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Assessment of the Determinants of Demand for Money in Nigeria: 1981-2020

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Abstract

This study examined economic reassessment of the demand for money and behaviour of its determinant: Empirical evidence from Nigeria using time series annual data from 1981-2020 which constitutes 40 years. The Augmented Dickey-Fuller unit root test was employed to establish the stationarity of the variables, bound tests analyses indicated that there is a long-run equilibrium relationship between the understudied variables and short-run equation of ARDL model was estimated to determine the speed of adjustment of the broad money supply to long-run equilibrium at three lags selected. The findings were that there was evidence of a long-run equilibrium relationship between independent variables (LRGDP, INT, INF, EXR, TRO) on the money supply (LBMS) in Nigeria. It was found that exchange rate has significant negative effects the money demand in the long-term but positively in short-term and also an increase in RGDP will raise money demand. From the findings, the recommendation made included; that Nigeria can use interest rate and control economic as a tool to adjust money demand and conduct of monetary policy in Nigeria should continue to focus on monetary aggregates, especially their growth rates.

Key words: *Demand for Money; Real Income; Interest Rate: Inflation Rate: Exchange Rate: Trade Openness*

1.0 Introduction

"Demand for money as a concept has over the years attracted the interest of great economists and it keeps being a subject of interest to many. Unlike the demand for goods, it is not restricted to one market but also involves other markets (Money market, capital market commodity market and foreign exchange market), hence it has a direct bearing on monetary policy and so relevant to the study of macro-economics. The focus on the demand for money is attributed to the fact that monetary policy will only be effective if the demand for money function is stable. Stability of the demand for money is crucial in understanding the behaviour of critical macro-economic variables (Essien, Onwioduokit and Osho. 1996).

Practically speaking, demand for money is the demand on the part of individuals and businesses to hold purchasing power in the

form of cash and checkable deposit. Demand for money has been defined also as the amount of money balance held for certain purpose rather than putting i them into immediate consumption expenditure. In the Nigerian society and other developing I countries of the world today, demand for money has increasingly been a focus of economic; analysis of which several studies have extensively been carried out as to what factors principally determine the demand for money in Nigeria.There have been tremendous theoretical and empirical studies on the demand for money. Pinpointing these with the seminal work of Tomon (1972) which has led to comments and criticism through the famous "Tatoo debate" of the 1970s that demand for money is influenced by real income and interest rate. And this was criticized by theother researchers like Ojo and Teriba (1974) that poorly specified demand for money functions makes the research conducted unreliable and spurious as there is unstable demand for money function estimation.

Also, the identification of the demand for money function is important as it plays an essential role in the transmission mechanism of both monetary and fiscal policy. Furthermore, the temporarystability of such identified function is also significant if monetary policy is to have a predictableeffect on the ultimate objective of economic policy (Oresotu and Mordi 1992). Thus, estimationof demand for money function is important as the positive fall out of anti-inflationarystabilization policy depend on a stable demand for money function (Nwabanmwen 2002).

Even as with many other issues in economic theory, disbelief (controversy) has split the economists and policy maker into different schools of thought, namely the classical, theKeynesian, neo-classical and the monetarists.The classicalists for instance argued that the demand for money, the medium of exchange as a | simple means of carrying out transaction Jhingan (2003).

Jhingan (2003), Keynes argued that the nominal interest rate affects real money holding,although that demand for money is determined by both income and interest rate, but emphasizing that interest rate is more superior. According to this same Jhingan, Keynes argued that decisionto either to hold cash, invest in bond or borrowing is pre-determined by the rate of interest.

The monetarist in their analysis however, refute Keynes' prediction tendency that interest rate and income determine demand for money. Rather they maintained that permanent income, influence the decision to hold money, Jhingan (2003).In spite of the controversies among the economists, the analysis of the demand and the supply ofmoney still play tremendous role in the economic policy both in the developed and developingeconomies.

In light of this, the research will look at economic reassessment of the demand for money and the behavior of its determinants: Empirical evidence from Nigeria from 1981 to 2020. As a result, the study's main objectives are:

(i) Examine the impact of real income on money demand in Nigeria

(ii) Access the impact of inflation rate on money demand in Nigeria

(iii) Investigate the impact of interest rate on money demand in Nigeria

(iv) Analyze the impact of exchange rate on money demand in Nigeria

(v) Evaluate the impact of trade openness on money demand in Nigeria

This paper is divided into five sections to fulfill these goals, with the introduction as the first. The second section is a literature review. The methodology is examined in the third section. The fourth section focuses on the presentation and discussion results. The summary, findings, policy recommendations and contribution to knowledge are all covered in section five.

