADF) test for stationarity. The findings support the presence of an ongoing relationship between growth, inflation, interest rates, and investment as well as between exchange rates. Finally, the findings indicate that, in Nigeria, exchange rate volatility has a positive link with inflation and interest rates while having a negative impact on investment and growth. Foreign exchange management and Nigeria's economic growth from 1970 to 2012 were analyzed by Fapetu and Oloyede (2014). The Johansen co-integration test and ordinary least square estimate approaches were used to determine the unique long-run relationship between Y, EXCR, EXPT, IMP, INF, and FDI. The outcome also demonstrates that the explanatory factors account for and explain nearly 99% of the variation in economic growth.

Due to the stability it offers, Jakob (2016) predicted that a fixed exchange rate regime will have a positive association with GDP growth. Inflation rate, gross capital formation (%GDP), index of government spending, and index of human capital per person are all employed as controls. Data from 74 nations for the year 2012 were examined, and it was discovered that there is a significant and positive association between fixed exchange rates and GDP growth.

The impact of foreign exchange regimes on industrial growth in Nigeria from 1985 to 2005 was experimentally evaluated by Owolabi and Adegbite (2012). Data on factors such the gross domestic product, world price index, per capita income, and net export were examined using multiple regressions. There were discovered to be considerable effects of exchange rate (broadly defined, narrowly defined, and quasi money) on economic growth.

Amassoma (2016) used annual data spanning 43 years to examine the effects of exchange rate fluctuations on the growth of the Nigerian economy (1970 – 2013). The variability included into the model with respect to the research's goal was captured and estimated using the standard deviation approach. Multiple Regression Model, Augmented

Dickey Fuller (ADF) test, Johansen Cointegration test, and Error Correction Model were among the econometric methods used in the study (ECM). Evidence from this study showed that exchange rate fluctuations have both a long-term and short-term, beneficial

Exchange Rate and Building and Construction Sector

From January 2007 to December 2018, Fasanya and Akinwale (2022) looked at the impact of exchange rate shocks on ten (10) sectoral stock returns in Nigeria. The symmetric and asymmetric link between exchange rate and sectoral stock returns is investigated using the auto regressive distributed lag and nonlinear autoregressive distributed lag. The outcome demonstrates that only the financial services sector exhibits asymmetrical short- and long-term movements, while none of the sectoral stock returns exhibited asymmetrical movements in the presence of structural breaks. The findings demonstrate how different sectors are impacted by changes in exchange rates.

In their study, Abina and Mogbeyiteren (2021), which used the exchange rate as an endogenous variable and the contributions of the agricultural, industrial, construction, trade, and service sectors to the GDP of Nigeria, they examined the relationship between exchange rate fluctuations and sectorial output. The study used descriptive statistics, short-run static multiple regression, the Phillips-Perron unit root test, Johansen cointegration, error correction estimates, and Granger causality tests to analyze time series data from the Central Bank of Nigeria Statistical Bulleting for the years 1985 to 2020. The five sectors have a positive and significant link with the exchange rate, according to the error correction estimations.

By analyzing the trend in naira exchange rate values and selected construction material prices over a five-year period and the impact of naira exchange rate on the price of selected construction materials, Obaedoa and Oseghale (2020) presented the results of the impact of naira exchange rate on prices of selected construction materials in Ekpoma of Edo state, Nigeria. The study used a survey approach to acquire data on the costs of particular construction materials and gathered information on monthly naira exchange rate values from the central bank of Nigeria's monetary authority database. Regression analysis, the Pearson Correlation Coefficient, and percentages were used to analyze the data. The Naira exchange rate and the cost of construction materials were shown to be strongly positively correlated.

The performance of Nigeria's real sector was examined by Falana (2019), who focused on the agricultural, industrial, building and construction, wholesale and retail trade, and service sectors between 1961 and 2017. The modified Mundell-Fleming IS-LM framework is used in the study. The relationship between the exchange rate regime and the performance of the real sector of the economy was investigated using paired Granger Causality and Autoregressive Distributed Lag approaches. The study's findings indicate that, in a regime of regulated exchange rates, there is a long-term inverse and significant relationship between the exchange rate and total real production, whereas that relationship is long-term direct and significant in a regime of guided deregulation.

Olanipekun and Saka (2019) looked at how economic shocks—measured by the GDP—affect the performance of the construction industry. The study employed an econometric technique that incorporates a number of sequential procedures, such as the unit root test, cointegration test, causality test, and exogeneity test. The GDP and construction sector annualized time series data were the ones used. The information was taken from a database maintained by the United Nations Statistics Division using the 2010 US Dollar exchange rate during a 47-year period (1970- 2016). In all the tests looked at, the study discovered that the GDP considerably influenced the production of the construction sector. According to the study's findings, the construction industry responded to economic shocks strongly in both the short- and long-term. The report proposed that Nigeria's government create a framework of policies to assist the parallel growth of the country's economy and construction industry.

In their 2017 study, Ugochukwu, Eze, Akabogu, and Abubakar sought to establish the statistical correlation between the pricing of a few particular building materials in Nigeria and the Naira-Dollar exchange rate. These items, which include cement, tiles, and reinforcing bars, were chosen through a market survey based on their importance in terms of cost for building construction and how frequently they are imported. The Central Bank of Nigeria's (CBN) statistical bulletin provided information on foreign currency rates for the years 2011 through the first quarter of 2017. With correlation coefficients of 0.93, 0.83, and 0.99, the inferential analysis conducted revealed a very significant association between the exchange rate and the cost of tiles, cement, and reinforcement bars. There are undoubtedly other variables that could explain the rise in these material prices, and a correlation does not imply a causal relationship.

