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Empirical Study Of The Relationship Between Key Macroeconomic Variables And Nigeria Economic Growth (2000-2018)

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Abstract: ***This study examines the relationship between key macroeconomic variables and Nigeria Economic Growth based on the annual time series data for the period 2000-2018. This is done by ascertained the causal connection between the selected economic variables and economic growth. The general objective was to determine how selected economic variables affect economic performance of Nigeria. Simple regression technique was used to establish the impacts of any changes in the independent variables (Money supply, Inflation, Interest rate and Foreign exchange) as a result of the unit change of the dependent variable (GDP). Pearson Correlation was used to determine the extent of the relationship between the dependent variable and the independent variables. The empirical result confirms that there is a significant relationship between interest rate and GDP as well as between exchange rate and GDP While money supply and inflation were insignificantly related to GDP. The researchers recommends: the applications of expansionary monetary policy to increase money s upply. Monetary policy of inflation targeting to control inflation, Investment friendly interest rate to encourage investors borrowing and foreign exchange liberalization to remove bottleneck on international transaction and boost economic growth of Nigeria.***

Keywords: Broad Money Supply, foreign Exchange Rate, Lending Interest Rate, Inflation rate, Real GDP, Monetary policy, Economic growth.

I. INTRODUCTION

A. BACKGROUND TO THE STUDY

Economic growth is the key policy objective of any government. A sustained economic growth is essential for any country's long-term development and stability. Economic growth provides crucial information to government, investors, non-governmental organizations as well as the international communities. The information provided by the economic growth includes the size of the economy, the rate of growth, GDP per capita, etc. It is therefore of paramount interests for policy makers to explore factors driving economic growth. Economic growth of any country reflects its capacity to increase production of goods and services which can be simply stated as the increase in the Gross Domestic Product (GDP) of a country. Economic growth has been viewed from the perspectives of the high inflation rate, mounting fiscal deficit, increasing foreign debt and debt servicing, political instability, economic mismanagement and corruption among other factors.

Interest rate is seen to be one of the macroeconomic variable that influence economic growth and development. The ups and down volatility of interest rates is closely related to inflation rates. Its high or low rates also impact on the economic boom (high GDP) and extending to influence economic growth rate.

Money supply, inflation and exchange rates are other key determinants of high economic growth rate capable of creating employment opportunities, poverty reduction, higher per capita income and standard of living that culminate into economic development (Phibian, 2010). Therefore, understanding the causal connections between money supply and GDP, Inflation trends and GDP, Bank lending interest

rates and GDP, Exchange rates and GDP is imperative because such relationship reveals the appropriate monetary policies necessary to achieve desired economic performance. In an attempt to achieve this, several monetary policies were adopted by Nigeria; these include exchange rate targeting regime 1959-1973, monetary targeting, inflation targeting among others. In a specific term, Inflation Targeting introduced by Charles Soludo in 2007 aim at keeping the price levels at a target rate as a means of achieving desired economic outcomes (Ogunmuyiwa and Francis, 2010).

This study is aimed at determining the relationship between the monetary policy variables (money supply, inflation, interest rate and exchange rate) and the economic growth proxy by GDP.

A. STATEMENT OF THE PROBLEM

Economic growth of any nation is influence and determine by the interplay of various macroeconomic variables such as Money supply, inflation rate, interest rate, exchange rate, monetary policy, population etc. This key macroeconomic variables influence the economic growth rate either positively or negatively. The positive impact promotes economics activities and boost economic growth while the reverse is the case. Therefore, Lack of proper understanding of the relationship between the various macroeconomic variables and economic growth is responsible for the poor performance of most economics policies. This research intend to create a clear understanding of the causal connections between money supply, Inflation rate, Interest rate, exchange rates and economic growth in other to guide monetary policies formulation and implementation for greater economic growth and development.

B. RESEARCH QUESTIONS

This study is to ascertain the relationship between macroeconomic variables (money supply, inflation. interest rate, and exchange rate) and economic growth by answering the following questions:

- ✓ What is the relationship between money supply and economic growth of Nigeria?
- ✓ What is the relationship between inflation and economic growth of Nigeria?
- ✓ What is the relationship between interest rates and economic growth of Nigeria?
- ✓ What is the relationship between foreign exchange rates and economic growth of Nigeria?

C. OBJECTIVES OF THE STUDY

Economic growth of any nation is dependent on the significant roles of key macroeconomics variables. Therefore, nations are expected to manage their macroeconomic factors to achieve economic growth and development. Macroeconomics variables such as broad money supply, inflation, interest rate and exchange are selected for study in other to ascertain their significant relationship with economic growth in Nigeria.

The specific objectives are as follows:

- ✓ To determine the relationship between money supply and economic growth of Nigeria.
- ✓ To determine the relationship between Inflation rate and economic growth of Nigeria.
- ✓ To determine the relationship between banks Interest rate and economic growth of Nigeria.
- ✓ To determine the relationship between foreign exchange rate and economic growth of Nigeria.

