NEAR EAST UNIVERSITY

The Graduate School of Social Sciences

Department of Economics

Monetary Policy and Economic Growth in Nigeria

In Accordance With the Regulations of the Graduate School of Social Science

MASTER THESIS

Umar AHMAD ABDULLAHI

Nicosia

(2014)

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DECLARATIONS

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results to this work.

Name, Surname: UMAR AHMAD ABDULLAHI

Signature:

Date:

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All praise is for Allah, lord of all that exists. Oh Allah, send prayers and salutations upon our beloved prophet Muhammad, his family, his companions and all those who follow his path until the last day.

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Dedicated to my loving family

ABSTRACT

Monetary policy variables have been used as policy tools to attain some specific macroeconomic goals. However, there are contention on the effectiveness and role of monetary policy on real variables such as economic growth and employment. Another issue of significant importance in monetary-growth studies is that of the choice of instrument of monetary policy variable. Most studies on monetary-growth nexus in Nigeria were at best theoretical and lack strong empirical support. Again, they are founded on weak and shaky econometric basis and model misspecifications. This study addresses these problems by investigating the impact of monetary policy on economic growth in Nigeria.

Using annual data from 1981-2012 and employing Vector Error Correction Technique, we find short run causal link between monetary policy and economic growth to be positive. In the long run, the result shows that monetary policy negatively impact on economic growth. Also, we find inflation, exchange rate and external reserve to promote growth in the short run, but have negative effect on economic growth in the long run.

Key word: Monetary policy, economic growth, vecm, Nigeria.

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LIST OF ABBREVIATIONS

CBN	Central BANK OF Nigeria
MPR	Monetary policy rate
RGDP	Real gross domestic product
INF	Inflation
ER	External reserve
REER	Real exchange rate
LRGDP	Log real gross domestic product
LER	Log external reserve
LREER	Log real exchange rate
GDP	Gross domestic product
VAR	Vector autoregressive
sVEC	Vector error correction
VECM	Vector error correction model
ECM	Error correction model
I(1)	Integrated of order one
I(0)	Integrated of order zero
AIC	Aikaike information criterion
SIC	Schwartz information criterion
SAP	Structural adjustment program
M1	Amount of money in circulation
M2	Money in circulation plus demand deposit
OMO	Open market operation

CHAPTER ONE

BACKGROUND OF THE STUDY

1.1Introduction

The history of monetary policy as an instrument for macroeconomic management in Nigeria can be dated back to the establishment of Central bank of Nigeria. Monetary policy can be defined as "the actions the monetary authority undertakes to affect the availability and cost of money and credit in the economy (Central Bank of Nigeria, 2010). This definition suggests two channels through which the monetary authority can influence the supply of money and credit. The first is through the growth of monetary base and the second is via interest rate relative to inflation (Labonte M. 2013). The goal of the monetary authority is either to ensure price stability, full employment, or equilibrium in balance of payment etc. Therefore, monetary authority will pursue policies that lead to the attainment of its statutory objectives. Monetary policy may also be defined as "the directives, policies, statements, and actions of the monetary authority that shape how the future is perceived because, the expectation of market participant is important to price determination and growth in the economy (Bhattacharya J. et al 2009).

It is argued that there is lag in transmission between monetary policy and its intended goal (Wen, Yi 2009). It is contested that the impact of monetary policy on real output and employment is only in the short run, while in the long run, its impact dissipates and results to inflationary pressure in the economy (Glick R. and Hutchison M. 2009). In the short run, most economies have systems of contracts that are difficult to adjust in the short time period, with respect to price and wages, in response to changes in monetary policies. Again, expectations are slow to adjust to long term impact of policy changes, which further adds rigidity to prices and wages. Therefore, changes in the growth of money and credit that changes the aggregate demand may have short run impact on real output and employment before the broader economy adjusts to policy changes. In the long run however, much of the changes in output and employment owing to monetary policy change will be reverse, so that the impact of policy changes is at best neutral in the long run.

Also, in the short run, the impact of monetary policy on real output and employment is dependent in part to the economy's full employment level. If an economy is near full employment level, an expansionary monetary policy is likely to disappear quickly through higher inflation, while in economy at far below the full employment level, the inflationary pressure as a result of expansionary monetary policy tend to be mild and has greater impact on real output (Lasaosa A. et al 2010).

There is shift in the choice of instrument of monetary policy. Most countries, especially developed countries are now relying more on interest rate as a tool of monetary policy, while the growth of monetary base is maintained at a constant rate (except in extraordinary times). This is so because, most of these economies are at full or near full employment level so that any discretionary expansionary monetary policy through increase in monetary base may result almost instantly to higher prices and leads to higher inflationary pressure in the economy. Interest rate adjustment affects the cost of credit so that there is lag in transmission. This lag occur as a result of the time frame needed for contracts and wages to be re-negotiated and to adjust, thereby, affecting growth in the short run.

Therefore, countries and monetary authorities must be cautious so as not promote higher inflation, through their policies, especially in the long run. The effect of monetary policy in an economy with high and very rapid inflation is often non-existent at best, if not negative. A low and stable rate of inflation promotes price transparency, leads to sounder economic decisions by economic agents (firms and household). This is the ultimate goal of monetary authority.

Nigeria provides us with unique opportunity here. This is particularly important because the economy is far below full employment level and second, because both instruments of monetary policy may be used to promote the growth rate of real output. It is important to note that there is significant information asymmetry between the monetary authority and the end users. Therefore, expansionary monetary policies, either by increasing the monetary base or through reducing the interest rate, may impact on growth in the meantime, before the wider economy may respond to policy change. Also, the rigidity in contracts and wages may take years to re-negotiate even with significant changes in monetary policies.

1.2 Statement of Research Problem

There are number of studies on monetary policy and growth in Nigeria. Yet, these studies suffer from a host of problems. First, most of the studies on monetary policy and growth in Nigeria were limited to theoretical analysis and/or review at best (Abata M. A. et al 2012). They have failed to empirically quantify the impact of monetary policy on growth. Therefore, without empirical test, we do not have sufficient basis to argue for the merit or otherwise, of policy change in Nigeria. Therefore, there is need for studies to address this problem. Our study hopes to fill this gap. Second, some studies have made attempt to empirically examine the impact of monetary policy on growth in Nigeria. Still, these studies are found to be with shortcomings, specifically, with respect to technique of estimation. For instance, the work by Onyeiwu, C. (2010), suffers from model misspecification. This is so because, when testing for unit root, he found the variables to be non-stationary in level but in differences. Nonetheless, when estimating the impact, the variables are specified in level forms, neglecting the order of integration in his estimation. Third, another clear limitation of previous studies is in term of choice of estimator. Abata et al (2012), employed OLS estimator in their study, albeit, discovering that all variables are integrated at higher orders. OLS may not be the best estimator in this regard. For example, in situation where the variables are found to be I(1), VECM may be better suited (if there is long run Co-integrating relationship) or VAR (if there is no long run relationship). Therefore, our study will correct this problem by choosing the most appropriate method of estimation.

Again, some of the studies juxtaposed variables that are highly correlated in a single model (Onyeiwu, C. 2012). This implies that their estimation may not be efficient and inconsistent at best. This is evidence by the presence of autocorrelation in their estimation and a very high R^2 and adjusted R^2 while most of the explanatory variables are found to be insignificant. One way to correct for serial autocorrelation is to use the lag or difference value of the explanatory variable. Therefore, our study will attempt to improve on this shortcoming.

Furthermore, in most previous studies, lag length selection is arbitrary (Azinne C. O. 2013). There are no clearly defined criteria or justifications for the selection of the optimal lag length. One possible way is to select the model with the lowest value of AIC (Aikaike Information Criterion) or SIC (Schwartz Information Criterion). Our study will look into it.

Final, most previous studies, either in due part to the wrong choice of estimator or due to lack of sound econometric background, have failed to separate the short run and long run effect of monetary policy on growth (Aigheyisi, O. S. 2011). Both economic theories and empirical experiences of other countries and studies have shown the impact of monetary policy on real output is time variant, so that there may be short run impact while in the long run, monetary policy may not matter to growth rate of real output. Hence, there is need for studies that seeks to remedy this shortcoming.

1.3Objectives of the Study

The main objective of this study is to develop a comprehensive analysis in order to assess the impact of monetary policy on economic growth in Nigeria.

The specific objectives of this study are

i) To assess the role of monetary policy on economic growth in Nigeria
ii) To determine both the short run and long run relationship that exist between monetary policy and economic growth
iii) To assess the current framework used by Central bank in conducting monetary policy in Nigeria

1.4Scope of the Study

This research work is a time series study, with data covering time period of thirty two years (32) that is 1981 to 2012, and it is solely focused on Nigeria. Therefore, our results and analysis may be limited to Nigeria alone. Caution must be taken when extending or applying our findings and policy prescription to other countries.

1.5 Organization of the Study

The rest of the work will be organized as follows: Chapter 2 is the monetary policy developments in Nigeria. Chapter 3 is the literature review. This section will discuss the theoretical background of the role of monetary policy on economic growth. It will also review empirical literatures on monetary policy and economic growth. Chapter 4 is the methodology and result presentation. This section will discuss the methodological aspect of our study and the results and analysis. It presents the economic results of our estimations and provides theoretical, empirical, and contemporary analysis of our findings. Chapter 5 is the summary and conclusion. This chapter summarizes the crux of our study and its major findings and conclusions. It will also recommend policy actions and identify gaps for future research works.

CHAPTER TWO

MONETARY POLICY DEVELOPMENTS IN NIGERIA

2.1 Introduction

The Central Bank of Nigeria (hereafter, CBN), defined monetary policy as the specific action "taken by the bank to regulate the value, supply and cost of money in the economy with a view to achieving predetermine macroeconomic goals" (CBN, 2011a). Like any other institution that manages monetary policies in developed and developing economies, it strives to accomplish stability in the price level via the money supply management. The understanding of the monetary policy knowledge is of paramount in realizing the relative relationship that exists between economic activity and the quantity of money supplied in an economy. When the supply of money is not stable to support the economic activities, the resultant effect will be either an increase or decrease in the price level. There are many factors that determine the supply of money in an economy. The central bank manipulates some of these factors while others are determined outside it boundary. The explicit objectives and importance of monetary policy may differ as economic activities and development in a country progresses over time.

The design in economic policy entails a series of approaches which can be used to evaluate the state of the economy and to specify the goals for achieving the set objectives. Hence, the path through which the 'initiation, analysis implementation and evaluation of policy in an economy is defined as a policy framework' (CBN, 2011c). Anyanwu et al (1997), refers macroeconomic policy to action taken by the government agencies responsible for the conduct of economic policy to achieve some desired objectives of policy through the manipulation of a set of variables. These variables are divided into two broad parts; target variable and instrumental variable. Target variables are the ones upon which government look for desirable values and are the immediate objectives of macroeconomic policy. The major target variables or goals are stability in the price level, sustainable economic growth, equitable distribution of income, full employment and, balance of payment equilibrium. On

the other hand, instrumental variables are the variables that the government can influence to realize its economic goal. They are necessarily exogenous variables as the government must be able to determine their values independently of the other variables in the system. Generally, as defined by Nnanna O. J. (2001), monetary policy is "a combination of measures designed to regulate the value, supply and cost of money in an economy in consonance with the expected level of economic activity".

In Nigeria, the monetary policy major objectives include the attainment of price stability and sustainable economic growth. To address these measures as a whole, the Nigerian experience was a mixed one and by definition, attainment of price stability in Nigeria is regarded to as a single-digit inflation rate on an annual basis (Nnanna, O. J. 2001). To pursue these objectives, the central bank acknowledges the presence of overlapping conflicts that calls for a trade-offs. These trade-offs are captured through the monetary policy targets. That is the operational target, the intermediate target and the ultimate targets (Ibeacbuchi, S. N. et al 2007). Thus, the central bank exert influence on the operating target since it has the power to control it directly to influence the immediate target that has influence on the final monetary policy objective. That is output and inflation. Also, in response to changes in macroeconomic conditions over the years, the bank has put in place a number of policy framework. Due to monetary policy lags, the CBN has moved from a short-term monetary policy framework (annual) to medium-term monetary policy framework (biennial) (CBN, 2011c). Monetary policy affects the economic and financial activities in our day-to-day activities. The effect or influence of these policies is felt via key macroeconomic measures which include the gross domestic product, interest rate and inflation. The promotion of output and price level from the short-term to medium-term involves several steps. The CBN is surrounded with the responsibility of estimating and forecasting on the performance of the economy in these periods and thereby comparing with the goals put in place to achieve the desired price level and output. If there appears a gap between the goals and the estimates, the CBN decides on how to act reasonably to close the gap. In trying to have a reasonable estimate of the economic conditions, the CBN looks at the most relevant economic developments such as government spending, economic

and financial conditions both home and abroad and the use of new technologies that increase productivity. These economic developments are then incorporated and measured in an economic model to see how growth is affected in the economy over time.

