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Research article

IMPACT OF FINANCIAL LIBERALIZATION ON THE STABILITY OF NIGERIAN MONEY DEMAND FUNCTION

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ABSTRACT

This study examined the impact of financial liberalization on the stability of Nigerian Money Demand Function between 1970-2008. It surveyed a stream of theoretical and empirical literatures on money demand in both developed and less-developed countries. The data employed were gathered from various sources such as the Central Bank of Nigeria Statistical Bulletin, Economic and Financial Review, Monthly and Annual Reports and statement of Accounts for various years; and the publications of International Monetary Fund such as International Financial Statistical Year Book and Bureau Office of Statistics. The study employed the multivariate co-integration methods by Johansen (1988) and Johansen and Juselius (1990) to estimate the relationship between M1, M2, Gross Domestic Product, domestic inflation exchange rate, foreign interest rate, Treasury bill rate and savings deposit rate. The time series property of quarterly data employed, were first investigated. This was then followed by testing for co-integrated variables which appear in the aggregate money demand models, using the sample period from 1970-2008. Based on the time series property of data used, the results clearly indicate that there are, at most, two co-integrating vectors. The long-run income elasticity is significant and positive. The coefficients of inflation rate, foreign interest rate and domestic interest rate are statistically significant and correctly signed. The short-run dynamics of the demand for money function shows that the speed of adjustment to equilibrium are about 34 percent for M2 and 56 percent for M1. This indicates that 34 percent and 56 percent of the errors in the short run are corrected in the long run. Based on the fact that the shift variable that captured the impact of financial liberalization is negative and significant, we conclude that financial liberalization has not really altered the stability of Nigerian Money Demand Function. Therefore, in line with the findings of this research work, we can conclude that a monetary aggregate can be a viable policy for monetary authority in Nigeria.

Keywords: financial liberalization, Nigerian Money, Economic and Financial Review

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1. INTRODUCTION

Theory and evidence have long supported a significant role of a smooth-functioning financial market for promoting high and sustained economic growth [De Gregorio and Guidotti (1995), Levine (1997), Darrat (1999), and Darrat, Chopin and Lobo (2005)] as cited by Darrat (2009). A well developed financial market enhances growth by promoting a more efficient allocation of resources, encouraging a faster accumulation of physical and human capital and technological progress, and reducing production costs relating to transaction, information and monitoring. Not surprisingly, financial markets in most emerging economies, Nigeria not exclusive have witnessed rapid expansion in recent years. For instance, Nigerian economy has embarked upon several financial reforms since adoption of structural adjustment programme (SAP) in the mid 80s such as banking sector deregulation, flexible exchange rate including facilitating the new entry of domestic and foreign banks, the gradual deregulation of lending and deposit interest rates, facilitating the use of credit and debit cards, updating payment technologies like ATM machines and electronic transfer of deposits, expanding a variety of internet banking services like e-banking and mobile banking technology, enhancing telecommunications infrastructure, supporting their financial sectors with such measures like tax-free environment.

While these fast financial developments could promote economic growth, such developments may also hamper the effectiveness of monetary policy. Theoretically, financial development and the proliferation of new financial products and deposit substitutes could cause instability in the underlying money demand relationship with important consequences for the conduct and efficacy of monetary policy Darrat (2009).

The usefulness of Money Demand Function in the conduct of monetary policy depends crucially on its stability. A stable Money Demand Function forms the core in the formulation and conduct of monetary policy. It enables a policy driven change in monetary aggregates to have forecast able influence on output, interest rates and prices (Sriresun, 1999). The issue of the stability of the demand for money is also crucial for the understanding of the monetary policy transmission mechanism (Laumas and Mehru (1976). It is crucial because a stable demand for Money Function means that the quantity of money is predictably related to a set of key variables that link money to the real sector of the economy. Therefore, this helps monetary authority to select appropriate monetary policy actions. It is therefore important to have knowledge of those factors that affect the demand for money in order to ensure that a stable relationship exists between these factors and the money stock.

