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Monetary Policy Transmission Mechanism in Nigeria

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1. Introduction

The formulation and implementation of appropriate monetary policy is one of the major responsibilities of central banks worldwide. Monetary policy can be described as a central bank's action to influence the availability and cost of money and credit, as a means of promoting national economic goals. Specifically, it can be defined as a combination of measures designed to regulate the value, supply and cost of credit in an economy in consonance with the expected level of economic activity. In broad terms, monetary policy aims at achieving price stability, full employment and economic growth, exchange rate stability, low interest rates and balance of payments equilibrium. However, recent experiences indicate the narrowing of the objectives of monetary policy to that of price stability. This is in realization of the fact that the achievement of all other objectives can be accomplished under stable prices in the medium to long-term.

The objectives are achieved by the central bank through the use of a number of instruments of monetary policy. The policy tools under the control of the central bank are not, however, directly linked to the policy objectives. Consequently, the usual practice is that intermediate targets such as money supply, interest rates and bank credit are employed to achieve monetary policy objectives. Generally, developing a practical understanding of how monetary policy action transmits to the economy remains a day-to-day challenge to central bankers. When a central bank takes a policy action, it sets in motion, a series of economic events. The sequence of events starts with the initial influence on the financial markets, which in turn slowly works its way through changes in current expenditure levels especially, private consumption and investment. Changes in domestic demand influence the current production levels, wages and employment, and in the process eventually lead to a change in domestic prices i.e. the rate of inflation. The chain of events, which link a

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change in monetary policy with changes in prices and output, is known as the transmission mechanism of monetary policy. In other words, transmission mechanism describes how changes in monetary policy transmit through the financial system, via financial market prices (interest rate and exchange rate) and quantities (money supply) to the real economy, affecting aggregate spending decisions of households and firms, and thus, from there to aggregate demand and inflation. There are long lags in the transmission mechanism (i.e. between monetary policy initiatives and the rate of inflation); thus, the chain of events emanating from a change in central bank policy rate or base money needs to be studied and analyzed. The study of these intricate links between economic variables will ensure that correct policy measures are taken now to produce a specific outcome in future. The identified channels in modern financial systems include interest rate, exchange rate, other asset prices including bond, stock market and real estate prices, and credit.

The monetary policy transmission mechanism varies in details between different economies because it depends partly upon the institutional structures. However, these differences are small and involve the relative importance of different channels rather than the existence of the channels themselves. Also, the design and implementation of monetary policy in a given economy depends on its financial structure and the macroeconomic environment.

The issue of transmission mechanism has been a subject of debate over time. The controversies centre largely on the complexity of the medium of transmission, the difficulty in quantifying the overall effects of policy changes on the economy and the problem of imperfect knowledge about shocks which are likely to adversely affect inflation and output volatility and, hence, the timing of the transmission channels. In spite of these controversies, an understanding of the transmission process is essential to the appropriate design and implementation of monetary policy. Essentially, in order to be successful in achieving the objectives of monetary policy, the monetary authorities must have a reasonable assessment of the timing and effect of their policies on the economy, thus requiring an understanding of the mechanism through which monetary policy affects the economy.

The main objective of this paper is, therefore, to review the monetary policy transmission mechanism in Nigeria with a view to appreciating the various challenges of the transmission process. Also, it highlights the need to continuously examine the channels of monetary policy in the economy to enhance policy design and implementation in Nigeria. The paper is divided into five parts. Following the

introduction as part I, Part II, discusses conceptual issues of monetary policy transmission mechanism, while Part III gives country experiences. Part IV x-rays monetary policy transmission mechanism in Nigeria and lessons from international experiences while Part V contains the concluding remarks.

