THE EFFECT OF MONETARY POLICY ON DEMAND FOR MONEY IN NIGERIA

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Abstract
The main thrust of this study was to investigate the effect of monetary policy on demand for money in Nigeria. Three hypotheses were formulated to guide and direct the study. The hypotheses formulated were meant to evaluate the relationship between interest rate and demand for money, inflation rate and demand for money and exchange rate and demand for money. Ex-post facto research design was adopted for the study. Relevant data for the study were collected from the Central Bank of Nigeria (CBN) statistical bulletin. Data collected was analyzed and tested using Ordinary Least Multiple regression statistical technique. Result of the finding revealed that there exist an inverse relationship between interest rate and money demanded, there exist an inverse relationship between expected inflation rate and money demanded and there exist an inverse relation between exchange rate and money demanded in Nigeria. It was recommended that the Nigerian government through the Central Bank should formulated good money policies that will ensure a stable demand for money function thereby encouraging economic growth in the country.

Keywords: Monetary policy, inflation, interest rate, exchange rate

1. Introduction
The demand for money is the desired holding of financial assets in the form of money: that is, cash or bank deposits. It can refer to the demand for money narrowly defined as M1 (non-interest-bearing holdings), or for money in the broader sense of M2 or M3. A stable money demand function is generally considered essential for the formulation and conduct of efficient monetary policy as it enables a policy-driven change in monetary aggregates to have a predictable influence on output, interest rates and ultimately price (Teriba, 2006a). Demand for money plays a major role in macroeconomic analysis, especially in selecting appropriate monetary policy. Thus, studies have been carried out in developed and developing countries to determine the factors that affect the long-run demand for money and the stability of the relationship between these factors and various monetary aggregates.

The primary objective of the Central Bank of Nigeria (CBN’s) monetary policy strategy is to maintain price stability in the medium term. In pursuing that objective, the CBN assigns more weight to the longer-term relationship between money growth and inflation than most, if not all, other major central banks. This emphasis reflects, in part, the CBN’s views that (i) “inflation is ultimately a monetary phenomenon” and (ii) “price stability enhances the potential for economic growth” (Rao, and Kumar (2007). Effectively, the emphasis reflects the notion that longer-term growth is determined by real factors—including an economy’s resources, the growth of its population, and the technical skills of its labor force—and that the most monetary policy can do to help the economy reach its growth potential is deliver a stable price level(CBN, 2011).

In several important respects, the CBN’s monetary policy strategy reflects the substantial influence of Milton Friedman’s research during the 1950s and 1960s. One such respect concerns the stability of the demand for money, which helps underpin the idea that there exists a reliable, longer-term relationship between the growth in the money supply and inflation (Omotor, 2009). In this paper, we explain the key linkages between monetary policy and
demand for money and the strategy adopted by the CBN. We also provide new evidence on the stability of Naira money demanded based on a framework that captures the effect of uncertainty on the demand for money.

2.0 Literature Review

2.1 Review of Empirical Literature

Teriba (1997) is one of the earliest studies of money demand in Nigeria and probably the foremost to model demand deposit. Using a double log specification and static Ordinary Least Squares (OLS) technique with annual data from 1958-1972, the study reported a high significant income-elasticity of demand deposits in Nigeria while interest rates were not statistically significant. Arinze, Darrat and Meyer (1990) however found foreign interest rate to be inversely related to the demand for money.

Nwaobi (2002) and Nwafor, Nwakanma, Nkasah and Thompson (2007) examined the stability of demand function for Nigeria using vector autoregression approach. Their results confirmed a stable money demand function for Nigeria. Akino (2006) using an autoregressive distributed lag (ARDL) technique combined with CUSUM and CUSUMQ tests, examined the cointegrating property and stability of broad (M2) money demand in Nigeria. The results show M2 to be cointegrated with income, interest rate and exchange rate. The CUSUM test weakly reported a stable money demand for Nigeria. Omotor (2009) also applied the ARDL technique and equally found a stable money demand for Nigeria.