D. STATEMENT OF HYPOTHESES

A research hypothesis is a tentative statement of expectation or prediction that would be tested by the research analysis. It is a tentative statement about the relationship between two or more variables. It is a specific and testable prediction about what you expect to happen in a study. Therefore, the statement of hypothesis for this research is stated below:

HYPOTHESIS ONE

H_o : There is no significant relationship between Money supply and economic growth of Nigeria

HYPOTHESIS TWO

H_o: There is no significant relationship between Inflation rate and economic growth of Nigeria

HYPOTHESIS THREE

H_o: There is no significant relationship between Interest rate and economic growth of Nigeria

HYPOTHESIS FOUR

H_o: There is no significant relationship between exchange rate and economic growth of Nigeria

E. SIGNIFICANCE OF THE STUDY

The primary objective of any government is to improve the welfare of her citizens in the provision of goods and services through the real economic sectors of the economy. This research work is sets out to empirically investigate the relationship between key macroeconomic variables (money supply, inflation, interest rate and foreign exchange rate) and economic growth of Nigeria as a guide to government and central bank of Nigeria monetary policy formulation and execution towards achieving steady economic growth and development in Nigeria.

II. REVIEW OF RELATED LITERATURES

A. CONCEPTUAL FRAMEWORK

MONEY SUPPLY

Money is anything that is widely accepted as a method of payment and Money supply is the total amount of all forms of money in circulation in a given country at a given period of time (Johnson, 1987; Jhingan, 2005; Abdullahi, 2009). Total money supply can be grouped into two broad categories as defined by Central Bank of Nigeria: These are near money (M1) and broad money (M2) (CBN, 2003). M1 indicates currency in circulation plus current account deposits with

commercial banks while M2 is M1 plus savings and time deposit.

INTEREST RATE

Interest rate is the bank lending rate or monetary policy rate (MPR) and it is one of the intermediate monetary policy instruments at the control of Central Bank to control the money supply and thus inflation rate (Anyaele, 2003). If the apex Bank feels to curtail money supply by reducing the power of participants (commercial banks), it will increase interest rates, while in case of an expansionary monetary policy the reverse will be the case.

INFLATION

Inflation is an upward movement in the average level of prices. Inflation generally entails a sustained rise in the price of goods and services in an economy (Medee and Nembee, 2010, Andy, 2001). Precisely, it is a situation in which the value of money is declining i.e when prices are raising rapidly (Aderinto and Abdullahi, 1988). It is opposite of deflation which is a downward movement in the average level of prices. The boundary between inflation and deflation is price stability. John Maynard Keynes defines, 'Inflation as the result of excess aggregate demand over the aggregate supply and the true inflation start after full employment. According to him, the rise in price level before full employment is semi-inflation. In the words of Peterson, "The word inflation in the broadest possible sense refers to any increase in the general price-level which is sustained and non-seasonal in character."

EXCHANGE RATE

Exchange rate is the price of one country's currency in relation to another country. It is the required amount of units of a currency that can buy another amount of units of another currency. In Nigeria, the exchange rate policy has undergone significant transformation from the immediate post-independence period when the country maintained a fixed parity with the British pound, through the oil boom of the 1970s, to the floating of the currency in 1986, following the near collapse of the economy between 1982 and 1985 period. In each of these epochs, the economic and political considerations underpinning the exchange rate policy had important repercussions for the structural evolution of the economy

ECONOMIC GROWTH

Todaro (1985) defined economic growth as a long-term rise in capacity to supply increasingly diverse economic goods and services to its population; this growth capacity is based on advancing technologies, the institutional and ideological advancement that it demands. Economic growth occurs whenever there is a quantitative increase in country's input and output over a period of time (Johnson, 1987; Kayode, 1996). Economic growth in this research context is proxy and measured as the rate of gross domestic products (GDP) over a specific period of time.

GROSS DOMESTIC PRODUCT (GDP)

Gross Domestic Product is the total monetary or market value of all the finished goods and services produced within a country's border in a specific time period. As a broad measure of overall domestic, it functions as a comprehensive scorecard of the country's economic health. It includes all private and public consumption, government outlays, investments, addition to private inventories, paid-in construction cost, and the foreign balance of trade (i.e plus exports and minus imports).

B. EMPIRICAL REVIEW OF LITERATURES

Many empirical studies have investigated the impact of different key macroeconomic variables on economic growth in Nigeria; some conclude on the positive impact while others revealed a negative impact in their findings; and many others argued that there is no significant relationship the dependent and independent variables.

Hussain and Haque (2017), researched on the relationship between money supply and per capita GDP growth rate for Bangladesh, used vector error correction model (VECM model) and concluded that the money supply has significant role on the GDP growth rate.

Gatawa, Abdulgafar and Olarinde (2017), investigated the impact of money supply and inflation on economic growth of Nigeria between 1973 to 2013, and used VECM. Their findings showed that broad money supply and interest were negatively related to economic growth.

Chude (2016), also researched the impact of broad money supply on the economic growth of Nigeria for the period of 24years (1987 – 2010), and they used ARDL model. Their finding showed that money supply and gross domestic product are closely related.