Oladipo (2015) evaluated the impact of a few macroeconomic variables, including inflation, currency rates, and interest rates, on the costs of a few building supplies. Inflation, exchange rate, and interest rate data were gathered from the Central Bank of Nigeria's (CBN) statistical bulletin, and prices of materials were gathered from the Nigerian Institute of Quantity Surveyors' (NIQS) journals from 1995 to 2015, as well as a market survey conducted with building material merchants. The data were analyzed using a multiple regression analysis technique.It was determined that there was a strong correlation between the pricing of building materials and the chosen economic indices.

In Lagos State, Nigeria, Akanni, Oke, and Omotilewa (2014) evaluated the effects of rising construction material prices. The principal contractors, builders' merchants, and consultants who are registered with government authorities were the sources of the information about the causes of and effects of growing building material costs. The 2012 field survey of builders' merchants and the archives of The Nation Newspaper, Lagos QS News Letter, provided the information on building material pricing. The computations of price indices and rates of inflation for building materials used the average prices. The exchange rate of the Nigerian Naira, with a Mean Rated Average (MRA) of 4.4; the cost of fuel and power supply, with an MRA of 4.3; and changes in government policies and legislation, with an MRA of 4.2; are the three most rated factors responsible for the rising cost of building materials. In contrast, changes in construction costs, with an MRA of 2.8; a decline in output, with an MRA of 2.52; and the risk of project abandon.

Oladipo and Oni (2012) looked into how macroeconomic indices affected the cost of building supplies with the goal of improving the procurement and execution of construction projects. Respondents who were architects, quantity surveyors, builders, engineers, bankers, and economists received questionnaires. The study found that the prices of building materials are significantly influenced by factors such as inflation, exchange rates, imports, interest rates, money supply and demand. In contrast, factors affecting inflation rate included changes in the value of the naira, demand for goods, shifts in real incomes, lending interest, and import tariffs. Demand for imports, inflation rate, government economic policies, level of foreign currency demand, and level of foreign currency supply were identified as factors causing a change in exchange rate. Government economic policies, the need for money, the rate of inflation, and the deregulation of interest rates, on the other hand, were the reasons that led to a shift in the interest rate. It was discovered that there was a strong correlation between the pricing of building supplies and the exchange rate, inflation rate, and interest rate.

Exchange Rate and Trade Sector

Oyelami and Ajeigbe (2021) evaluated the sector-specific impact of exchange rate volatility on Nigeria's non-oil exports. Volatility and trading have a murky theoretical and empirical relationship. The bound test was used in the paper to examine the relationship between exports of non-oil products and exchange rate volatility. Empirically, the findings indicate that, in the majority of cases, we may accept the hypothesis that there is no co-integration between volatility and export of non-oil businesses. Accordingly, the study comes to the conclusion that exchange rate volatility can actually have a negative impact on non-oil export industries in the short run, especially the major industries (agriculture, food, and manufacturing), but that this impact does not last into the long run, which suggests that most of these industries have been able to develop a mechanism to deal with exchange rate volatility problems in the long run.

The impacts of exchange rate on international trade in a mono product economy: Nigeria's experience 1986–2018 were explored by Kalu and Anyanwaokoro (2020). Nigeria has a vast population and imports nearly everything, even toilet paper and toothpicks. In some circles, consuming imported goods has even taken on status symbol status. With few operating manufacturing companies, Crude Oil, which accounts for over 70% of her foreign exchange earnings, has consistently seen price declines and even no signs of recovery. A significant portion of the foreign exchange earned is used to import processed petroleum products from other countries due to the country's inability to process enough crude for domestic consumption. Further straining her foreign exchange and, consequently, the exchange rate of the naira, is the citizens' unbridled and insatiable appetite for imported goods, which range from food and fodder to electronics, ceramics and all kinds of building materials, including raw materials, to automobiles and, worst of all, medical tourism. The researcher used Augmented Dickey Fuller, Vector Error Correction Model, and co-integration tests to test the hypothesis ex post facto. The following conclusions were reached after adopting a VECM and Co-integration framework with a specific focus on the Nigerian economy: Nigerian economy shared a long run co-integrating relationship with the studied international trade related variables, Nigerian economy adjusts at 81% to the shocks and dynamics

of the exchange rate and its correlates, and there is a causal relationship between export and exchange rate and all the studied variables in the block exogeneity form.

Using monthly data from the first month in 2006 (M01) to the last month in 2019, Yunusa (2020) studied the impact of exchange rate volatility on Nigerian crude oil export to its trading partners (the UK, USA, Italy, France, Spain, Canada, and Brazil) (M12). GARCH was used to predict exchange rate volatility, while ARDL was used to determine how exchange rate fluctuation affected exports of crude oil. The GARCH result demonstrates that the trade partners' exchange rates are erratic. The ARDL result demonstrates that the exchange rate volatility of Nigeria's trading partners is statistically significant for all of them, albeit to varying degrees, and that this volatility is crucial in determining the amount of crude oil that Nigeria exports to each of its trading partners. While the income of Nigeria's trading partners is statistically significant for 4 of the 7 nations, the actual exchange rate is statistically significant for all trading partners. The outcome implies that exchange rate volatility has a major impact on Nigeria's export of crude oil.