Furthermore, in the literature, there are disputes on whether a stable long-run money demand function actually exists, while some authors argued that money demand function was stable. (Hamori and Hamori, 1973; Ajayi, 1977; Hansen and Kim, 1995; Akinlo and Folorunso 1999; Oskooee, 2000; Nwaobi, 2002; Busari, 2004; Gbadebo and Adedapo, 2008) and many others, while some authors were of the opinion that money demand function was not stable (Gold Feld, 1973, Buhmani, 2000). In Nigeria, the aggregate money demand function often revealed its stability (Tomori, 1972, Ojo, 1974, Iyoha, 1976). But in recent years, the public demand for money has grown significantly more than how it was predicted by existing money demand regression equations. Despite the efforts to

rectify this vacuum, the phenomenon persists. Indeed, the actual money balances that Nigerians prepare to hold now are much higher than the predicted by existing money demand regression equations. The question is, why have Nigerians prepared to hold more money balances than what was predicted by existing money demand regression equation?

The purpose of this paper is to examine whether the recent financial development in Nigeria (Liberalization) has altered the underlying stability of Nigerian Money Demand Function. However, to achieve this, this paper is organized in five sections. Following the introductory section is section 2 that contains Literature Review, section 3 deals with research method, Chapter 4 deals with Data Analysis and Interpretation, section 5 concludes the paper.

THEORETICAL ISSUES

Classical Theories

According to classical economists, money acts as a numéraire. In other words, it is a commodity whose unit is used in order to express prices and values, but whose own value remains unaffected by this role (Sriram, 1999). However, money is deemed neutral with no real economic consequences since its role as a store of value, is limited under the classical assumption of perfect information and negligible transaction costs (Sriram, 1999). The roots of modern theory of money demand began from the early contributions of Mill (1848), Walras (1900) and Wicksell (1906). The concept of money demand took formal shape through the quantity theory developed in the classical equilibrium framework by two different but equivalent expressions.

Fisher (1911) provided the famous equation of exchange (MsVt =PtT, where Ms is quantity of money, Vt is the transactions velocity of circulation, Pt is prices and T the volume of transactions) where money is held simply to facilitate transactions and has no intrinsic value. The alternative paradigm, the so-called Cambridge approach, was primarily associated with the neo-classical economists Pigou (1917) and Marshall (1923). This approach stressed the demand for money as public demand for money holdings, especially the demand for real balances, which was an important factor in determining the equilibrium price level consistent with a given quantity of money (Sriram, 1999).

Keynesian Theory

Keynes (1930, 1936) built upon the Cambridge approach to provide a more rigorous analysis of money demand, focussing on the motives of holding money. Keynes postulated three motives for holding money: transactions, precautionary and speculative purposes. He also formally introduced the interest rate as another explanatory variable in influencing the demand for real balances. The money demand function was then represented as $md = f(y, i)$,

where the demand for real balances (md) is a function of real income (y) and nominal interest rates (i). The main proposition of the Keynesian analysis is that when interest rates are low, economic agents will expect a future increase in interest rates; thus, preferring to hold whatever amount of money is supplied.

Therefore, the aggregate demand for money becomes perfectly elastic with respect to the interest rate (liquidity trap).

Post-Keynes

Following Keynes, a number of models were developed to confirm the relationship between the demand for real money and, income and interest rates. These models can be classified into three separate frameworks, namely transactions, asset and consumer demand theories of money.

Under the transactions theory of money demand framework, the inventory-theoretic approach (see Baumol, 1952 and Tobin, 1956) and the precautionary demand for money (see inter alia Cuthbertson and Barlow, 1991) models were introduced. These models were derived from the medium-of-exchange function of money.

The asset function of money led to the asset or portfolio approach where major emphasis is placed on risk and expected returns of assets (see Tobin, 1958). Alternatively, the consumer demand theory approach (see Friedman, 1956 and Barnett, 1980) considers the demand for money as a direct extension of the traditional theory of demand for any durable good (see Feige and Pearce, 1977). The resulting implication of all the models discussed in the previous sections is that the optimal stock of real money balances is positively related to real income and inversely related to the nominal rate of return. Ultimately, the difference lies in the selection of variables that will enter the model.6

2. REVIEW OF EMPIRICAL LIERATURE

Introduction

This review of empirical literature starts with review of empirical studies in developed nations follow by studies from developing nations.

