

Testing for the Stability of Money Demand Function in Nigeria

Benedict Imimole*, Samuel Ogbomeda Uniamikogbo

Department of Economics, Faculty of Social Sciences, Ambrose Alli University, Ekpoma, Nigeria

*Email:bnimimole@gmail.com

Abstract

This paper empirically examined the broad money demand function and its stability in Nigeria for the period 1986Q1 to 2010Q4 using the Autoregressive Distributed Lag (ARDL) Bounds testing procedure. The aim is to ascertain whether the recent macroeconomic developments in the country from the inception of the Structural Adjustment Programme (SAP) in 1986, have resulted in the real broad money demand becoming structurally unstable, and whether the stability of the money demand function supports the choice of M_2 as a viable instrument for policy implementation in Nigeria. The empirical results indicate that a long-run relationship exists between M_2 money aggregate and its determinants during this period, and that M_2 money demand in Nigeria is stable. The CUSUM and CUSUMQ test conducted confirm that the short and long run parameters of the real broad money demand function are robust, and exhibit remarkable stability. This finding validates the use of M_2 monetary aggregate as a nominal anchor for monetary policy implementation. It was therefore recommended that monetary authority should target M_2 monetary aggregate in regulating domestic prices and stimulating economic activity in Nigeria.

Keywords: Money Demand, Stability, ARDL Model, Bounds Test.

1. Introduction

The search for a viable and sustainable monetary policy framework for Nigeria has been on since the creation of the Central Bank of Nigeria in 1959. As noted by Connell (2008) a monetary policy framework refers to (i) a set of macroeconomic objectives for monetary policy, including but not necessarily limited to price stability; (ii) a set of instruments the Central Bank uses to achieve these objectives (exchange rate policy included); (iii) a procedure for guiding the choice of instruments as functions of observable variables and expert judgments, often involving intermediate targets; and (iv) a strategy for communicating Central Bank choices to the public. Adam (2008) however argued that all monetary policy frameworks are 'Inflation Targeting' frameworks in the sense that (one of) monetary policy objectives is to establish a (credible) nominal anchor for domestic prices, and that policy frameworks differ in terms of the choice of anchor.

The money demand function has often been used as an indispensable tool by Central Banks world-wide in the design and implementation of monetary policy. As noted by Owoye and Onafowora (2007), it is useful for identifying growth targets for money supply, manipulating interest rates and reserve money for the control of liquidity and managing inflation. Monetary authorities have therefore shown increasing interest for stable money demand as a viable instrument for the conduct of effective monetary policy. More so, there is the belief that the effectiveness and success of any monetary programme critically depend on a stable money demand function. This ensures that money supply would have predictable impact on other economic variables such as inflation, interest rates, national income, etc. Investigating the stability of real money demand function therefore, has important implication for the conduct and implementation of monetary policy.

The monetary authority's strategy for inflation management is based on the view that inflation is essentially a monetary phenomenon. Because targeting money supply growth is considered as an appropriate method of targeting inflation in the Nigerian economy, the Central Bank of Nigeria chose a monetary targeting policy framework to achieve its objective of price stability. With the broad measure of money (M_2) as the intermediate target, and the monetary base as the operating target, the CBN utilized a mix of indirect (market-determined) instruments to achieve its monetary objectives. These instruments included reserve requirements, open market operation on Nigerian Treasury Bills (NTBs), liquid asset ratios and the discount window (see IMF Country Report No. 03/60, 2003).

The current focus of the Central Bank of Nigeria on price stability objective is a major departure from past objectives in which the emphasis was on the promotion of rapid and sustainable economic growth and employment. Prior to 1986, the CBN relied on the use of direct (non-market) monetary instruments such credit ceilings on the deposit money of banks, administered interest and exchange rates, as well as the prescription of cash reserves requirements in order to achieve its objective of sustainable growth and employment. During this period, the most popular instruments of monetary policy involved the setting of targets for aggregate credit to the domestic economy and the prescription of low interest rates. With these instruments, the CBN hoped to direct the flow of loanable funds with a view to promoting rapid economic development through the provision of finance to the preferred sectors of the economy such as the agricultural, manufacturing, and residential housing.

