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Effect of Monetary Policy on Trade Openness in Nigeria

Abdurrauf Babalola[1], Kamaldeen Alabi[2]

[1&2] Department of Economics, Al-Hikmah University, Ilorin, Nigeria

Abstract

This study investigated the effect of monetary policy on trade openness in Nigeria. Annual time series data were used between 1987 and 2020. Haven used broad money growth, lending rate, and exchange rates to proxy monetary policy in Nigeria, VAR/ECMl, and Granger Causality techniques were employed for the analysis.The study found that monetary policy hasa significant effect on trade openness in both the short-run and long-run periods. Specifically, broad money growth has a significant direct/ positive effect on trade openness while lending rate has a significant inverse influence on trade openness. However, the exchange rate does not have any significant swayon trade openness in Nigeria. The study, as such, suggests that monetary policy be used to boost the economy's trade openness by increasing the broad money growth and reducing the lending rate which could improve quality investments for export.

JEL CLASSIFICATION CODE: C33, C52, F41

KEYWORDS: Money supply growth, Monetary Policy, Lending rate, Trade openness.

1. Introduction

International trade has been noted to be a predominant driver of global development in the past four decades (IMF, 2001). Meanwhile, for international trade to exist, there must be economic openness on the part of the participating nations Zahonogo (2017). Through Trade openness (TOPS), output and competitiveness are enhanced via the influence of trade, which also helps in improving the standards of living and sustaining economic development (Gbosi, 1995).

Hence, in pursuit of sustainable productivity, the government of a country always face the dilemma of choosing the measures to employ in its operations, it either chooses protectionist measure or liberalizing measure. There is also debate on which of the measures enhance rapid economic development, and this question is what the policy debate attempts to resolve. The liberationist or openness causes economic integration and development due to the country's opening of its borders to trade with other countries while protectionist policy stands against international trade by closing

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its borders (Adenikinju & Chete, 2002). This was implemented in Nigeria in recent times.

Research have revealed that, over the years, owing to the benefits of liberationist policy, many nations have employed liberationist economic policy over protectionist economic policy. Two factors: globalization and liberationism are seen as major catalysts for the realization of economic growth and wealth of many countries at various stages (IMF;2005). Ude and Agodi (2015) revealed that Liberationist policy is a type of economic policy that accounts for free flow of exchange of goods and services without hindrance from restrictions imposed by the government in terms of regulatory legislation, quotas, high taxes, and tariffs. Openness is quite a good measure of international competition among nations in the world.

The purpose of economic partnership has a primary goal which is to create free trading regions through the removal of trade barriers, reduction of tariffs and commence external-centred trade strategies (Nduka 2013). Adenikinju and Chete (2002) are of the perspective that an economy's openness to trade renders a huge prospect of overcoming challenges caused by trivial local markets (especially in developing countries). This will thereby foster the influx of foreign exchange needed to fund the importation of important products. A liberationist economy encourages the circulation of elements of production such as capital (tangible and human resources), finance and technology, across the nation's borders and thereby promotes the structure of the economic process in the importing nation. Trade openness according to economic theory states that it enhances competition, encourage global specialization and trade fosters effective market, and boost economic development and growth processes (Fratzscher & Bussiere, 2004).

Employing the concept of comparative cost advantage, trade openness gives room for a country to appropriate its resources the importation of products and services at a reduced cost compared to if it were manufactured domestically. The more a country opens itself to trade internationally, the more the integration into the global markets. Trade openness affords evolving economies to import capital equipment and intermediate inputs which may be costly or infeasible to be manufactured locally but are necessary for perpetual development. Some projected advantages of trade openness comprise, intensive competition. The intensive competition allows home-based companies to increase in proficiency compared to if they were under the protectionist policy, though this may be utilized up till when productive capacity is above average. This also affords them better knowledge of novel technologies and foreign ideas (also known as knowledge spillover) (Ude&Agodi, 2015).

Study by Hussaini and Kabuga (2016), identified that t the opening of international markets and boundaries ensures effective resource distribution amongst competing economic units towards trade especially non-oil export sectors.Even with these advantages embedded in trade openness, many researchers, including (Singh, 1994;

Print ISSN: 2672-4375; Online ISSN: 2672-4324

Christopher &Damilola, 2014) have probed the existence and entirety of liberationist policy with the view that it reduces domestic income through taxes and tariffs reduction while some claim that it fosters reduction in the competition of home-based production through depletion in innovation and creativity. Some postulates that the economy will be incapacitated to create jobs thereby leading to unemployment.

Though the economy has strived to propel growth via trade openness, the economic situation only continue to be worseoff. As the country demonstrates more effort towards enhancing her economic growth through trade openness to the international economy, she turns out to be worse, compare to her trading partners, which is determined through growth in the country's productivity. As a result, reviewing Nigeria's liberalization trade policies is cogent and examining the use of monetary policies to realize its macroeconomic aims, is germane.

Thus, an economy's openness can enhance technology procurement. Also, liberationist trade stimulates invention through an exchange of knowledge, technology and investment in development and research via international direct investment.

The Nigerian government implements three kinds of general policies to undertake its aim of resource allocation and revenue distribution (Olaniyi, 1999). The policies are monetary policy, fiscal policy and income policy. To achieve specific economic goals such as macroeconomic goals which include; balance of payment equilibrium, economic growth and development, employment and moderately stable general price level, the Nigerian government has continually depended on monetary policy. This is so because monetary policy has severe effects on income and fiscal policy methods.

The broad objective of this study is to examine the impact of monetary policy on Nigeria Trade openness. Specifically, the paper examines the effect of broad money on trade openness; it examines the influence of lending rate on trade openness, and it determines the effect of exchange rate on trade openness in Nigeria. To existing literature, this study will contribute its significance and also input its fresh findings and discoveries. This study will be of relevance and advantage to scholars, researchers, international trade policy formulators to mention but a few.