Studies in Developed Countries

A large number of studies have been conducted in both advanced countries and developing countries on the stability of money demand function using both traditional method of ordinary least square (OLS) and error correction model as estimation techniques. The results and the implications of these studies clearly depend on the underlying variables, the econometric methods, stability tests, data frequency, and the development stage of a country. A few of recent examples for these studies are noted here. As far as the industrialized countries are concerned, one can refer to: Vega (1998) for Spain; Hamori and Hamori (1999) for Germany; Amano and Wirjanto (2000) for Japan; Karfarkis and Sidiropolus (2000), for Greece; Bahmani-Oskooee and Chomsisengphet (2002) for 11 OECD countries; Bhmani and Shin (2002) for UK; Sriram (1999) for Australia; Arize (1999) for 12 LCD's; Buch (2001) for Poland and Hungary; Andoh and Chapell (2002) for Germany; Pradhan and Subramanian (2003) for Japan; and Nell (2003) for USA, Gil-Alana, (2004) for five major industrial countries namely; Canada, US, Japan, Germany and UK. Bahmani-Oskooee and Barry (2000), Bahmani-Oskooee and Bohl (2000), Bahmani-Oskooee (2001), Fielding (1994), Hamori and Hamori (1999).

Studies from developing nations

The majority of the studies on Money Demand Function have been confined to industrial countries. However, studies carried out in developing countries have increased in recent years. These increases in studies have been attributed to a shift from regulated economy to deregulated Economy by many of these developing nations.

The World Bank (1991) in a preliminary study of money demand relation in Nigeria, World Bank specified and estimated a log-linear relationship for real broad money for the period 1961 to 1966 and 1974 to 1989 using annual data. Implicitly assuming instantaneous adjustment, the study specified real demand for broad money as a function of non-agricultural GDP, the rate of inflation and the real deposit rate. All the variables turned out with the expected signs and were all significant at the one percent level.

Essien, Onmoduokit, and Osho (1996) dealt extensively on issue relating to money demand in a liberalizing but heavily indebted economy (1986-1995) using Nigeria as a case study their result showed that money demand function was not stable for the study period.

Akinlo and Folorunsho, (1999) in their study, examined the stability of and nature of Nigerian money demand function through the adoption of ECM technique and confirmed that money demand function was stable between 1960-1995.

Emmanuel, (2002) examined the stability of the m2 money demand function in Nigeria in the Structural Adjustment Program (SAP) period. The result from the Johansen and Juselius cointegration test suggests that real discount rate, economic activity and real m2, were cointegrated.

Busari, (2004) using cointegration and error correction approach on annual data for the period 1970-2002 to examine Nigerian money demand function. In this study, he observed that demand for money in Nigeria this period was stable and that reforms measures introduced in the mid 1980s seems not to have significantly altered the demand function for money in Nigeria.

Adebiyi (2006) examined broad money demand, financial liberalization and currency substitution in Nigeria using Error Correction Model (ECM). His results showed that long-run demand for real balances in Nigeria depends upon real income on its own interest rate, interest rates on government securities, inflation and expected exchange rates. He finally concludes that money demand function in Nigeria was stable despite the economic reforms and financial crises.

Gbadepo and Adedapo, (2008) examined the impact of financial innovation on the stability of Nigeria money demand function using Johansen ECM and they found that financial innovation has impact but not a significant impact.

3. RESEARCH METHOD

Model Specification

There is a diverse spectrum of money demand theories that emphasize transactional, speculative and precautionary or utility considerations (see Lewis and Mizen, 2000). These theories implicitly address a board range of hypotheses. One significant aspect, however, is that they all share common variables. In general, these hypotheses quantity the demand for money function as a function of a set of important economic variables linking money to the real sector of the economy (Judd and Scadding, 1982). Consequently, the empirical studies of money demand emerge from the theoretical literature and converge to a specification in which real money balances are a function of a scale variable and the opportunity cost of holding money. Thus, the basic model of demand for money can be expressed as (Ericsson, 1998):

$$\left(\frac{M}{P}\right)^{d} = f(S, OC) \qquad ..(1)$$

This specification represents the "desired" or long-run real money demand function and assumes a long-run unitary elasticity of the nominal cash balances with respect to the price level. This formulation implicitly assumes that the function is homogenous of degree in the level of prices.