It is also worthy of note that since the introduction of the Structural Adjustment Programme (SAP) in 1986, the

Nigerian economy has witnessed some significant structural and institutional changes such as the liberalization of external trade and payment system, consolidation of the banking sector, the adoption of a managed float exchange rate regime, the elimination of price and interest rate controls, changes in monetary policy among others. These developments may have altered the relationship between money, income, prices and other key macroeconomic variables, which may have caused the money demand function to become structurally unstable. The questions that therefore arise are: (i) Is the money demand function in Nigeria structurally unstable? (ii) Is broad money M_2 a viable monetary policy instrument in Nigeria? The main objective of the paper therefore, is to investigate the stability of money demand function in Nigeria since the commencement of SAP in 1986. In addition to this, the paper will also ascertain if the stability of the money demand function supports the choice of M_2 as a viable instrument for policy implementation in Nigeria.

The study departs from previous Nigerian studies in the following areas. First, the study employed the recent Bounds testing cointegration technique instead of the Engle-Granger (1987), Johansen (1988) and Johansen and Juselius (1990) cointegration framework that are commonly used. This is to ensure that spurious regression results are not generated. The most recent work in this area of study that used this methodology is Iyoboyi and Pedro (2013) whose work covered the period 1970 to 2010. Although the study employed the ARDL bounds testing methodology, it investigated the narrow real money demand function for Nigeria using annual time series data. Secondly, this study has employed quarterly time series data on broad real money demand function from 1986Q1 to 2010Q4 for an update analysis. This is so because an update is long overdue. The work of Anoruo (2002) which tested for the stability of the demand for M_2 in Nigeria around the SAP period applied the JML technique to quarterly data for the period 1986Q2 to 2000Q1. Owoye and Onafowora (2007) also applied a similar technique to M_2 quarterly data in Nigeria, but for over a marginally longer period (1986Q1 – 2001Q1). This paper however extends the period covered beyond 2001Q1 to 2010Q4. By implementing the recent Autoregressive Distributed Lag (ARDL) Bounds testing cointegration methodology, the money demand model specified is estimated using quarterly data, obtained mainly from Central Bank of Nigeria Statistical Bulletin (2008, 2010 and 2012) and the Federal Reserve Bank of St. Louis (FRED). The paper proceeds as follows: Section 2 provides the literature review. This is followed by methodology of the study in Section 3. Section 4 takes a look at the empirical results of the co-integration tests and Section 5 concludes the paper.

2. Literature Review

The concept of ‘money demand’, and the role it plays in bringing about effectiveness in monetary policy if the money demand function is stable, has over the years attracted the interest of great economists like Irving Fisher in the early 1900s, John Maynard Keynes in the early 1920s and 1930s, William Baumol, James Tobin and Milton Friedman from the 1950s on, and researchers alike.

Keynes (1936) defined money demand in terms of why people want to keep their fund in liquid form (liquidity preference). According to him money is demanded for transaction, precautionary and speculative purposes. Of these three motives, the speculative motive which, taken together with the quantity of money, plays significant role in the determination of the rate of interest. While the first two motives are fairly stable, constant, exert very little influence on the rate of interest and are satisfied by M_1 definition of money, the third (the speculative) is highly unstable and is satisfied by M_2 definition of money.

Friedman (1956) providing an answer to the question of how an individual can hold his wealth opined that investors can hold their wealth in the form of money, bonds, equities and commodities. According to him as cited in Bitrus (2011), wealth must be variable in the money demand function and he used permanent income, a weighted average of current and past levels of income as an alternative in the absence of a direct estimate of wealth.