Theremaining part of the paper is structured as:Sectiontwo comprises a review of relevant literature; Section three showcases the methodology of the study; Section four presents the findings from the analysis; Section five discusses the findings, and Section six concludes and proffers recommendations.

2.0 Literature Review

2.1 Conceptual Review

2.1.1 Monetary Policy

Though economists have not reached unanimity on how monetary policy react and the extent of its influence on economies, it is generally and strongly agreed that it possessesa substantial effect on an economy

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(Nkoro, 2005). Through the effect of monetary policy on economic factors, it remains an important catalyst of economic growth. Anowor and Okorie (2016) are of the thought that monetary policy has been in existence since the period of Adam Smith and that it was afterwards publicized by monetary economists. Having realized the functions of monetary policy especially on macroeconomic goals which include development and growth of the economy such as the creation of job opportunities, price stability, increase in Gross Domestic Production (GDP), the balance of payments equilibrium and many more, the bodies responsible for monetary policies have a primary duty of formulating and implementing policies aimed towards balancing the economy.

Definitions have the concept of monetary policy have emerged through various studies. Abiodun and Ogun (2019) defined monetary policy as a calculated or measured strategy undertaken by monetary policy formulators used in regulating the value, supply and capital cost to achieve specific macroeconomic goals in an economy. As defined by CBN (2006), monetary policy is any policy tool planned by the federal government through the CBN to regulate cost availability and supply of credit. It can be said as the control of interest rate and money supply by the CBN to regulate inflation and ensure the stability of the flow of currency in an economy. Jhingan (2011), opined that monetary policy is a credit strategy implemented by the apex bank of a nation. It is also the fusion of tools deliberately put in place to control the value, supply and capital cost following the processes in an economy. It may be defined as the means of directing the motion of financial and investment tools towards achieving economic growth and stability in price in an economy (CBN, 2017). According to Abeng (2006), it was expounded that it is only an economy that uses money as its currency that has validity to implement monetary policy, exceptions to these will jeopardize the effectiveness of the monetary policy. Citing an example, ina less developed economy whose subsistence industry produces the majority of its products, the supply of money tend to be autonomous, monetary policy cannot be recommended for such an economy.

It can be deduced from the above-mentioned definitions that monetary policy shows that monetary policy is majorly a tool in an economy used to regulate the supply of money to attain calculated macroeconomic goals and stability of the economy. Consensus has been reached by a slew of economists that the long-term productivity generally determined by gross domestic product is constant, therefore, variation in the supply of money causesa price change. While price changeframe, changes do not often occur in prices and wages, variation in the supply of money may influence the real manufacture of products and services (Chavula, 2016).

Targets of monetary policy are three, according to CBN (2014): the operational; intermediate and ultimate targets. Operational targets are mostly the instruments such as open market operation,

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cash reserve ratio and liquidity ratio, which are used to achieve the intermediate target (money supply, exchange rate and interest rate).These will finally lead to the realization of predetermined macroeconomic goals such as economic growth, reduced inflation and unemployment rate among others, which are the ultimate targets.

2.1.7 Trade Openness

There are diverse definitions for trade openness, for instance, as regards trade to GDP ratio; no barriers to foreign investment; reduced maximum tariff barriers; export subsidies, cropped import quotas; government procurement procedures; and so on. Ishola et al. (2013) opined that trade openness is a trade policy that fosters the circulation of products and services without hindrance from government-enforced constraints such as regulatory legislation and quotas, high taxes, and tariffs. Saibu (2004) suggested that the rate of export or import to a country's GDP can be considered as trade openness.

Christopher and Damilola (2014) postulated that a mechanism that can be used to measure a country's international competitiveness in the international market is trade openness and it can be calculated by adding the ratio of exports and imports over the economy's GDP. The following are considered as trade openness; exchange-rate policies, import, export taxes, domestic taxes and subsidies, education policies, competition and other regulatory policies, the type of the legal system, the system of government practised, and the overall type of institution and culture.

2.1.8 Nigeria Trade Policies

The aim of Nigeria's trade policies, which have been on a shot-run, has been to secure a balance of payment equilibrium and promote exportation. Industrialization policy, self-sufficiency policies and creation of employment are also some of its uses. Analogbei(2000), divides Nigeria's trade policies into pre- Structural Adjustment Program (SAP) era and post-SAP era policies. At independence, Nigerian's economy was essentially based on agriculture with a sparse industrial sector. To advance the industrial sector (particularly for domestic commodities), a development strategy was drafted. To achieve the expansion of Nigeria's industrial sector and its finance importation, thorough export of cash crops kicked off. To ensure the readiness of external markets of farmers for cash crops like cocoa, groundnuts, palm produce, rubber, ginger, and so on, marketing committees were created. Some other solid minerals that were exported include; tin and coal. The haste to achieve rapid industrial development resulted in higher demands for imported goods which incurred the balance of payments issue. To lessen compression on the BOP, measures such as exchange control methods, import tariffs, import licensing which affected industrialization policy, a bigoted custom tariff structure, and import prescription were put in place.

The 1970–1974 national development plan was the second which was put in place to propel economic growth through the rejuvenation of assets lost to the civil war and the renovation of the industrial facility along

with ascertaining fair allocation of benefits gained from the initiated plan. This development strategy has an additional purpose, which is to integrate and foster the areas of importance of the 1962 to 1968 strategy. But, because of consistent tension on the BOP, limiting trade measures were still reserved and tightened. In the middle of executing this strategy, the price for crude oil in the international market geared up in 1973,which led to excess funds in which Nigeria had no direct domestic investment channel as a result of the nation's small assimilative ability. This subsequently resulted in the alleviation of exchange control regulations (CBN, 1979). The National Development Plan of 1975 to 1980 got instituted during the oil boom though it was strategically planned to foster income from the oil sector, trade policies were thereby eased (Analogbei, 2000).