Given the above general framework, it is important thereafter to determine the variables that explain the demand for money. In the empirical literature, the scaled variable is used as a measure of transactions related to economic activity. This is usually represented by income, expenditure or a wealth concept and is expected to have a positive relationship with the demand for money. The price variable (consumer price index) is selected to follow closely the chosen scale variable.

One of the most important aspects of modeling the demand for money is the selection of the appropriate opportunity cost variables. The literature shows that the studies which paid inadequate attention to this matter produced poor results. There are two major ingredients; own rate and alternative return on money. The former happens to be very important, especially if the financial innovation has been taking place in an economy (Ericsson, 1998).
The latter involves yields on domestic financial and real assets as well as on foreign assets. The yield on real assets is usually proxied by the expected rate of inflation, return on foreign assets or some form of exchange variable.

The theoretical literature provides some guidance in reference to the relationship between demand for money and its' elements. As the scale variable represents the transaction effects, it is expected to be positively related to the demand for money. The own-rate is expected to be positively related as higher the return on money, less the incentive to hold assets alternative for money. Conversely, higher the returns on alternative assets lower the intensive to hold money, and hence, the coefficients of alternative returns expected to be negative. The expected inflation generally affects the demand for money negatively as agents prefer to hold real assets as hedges during the

periods of raising inflation. The foreign interest rates are expected to exert negative influence as increase in foreign interest rates potentially induces the domestic residents to increase their holding of foreign assets which will be financed by drawing domestic money holdings. Similarly, the expected exchange depreciation will also have a negative relationship. An increase in expected depreciation implies that expected returns from holding foreign money increases, and hence, agents would substitute the domestic currency for foreign currency (see Lewis and Mizen, 2000).

Given the above background, we define the following model of money demand in Nigeria:

$$M/P = f(RGDP, INF, EX, FR, SDR, TDR, DSAP, U) \quad ..(2)$$

In a more explicit and econometric form

$$M/P = \beta_0 + \beta_1 RGDP_t + \beta_2 INF_t + \beta_3 EX_t + \beta_4 FR_t + \beta_5 SDR_t + \beta_6 TDR_t + \beta_7 DSAP_t + U_t \quad ..(3)$$

Representing the above equation in a log-linear form

$$Log\, M/P_t = \alpha_0 + \alpha_1 LogRGDP^t + \alpha_2 LogINF_t + \alpha_3 LogEX_t + \alpha_4 LogFR_t + \alpha_5 LogSDR_t + \alpha_6 LogTDR + \alpha_7 DSAP + U \quad ..(4)$$

Definition of Variables

M/P = Real Money Stock RGDP = Real Gross Domestic Product INF = Inflation Rate
EX = Exchange Rate FR = Foreign Interest Rate TDR = Treasury Bill Rate
DSAP= Structural Adjustment Programme

The Data

The data to be used in this research work shall be quarterly observations on gross domestic product (GDP), money stock [which shall be deflated by CCPI (Composite consumer price index) to get real money supply], domestic interest rates e.g. Treasury bill rate and savings deposit rate, inflation rate. Treasury bill rate, and savings deposit rate had no quarterly series (1970-1980) due to the regulation of prices. To resolve this problem of non-availability of quarterly data on those variables mentioned, discomposing annual series to quarterly series using cubic splain function by Asogu, (1992) was employed.

4. DATA ANALYSIS AND INTERPRETATION OF RESULTS

Unit Root Tests

Since correct inference will depend on the statistical properties of the data. Particularly, a unit root test is conducted on the relevant series. The Augmented Dickey-Fuller (ADF) with intercept but no trend and with intercept and trend.

Table 1: displays the result of the Augmented Dickey Fuller Tests for the variables in levels.