Aslam (2016), investigated the impact of money supply on economic growth for Sri Lanka over the period 55years (1959-2013), employed multivariate econometrics variable and found that money supply has positive impact on the economic growth.

Chinuba, Akhor, and Akwaden (2015), studied the relationship between money supply and economic growth, estimating a time series data covering a period of 28years (1981-2008) used a simple OLS on the Nigeria economy, the result indicated that money supply exerts a considerable positive impact on economic growth.

Owolabi (2014), examined the effect of money supply and foreign exchange on Nigeria economy with a data from the period 1988 to 2012, used Ordinary Least Squares (OLS). The result shows that money supply has positive significant impact on economic growth in Nigeria.

Uduakobong (2014), investigated the role of money supply on economic growth in Nigeria with a data covered the period 1985 to 2012, used augmented Cobb-Douglas production function and relied on Co-integration test and Error- Correction Model. The result shows that money supply does not only have a positive impact on economic growth in Nigeria but that the impact is strongly and statistically significant.

Adusei (2013), investigated the relationship between financial development and economic growth for Ghana over the period from 1971-2010, employed Fully Modified Ordinary Least Squared (FMOLS), and found out that financial development (including money supply) undermines economic growth.

Osuala, (2013), carried out an empirical study on the impact of inflation on economic growth over a period of thirty-one years. The VAR results revealed a statistically significant positive impact of inflation on economic growth in Nigeria while the causality test shows that there is no causality in between the two variables.

Obansa, Okoroafor, Aluko and Millicent (2013) also examined the relationship between exchange rate and economic growth in Nigeria between 1970 and 2010. Their findings indicated that exchange rate has a strong impact on economic growth. It was concluded however that exchange rate liberalization was good to Nigerian economy as it promotes economic growth.

Ihsan and Anjum (2013), examined the impact of money supply (m2) on GDP for Pakistan between 2000 and 2011, used economic indicators and they found statistically insignificant and negative impact of money supply on economic growth.

Ehigiamusoe (2013), researched about the link between money markets and economic growth in Nigeria over the period between 1980 and 2012, employed VECM. He ascertains that the link between the money market and real sector of the economy is very weak.

Adesoye, (2012), examined the causality between price, monetary aggregate and real output in Nigeria from the period 1970 to 2009, used the inflationary gap model that emanates from the quantity theory of money. The econometric findings suggest that output gap was strong indicators of controlling monetary aggregate in Nigeria, which indicates positive impact of money supply on economic growth.

Aminu and Amono (2012), conducted an empirical investigation into the effect of inflation on the growth and development of Nigeria Economy on secondary annual data from 1973-2010. The work employed Cobb Douglas Production function with ordinary least square method and concluded that inflation posses a positive impact on economic Growth.

Asher (2012), examined the impact of exchange rate fluctuation on the Nigeria economic growth for the period of 1980 to 2010. The result showed that real exchange rate has positive effect on the economic growth of Nigeria.

Azeez, Kolapo and Ajayi (2012) also investigated the effect of exchange rate volatility on macroeconomic performance in Nigeria using data ranging from 1986 to 2010. They discovered that exchange rate is positively related to economic growth (proxied by GDP).

Taiwo, (2012), studied the impact of injection and withdrawal of money stock on economic growth in Nigeria, used an Ordinary Least Square (OLS) as estimation technique over a period of 39years (1970-2008). The results revealed that monetary aggregate injection has positive effect on economic growth while withdrawal of money stock showed a negative impact on the GDP of Nigeria.

Nouri and Samimi (2011), investigated the impact of monetary policy on economic growth in Iran with a data from the period 1974 to 2008, used the Ordinary Least Squares (OLS). Their findings indicated that there is a positive and significant relationship between money supply and economic growth in Iran.

Isiaka, S.B, Abdulraheem, A & Mustapha, I.Y (2011), conducted an empirical study on the Impact of Money Supply on Economic Growth in Nigeria for the period of 10 years from (1995-2004) used a simple regression technique. They concluded from their findings that there exist a long-run insignificant positive relationship between money supply and GDP.

Amassona, D., Nwosa, P.I & Olaiya S.A (2011) investigated the effect of money supply on some Macroeconomic variables in Nigeria. Used a simplified OLS with annual data spanning from (1986-2009), and concluded based on their findings that there exist an inverse relationship between the two variables for the period under review.

Obamuyi and Olorunfemi (2011), examined the implications of financial reform and interest rate behavior on the economic growth in Nigeria. Their results revealed that financial reform and interest rates have significant impact on economic growth in Nigeria;

Taiwo, (2011) investigated the impact of inflation and investment on economic growth in Nigeria with the use of ordinary least square (OLS) method on annual secondary data from 1981-2006, the investigation revealed that inflation has negative and significant impact on economic growth, meaning that as inflation increases economic growth falls.