The next National Development Plan from 1981 to 1985 was introduced at a time of decline in foreign exchange income because of the oil shock Nigeria was experiencing. An increase in demand for importation led to a decrease in external reserves. Thereafter, the state of Balance of Payment degenerated and severer trade constraints were applied though the effectiveness of this strategy was not assuring because the situation that required its implementation continued. Liberalization of trade and pricing systems were features of trade policies enacted in the SAP era, while the main focus was proper pricing techniques for foreign exchange allocation. Another level that embodies market authority in the foreign exchange regime was established to decide the exchange rate. Licenses to export and import were eliminated, exportation was stimulated and bottlenecks such as the constraint that the CBN must collect profits from exporters was abolished; exporters' domiciliary accounts creation were supported; reviewed duty suspension structure was established; the Export Incentive and Miscellaneous Provisions Decree of 1986, the Nigerian Export Credit Guarantee and the Insurance Corporation of 1988 (now Nigerian Export-Import Bank-NEXIM) were instituted. Trade policies in the post-SAP opened trade through the usage of customs tariffs instead of import-licensing constraints. More so, the prohibition list gradually reduced. In all, the era of trade policy in Nigeria was properly categorized and created on the approaches used from 1970–1973, 1974–1979, 1980–1985, 1986–1993, and 1994–1999. The recent policy of, closure of all land borders with neighbouringcountries in August 2019 and reopening in December 2020, was not out of the lots of policies put in place on trade openness (Babalola&Olasupo, 2020).

2.2 Theoretical Review

The basic theories of trade openness are those of the Absolute and Comparative theories of David Ricardo, and the Neo-Classical theory popularly known as the Hecksher-Ohlin theory of trade.The absolute advantage explains that a country should produce those goods it has the opportunity of using less a given resources than a competing country,

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while the comparative cost advantage postulates the capability of a country to produce and export goods/services at a lower marginal and opportunity cost over another country (Ricardo, 1817; Krugman, 1996).

The Hecksher-Ohlin theory asserts that the basis of international trade is due to the gap in labour productivity which is in form of technological and factor supplies differences. It further explains why countries with a shortage supply of one factor have to trade with countries with abundant supply. Therefore, the need for trade openness among nations.

More theories on the study are those of the general Classical, Keynesian and Monetarist views of monetary policy as it affects the real sector of the economy. The classical economist believes that monetary policy is neutral in affecting the real sector of the economy in both the short run and long run, except that, it has a directly proportionate relationship with the price level. The Keynesians believe that monetary policy (money supply) is non-neutral. It can affect the real sector, in which trade openness is part, of the economy in both short-run and long-run periods, except in two extreme cases: When the economy is at full employment equilibrium; and at the liquidity trap region.

The Monetarists submit that, in the short run, monetary policy is neutral, while it can influence the real sector in the long run period (Jhingan, 2011).As applicable to the Monetarist school of thought, Friedman (1963) emphasized money supply as an important element that affects the economy's welfare and also, stated that to stabilize the economy, an active monetary policy is required. He postulates the idea that to encourage a stable growth rate, the supply of money should increase at a constant rate, contrary to its alterations and regulations by monetary policy forces. He also debated that, the demand for supply of money can be for other purposes against its expected trade, he offered that it can be in diverse forms including money, equities, bonds, tangible products and human resources.

2.3 Empirical Review

There are very scanty studies on the topic. The most recent topic on this is that of Chiaraah (2019) which studied the association between trade openness and monetary policy in reducing the inflation rate and improving local output in Ghana. Employing co-integration technique on quarterly data between 2002 and 2016, the finding revealed that as the magnitude of trade openness improves, the effectiveness of monetary policy in reducing the rate of inflation becomes weak and causes local output to reduce in the long-term. The work of Chiaraah (2019) is quite different from the aim of this work because his work is mainly investigating the effect of monetary policy and trade openness on inflation and output. This study is investigating the effect of monetary policy on trade openness.

Similar to the work of Chiaraah (2019), was the study of Ahiakpor, Cantah and Brafu-Insaidoo (2019), who employed a Structural VAR model, on data from 2002 to 2017 to

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assess the relationship between trade openness and the effectiveness of the monetary policy, also in Ghana. The empirical results revealed that as the degree of trade openness increases, monetary policy becomes more effective in reducing the rate of inflation. Nevertheless, monetary policy was less effective in improving total output.

Ajayi and Araoye (2019) investigated the impact of liberationist policy on Nigeria's economy utilizing 1970-2016 data, The Co-integration test revealed that a balanced link is present amid the variations. Hence, the coefficients present were rightly stationed at the 5per cent level. A good connection exists between economic growth and trade openness but the reverse is the case with the exchange rate and economic growth though this is foreseen particularly in countries involved in an international transaction. Though this work was recent, it did not employ the correct technique for impact analysis as cointegration would only explain the existence of a long-run relationship in a model. More so, the researchers did not investigate the effect of monetary policy on trade openness in Nigeria. Another query is that the period of analysis was mixed.

Sunday and Ahmed (2019) empirically probed the distinguishing effect of liberationist policy on Nigerian economy growth dating from 1980 to 2016. The diagnostic test carried out were: cointegration test, error correction model and unit root test. The deduction from the outcome showed that in both the short and long term, the effect of trade openness on Nigeria's economy was negative. The work is quite similar to that of Ajayi and Araoye (2019), but different from this work in that, trade openness is put as the dependent variable, and the period is not mixed between pre-SAP and post-SAP periods. Thus, the previous papers might have encountered a structural break in their analysis but not captured in the techniques used.