2.2 Conduct of Monetary Policy in Nigeria

The monetary policy process and practice is the sole duty of the Central Bank of Nigeria (CBN). The bank was founded in 1958 by the CBN act of 1958, though various amendments have taken place up to 2007. For instance, between 1968 and 1970, the bank power in terms of monetary policy management was shorten and kept under the supervisory watch of the finance ministry. The operational autonomy was brought back via the act of 1991 and later on, the amendment act of 1997 restored it back under finance ministry supervision (CBN, 2011c). This status was changed in 1998 act as amended and then strengthens with the CBN act in 2007. This 2007 amendment act gave the CBN the autonomous power to conduct monetary policy rules in line with the international best practice. Moreover, before the consolidation of banking sector activity that took place in 2005, some changes in the monetary policy framework have been witnessed in Nigeria. This ranges from era of exchange rate target regime to adoption of direct control, and to indirect monetary policy/post SAP era, and the shift from short-term of one year to a two year medium-term policy framework. The policy objectives over these periods were essentially unchanged and also, aggregates of money remained the immediate target for realizing the final objective of inflation. These changes where done in order to cope with the new developments in the financial arena (Ibeabuchi, S. N. et al 2007).

The management of monetary policy before the 1960 independence in Nigeria was dominated by the British economic developments. Exchange rate at that period serves as the tool for monetary policy. The Nigerian currency then is called pound and is fixed against British pound in relation to the economic situation at that time. The exchange rate fixing provides an efficient process in controlling inflation and maintenance of balance of payments position of the Nigerian economy. The devaluation of the British pound in 1967 terminated the fixed parity (CBN, 2011c).

The structure of the Nigerian economy in the 1970s witnessed remarkable changes that immensely affected the monetary policy. The discovery of oil gave rise to increase in the revenue generated by the oil sector resulted in the growth of the Nigerian external reserve which eliminated the balance of payment problem.The favourable growth in the external account led the authorities to considerably engage in public expenditure, thereby intensifying the inflationary pressure. This situation led the monetary authorities to support a new policy framework (monetary target) that will contain the inflationary pressure (CBN, 2011c).The negative price shock in the world oil market in the early 1980s resulted in a substantial reduction in export earnings that accrued to government. The aftermath of this, as depicted by Table 2.1below was huge and recurring fiscal deficits, balance of payments and debt crises, due to unsustainable huge public sector expenditure and lack of alternative source of export earnings.

Table 2.1: Growth Rates of Some Selected Variables in Nigeria 1981-2012

Year	Growth rate of import %	Growth rate of export %	Growth rate of government consuption expenditure %	Growth rate of GDP %
1981	2.4	-34	-8	-13
1984	-36.8	4.5	-17.4	-2
1987	26.7	84.2	-48.3	-10.3
1990	25	-9.2	2.5	12.8
1993	5.1	-7.9	10	2.4
1996	12.2	-4.9	-14.3	4.7
1999	-39.1	16.1	-51.9	0.53
2002	-8.9	-3.1	0	21.2
2005	10.2	11.3	4.5	6.6
2008	-12.7	25.4	23.1	6.2
2011	34.1	44	15.8	6.8
2012	-5.5	-17.4	3	6.5

Source: World Macroeconomic Research 2014.

From the above table it can be observed that growth rate of imports as at 1981 was 2.4% while the growth rate of export, government expenditure and GDP were all negative. In 1984, growth rate of exports was positive while growth rates of imports, government expenditure and GDP were negative. The reason for the negative growth rates of these

variables could be attributed to the dwindling revenue of Nigeria during the early 1980's. In 1987, both imports and exports improved while government expenditure and GDP were negative. In 1990, growth rates of imports, government expenditure and GDP were still positive while exports maintained a negative growth rate probably due to the activities of Niger Delta militants which reduced the crude oil production commonly known as the main exports good of Nigeria. This same trend was recorded in 1996.

In 1999, imports and government expenditure recorded a negative growth rate while exports and GDP recorded a positive growth rate. In 2002, both exports and imports recorded a negative growth rates while GDP recorded a positive growth rate. All variables could be seen to have a continuous positive growth rates with the exception of imports in 2008. In 2012, both imports and exports recorded a negative growth rates probably because of the insurgency in the Nigerian nation which could scare importers and exporters.

In an attempt to address the various macroeconomic problems in the economy, government adopted the demand management policy in 1982 when the problems were perceived as demand driven. In effect, various stabilisation measures were introduced. Such measures include imposition of tariffs and application of contradictory fiscal and monetary policies in order to reduce the level of aggregate demand and achieve fiscal and balance of payments equilibrium.

The overall balance of payments position which was negative between 1982 and 1984 became positive in 1985 period. All these have consequences for imports, savings and investment and growth particularly in developing countries such as Nigeria which depends heavily on imports for its capital goods and raw materials.The persistence of the macroeconomic problems in the economy even after the introduction of a number of stabilisation measures made the government to adopt the structural adjustment programme (SAP) in 1986. This was meant to further strengthening the existing demand management policies; restructure and diversify the productive base of the economy and reduce dependence on the oil sector and on imports; and to achieve fiscal and balance of payments viability, among other underlying objectives

Further, the SAP policy package includes trade and payment liberalisation which suggest that there was no serious balance of payments constraint during the period of implementation of SAP compared to what obtained before SAP. This is because there was absence of serious constraint on import demand, as a result of the implementation of trade liberalisation under SAP where the levels of both tariff and non-tariff barriers to trade were reduced. It should be noted that with the introduction of SAP in Nigeria, the procedures hitherto used in allocating foreign exchange and which consequently serve as a mechanism for controlling demand for foreign exchange was abolished. Thus, the foreign exchange market was deregulated. This policy aims at making foreign exchange available to whoever could afford the prevailing exchange rate.

2.3 The Short-Term Monetary Policy Regime (1986-2001)

Prolonged use on the direct instruments of monetary policy has had an adverse effect in the management of economic policies in Nigeria. The major problem faced by the CBN was lack of instrumental autonomy during the era, where policy issues on monetary aspect was been directly received from the finance ministry. Also, the downward fall in the crude oil prices from a barrel of $40 to $14 per barrel United State dollar within the early to mid-1980s resulted in a severe external sector imbalance. Hence, the Nigerian authorities resolve to shift its policy plan on money to a market oriented one in 1986. The idea is to have a free competitive market devoid of government intervention in the economic activities. This led to the adoption of the Structural Adjustment Programme (SAP) at that time as the demand for oil in the international market had crashed and coupled with the deteriorating economic condition in the country. The aim is to have a more vibrant and dynamic market for resource allocation which will bring back growth to the economy. Some reforms were put in place to achieve the target which include; deregulation of foreign exchange market, supporting appropriate price strategy in some part of the economy and public expenditure reorientation. With this development, and since the ultimate objectives of the monetary policy was not changed, expectations were high as the new policy will play a crucial role in the process of economic management. The one year or short term monetary plan was supported with a number of monetary goals. Open market operation continues to

be the main monetary instrument and the government treasury bills were used. The adoption of the SAP programme led to the addition of several measures to drive the growth in excess liquidity. The federal government in 1989 ordered the withdrawal of public sector account from commercial banks. Thus, immediately reduce the liquidity from the system but from 1999 the authorities changed the policy due to shift of retail banking from central bank to commercial banks. Foreign currency account deposit is no longer accepted as collateral to access loan in naira. Other policy measures introduced by the authorities include;

- Limitation in the amount of credit given by banks to some sectors in the economy.
- Deregulation in the rate of interest policy.
- Reintroducing the use of stabilization securities in 1990.
- Adjustment of cash reserve ratio.
- Banks were compelled to buy special government treasury bills.
- Enhancement in the deposit money banks' reserve requirements.

The introduction of SAP ushered-in a structural change regime in the system characterized as perfectly competitive market and it uses indirect instruments for monetary control. These structural changes encompass the liberalizations of key macroeconomic variables such as the interest rates, discount window operations, exchange rates and regulatory reforms. Consequently, the CBN relies on indirect techniques such as open market operations as the dominant instruments complimented by cash reserve requirement among others in the execution of its monetary programme. The surveillance activity by the bank is aimed at coherent management and a sound statement of financial position of the deposit money banks (CBN, 2011c).

2.4 Medium Term Era of Monetary Policy 2002

In an attempt to deal with the issue of time variance and temporary shocks to the economy, the CBN introduce a policy framework of two years term from 2002. This new framework which is on course is established due to the fact that significant time variance affects the final goal of monetary policy action. Under this framework, policy rules on money are

examined in every six month of the year in order to achieve medium to long-term monetary and financial market developments conditions. The main objective behind this policy since the commencement of this framework is to have single digit of inflation, exchange rate stability, employment and growth in the economy. The open market operation as the main tool of monetary policy is complimented by the short term funding of banks from the apex bank, reserve ratio, market for exchange rate and public sector injection/withdrawal of deposits from commercial banks. Also, attention was given to the finance sector for a better payment and competing system. The effective transmission of policies by the apex bank was not felt on the real sector only, but rather the new system of payments has ensured healthy and sound financial sector stability. There are some steps taken by the authorities in strengthening the deposit banks sectors of the economy to consolidate the policy and one of it is the amount of capital requirement as a basis for deposit money bank by the apex bank.

From 2005, the policy rule of 2004/2005 was modified view of the challenges faced. A 3% minus/plus close band of exchange rate was placed, public sector injection or withdrawal of deposits from commercial banks and cash ratio requirements were placed on two weeks advance. These policy modifications have had a positive influence on the aggregates of money and to a large extent a balanced budget was attained in the economy during the period. GDP growth increased substantially which exceeds the set targets in 2003-2005 and inflationary outcome was 10 per cent as against the target of 11.57% as shown in the *Table 2.1* below. The outcomes from inflation and GDP growth in 2006 to 2007 were closest to their targets when compared with the previous years. Moreover, from 2008 to 2012, inflation outcome rises to 15% and later on drop down to 12% as against the targets of 9% to 9.50% over the period reviewed. This was due to the global financial crises that happen at that period coupled with some ease in monetary policies put by the CBN. This includes the suspension of open market operation from September 2008 to September 2010, and a cut of 10.25% monetary policy rate down to 6.0%. Also, fiscal expenditure by the government contributed to the surge in inflation as can be observed in the 2012 budget, where over 70% of the budget was allocated to recurrent expenditure. But some of the

measures taken by the CBN were similar to the ones taken by central bankers worldwide to allow the financial system to recover from the global financial crises of 2008.

Table 2.2: Key Policy Variables (% except otherwise stated)

Year		M2	M1	Agg. Credit to the Economy	Net Credit to Govt.	Net Credit to private Sector	Inflation	Real GDP Growth
2002	Target	15.30	12.40	57.90	96.60	34.90	9.30	5.00
	Outcome	21.55	15.86	56.59	6,320.55	11.79	12.17	4.63
2003	Target	15.00	13.80	25.70	-150.30	32.30	9.00	5.00
	Outcome	24.11	29.52	35.70	58.43	26.81	23.81	9.57
2004	Target	15.00	10.80	22.50	29.90	22.00	10.00	5.00
	Outcome	14.02	8.58	11.99	-17.94	26.61	10.01	6.58
2005	Target	15.0	11.40	22.50	-10.90	22.00	10.00	5.00
	Outcome	24.35	29.7	14.51	-36.99	30.82	11.57	6.51
2006	Target	27.00	-	-72.30	-	30.00	9.0	7.00
	Outcome	43.09	32.18	-69.13	-732.81	32.06	9.0	6.03
2007	Target	24.10	-	-29.90	-	30.00	9.00	10.00
	Outcome	44.80	37.63	279.57	-22.30	91.62	6.56	6.45
2008	Target	45.00	-	66.00	-54.57	54.70	9.00	7.50
	Outcome	57.88	56.07	84.20	-31.21	59.49	15.06	5.98
2009	Target	20.80	32.20	87.00	21.90	45.00	9.00	5.00
	Outcome	17.07	2.41	58.55	25.92	26.15	13.93	6.96
2010	Target	29.25	22.40	51.40	51.36	31.54	11.20	6.10
	Outcome	6.91	11.05	10.00	51.27	-3.81	11.80	7.98
2011	Target	13.75	-	27.69	29.29	23.34	44.28	7.40
	Outcome	15.43	21.54	57.16	55.71	44.28	10.30	7.43
2012	Target	24.64	-	52.17	61.47	47.50	9.50	7.30
	Outcome	16.39	9.59	-7.22	-393.81	6.83	12.00	6.58

Source: CBN Statistical Bulletin 2012.

The CBN was able to achieve the policy targets owing to the pro-active implementation of sound monetary policies, including zero tolerance on government borrowing from the central bank, increased coordination between the bank and the fiscal authorities, aggressive liquidity mop-up operations-frequent OMO sales supported by discount window operation, restructuring of debt instruments into longer tenor debts, increased deregulation of forex market and occasional forex swap. Consequently, these reforms from the monetary point of view of financial system, a key component of which was banking consolidation, was

intended to minimize macroeconomic instability arising from banking systemic distress; deepen capital market; minimize the counterfactual shocks of creating distortions in the money market and financial system; encourage investment inflows through effective participation of the industry in the global financial system among others. The banks now have the potentials of financing large investment transactions as single obligator limits have increased, while regulation and supervision have become more effective given that ownership has been diluted with more regulators having the legal authority to oversee them. The CBN now can focus on a fewer number of banks for effective supervision and zero tolerance towards infractions, and improved corporate governance as greater transparency is being enforced and deployment of IT infrastructure (eFASS and RTGS) has significantly help the system (Ibeabuchi, S. N. et al 2007).