The search for a stable money demand function has been on since the early 1970s. Tomori (1972) generated a lot of debates on the subject matter, and this has consequently led to further empirical investigations. Tomori found income, interest rate and real income as major determinant of demand for money in Nigeria. Bahmani-Oskooee and Gelan (2009) tested for the stability of M_2 money demand, using quarterly data for 21 African Countries (including Nigeria) between 1971Q1 and 2004Q3 using Autoregressive Distributed Lag (ARDL) technique and obtained a long-run relationship between M_2 , the inflation rate, income and nominal effective exchange rate for all countries. The application of CUSUM and CUSUMQ tests revealed that the estimated models were stable in all cases. Anoruo (2002) tested for the stability of the demand for M_2 in Nigeria using the Johansen Maximum Likelihood technique on quarterly data for the period between 1986(Q2) and 2000(Q1). The result showed an unreasonably high estimate of 5.70 for the elasticity of demand with respect to industrial production. The results also suggest that the M_2 demand function was stable during the period, and that money supply is a viable monetary policy tool in Nigeria.

Bitrus (2011) examined the impact of income, interest rate, exchange rate and the stock market on the demand for narrow and broad money in Nigeria using annual time series data from 1985 to 2009, the Ordinary Least Square (OLS) single equation regression technique, unit root test for stationarity and CUSUM stability test. The

study found out that money demand function is stable in Nigeria for the period, and that income is the most significant determinant of the demand for money. Unrealistically high income elasticity was identified for M_2 and M_1 for Nigeria and Cote d'Ivoire respectively by Nwafor et al. (2007) and Drama and Yao (2010). Iyoboyi and Pedro (2013) estimated a narrow money demand function for Nigeria from 1970 to 2010 using the Autoregressive Distributed Lag (ARDL) bounds test approach to cointegration. The empirical results found cointegration relationship among narrow money demand, real income, short-term interest rate, real expected exchange rate, expected inflation rate and foreign real interest rate. Real income and real interest rates were found to be significant determinants of the demand for narrow money in Nigeria. The results also indicate that narrow money demand function for Nigeria is stable over the study period.

3. Methodology of the study

3.1 Data Sources and Method of Analysis

The money demand model in our study was estimated using quarterly data, obtained mainly from Central Bank of Nigeria Statistical Bulletin (2008, 2010 and 2012) and the Federal Reserve Bank of St. Louis (2014), for the period 1986:1 to 2010:4. The study employed the Autoregressive Distributed Lag (ARDL) bounds testing procedure developed by Pesaran, et al (2001) to examine the relationship between real broad money demand and its determinants. The choice of this methodology is based on the following considerations.

- (i) The bounds test unlike most of the conventional multivariate cointegration procedures, which are valid for large samples, is suitable for small sample study (Pesaran, et al., 2001). Given that our sample study is limited to a total of 100 observations only, this approach was found to be appropriate.
- (ii) The bounds test does not impose a restrictive assumption that all the variables under study must be integrated of the same order. The procedure is applicable irrespective of whether the underlying regressors are purely I(0), purely I(1) or mutually cointegrated.
- (iii) The use of ARDL ensures the estimation of both the long-run and short-run parameters of the model.

The first step in implementing the ARDL procedure is to conduct the Wald (F-test) to determine the existence of any long-run relationship between broad money demand and the chosen explanatory variables. This is followed by the estimation of the long-run and then the short-run coefficients using the error correction representation of the ARDL specification, with a view to establishing the speed of adjustment to equilibrium.

3.2 Model specification

It was well established in literature that the determinants of Real Broad Money Demand (RBMD) are FIR, RGDP, STIR, REER, INFR. Consequently, the functional form of the relationship existing between these variables in Nigeria may be expressed as:

Rewriting equation (1) above more specifically in log form, we have,

Where,

L represents Natural logarithm,

$$RBMD = f(FIR, RGDP, STIR, REER, INFR) \text{-----(1)}$$

$$LRBMD_t = \alpha_0 + \alpha_1 LRBMD_{t-1} + \alpha_2 LRGDP_t + \alpha_3 FIR_t + \alpha_4 STIR_t + \alpha_5 REER_t + \alpha_6 INFR_t + U_t \text{--(2)}$$

RBMD = Real Broad Money Demand (M_2)

RGDP = Real Gross Domestic Product

FIR = Foreign Real Interest Rate

STIR = Short-term Domestic Interest Rate

REER = Real Expected Exchange Rate

INFR = Inflation Rate

The apriori expectations for the coefficients are: $\alpha_1, \alpha_2 > 0, \alpha_3, \alpha_4 < 0, \alpha_5 > 0, \alpha_6 < 0$