2.0 Review of Related Literature

2.1 Theoretical Review

2.1.1 The Classical Theory of Demand for Money

The classical economists did not unambiguously devise demand for money thesis but their outlooks are intrinsic in the volume of thesis of money. They highlighted the transactions demand for money of exchange and smooth the progress of the exchange of goods and services.

In Fisher's Equation of Exchange

$$MV = PT \quad \text{----------1}$$

Where M is the total volume of money, V is its velocity of circulation, P is the price level and T is the aggregate amount of goods and services exchanged for money.

The right-hand side of this equation PT represents the demand for money which actually based on the value of the transactions. MV represents the supply of money which is specified and in symmetry parities the demand for money. This transaction demand for money, in turn is ascertained by the level of full employment earnings. This is due to the classicists assumed in Say's Law whereby supply created its own demand, presuming the full employment level of earnings. Thus, the demand for money in Fisher's approach is invariable ration of the level of transactions which in turn abides and invariable association to the level of national earnings.

2.1.2 Keynesian Theory of Demand for Money

The transactions demand for money mounts from the medium of exchange role of money inmaking regular payments for goods and services. As per Keynes, it relates to "the need for cashfor the current transactions for personal and business exchange." It is further more sectioned into earnings and trade motives.The earnings motive is meant "to bridge the interval amidst the receipt of earnings and its disbursement." Likewise, the trade motive is meant "to bridge the interval amidst the time of incurring trade costs and that of the receipt of earnings is the sale proceeds.They are based on the level of earnings, the rate of interest, the business proceeds, the normal period amidst the receipt and disbursement of earnings etc.The transactions demand for money is a direct proportional and positive fiction for the level of earnings and is given as follows:

Lr = kY---------- 2.8

Where Lr, is the transactions demand for money, k is the ration of earnings which is kept for transactions purposes and Y is the earnings.

2.1.3 Friedman's Restatement of Quantity Theory Money

In the reformulation of the volume thesis, Friedman asserts that "the quantity thesis is in the firstinstance a theory of demand for money. It is not a theory of output or of money income or of the

price level."The demand for money on the part of maximum prosperity holders is formally identical with that of the demand for a consumption service. He considers the amount of real cash balance (M/P) as a product which is demanded for the reason that it capitulate services to the person who holds it.Therefore, money is an asset or capital good and the demand for money forms part of wealth thesis. For maximum prosperity holders the demand for money in real terms may be expected to be an operation primarily of the succeeding erratic; total Affluence, the division of affluence amidst human and non-human forms, the anticipated rates of return on money and other assets, and other variables.

2.2 Empirical Review

Folarin and Asongu (2019) investigated the financial liberalization and long-run stability of money demand in Nigeria. The study employed ARDL bounds approach and CUSUMSQ tests to conduct co-integration and stability test respectively. The results revealed that there is a long-run relationship between demand for money and its determinants, also the CUSUMSQ outcomerevealed that demand for money is stable within the period of financial deregulation consideredthe study. In addition, it was also revealed that inflation rate will be a better proxy for anopportunity variable when compared to interest rate.

Tule, Okpanachi, Ogiji, and Usman (2018) re-examined broad money (M2) demand and its Stability in Nigeria using the Autoregressive Distributed Lag (ARDL) bounds testing procedure. First, the results indicate that a stable long-run relationship exists between M2 and its determinants including GDP, stock prices, foreign interest rates and real exchange rate.

Furthermore, stock prices showed a significant and positive effect on the long-run broad money demand, which in some ways reflect increased 'financialization' and integration of the Nigerian economy into the global economic system. Overall, the findings of this study lend credence to the continued relevance of the broad money aggregate, M2, as a benchmark for monetary policy implementation in Nigeria.

Asongu, Folarin and Biekpe (2018) examined the stability of money demand in the proposed West African Monetary Union (WAMU). The study uses annual data for the period' 1981 to 2015 from thirteen of the fifteen countries making-up the Economic Community of West African states (ECOWAS). A standard money demand function is designed and estimated using a bound testing approach to co-integration and error-correction modeling. The findings show divergence across ECOWAS member states in the stability of money demand. This

divergence is informed by differences in co-integration, stability, short run and long-term determinants, and error correction in event of a shock.