Nachega (2001) applies a cointegrated analysis and error correction modeling to investigate the behavior of broad money demand in Cameroon over 1963/64 – 1993/1994. The cointegrated VAR analysis identified a stable money demand function and an excess aggregate demand relationship for Cameroon. Further empirical estimates provided support for both purchasing power parity (PPP) and an international Fisher parity between Cameroon and France. Nell (1999) empirically evaluated the existence of a stable long-run demand for money function over the period 1965-1997; given that after the adoption of money market-oriented monetary policy measures in 1980, South Africa Reserve Bank primarily relied on setting predetermined growth targets for M3. The empirical results suggest that M3 was stable while M1 and M2 display parameter instability. This suggests that M3 money stock could serve as an indicator for monetary policy for South Africa.

Kallon (1992) paper among other issues sought to determine whether the Ghanaian demand for real money balances was stable during the 1966:1 to 1986:4 period. The results failed to reject the null hypothesis of structural stability. The paper also finds evidence of the nominal adjustment specification as the appropriate short-run adjustment mechanism for the demand for real M1 balances. Further suggestion of foreign interest rates not having any significant effect on the demand for money in Ghana was evidenced.

2.2 Interest Rate

In addition to income, there are other variables that need to be considered in the demand for money function. One important controversial variable is the interest rate. The traditional money demand models postulate that the demand for real cash balances is negatively related to the yield on financial assets (interest rate). The domestic interest rate represents the opportunity cost of holding money; thus the public would prefer to hold more financial assets such as treasury bills, bonds, etc., during times of high interest rate. In the money demand function for the financially developed industrial countries, this is beyond controversy. However, the role of interest rate in developing economies deserves some attention.

The standard demand for money model which requires a well-developed financial market, has been corroborated by many theoretical and empirical studies. Keynes was the first to realize the importance of the speculative demand for money in the presence of capital markets. But whereas Keynes’ analysis is based on risk, others emphasized, the importance of interest rate using other approaches. While Tobin’s analysis is founded on uncertainty and Baumol’s on some kind of inventory model, Friedman used a variety of interest rates as the yields on financial asset.

However, despite the different approaches or explanations, theoretical reasoning and empirical investigation have indicated the importance of interest rate for the demand for money. Because of colinearity in interest rates, an important empirical simplification in asset money demand functions has been the introduction of only one interest rate to represent the entire measure opportunity cost of holding money. One of the earliest attempts was by Hamburger (1977), who specified the demand for real M, as a function of real income, lagged M1, and three rates of return the commercial bank savings deposit rate, the U.S. government bond rate, and the dividend-price ratio on equities.59 Robert Heller and Khan (1979) and Khan (1980) expanded the range of the opportunity cost of money in their equation to include the entire term structure of interest rates. Among developing countries, it is quite widely accepted that interest rate is in practice an unsatisfactory measure of the opportunity cost of holding...
money. In the first place, financial markets outside the banking system are not well developed, so that the possibilities of substitution between money and other financial assets are limited. Second, a more practical objection is that observed interest rates are often centrally determined and remain unchanged for long periods. So, there is insufficient variation in this interest rate to enable its influence on the demand for money to be estimated with confidence.

Many studies that include interest rate as an argument in the money demand function for developing countries, have shown the existence of a negative relationship between the domestic interest rate and the demand for money. Of the Arab countries, for example, Swelem's (1974), Teleb's (1985) and Hemaya's (1990) studies indicated that the interest rate as an opportunity cost for holding money has a highly significant negative effect on the demand for money in Egypt. Moosa's (1983), Basha's (1984) and Amr and Al Mahmeed's (1987) studies found out that interest rate has a significant effect on the demand for money function in Kuwait.

2.3 Expected Rate of Inflation

On the basis of the results of several studies as well as the theoretical understanding of interest rate, one can't determine that the rate of interest affects the demand for money in developing countries. So, in developing countries, due to the scarcity of interest rate data, the underdeveloped nature of money and capital markets, and the failure of government regulated interest rates to reflect actual alternative yields available, it seems appropriate to estimate the demand for money function using a measure of expected inflation as the opportunity cost of holding money.