Note: FIR, STIR, REER and INFR are not logged since they are already expressed in percentages. In order to estimate the long-run relationship between the broad money demand and its determinants in Nigeria, we employ the recent Autoregressive Distributed Lag (ARDL) bounds testing procedure based on an open economy portfolio balance approach of money demand as documented in Thomas (1985) and Handa (2000). Agents may hold money either as an inventory to smoothen differences between income and expenditure, or for its yield as an interest bearing asset in a portfolio. Either motive suggests a specification in which the demand for money depends on a scale variable such as income or wealth, and the rate of interest on money or on alternative assets which may be domestic, real or foreign. While the return on domestic asset is the own interest rate, that of foreign assets is the foreign interest rate and the return on real assets is the expected inflation rate.

Therefore, following Pesaran et al (2001), and assuming a unique long-run relationship exist among the variables being investigated, we specify the ARDL model for the broad money demand function from equation (2) above as follows.

$$\Delta LRBMD_t = \alpha_0 + \sum_{i=1}^n \alpha_{1i} \Delta LRBMD_{t-1} + \sum_{i=0}^n \alpha_{2i} \Delta LRGDP_{t-i} + \sum_{i=0}^n \alpha_{3i} \Delta FIR_{t-i} + \sum_{i=0}^n \alpha_{4i} \Delta STIR_{t-i} + \sum_{i=0}^n \alpha_{5i} \Delta REER_{t-i} + \sum_{i=0}^n \alpha_{6i} \Delta INFR_{t-i} + U_t \quad (3)$$

$$\Delta LRBMD_t = \alpha_0 + \sum_{i=1}^n \alpha_{1i} \Delta LRBMD_{t-1} + \sum_{i=0}^n \alpha_{2i} \Delta LRGDP_{t-i} + \sum_{i=0}^n \alpha_{3i} \Delta FIR_{t-i} + \sum_{i=0}^n \alpha_{4i} \Delta STIR_{t-i} + \sum_{i=0}^n \alpha_{5i} \Delta REER_{t-i} + \sum_{i=0}^n \alpha_{6i} \Delta INFR_{t-i} + \delta_1 LRBMD_{t-1} + \delta_2 LRGDP_{t-1} + \delta_3 FIR_{t-1} + \delta_4 STIR_{t-1} + \delta_5 REER_{t-1} + \delta_6 INFR_{t-1} + ECM_{t-1} + U_t \quad (4)$$

Where, the parameters α_i : 1, 2, 3, 4, 5, 6 are the short-run dynamic elasticities of the model's convergence to equilibrium, and δ_i : 1, 2, 3, 4, 5, 6 are the long-run multipliers of the underlying ARDL model and all the other variables are as earlier defined. The broad money demand model is estimated using quarterly data from 1986:1 to 2010:4 as earlier indicated.

The real broad money demand is measured as the nominal M_2 money stock divided by the inflation rate (INFR). The real income as a measured scale variable is represented by the quarterly data on real GDP (RGDP). The domestic interest rate ('own' rate of return) is proxied by the three-month interbank rate of interest. The appropriateness of this for Nigeria has been documented by Wong (1977) and Owoye and Onafowora (2008). The inflation rate is the quarterly rate of inflation as provided in the CBN Statistical bulletin (2010). The US Three-month Treasury Bill rates and the Nigerian Naira/US dollar exchange rates are used as the foreign interest rate and the nominal exchange rate respectively. This became necessary since well over 40 per cent of Nigeria's international trade is conducted with the United States (US).

Testing the existence of a long-run relationship can be conducted by examining the joint null hypothesis that

$$H_0: \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = \delta_6 = 0$$

against the alternative that

$$H_1: \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq \delta_5 \neq \delta_6 \neq 0$$

The existence of a long-run relationship can be confirmed once the null hypothesis is successfully rejected. To do this, two sets of critical values as provided by Pesaran et al. (1996, 2001) were used. One set assumes that all variables are I(0) and the other assumes that they are all I(1). However, the null hypothesis can be rejected when calculated F-values are greater than the upper boundary and cannot be rejected when they are less than the lower boundary. When the F-values are within the band, the result is inconclusive. Once the cointegration relationship was established, the next step was to proceed to estimate the conditional ARDL long-run model for LRBMD as well as the short-run dynamic parameters by estimating an Error Correction Model (ECM) associated with the long-run estimates (i.e equation 4).