Variables	**Untrended**	**Trended**
LRM2	1.956568	-2.053431
LRM1	1.8725	-1.95625
LGDP	-2.221540	-2.263249
INF	-2.56486	-2.536110
EX	-0.8014171	2.314022
TBR	-1.562881	-1.218628
FR	-2.25008	-2.910997
SDR	-1.348129	-1.198838

Mckinnon critical values for respectively of hypothesis of a unit root at 5% = -2.8806
trended and 3.4403 for untrended formulated from the table, it is obvious that none of the variables is stationary at levels. Therefore we proceed to unit of the variables at first difference.

Table 2: Unit root test for the variables at first difference

Variables	Untrended	Trended
ΔLRM2	-4.959304	-5.059079
ΔLRM1	-4.87253	-5.03456
ΔRGDP	-4.972948	-5.16667
ΔINF	-5.140943	-5.134229
ΔEX	-8.453799	-8.466849
ΔFR	-4.034007	-4.081913
ΔTBR	-5.733820	-5.788950
ΔSDR	-6.856816	-7.056206

Mckinnon critical values for rejection of hypothesis of a unit root at 5% level of significant -2.8807 untrended and -3.4403 for untrended formulated.

From results in table 2, after taking the first differences, all variables became stationary. Therefore we can conclude that all the variables in our cointegration regression are first difference stationary.

Cointegration Test Results

Following our findings in table 2 that all variables of interest are of I(1) we, therefore, test for possible cointegration among the variables.

Recall that the purpose of this paper is access the impact of financial liberalization on the stability of Nigerian money demand function. Hence, we first test for the presence of long run money demand relation without allowing for financial liberalization and then re-test the nurture of the long-run relations after incorporating the dummy variable representing financial liberalization. However, the results with and without allowance for financial liberalization in both M1 and M2 reject the null hypothesis of no-cointegration in favour of at least two cointegrating relationship and that all the variables in the model are long run determinants of money demand function in Nigeria.

Table 3: Co-integration results for broad money without shift term (Dummy variables)

Series: LM2 LRGDP RF SDR TDR INF ER
Lags interval: 1 to 4

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.331335	158.6364	124.24	133.57	None **
0.203536	97.86316	94.15	103.18	At most 1 *
0.157152	63.49951	68.52	76.07	At most 2
0.110790	37.68329	47.21	54.46	At most 3
0.092362	19.95252	29.68	35.65	At most 4
0.030754	5.319133	15.41	20.04	At most 5
0.003981	0.602348	3.76	6.65	At most 6

Table 4: Co-integration results for broad money with shift term (Dummy Variable)

Series: LM2 LRGDP RF SDR TDR INF ER DUMMY
Lags interval: 1 to 4

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.338937	206.6476	156.00	168.36	None **
0.290088	144.1478	124.24	133.57	At most 1 **
0.187899	92.41312	94.15	103.18	At most 2
0.160190	60.98535	68.52	76.07	At most 3
0.098607	34.62391	47.21	54.46	At most 4
0.094160	18.94798	29.68	35.65	At most 5
0.024309	4.015127	15.41	20.04	At most 6
0.001979	0.299085	3.76	6.65	At most 7

Table 5: Co-integration results for narrow money with shift term (Dummy Variable)

Series: LM1 LRGDP SDR TDR RF ER INF DUMMY
Lags interval: 1 to 4

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.311193	208.3892	156.00	168.36	None **
0.281251	152.0973	124.24	133.57	At most 1 **
0.204081	102.2305	94.15	103.18	At most 2 *
0.176118	67.76350	68.52	76.07	At most 3

0.127397	38.51065	47.21	54.46	At most 4
0.093280	17.93315	29.68	35.65	At most 5
0.017377	3.146938	15.41	20.04	At most 6
0.003305	0.499872	3.76	6.65	At most 7

Table 6: Co-integration results for narrow money without shift term(Dummy Variable)

Series: LM1 LRGDP SDR TDR RF ER INF
Lags interval: 1 to 4

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.286173	158.6933	124.24	133.57	None **
0.238482	107.7890	94.15	103.18	At most 1 **
0.173992	66.65042	68.52	76.07	At most 2
0.124204	37.78663	47.21	54.46	At most 3
0.089283	17.76069	29.68	35.65	At most 4
0.019129	3.638701	15.41	20.04	At most 5
0.004771	0.722161	3.76	6.65	At most 6