As far as the influence of opportunity cost variables is concerned, theory suggests that an increase in the expected rate of inflation would reduce the attractiveness of money balances. This effect should be more pronounced for narrow money, which conventionally has a zero nominal yield, than for broad money, which includes time and savings deposits, whose yield can be adjusted to offset inflationary expectations.

The expected rate of inflation was introduced in the demand for money function by Friedman (1956). He argued that the demand for real balances is universally related to the expected rate of inflation. So, an increase in the general price level erodes the real value of money and induces a portfolio shift. Friedman treats the rate of inflation as the rate of return on real assets just as the rate of interest is the rate of return on financial assets. Therefore, higher inflation rates lead people to shift part of their wealth from money and financial assets to real assets which, in turn, means that higher inflation rates are associated with lower demand for money. However, because the effect of inflation rate on the demand for money was relatively neglected except in cases of hyper inflation, it was concluded that moderate rates of inflation do not affect the demand for money.

Empirical work on developing countries has been less successful in discovering significant and stable coefficients for inflation elasticities than for income elasticities. Galbis (1979) found only sporadic evidence of significant negative inflation elasticities in some Latin American countries. Morgan (1979), despite experiments with various specifications of the expected price change variables, was unable to discover any significant relationship with the appropriate sign. Mackenzi (1979) has employed the adaptive expectations hypothesis in order to generate the expected rate of inflation to examine its ability to measure the opportunity cost of holding money in Egypt. The expected rate of inflation was rejected because of its insignificant role as explanatory variable in the demand for money functions. El-Sheikh (1982) also rejected the hypothesis due to the low level and absent trend for inflation rate during the jumble period. To Hemaya (1990) inflation appears not to have any influence on the demand for money in the stock adjustment expectation model. On the contrary, estimates of the error correction model indicate that inflation has significantly affected the demand for the three definitions of money, M1, M2 and M3. Also, Diabi (1993) found that inflation has no significant effect on the demand for money (M1 or M2) in Algeria. He concluded that there is no relationship between demand for money and the opportunity cost of holding money as measured by prices. His explanation rests on the assumption that the GDP deflator in Algeria is not a good measure for opportunity cost because it includes changes in oil prices, on one hand, and because speculative demand for money in Algeria is relatively weak, on the other. However, there are several other studies that indicate the significant role of inflation in the demand for money.

Akhtar (1974) and Abe, et al., (1975) found a significant role for price expectations in the demand for money function in Pakistan. The role of price expectations has also been central to the studies of Chile by Hynes (1967) and Deaver (1970). Ghosh and Kazi (1977) use a model for Nigeria and like Hynes found evidence in favor of the demand for money in nominal forms being homogeneous of degree one in the price level.75 Many researchers have solely used the expected rate of inflation to capture the foregone yield on real assets. Nyong (1993) found out that the inclusion of inflationary expectation in the demand for money in South Africa enhanced the functional fit of the model and the inflationary expectation coefficient was statistically significant and of the right sign. This implied that money holders view real goods as an important substitute to holding money balances. The Bahmani-Oskooee and Molixi (1991) study of the demand function for money in 13 developing countries indicated that the inflation rate (or its expectation in some cases) is one of the major determinants of the demand for money in countries. A study by Perera (1988) where partial adjustment mechanism
(nominal and real) and adoptive expectation mechanism were incorporated to specify the demand for money function for Sri Lanka indicated that current real income and expected rate of inflation are the major determinants of such a function.

2.4 Exchange Rate

Given the openness of most contemporary economies, money demand functions should include the effect of external monetary and financial factors approximated by movements in foreign rate and exchange rate. An increase in (expected) foreign interest rates would induce domestic residents to increase their holdings of foreign assets which would be financed by drawing down domestic money holdings. Also a change in exchange rate would affect portfolio decisions between domestic assets and foreign assets. So, if, for example, domestic currency is expected to depreciate, domestic portfolio holders would adjust their portfolio in favor of foreign assets and vice versa. It can be postulated from such effect of external factors that foreign interest rate and exchange rate expectations may have a negative effect on the demand for money.