El-Rasheed *et al* (2017) investigated the determinants of money demand (M2) in Nigeria. The scope of the study was between 1980 and 2014. The study also employed the autoregressive distributed lag model for its estimation and it was revealed that monetary uncertainty has significant influence on the demand for money function in Nigeria.

Manamba (2017) investigated the determinants of demand for money and its stability in (Tanzania using annual time series data spanning from 1966 to 2015. Johansen co-integrationresults reveal that there is a long-run relationship between real money balances and the [explanatory variables namely, real GDP, deposit interest rate, real exchange rate and inflation rate. Consistent with money demand theory, the VECM results show that the demand for real money balances is positively related with scale variable (real GDP) but it responds inversely to opportunity cost of holding money (deposit interest rate and inflation rate). Moreover, results provide evidence that the demand for real money balances and real exchange rate are positively associated.

Dennis and Vaclav (2016) examined the demand for broad money and its stability in Ghana within the period of 1990 to 2014. Unit root test and Johansen's co-integration approach reveals that the variables were non stationary and co-integrated, therefore, an error correction model, was used to determine the factors that influence real money aggregate in Ghana from 1990 to 2014. The results show that, GDP affects the level of demand for money in the long run while the interest rate affects it in the short run. The error correction term in each of the cases shows, 18% of deviations in the real demand for money is corrected annually. The CUSUM tests of parameter stability showed that, the money demand function was stable over the period and the Chow test indicated that there were no structural breaks.

Ben-Salha and Jahidi (2014) investigated the determinants of money demand in developing countries: a case study of Tunisia. The study used annual time series data ranging between 1970 and 2011. It employed ARDL bound test and the result revealed a long-run relationship between broad money demand and its determinants, namely final consumption expenditure, expenditure on investment goods, export expenditure and interest rate. The Error correction model result shoed that demand for money is only affected by interest rate and expenditure on investment goods in the short run, while in the long run final consumption expenditure and interest rate are the major determinants of demand for money.

3.0 Methodology

3.1 Model Specification

The study adapts Iyoboyi and Pedro's model (2013). In their work titled "Determinants of money Demand (Ml) in Nigeria", they specified the model: Ml = f (real income, short term interest rate, real exchange rate and inflation rate).Thus, the general functional form of the adapted model is specified as follows:

M2 = (RGDP; LDIR, INFR, EXR, TRO) (3.1)

The econometric version of this model can be stated as follow;

$$LBMS = Y_0 + Y_1\ RGDP + Y_2LDIR + Y_3INFR + Y_4EXR + Y_4TRO + \mu \ldots\ldots\ldots (3.2)$$

Where;

BMS = Broad money supply (M2), RGDP = Real Gross Domestic Product., LDIR = Lending Interest Rate, INFR = Inflation Rate, EXR= Exchange Rate and TRO= Trade Openness.

A priori Expectation

It is expected that based on a priori functional relationship between dependent and independent variables that the coefficient of RGDP>1, LDIR<1, INFR>1, EXR>1 and TRO>1.

3.2 Data Estimation Technique

The Augmented Dickey-Fuller (ADF) test was adopted to test the time-series properties of data and determine the order of integration to stationarity.ARDL bounds testing approach was used to determine the long relationship between the variables. Hence, the ARDLrepresentation of equation 3.2 can be presented as thus;

$$\Delta BMSt = \beta_0 + \beta_1 BMS_{t-1} + \beta_2 RGDP_{t-1} + \beta_3 LDIR_{t-1} + \beta_4 INFR_{t-1} + \beta_5 EXR_{t-i} + \beta_6 TRO_{t-i} + \beta_7 \Delta RGDP_{t-i} + \beta_8 \Delta LDIR_{t-i} + \beta_9 \Delta INFR_{t-I} + \beta_{10} \Delta EXR_{t-I} + \beta_{11} \Delta TRO_{t-i} + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.3)$$

Where; Δ is the first-difference operator, and β's shows the long run coefficients and short run coefficients. Hence, the null hypothesis (H_0) of no cointegration states that, H_0: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = \beta_9 = \beta_{10} = \beta_{11} = 0$ and the alternative hypothesis of existence state that; $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq \beta_7 \neq \beta_8 \neq \beta_9 \neq \beta_{10} \neq \beta_{11} \neq 0$

3.3 Data Types and Sources

The annual time series data required for the estimation of the models include Broad Money supply (M2), Real GDP, Lending Interest Rate, Exchange Rate, Trade Openness and Inflation Rate. The data for M2 and RGDP are sourced from the Central Bank of Nigeria's Statistical Bulletin (2020, Vol. 30), while data for Lending Interest Rate and Inflation Rate are sourced from the World Bank Development Indicator's Data bank.