Consequently, with the recent developments in the Nigerian economic conditions, particularly in the financial sector, it became imperative for the authorities to review the conduct of monetary policy and strengthen the machinery of monetary policy to achieve the set targets coupled with the fact that the objectives remained unchanged. Specific focus was on the relationship between the minimum rediscount rate (MRR) and other rates in the market that became weak and the significance of using the MRR as the anchor for other short-term interest rates was eroded. Therefore, in December 2006, the CBN introduced a policy framework with the objectives of addressing the persistent interest rate volatility and making the money market more responsive to monetary policy interest rate changes, especially the overnight interbank interest rate. Hence, the interest rate volatility containment was to be addressed through the application of some policy measures including averaging of reserve requirements over a maintenance period of two weeks, and the use of standing lending and deposit facilities to define an interest rate corridor around the monetary policy rate (MPR) which would drive interest rate in the money market. The standing lending facility provides access to liquidity for participants in the Real Time Gross Settlement System (RTGS), on an overnight basis, to assist them square-up their short positions in the interbank market and ensure the smooth operation of the market. The standing deposit facility on the other hand, provides an investment outlet for the surplus

reserves of operators in the RTGS, thereby increasing the incentives for resource mobilization.

The CBN standing facilities (Lending and Deposit Facilities) which constitute the hub of the new monetary policy implementation framework were designed to achieve interbank rate stability by influencing the short term money market rates. Hence, they provide the financial valves for absorbing surplus funds and injecting overnight funds on a lender of last resort basis. There is also the use of Repurchase Agreements (Repos). They are temporary purchases (repos) and sales (reverse repos) of eligible securities by the Bank to either supply or withdraw liquidity and ensure a healthy interbank market and curtail interest rate volatility. Repo transactions enable the Bank to provide temporary liquidity to needy operators in the discount window on a collateralized basis to ensure the smooth operations of the interbank market on a continuous basis. The transactions (repos and reverse repos) are usually between one to seven days executed between the Bank and any of the operators in the discount window. Under a repo agreement, CBN injects domestic currency against the purchase of a domestic asset through a contract specifying the resale at a given price at a future date (the repurchase rate). Reverse repo on the other hand, is the opposite of the repurchase agreement that result in the injection of liquidity into the system. This provides operators in the money market with excess reserves to invest through the discount window at an agreed interest rate. Thus, helps to influence the interbank interest rate from falling to unduly low levels in the period of liquidity surfeit in the banking system. In this agreement, CBN sells funds as assets against domestic currency, temporarily withdrawing liquidity, but enters into an agreement to buy back the asset at a future date. But from September 2008, the tenor of repos was extended to 365 days, due to the concerns on the impact of the global financial crises and the CBN's policy rate is applied to all these transactions.

The medium term monetary policy framework outcome has been mixed over the period. The excessive fiscal operations of the government had led to the growth in monetary aggregate to exceed the target with substantial margin and also, inflationary rate was mixed as it remained single digit in 2006 and 2007 but reverted to double digits in 2008 due to the

global food shortages and financial crises (CBN, 2011c). Thus, the effectiveness of monetary policy has improved progressively over the years in Nigeria. It begins basically under the control of the British colonial era (pre-independence) to the time of independence, through periods of economic crises and the use of unconventional policy instruments. And over the last decade, the monetary policy tools have significantly improved in accordance with the international best practices resulting in more effective monetary policy.

CHAPTER THREE

MONETARY POLICY AND ECONOMIC GROWTH

3.1 Introduction

This chapter focuses on the theoretical and empirical literature related to monetary policy and economic growth. The aim of the theoretical literature is to review related theories about monetary policy and economic growth. This chapter will also discuss monetary policy and the process of the monetary policy transmission mechanism (MPTM). Other sections of the chapter are organised as: Section 3.2 discusses Theories on monetary policy and the processes in the policy transmission mechanism (MPTM). Sections 3.4 review some empirical literatures from developed and developing economies.

3.2 Theoretical Literature

3.2.1 Classical View on the Role of Money

The classical theory is based on the assertion that all markets in a capitalist society clear and that prices are flexible to ensure automatic adjustment back to the equilibriium. According to this doctrine, a cahnge in money supply does not affect real variables like output, employment and income. Money is therefore considered neutral in the economy. The classical view is based on the quantity theory of money.

$$MV=PY \quad \text{……...……..3.1}$$

Where:

M= money supply

V= velocity of money

P= price level

Y= output

According to this school of thought, money supply (M) does not have any impact on real output (Y) but that its impacts is on the price level (P) only (Jinghan 2009).

3.2.2 Keynesian View

The Keynesian theory is based on the assumption that prices are sticky and therefore markets do not clear on their own. They assert that a nation could remain in low output and unemployment without the invisible hands guiding the economy back to full employment level of output. The traditional Keynesian view of the IS-LM model of the monetary policy transmission mechanism states that expansion in money supply leads to a fall in interest rate, thereby causing investment to rise and consequently a rise in output. This can be characterized by the following schematic showing the effects of monetary expansion:

$M\uparrow \ldots\ldots\ ir\downarrow \ldots..\ I\uparrow \ldots..\ Y\uparrow$

Which indicates that an expansionary monetary policy leads to a fall in interest rate which in turn lowers the cost of capital, causing investment spending to rise, thereby leading to an increase in the aggregate demand and a rise in output .

The keynesian transmission mechanism therefore starts from the permise that money and certain marketable fixed income securities (bonds) are close substitutes. He further states that if a difference exist between the desired and actual money balances, individuals try to dispose the excess money balance by buying bonds which help increase investment, aggregate demand and hence output (Jinghan 2010).

3.2.3 Monetarist View

The monetarists posit that changes in money supply could affect the level of economic activity in both the real and nominal terms. Unlike keynes, Friedman's view is based on the premise that money is not just a close substitute for a small class of assets but rather a substitute for a large spectrum of financial assets and even non-financial assets such as securities, durable and semi-durable goods and services etc

$$M^d/P = f(y_p,\ r_b\text{-}r_m,\ r_e\text{-}r_m,\ \pi_e\text{-}r_m)\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.2$$

Where:

M^d/P= demand for real money balances

y_p= individual wealth which corresponds to permanent income

r_b= expected returns on bonds

r_m= expected returns on money

r_e= expected returns on equities

π_e= expected inflation

Expected inflation represents the returns on holding goods. This last element is the distinctive relationship Friedman adds, that agents hold durable goods as assets and will substitute them for money if they expect price inflation (i.e capital gains on holding goods). This is the heart of the monetarists tranmission channel.

Friedman uses his restatement to elaborate upon Keynes theory of liquidity preference. He posits that excess money holding is not applied to the purchase of interest-bearing assets only but also consumer goods too. This is because consumer durable and semi-durable goods are also store of wealth too. That is, if the portfolio disequilibrium is disposed of in the purchase of consumer goods, there will be direct impact on aggregate demand and thus output (Palley 2001).

3.2.4 New Classical View

This school of thought arose in rsponse to stagflation of the 1970s. Just like the classicals, they assume that all markets clear in a free market economy and therefore there is no possibility of involuntary unemployment in the economy. In other words, the economy is always at full employment level since wages and prices are flexible. The only difference between classicals and new classicals is that new classicals assume that all agents are rational. Decisions taken by workers and firms reflect optimizing behaviour on their part

and the supply of labour or output by workers or firms depend up on relative prices. The new classicals assert that since agents are rational, monetary policy is ineffective. It is only an unexpected change in monetary policy that can affect output and employment.

3.3 Monetary Policy Channels of Transmission Mechanism

According to Mishkin (1996), the main channels of monetary policy transmission mechanism are:

3.3.1 Interest Rate Channel

This channel is otherwise seen as the basic Keynesian IS-LM model which has been a mainstay of teaching in macroeconomics. The interest rate channel can be represented using the following scheme;

$$M\uparrow \ldots\ldots\ ir\downarrow \ldots\ldots\ I\uparrow \ldots\ldots\ Y\uparrow$$

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

3.3.2 The Credit Channel

The credit channel of monetary policy transmission is an indirect amplification mechanism that works in tandem with the interest rate channel. The credit channel is therefore not a distinct, free-standing alternative to the traditional monetary policy transmission mechanism but rather as a set of factors that amplify and propagate the conventional interest rate channel (Bernanke, S. and Gertler, M. 1995).

The credit channel is divided into two: Bank lending and Balance sheet channel.

3.3.2.1 Banklending Channel

The basic idea underlying this channel is that banks play special role in financial system by mobilizing deposits as well as granting loans for which few close substitutes exists.

M↑ ….. Deposits in Banks↑….. Loans in Banks↑ ….I↑ …..Y↑

The scheme above depicts that as a result of expansionary monetary policy, bank deposits increases leading to more loans granted by banks to firms which lead to more investment and subsequently growth in output.

3.3.2.2 Balance Sheet Channel

The balance sheet channel theorises postulate that the size of the external finance premium should be inversely related to the borrower's net worth. Therefore, higher net worth agents may have more collateral to put up against the funds they need and thus are closer to being fully collaterised than low net worth agents. As a result, lenders assume less risk when lending to high net worth agents and agency costs are lower. The cost of raising external funds should therefore be lower for high net worth agents. Since the quality of borrowers financial position affect the terms of their credit, changes in financial position should result to changes in their investment decisions.

M↑ …. Loans↑ …….I↑ …..Y↑

The scheme above shows how changes in monetary policy affect credit worthiness of household/firms leading to increase in loans given to them. Increase in loans leads firms and households to increase investment and expenditures which also lead to increase in output.

3.3.3 Asset Price Channel

This theory works through the wealth effect on consumption and is derived from the Life cycle Model of Modigliani, where consumption expenditure is a function of the resources accumulated over lifetime and these resources consist of human capital, real capital and savings. An expansionary monetary policy will raise the supply of money, making public richer, and so they try to decrease their liquidity holding through increasing expenses. An important element of household savings is equities and when their prices increase, the value of savings rises, thereby boosting the lifetime resources of households as well as increasing their consumption spending.

M↑……. P_e↑…… Wealth↑….. Consumption↑…… Y↑

The above scheme depicts how expansionary monetary policy increases price of equities which makes public to feel wealthier and they tend to increase expenses on consumption and hence aggregate output.

3.3.4 Exchange Rate Channel

This channel involves the interest rate effects because when domestic real interest rate falls, domestic currency becomes less attractive relative to foreign currencies leading to a fall in the value of domestic currency relative to the foreign currency. The lower value of the domestic currency makes domestic goods cheaper than foreign goods thereby causing a rise in net exports and hence aggregate output.

M↑…..ir↓ …….E↑ …… NX↑ …..Y↑

The above scheme shows how expansionary monetary policy leads to a fall in the domestic interest rate which makes exchange rate to increase. This makes the foreign currency more attractive relative to domestic currency and this leads to increased net export and hence aggregate output.

3.4 Monetary Policy Instruments

The eventual purpose of monetary policy is to achieve certain national goals via the use of economic variables which are referred to as "goals" or as "ultimate goals" of monetary policy (Handa, J. 2009). Achieving these goals involves the use of monetary policy instruments which are divided broadly into two: direct and indirect instruments. Some of the direct instruments of monetary policy are;

- Selective credit control which involves the imposition of quantitative ceilings on the overall and/or sectorial distribution of credit by the central bank. This could also take the form of imposition of ceilings on deposits in which case, a limit is set on the amount of (for instance, foreign currencies) an individual or organization can deposit into a bank account.
- Direct regulation on interest rate which involves fixing of deposit and lending rates ranging within which banks are expected to charge.

- Moral suasions which refers to situations whereby the central bank resorts to subtle appeals to banks through bank committee and other communication channels to briefly correct, compel and give guidelines to commercial banking operators.

While on the other hand, the indirect instruments also called the market weapons include;

- Open market operations (OMO). It involves the sale or purchase of treasury bills or government securities with the aim of controlling the base money or its components which in turn influences deposit money banks' reserve balance.
- Reserve requirement. This is the minimum amount of eligible liquid asset that commercial banks must hold in proportion of total deposit liabilities. It is designed purposely to protect customers' deposits by ensuring some minimum level of bank liquidity.
- Discount rates. The interest rate at which future receipts or payments are discounted to find their present value. That is the price paid by the owner of securities to the central bank for converting the securities into cash. It is designed to influence the cost and availability of credit and hence, the supply of money in the economy. The ability of the central bank to apply this policy was derived from its role as the lender of last resort (Ibeabuchi, S. N. et al 2007).

Therefore, in selecting of these monetary policy instruments, the central banks adopt different policy strategies to attain the desired target that will promote economic growth. These different strategies affect the operating, intermediate and ultimate targets or goals through series of avenues. They include monetary targeting, interest rate targeting, nominal gross domestic product or output targeting, exchange rate targeting and inflationary targeting. The table below (table 3.1) illustrate a rough design on the roles and sequence of the various monetary policy variables.

Table 3.1: Monetary Policy Tools, Target and Goals

Policy Instruments	Operating targets	Intermediate targets	Goals
Open-market operations Discount rate Reserve requirements	Short term interest rates Reserve aggregates (Monetary base, reserve, non-borrowed reserve, etc.)	Monetary aggregates (M1, M2, etc.) Interest rates (short and long term) Aggregate demand	Low unemployment rate Low inflationary rate Financial market stability Exchange rate

Source: Handa (2009:309).