4. Empirical Results

Stationarity situation of the data series was first of all examined using the Augmented Dickey-Fuller (ADF) unit root test. The result revealed that all the variables in the model are integrated in levels. In other words, they are stationary at I (0) as reported in Table 1 below.

Table 1: Augmented Dickey Fuller Unit Root Test from M_2 Demand Function

Variable	Level	First Difference	Conclusion
LRBMD	-4.1400	nil	I (0)
FIR	-3.6046	nil	I (0)
LRGDP	-3.7996	nil	I (0)
STIR	-3.7615	nil	I (0)
REER	-6.0569	nil	I (0)
INFR	-3.7169	nil	I (0)
5% C.V.	-3.4571	nil	

Source: Computed by Researcher with information from stationarity test

In implementing the ARDL approach, an OLS estimate of the first difference part of the equation estimated (equation 4) was taken, and then, the test for the joint significance of the parameters of the lagged levels variables after they have been added to the first regression. The result of the Bound test is presented in Table 2 below.

Table 2: ARDL Bounds Test for Cointegration Analysis

Computed F-Statistic	Critical F-Statistics at K=6		
	Lower Bounds	Upper Bounds	Significance Level
2.88	2.04	3.24	5%
	1.75	2.87	10%

Note: K=6, where K represents the number of regressions

Source: Extracted from ARDL Bounds Test Result using Microfit 4.0

The computed F-statistics from the bounds test is given as 2.88. This value is higher than the upper bound critical value of 2.87 at 10 percent level of significance implying that the alternative hypothesis of a unique long-run relationship exist between Real Demand for M₂ money balances and its determinants. At 5 percent significant level however, the computed F-statistics falls between the lower and upper bounds of 2.04 and 3.24 percent critical values respectively. This result is an inconclusive case.

The results of the long-run estimates of the broad demand for money function are presented in Table 3 below.

Table 3: Estimated Long-run Coefficient using ARDL Approach

Dependent Variables: LRBMD			
Regressors	Coefficient	T-Values	P-Values
FIR	-.0044	-0.0374	0.970
LRGDP	3.9456	5.4824	0.000
STIR	0.0109	0.2206	0.826
REER	0.0162	3.2961	0.001
INFR	-0.0384	-4.1757	0.000

Note: ARDL (100011)

Source: Extracted from ARDL Bounds Test Result using Microfit 4.0

All the coefficients with the exception of STIR are correctly signed. There is a positive and statistically significant relationship between real broad money demand and real income during the period of study, as the income elasticity is statistically significant at 1% level. This implies that an increase in real income leads to increase in the demand for money as predicted by economic theory. The real income coefficient is 3.95, which is greater than unity. The STIR is not correctly signed, and is also not statistically significant.

There is also a positive and statically significant relationship between real broad money demand and REER during the period. The relationship is consistent with theory that predicts that depreciation of domestic currency (i.e an increase in exchange rate) can be perceived as an increase in wealth, leading to a rise in the demand for domestic money. Thus, exchange rate depreciation is probably perceived as an increase in wealth in Nigeria, and it is a statistically significant determinant of broad money demand in the long-run.

INFR has a negative sign and is consistent with apriori expectation. Studies have found that changes in price level do predict changes in the demand for money. The coefficient of -0.0384 shows that, the demand for broad money in Nigeria will decrease by about 4% when the current inflation rate rises by 1%. Given that the reason for incorporating expected inflation rate in the money demand function is to measure the return on items such as equity holding (shares), investment in land and real estate, which constitutes an alternative to holding domestic currency, the results indicates that the higher the rate of expected inflation, the lower the demand for broad money ceteris paribus.