Etale and Ochuba (2019) looked at the impact of trade balance and currency rate volatility on economic growth in Nigeria. GDP was employed as the dependent variable in the study as a stand-in for economic growth, while the exchange rate (EXR) and trade balance (TBA) served as the independent variables. Inflation was added as a third component because it might exert pressure on a nation's national output, net trade effect, and international reserves when combined with the exchange rate. The variables' time series secondary data came from yearly reports of the Central Bank of Nigeria (CBN) Statistical Bulletins, which covered the years 2000 to 2017. As methods for data analysis, the study used multiple regression analysis based on the E-views 10.0 program and descriptive statistics. The empirical findings indicated that the trade-balance had a negligibly positive impact on gross domestic product, a proxy for economic growth, while inflation had a negligibly negative but negligible impact on the same measure. Exchange rates also had a considerable beneficial influence on GDP.

Using a descriptive methodology, Obinwata, Owuru, and Farayibi (2017) looked at Nigeria's export performance and exchange rate movements between 1970 and 2015. The study places a special emphasis on the effects of exchange rate fluctuation on the nation's export demand. The decision to use this time frame is further supported by the fact that it begins before the start of the structural adjustment program (SAP), which is frequently referred to as the period of prosperity during which agricultural and non-oil exports significantly grew. Once more, this date falls during a time when external trade and the currency rate were liberalized. Results from descriptive analysis reveal that exchange rate volatility significantly impacted Nigeria's export performance over the studied period notwithstanding policy announcements, particularly the magnitude of export demand.

Using annual data, Eke, Eke, and Obafemi (2015) calculated the impact of exchange rates on Nigeria's trade balance for the years 1970 to 2012. In the literature, there is a great deal of dispute regarding the impact of exchange rate behaviour on trade balances and the efficiency of currency devaluation as a strategy for improving a country's trade balance. In order to study the relationship between these variables, we employed the real exchange rate for the analysis and applied the Augmented Dickey Fuller test for the unit root, the Johansen test for co-integration among variables, and error correcting mechanism (ECM). The co-integration test demonstrates that trade balances and the relevant variables have a long-term relationship. The anticipated outcome demonstrates that the exchange rate significantly impacted Nigeria's trade balance over the time. The outcome thus indicated that a depreciation of the domestic currency did not help the country's balance of trade or balance of payments position. Therefore, it was advised that actions to stabilize the exchange rate and stop it from continuing to decrease in value should be carefully explored as a possible course of action.

Aliyu (2014) conducted a quantitative analysis of the effect of exchange rate volatility on Nigerian non-oil export flows. The relationship between volatility and trade is unclear theoretically, while some research have found an inverse relationship between export flow and volatility. The study used fundamental analysis, assuming that fundamental factors such as the volatility of the naira exchange rate, the volatility of the US dollar, Nigeria's terms of trade (TOT), and the openness index would determine the flow of non-oil exports from the country's economy (OPN). The unit root was present at level according to empirical findings, however the first difference disproved the null hypothesis of non-stationarity. According to co-integration analysis, non-oil exports and the underlying variables have a reliable long-term equilibrium relationship. Using quarterly data for 20 years, a vector co-integration estimate showed that in the year 2003, the volatility of the naira exchange rate

lowered non-oil exports in Nigeria by 3.65%, while the similar estimate for the volatility of the US dollar increased non-oil exports in Nigeria by 5.2%.

Ibrahim, Akinbobola, and Ademola (2014) looked into how the exchange rate affected Nigeria's trade balance between 1970 and 2012. Annual statistics were gathered from the World Development Indicator of the World Bank and the Statistical Bulletin of the Central Bank of Nigeria. For this estimation, the co-integrating and error-correcting methods were utilized. The study's main conclusions were that the trade activities in Nigeria's economy were strongly influenced by both the country's income levels and those of its trading partners. The exchange rate also had a significant long-term impact on trade balance, but in contrast to what policymakers had hoped and in contrast to the j-curve hypothesis, it did so in an opposite direction.

Ngene (2010) used a time-series econometric model including GARCH modeling, Mundell-Fleming model, multivariate Johansen cointegration test, vector error-correction mechanism, variance decomposition, and impulse response analyses to study exchange rate volatility and trade flows in Nigeria. Empirically, some intriguing findings were made. The trade between Nigeria and the US is found to be negatively and significantly impacted by exchange rate variations. There is evidence that various economic policy changes have a significant impact on exchange rate volatility, which negatively impact trade flows either directly or indirectly. According to theoretical predictions, US GDP has a big positive impact on trade with Nigeria, but oddly, domestic income has a significant negative impact. The research also showed that a real exchange rate might boost the amount of net exports.

3. METHODOLOGY

In order to investigate the effect of exchange rate on real sector output in Nigeria from 1986 to 2021, this study used ex-post facto research design. The secondary data to be used in this study were obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin. The dependent variables are Agricultural Sector Contribution to Real Gross Domestic Product (AGSCRGDP), Industrial Sector Contribution to Real Gross Domestic Product (INDSCRGDP), Building and Construction Sector Contribution to Real Gross Domestic Product (BCSCRGDP), Trade Sector Contribution to Real Gross Domestic Product (TSCRGDP). The independent variable is Exchange Rate Fluctuation (EXCHF). Inflation Rate (INFR) was introduced in the models as a control variable capable of influencing real sector output.