II. Conceptual Issues

Monetary policy transmission mechanism is a description of how policy-induced changes in the nominal money stock or the short-term interest rate impact on real variables such as inflation, aggregate output and employment. In other words, the transmission mechanism describes the channels or the processes through which monetary policy actions of the central bank impact on the ultimate objectives of inflation and output. Specific channels of monetary transmission operate through the effects that monetary policy has on interest rates, exchange rates, equity and real estate prices, bank lending and firm balance sheets.

Four main channels through which monetary policy influences the economy have been identified in the literature namely, interest rates (sometimes referred to as liquidity channel), exchange rate, other assets prices and credit. The various channels reinforce each other but may vary in importance from country to country and from time to time. Furthermore, every monetary impulse (e.g an interest rate change by the central bank or change in monetary base through changes in minimum reserve ratio or open market operations) has a lag effect on the economy. The identified channels are discussed below:-

(i) The Traditional Interest Rate Channels

The traditional interest rate channels have featured in the literature over several decades as the key monetary transmission mechanism in the basic Keynesian ISLM textbook model. It can be characterized by the following schematic showing the effect of a monetary expansion:

$$?M \; ? \; ?ir \; ? \; ?I \; ? \; ?Y \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where (?M) indicates expansionary monetary policy leading to a fall in real interest rate (?ir) which in turn lowers the cost of capital, causing a rise in investment spending (?I), thereby leading to an increase in aggregate demand and a rise in output (?Y) .

Although Keynes originally emphasized this channel as operating through businesses' decisions about spending, later research recognized that consumers' decisions about expenditure on housing and consumer durables are also investment decisions. Thus, the interest rate channel of monetary transmission outlined above applies equally to consumer spending in which (I) represents residential housing and consumer durable expenditure.

An important feature of this transmission mechanism is its emphasis on the real rather than the nominal interest rate as that which affects consumer and business decisions. Furthermore, it is often the real long-term interest rate and not the short-term interest rate that is viewed as having the major impact on spending. It is important to note that changes in the short-term nominal interest rate by a central bank leads to a corresponding change in the real interest rate on both short and long-term bonds. This is explained by the phenomenon known as sticky prices, the fact that aggregate price level adjusts slowly over time. This means that expansionary monetary policy, which lowers the short-term nominal interest rate, also lowers the short-term real interest rate. The expectations hypothesis of the term structure, which states that the long-term interest rate is an average of expected future short-term interest rates, suggests that the lower real short-term interest rate leads to a fall in the real long-term interest rate.

The fact that it is the real interest rate rather than the nominal rate that affects spending provides an important mechanism for showing how monetary policy can stimulate the economy, even if nominal interest rates hit the floor of zero during a deflationary episode. With nominal interest rate at the floor of zero, an expansion in the money supply (?M) can raise the expected price level (?Pe) and, hence, expected inflation (↑πe), thereby, lowering the real interest ir (ir = i- πe) even when the nominal interest rate is fixed at zero, and stimulates spending through the interest rate channel:

$$?M \uparrow ?Pe \rightarrow \uparrow \pi e \uparrow ?ir \uparrow ?I \uparrow ?Y \quad \text{.....} \quad (2)$$

This mechanism indicates that monetary policy can still be effective even when nominal interest rates have already been driven down to zero by monetary authorities.

Conversely, a monetary policy tightening through a rise in interest rates makes it more expensive to borrow and consume today relative to the future. This causes a reduction in investment and consumption, and thus, a fall in aggregate demand. This

fall in aggregate demand below the economy's productive capacity eventually reduces inflation. The lags in this transmission channel are due to the time it takes for aggregate demand to respond to changes in interest rates, and the time it takes for inflation to respond to the output gap.

(ii) The Exchange Rate Channel

The exchange rate channel is an important element in the conventional open-economy macroeconomic models. With the growing internationalization of economies and the advent of flexible exchange rate, more attention has been paid to monetary policy transmission operating through exchange rate effects on the net exports. The chain of transmission here runs from interest rates to the exchange rate via the uncovered interest rate parity condition relating interest rate differentials to expected exchange rate movements. The uncovered interest rate parity relationship, assumes that equality should hold between the interest rate differential and the expected rate of appreciation or depreciation of the exchange rate.