Applying secondary data from 1975-2017, Ijirshar (2019) examined the effect of liberationist policy on economic growth among ECOWAS nations. The research implements different moveable dynamic panel models via the use of Pooled Mean Group (PMG) and Mean Group (MG) measures because time dimension surpasses cross-sections. Utilizing the Hausman test, the PMG estimator was indorsed. The outcome revealed that in a short term, ECOWAS nations experience a constructive effect on their economic growth but a mixture of positive and negative in the long term. This is a panel analysis due to the cross-sectional and time-series used for many countries.

Nura and Amina (2018) examinedthe impact of trade openness on Nigeria's economic growth inthelong term using interval data from 1986-2016. Applying the Johansen cointegration method, the research got proof of co-stationary on a long-term between economic growth, trade openness and exchange rate as the variables of interest are revealed to be co-incorporated. Applying Fully Modified Ordinary Least Square (FMOLS) and Dynamic OLS regression methods, the researchers discovered the proof to imply that trade openness has a vital constructive effect on economic growth. This

means that, until there is diversification of Nigeria's production industry, trade openness' effect in the long term on the economy will always infuse weakness to its growth. The result also revealsthat the exchange rate has an inverse relationship with economic growth in the long run, but the effect is statistically insignificant. The issue of the study is not different from the previous with the dependent variable being economic growth and trade openness being put as the independent variable.

Ekpo and Effiong (2017) researched the relationship between openness to trade and the influenceof monetary policy on growth and inflation in Africa. It is claimed that the effectiveness of monetary policy is facilitated according to the length of openness to international trade. Standard panel data methods were applied using annual data from 1990 to 2015 for a panel of 37 African nations and discovered a sturdy vital connection between openness to trade and the effectiveness of monetary policy in Africa. The outcomes show that monetary policy's effect on productivity growth and inflation rises and falls accordingly with a heightened degree of trade openness.

Zahonogo (2017) studied the causal effect of trade on economic growth in evolving economies via nations in Sub-Saharan Africa. Dynamic growth model was applied using 42 Sub-Saharan African nation's data of 1980 - 2012. The study made use of Pooled Mean Group and the outcome indicated that a trade verge exists. Below this verge, greater trade openness is of positive impact on economic growth but above the verge, the impact declines.

Iyoha and Okim (2017), examined the influence of trade openness on ECOWAS nations' economic growth using panel data between 1990 and 2013. The study made use of four estimators, namely; Dynamic Panel Regression model, Pooled OLS, Random-effects model, and Fixed-effects model, and though the problem of endogeneity was tackled by dynamic panel data estimator. The study discover that exportation, investment and exchange rate were vital determining factors of increase per capita of actual revenue and that exports were constantly constructively linked to growth, insinuating that trade openness is of constructive influence on ECOWAS nations' economic growth. The inadequacies in this research, however, is that it failed to cover analysis and specifications for selecting between Pooled Mean Group estimator and Mean Group estimator via the use of the Hausman test which would have deliberated on the significance of the estimated coefficients differences if it were methodical or not.

Anowor and Okorie (2016) experimentally reevaluated the influence of monetary policy on Nigeria's economic growth while using the Error Correction Model technique. The study made use of time interval secondary data which covers 1982 to 2013. The outcome of the study revealed that an increase in a unit Cash Reserve Ratio (CRR) incurs an increase in about seven units in Nigeria's economic growth. The result aligned with economic literature as monetary policy among other objectives is geared

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towards achieving the macroeconomic objectives of sustained economic growth and price stability. This work is similar but did not treat trade openness at all. It has also used operational instruments to capture monetary policy. This study is different as it used intermediate instruments to proxy monetary policy.

Ude and Agodi (2015) investigated the sense of trade openness as it affects economic growth in Nigeria.Using Generalized Autoregressive Conditional Heteroscedasticity (GARCH) and Pairwise-Granger causality as tools for analysis on time series data between 1984 and 2013, their finding divulged that trade openness has a significant impact on economic growth. They concluded that trade openness makes sense in Nigeria.

Christopher and Damilola (2014) considered the relative relationship between trade openness and output growth in Nigeriabetween 1970 and 2010. Non-Monotonic modelling and Ordinary Least Square (OLS) wereutilised as the estimation tools. Their finding indicateda positive relationship between trade openness and output growth in Nigeria.

2.4Conceptual Framework

Based on previous literature and the relationship those exist between monetary policy and trade openness the conceptual framework for this study is formulated below. The dependent variable is trade openness is expressed as the ratio of import to export in an economy that is affected by each of the policies at the disposal of the central bank for regulatory purposes. Some of the major monetary policies instruments that directly affect trade openness are exchange rate, interest rate, and money. This instrument tends to have a direct effect on the country's balance of trade, the attraction of foreign direct investment and the country's external reserve. The diagrammatic representation of the framework is therefore shown in figure 1.