The FIR is correctly signed, indicating that a rise in foreign interest rate may give rise to a fall in the demand for local currency and an increase in the demand for foreign currencies. This implies that currency substitution exist in Nigeria. This variable is however not statistically significant in explaining the demand for broad money in Nigeria.

The error correction regression associated with the above long-run relationship based on the ARDL approach is

reported in Table 4 below

Table 4: Error Correction Representation of the selected ARDL Real M2 Demand Model

Variable	Coefficient	T-value	P-value
Δ FIR	-0.0011	-0.373	0.970
Δ LRGDP	0.9873	3.2779	0.001
Δ STIR	0.0027	0.2227	0.824
Δ REER	0.0072	7.2571	0.000
Δ INFR	-0.0435	-8.2136	0.000
ecm (-1)	-0.2502	-3.8460	0.000
R ²	0.65	R ²	0.62
S.E. of Repressor	0.40	F(6,90)	2.74898(0000)
RSS	0.40	LL	-44.5946
D.W.	2.37	SBC	-65.1808

Note: ARDL (100011) selected on the basis of SBC.

Source: Extracted from ARDL Bounds Test Result using Microfit 4.0

The coefficient of real income is statistically significant at 1%, and is correctly signed. Income is therefore a significant determinant of demand for broad money in Nigeria, in both the long and short-run. The coefficient of real income is 0.99 which is less than unity. The STIR is found to be statistically not significant in both the long and short-run, and it is also not correctly signed. The probable explanation of this is that domestic interest rate does not seem to explain the demand for broad money in Nigeria possibly because of the underdeveloped nature of the Nigerian money market which, according to Iyoboyi and Pedro (2013) is deficient in depth and flexibility. The goodness of fit for the short-run ARDL model is 65% and the adjusted R² is 62%. The F-statistics indicates joint significance of coefficients, and the Durbin Watson statistics of 2.37 is indicative of absence of autocorrelation. The estimated lagged error correction term ECM_{t-1} is negative and highly significant. Judging from the negative sign and the highly significant value of the ECM as indicated by its pro-value of 0.000, this result is a further evidence to support the cointegration relationship among the variables in the series. The coefficient of the feedback parameter is -0.2502 and it suggests that when real broad money balances exceeds their long-run relationship with foreign interest rate, they adjust downwards at a rate of about 25 per cent per quarter.

To test the stability of the long-run coefficients together with the short-run dynamics, the Cumulative Sum (CUSUM) and the Cumulative Sum of Squares (CUSUMQ) were employed. The null hypothesis is that the coefficient is the same every period and the alternative is that it is not the same (Bahmani-Oskooee, 2001). CUSUM and CUSUMQ statistics are plotted against the critical bounds of 5 percent significance. According to Bahmani-Oskooee and Wing NG (2002), if the plot of this statistic remains within the critical bound of the 5 percent significance level, the null hypothesis (i.e that all coefficients in the Error Correction Model are stable) cannot be rejected. The plot of the Cumulative Sum and the Cumulative Sum of Squares of the recursive residuals are presented in fig 1.1 and 1.2 below repetitively.

Fig. 1.1 Plot of Cumulative Sum of Recursive Residuals (CUSUM)