Error Correction Presentation

Table 7 shows the parsimonious model for m2

Included observations: 151 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.075148	0.038792	1.937216	0.0548
D(LM2(-1))	-0.276175	0.102329	-2.698888	0.0078
D(LM2(-2))	-0.151275	0.085277	-1.773917	0.0783
D(INF(-2))	-0.018558	0.020045	-0.925787	0.3562
D(INF(-3))	-0.013694	0.019801	-0.691598	0.4904
D(RF)	0.069453	0.066070	1.051203	0.2950
D(RF(-3))	-0.114472	0.067385	-1.698782	0.0917
D(TDR)	-0.011531	0.032474	-0.355069	0.7231
D(TDR(-3))	0.011341	0.051607	0.219762	0.8264
D(SDR(-1))	-0.072426	0.045937	-1.576640	0.1172
D(SDR(-3))	-0.051334	0.068932	-0.744709	0.4577
D(LRGDP(-1))	-0.251407	0.249475	-1.007744	0.3154
D(LRGDP(-4))	0.228318	0.223653	1.020857	0.3091
D(ER)	0.005387	0.039688	0.135740	0.8922
D(ER(-3))	0.023219	0.042017	0.552615	0.5814
ECM(-1)	-0.568030	0.108298	-5.245047	0.0000

R-squared	0.440732	Mean dependent var	0.046853
Adjusted R-squared	0.378592	S.D. dependent var	0.539578
S.E. of regression	0.425346	Akaike info criterion	1.228089
Sum squared resid	24.42412	Schwarz criterion	1.547801
Log likelihood	-76.72072	F-statistic	7.092474
Durbin-Watson stat	2.058550	Prob(F-statistic)	0.000000

Table 8: Parsimonious model for m2 with dummy variable

Included observations: 151 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.073810	0.039211	1.882361	0.0620
D(LM2(-1))	-0.277323	0.103114	-2.689492	0.0081
D(LM2(-2))	-0.151311	0.085867	-1.762152	0.0803
D(INF(-2))	-0.018454	0.020189	-0.914078	0.3623
D(INF(-3))	-0.013724	0.019938	-0.688363	0.4924
D(RF)	0.070480	0.066678	1.057033	0.2924
D(RF(-3))	-0.113920	0.067912	-1.677460	0.0958
D(TDR)	-0.011505	0.032700	-0.351831	0.7255
D(TDR(-3))	0.011384	0.051964	0.219082	0.8269
D(SDR(-1))	-0.072253	0.046268	-1.561633	0.1208
D(SDR(-3))	-0.051270	0.069409	-0.738662	0.4614
D(LRGDP(-1))	-0.256248	0.251928	-1.017147	0.3109
D(LRGDP(-4))	0.227988	0.226264	1.007619	0.3155
D(ER)	0.005759	0.039978	0.144050	0.8857
D(ER(-3))	0.023407	0.042310	0.553218	0.5810
D(DUMMY)	0.082265	0.434941	0.189142	0.8503
D(DUMMY(-4))	0.148019	0.430283	0.344003	0.7314
ECM(-1)	-0.567247	0.109095	-5.199549	0.0000

R-squared	0.441377	Mean dependent var	0.046853
Adjusted R-squared	0.369974	S.D. dependent var	0.539578
S.E. of regression	0.428285	Akaike info criterion	1.253426
Sum squared resid	24.39598	Schwarz criterion	1.613102
Log likelihood	-76.63369	F-statistic	6.181489
Durbin-Watson stat	2.057968	Prob(F-statistic)	0.000000

The Parsimonious Model for M2

The unrestricted model equation is reduced to a parsimonious one by one following the general to specific principles. This parsimonious model is attained by the sequential removal of those variables exerting no influence in the model. After removing all variables found insignificant in unrestricted model, the $\Delta LM2_{t-1}$, $\Delta LM2_{t-1}$, ΔRF_{t-1}, and RESM2 now significant

The result from parsimonious model shows that the Durbin-Watson statistic value is (2.058550). Since it is above 2, we conclude that the model does not suffer serial correlation. Also, the speed of adjustment to short-run equilibrium is about 57 percent. The 44 percent of the variation in the real m1 balance is explained by the included fundamentals.