The central bank uses it policy instruments to upset the operating target variables. This is done with the intension to exert influence on the intermediate targets which are the final ones of the financial system, in order to achieve it desired goals. There are certain issues that arise within the interactions of these variables in relation to the achievement of monetary policy target. The first concerns the existence or otherwise of stable and predictable relationships between the ultimate goal variables, intermediate variables and operating targets. The second concerns whether the monetary authorities can actually achieved the desired level of the operating targets with the instruments at their disposal. And the third has to do with the lag structure (short or long term) of the relationships with the implication that prediction of the future course of the economy will be increasingly less precise in the presence of long lags (Handa, J. 2009:309:10).

The monetary authorities in Nigeria while setting the operating target (base money) and the intermediate target (broad money) obtain an ex ante monetary survey (a consolidated balance sheet of the banking system, i.e., central bank and deposit money banks) which may or may not be consistent with the desired growth in money supply. Hence, financial programming is used to determine the optimal money supply that is consistent with the predetermined ultimate targets. Thus, the framework is based on the quantity theory of money and the money supply process.

$$MV=PY \qquad (3.7)$$

Where M is the stock of money and the market value of output that it finances PY, P is the price level and Y is the output. M is related to P with a velocity of money, V. Generally,

monetary authorities are faced with the challenge in chosen between monetary aggregates and interest rates which are mainly the two intermediate targets. And this depends on the policy objective of the monetary authorities, the structure of the economy and, to a lesser extent, the source of exogenous shocks to the economy (CBN, 2011c).

The Nigerian monetary policy strategy entails modifying the amount of base money (M1) in circulation. This process of changing base money through the sale and purchase of government securities is called open market operations. Continuous market transactions by the authorities change the supply of money that affects other variables in the market such as short term interest and exchange rates. Consequently, the difference between the various strategies involved lies primarily with the set of instruments, targets and variables that are used by the monetary authorities to achieve the desired goals. Table 3.2 below shows how the monetary authorities in Nigeria classify it target strategy.

Table 3.2: Strategies of Monetary Policy in Nigeria

Monetary Policy Strategy	Target Variable	Long Term Objective
Monetary Targeting	Growth in money supply	A given rate change in CPI
Price level Targeting	Interest rate on overnight debt	A specific CPI
Inflation Targeting	Interest rate on overnight debt	A given rate/band of inflation
Fixed Exchange Rate	Spot price of the currency	A given rate of change in CPI

Source: CBN, 2011

The authorities' strategy under the monetary targeting framework is the growth in the money supply which is anchored to achieve the long-term objective of price stability. In order to predict the growth in the future size of money supply and to avoid inflationary pressure, the CBN monitors closely the growth in monetary aggregates. Thus, help the CBN in deciding whether to halt growth in money supply or to raise interest rates. This approach focused on monetary quantities rather than price signal. The price level targeting on the other hand is similar to inflation targeting in that both establish targets for a price index like the CPI. While price level targeting takes account of past years when conducting open market operations, the inflationary targeting only looks forward with a 2% inflation

target per year. Therefore, from a theoretical base of 100 to 102 where price level rose by 2% in the previous year, a drop in the price level of next year would be necessary to bring back the price down to the 100 target level. This implies that more forceful actions needs to be taken than would be required in if inflation targeting were used. Generally, price level targeting is considered as a risky policy stance which is not used by many central banks. In the short-run, price level target brings more variability in inflation and employment as compared to inflation targeting. Looking at the inflation targeting strategy approach by the central bank, it estimates and makes public a projected or target inflation rate and then attempt to steer actual inflation towards the target through the use of interest rate changes and other monetary tools. Under this inflation target, the authorities are more transparent in raising or reducing the policy rates. Thus, if inflation is above the target, the central bank is likely to raise the policy rate. And if inflation is below the target, the central bank is likely to lower the policy rate. Hence, investors can easily figure out the expected changes in the interest rate since they knew the targeted inflationary rate in the system. Advocates of inflation targeting regarded this as leading to increased economic stability. And on the exchange rate targeting, the central bank fixed the value of its currency in relation to another currency or a basket of currencies. This policy can be used as a means to control inflation facilitates trade between countries and it encourages small economies where external trade forms a large part of their GDP. However, as the reference value rises and falls, so does the currency pegged to it (CBN, 2011c).

3.5 Factors Influencing Monetary Policy

According to Anyanwu (2003) a number of variables or aggregates have tended to influence the monetary policy. These variables are:

3.5.1 Economic Stability:

For the main thrust of monetary policy to be fully implementable, there should be macroeconomic stability otherwise a lot of distortions and lapses will make the targets unrealizable.

3.5.2 Financial Market Efficiency:

A special ingredient for the monetary policy effectiveness is the money market segment. Inflation: The scope or magnitude of the inflationary trends in the economy goes a long way to influence the monetary policy. With high inflationary rate, the price stability, exchange rate stability and balance of payments position will not be fully realized.

3.6Empirical Literature Review on Monetary Policy and Economic Growth in Nigeria.

The strength of a theory either economic or otherwise is tested by its behaviour when subjected to empirical analysis. Quite a number of studies have attempted to empirically examine the effect of monetary policy on economic growth in Nigeria. These includes the work ofOlusanya, S. O. and Matthew, A. O. (2012) in their paper "Analysis of causality between monetary policy and economic growth in pre- and post-deregulated Nigerian economy (1970-2009)" used Granger causality test to appraise the relationship between GDP and interest rate, to also determine the effect of money supply on GDP and to analyse the effect of exchange rate on GDP and the result showed that there is a one-way relationship between money supply and economic growth (GDP).

Onyeiwo Charles (2012), in his paper "Monetary policy and economic growth in Nigeria" using OLS data from 1981-2008 to examines the impact of monetary policy on the Nigerian economy found out that money supply exerts positive impact on GDP growth and balance of payment but a negative impact on the rate of inflation.

Fasanya, I. O. Onakoya, A. B. and Agboluaje M. A. (2013) in their paper "Does monetary policy influence economic growth in Nigeria?" used ECM. Time series data covering from 1975-2010 to examines the effectiveness of monetary policy on economic growth in Nigeria found out that Monetary policy has significant influence on economic growth.

Chuku, A. Chuku (2009), in his paper "Measuring the effect of monetary policy innovations in Nigeria: A structural vector autoregressive approach" to identify the effect of monetary policy shocks on output and prices in Nigeria found out that monetary policy innovations carried out on the quantity-based nominal anchor (M2) has modest effect on

output with a very fast speed of adjustment. While innovations on price-based nominal anchor (MRR & REER) have neutral and fleeting effect on output.

Udah, E. B. (2009), in his paper "A dynamic macroeconomic model of the Nigerian economy with emphasis on the monetary sector" using Co-integration, error correction model, OLS and Simulation to investigate how monetary variables affect various sub-sector of the Nigerian economy the result showed that interest rate, credit to private sector and technology are the factors responsible for the growth of production in Nigeria.

Akujuobi, L. E. (2010) in his paper "Monetary policy and Nigeria's economic development" used OLS to assess the impact of monetary policy on the economic growth of Nigeria and the result showed that monetary policy instrument are significant in impacting on the economic growth of Nigeria.

Chukuigwe C.E and Abili I. D (2008) in their paper "An econometric analysis of the impact of fiscal and monetary policies on non-oil export in Nigeria" used OLS to determine the impact of fiscal and monetary policies on non-oil export and the result shows that monetary policy instruments are significant in impacting on the economic growth of Nigeria.

Sanni, M. R., Amusa N. A. and Agbeyangi, B.A (2012) in their paper "Potency of monetary and fiscal instruments on economic activities of Nigeria" used ECM, Johansen cointegration and granger Causality to examine the use of fiscal and monetary policies in controlling economic activities in Nigeria. The result showed that monetary policy instrument exerts more on economic activities than fiscal policy instrument.

Datimi A, Nwosa P.I and Olaiya S.A. (2011) in their paper "An appraisal of monetary policy and its effect on macroeconomic stabilization in Nigeria" using OLS and Johansen cointegration to examine the relationship between monetary policy and macroeconomic variables, found out that Monetary policy had a significant effect on Exchange rate and money supply while it has not been effective in achieving price stability.

In a paper titled "Empirical analysis of the effect of monetary policy innovations on stabilization of commodity prices in Nigeria". Okwu, A. T., Obiakor, R. T. and Falaiye, O. B. (2011) used OLS to examines the effects of monetary policy innovations on stabilization

of commodity prices in Nigeria and the results shows that positive relationship exist between monetary policy and commodity prices.

Aigheyisi, O. S. (2011), in his paper "Examining the relative effectiveness of monetary and fiscal policy in Nigeria: A cointegration and error correction approach" using cointegration and error correction model try to examine the relative effectiveness of monetary and fiscal policy in Nigeria and the result show that positive impact exist more significantly on monetary policy action than on fiscal policy on economic activities.

Onuorah, A. C. and Ebiringa, O. T. (2012) in their paper "Impact of monetary factors on Nigeria's economic growth" used cumulative density function, PP Test and Granger causality to study the effect of monetary factors on Nigeria's economic growth and the result show that there is a significant relationship between money supply, foreign exchange rate and economic growth in Nigeria.

Adesoye, A. B., Maku, O. A. and Atanda, A. A. (2012) in their paper "Is monetary policy a growth stimulant in Nigeria? A vector autoregressive approach" used VAR, Johansen multivariate cointegration test, Granger-causality test. The result show that growth rate of real output is not a leading indicator for any monetary variable.

Ogunmuyiwa, M. S. and Ekone, A. F. (2010) in their paper "Money supply – Economic growth nexus in Nigeria" used OLS, Causality Test and ECM to investigate the impact of money supply on economic growth in Nigeria (1980-2006). The result reveals that although money supply is positively related to growth but the result is however insignificant in the case of GDP growth rates on the choice between contractionary and expansionary money supply.

Kumar, S., Webber, D. J. and Fargher, S. (2013) in their paper "Money demand stability: A case study of Nigeria" used Structural change method, Cointegration to empirically investigate into the demand for Nigerian real narrow money (M1) from 1960 to 2008 in an attempt to identify whether the CBN were right to adopt the new monetary policy framework. The findings favour the use of supply of money as an instrument of monetary policy, thus lending limited support for the new monetary policy framework.

Omanukwue, P. O. (2010), used Engle-Granger two-stage test for cointegration in her paper "the quantity theory of money: Evidence from Nigeria" to examine the quantity theory of money from Nigeria. The results indicate that monetary aggregates still contain significant, albeit weakening information about developments in core prices in Nigeria.

Adeolu, A. M., Sunday, K. J. and Abike, B. S. (2012), in their paper "Fiscal/Monetary policy and economic growth in Nigeria: A theoretical exploration" investigates the impact of fiscal policy variables on economic growth in Nigeria and found out that there exist a mild long run equilibrium relationship between economic growth and fiscal variables in Nigeria.

Sunday, O. (2013), in his paper titled "Impact of monetary policy on Nigerian economic growth" used cointegration and error correction model to examine the impact of monetary policy on economic growth from 1970 to 2010. Evidence shows the existence of a long run equilibrium relationship and that interest and inflation were negatively correlated with GDP while money supply, exchange rate and credit to the economy are positively related to GDP.

In a paper titled "The impact of monetary policy on Nigeria's macroeconomic stability". Nenbee, S. G. and Madume, J.V. (2011) used cointegation and error correction model to investigate the impact of monetary policy on Nigeria's macroeconomic stability. The finding reveals that only 47% of the total variations in the model are caused by the monetary policy variables in the long-run.

The Table below (Table 3.1) depicts a summary of the empirical studies of "the relationship between monetary policy and economic growth". The empirical evidence remains inconclusive, as there are basically three stances in the literatures;

First, there are those that show positive relationship between monetary policy and economic growth and one of the interesting aspects of this finding is that, the evidence reflects the experience in both developed and emerging economies. They include the works of Charles O. (2012), Onakoya, A. Fasanya, I. and, Agboluaje M. (2013), Adeolu, A. M. Sunday, K. J. and Abike, B. S. (2012), among others. Other works are the works of Eze, L.

A. (2010).,Rotimi M.S, Adebayo N. A and Adisa B.A (2012).,Datimi A, Nwosa P.I and Olaiya S.A.(2011),Okwu, A., Obiakor, R. and Falaiye, O. (2011)., Scott, A. O (2011), Onuorah, A. C. and Ebiringa, O. T. (2012),. The rest are the works of Ogunmuyiwa, M. and Ekone, F. (2010)., Omanukwue, P. O. (2010).,Sunday, O. A. (2013)., Olusanya, S. O. and Matthew, A. O. (2012).

Second, the works of Udah, E. B. (2009) and Chukuigwe C.E and Abili I. D (2008), reveals a negative impact of money policy on growth in the economy.

Third, the last direction of the empirical works shows that policy rules on money has no effect on growth in the economy as can be seen in the work of Chuku, A. Chuku (2009)., Maku, A., Adesoye, B., and Atanda, A. (2012). Others are Nenbee, S. G. and Madume, J. V. (2011)., and Kumar, S., Webber, D. and Fargher, S. (2013).

From the above empirical studies reviewed, an observation was made that some researchers tried in the past to examine the effectiveness of monetary policy on the Nigerian economy, but none has shown an accurate long run effect of monetary policy instruments on the Nigerian economy. In some of the studies reviewed test for unit root to ascertain the validity of the variables was not employed, and in others some variables that are critical to the effectiveness of macroeconomic model designed to determine the amount of desired effect of monetary policy such as interest rate were omitted. Either because of their inability to utilize the necessary variables in their model or ability to apply the correct econometric method in their test is lacking. It is in the above view that, this research work tries to bridge the gap overlooked by the previous researchers, by including some of the necessary variables not included by some of the previous researchers and also performing some important econometric tests that have been ignored by the previous researchers. Thus, it helps in ascertaining the accurate long run effect of monetary policy instruments on Nigerian economic growth.