Omotor, (2010), investigated the long-run and short-run impact of money supply on economic growth of Nigeria for the period of 21years (1986-2006), used VAR Model, the results provided an evidence in support of the long run positive impact of money supply on growth in income but without significant impact in the short-run.

Ogunmujiwa and Ekone (2010), investigated the impact of money supply on economic growth in Nigeria from 1980 to 2006. Applied Ordinary Least Squares (OLS), Granger causality test and Error correction Model (E.C.M) to the time series data, the results revealed that money supply is positively related to growth but insignificant in the case of GDP (Gross Domestic Product) growth rates on the choice between contractionary and expansionary money supply.

Suleiman, (2010), studied the impact of money supply on economic growth of Nigeria, used ordinary least square method and analyzed secondary annual data for a period of 38 years from 1970-2007 and concluded base on the result that money supply has negative impact on the real GDP of Nigeria for the period reviewed.

Christian R.K, Adedapo .A. & William .O. (2010), estimated inflation threshold in WAMZ case of Ghana and Nigeria; employed non linear (conditional least square techniques) on the work for a period of 34yrs from 1975 to 2008. The result showed that there exists a statistically positive impact of inflation on economic growth in the two countries but the causality test conducted with lags shows no causality between the two variables in each country.

Ogunmuyiwa M.S & Francis E.A, (2010), carried out an analysis of the nexus or connection between money supply,

inflation, interest rate and economic growth, in Nigeria over a period of 1980-2006, used co-integration and vector error correction technique. The result revealed that money supply exerts an insignificant positive impact on GDP; while interest rate is observed to be positively and significantly related to economic growth. However, no causality was found to exist between the variables in both the short and long run.

Omoke, (2010), conducted an investigation into the relationship between inflation and economic growth in Nigeria based on secondary data from 1970-2005, the outcome revealed that inflation has positive impact on economic growth and causality is discovered to be running from Inflation to economic growth.

Omoke and Ugwuanyi (2010), tested the relationship between money, inflation and output by employing co-integration and Granger-causality test analysis. Their findings revealed no existence of a co-integrating vector in the series used. Money supply was seen to Granger cause both output and inflation. The result suggested that monetary stability can contribute towards price stability in Nigerian economy since the variation in price level is mainly caused by money supply and also concluded that inflation in Nigeria is too much of a monetary phenomenon.

Eregha (2010) explored variations in interest rate and investment determination in Nigeria for the period 1970-2002. He used the dynamic model of two equations and found that inverse relationship exists between interest rate and investment.

Adofu and Audu (2010), used ordinary least square method to ascertain the assessment of the effects of interest rate deregulation in enhancing agricultural productivity in Nigeria. The study found out that interest rate play a significant role in enhancing economic activities and as such, monetary authorities should ensure appropriate determination of interest rate level that will break the double - edge effect of interest rate on savers and local investors.

David, Umeh and Ameh (2010) examined the effect of exchange rate fluctuations on Nigerian manufacturing industry. They employed multiple regression econometric tools which revealed a negative relationship between exchange rate volatility and manufacturing sector performance in Nigeria.

C. GAP IN LITERATURE

Gap in literatures is the difference between what has been reviewed by other researchers and what this study intend to contribute. This study is therefore measuring the impact of four reasonably selected key macroeconomic variables (money supply, inflation interest rate and foreign exchange rate) in a different frame work on economic growth of Nigeria.

D. THEORETICAL FRAMEWORK

Over the years, theories on the nexus or connection between monetary policy and economic growth have flourished resulting into different strands of opinions among different schools of thought. This was predicated on the fact that high economic growth rate capable of translating into economic development required a proper mixed monetary policy variables, hence this has generated a lot of attention among the various schools of thought ranging from Classical to Neo Classical, Keynesian to Neo Keynesian etc.

The Classical monetary theory is hinged on Irving Fisher equation of exchange or what he called value theory. Irving Fisher in his statement as cited by Jhingan (2005) postulated that "Other things remaining unchanged, as the quantity of money in circulation increases, the price level also increases in direct proportion and the value of money decreases and vice versa". This implies that the quantity of money is the main determinant of the price level or the value of money. Any change in the quantity of money produces an exact proportionate change in the price level. The Fisher equation of exchange states that the quantum of money multiplied by the velocity of money is equal to the price level multiplied by the amount of goods sold. It is often replicated as MV= PQ, where M is defined as the quantity of money, V is the velocity of money (the number of times in a year that a currency goes around to generate a currency worth of income), and P represents the price level while Q is the quantity of real goods sold (real output).

On the contrary, the attack of Keynes on the classical quantity theorists brought about a reformulated quantity theory of money, which brought about a transition from monetary theory of prices to monetary theory of output. Keynes integrated monetary theory with value theory and link theory of interest into monetary theory. In the Keynes statement as cited by Jhingan (2005), "it is through the theory of output that value theory and monetary theories are brought into just a position with each other". Keynes disagrees with the older quantity theorists on their conclusion that there is a direct and proportional relationship between quantity of money and prices. He made it clear that, the effect of change in the quantity of money on prices is indirect and non-proportional and changes in the money supply affect only the absolute price level but exercise no impact on the relative price level. Keynes believes that so long as there is unemployment, output will change in the same proportion as the quantity of money and there will be no change in prices; and when there is full employment, prices will change in the same proportion as the quantity of money.