The model of Uddin, Rahma and Quaosor (2014) for a similar study in Bangladesh was adopted. Their model is stated thus:

$$LnRGDP = f(LnREXR) \quad \text{3.1}$$

Where:
LnRGDP = Natural log of real gross domestic product
LnREXR = Natural log of exchange rate

Modifying their model by incorporating the likely effect of macroeconomic uncertainties, four functional models are stated as:

$$AGSCRGDP = f(EXCHF, INFR) \quad \text{3.2}$$
$$INDSCRGDP = f(EXCHF, INFR) \quad \text{3.3}$$
$$BCSCRGDP = f(EXCHF, INFR) \quad \text{3.4}$$
$$TSCRGDP = f(EXCHF, INFR) \quad \text{3.5}$$

Classically logging the variables to obtain a balance in coefficient between the dependent and independent variables, the following model were developed:

Model 1

$$LogAGSCRGDP_t = a_0 + a_1 logEXCHF_t + a_2 logINFR_t + u_t \quad \text{3.6}$$

Model 2

$$LogINDSCRGDP_t = a_0 + a_1 logEXCHF_t + a_2 logINFR_t + u_t \quad \text{3.7}$$

Model 3

$$LogBCSCRGDP_t = a_0 + a_1 logEXCHF_t + a_2 logINFR_t + u_t \quad \text{3.8}$$

Model 4

$$LogTSCRGDP_t = a_0 + a_1 logEXCHF_t + a_2 logINFR_t + u_t \quad \text{3.9}$$

Where:

$AGSCRGDP$ = Agricultural sector contribution to real GDP;

$INDSCRGDP$ = Industrial sector contribution to real GDP;

$BCSCRGDP$ = Building and construction sector contribution to real GDP;

$TSCRGDP$ = Trade sector contribution to real GDP;

$EXCHF$ = Exchange Rate Fluctuation

$INFR$ = Inflation Rate

α_0 = constant coefficient;

α_1 & α_2 = coefficients of exchange rate fluctuation and inflation rate respectively;

μ = a random error term; and

t = the time trend; normally included in standard time-series specifications to account for the omitted variables in the model.

4. ANALYSIS AND DISCUSSION OF FINDINGS

Descriptive Statistics of the Data

The descriptive statistics of the data were structured to capture the mean, median, maximum, standard deviation, skewness, kurtosis, Jarque-Bera, p-value and number of observations of the data set. From the descriptive features of the data common sample in Table 4.2, the mean are 9421.253, 12542.28, 1232.590, 5824.287, 123.0904, and 18.62333 respectively for AGSCRGDP, INDSCRGDP, BCSCRGDP, TSCRGDP, EXCHF, and INFR. The median are 8864.770 for AGSCRGDP, 12951.53 for INDSCRGDP, 803.0350 for BCSCRGDP, 3654.265 for TSCRGDP, 123.4017 for EXCHF, and 12.11500 for INFR. The maximum and minimum values are 18738.41 and 2891.670 for AGSCRGDP, 16742.15 and 8347.530 for INDSCRGDP, 2680.220 and 335.7600, for BCSCRGDP, 11697.59 and 1788.770 for TSCRGDP, 399.9600 and 2.070600 for EXCHF, and 72.80 and 5.40 for INFR. The standard deviations are 5538.758, 2340.605, 857.6701, 3886.098, 109.2155 and 16.42388 for AGSCRGDP, INDSCRGDP, BCSCRGDP, TSCRGDP, EXCHF, and INFR respectively. All the variables were found to be positively skewed towards normality as evidenced by the positive values of the skewness statistic. The Jarque-Bera suggests that all the variables are normally distributed as the p-values are significant at a level of 5%.

Table 4.2: Descriptive Statistic of Data

	AGSCRGDP	INDSCRGDP	BCSCRGDP	TSCRGDP	EXCHF	INFR
Mean	9421.253	12542.28	1232.590	5824.287	123.0904	18.62333
Median	8864.770	12951.53	803.0350	3654.265	123.4017	12.11500
Maximum	18738.41	16742.15	2680.220	11697.59	399.9600	72.80000
Minimum	2891.670	8347.530	335.7600	1788.770	2.070600	5.400000
Std. Dev.	5538.758	2340.605	857.6701	3886.098	109.2155	16.42388
Skewness	0.289447	0.072809	0.658068	0.446666	0.854829	1.907892
Kurtosis	1.580424	1.850941	1.766359	1.449664	3.004778	5.674177
Jarque-Bera	15.25472	10.12311	9.881129	8.802375	6.384430	32.56713
Probability	0.001575	0.015622	0.027112	0.030610	0.041669	0.000000
Sum	339165.1	451522.1	44373.23	209674.3	4431.254	670.4400
Sum Sq. Dev.	1.07E+09	1.92E+08	25745931	5.29E+08	417481.1	9441.036
Observations	36	36	36	36	36	36

Source: E-views 10.0 version data output

Unit Root Test

This Augmented Dickey-Fuller (ADF) Test and Phillips Perron (PP) were the test of stationarity adopted. Owing to the fact that most time series data are not always stationary at level form, the test for stationarity was conducted at first difference and in two sets: intercept and trend intercept. The results of the ADF and PP tests show that all the variables are stationarity at first difference. The unit root test are detailed in Table 4.3 and 4.4 respectively.

Table 4.3: Result of ADF Test

Variables	Intercept	Trend and Intercept	Remark
AGSCRGDP	-6.465321 (0.00)*	-7.139417 (0.00)*	Stationary
INDSCRGDP	-6.562274 (0.00)*	-6.545989 (0.00)*	Stationary
BCSCRGDP	-3.342122 (0.02)**	-4.369503 (0.04)**	Stationary
TSCRGDP	-3.306386 (0.02)**	-7.889169 (0.00)*	Stationary
EXCHF	-3.909323 (0.00)*	-4.455142 (0.00)*	Stationary
INFR	-5.118979 (0.00)*	-3.734800 0.03)**	Stationary

Source: E-views 10.0 version data output

Note: The optimal lag for ADF test is selected based on the Akaike Info Criteria (AIC), p-values are in parentheses where (*) & (**) denote significance at 1% and 5% respectively.