Bahmani-Oskooee and Malixi (1991) assessed whether a change in real effective exchange rate has any impact on the demand for money in 13 developing countries using quarterly data over 1963-1985.87 Estimates of the short-run elasticities indicated that there are positive as well as negative effects. However, in the long run a change in real effective exchange rate has a significant negative effect on demand for money function in nine out of eleven cases. This indicates that where the currency of each of these countries depreciates, the public holds less domestic currency and more foreign currency which means demand for money increases. This means that there is some kind of substitutability between the domestic currency and some foreign currencies.

Empirical results of studies of some of the Arab countries lend strong support to the hypothesis that external developments represented by exchange rate, and in some cases, foreign interest rates influence domestic currency holdings. Domowitz and El Badawi (1987) study indicated that there is a strong effect of the exchange rate variable - defined as a number of units of the country's currency per unit of U.S. dollar - on the demand for money function in Sudan. Darrat's (1984, 1985), and Ghamdi (1989) studies found that exchange rate along with foreign interest rate have significant negative effect on the demand for money function in Saudi Arabia. Also, Darrat's (1986) study showed that foreign interest rates play a major role in explaining money demand in the open economies of Saudi Arabia, Libya and Nigeria. Without such a variable, all of the estimated money demand functions appear seriously mis-specified and structurally unstable. Ghamdi's (1991) study tested the effect of the openness of the Jordanian economy on the demand for money function by including foreign interest rate as well as the inflow of foreign aid as major determining factors which were found to have significant effects. The inflow of foreign aid has a significant positive effect on demand for money while low foreign interest rate tends to lower it.

So, when exchange rate is identified as one of the determinants of demand for money function in some developing countries, it means that external monetary and financial factors have significant influence on such economies. This implies that the role of fiscal and monetary policy should be changed to reflect such results. It also indicates that there is some degree of substitution between domestic and foreign assets. Monetary policy, which is designed to counteract the effect of external factors on macroeconomic variables such as inflation, for example, must consider the effect of such factors on the demand for money function.

3. Research methodology

3.1 Research Design

Ex-post facto research design was adopted for this study. Ex-post facto research design according to Ayara (2005) is the research design is the design that allows the researcher to study situation as they occurred. The variables are not manipulated by the researcher. Thus at the time of study variables use in the study such as Gross Domestic product, interest rate, inflation rate and exchange rate had already occurred. Thus the researcher was studying them as they are

3.2 Data Source and Method of Collection

A need to have a better understanding of this study leads us to the consultation of a number of related materials. Most of the required data of this work were obtained from published articles, journals, bulletin especially those from federal office of statistics, debt management office (DMO), articles and news papers publications. The technique adopted in obtaining information for this study relied much on intensive library research. Thus, this study relied heavily on secondary information such as published journals, texts, paper presentations, reading, newspapers, annual reports and internet materials.

3.3 Model Specification

The model is based on the monetarist demand for money theory. It maintains that the function of money demand includes such variables as interest rate, inflation rate exchange rate and money
In the monetarist money demand function, the demand for money is usually expressed as depending on income (Y) and other factors, denoted by (X). That is the demand for money can be written as \( M = F(y, x) \).

Selecting the key variables from the above monetarist model of money demand, we can specify the relationship symbolically as follows:

\[
MD = F (RIR, INFLA, EXCH, U)
\]

Where

- \( MD \) = Demand for money
- \( RIR \) = Interest rate (prime)
- \( INFLA \) = Inflation rate.
- \( EXCH \) = Exchange rate

To make the equation easily testable, we specify that:

\[
MD = b_0 + b_1 RIR + b_2 EXCH + b_3 INFLA + U
\]

The sign constraints are that: \( b_0 > 0, b_1 > 0, b_2 > 0 \) and \( b_3 < 0 \)

\( b_0 \) = intercept
\( b_1, b_2 \) and \( b_3 \) = coefficients of the independent variables.
\( U \) = Stochastic term.

4. Analysis

Table shows data for the demand for money and selected money policy indicators in Nigeria from 1970 to 2007.