Table 3.3: Summary of Previous Studies

Authors Name	Country	Methodology/ Sample	Results
Charles Onyeiwo (2012)	Nigeria	OLS/ 1981 to 2008.	Positive impact
"Fasanya, I. O. Onakoya, A. B. and Agboluaje M. A. (2013)"	Nigeria	ECM. Time series data from 1975 to 2010	Positive impact
Adeolu, A. M. Sunday, K. J. and Abike, B. S. (2012)	Nigeria	Theoretical review of policies from 1998 to 2012	Positive impact
"Chuku, A. Chuku (2009)".	Nigeria	SVAR model/1986: Q1 to 2008: Q4.	No impact
"Udah, E. B. (2009)".	Nigerian	Cointegration, ECM and Simulation/1970 to 2004.	Negative impact
Akujuobi, L. E. (2010)	Nigeria	OLS/1986 to 2007	Positive impact
"Chukuigwe C.E and Abili I. D (2008)"	Nigeria	OLS/1974 to 2003	Negative impact
Sanni, M. R., Amusa N. A. and Agbeyangi, B.A (2012)	Nigeria	ECM/1960 to 2011	Positive impact
Datimi A, Nwosa P.I and Olaiya S.A.(2011)	Nigeria	OLS/1986 to 2009	Positive impact
"Okwu, A., Obiakor, R. and Falaiye, O. (2011)".	Nigeria	OLS/1995 to 2009	Positive impact
Aigheyisi. O. S. (2011).	Nigeria	Cointegration and ECM/1981 to 2009	Positive impact
Onuorah, A. C. and Ebiringa, O. T. (2012)	Nigeria	Cumulative density function, PP Test and Granger causality/1981 to 2010	Positive impact
Adesoye, B., Maku, A. and Atanda, A. (2012)	Nigeria	VAR model/1970 to 2007	No impact
Nenbee, S. G. and Madume, J. V. (2011)	Nigeria	Cointegration, ECM/1970 to 2009	No impact
"Ogunmuyiwa, M. and Ekone, A. (2010)"	Nigeria	ECM/1980 to 2006	Positive impact
"Kumar, S., Webber, D. and Fargher, S. (2013)".	Nigeria	Structural change method, Cointegration/1960 to 2008	No impact
Omanukwue, P. (2010)	Nigeria	Engle-Granger two-stage test for cointegration/1990: Q1 to 2001: Q4	Positive impact
Sunday, O. (2013)	Nigeria	ECM/1970 to 2010	Positive impact
Olusanya, S. O. and Matthew, A. O. (2012).	Nigerian	Granger causality test/1970 to 2009	Positive impact

Source: Authors compilation

CHAPTER FOUR

METHODOLOGY AND DATA ANALYSIS

4.1 Introduction

This chapter explains the steps involved in the empirical analyses to be used. It is in the methodology that step by step procedures and processes of achieving the objective of the work are discussed.

4.2 Variables and Data

Time series data will be applied in the conduct of the research work and the variables to be used are real gross domestic product, monetary policy rate, real exchange rate, inflation and external reserve. The data on real GDP, external reserve, inflation and monetary policy rate were collected from the central bank of Nigeria (CBN) statistical bulletin and the Nigerian bureau of statistics (NBS), while real exchange rate was collected from the World Bank data bank from 1981-2012.

4.3 Model Specification

Following the work of Chuku, C. Chuku (2009), we state our model in functional form.

$$Y= f (m, v) \quad \ldots\ldots 4.1$$

Where Y= measure of economic growth, m= monetary policy variable, v= vectors ofdeterminants of economic growth.

Transforming our functional representation to an econometric equation, we have

$$Y_t= \alpha+ \beta_1 MPR_t + \beta_2 REER_t + \beta_3 INF_t + \beta_4 ER_t + \varepsilon_t \quad \ldots\ldots 4.2$$

Where:

Y_t denotes economic growth as measured by Real Gross Domestic Product, MPR= Monetary Policy Rate, REER= Real Exchange Rate, INF=Inflation, ER= External Reserve, ε_t= stochastic error term. α is intercept while β_1- β_4 slope coefficient/parameter coefficients.

We took the log of variables (real GDP, real exchange rate and external reserve), so as to ascertain the rate of change (elasticity) in the dependent variable given a change in the

explanatory variables. Also, taking the log will allow us to express our data in the same form for easy analysis. Monetary policy rate and inflation are already in percentage form. We therefore have;

$$LY_t = \alpha + \beta_1 MPR_t + \beta_2 LREER_t + \beta_3 INF_t + \beta_4 LER_t + \varepsilon_t \quad \text{.....4.3}$$

Where; L denotes log of the variables while the variables are as defined above.

4.4 Method of Estimation

For the purpose of this study, we shall employ Johansen cointegration technique and VECM (Vector Error Correction Model) to examine both the long run and short run relationship between economic growth and monetary policy variables. The choice of these methods is contingent upon the following requirements; that all the variables are integrated of the same order one. i.e. I(1). That is they must be non-stationary in level but stationary in first difference. i.e. I(0). Secondly, there exist cointegrating relationship among the variable, meaning that there is long run equilibrating relationship among the variables and that any deviation from the long run equilibrium, the variables would make adjustment to restore back equilibrium. In the case where all the variables are stationary in difference but no cointegration relationship exist among them; we shall estimate this case with VAR in difference.

The strength of this method (VECM) is that it is a system of equation model, which treats all variables as potentially endogenous, consequently addressing the problem of endogeneity in our model. There are two tests that need to be conducted before estimating the VECM model. The first test is the unit root test. In testing for unit root process, we utilized two test statistics. That is Augment Dickey Fuller (ADF) test and Philip Perron test.

After establishing the order of integration and it is found that all the variables are I(1), the next step is to test for cointegration. This test informs us whether or not there exist long run relationships among our variables. Several techniques for testing for cointegration between series of non-stationary data have been employed in empirical studies of this nature. For the purpose of this study, Johansen approach will be used to test for cointegration. This is used to test for the existence of long run relationship among variables. Johansen (1988, 1989)

and Johansen and Juselius (1990) recommended two statistic tests to determine the number of cointegrating vectors. The first is the trace test (λ_{trace}) which tests the null hypothesis that the number of notable cointegrating vector is less than or equal to q against a general unrestricted alternatives q = r.

The test is calculated as $\lambda_{trace}(r) = - T \Sigma \text{ In } (1- \lambda_t)$ where T is the number of usable observations, and the λ_t,s are the estimated eigenvalue from the matrix. Where r = 0, 1, 2… n-2, n-1

The second test statistic is the maximum eigenvalue test (λ_{max}) which is calculated as;

$\lambda_{max}(r, r+1) = - T \text{ In } (1- \lambda_{r+1}) = T \text{ In } (1 - \lambda_{r+1})$. This test concerns a test of the null hypothesis that there is r cointegrating vectors against the alternative that r + 1 cointegrating vector exist. We say there is long run cointegrating relationship among our variables if these tests statistics are more than critical values at 5% level. For the purpose of this study, we utilized only the Trace test statistics. Theoretically, the number of cointegrating equations should be at one less than the number of variables in our model. i.e.; $\mu_{t-1} = (n-1)$. Where n= the number of variables in the model.

In conducting the cointegration test, there is need to select an optimal lag order in order to conduct this test. There are basically two ways to choose the lag order. These are via information criteria such as AIC (Akaike Information Criteria), SIC (Schwarz Information Criteria), ML (Maximum Likelihood Criteria) or by selecting lag length necessary to whiten the residuals.

Econometric views (Eviews 8) and Microsoft Excel 2010 is the computer packages used for data processing in this study.

4.5 Vector Error Correction Model (VECM)

The Granger Representation Theorem suggests that if two variables are cointegrated, the relationship between them can be expressed as an error correction (Gujirati and Porter, 2009). An error correction model unravels the long run equilibrium relationship among. Therefore, the relationship between non-stationary but cointegrated variables should be based on an error correction model. Hence, if the variables are found to be cointegrated, it

shows that they have a stable long run equilibrium relationship, while a short run disturbance among the variables is corrected or adjusted back towards equilibrium by the error correction mechanism. Our VECM model can be presented as thus below;

$$\Delta LY_t = \alpha_1 + \beta_{11}\Sigma\Delta LY_{t-I} + \beta_{12}\Sigma\Delta MPR_{t-I} + \beta_{13}\Sigma\Delta LER_{t-I} + \beta_{14}\Sigma\Delta INF_{t-I} + \beta_{15}\Sigma\Delta LREER_{t-I} + \beta_{16}\mu_{t-1} + \varepsilon_{1t}$$

$$\Delta MPR_t = \alpha_2 + \beta_{21}\Sigma\Delta MPR_{t-I} + \beta_{22}\Sigma\Delta Y_{t-I} + \beta_{23}\Sigma\Delta LER_{t-I} + \beta_{24}\Sigma\Delta INF_{t-I} + \beta_{55}\Sigma\Delta LREER_{t-I} + \beta_{26}\mu_{t-1} + \varepsilon_{2t}$$

$$\Delta LER_t = \alpha_3 + \beta_{31}\Sigma LER_{t-I} + \beta_{32}\Sigma\Delta LY_{t-I} + \beta_{33}\Sigma\Delta MPR_{t-I} + \beta_{34}\Sigma\Delta INF_{t-I} + \beta_{35}\Sigma\Delta LREER_{t-I} + \beta_{36}\mu_{t-1} + \varepsilon_{3t}$$

$$\Delta INF_t = \alpha_4 + \beta_{41}\Sigma\Delta INF_{t-I} + \beta_{42}\Sigma\Delta LY_{t-I} + \beta_{43}\Sigma\Delta MPR_{t-I} + \beta_{44}\Sigma\Delta LER_{t-I} + \beta_{45}\Sigma\Delta LREER_{t-I} + \beta_{46}\mu_{t-1} + \varepsilon_{4t}$$

$$\Delta LREER_t = \alpha_5 + \beta_{51}\Sigma\Delta LREER_{t-I} + \beta_{52}\Sigma\Delta LY_{t-I} + \beta_{53}\Sigma\Delta MPR_{t-I} + \beta_{54}\Sigma\Delta INF_{t-I} + \beta_{55}\Sigma\Delta LER_{t-I} + \beta_{56}\mu_{t-1} + \varepsilon_{5t}$$

Each of the above models (system of equations) can be decompose into three parts. The first part of the model is the difference component also known as the VAR component of the model. This part captures the short run relationship among our variables. The second component of the models is the error correction component of the model and is denoted by μ_{t-1}. This part represents the long run relationship and the coefficient of the error correction component measures the speed of adjustment. That is; it tells us how long a deviation from the long run equilibrium will take to be corrected. Theoretically, the coefficient of the error correction term should be negative in order to achieve convergence and should lie between zero and negative two ($-2 \leq EC_{t-1} < 0$). Finally, the last components of the models are the intercept and the error term/residual term.

4.6 Empirical Result

This section covers the initial results of analysing the impact of monetary policy and economic growth in Nigeria. The sample period runs from 1981 to 2012. The first three observations are reserved for the lagged explanatory variables in the Normalised Equation and Vector Error Correction Model (VECM). The estimation period is 1984 to 2012.

4.6.1 Unit Root Test Results

To begin the analysis of our series, we first check for their stochastic properties as most of the time series data exhibit trend over a period of time. The literature on stationary testing has evolve for example see (Lee, 2004), and for the sake of this study we use ADF and PP test; we conduct the test for the variables by assuming three different specification on the random walk model.Unit root test was conducted to identify the order of integration and also to make the series stationary after which the Vector Error Correction model will be estimated. Both the Augmented Dickey-fuller (ADF) and the Philips-Perron (PP) standard test for stationarity were used to establish the order of integration of the series. Both tests indicate that all variables in the model are integrated of order one I(I). The summary of this finding can be seen in Table 4.1.

Table 4.1: The Result of Unit Root Tests

VARIABLES	LEVEL		REMARK	FIRST DIFFERENCE		REMARK
	ADF	PP		ADF	PP	
INF	-1.2497 (0.1894)	-2.9001 (0.0568)	I(I)	-4.5469** (0.0001)	-5.3959** (0.0000)	I(0)
MPR	-0.2092 (0.6022)	-2.7825 (0.0724)	I(I)	-3.4799** (0.0011)	-7.6022** (0.0000)	I(0)
LER	0.1772 **(**0.7303**)**	0.0585 (0.6940)	I(I)	-3.8275** (0.0004)	-5.2952** (0.0000)	I(0)
LREER	-2.6587 (0.0934)	-0.7843 (0.3682)	I(I)	-4.1123* (0.0161)	-4.2083** (0.0001)	I(0)
LRGDP	4.1458 (0.9999)	-1.7240 (0.7162)	I(I)	-3.5279* (0.0146)	-3.6473* (0.0106)	I(0)

NOTE: ADF and PP denotes Augmented Dickey Fuller and Phillip Peron test statistics respectively. Lag length in both ADF and PP are sets at 2. INF, MPR, LER, LREER, LRGDP represents inflation, monetary policy rate, log of external reserve, log of real exchange rate, and log of real GDP respectively. The value in the parenthesis denotes the p- value while the coefficient represents the t-value. All values are approximated to four (4) decimal place. The sign ** and * implies significance at 1 and 5 per cents respectively

This finding implies that a test is needed to see whether there is cointegration among the variables in the model. In other words, a test for co integration is needed to establish whether the variables in the model are converging in the long run. The result of the co integration test can be seen from the table below.