Table 4.4: Result of PP Test

Variables	Intercept	Trend and Intercept	Remark
AGSCRGDP	-11.92534 (0.00)*	-14.31423 (0.00)*	Stationary
INDSCRGDP	-7.707919 (0.00)*	-7.563862 (0.00)*	Stationary
BCSCRGDP	-3.306996 (0.02)**	-13.32590 (0.00)*	Stationary
TSCRGDP	-3.353871 (0.02)**	-3.564569 (0.04)**	Stationary
EXCHF	-3.816434 (0.00)*	-4.313126 (0.00)*	Stationary
INFR	-5.440983 (0.00)*	-5.277270 (0.00)*	Stationary

Source: E-views 10.0 version data output

Note: The optimal lag for ADF test is selected based on the Akaike Info Criteria (AIC), p-values are in parentheses where (*) & (**) denote significance at 1% and 5% respectively.

ARDL Long-Run Relationship

The confirmation of the stationarity of the data made way for the testing of the long-run relationship between exchange rate fluctuation and real sector output in Nigeria disaggregated into agriculture, industrial, building and construction, and trade sector contribution to RGDP. The Autoregressive Distributive Lag (ARDL) was selected because it takes into consideration the different order of integration of variables. Tables 4.5, 4.6, 4.7 and 4.8 reveal that there is a long-run relationship between exchange rate fluctuation and real sector output in Nigeria. This assertion is based on the fact that the values of the f-statistic of 9.112173 (Table 4.5), 3.922885 (Table 4.6), 12.23680 (Table 4.7), and 17.15539 (Table 4.8) are higher than the upper and lower bound test of 3.87 and 3.10 respectively at a 5% significance level.

Table 4.5: ARDL Bound Test for AGSCRGDP → EXCHF and INFR

T-Test	5% Critical Value Bound		Remark
F-Statistic	Lower Bound	Upper Bound	
9.112173	3.1	3.87	Null Hypothesis Rejected

Source: E-views 10.0 version data output

Table 4.6: ARDL Bound Test for INDSCRGDP → EXCHF and INFR

T-Test	5% Critical Value Bound		Remark
F-Statistic	Lower Bound	Upper Bound	
3.922885	3.1	3.87	Null Hypothesis Rejected

Source: E-views 10.0 version data output

Table 4.7: ARDL Bound Test for BCSCRGDP → EXCHF and INFR

T-Test	5% Critical Value Bound		Remark
F-Statistic	Lower Bound	Upper Bound	
12.23680	3.1	3.87	Null Hypothesis Rejected

Source: E-views 10.0 version data output

Table 4.8: ARDL Bound Test for TSCRGDP → EXCHF and INFR

T-Test	5% Critical Value Bound		Remark
F-Statistic	Lower Bound	Upper Bound	
17.15539	3.1	3.87	Null Hypothesis Rejected

Source: E-views 10.0 version data output

ARDL Short Run Relationship

Agricultural Sector Output and Exchange Rate Fluctuation

The result in Table 4.9 shows that exchange rate fluctuation has a significant negative relationship with agricultural sector output, while inflation rate has an insignificant negative relationship with agricultural sector output. A unit increase in exchange rate fluctuation leads to a significant factor of 14.28 depreciation in agricultural sector output, whereas a unit rise in inflation rate increases agricultural sector output insignificantly by a factor of 16.91601. When exchange rate fluctuation and inflation rate are held constant, agricultural sector output would amount to ₦1642.743 billion. The result in Table 4.9 shows the adjusted R-square value to be 0.987704, an insinuation that 98.77% changes in agricultural sector output was as a result of joint variation in exchange rate fluctuation and inflation rate. The F-statistic which determines if the changes in the dependent variable is significant or not, showcases that the aforementioned magnitude of changes in agricultural sector output was significantly (less than 0.05) explained by exchange rate fluctuation and inflation rate. The traditional Durbin Watson test of autocorrelation shows a value of 1.88, which implies that there is no autocorrelation in the model.

Table 4.9 ARDL Regression for AGSCRGDP → EXCHF and INFR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AGSCRGDP(-1)	0.217596	0.157813	1.378816	0.1818
AGSCRGDP(-2)	0.444482	0.117771	3.774108	0.0010
AGSCRGDP(-3)	0.330281	0.150159	2.199546	0.0386
EXCHF	-14.28975	5.963396	-2.396244	0.0255
EXCHF(-1)	38.35065	9.339809	4.106149	0.0005
EXCHF(-2)	-42.88362	10.41315	-4.118219	0.0005
EXCHF(-3)	19.83229	7.689390	2.579176	0.0171
INFR	-16.91601	9.827631	-1.721271	0.0992
INFR(-1)	0.502722	12.16783	0.041316	0.9674
INFR(-2)	-15.36535	9.628784	-1.595773	0.1248
C	1642.743	428.3408	3.835131	0.0009
R-squared	0.991546	Mean dependent var		10003.39
Adjusted R-squared	0.987704	S.D. dependent var		5418.380
S.E. of regression	600.8322	Akaike info criterion		15.89571
Sum squared resid	7941984.	Schwarz criterion		16.39455
Log likelihood	-251.2792	Hannan-Quinn criter.		16.06355
F-statistic	258.0451	Durbin-Watson stat		1.880409
Prob (F-statistic)	0.000000			