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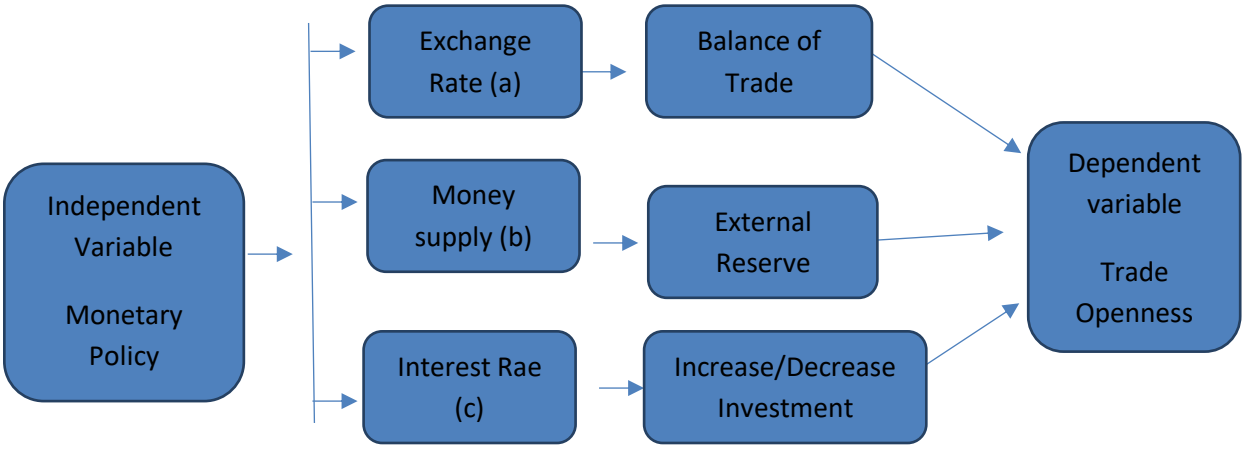

Source: Authors computation (2021).

Figure 1: Framework of Transmission Mechanism of Monetary Policy

In Figure 1, when the monetary authority makes a contractionary monetary policy, for instance, it makes interest rate (c) increase and the cost of investment becomes high and investors are discouraged from investing. Production of goods will be low and thus, trade openness is affected. Money supply (b) reduction will lead to less quantity of money in circulation which will make obtaining loans for investment very difficult, thereby further making investment tough. This will have an adverse effect on trade openness. Exchange rate (a) will affect the balance of trade which will have an impact on trade openness. When the exchange rate is high (dearer), the trade will be discouraged especially the importation, which will affect the international trade balance.

2.5 Theoretical Framework

Here, the concern is to see how the transmission mechanism goes with the Heckscher-Ohlin theory. The chat in Figure 2 explains this transmission

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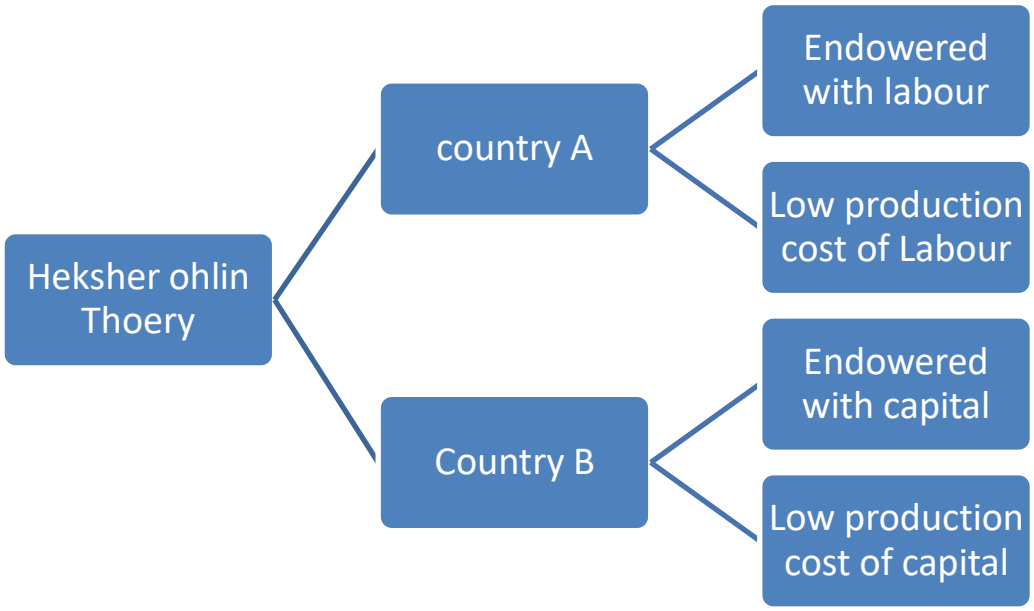

Source: Authors computation (2021).

Figure 2: Fig 2.0: Diagrammatic of Hecksher-Ohlin Theory of International Trade.

Figure 2 shows a basic representation of two identical countries (A and B) with different initial factor endowments. Initially, with no trade, individual production equals consumption. Country A is endowed with labour resources while country B is more endowed with capital. According to H-O theory, when each of the countries will engage in international trade, they should focus on goods that give them a comparative advantage i.e. each of the countries should major in goods that gives the least cost of production

2.7 Research Gap

Having critical examined different literature and studies that have explored the topic of concern in this study, it was observed that several studies have only examined trade openness and its contribution to economic growth while some other studies examine the combined effect of fiscal and monetary policy on trade openness. Furthermore, the few studies that solely explore the individual monetary policy and their causality on trade openness and the few could not adopt a robust econometrics method of estimation, thus a methodology gap.None of them has studied the impact of monetary policy on trade openness so far. Therefore, this study will be filling the gap of updating existing literature, examining the effect of each of the monetary policy tools (money supply, lending rate and exchange rate) on Nigeria's trade openness as well as adopting a seasoned econometric technique to measure the effect of monetary policy on Nigeria's trade openness.