4.6.2 Johansen Cointegration Result

After confirming all the variables in the model are integrated of order one I(1), we proceed by testing the long run relationship among the variables using Johansen cointegration test and the result is presented in Table 4.2.The result from the cointegration test suggests that there is evidence of cointegration among the variables in the model. Trace test indicates 4 cointegrating equation while the Maximum Eigen test indicates 3 cointegrating equations.

This is because the four test values from Trace test are greater than their critical values while three test values from Maximum Eigen test are greater than their critical values at 5 per cent significance level. The test was conducted using lag 3. The lag length selection is based onAkaike and Schwarz information criterion.

Table 4.2: The Result of Cointegration Tests

HYPOTHESIZED NO OF CE(S)	TRACE TEST		MAXIMUM EIGENVALUE	
	Test value	Critical value (0.05)	Test value	Critical value (0.05)
None *	209.2538	79.34145	85.61978	37.16359
At most 1 *	123.6340	55.24578	72.40738	30.81507
At most 2 *	51.22660	35.01090	32.28711	24.25202
At most 3 *	18.93949	18.39771	15.26937	17.14769
At most 4	3.670117	3.841466	3.670117	3.841466

NOTE: Trace test indicates 4 co-integrating eqn(s) at the 0.05 level while Max-eigenvalue test indicates 3 cointegratingeqn(s) at the 0.05 level. Lag length selection is based on Akaike and Schwarz information criterion. Lag order is 1 3. The sign * denotes the existence of cointegration.

We therefore proceed to analyse the Johansen Cointegrating Normalized coefficients[1] to ascertain the long-run relationship between the estimated variables. This is presented in Table 4.3 below as it was extracted from the cointegration test result (see appendix II). The figures in parenthesis under the estimated coefficients are the asymptotic standard errors.

[1]Since our variable of interest is GDP we normalized the variable on LRGDP value and we select the parsimonious long run equation

Table 4.3:Estimate of the (Identified) Long-run Equilibrium

Variable	LRGDP	MPR	LREER	INF	LER
Cointegrating Vector	1.000000	0.033804	0.177551	0.002759	0.031870
S.E		(0.00200)	(0.02026)	(0.00065)	(0.01425)

The result from the normalized equation on economic growth above identifies the long run equilibrium between our variables in the model. This is supported by both Trace test and Maximum Eigen test which depicts presence of cointegration in the variables. In other word the null hypothesis of no cointegration among the variables is rejected in at least four equations. Therefore, when we take the explanatory variables (MPR, LREER, INF and LER) to the other side of the equation,the normalized equation indicates that there is negative long run relationship between the dependent variable (RGDP) and the explanatory variables. In other word, monetary policy, real exchange rate, inflation and external reserve affects growth negatively in the long run. This shows that a unit increase in MPR andINF on average, will lead to a decrease in RGDP by 0.033804 and 0.002759 percent respectively. Also, a percentage increase in REER and ER on average will lead to a decrease in RGDP by 0.177551 and 0.031870 percent respectively.

4.6.3 Error Correction Model (ECM) Result

Since we have determined the order of cointegration of our variables, the next stage is to present the result of vector error correction model.The existence of a long run cointegrating equilibrium provides for short run fluctuations and the ECM is meant to tie the short run dynamics of the cointegrating equations to their long run static dispositions.

Table 4.4below depicts the result of the short run dynamic based on VEC model and the speed of adjustment coefficient.

Table 4.4:VectorError Correction Model (VECM) Result

Vector Error Correction Estimates with RGDP as the dependent Variable			
Date: 06/08/14 Time: 00:37			
Sample (adjusted): 1985 2012			
Included observations: 28 after adjustments			
Variables	Coefficient	Std. Errors	t. Statistic
C	-0.006237	0.01880	-0.33181
D(LRGDP(-1))	0.127657	0.20728	0.61586
D(LRGDP(-2))	0.312975	0.24762	1.26393
D(LRGDP(-3))	0.398815	0.22702	1.75672
D(MPR(-1))	0.012077	0.00488	2.47411
D(MPR(-2))	0.004299	0.00331	1.29991
D(MPR(-3))	0.002811	0.00263	1.06748
D(LREER(-1))	0.091694	0.04775	1.92021
D(LREER(-2))	0.079790	0.03563	2.23950
D(LREER(-3))	0.027716	0.03918	0.70741
D(INF(-1))	0.001763	0.00073	2.42948
D(INF(-2))	0.001767	0.00076	2.32427
D(INF(-3))	0.000596	0.00054	1.11372
D(LER(-1))	0.022345	0.00910	2.45417
D(LER(-2))	0.016068	0.00739	2.17513
D(LER(-3))	-0.010586	0.01512	-0.33181
ECM(-1)	-0.534476	0.19249	-2.77661
R-squared	0.775648		
Adj. R-squared	0.394249		
F-statistic	2.033694		

From the above table 4.4 as extracted from the VEC model estimate, the result shows that the coefficient of the error correction model has a negative sign and is statistically significant at 5% level, which is in line with it theory. That is the speed of adjustment to the long run equilibrium is relatively high. The result shows about 53% of the deviation from the equilibrium relationship will be corrected in the first year while the remaining 47% will be corrected in the second year.In other word, it will take about two year for any deviation to be corrected and equilibrium restored. The result of the short run relationship reveals that MPR at lag one is found to be positive and significant while at lag two and three MPR is found to be insignificant. Again, we found REER to be significant at lag two but insignificant at lag one and three.Also, INF is found to affect economic growth positively at lag one and two but insignificant at lag three.Final, ER is found to promote economic

growth at lag one and two but insignificant at lag three. The power of our explanatory variables in explaining changes in the dependent variable is high asevident by the value of the R^2 (0.78). Therefore, the short run positive relationship in this result is in tandem with the medium term monetary policy conduct in Nigeria which uses medium term to correct for the shocks or any distortions on the target objectives of maintaining economic growth, price stability and inflation in the economy. This means the action of the instruments is controlled by the policy makers but due to the time lag (before full impact on policy), the variables maintain positive relationship within the short run and negative in the long run (the time lag effect has taken place and the impact of the policy decision has fully take place).

Table 4.5 below represents the dynamic response of RGDP to generalize one standard deviation (SD) shock to MPR and other variables in the model within a horizon of 10 periods. It could be observed that from the table that response of RGDP to MPR was negative throughout the 10 periods; RGDP and MPR tend to move in the same direction. That is fall in MPR corresponds with decrease in RGDP from the first period to the fifth period while in the sixth period RGDP recorded a slight increase against decrease in MPR. From the seventh to the tenth period, MPR decreases with a corresponding decrease in RGDP.

It could also be observed thatRGDP has a negative response from shocks inREER but in a fluctuating manner while RGDP responds to shocks in INF and ERpositively from first to third period. RGDP responded negatively to shock in inflation in the fourth period and positive in the fifth and sixth. But from period seven to nine, RGDP responded negatively to shocks in INF. In the tenth period, RGDP responded positively. It could also be seen that RGDP responded to shocks in LER negatively from the fourth period to the seventh period. It then responded positively in the eighth period and then negatively in the ninth period and positively in the tenth period.

Table 4.5: Impulse Response Table

Response of LRGDP					
Period	LRGDP	MPR	LREER	INF	LER
1	0.023743	0.000000	0.000000	0.000000	0.000000
2	0.019628	-0.007599	-0.005553	0.005328	0.004414
3	0.018480	-0.015647	-0.009678	0.006009	0.005315
4	0.010615	-0.028499	-0.001525	-0.005346	-0.009861
5	0.006530	-0.041579	-0.007536	0.005522	-0.007072
6	0.014243	-0.032866	-0.006624	0.002136	-0.003886
7	0.009997	-0.030725	-0.012848	-0.007566	-0.001173
8	0.001394	-0.028764	-0.015174	-0.006960	0.001998
9	0.000937	-0.027824	-0.012182	-0.006814	-0.001961
10	-0.003662	-0.021172	-0.018320	0.003433	0.005697

Figure 5.1below illustratesthe graphical responseto augment the impulse response table resultwhich depicts the relationship between monetary policy and economic growth.

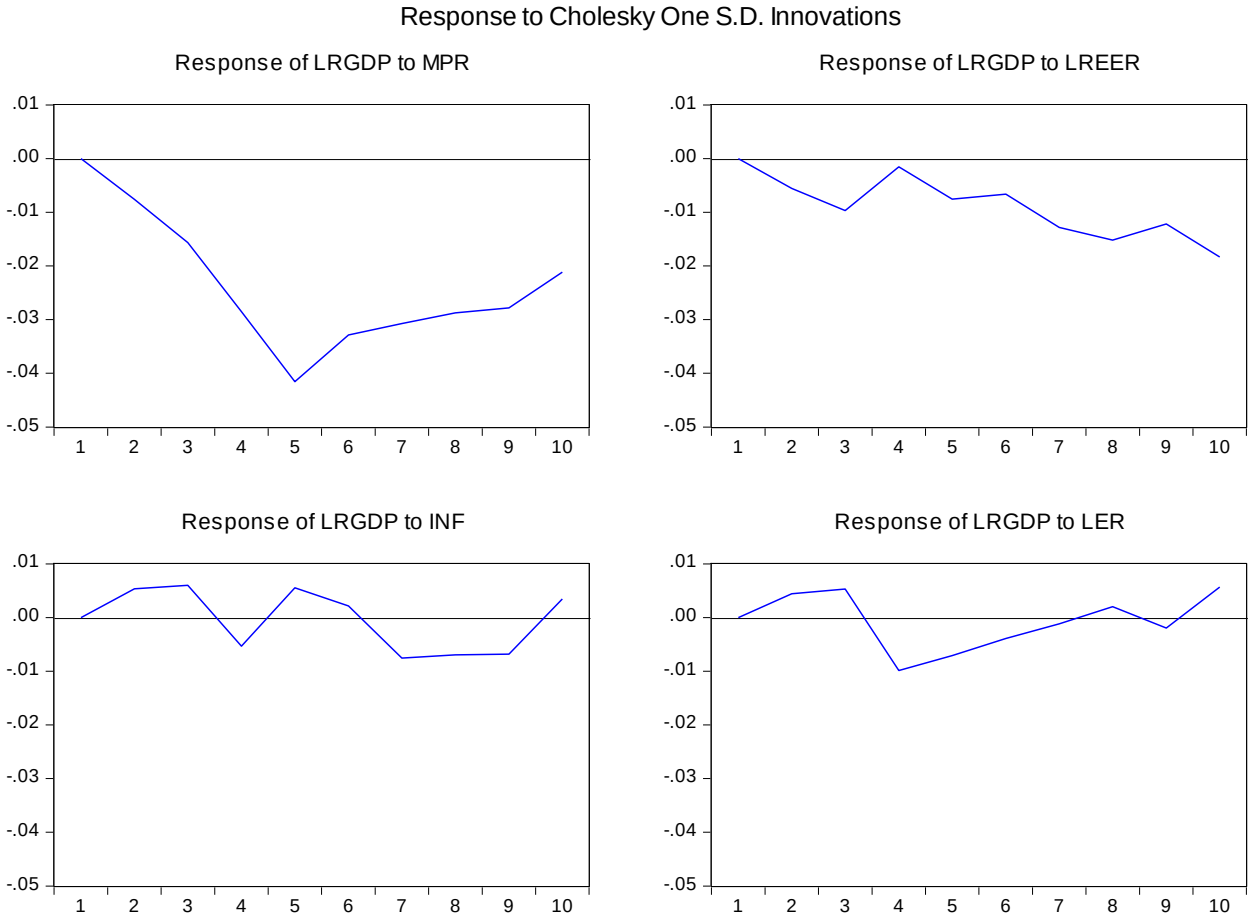

Figure4.1: Impulse Graphs

This finding is in consonance with the works of Charles O. (2012) and Onakoya, A. Fasanya I and others. As it could be gathered from the impulse response table, response of RGDP to MPR has been negative all throughout the study period. This is in line with the theory which stipulates a negative relationship between interest rate (MPR) and economic growth. We can therefore conclude that monetary policy impacts on economic growth in Nigeria.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

6.1 Summary

The study aimed at re-investigating the relationship between monetary policy and economic growth in Nigeria. In chapter one, concise background of the study has been given. Chapter two looked at monetary policy in Nigeria, its origin, conception and implementation for the achievement of the macroeconomic objective of Nigeria. In chapter three, quite a number of theoretical and empirical literature have been reviewed. The conflicting theoretical propositions in this area have left many to question the linkage between monetary policy and economic growth.