Source: E-views 10.0 version data output

Industrial Sector Output and Exchange Rate Fluctuation

As can be seen in Table 4.10, exchange rate fluctuation and inflation rate have significant negative relationship with industrial sector output. A percentage increase in exchange rate fluctuation and inflation rate lead to 13.29148 and 17.00903 factor depreciation in industrial sector output respectively. Holding exchange rate fluctuation and inflation rate constant would result in 3139.864 factor appreciation in industrial sector output. From the adjusted R-square, 90.18% variation in industrial sector output was attributed to exchange rate fluctuation and inflation rate. There is no need to worry about the significant of this variation as the p-value (0.00) and the F-statistic (79.12) vehemently showed that exchange rate fluctuation and inflation rate were significant in explaining the changes in industrial sector output. The Durbin Watson is 2.35 shows that there is no element of autocorrelation in the model.

Table 4.10 ARDL Regression for INDSCRGDP → EXCHF and INFR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INDSCRGDP(-1)	0.766182	0.099612	7.691635	0.0000
EXCHF	-13.29148	6.491768	-2.047436	0.0495
EXCHF(-1)	17.09542	7.114721	2.402823	0.0227
INFR	-17.00903	8.008441	-2.123888	0.0420
C	3139.864	1066.394	2.944375	0.0062
R-squared	0.913419	Mean dependent var		12662.13
Adjusted R-squared	0.901874	S.D. dependent var		2259.923
S.E. of regression	707.9206	Akaike info criterion		16.09410
Sum squared resid	15034547	Schwarz criterion		16.31630
Log likelihood	-276.6468	Hannan-Quinn criter.		16.17081
F-statistic	79.12375	Durbin-Watson stat		2.359065
Prob (F-statistic)	0.000000			

Source: E-views 10.0 version data output

Building and Construction Sector Output and Exchange Rate Fluctuation

The result in Table 4.11 shows that exchange rate fluctuation has significant negative relationship with building and construction sector output in Nigeria, while inflation rate has an insignificant negative relationship with building and construction sector output in Nigeria. A unit increase in exchange rate fluctuation and inflation rate result in 3.45 and 1.75 depreciation in building and construction sector output respectively. When exchange rate fluctuation and inflation rate are held constant, building and construction sector output would be valued at 145.7166. The result in Table 4.11 shows the adjusted R-square value to be 0.991553, an insinuation that 99.15% changes in building and construction sector output was as a result of joint variation in exchange rate fluctuation and inflation rate. The F-statistic which determines if the changes in the dependent variable is significant or not, showcases that the aforementioned magnitude of changes in exchange rate fluctuation and inflation rate was significantly (less than 0.05) explained by exchange rate fluctuation and inflation rate. The traditional Durbin Watson test of autocorrelation shows a value of 1.96, which implies that there is no autocorrelation in the model.

Table 4.11 ARDL Regression for BCSCRGDP → EXCHF and INFR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BCSCRGDP(-1)	1.063962	0.039058	27.24060	0.0000
EXCHF	-3.450029	0.814467	-4.235933	0.0003
EXCHF(-1)	2.264207	1.222947	1.851436	0.0776
EXCHF(-2)	1.193507	1.287493	0.927000	0.3640
EXCHF(-3)	-2.674722	1.329899	-2.011221	0.0567
EXCHF(-4)	2.485315	0.906198	2.742573	0.0119
INFR	-1.757719	1.267258	-1.387025	0.1793
INFR(-1)	1.108957	1.609044	0.689202	0.4979
INFR(-2)	-2.686467	1.295199	-2.074174	0.0500
C	145.7166	42.31936	3.443262	0.0023
R-squared	0.994005	Mean dependent var		1338.914
Adjusted R-squared	0.991553	S.D. dependent var		851.6725
S.E. of regression	78.27513	Akaike info criterion		11.80864
Sum squared resid	134793.9	Schwarz criterion		12.26669
Log likelihood	-178.9383	Hannan-Quinn criter.		11.96047
F-statistic	405.3270	Durbin-Watson stat		1.966157
Prob (F-statistic)	0.000000			

Source: E-views 10.0 version data output

Trade Sector Output and Exchange Rate Fluctuation

The As can be seen in Table 4.12, exchange rate fluctuation has significant negative relationship with trade sector output, while inflation rate has an insignificant negative relationship with trade sector output. A percentage increase in exchange rate fluctuation and inflation rate lead to 10.97 and 5.87 factor depreciation in trade sector output. Holding exchange rate fluctuation and inflation rate constant would result in 749.7679 factor

appreciation in trade sector output. From the adjusted R-square, 99.38% variation in trade sector output was attributed to exchange rate fluctuation and inflation rate. There is no need to worry about the significant of this variation as the p-value (0.00) and the F-statistic (561.74) vehemently showed that exchange rate fluctuation and inflation rate was significant in explaining the changes in trade sector output. The Durbin Watson of 2.66 shows that there is no element of autocorrelation in the model.