The transmission channel holds that when the domestic real interest rates fall (?ir) following an expansionary money supply (?M), equilibrium in the foreign exchange market would require that the domestic value of the local currency relative to a foreign currency falls (?E), (i.e domestic currency depreciates), making domestic goods cheaper than foreign goods, thereby causing a rise in net exports (?NX) and hence, in aggregate output (?Y).

?M ? ?ir ? ?E? ?NX ? ?Y .....…….(3)

Put differently, when domestic real interest rates falls (?ir), domestic currency deposits become less attractive to deposits denominated in foreign currency leading to a fall in the value of domestic deposits relative to other currency deposits i.e. depreciation of the domestic currency.

Conversely, an increase in domestic interest rate, relative to foreign rates would lead to a stronger currency and a reduction both in net exports and in the overall aggregate demand.

(iii) Other Assets Channel

A key argument against the Keynesian monetary transmission mechanism is that it focuses only on one asset price, the interest rate, rather than other assets prices.

Monetarists view a transmission mechanism in which other relative asset prices and real wealth transmit monetary effects to the economy. For example, besides exchange rate, other assets prices include bond prices, equity prices, as well as house and land prices. The other assets channels are discussed below:-

- Equity Price Channels

Tobin's q Theory

Tobin's q theory provides a mechanism by which monetary policy affects the economy through its effects on the valuation of equities. Tobin defines q as the market value of firms divided by the replacement cost of capital. If q is high, the market price of firm is high relative to the replacement cost, and new plant and equipment capital is cheap relative to the market value of business firms. Companies can then issue equity and get a high price for it relative to the cost of plant and equipment they are buying. Thus, investment spending will rise because firms can buy a lot of new investment goods with only a small issue of equity. In order to understand this mechanism clearly, consider a situation of monetary expansion. Economic agents can invest their excess funds in the stock market, increasing the demand for equities and consequently raising their prices. Also, we note that monetary expansion leads to a fall in interest rates making bonds and other fixed interest financial assets less attractive relative to equities. This is represented schematically as follows:

?M ? ?ps ? ?q? ?I ? ?Y .....……(4)

When q is low, firms will not purchase new investment goods because the market value of firms is low relative to the cost of replacement of capital. If companies want to acquire capital they can buy another firm cheaply and acquire old capital instead thus, investment spending will be low.

Wealth Effects

An alternative channel for monetary transmission through equity prices occurs through wealth effects on consumption. In Franco Modigliani's life cycle model, consumption spending is determined by the lifetime resources of consumers, which are made up of human capital, real capital and financial wealth. A major component of financial wealth is common stocks. When stock prices rise, the value of financial wealth increases, thus increasing the lifetime resources of consumers, and consumption should rise as indicated in equation (5) below.

?M ? ?ps ? ?wealth? ? consumption ? ?Y …….(5)

The monetary transmission also operates through land and housing prices as they constitute extremely important components of wealth. A rise in housing and land prices will increase wealth thereby raising consumption. The Tobin's q framework also applies directly to the housing market.

(iv) The Credit Channels

The credit channel has a greater effect on expenditure of smaller firms, which are more dependent on bank loans, than it will on large firms, which can access the credit markets directly through stock and bond markets.

There are two aspects, namely the bank lending and the balance sheet channels.