3.0 Methodology

3.1 Model Specification

To investigate the impact of monetary policy on trade openness, this study adapted the

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work of Chiarahh (2019), by placing trade openness as the dependent variable while the intermediate monetary policy targets (broad money supply growth, lending rate and exchange rate) stood as the explanatory variable, as

$$TOP = f(M2, LR, EXR) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

Expressing equation (1) in its explicit econometric form, it becomes:

$$TOP = \alpha_0 + \alpha_1 M2 + \alpha_2 LR + \alpha_3 EXR + \mu \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

Where:

TOP = Trade openness

M2= Broad money supply growth

LR = Lending rate

EXR = Exchange rate

μ_t = Error term, α_0= intercept and $\alpha_1 - \alpha_3$= Slopes, and they are the also to be estimated.

The *a priopi* expectation is that, when the money supply grows in the economy, demand and investment will increase, and it will increase the quantity of aggregate demand and thus, trade openness will improve. Therefore, it has a positive impact on trade openness. This is represented algebraically as:

$$\frac{\partial TOP}{\partial M2} > 0$$

More so, when the lending rate reduces, more investors will see it as a reduction in the cost of investment and so, it will boost investment and supply will be increased as well as the trade openness since more goods would be traded outside the country. Hence, the impact of lending rate on trade openness is expected to be inverse, as:

$$\frac{\partial TOP}{\partial LR} < 0$$

When the exchange rate is high, it means the value of the home currency is low. More goods will be demanded by foreigners, *ceteris paribus* since the goods will be cheap. Therefore, it is expected to have a positive impact on trade openness. Algebraically, it will be

$$\frac{\partial TOP}{\partial EXR} > 0$$

3.2Measurement of Variables

Trade Openness (TOP): This is the ratio of the sum of imports and exports to the nation's gross domestic product.

Exchange Rate (EXR): The official rate at which the Nigerian Naira is exchanged for one US dollar.

Lending rate (LR): This is the rate at which commercial banks lend out money to investors. The prime lending rate is utilized in this study.

Broad Money Supply Growth (M2): This is growth in the broad money supply. It is expressed as a percentage change in the broad money supply (M2).

3.3 Source of Data

The timeframe of this research spannedfrom 1987 to 2020 and is selected due to the history of Nigeria's economy. This timeframe experienced a significant change in Nigeria's economic history as it was a period when major monetary policies were made to boost the country's economy, most

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especially the liberalization. Apart from this, this was a period when Nigeria signed several treaties and international trade pacts with WTI, IMF and ECOWAS. This research will implement statistical data gotten from World Development Indicators (2020).

3.4 Estimation Techniques

The main techniques of analysis for this study were the Cointegration and Vector Auto-Regressive (VAR)/Error Correction Model (ECM) and Granger Causality, which constituted the Estimation Techniques. Pre-estimation tools would be the descriptive, correlation and unit root test statistics. Finally, the post-estimation techniques would showcase the residual diagnostic tests and stability tests of the model. All these analyses have paramount importance to the study. The choice of this method was informed by the result of the unit root tests in which all variables were integrated of order one. This method would be adequate as it divulged the short-run and long-run effects of monetary policy on trade openness in Nigeria.

4.0 Empirical Findings

4.1.0 Results of Pre-Estimation Analysis

4.1.1 Descriptive Statistics

Table 1 presents the descriptive statistics which explains the status of each variable used in the study. EXR (Exchange rate) has the highest mean of 121.05 followed by TOP (trade Openness with 52.16 and then M_2 and LR with 25.56 and 19.05 respectively. The median follows the same positioning as the mean. However, the standard deviation (from the mean) is lowest in LR (lending rate) followed by TOP and then M_2. All the variables appear to be positively skewed except TOP which is negative. The kurtosis figures indicate that M_2 and EXR (3.03 and 3.27) are both Mesokurtic, while TOP (2.10) and LR (5.4) are Platykurtic and Leptykurtic respectively.

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Table 1: Descriptive Statistics Results

	M2	TOP	LR	EXR
Mean	25.56347	52.15592	19.04875	121.0480
Median	20.67703	55.84639	17.94833	120.5782
Maximum	64.92465	81.81285	31.65000	379.5500
Minimum	1.387829	20.72000	13.64202	4.016037
Std. Dev.	16.81542	16.14979	3.702924	110.2676
Skewness	0.912884	-0.241105	1.383006	1.011594
Kurtosis	3.026725	2.102391	5.395141	3.272344
Jarque-Bera	4.584451	1.427564	18.40784	5.730263
Probability	0.101041	0.489788	0.000101	0.056976
Sum	843.5946	1721.146	628.6087	3994.585
Sum Sq. Dev.	9048.268	8346.104	438.7726	389086.5
Observations	33	33	33	33

Source: Author's Extraction from E-Views Analysis, 2021.

The Jarque-Berra statistics, which explains how normally distributed a variable is, given its null hypothesis to be normality distributed, shows, in the result, that all the variables are normally distributed except LR. This conclusion is shown in their probability values, which indicate that the null hypotheses of M_2, TOP and EXR, be

Print ISSN: 2672-4375; Online ISSN: 2672-4324

accepted since their probabilities are more than 5per cent (10.1per cent, 49per cent, 57per cent).

4.1.2 Pairwise Correlation Matrix

This statistics is important to ascertain the presence or absence of multicollinearity in the explanatory variables. Table 2 shows the pairwise correlation between variables. The pairwise relationship between the explanatory variables (M_2, LR and EXR) shows less than 0.5 which is far less than the threshold of high correlation (0.8 and above).

Table 2: Pairwise Correlation Matrix

	M2	TOP	LR	EXR
M2	1			
TOP	0.3949	1		
LR	0.3871	0.4564	1	
EXR	-0.4142	-0.5778	-0.4617	1

Source: Author's Extraction from E-Views Analysis, 2021.

This means that the explanatory variables are not highly correlated and thus it is concluded that there is no presence of multicollinearity in the explanatory variables, hence, the model.