4.0 Data Analysis

4.1.1 Unit Root Test.

The unit root test will be carried out based on the augmented dickey fuller (ADF) test at 5% level of significance.

Table 4.1.1.1: Unit Root Test Results for Stationarity (ADF at 5 percent levels)

Variables	ADF Statistics	5% Critical Value	Order of Integration
BMS	-4.807638	-3.533083	I(1)
RGDP	-2.996894	-2.941148	I(0)
INT	-10.30522	-1.949856	I(1)
INF	-6.112895	-1.949856	I(1)
EXR	-3.388354	-1.949856	I(1)
TRO	-7.654953	-1.949856	I(1)

Source: Author's Computation, E-views version 9.0

Based on the above result of the Augmented Dickey-Fuller unit root test,the variables are mixture of 1(1) and I (0) and are significant at 5% level of significance. This means that the null hypothesis will not be accepted. We therefore conclude that the time series collected are all stationary.

4.1.2 ARDL Bound Test Result

Table 4.1.2 ARDL Bond Test Results

Dependent Variable: LBMS **Functions:** (LRGDP, INT, INF, EXR, TRO) **F-statistics:** 6.937636		
K	**5**	
Critical Value Bounds		
Significant	**Lower Bound**	**Upper Bound**
5%	2.62	3.79

Source: Author's Computation, E-views version 9.0

The ARDL bound test results presented above show that F-statistics value of the mode 6.94 greater than I (1) bound test value of 3.79 at 5% significant level. Therefore, we reject the null hypothesis of no co-integration and concluded that there exist long run relationship among the variables in the model.

4.1.3 Results of the Short-Run Equation of ARDL Model

Table 4.1.3 Short Run Results of ARDL Model

Dependent Variable: D(BMS)
Method: Least Squares
Date: 08/30/21 Time: 22:20
Sample (adjusted): 1986 2020
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(BMS(-1))	0.344866	0.183037	1.884131	0.0791
D(BMS(-2))	0.064360	0.165123	0.389769	0.7022
D(BMS(-3))	0.481252	0.173489	2.773955	0.0142
D(RGDP(-1))	-0.627400	0.190508	-3.293299	0.0049
D(RGDP(-2))	0.727393	0.282908	2.571133	0.0213
D(RGDP(-3))	0.024304	0.242791	0.100103	0.9216
D(INT(-1))	35.45790	48.38982	0.732755	0.4750
D(INT(-2))	-69.76912	57.82756	-1.206503	0.2463
D(INT(-3))	-118.7897	45.08418	-2.634842	0.0188
D(INF(-1))	-2.916170	10.62061	-0.274576	0.7874
D(INF(-2))	10.90799	9.636126	1.131989	0.2754
D(INF(-3))	5.826661	9.910419	0.587933	0.5653
D(EXR(-1))	-6.227334	11.43220	-0.544719	0.5940
D(EXR(-2))	26.48813	11.03645	2.400059	0.0298
D(EXR(-3))	1.435494	11.36219	0.126340	0.9011

D(TRO(-1))	-1.138286	19.26886	-0.059074	0.9537
D(TRO(-2))	58.45012	21.84465	2.675718	0.0173
D(TRO(-3))	11.43683	18.68053	0.612233	0.5496
C	-55.51464	253.9148	-0.218635	0.8299
ECM(-1)	-1.290010	0.456444	-2.826215	0.0128

R-squared 0.894157

Source: Author's Computation, E-views version 9.0

The coefficient of the error correction in the table 4.1.3, has -1.29 and significant at 0.05 level. This sign indicates that broad money supply will converge to its long-run equilibrium when there is a short-term relationship between the real gross domestic product, band deposit interest rate, inflation rate, exchange rate and trade openness. This also means that the errors will continue to be corrected at 1.29%.

4.1.4 Stability Test

Recursive least square tests (CUSUM TESTS) have been also applied for checking parameter stability for the quarterly data of the variables. In figure 4.1.1 shows recursive coefficients estimates where estimated values of parameter for regressand variables i:e BMS and explanatory variables i:e RGDP, INT, INT, INF, EXR and TRO are plotted against each iteration. The graphs show the stability analysis during the year 1981to 2020. During the intervals the data look stable because it falls with 0.05%.