- **Bank Lending Channel**

The bank lending channel is based on the assumption that banks play a significant role in the financial system in terms of channeling resources from surplus to deficit spending units. Expansionary monetary policy (?M), which increases bank reserves and bank deposits (?bank deposits), increases the quantity of bank loans available (?bank loan). Given banks' special role as lenders to classes of bank borrowers, the increase in loans will cause investment and (possibly consumer) spending to rise (?I) and hence aggregate output (?Y). Schematically, the monetary policy effect is:

?M ? ?bank deposits ? ? bank loans ? ?I ? ?Y ……..(6)

- **Balance Sheet Channel**

The balance sheet channel arises from the presence of information asymmetry inherent in the credit market. The lower the net worth of business firms the more severe the adverse selection and moral hazard problems are in lending to these firms. A lower net worth of business firms increases the moral hazard problem because it means that owners have a lower equity stake in their firms, giving them more incentive to engage in risky investment projects. Since taking on riskier investment projects makes it more likely that lenders will not be paid back, a decrease in business firms' net worth leads to a decrease in lending and, hence, in investment spending.

Monetary policy can affect firm's balance sheets in several ways. Expansionary monetary policy (?M) which causes rise in equity prices (?ps) and raises the net worth of firms, leads to higher investment spending (?I) because of the decrease in

adverse selection and moral hazard problems. This is schematically presented below:

?M ? ?ps? ?adverse selection ? ? moral hazards ? ? loans ? ?I ? ?Y ...…....(7)

Cash Flow Channel

Similarly, expansionary monetary policy which lowers nominal interest rates also causes an improvement in firms' balance sheet because it raises its cash flow, thereby reducing adverse selection and moral hazard problems. The relations are represented in the following schema:

?M? ?i? ?cash flow? ?adverse selection ? ?moral hazards ? ?loans ? ?I? ?Y……(8)

An important feature of this transmission channel is that it is the nominal interest rates that affect firm's cashflow and not the real interest associated with the traditional interest rate channel. Furthermore, the short-term interest rate plays an important role in this transmission because it is the payments on short-term rather than long term debts that typically have the greatest impact on the cash flows.

This transmission channel is applicable to firms as well as individual households. Accordingly, it forms an important transmission mechanism that the central bank can rely upon to deal with a financial crisis.

Unanticipated Price Level Channel

The channel operates through monetary policy effects on the general price level. An unanticipated rise in the general price level lowers the value of firm's liabilities in real terms (decreased debt burden) since debt payments are contractually fixed in nominal terms but should not lower the real value of the firm's assets. Thus, monetary expansion that leads to an unanticipated rise in the price level (P?) raises real net worth of firms which lowers adverse selection and moral hazard problems thereby leading to a rise in investment spending and aggregate output

M?? unanticipated P?? adverse selection ?moral hazard ?? lending? ? I?? Y?….. (9)

Household Liquidity Effects

This channel operates through the link between money and equity prices. Due to asymmetric information about their quality, consumer durables and housing are very illiquid assets. If consumers needed to sell their consumer durables or housing to raise money following a bad income shock, they would expect a big loss because they

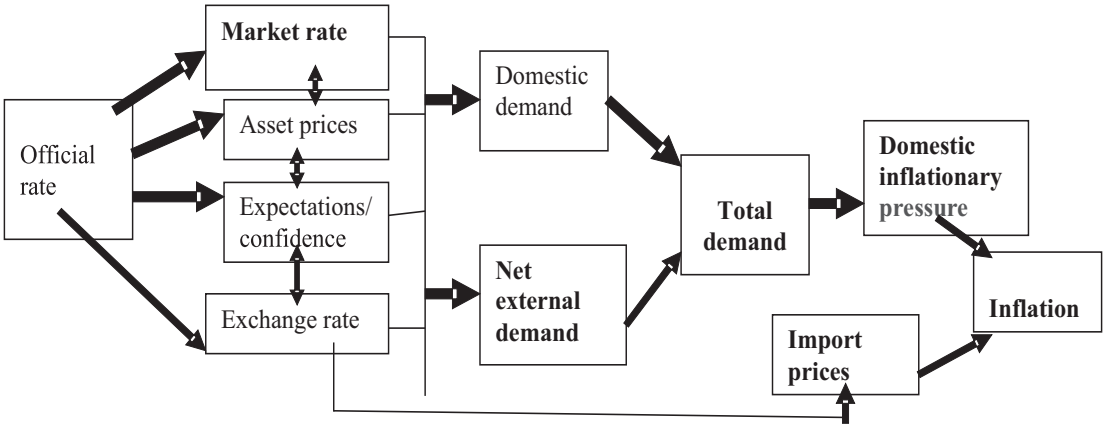
cannot get the full value of these assets in a distress sale. On the other hand, if consumers hold financial assets, they can easily sell them and get full market value of the assets. This channel focuses on liquidity effects on consumer durable and housing expenditure.