Table 9: The restricted model for M1

Included observations: 151 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.057640	0.016975	3.395523	0.0009
D(LM1(-1))	-0.225816	0.081822	-2.759849	0.0066
D(LM1(-2))	-0.063668	0.065675	-0.969437	0.3341

D(INF)	0.083035	0.008866	9.365777	0.0000
D(INF(-1))	-0.038877	0.010074	-3.858982	0.0002
D(INF(-4))	-0.019709	0.008596	-2.292765	0.0234
D(RF(-1))	0.063436	0.029391	2.158311	0.0327
D(RF(-2))	-0.031824	0.029464	-1.080086	0.2820
D(TDR(-3))	-0.031373	0.014236	-2.203793	0.0292
D(TDR(-4))	-0.050246	0.022793	-2.204421	0.0292
D(SDR(-1))	0.013734	0.018449	0.744410	0.4579
D(SDR(-4))	0.055953	0.030356	1.843192	0.0675
D(LRGDP(-1))	-0.203164	0.103817	-1.956939	0.0524
D(LRGDP(-4))	0.136809	0.095518	1.432282	0.1544
D(ER(-2))	0.010100	0.017617	0.573292	0.5674
D(ER(-4))	0.023241	0.017681	1.314489	0.1909
ECM(-1)	-0.347651	0.071930	-4.833187	0.0000

R-squared	0.626408	Mean dependent var	0.046001
Adjusted R-squared	0.581800	S.D. dependent var	0.280548
S.E. of regression	0.181426	Akaike info criterion	-0.470216
Sum squared resid	4.410647	Schwarz criterion	-0.130522
Log likelihood	52.50130	F-statistic	14.04251
Durbin-Watson stat	2.126583	Prob(F-statistic)	0.000000

The Parsimonious Model for M1

$\Delta LM1_{t-2}$, ΔINF_{t}, ΔINF_{t-1} ΔINF_{t-2} , ΔRF_{t-1} ΔTDR_{t-3}, ΔTDR_{t-4}, ΔSDR_{t-4}, $\Delta LRGD_{t-1}$and RESM, are significant determinants of short run money demand in Nigeria if money demand is defined narrowly. Also, the result performed reasonable well, since the Durbin Watson is above two, which implies that the model did not suffer from serial correlation. It should be noted that in term of error correction model, M1 performed better than M2. The dummy variable that represents financial liberalization also was not significant at any level, which implies that financial sector reforms or liberalization has no much effect on the stability of Nigerian money demand.

Comparative Analysis of ECM on both narrow and broad money

It is obvious that Δm1, has a better explanatory power 70 percent more additively stable than for Δm2 47 percent. The dynamic stability of both models is further confirmed by the ECM reported in equations. This means that there is a lower level of uncertainty about the dynamic adjustment of ΔM1 compared to ΔM2, in spite of the fact that the equilibrium estimates of M2 are more predictable than that of M1.

Thus, if policy makers are interested in understanding the short-run adjustment of money holding, they will be better off relying on the ΔM1 model. But if what they care about are the long run responses, the ΔM2 model reveals more. These assertions derive from the fact that the dynamic model for ΔM1 has higher levels of additive and multiplicative stability than the ΔM2 model. The adjusted R2 for M1 ECM is much higher, about 78 percent, compared to 47 percent for M2 ECM. Majority of the coefficients in the M1 ECM are significant at both 10 percent and 5 percent level of significant. While the coefficients in the M2 ECM that are significant at this level, are very few in the M2. However, the speed of adjustment back to equilibrium is faster and also less uncertain than for M1 going by the coefficient of the error-correction term (ECT) of 0.54 with a t-ratio of about 0.34 while M2 will

readjust to equilibrium in a little over five months (less than two quarters), it will take nearly eight months (close to three quarters) for M1 to do the same. Finally, M2 model has the added advantage of combining all these strong attributes of stability and dynamic reliability, which makes the model especially suitable for policy inferences, with the absence of reverse causation from the dependent variable to any of its explanatory variables. This means that policy makers have the added luxury of being able to rely on the M2 model for out of sample forecasting. M2 model is ill-suited for forecasting because of reverse Granger causality from M1 to Gross Domestic Product.