A strand of the literature argued that monetary policy has a positive relationship with economic growth. Another strand of the literature argued that monetary policy has a negative impact on economic growth while the third strand of the literature was inconclusive as to whether monetary policy has positive or negative impact on economic growth. Chapter four discussed the methodology adopted in order to empirically test the hypothesis and analyse the results. VAR model was considered suitable and conducive for the estimation of our model due to its diverse properties and as a tradition in investigating monetary policy shocks. Unit root test was conducted to ascertain the stationarity of our variables and they were found to be non-stationary at level and stationary at first difference. Vector error correction model was used because cointegration was found to exist between the variables in the model. Impulse response was also used to examine the relationship that exists between economic growth, monetary policy rate and other supporting macroeconomic variables in Nigeria.

6.2 Conclusion

From the results estimate, the following major findings were observed:

- Monetary policy interest ratenegatively affects economic growth in the long run in Nigeria
- In the short run, policy rateis found to impact on economic growth positively.
- The coefficient of the speed of adjustment is relatively high and significant.

6.3 Recommendations

Based on our result which shows that monetary policy action have a very short term temporary effect on economic growth due to information asymmetric. As information devolves and expectation adjusted, the short run impact fizzles and generate destabilizing consequences on economic growth in the long run. This means that the role of monetary policy is only temporary and in the short run both may be detrimental to growth in the long run. Therefore we advise the monetary authorities to adopt it monetary policy with rule so as to ensure stability and sanity in the price and economic conditions of the economy.

6.4 Gap for Further Studies

Future studies are encouraged to dis aggregate this study into two time period to capture structural breaks in policy variables. That is from 1981 to 2006 when minimum rediscount rate (MRR) was the major policy variable and from 2007 to date when monetary policy rate(MPR) is the major policy variable. Furthermore, we recommend future studies to look into the issue of trilemma (monetary policy independent, capital account openness and exchange rate).

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APPENDIX I

Unit Root Test

Augmented Dickey-Fuller Test at Level

Null Hypothesis: LER has a unit root
Exogenous: None
Lag Length: 2 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.177155	0.7303
Test critical values:	1% level	-2.647120	
	5% level	-1.952910	
	10% level	-1.610011	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LER)
Method: Least Squares
Date: 05/05/14 Time: 20:01
Sample (adjusted): 1984 2012
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LER(-1)	0.003457	0.019516	0.177155	0.8608
D(LER(-1))	0.016937	0.197134	0.085916	0.9322
D(LER(-2))	-0.047036	0.195192	-0.240975	0.8115

R-squared	-0.009452	Mean dependent var	0.134010
Adjusted R-squared	-0.087102	S.D. dependent var	1.195995
S.E. of regression	1.246995	Akaike info criterion	3.377048
Sum squared resid	40.42991	Schwarz criterion	3.518492
Log likelihood	-45.96719	Hannan-Quinn criter.	3.421346
Durbin-Watson stat	1.984259		

Null Hypothesis: INF has a unit root
Exogenous: None
Lag Length: 2 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.249724	0.1894
Test critical values:	1% level	-2.647120	
	5% level	-1.952910	
	10% level	-1.610011	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INF)
Method: Least Squares
Date: 05/03/14 Time: 13:12
Sample (adjusted): 1984 2012
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF(-1)	-0.144565	0.115678	-1.249724	0.2225
D(INF(-1))	0.116129	0.175817	0.660506	0.5147
D(INF(-2))	-0.385610	0.174289	-2.212478	0.0359

R-squared	0.263021	Mean dependent var	-0.403448
Adjusted R-squared	0.206331	S.D. dependent var	18.46536
S.E. of regression	16.45044	Akaike info criterion	8.536279
Sum squared resid	7036.044	Schwarz criterion	8.677724
Log likelihood	-120.7760	Hannan-Quinn criter.	8.580578
Durbin-Watson stat	2.137695		

Null Hypothesis: LREER has a unit root
Exogenous: Constant
Lag Length: 2 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.658659	0.0934
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LREER)
Method: Least Squares
Date: 05/03/14 Time: 13:12
Sample (adjusted): 1984 2012
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LREER(-1)	-0.249255	0.093752	-2.658659	0.0135
D(LREER(-1))	0.287226	0.175730	1.634472	0.1147
D(LREER(-2))	0.013219	0.180847	0.073096	0.9423
C	1.165957	0.455581	2.559273	0.0169

R-squared	0.267905	Mean dependent var	-0.042282
Adjusted R-squared	0.180054	S.D. dependent var	0.319632
S.E. of regression	0.289429	Akaike info criterion	0.485632
Sum squared resid	2.094235	Schwarz criterion	0.674224
Log likelihood	-3.041661	Hannan-Quinn criter.	0.544697
F-statistic	3.049526	Durbin-Watson stat	2.089332
Prob(F-statistic)	0.047152		

Null Hypothesis: LRGDP has a unit root
Exogenous: None
Lag Length: 2 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		4.145847	0.9999
Test critical values:	1% level	-2.647120	
	5% level	-1.952910	
	10% level	-1.610011	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LRGDP)
Method: Least Squares
Date: 05/03/14 Time: 13:13
Sample (adjusted): 1984 2012
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LRGDP(-1)	0.003139	0.000757	4.145847	0.0003
D(LRGDP(-1))	0.245563	0.168060	1.461164	0.1560
D(LRGDP(-2))	-0.104063	0.163340	-0.637098	0.5296

R-squared	0.101813	Mean dependent var	0.046560
Adjusted R-squared	0.032722	S.D. dependent var	0.032118
S.E. of regression	0.031588	Akaike info criterion	-3.974396
Sum squared resid	0.025942	Schwarz criterion	-3.832952
Log likelihood	60.62874	Hannan-Quinn criter.	-3.930098
Durbin-Watson stat	2.192765		

Null Hypothesis: MPR has a unit root
Exogenous: None
Lag Length: 2 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.209153	0.6022
Test critical values:	1% level	-2.647120	
	5% level	-1.952910	
	10% level	-1.610011	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MPR)
Method: Least Squares
Date: 05/03/14 Time: 13:14
Sample (adjusted): 1984 2012
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPR(-1)	-0.010039	0.047997	-0.209153	0.8360
D(MPR(-1))	-0.378755	0.189824	-1.995301	0.0566
D(MPR(-2))	-0.349313	0.189501	-1.843332	0.0767

R-squared	0.186338	Mean dependent var	0.137931
Adjusted R-squared	0.123749	S.D. dependent var	3.819132
S.E. of regression	3.575024	Akaike info criterion	5.483518
Sum squared resid	332.3007	Schwarz criterion	5.624963
Log likelihood	-76.51101	Hannan-Quinn criter.	5.527817
Durbin-Watson stat	1.895813		

Augmented Dickey-Fuller Test at 1st Difference

Null Hypothesis: D(INF) has a unit root
Exogenous: None
Lag Length: 2 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.546920	0.0001
Test critical values:	1% level	-2.650145	
	5% level	-1.953381	
	10% level	-1.609798	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INF,2)
Method: Least Squares
Date: 05/03/14 Time: 13:18
Sample (adjusted): 1985 2012
Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INF(-1))	-1.659716	0.365020	-4.546920	0.0001
D(INF(-1),2)	0.607119	0.251815	2.410975	0.0236
D(INF(-2),2)	0.169871	0.191427	0.887392	0.3833

R-squared	0.616369	Mean dependent var	-0.542857
Adjusted R-squared	0.585678	S.D. dependent var	26.25090
S.E. of regression	16.89713	Akaike info criterion	8.593122
Sum squared resid	7137.828	Schwarz criterion	8.735858
Log likelihood	-117.3037	Hannan-Quinn criter.	8.636758
Durbin-Watson stat	1.857371		

Null Hypothesis: D(LREER) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 2 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.112348	0.0161
Test critical values:	1% level	-4.323979	
	5% level	-3.580623	
	10% level	-3.225334	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LREER,2)
Method: Least Squares
Date: 05/03/14 Time: 13:19
Sample (adjusted): 1985 2012
Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LREER(-1))	-1.225719	0.298058	-4.112348	0.0004
D(LREER(-1),2)	0.329711	0.236266	1.395509	0.1762
D(LREER(-2),2)	0.205521	0.187398	1.096710	0.2841
C	-0.346810	0.148969	-2.328058	0.0291
@TREND("1981")	0.016114	0.007557	2.132287	0.0439

R-squared	0.524082	Mean dependent var	-0.007110
Adjusted R-squared	0.441314	S.D. dependent var	0.405163
S.E. of regression	0.302840	Akaike info criterion	0.609209
Sum squared resid	2.109378	Schwarz criterion	0.847102
Log likelihood	-3.528921	Hannan-Quinn criter.	0.681935
F-statistic	6.331919	Durbin-Watson stat	2.053882
Prob(F-statistic)	0.001375		

Null Hypothesis: D(LRGDP) has a unit root
Exogenous: Constant
Lag Length: 2 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.527920	0.0146
Test critical values:	1% level	-3.689194	
	5% level	-2.971853	
	10% level	-2.625121	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LRGDP,2)
Method: Least Squares
Date: 05/03/14 Time: 13:20
Sample (adjusted): 1985 2012
Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LRGDP(-1))	-0.881964	0.249995	-3.527920	0.0017
D(LRGDP(-1),2)	0.023319	0.191374	0.121852	0.9040
D(LRGDP(-2),2)	-0.141195	0.164196	-0.859917	0.3983
C	0.043645	0.012189	3.580758	0.0015

R-squared	0.512975	Mean dependent var	0.002764
Adjusted R-squared	0.452097	S.D. dependent var	0.042469
S.E. of regression	0.031436	Akaike info criterion	-3.950192
Sum squared resid	0.023717	Schwarz criterion	-3.759877
Log likelihood	59.30269	Hannan-Quinn criter.	-3.892011
F-statistic	8.426277	Durbin-Watson stat	1.667777
Prob(F-statistic)	0.000532		

Null Hypothesis: D(MPR) has a unit root
Exogenous: None
Lag Length: 2 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.479933	0.0011
Test critical values:	1% level	-2.650145	
	5% level	-1.953381	
	10% level	-1.609798	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MPR,2)
Method: Least Squares
Date: 05/03/14 Time: 13:22
Sample (adjusted): 1985 2012
Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MPR(-1))	-1.629098	0.468141	-3.479933	0.0019
D(MPR(-1),2)	0.264786	0.342266	0.773628	0.4464
D(MPR(-2),2)	-0.073886	0.202420	-0.365015	0.7182

R-squared	0.685649	Mean dependent var	0.028929
Adjusted R-squared	0.660501	S.D. dependent var	6.175898
S.E. of regression	3.598482	Akaike info criterion	5.499858
Sum squared resid	323.7268	Schwarz criterion	5.642595
Log likelihood	-73.99802	Hannan-Quinn criter.	5.543494
Durbin-Watson stat	1.988541		

Null Hypothesis: D(LER) has a unit root
Exogenous: None
Lag Length: 1 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.827506	0.0004
Test critical values:	1% level	-2.647120	
	5% level	-1.952910	
	10% level	-1.610011	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LER,2)
Method: Least Squares
Date: 05/05/14 Time: 20:19
Sample (adjusted): 1984 2012
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LER(-1))	-1.022116	0.267045	-3.827506	0.0007
D(LER(-1),2)	0.043231	0.190494	0.226942	0.8222

R-squared	0.491247	Mean dependent var	0.014784
Adjusted R-squared	0.472404	S.D. dependent var	1.685702
S.E. of regression	1.224423	Akaike info criterion	3.309288
Sum squared resid	40.47871	Schwarz criterion	3.403585
Log likelihood	-45.98468	Hannan-Quinn criter.	3.338821
Durbin-Watson stat	1.984104		

Phillips-Perron Test at Level

Null Hypothesis: LER has a unit root
Exogenous: None
Bandwidth: 2 (Used-specified) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		0.058475	0.6940
Test critical values:	1% level	-2.641672	
	5% level	-1.952066	
	10% level	-1.610400	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	1.334852
HAC corrected variance (Bartlett kernel)	1.338306

Phillips-Perron Test Equation
Dependent Variable: D(LER)
Method: Least Squares
Date: 05/05/14 Time: 20:25
Sample (adjusted): 1982 2012
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LER(-1)	0.001061	0.017902	0.059257	0.9531

R-squared	-0.005830	Mean dependent var	0.088847
Adjusted R-squared	-0.005830	S.D. dependent var	1.171047
S.E. of regression	1.174456	Akaike info criterion	3.191214
Sum squared resid	41.38042	Schwarz criterion	3.237471
Log likelihood	-48.46381	Hannan-Quinn criter.	3.206293
Durbin-Watson stat	1.933311		

Null Hypothesis: INF has a unit root
Exogenous: Constant
Bandwidth: 2 (Used-specified) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.900110	0.0568
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	250.4227
HAC corrected variance (Bartlett kernel)	258.1409

Phillips-Perron Test Equation
Dependent Variable: D(INF)
Method: Least Squares
Date: 05/03/14 Time: 12:37
Sample (adjusted): 1982 2012
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF(-1)	-0.447503	0.155790	-2.872480	0.0075
C	9.397150	4.477389	2.098801	0.0447

R-squared	0.221500	Mean dependent var	-0.306452
Adjusted R-squared	0.194656	S.D. dependent var	18.23173
S.E. of regression	16.36133	Akaike info criterion	8.490060
Sum squared resid	7763.104	Schwarz criterion	8.582575
Log likelihood	-129.5959	Hannan-Quinn criter.	8.520217
F-statistic	8.251139	Durbin-Watson stat	1.631673
Prob(F-statistic)	0.007539		