III Country Experiences

Britain

The Bank of England (BOE) uses the short-term official interest rate as its main instrument of monetary policy to influence other market rates. The official rate is determined by the Monetary Policy Committee (MPC). Like most central banks, the BOE is the monopoly supplier of 'high-powered' money which is also known as 'base money'. Through its operating procedure which is almost similar to most central banks, it chooses the price at which it will lend high-powered money to private sector institutions. The Bank's lending is predominantly through gilt sale and repurchase agreements (repo) of two-week maturity. The Bank also conducts daily transactions on Open Market Operations (OMO) where securities are purchased or sold to authorized dealers in order to influence monetary conditions. When a change in the official rate takes place, the effect is immediately transmitted to other short-term sterling wholesale money-market rates, money-market instruments of different maturities and to other short-term rates, such as inter-bank rates. The main links in the transmission are:-

Figure 1: The Transmission Mechanism of Monetary Policy in Britai



Source: Adapted from Bank of England Quarterly Bulletin, May 1999

South Africa

The Reserve Bank of South Africa uses the repurchase rate, (i.e. repo rate) as its main instrument of monetary policy to influence other market rates. The main links in the transmission mechanism of monetary policy, depicted in the flow chart below can be briefly described as follows: The repo rate has direct effects on other variables in the economy, such as other interest rates, the exchange rate, money and credit, other asset prices and decisions on spending and investment. Thus, changes in the repo rate affect the demand for and supply of goods and services. The pressure of demand relative to the supply capacity of the economy is a key factor influencing domestic inflationary pressures. Inflation is, amongst others, the result of pressures originating in the labour market and/or the market for goods and services as well as a result of imported inflation, which is influenced by exchange rate movements.

The size of the change in any central bank's interest rate is not a good indication of the likely impact of monetary policy on that economy. If the responses of interest rates, exchange rate, credit and other asset prices are insignificant to changes in the official interest rate, monetary policy will have little effect on the economy. In this regard, the channels are blocked or not fully functional.