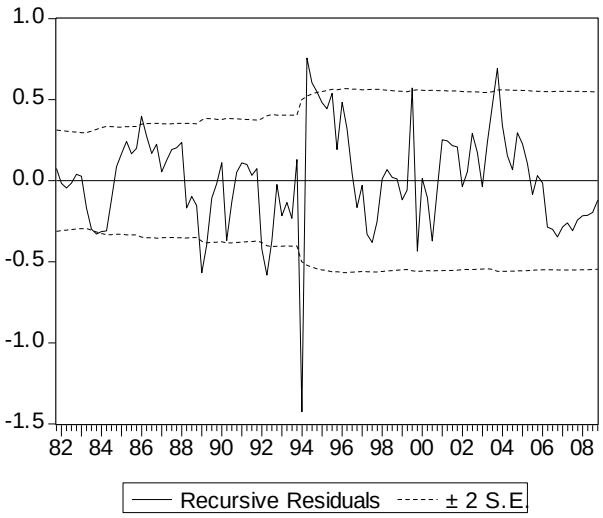

Figure 1: Structural Stability Test (Recursive Stability Test Approach For the Combinations of all the series in the Model)

In order to test whether a structural break occurred, we estimated recursive model based on the parsimonious model. The recursive parameter estimates obtained are plotted against time to get a graphical representation. The visual inspection of the graphical representation of recursive model estimates enables us to trace the time path of each parameter, thus showing when structural break occurred in each variable included in the model. If the coefficient plots show dramatic jumps, it is a sign of the potential structural break.

The recursive estimations reported in figure 1 shows a generally stable money demand function with only a break or parametric instability in the years 1986 to 1999. This is the period when government and the central bank of Nigeria introduced several policies (SAP) and policies by the central bank to liberalize the financial system in Nigeria to be more market oriented.

5. CONCLUSION AND RECOMMENDATION

The unit roots tests indicated that all the variables were stationary at their first difference. Therefore, this meant the co-integration techniques such as Johnasen (1988) and Johnasen Juselius (1990) is the appropriate Framework that can be applied to evaluate the longrun and short run characteristic of the demand for broad money function in

Nigeria. The tests for co-integration confirmed a unique relationship between real money and the variables included in the model. This pave way for the formulation of an appropriate error correction model (ECM), which was used to evaluate the short run properties of the demand for money function. The co-integration tests indicate that the model is well specified with the income elasticity of both M1 and M2 close to one, although it is less than one. Though not positive which the likely reason (s) had been explained in the both co-integration and ECM results. Previously, most of the variables in the model show the expected signs and acceptable magnitudes in comparison with other studies carried out in developing countries. Most importantly, the error correction model shows a significant error correction term with a negative sign, indicating a valid cointegration relationship for both narrow money and broad money.

The demand for money function appears to be stable as a whole, although all variables show some vulnerability during the 1986-1999 periods. This structural break is understandable, since it coincide with the major financial liberalization measures introduced during the period.

Although, from our empirical findings, financial liberalization policy has relative impact on the stability of Nigerian money demand function thus, there is need for more effective monetary policy. It is something we cannot run away from and as such, the central bank of Nigeria should always prepare for it, more so in the light of the recent reforms in the financial sector of Nigerian economy.

Also, since the stability of money demand function is crucial to the formulation of monetary policy, the monetary authority must be free to use its instruments to attain broad target consistent with stabilization policy objectives. A precondition for efficient liberalized financial sector is a stable macroeconomic environment during the time of the financial sector reforms. Thus, in order to ensure effective financial development and savings mobilizations, the government and monetary authority should use monetary instruments that will stabilize the macroeconomic environment. This will create an environment conducive to financial deepening and savings mobilizations.

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