Keynesian and Neo-Keynesian theory provided a more comprehensive model for linking Inflation to Growth under the aggregate supply-aggregate demand (AS-AD) framework. The aggregate (AS-AD) framework postulated a positive relationship between inflation and growth where, as growth increased, so inflation does. According to this model, in the short-run, the (AS) curve is upward sloping rather than vertical, which is its critical feature. If the AS curve is vertical, changes on the demand side of the economy affect only prices. However, if it is upward sloping, changes in AD affect both price and output, (Dornbusch, et al., 1996). This holds that many factors drive the inflation rate and the level of output in the short-run. These include changes in: expectations, labor force, prices of other factors of production, fiscal and/or monetary policy.

In moving from the short-run to the hypothetical long-run, the above-mentioned factors, and its 'shock' on the 'steady state' of the economy are assumed to balance out. Producers feel that only the prices of their products have increased while

the other producers are operating at the same price level. However in reality, overall prices have risen. Thus, the producer continues to produce more and output continues to rise. Vikesh and Sabrina (2004) also believed that inflation could positively impact economic growth; the positive relationship could be due to agreements by some firms to supply goods at a later date at an agreed price. Therefore, even if the prices of goods in the economy have increased, output would not decline, as the producer has to fulfill the demand of the consumers or customers with whom the agreement to supply goods was made.

Another theory, which suggests that inflation, could positively affect economic growth could be linked to "Tobin effect". Tobin (1972), suggested that inflation causes individuals to substitute liquidity for interest earning assets, which leads to greater capital concentration and promotes economic growth. In effect, inflation exhibits a positive relationship to economic growth. He further argued that, because of the downward rigidity of prices (including wages), the adjustment in relative prices during economic growth could be better achieved by the upward price movement of some individual prices.

Another inflation theory is demand pull inflation which is the traditional theory of inflation. According to classical, the key factor is the money supply because in accordance with the quantity theory of money only an increase in the money supply is capable of raising the general price level. In modern income theory, demand pull is interpreted to mean an excess of aggregate money demand relative to the economy's full employment output level. As a result of excess demand, prices will rise and excess demand inflation or demand pull inflation would come to exist. According to this theory price rises in respond to an excess in aggregate demand over existing supply of goods and services caused by an increase in the quantity of money- resulting in the fall of interest rates- increasing investment expenditures and prices.

On the contrary, Adam Smith posited negative impact of inflation on economic growth. Adam smith provides a classical growth model. The link between the change in price levels (inflation), and its "tax" effects on profit levels and output were not specifically articulated in classical growth theories. However, the relationship between the two variables is implicitly suggested to be negative, as indicated by the reduction in firms' profit levels through higher wage costs, (Vikesh and Sabrina, 2004). Friedman further supported this view most especially in a situation in which growth in money supply is higher than the economic growth rate. However, inflation does have real consequences for other macroeconomic variables. Through its impact on capital accumulation, investment and exports, inflation can adversely influences a country's growth rate, (Dornbusch, et al., 1996). The negative relationship between inflation and growth is important, as it quite often occurs in practice, as ascertained by empirical literature. This phenomenon is regarded as stagflation, when inflation rises as output falls or remains stable. The economy does not move directly to a higher inflation rate, but follows a transitional path where inflation rises then falls. Under this model, there is a short-run trade-off between output and the change in inflation, but no permanent trade-off between output and inflation. For inflation to be held steady at any level, output must equal the natural rate, (Jhingan, 2005).

Classical theory further related the theory of interest rate to the forces of demand and supply. According to them, demand refers to the demand of investment and supply refers to the supply of savings. Therefore, the rate of interest can be determined with the help of demand for savings money to be invested in the capital goods and the supply of savings. The expected net return of capital goods investment that is represented by the percentage of cost of capital goods would be determine by the rate of interest on the fund to be raise for such investment.

However, Neo classical came out with an improved version of the classical theory of interest, which is the loanable funds theory of interest. According to the neo classical theory, interest is a reward for the use of loanable funds and the rate of interest is determined by the demand for and supply of loanable funds. Unlike the classical theory which deals only with the real factors of savings and investment, the loanable funds theory includes both real as well as monetary factors influencing the loanable funds and thus the rate of interest.

However, In the case of credit market theory, a model of the neoclassical credit market postulates that the terms of credits clear the market. If collateral and other restrictions (covenants) remain constant, the interest rate is the only price mechanism. With an increasing demand for credit and a given customer supply, the interest rate rises, and vice versa. It is thus believed that the higher the risk of the failure by the borrower, the higher the interest premium (Ewert, 2000).

The Purchasing power parity theory states that spot exchange rate between currencies will change to the differential in inflation rate between countries. The theory states that the equilibrium exchange rate between two inconvertible paper currencies is determined by the equality of their purchasing power. That is, the exchange rate between two countries is determined by their relative price levels (Obadan, 2006).