The channels or transmission mechanism earlier discussed in this paper namely,

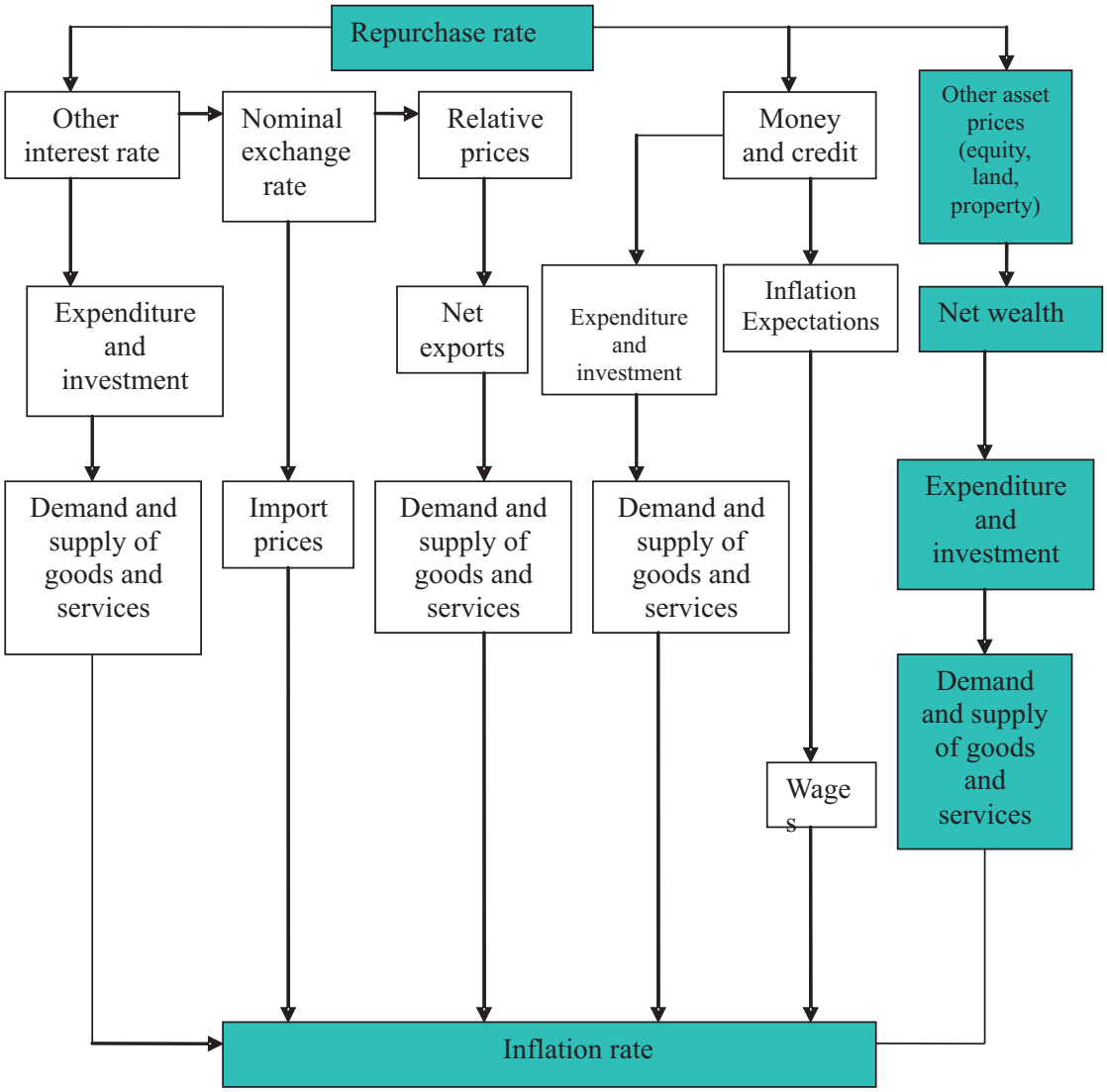
interest rate channel, other asset price channels and credit channels are relevant in South Africa although with different strengths of impact. For instance, changes in the repo rate influences the interest rates on retail financial products. Soon after the official rate is changed, domestic banks are inclined to adjust their lending rates, usually, but not necessarily by the same amount of change in the policy rate. Firms and individuals respond to the change in interest rates by altering their investment and spending patterns. As a result, consumer spending (C), fixed capital formation (I) and real output (y) start to respond. It is precisely through this channel that demand pressures feed through changes in the output gap to inflation. This can be schematically presented as follows:

? repo ? ? interest rates ? (?I, ?C) ? ?y

Through economic research, various models were developed to explore and better understand the channels through which monetary policy affects aggregated demand and ultimately inflation in South Africa.