4.1.3 Result of Unit Root Test

The result of two statistical tests (ADF and PP) of the unit root is presented in Table 3. Their respective p-values suggest that the null hypothesis of non-stationarity be accepted as they all have more than a 5per cent level of significance. Therefore, it is concluded that the variables are not stationary at level.

Table 4 present the test again at first difference, using ADF and PP tests, the result in table 4 shows that all variables are stationary at first difference because their respective p-values are less than 5per cent which suggest that the null hypotheses (of non-stationary) be rejected.

Print ISSN: 2672-4375; Online ISSN: 2672-4324

Table 3: Result of Unit Root Test (At Level)

Series	ADF(Prob.)	PP(Prob.)	Remarks
M2	0.0582	0.0944	Non-Stationary
TOP	0.1691	0.2288	Non-Stationary
LR	0.0816	0.0541	Non-Stationary
EXR	0.9841	0.9978	Non-Stationary

Source: Author's Extraction from E-Views Analysis, 2021.

Conclusively, since all the variables are integrated of the same order one (I(1)). It suggests that the best technique of analysis be the Vector Auto-Regressive (VAR) Model.

Table 4: Result of Unit Root Test (At First Difference)

Series	ADF(Prob.)	PP(Prob.)	Remarks
D(M2)	0.0000	0.0000	Stationary
D(TOP)	0.0000	0.0000	Stationary
D(LR)	0.0000	0.0000	Stationary
D(EXR)	0.0132	0.0144	Stationary

Source: Author's Extraction from E-Views Analysis, 2021.

4.2 Results of estimation Analysis

4.2.1 Lag Selection Order

Table 5 showcases the outcome of lag selection order for the best lag. Four out of the five criteria indicate that the best selection is lag 1, therefore, this study would employ the lag 1 for its analysis.

Print ISSN: 2672-4375; Online ISSN: 2672-4324

Table 5: Lag Selection Order

Lag	LogL	LR	FPE	AIC	SC	HQ
1	-331.8540	NA	1.63e+08 *	30.24818 *	31.03808 *	30.44684 *
2	-321.4202	13.60930	2.95e+08	30.73219	32.31201	31.12951
3	-309.2728	11.61931	5.76e+08	31.06720	33.43692	31.66318
4	-289.2487	12.18856	9.49e+08	30.71728	33.87691	31.51192
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Source: Author's Extraction from E-Views Analysis, 2021.

4.2.2 Result of Cointegration Analysis

The Johansen Cointegration Technique using the Trace and Maximum Eigenvalue statistics were employed to test for the long-run relationship in the model. These results are presented in Tables 6 and 7. From Table 6, the Trace test indicates that there exist four cointegrating equations in the model since their values are less than 0.05.

Table 6: Johansen Cointegration Test (Trace)

Hypothesized	Trace	0.05		
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.665444	61.11910	47.85613	0.0018
At most 1 *	0.512608	33.74534	29.79707	0.0167
At most 2 *	0.370448	15.77818	15.49471	0.0453
At most 3 *	0.154968	4.209513	3.841466	0.0402

Source: Author's Extraction from E-Views Analysis, 2021.

This result is further supported given the Maximum-Eigen value test result in Table 7. It suggests that there is a cointegrating equation as its p-valueis less than 0.05

(0.0402).Summarily, the two tests statistics informed the study that there exists a long-run relationship in the model and thus, the Error Correction Mechanism (ECM) could be employed.

Table 7: Johansen Cointegration Test (Maximum Eigenvalue)

Hypothesized	Max-Eigen	0.05		
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None	0.665444	27.37376	27.58434	0.0532
At most 1	0.512608	17.96716	21.13162	0.1311
At most 2	0.370448	11.56867	14.26460	0.1279
At most 3 *	0.154968	4.209513	3.841466	0.0402

Source: Author's Extraction from E-Views Analysis, 2021.

4.2.3 Result of Short-Run and ECM Coefficients.

The result in Table 8 presents the short-run and Error Correction Mechanism (ECM) of the model. Being particular in the second column from the left, the result shows that, broad money supply (M2) and lending rate (LR) have the correct positive and negative signs in line with *a priori* expectation. Both of the variables have a significant impact on trade openness (TOP), as their t-values (2.45 and -2.3) indicate. This means that a unit increase in money supply growth (M2), on average, will lead to 0.38 unit increase in trade openness. This result is in line with the work of Ekpo and Effiong (2017) in the African region, but against the findings of Chiaraah (2019) in Ghana.

Table 8: Short-Run and ECM Coefficients

Error Correction:	D(DTOP)	D(DEXR)	D(DLR)	D(DM2)
CointEq1	-0.258496	0.414488	0.220399	-0.244578
	(0.19386)	(0.26061)	(0.04540)	(0.24605)
	[-1.33343]	[1.59044]	[4.85416]	[-0.99401]
D(DTOP(-1))	-0.400391	-0.566128	-0.081423	0.379260
	(0.18961)	(0.25490)	(0.04441)	(0.24066)
	[-2.11164]	[-2.22096]	[-1.83346]	[1.57592]

Print ISSN: 2672-4375; Online ISSN: 2672-4324

D(DEXR(-1))	0.121555	-0.444184	0.021726	0.286473
	(0.13160)	(0.17691)	(0.03082)	(0.16702)
	[0.92370]	[-2.51080]	[0.70489]	[1.71516]
D(DLR(-1))	-1.710458	1.250511	0.075509	-1.351476
	(0.74358)	(0.99963)	(0.17416)	(0.94377)
	[-2.30030]	[1.25098]	[0.43357]	[-1.43200]
D(DM2(-1))	0.383920	-0.485384	-0.057706	-0.079687
	(0.15652)	(0.21041)	(0.03666)	(0.19866)
	[2.45288]	[-2.30681]	[-1.57416]	[-0.40113]
C	-1.736676	-1.527522	-0.131468	0.886809
	(2.83040)	(3.80503)	(0.66292)	(3.59242)
	[-0.61358]	[-0.40145]	[-0.19832]	[0.24686]
R-squared	0.612356	0.348214	0.671870	0.305794
Adj. R-squared	0.520060	0.193026	0.593744	0.140506

Source: Author's Extraction from E-Views Analysis, 2021.