The balance of payment theory stipulates that under free exchange rate, the exchange rate of the currency of a country depends upon its balance of payment. According to Jhingan (2004), a favorable balance of payments raises the exchange rate, while an unfavorable balance of payments reduces the exchange rate. Thus the theory implies that the exchange rate is determined by the demand for and supply of foreign exchange.

However, this work adopted Neo classical of theory of interest as its theoretical base and guide, because the theory gives the ground upon which the relationship between interest rate on loanable fund, money supply, inflation and economic growth can be tested and analyze.

III. METHODOLOGY

A. RESEARCH DESIGN

A research design is the basic plan which guides the collection and analysis of data. It is the frame work that specified the type of information to be collected and the source of data. This research is an ex-post-facto (after-the-

fact) research where the investigation was conducted without the researcher's interference with the research data.

B. SOURCES OF DATA COLLECTION

Annual time series data covering 2000-2018 were used, the data were sourced from Central Bank of Nigeria (CBN) publications; Central Bank of Nigeria (CBN) annual statistical bulletin and National Bureau of Statistics.

C. METHOD OF DATA COLLECTION

The data used for this research work is purely secondary data obtained through internet browsing into the Central Bank of Nigeria (CBN) publications, Central Bank of Nigeria (CBN) annual statistical bulletin and National Bureau of Statistics.

D. DESCRIPTION OF RESEARCH VARIABLES

The variables for this study includes: Real GDP used as proxy for Economic Growth and a dependent variable, M_2 which is M_1 plus savings and time deposit used to measure money supply (BMS) as one of the independent variable, annual inflation rate (INFR) used to measure price changes as another independent variable, the bank interest rate used to measure the rate of interest (RINTR) on loans given out by the commercial banks in Nigeria as the third independent variable and the average official foreign exchange rate (AOFER) used to measure the rate of exchange between Nigeria and foreign currency as fourth and the last independent variable. All the variables are expressed in their natural log form with the exemption of variables in their rates.

E. MODEL SPECIFICATION AND VARIABLE MEASUREMENT

Different economic factors are responsible for changes in economic growth. In other to achieve logical conclusion on this research work, simple linear regression techniques, correlation analysis and ANOVA would be use to determine the level of relationship between the dependent and independent variables.

Regression equation adopted for this research is $Y=a+b_1X_1$ ……+μ

Where:Y=Estimated dependent variable, a= constant, b= regression coefficient and X_1 or X_2 or X_3 or X_4……= Independent variables and μ= error term

$Y(GDP) = a+b_1X_1(Int, BMS, Inf, ExchR)+\mu$

Where: GDP = Gross Domestic Product (Proxy for Economic Growth), BMS = Broad Money Supply, INF = Inflation, RINTR = Real Interest Rate, EXCHR= Exchange Rate

To capture economic growth, real GDP stand as its proxy, while M_2 comprises of M_1 plus savings and time deposit measure money supply. Annual inflation rate measure the rate of inflation. Rate of foreign exchange measure the annual exchange rate while Commercial bank interest rate measuress the rate of interest. All the variables are expressed in their natural log form with the exemption of variables in their rates.

DISSION RULES

The significant level for the analysis is $\alpha < 0.05$. The alternative hypothesis would be accepted when the significant or probability level is less than 0.05, otherwise rejected and Null hypothesis accepted. Also, where the computed f result is less than the f-tab, it shows an insignificant relationship between the dependent and independent variables.

IV. DATA PRESENTATION AND ANALYSIS

A. DATA PRESENTATION (RESEARCH VARIABLES)

Years	GDP Proxy For Economic Growth (%)	Broad Money Supply (b)	Inflation Rate (%)	Interest Rate (%)	Exchange Rate (#-$)
2000	5.52	48.07	14.50	17.98	102.105
2001	6.67	27.00	19.50	18.29	111.943
2002	14.60	21.55	12.20	24.85	120.970
2003	9.50	24.11	23.80	20.71	129.357
2004	10.40	14.02	10.00	19.18	133.500
2005	7.01	24.35	11.60	17.95	132.147
2006	6.73	43.09	8.50	17.26	128.652
2007	7.32	44.24	6.60	16.94	125.833
2008	7.20	57.78	15.10	15.14	118.567
2009	8.35	17.60	13.90	18.99	148.298
2010	9.54	6.91	11.80	17.59	150.298
2011	5.31	15.43	10.30	16.02	153.862
2012	4.21	16.39	12.00	16.79	157.499
2013	5.49	1.32	7.96	16.72	157.311
2014	6.22	7.20	7.98	16.55	158.553
2015	2.79	5.90	9.55	16.85	193.279
2016	-1.58	17.78	18.55	16.87	253.000
2017	0.82	2.33	15.37	17.78	305.790
2018	1.93	12.30	11.40	16.44	306.030