In particular, a small macro-econometric model, incorporating as fully as possible the main channels of the transmission mechanism was developed by South Africa in an attempt to illustrate the transmission mechanism of monetary policy in that country. The repurchase rate was shocked by an increase of 100 basis points from its baseline scenario during the very first year of the 3-year simulation period in order to illustrate the change and time lag of the response. The results of the simulations with macro-econometric model, support the notion that there is a long time lag between a change in interest rates and the impact on the real economy, and that in some instances this impact will only be felt after a period of between four to six quarters. Only in the year 2000, when South Africa adopted inflation targeting monetary policy framework, did the importance of the time lags and magnitude changes of key economic variables begin to gain more prominence in that country. Fluctuations in the real economy influence the output gap, so that as the gap between actual and potential economic activity adjusts, inflationary pressures will start to change. However, the effects of the change in real output will only start to affect inflation after a further three to four quarters, with the result that the monetary policy transmission mechanism can be expected to have an impact on inflation after a period of between 12 and 24 months, with the full impact taking at least 2 years.

Figure 2: The Transmission Mechanism of Monetary Policy in South Africa



Source: Adapted from "How Monetary Policy Works", edited by Lavan Mahadeva and Peter Sinclair, 2005

IV. Monetary Transmission Mechanism in Nigeria

The objectives of monetary policy have not changed significantly over time, or departed from the overall desire to maintain macroeconomic balance. However, the transmission mechanism has tended to vary with the changes in approaches to monetary policy. While the objectives of monetary policy in the early 1970s were designed to deal with four main broad objectives, namely price stability, high rate of unemployment, sustainable economic growth and balance of payments, the approach of monetary policy implementation has evolved over the years from absolute reliance on direct controls in the 1970s and early 1980s to focus on the market based system of monetary control. Since the mid-1980s, and consistent with the marketbased policies of the structural adjustment program, the techniques of monetary policy relied on the indirect instruments to realize its objectives.

The Transmission Mechanism under the Direct Monetary Control

Under direct controls, monetary management depended on the use of direct instruments, such as credit ceilings, selective credit controls, administrative fixing of interest rates and exchange rate as well as the prescription of cash reserve requirements. The main objective then was to ensure that funds were made available to the productive sectors of the economy such as agriculture and manufacturing at relatively cheap terms. Under this regime, monetary policy impulses through changes in interest, exchange rates and credit ceilings were expected to positively affect changes in output and prices through the credit channel. Achieving the objective of monetary policy under this approach was, however, hampered by excessive fiscal dominance and poor compliance with statutory directives by deposit money banks as operators continued to hide credit transactions in a way that prevented funds from flowing into the preferred sectors of the economy. Consequently, with the introduction of the market based economic policies under the structural adjustment program in the mid-1980s, the Central Bank consciously changed its techniques of monetary policy to reflect market characteristics. Accordingly, the use of market based instruments of policy became popular and for the first time Open Market Operations, (OMO) became prominent as an instrument of monetary policy.

Transmission Mechanism under the Indirect Approach to Monetary Control

The financial reforms of the mid-1980s provided a watershed for monetary policy reforms in Nigeria. First, the transition from direct to indirect approach meant that the

instruments as well as the transmission mechanisms of policy would change. Second, while the broad objectives of ensuring macroeconomic balance continued to be an area of focus, the desire for policy effectiveness necessitated a refocusing on narrow targets believed to have a strong bearing on the ultimate objectives.

Under the indirect approach, the link between the monetary base and money stock, determined by the money multiplier is emphasized under the monetary targeting framework, which the Bank adopted. The underlying assumption for using the base money as the operating target is that the Central Bank of Nigeria has control over its liabilities- the base money (particularly the reserve component). With the multiplier known (by assuming the knowledge of the required reserves and currency deposit ratios), the authorities are in a good position to achieve a desired level of money supply via the manipulation of its high powered money. Since the introduction of OMO as the main instrument of monetary policy in 1993, the interest rate and to a large extent, the exchange rate channels have been explicitly prominent in transmitting monetary policy impulses to the real sector in Nigeria. Consequently, while the operating target- the base money- is periodically adjusted to change the level of money supply, the effects are expected to work through the impact on short-term interest rates or the exchange rate to effect changes in output and prices.