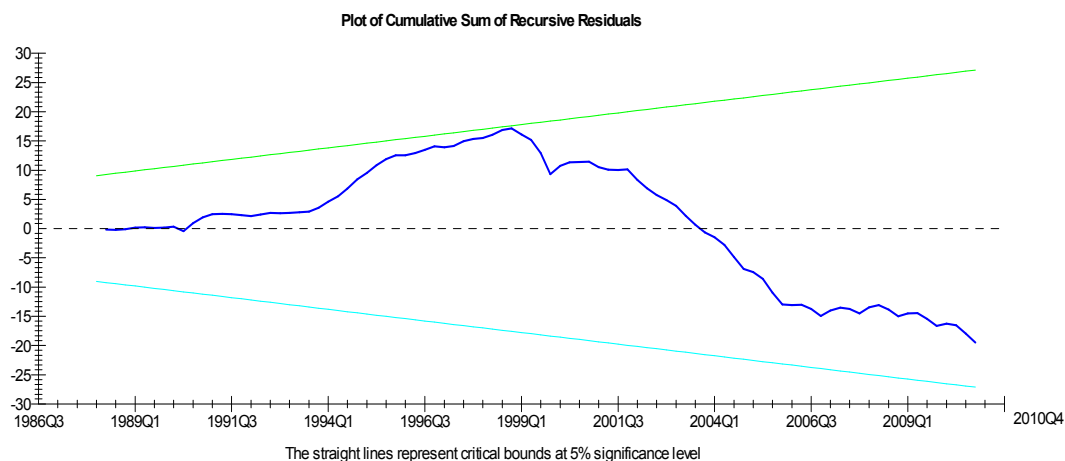
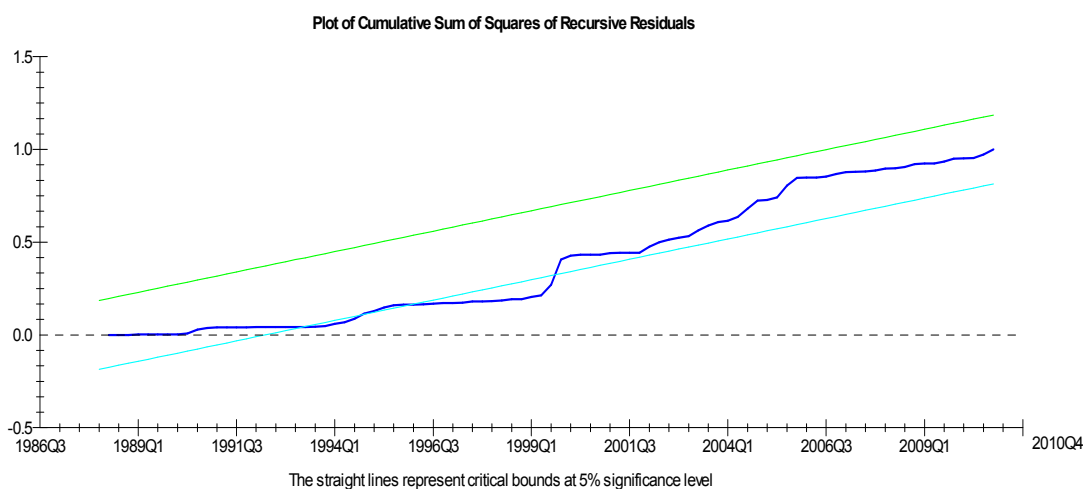


Fig. 1.2 Plot of Cumulative Sum of Squares of Recursive Residual (CUSUMQ)



As revealed above, the plot of both CUSUMQ and CUSUM residuals in our model using quantity data series is largely within the boundaries, implying that the coefficients are robust and exhibit remarkable stability. That is, the stability of the parameters has remained within the critical bound of parameter stability. It is therefore clear from the graphs that both CUSUMQ and CUSUM tests confirm the stability of the long-run coefficients of the LM function in the equation.

5. Concluding Remark

The paper has estimated the broad money demand function for Nigeria for the period 1986Q1 to 2010Q4 using quarterly data and the Autoregressive Distributed Lag (ARDL) procedure proposed by Pesaran et al. It was demonstrated that a long-run relationship exist between the real broad money demand, real gross domestic product, foreign real interest rate, real expected exchange rate and inflation rate. The result of the estimation also indicates that in both the long and short-run, real gross domestic product, real expected exchange rate and inflation rate are significant determinants of real broad money demand in Nigeria. From the coefficients it is clear that real income tend to be the most significant factor determining the demand for broad money in Nigeria. The results further demonstrates that the broad money demand function for Nigeria is stable over the sample period, and validates the use of M_2 monetary aggregate as a nominal anchor for monetary policy implementation.