Table 4.12 ARDL Regression for TSCRGDP → EXCHF and INFR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TSCRGDP(-1)	0.961839	0.030454	31.58366	0.0000
EXCHF	-10.97375	2.990147	-3.669971	0.0013
EXCHF(-1)	8.837725	4.681301	1.887878	0.0723
EXCHF(-2)	-1.327320	4.972205	-0.266948	0.7920
EXCHF(-3)	-8.157890	5.169047	-1.578219	0.1288
EXCHF(-4)	15.08627	3.617981	4.169804	0.0004
INFR	-5.877115	4.886569	-1.202708	0.2419
INFR(-1)	5.259482	6.207873	0.847228	0.4060
INFR(-2)	-13.05824	4.985471	-2.619260	0.0157
C	749.7679	168.7741	4.442435	0.0002
R-squared	0.995667	Mean dependent var		6304.815
Adjusted R-squared	0.993895	S.D. dependent var		3860.376
S.E. of regression	301.6311	Akaike info criterion		14.50659
Sum squared resid	2001590.	Schwarz criterion		14.96464
Log likelihood	-222.1055	Hannan-Quinn criter.		14.65842
F-statistic	561.7464	Durbin-Watson stat		2.661976
Prob (F-statistic)	0.000000			

Source: E-views 10.0 version data output

Residual and Stability Test

The residual (serial correlation and heteroskedasticity) and stability (Ramsey specification) was processed. Tables 4.13 and 4.14 give the residual diagnosis of the model, while Table 4.15 took care of the model stability diagnostic. From Table 4.13, the serial correlation LM test presents no autocorrelation in the models (0.3009, 0.4721, 0.9801, and 0.1593 > 0.05). In Table 4.14, the model has no heterskedasticity problem (0.4629, 0.2190, 0.3043, and 0.5908 > 0.05), whereas Table 4.15 discloses that the model is well specified (0.5695, 0.7193, 0.1183, and 0.5462 > 0.05).

Table 4.13: Breusch-Godfrey Serial Correlation LM Test

Models Estimated	F-statistic	Prob.
AGSCRGDP → EXCHF + INFR	1.276249	0.3009
INDSCRGDP → EXCHF + INFR	0.771141	0.4721
BCSCRGDP → EXCHF + INFR	0.020120	0.9801
TSCRGDP → EXCHF + INFR	2.016447	0.1593

Source: E-views 10.0 version data output

Table 4.14: Heteroskedasticity Test

Models Estimated	F-statistic	Prob.
AGSCRGDP → EXCHF + INFR	1.013817	0.4629
INDSCRGDP → EXCHF + INFR	1.528717	0.2190
BCSCRGDP → EXCHF + INFR	1.274752	0.3043
TSCRGDP → EXCHF + INFR	0.836966	0.5908

Source: E-views 10.0 version data output

Table 4.15: Ramsey Reset Specification

Models Estimated	t-statistic	df	P-value
AGSCRGDP → EXCHF + INFR	0.575122	30	0.5695
INDSCRGDP → EXCHF + INFR	0.267072	29	0.7913
BCSCRGDP → EXCHF + INFR	1.628703	21	0.1183
TSCRGDP → EXCHF + INFR	0.613380	21	0.5462

Source: E-views 10.0 version data output

Granger Causality Effect Estimation

To determine the effect of exchange rate fluctuation on real sector output in Nigeria, the granger causality analysis was performed. The regression output in Table 4.16 reveals the following:

1. Exchange rate fluctuation has significant effect on agricultural sector output due to the fact that causality runs from exchange rate fluctuation to agricultural sector output at a significant level of 5%.
2. Exchange rate fluctuation has no significant effect on industrial sector output owing to the non-flow of causality from exchange rate fluctuation to industrial sector output at a significant level of 5%.
3. Exchange rate fluctuation has no significant effect on building and construction sector output in Nigeria. There is no unidirectional or bidirectional causal relationship between exchange rate fluctuation and building and construction sector output at a significant level of 5%. On the other hand, building and construction sector output was found to have significantly affected exchange rate fluctuation because, causality flows from building and construction sector output to exchange rate fluctuation at a significant level of 5%.
4. Exchange rate fluctuation has no significant effect on trade sector output in Nigeria owing to the non-flow of causality from exchange rate fluctuation to trade sector output at a significant level of 5%.

Table 4.16: Granger Causality Result

Null Hypothesis:	Obs	F-Statistic	Prob.	Remarks
EXCHF does not Granger Cause AGSCRGDP	34	3.44403	0.0455	Causality
AGSCRGDP does not Granger Cause EXCHF		0.81022	0.4546	No Causality
INFR does not Granger Cause AGSCRGDP	34	1.16502	0.3261	No Causality
AGSCRGDP does not Granger Cause INFR		1.50818	0.2382	No Causality
EXCHF does not Granger Cause INDSCRGDP	34	1.05362	0.3616	No Causality
INDSCRGDP does not Granger Cause EXCHF		1.49144	0.2418	No Causality
INFR does not Granger Cause INDSCRGDP	34	0.78299	0.4665	No Causality
INDSCRGDP does not Granger Cause INFR		0.81392	0.4530	No Causality
EXCHF does not Granger Cause BCSCRGDP	34	0.80925	0.4550 0.0105	No Causality
BCSCRGDP does not Granger Cause EXCHF		5.35584		Causality
INFR does not Granger Cause BCSCRGDP	34	0.33833	0.7157 0.3373	No Causality
BCSCRGDP does not Granger Cause INFR		1.12840		No Causality
EXCHF does not Granger Cause TSCRGDP	34	0.99099	0.3834 0.2075	No Causality
TSCRGDP does not Granger Cause EXCHF		1.66087		No Causality
INFR does not Granger Cause TSCRGDP	34	0.74399	0.4841 0.2419	No Causality
TSCRGDP does not Granger Cause INFR		1.49108		No Causality