Empirical evidence from Nigerian data indicates the following results:-

Changes in base money take about two months to affect the money supply, the main intermediate target of policy.

Changes in money supply in turn take about 12 months to affect output. Thus, it takes about 15 months for changes in CBN monetary policy action, via base money and money supply (M2) to have its full impact on output.

On the other hand, and contrary to evidence in other countries, the relationship between output and inflation seems weak and unstable but more stable between money supply and inflation.

It takes about 24 months for money supply to have its full impact on inflation; but using exchange rate and money supply as explanatory variables, the effect on inflation actualizes within one year.

Furthermore, preliminary study by the Research & Statistics Department (2007) using a Vector Auto Regression (VAR) model on quarterly data, showed that the exchange rate channel was very strong in Nigeria between 1980 and 2005 while the interest rate and credit channels were weak. The results are not surprising given that the policy rate, the minimum rediscount rate (MRR), was not a transaction rate and

remained constant for a long time. In addition, the bulk of domestic credit went to government and not to the core private sector for most of the years under study. This is a preliminary investigation that needs further research. Thus, the results should be taken and interpreted with caution.

Challenges of Transmission of Monetary Policy in Nigeria

The challenges of assessing monetary transmission mechanism in Nigeria could be summarized as follows:

Large recognition lags, involving the time of recognition of anomalies and when precisely to take a decision. This border on adequate independence for the Central Bank of Nigeria (CBN) and availability of intervention instruments.

Absence of high frequency data that would aid effective assessment of monetary policy action, particularly data on the real economy such as GDP, investment spending, consumer spending, employment, etc.

Unreliability of information rendered by the deposit money banks.

Inappropriate macroeconomic models for Nigeria that would aid proper assessment of transmission of monetary policy.

Inadequate coordination between fiscal and monetary authorities with respect to liquidity flows in the economy (though improving).

Relative shallowness of the financial markets.

Lessons of Country Experiences

The experiences of the countries examined in the paper which are considered useful to Nigeria in our efforts at understanding the transmission mechanism on monetary policy are highlighted as follows:-

The development of an appropriate macroeconomic model for Nigeria should be pursued with vigor, including the improvement in both the quality and timeliness of data for result-oriented model. This is in line with the South African experience where through economic research, various models were developed to explore and better understand the channels through which monetary policy affects aggregate demand and ultimately inflation in that country.

Until an appropriate macroeconomic model for the Nigerian economy is

developed, the actual effects of transmission mechanism of monetary policy on the Nigeria economy may be difficult to ascertain.

The quality of information rendered to the CBN by Deposit Money Banks (DMBs) needs to be improved upon. This will enhance the reliability of data for monetary policy design in Nigeria.

An appropriate institutional and legal framework should be put in place to enhance the smooth functioning of the financial markets.

Efforts should continue to be made to deepen the Nigerian financial markets in order to enhance effective transmission of monetary policy impulses to the economy.

V Concluding Remarks

The various processes of monetary policy transmission mechanism were reviewed in the paper. Four major channels of transmission of policy impulses to the economy identified in the literature were discussed, while the effectiveness of each was found to depend on the institutional as well as the policy and economic environment of the country. The various channels of transmission mechanisms at one time or the other have been relevant to the Nigerian economy. However, recent preliminary study indicated that the exchange rate channel was very strong in Nigeria between 1980 and 2005, while the interest rate and the credit channels were weak during the period. The experiences of other countries, such as Britain and South Africa show that a macro-economic model, incorporating as fully as possible the main channels of transmission mechanism should be developed in Nigeria to enhance the understanding of the monetary policy transmission process. Furthermore, with effective policy coordination and clarity of vision and policy objectives, it is possible to have a smooth transmission of monetary policy impulses to the real economy. We would like to conclude that understanding the channels of transmission of monetary policy is critical to the design and effective implementation of monetary policy in Nigeria.

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