Source: CBN Statistical Bulletin 2019

B. DATA ANALYSIS

SIMPLE REGRESSION ANALYSIS

GDP VS BROAD MONEY SUPPLY

The regression equation is $Y=a+b_1X_1+\mu$

That is GDP = 5.37 + 0.0472 (BMS) + μ

Predictor	Coef	SE Coef	T	P
Constant	5.368	1.306	4.11	0.001
BMS	0.04723	0.04909	0.96	0.350

S = 3.37241 R-Sq = 5.2% R-Sq(adj) = 0.0%

Table 1: Gdp Vs Bms

Source	DF	SS	MS	F	P
Regression	1	10.52	10.52	0.93	0.350
Residual Error	17	193.34	11.37		
Total	18	203.87			

Table 2: Analysis Of Variance

CORRELATIONS RESULT

Broad Money Supply And Gross Domestic Product

Pearson correlation of BMS and GDP = 0.227 and the P-Value of the regression is = 0.350

The simple regression model (GDP=5.37+0.0472BMS) above shows that Broad Money Supply made a weak contribution of 0.0472 to the GDP with a very weak correlations of 0.227 between the independent (money supply) and the dependent variable (GDP).

The simple regression result and the analysis of the variance above indicated that the broad money supply (BMS) has a probability of 0.350 which is greater than the alpha (α 0.05), meaning that broad money supply within the period studied does not significantly influences the rate of gross domestic product (GDP).

GDP VS INFLATION RATE

The regression equation is $Y=a+b_1X_1+\mu$
That is GDP = 6.50 - 0.009 (INF) + μ

Predictor	Coef	SE Coef	T	P
Constant	6.497	2.481	2.62	0.018
INFLATION	-0.0092	0.1856	-0.05	0.961

S = 3.46273 R-Sq = 0.0% R-Sq(adj) = 0.0%

Table 3: GDP VS INFLATION

Source	DF	SS	MS	F	P
Regression	1	0.03	0.03	0.00	0.961
Residual Error	17	203.84	11.99		
Total	18	203.87			

Table 4: Analysis Of Variance

CORRELATION RESULT

Inflation And Gross Domestic Product

Pearson correlation of INFLATION and GDP = -0.012 and the P-Value of the regression = 0.961

The Pearson correlation ratio of -0.012 indicates a very weak negative relationship between GDP and inflation which means that a change in inflation rate does not prompt a significant change in the GDP for the period reviewed.

The simple regression model shows that inflation made a contribution of -0.0092 to GDP and the regression result shows that the probability or significant level of 0.961 is greater than the Alpha level of 0.05 significant limits. The analysis of variance (ANOVA) results also indicated that the f-calculated is 0.000 which is less than the f-tab value of 4.45 which is a show of insignificant relationship between the variables.

GDP VS INTEREST RATE

The regression equation is $Y=a+b_1X_1+\mu$
That is GDP = - 13.7 + 1.13 (INTEREST RATE) + μ
TABLE 7 - GDP VS INTEREST RATE

Predictor	Coef	SE Coef	T	P
Constant	-13.688	4.904	-2.79	0.013
INTREST	1.1251	0.2731	4.12	0.001

S = 2.44986 R-Sq = 50.0% R-Sq(adj) = 47.0%

TABLE 8 - ANALYSIS OF VARIANCE

Source	DF	SS	MS	F	P
Regression	1	101.84	101.84	16.97	0.001
Residual Error	17	102.03	6.00		
Total	18	203.87			

CORRELATION RESULT

Interest Rate And Gross Domestic Product

Pearson correlation of INTEREST and GDP = 0.707 and the P-Value of the regression = 0.001

The Pearson correlation result shows a strong positive relationship between interest rate and GDP with a correlation ratio of 0.707. This means that a change in interest rate result in a significant change in GDP. The simple regression model for interest rate against GDP shows that interest rate made a strong positive contribution of 1.13 per unit increase to GDP. The probability level of 0.001 from the regression and ANOVA is less than the significant level of α=0.05 which shows a significant relationship between the variables. Also the f-calculated of 16.97 is greater than f-tab of 4.45 which further indicated a significant relationship between bank interest and GDP.

GDP V S EXCHANGE RATE

The regression equation is
$Y=a+b_1X_1+\mu$
GDP = 12.9 - 0.0401 (EXCHANGE RATE) + μ

Predictor	Coef	SE Coef	T	P
Constant	12.902	1.612	8.00	0.000
EXCHANGE RATE	-0.040141	0.009327	-4.30	0.000

S = 2.39567 R-Sq = 52.1% R-Sq(adj) = 49.3%

Table 9: GDP VS EXCHANGE RATE

Source	DF	SS	MS	F	P
Regression	1	106.30	106.30	18.52	0.000
Residual Error	17	97.57	5.74		
Total	18	203.87			

Table 10: Analysis Of Variance

CORRELATION RESULT

Exchange Rate And Gross Domestic Product

Pearson correlation of exchange rate and GDP= -0.722 and the P-Value of the regression= 0.000

Exchange rate and GDP are negatively correlated at -0.722 and the regression model shows that Exchange rate made a contribution of 0.0401 per unit increase to GDP. The simple regression and the analysis of variance result show the probability level of 0.000 less than the significant level of 0.05. Also the f-calculated of 18.52 is greater than the f-tab of 4.45 as an indication of a significant relationship between the variables.