Source: E-views 10.0 version data output

Discussion of Findings

This study examined the effect of exchange rate fluctuation on real sector output in Nigeria from 1986 to 2021 with the aim of evaluating the effect of exchange rate fluctuation on agricultural, industrial, building and construction, and trade sector output. Firstly, the study found a long run relationship between exchange rate fluctuation and real sector output disaggregated into agricultural, industrial, building and construction, and trade sector output. This supports the findings of Falana (2019) and Mazeli, Adigwe and Ananwude (2020) on a long-run relationship between exchange rate and different components of the real sector. There is a negative significant relationship between exchange rate fluctuation and agricultural output in Nigeria. This is in affirmation of the researches of Ibekwe (2020), Awolaja and Okedina (2020), Oyinbo, Abraham and Rekwot (2014) and Ikpesu and Okpe (2019). However, it refuted the results of Gatawa and Mahmud (2017), Akinbode and Ojo (2018), Iliyasu (2019), Adekunle, Tiamiyu, Odugbemi and Ndukwe (2016), Adekunle and Ndukwe (2018) and Orji, Ogbuabor, Okeke and Anthony-Orji (2019) on the

positive nexus between exchange rate fluctuation and agricultural output. The granger causality test in Table 4.16 provides that exchange rate fluctuation has significant effect on agricultural sector output in Nigeria. This may be attributed to the fact that given that tractors and machinery are used in effective agricultural programs, and these are imported. As a result, importing becomes extremely expensive during exchange rate depreciation, which makes it difficult to buy capital equipment and machinery due to the rising cost of foreign exchange.

Secondly, it was revealed that exchange rate fluctuation has significant negative relationship with industrial sector output. The result may be somewhat explained by the fact that Nigeria's industrial sector likewise extensively depends on imported machinery, manufacturing facilities, as well as some raw materials. The impact of a rising exchange rate on the industry will be increased costs for equipment and other materials, which will increase the cost of production. As a result, the Industrial sector will suffer from a declining exchange rate. Although, the significant effect of exchange rate fluctuation on industrial sector output was not confirmed by the granger causality test output in Table 4.16. This is in collaboration with and Owolabi and Adegbite (2012).

Thirdly, exchange rate fluctuation is related significantly and negatively with building and construction sector output in Nigeria. This refutes the finding of Abina and Mogbeyiteren (2021) on the positive effect of exchange rate fluctuation on building and construction sector output. Even though the sector's inputs are imported and should be negatively impacted by exchange rate fluctuations, the pattern of the sector's performance showed that the industry is only slightly affected by currency rates when compared to what was shown in the trade and agriculture sectors. The granger causality test in Table 4.16 shows that exchange rate has no significant effect on building and construction sector contribution to RGDP which is not in line with Abina and Mogbeyiteren (2021) on the significance influence of exchange rate on building and construction output in Nigeria.

Fourthly, exchange rate fluctuation was found to have a negative significant relationship between trade sector outputs in Nigeria. The granger causality test in Table 4.16 does not show that trade sector was significantly affected by exchange rate fluctuation. The implication of this is that depreciation in exchange rate did not spur trade sector output during the period under consideration. This is against economic theory that depreciation of exchange rate increases export and thus strengthens the net export which spurs economic growth. In overall, the outputs of each individual subsector of the Nigerian economy are more strongly impacted by exchange rate fluctuations than the total real sector. The variation in the size of the effect further supports the value of sectoral analysis.

Finally, Inflation has a significant negative relationship with agricultural, industrial, building and construction, and trade sector contribution to real sector output. This situation is in tandem with one line of theoretical consideration on the relationship between inflation and real sector output which hypothesised that high inflation rate results in decline in the output of the real sector. The negative influence of inflation on different sectors of the real economy is in consonance with the study of Ibekwe (2020). Even though inflation rate shows a negative relationship with all the sectors that made of the real sector output, the granger causality in Table 4.16 emphasis that inflation rate has not significantly affected the performance of agricultural, industrial, building and construction, and trade sector outputs.

5. CONCLUSION AND POLICY IMPLICATIONS

In this study, the effect of exchange rate fluctuation on real sector output in Nigeria from 1986 to 2021 was examined. Our findings are summarized as follows:

1. Exchange rate fluctuation has significant and negative effect on agricultural sector output.
2. Exchange rate fluctuation has significant and negative effect on industrial sector output rather.
3. Exchange rate fluctuation has significant and negative effect on building and construction sector output.
4. Exchange rate fluctuation has significant and negative effect on trade sector output.

The study concludes that foreign exchange fluctuation has significant effect on the real sector output although it exerted negative influence on all the sectors considered in this study. This supports our a priori that steady depreciation in the value of our currency would be a disincentive to the real sector growth in Nigeria.

Based on the findings that of the study, the following recommendations are made:

1. Government at all levels (federal, state, and local) should invest in agriculture to welt domestic demand and export to the surplus to earn foreign exchange. The Central Bank of Nigeria (CBN) has done much in this regard and should also be encouraged to do more.

2. The Central Bank of Nigeria (CBN) should provide foreign exchange cover for the acquisition of raw commodities that the nation naturally lacks while measures should be put in place to reduce the foreign content of the raw material inputs to strengthen the value of our currency.
3. Government should implement economic policies that will lead to macroeconomic stability and stabilize the exchange rate.
4. In order to actively encourage production and growth of non-oil exports in Nigeria, government should provide incentives like tax holidays to improve the ease of doing business in Nigeria which will enhance foreign exchange inflows. The Central Bank of Nigeria should set a reasonable exchange rate in a more powerful official market while allowing the market forces to alter within the fixed range. To encourage more exchange rate stability, improve trade terms, and encourage greater economic openness in order to boost non-oil exports, it is important to solve the issue where the exchange rate differs from different trade commodities.

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