References

- Adam, C. (2008). Factors in the Choice of Monetary Policy Regimes, Central Bank of Nigeria, Abuja.
- Anoruo, E. (2002). Stability of the Nigerian M_2 Money Demand function in the SAP Period, *Economics Bulletin*, 14(3), 1-9.
- Bahmani-Oskooee, M. (2001). Real and Nominal Effective Exchange Rates of Middle Eastern Countries and their Trade Performance, *Applied Economics*, 1, 103-111.
- Bahmani-Oskooee, M. and Wing NG, R.C. (2002). Long-run Demand for Money in Hong Kong: An Application of the ARDL model, *International Journal of Business and Economics*, 1(2), 147-155.
- Bahmani-Oskooee, M. and Gelan, A. (2009). How Stable is the Demand for Money in African Countries. *Journal of Economic Studies*, 36(3), 216-235.
- Bitrus, Y.P. (2011). The Demand for Money in Nigeria, *European Journal of Business and Management*, 3(6).
- Connel, S.O. (2008). Inflation Targeting as a Monetary Policy Framework, Central Bank of Nigeria, Abuja.
- Central Bank of Nigeria (2008). Statistical Bulletin, Golden Jubilee Edition
- Central Bank of Nigeria (2010). Statistical Bulletin, Vol. 21, December.
- Central Bank of Nigeria (2012). Quarterly Statistical Bulletin, Vol. 1, No. 1, March.
- Drama, B.H.G. and Yao, S. (2010). The Demand for Money in Cote d' Ivoire: Evidence from the Cointegration Test, *International Journal of Economics and Finance*.
- Engle, R.F. and Granger, W.J. (1987). Cointegration and Error Correction Representation, Estimation and Testing, *Econometrica*, 55, 251-276.
- Federal Reserve Bank of St. Louis (2014). 3-Month Treasury Bills: Secondary Market Rate TB3MS, Board of Governors of the Federal Reserve System.
- Friedman, M. (1956). The Quantity Theory of Money- A Restatement; in M. Friedman (ed): *Studies in Quantity Theory of Money*, Chicago University Press.
- Handa, J. (2000). *Monetary Economics*, New York: Routledge Publishing, Taylor and Francis Group.

- International Monetary Fund (2003). Nigeria: Selected Issues and Statistical Appendix, IMF Country Report No. 03/60, IMF: Washington, DC.
- Iyoboyi, M. and Pedro, L.M. (2013). The Demand for Money in Nigeria: Evidence from Bounds Testing Approach, *Business and Economic Journal*, Vol. 2013: BEJ-76.
- Johansen, S. (1988). Statistical Analysis of Cointegration Vectors, *Journal of Economic Dynamic and Control*, 12, 231-254.
- Johansen, S. and Joselius, K. (1990). Maximum Likelihood Estimation and Inference on Cointegration with Application to Demand for Money, *Oxford Bulletin of Economics and statistics*, 52, 169-210.
- Keynes, J.M. (1936). *The General theory of Employment, Interest and Money*, London and New York: Macmillan.
- Nwafor, F., Nwakanma, H., Nkansah, p. and Thompson, F. (2007). The Quantity Theory of Money in a Developing Economy: Empirical Evidence from Nigeria, *African Economic and Business Review*, 5, 1-9.
- Owoye, O. and Onafowora, O.A. (2007). M_2 Targeting, Money Demand and Real GDP Growth in Nigeria: Do Rules Apply?, *Journal of Business and Public affairs*, 1, 1-20.
- Owoye, O. and Onafowora, O.A. (2008). Structural Adjustment and the Stability of the Nigerian Money Demand Function, *International Business and Economic Research Journal*, 3(8).
- Pesaran, M.H., Shin, Y. and Smith, R.J. (1996). Testing for the Existence of a Long-run Relationship, Department of Applied Economics Working Paper No. 9622, University of Cambridge.
- Pesaran, M.H., Shin, Y. and Smith, R.J. (2001). Bounds Testing Approach to the analysis of Level Relationships. *Journal of Applied Econometrics*, 16, 289-326.
- Thomas, L. (1985). Portfolio Theory and Currency Substitution, *Journal of Money, Credit and Banking*, 17(3), 347-357.
- Tomori, S. (1972). Demand for Money in the Nigerian Economy, *Nigerian Journal of Economics and Social Studies*, 14(3), 337-345.
- Wong, C. (1977). The Demand for Money in Developing Countries: Some Theoretical and Empirical Results, *Journal of Monetary Economics*, 3, 86-95.