Pearson correlation of BMS and GDP = 0.227 and the P-Value of the regression is = 0.350

The simple regression model (GDP=5.37+0.0472BMS) above shows that Broad Money Supply made a weak contribution of 0.0472 to the GDP with a very weak correlations of 0.227 between the independent (money supply) and the dependent variable (GDP).

C. DISCUSSION OF FINDINGS

This research empirically studied the relationship between key economic variables and economic growth, using linear regression, analysis of variance (ANOVA) and Pearson correlation to analyze the extent of their relationship. The first comparative relationship was that of Broad money supply and Economic growth been proxy by GDP. The linear regression has a probability level of 0.350 greater than the decision level of alpha 0.05. This result signifies that money supply is insignificantly related to economic growth. This implies that a significant change or shift in the quantity of money supply into the economy does not significantly change the GDP which measure the economic growth for the studied period. When other variables like inflation rate, interest rate and exchange rate are unfavorably high, supply of money into the economy would not create a significant changes in the economic growth in short-run. Also when money supply is short of demand, it would create an insignificant change in the economic growth.

The revealed relationship between inflation rate and economic growth is also insignificant. This is shown by the regression probability level of 0.961 greater than the Alpha level of 0.05 significant decision limits. The analysis of variance (ANOVA) results also indicated that the f-calculated is 0.000 less than the f-tab value of 4.45 which also signifies an insignificant relationship between the variables. The Pearson correlation ratio of -0.012 indicates a very weak negative relationship between GDP and inflation which means that a change in inflation rate does not prompt a significant change in the GDP for the period reviewed. This is possible because the inflation increase in processed goods is being overshadowed by the national boost in Agricultural outputs. However, Inflation in the long-run is a threat to national development with it deteriorating impact on the value of money.

But the regression outcome shows a strong positive relationship between Interest rate and economic growth. The probability level of 0.001 from the regression and ANOVA is less than the significant level of α=0.05 which shows a significant relationship between the variables. Also the f-calculated of 16.97 is greater than f-tab of 4.45 which further indicated a significant relationship between bank interest and GDP. The Pearson correlation result also shows a strong positive relationship between interest rate and GDP with a correlation ratio of 0.707. This means that a change in interest rate creates a significant change in GDP. Whenever interest rate on lending is increased, more investors would access credits facilities for more investment that boost GDP. Similarly an increase in lending interest discourages access to credits and so reduces investment. Investors are always attracted to moderate interest rate that does not hamper investment opportunity. This is the reason why interest rate is one of the significant factors that influence and determine the movement of GDP over the reviewed period.

The regression further revealed a strong significant relationship between Foreign exchange rate and economic growth. The simple regression and the analysis of variance results probability level is 0.000 less than the significant level of 0.05. Also the f-calculated is 18.52 greater than the f-tab of 4.45 which are both indication of a significant relationship between the variables.

This means that changes in exchange rate affects the rate of importation and exportation of goods and services and so impact significantly on GDP and economic development.

V. CONCLUSION AND RECOMMENDATIONS

A. CONCLUSION

Based on the research findings, it is concluded that broad money supply was insignificantly related to GDP. This was due to high rate of factors like inflation rate, interest rate and exchange rate as well as insufficient supply of money into the economy within the study period. Inflation was also insignificantly related to GDP because of other factors such as high interest rate which has hampered sufficient borrowing, high foreign exchange rate which has affected importation and low money supply which has affected the economic activities in the economy. However, Interest rate was significantly related to GDP which impacted on the economic growth of Nigeria. This relationship was the high rate of lending which negatively affected investment and economic growth. Most investors were frustrated and industries where found liquidating due to difficulty in accessing funds as a result of high interest rate on lending. Foreign exchange in like manner was significantly related to GDP and economic growth within the reviewed period. This was obvious from the relatively high foreign exchange rate which negatively hamper adequate international trade.

B. RECOMMENDATIONS

The Researcher recommends the following:

- ✓ To create a positively significant relationship between money supply and economic growth, the expansionary monetary policy is advised to be implemented to guide against higher cost of capital, which make loan unattractive for productive purposes. Because more money in the economy would positively impact on the GDP in the long run.
- ✓ To achieve a positively significant relationship between inflation and GDP, fiscal policy should be design in such a way that could boost economic growth and development. Monetary policy strategy such as inflation targeting should be pursued vigorously to achieve and maintain a minimum and tolerable rate of inflation.
- ✓ The government through the apex bank should make the financial institutions safe and sound; and fine-tune the interest rates that will not raise the level of inflation or jeopardizes investors' investment objective as well as break the double - edge effect of interest rate on savers and local investors.
- ✓ To achieve positive impacts of Exchange rate on the economic growth, exchange rate liberalization is recommended because it is good to Nigerian economy as it promotes economic growth.

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