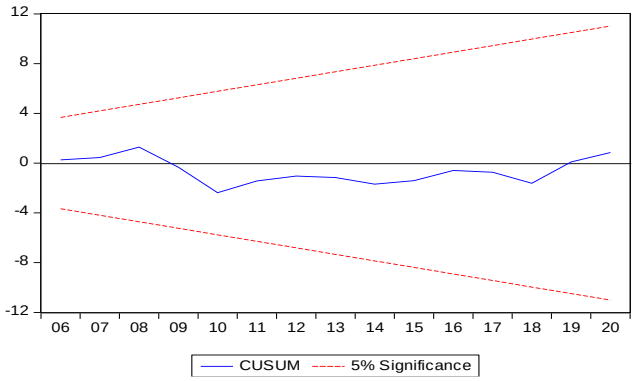

Figure 4.1.1 Stability Test (LBMS, LRGDP, INT, INF, EXR, TRO)

Source: Author's Computation, E-views version 9.0

4.2Discussion of Results

The results of the bound tests analyses indicated that there is a long-run equilibrium relationship between the understudied variables. Furthermore, the estimated coefficient in the tables 4.2.5 shows or explains the long-run impact of independent variables (LRGDP, INT, INF, EXR, TRO) on the money supply (LBMS) in Nigeria.The exchange rate significantly negatively affects the money demand in the long-term but positively in short-term. It shows that the economic entity considers the opportunity cost

of holding money, thereby adjusting the money supply.

Also, an increase in RGDP will raise the national income so that people will need more money to purchase, it will lead to an increase in money demand, In the long run, continued exchange rate appreciation (and appreciation expectations) will reduce demand for money. This implies broad money supply parameter, is seriously influenced by interest rate, inflation rate and other variables used in the study. Based on their performance, these variables are perceived to provide buffer against loss. More so, error correction result indicated that broad money supply will converge to its long-run equilibrium when there is a short-term relationship between the real gross domestic product, band deposit interest rate, inflation rate, exchange rate and trade openness. means that the errors will continue to be corrected at 1.29%. Interestingly, recursive least square tests (CUSUM TESTS) were applied to check parameter stability for the variables. The graphs showed the stability analysis during the year 1981 to 2020. During the intervals the data look stable because it falls with 0.05%.

5.1 Summary

The paper examines the determinants of the demand for money in Nigeria. the results showed the long-run impact of independent variables (LRGDP, INT, INF, EXR, TRO) on the money supply (LBMS) in Nigeria.The exchange rate significantly negatively affects the money demand in the long-term but positively in short-term. It shows that the economic entity considers the opportunity cost of holding money, thereby adjusting the money supply.Also, an increase in RGDP will raise the national income so that people will need more money to purchase, it will lead to an increase in money demand, In the long run, continued exchange rate appreciation (and appreciation expectations) will reduce demand for money. More so, error correction result indicated that broad money supply will converge to its long-run equilibrium when there is a short-term relationship between the real gross domestic product, band deposit interest rate, inflation rate, exchange rate and trade openness. means that the errors will continue to be corrected at 1.29%. In addition, recursive least square tests (CUSUM TESTS) were applied to check parameter stability for the variables. The graphs showed the stability analysis during the year 1981 to 2020. During the intervals the data look stable because it falls with 0.05%.

5.2 Conclusion

The finding suggested that the real GDP has a positive and significant impact on money demand in the short run and this confirms the economic theories. The interest rate also showed that it has negative and significant impact on demand for money in short run. While the coefficient of the exchange rate showed that it has a negatively relation with the demand for money in the long run. At the same time, the finding showed that the inflation has no impact on affect the money demand in the long run. While trade openness has positive and significant impact on demand for money in the long run.

5.3 Recommendations

On the basis of the findings that have been established and the conclusion drawn from the study, following recommendations are necessary:

(i) Since the RGDP and interest rate are the key factors affect money demand in Nigeria, we suggest that Nigeria can use interest rate and interventions as a tool to adjust money demand.

(ii) The conduct of monetary policy in Nigeria should continue to focus on monetary aggregates, especially their growth rates.

(iii) Policy makers in Nigeria should allow for more trade openness, so as to reduce the country's inflation over time, increase the demand for money and also boost the economy for better productivity.

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