Table 2 shows the regression result of the relationship between dependent variable (demand for money) and explanatory variables (interest rate, inflation rate and exchange rate) for Nigeria. The coefficient of multiple determinations from the result shows that 83% of variation in demand for money is jointly caused by changes in interest rate, inflation rate and exchange rate. The F-ratio of 19.83 being greater than the table F-value of 3.14 at 5% level of significance implies that there is a strong association of demand for money and monetary policy in Nigeria. It further indicates that the model explained well the variation in demand for money as measured by monetary policy.

The estimated parameter of interest is negative meaning that there exist an inverse relationship between interest rate and demand for money. The sign is consistent with our postulate. Indeed, the sign suggests a linear relationship. The estimated coefficient is significant at 5 per cent level of significance.

The estimated coefficient for inflation is negative meaning that there exist an inverse relationship between inflation rate and demand for money in Nigeria. In other words when inflation rate increases demand for money will increases. This result is in order with economic apriori criteria. The estimate is statistically significant at 5% per cent level of significance. The estimated coefficient for exchange rate is negative, implying that there exist an inverse relationship between exchange rate and demand for money in Nigeria. This result is in order with economic apriori condition and is significant at 5% level of significant.

4.1 Discussion of Findings

The result of this study revealed that there exist an inverse relationship between interest rate and demand for money. This implies that increase in interest rate will certainly reduces the demand for money and vice versa. This finding is in agreement with the finding of Amr and Al Mahmeed's (1987) study who found out that interbank interest rate has a significant effect on the demand for money function in Kuwait. The result is also in agreement with the findings of Chukwu, Agu and Onah (2010) who found out that there exist a significant inverse relationship between interest rate and demand for money.

The findings of this study also revealed that there exist a significant inverse relationship between inflation rate and demand for money. This finding is in line with the finding obtained by Galbis (1979) who found evidence of significant negative inflation elasticities in some Latin American countries. This finding is in disagreement with the finding obtained by Morgan (1979), who in his experiments with various specifications of the expected price change variables, was unable to discover any significant relationship with the appropriate sign.

The finding of this study revealed that there exist an inverse relationship between exchange rate and demand for money in Nigeria. The finding of this study is in agreement with the finding obtained by Ghamdi (1989) whose study found that exchange rate along with foreign interest rate have significant negative effect on the
demand for money function in Saudi Arabia. Also, Darrat's (1986) study showed that foreign interest rates play a major role in explaining money demand in the open economies of Saudi Arabia, Libya and Nigeria

5.0 Conclusion and recommendations

This study investigated the influence of money policy on demand for money in Nigeria. Three hypotheses were formulated to guide and direct the study. Data for the study was obtained from the Central Bank of Nigeria Statistical Bulletin. Result of the findings leads us to the conclusion that an inverse relationship exist between interest rate and demand for money in Nigeria. This implies that when interest rate increases demand for money will decreases. Also expected inflation rate has an inverse relationship with demand for money. Lastly the result led us to the conclusion that exchange rate moves in an opposite direction with demand for money.

Bases on the findings the following recommendations were made:

1. Nigerian government through the Central Bank should formulated good money policies that will ensure a stable demand for money function thereby encouraging economic growth in the country.

2. A policy of attracting more participants (non-government) and private sector funds to the money market is necessary as this will deepen the market and make the market more dynamic and amenable to monetary policy. This will further reduce the present long time lags associated with monetary policy in Nigeria.

3. Although, from our results financial innovation have not affected the demand for money thus there is still a basis for monetary policy. It is something we cannot run away from and as such, the CBN should be prepared for when it comes. More so, in the light of the recent.

4. Recapitalization in the Nigerian banking sector which have led to financial innovations, the monetary policy strategy of the CBN should be fine-tuned to ensure it is well suited to deal with the challenges posed by the banks.
References


Annexure

Table 1: Demand for money and selected money policy indicators in Nigeria

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Source CBN Statistical bulletin 2008
Table 2: Regression result of the relationship between monetary policy and demand for money in Nigeria.

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</table>

R^2 = 0.83,

Adjusted R^2 = 0.67,

F-value = 19.833,

*significant at 1% level, ** significant at 5% level, *** significant at 10% level.

Source: Researcher Estimation, 2012