Also, a unit increase in lending rate, on averagely, leads to a 1.71 unit decrease in trade openness in Nigeria, in the short run. However, the exchange rate (EXR) has a positive sign but could not have any significant impact on trade openness, as its standard error (0.13) is too large and t-value (0.92) is too small. ECM coefficient shows the correct negative sign but could not be significant, meaning that the switch between the short-run and long-run periods in the model could not be significant.

4.2.4 Result of Long-Run Coefficients

In the long run, as shown in Table 9,broad money supply growth and lending rate have the expected signs and they are significant at 5per cent and 1per cent levels. However, the exchange rate could not be significant. Since M2 and LR are significant in the long run, the study concludes that monetary policy has a significant impact on trade openness in Nigeria in the long run. The finding is in deviance with the work of Ahiakpor, Cantah and Brafu-Insaidoo (2019).

Table 9: Long-Run Coefficients

Print ISSN: 2672-4375; Online ISSN: 2672-4324

Variables	Coefficients	Standard Error	t-statistics
DTOP(-1)	1.000000		
DEXR(-1)	0.143655	0.20235	0.70993
DLR(-1)	-6.279255	1.18307	-5.30758
DM2(-1)	0.535487	0.21052	2.54368
C	-1.255362		

Source: Author's Extraction from E-Views Analysis, 2021.

4.2.5 Result of VEC Granger Causality Test (Individual and Joint Tests)

The result of the Granger causality test is presented in Table 10. It consists of both joint and individual variable causalities. The result of the joint causality shows that all the variables jointly granger cause trade openness, according to the probability value (0.0427). However, the individual result shows that only M2 and LR granger cause trade openness, as their probability values (0.36, 0.02 and 0.1) indicate. Hence, the study concludes that monetary policy granger causes trade openness in Nigeria. This result was supported with the findings of Ekpo and Effiong (2017).

Table 10: VEC Granger Causality Test

Dependent variable: D(DTOP)			
Excluded	Chi-sq	Df	Prob.
D(DEXR)	0.853224	1	0.3556
D(DLR)	5.291392	1	0.0214
D(DM2)	6.016624	1	0.0142
All	25.20267	3	0.0427

Source: Author's Extraction from E-Views Analysis, 2021.

4.3 Post-Estimation Analysis

4.3.1 Result of Residual Tests

Table 11 presents the diagnostic test result of the residual in the model. Using the p-values of the three test statistics, the null hypotheses are accepted that, there is no presence of serial correlation and heteroskedasticity in the model, and generally, the variables are normally distributed.

Table 11: Result of Residual Tests

Diagnosis	Statistics	Probability
Serial Correlation	13.79766	0.6138
Heteroskedasticity	179.3897	0.4988
Normality	0.026440	0.8708

Source: Author's Extraction from E-Views Analysis, 2021.

4.3.2 Result of Stability Tests

Figure 1 showcases the stability results for the model. As could be seen in the figure, all the dots are within the circle, which implies that the model is stable and consistent for use.

Print ISSN: 2672-4375; Online ISSN: 2672-4324

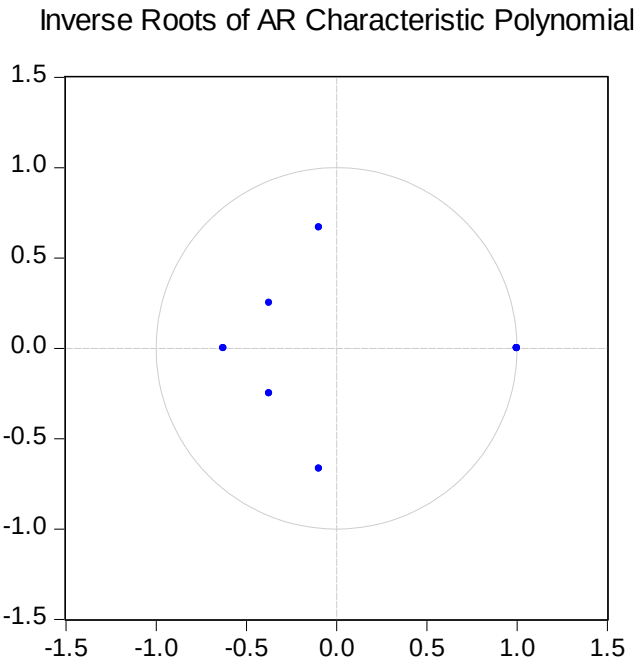

Figure 1: Stability Test

5. Conclusion and Recommendations

This study investigated the impact of monetary policy on trade openness in Nigeria. Haven used broad money growth, lending rate and exchange rates to proxy monetary policy in Nigeria, the study found out the monetary policy has a significant impact on trade openness in both the short-run and long-run periods. Specifically, broad money growth has a direct/ positive impact on trade openness while lending rate has an inverse impact influence on trade openness. However, the exchange rate does not have any significant impact on trade openness in Nigeria.

Based on the findings and conclusion of this study, it is suggested that monetary policy be used to boost the economy's trade openness by increasing the broad money growth and reducing the lending rate which could improve quality investments for export.

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