Null Hypothesis: LREER has a unit root
Exogenous: None
Bandwidth: 2 (Used-specified) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-0.784332	0.3682
Test critical values:	1% level	-2.641672	
	5% level	-1.952066	
	10% level	-1.610400	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	0.092737
HAC corrected variance (Bartlett kernel)	0.116730

Phillips-Perron Test Equation
Dependent Variable: D(LREER)
Method: Least Squares
Date: 05/03/14 Time: 12:39
Sample (adjusted): 1982 2012
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LREER(-1)	-0.009449	0.011311	-0.835342	0.4101

R-squared	0.011157	Mean dependent var	-0.033327
Adjusted R-squared	0.011157	S.D. dependent var	0.311302
S.E. of regression	0.309561	Akaike info criterion	0.524401
Sum squared resid	2.874834	Schwarz criterion	0.570659
Log likelihood	-7.128214	Hannan-Quinn criter.	0.539480
Durbin-Watson stat	1.543273		

Null Hypothesis: MPR has a unit root
Exogenous: Constant
Bandwidth: 2 (Used-specified) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.782482	0.0724
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	10.31314
HAC corrected variance (Bartlett kernel)	8.506407

Phillips-Perron Test Equation
Dependent Variable: D(MPR)
Method: Least Squares
Date: 05/05/14 Time: 18:46
Sample (adjusted): 1982 2012
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPR(-1)	-0.399560	0.138250	-2.890121	0.0072
C	5.387052	1.893352	2.845247	0.0081

R-squared	0.223619	Mean dependent var	0.193548
Adjusted R-squared	0.196847	S.D. dependent var	3.704915
S.E. of regression	3.320300	Akaike info criterion	5.300328
Sum squared resid	319.7074	Schwarz criterion	5.392844
Log likelihood	-80.15509	Hannan-Quinn criter.	5.330486
F-statistic	8.352799	Durbin-Watson stat	2.156316
Prob(F-statistic)	0.007220		

Null Hypothesis: LRGDP has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 2 (Used-specified) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.723958	0.7162
Test critical values:	1% level	-4.284580	
	5% level	-3.562882	
	10% level	-3.215267	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	0.000988
HAC corrected variance (Bartlett kernel)	0.001227

Phillips-Perron Test Equation
Dependent Variable: D(LRGDP)
Method: Least Squares
Date: 05/04/14 Time: 12:11
Sample (adjusted): 1982 2012
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LRGDP(-1)	-0.130818	0.079956	-1.636133	0.1130
C	1.604721	0.977132	1.642276	0.1117
@TREND("1981")	0.007496	0.003325	2.254663	0.0322

R-squared	0.322297	Mean dependent var	0.040784
Adjusted R-squared	0.273890	S.D. dependent var	0.038810
S.E. of regression	0.033071	Akaike info criterion	-3.888552
Sum squared resid	0.030623	Schwarz criterion	-3.749779
Log likelihood	63.27255	Hannan-Quinn criter.	-3.843315
F-statistic	6.658025	Durbin-Watson stat	1.554350
Prob(F-statistic)	0.004311		

Phillips-Perron Test at 1st Difference

Null Hypothesis: D(LER) has a unit root
Exogenous: None
Bandwidth: 2 (Used-specified) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-5.295246	0.0000
Test critical values:	1% level	-2.644302	
	5% level	-1.952473	
	10% level	-1.610211	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	1.353997
HAC corrected variance (Bartlett kernel)	1.311817

Phillips-Perron Test Equation
Dependent Variable: D(LER,2)
Method: Least Squares
Date: 05/05/14 Time: 20:29
Sample (adjusted): 1983 2012
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LER(-1))	-0.974716	0.184025	-5.296660	0.0000

R-squared	0.491496	Mean dependent var	0.033863
Adjusted R-squared	0.491496	S.D. dependent var	1.659676
S.E. of regression	1.183506	Akaike info criterion	3.207605
Sum squared resid	40.61992	Schwarz criterion	3.254311
Log likelihood	-47.11407	Hannan-Quinn criter.	3.222547
Durbin-Watson stat	2.006205		

Null Hypothesis: D(INF) has a unit root
Exogenous: None
Bandwidth: 2 (Used-specified) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-5.395866	0.0000
Test critical values:	1% level	-2.644302	
	5% level	-1.952473	
	10% level	-1.610211	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	326.4260
HAC corrected variance (Bartlett kernel)	243.2151

Phillips-Perron Test Equation
Dependent Variable: D(INF,2)
Method: Least Squares
Date: 05/03/14 Time: 11:13
Sample (adjusted): 1983 2012
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INF(-1))	-0.984322	0.184007	-5.349385	0.0000

R-squared	0.496483	Mean dependent var	0.486667
Adjusted R-squared	0.496483	S.D. dependent var	25.89685
S.E. of regression	18.37613	Akaike info criterion	8.692747
Sum squared resid	9792.779	Schwarz criterion	8.739453
Log likelihood	-129.3912	Hannan-Quinn criter.	8.707689
Durbin-Watson stat	1.916490		

Null Hypothesis: D(LREER) has a unit root
Exogenous: None
Bandwidth: 2 (Used-specified) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.208330	0.0001
Test critical values:	1% level	-2.644302	
	5% level	-1.952473	
	10% level	-1.610211	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	0.092545
HAC corrected variance (Bartlett kernel)	0.091156

Phillips-Perron Test Equation
Dependent Variable: D(LREER,2)
Method: Least Squares
Date: 05/03/14 Time: 13:01
Sample (adjusted): 1983 2012
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LREER(-1))	-0.762693	0.180876	-4.216666	0.0002

R-squared	0.380034	Mean dependent var	0.003352
Adjusted R-squared	0.380034	S.D. dependent var	0.392965
S.E. of regression	0.309413	Akaike info criterion	0.524484
Sum squared resid	2.776351	Schwarz criterion	0.571190
Log likelihood	-6.867257	Hannan-Quinn criter.	0.539426
Durbin-Watson stat	1.942491		

Null Hypothesis: D(LRGDP) has a unit root
Exogenous: Constant
Bandwidth: 2 (Used-specified) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.647333	0.0106
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	0.001198
HAC corrected variance (Bartlett kernel)	0.000865

Phillips-Perron Test Equation
Dependent Variable: D(LRGDP,2)
Method: Least Squares
Date: 05/03/14 Time: 12:57
Sample (adjusted): 1983 2012
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LRGDP(-1))	-0.641467	0.169595	-3.782354	0.0008
C	0.028375	0.009427	3.010041	0.0055

R-squared	0.338159	Mean dependent var	0.002704
Adjusted R-squared	0.314521	S.D. dependent var	0.043280
S.E. of regression	0.035833	Akaike info criterion	-3.755542
Sum squared resid	0.035953	Schwarz criterion	-3.662129
Log likelihood	58.33313	Hannan-Quinn criter.	-3.725658
F-statistic	14.30620	Durbin-Watson stat	1.962957
Prob(F-statistic)	0.000751		

Null Hypothesis: D(MPR) has a unit root
Exogenous: None
Bandwidth: 2 (Used-specified) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-7.602206	0.0000
Test critical values:	1% level	-2.644302	
	5% level	-1.952473	
	10% level	-1.610211	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	12.60097
HAC corrected variance (Bartlett kernel)	8.562424

Phillips-Perron Test Equation
Dependent Variable: D(MPR,2)
Method: Least Squares
Date: 05/03/14 Time: 13:03
Sample (adjusted): 1983 2012
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MPR(-1))	-1.276306	0.179393	-7.114581	0.0000

R-squared	0.635750	Mean dependent var	0.027000
Adjusted R-squared	0.635750	S.D. dependent var	5.982238
S.E. of regression	3.610469	Akaike info criterion	5.438318
Sum squared resid	378.0291	Schwarz criterion	5.485024
Log likelihood	-80.57476	Hannan-Quinn criter.	5.453259
Durbin-Watson stat	2.154843		

APPENDIX II

Johansen Cointegration Test

Date: 05/30/14 Time: 19:38
Sample (adjusted): 1985 2012
Included observations: 28 after adjustments
Trend assumption: Quadratic deterministic trend
Series: LRGDP MPR LREER INF LER
Lags interval (in first differences): 1 to 3

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.953011	209.2538	79.34145	0.0000
At most 1 *	0.924678	123.6340	55.24578	0.0000
At most 2 *	0.684347	51.22660	35.01090	0.0004
At most 3 *	0.420352	18.93949	18.39771	0.0420
At most 4	0.122849	3.670117	3.841466	0.0554

Trace test indicates 4 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.953011	85.61978	37.16359	0.0000
At most 1 *	0.924678	72.40738	30.81507	0.0000
At most 2 *	0.684347	32.28711	24.25202	0.0035
At most 3	0.420352	15.26937	17.14769	0.0919
At most 4	0.122849	3.670117	3.841466	0.0554

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LRGDP	MPR	LREER	INF	LER
42.89994	1.450177	7.616932	0.118371	1.367204

-13.14301	0.132162	-3.491346	-0.117564	-0.260431
0.944777	-0.774648	-11.59230	-0.356065	-6.379890
22.00430	1.104436	7.685049	-0.026194	1.151460
9.245515	-0.321606	0.423893	0.152668	6.268947

Unrestricted Adjustment Coefficients (alpha):

D(LRGDP)	-0.012459	-0.003846	-0.004575	0.000585	0.004239
D(MPR)	-0.534983	0.908375	-0.003219	-0.400958	-0.176886
D(LREER)	0.104249	0.026766	0.027833	-0.027966	0.035392
D(INF)	4.706202	2.727945	2.478274	4.649911	0.103640
D(LER)	-0.009702	0.429459	-0.658831	0.040187	-0.103917

1 Cointegrating Equation(s):	Log likelihood	-51.88266

Normalized cointegrating coefficients (standard error in parentheses)

LRGDP	MPR	LREER	INF	LER
1.000000	0.033804	0.177551	0.002759	0.031870
	(0.00200)	(0.02026)	(0.00065)	(0.01425)

Adjustment coefficients (standard error in parentheses)

D(LRGDP)	-0.534476
	(0.19249)
D(MPR)	-22.95073
	(16.8550)
D(LREER)	4.472268
	(1.63356)
D(INF)	201.8958
	(113.210)
D(LER)	-0.416216
	(13.0509)

2 Cointegrating Equation(s):	Log likelihood	-15.67897

Normalized cointegrating coefficients (standard error in parentheses)

LRGDP	MPR	LREER	INF	LER
1.000000	0.000000	0.245446	0.007527	0.022579
		(0.04454)	(0.00204)	(0.04554)
0.000000	1.000000	-2.008504	-0.141036	0.274842
		(1.35112)	(0.06184)	(1.38135)

Adjustment coefficients (standard error in parentheses)

D(LRGDP)	-0.483923	-0.018576
	(0.19378)	(0.00629)
D(MPR)	-34.88950	-0.655767
	(12.0268)	(0.39033)
D(LREER)	4.120482	0.154717
	(1.66576)	(0.05406)
D(INF)	166.0424	7.185355
	(111.898)	(3.63164)
D(LER)	-6.060597	0.042689
	(12.2140)	(0.39640)

3 Cointegrating Equation(s): Log likelihood 0.464583

Normalized cointegrating coefficients (standard error in parentheses)

LRGDP	MPR	LREER	INF	LER
1.000000	0.000000	0.000000	-0.001140	-0.090940
			(0.00089)	(0.02797)
0.000000	1.000000	0.000000	-0.070119	1.203780
			(0.02576)	(0.80905)
0.000000	0.000000	1.000000	0.035308	0.462502
			(0.00333)	(0.10447)

Adjustment coefficients (standard error in parentheses)

D(LRGDP)	-0.488245	-0.015032	-0.028438
	(0.18263)	(0.00671)	(0.05821)
D(MPR)	-34.89254	-0.653273	-7.209061
	(12.0293)	(0.44212)	(3.83397)
D(LREER)	4.146778	0.133156	0.377963
	(1.61863)	(0.05949)	(0.51589)
D(INF)	168.3838	5.265566	-2.406278
	(106.253)	(3.90516)	(33.8649)
D(LER)	-6.683045	0.553050	6.064076
	(7.86303)	(0.28899)	(2.50609)

4 Cointegrating Equation(s): Log likelihood 8.099269

Normalized cointegrating coefficients (standard error in parentheses)

LRGDP	MPR	LREER	INF	LER
1.000000	0.000000	0.000000	0.000000	-0.080824

				(0.02225)
0.000000	1.000000	0.000000	0.000000	1.826255
				(0.90058)
0.000000	0.000000	1.000000	0.000000	0.149055
				(0.29686)
0.000000	0.000000	0.000000	1.000000	8.877387
				(8.39884)

Adjustment coefficients (standard error in parentheses)

D(LRGDP)	-0.475377	-0.014386	-0.023944	0.000591
	(0.20319)	(0.00807)	(0.06601)	(0.00160)
D(MPR)	-43.71534	-1.096105	-10.29044	-0.158470
	(11.8038)	(0.46878)	(3.83459)	(0.09307)
D(LREER)	3.531414	0.102270	0.163046	1.56E-05
	(1.74770)	(0.06941)	(0.56776)	(0.01378)
D(INF)	270.7019	10.40109	33.32851	-0.767861
	(92.7490)	(3.68349)	(30.1305)	(0.73128)
D(LER)	-5.798753	0.597435	6.372917	0.181897
	(8.73427)	(0.34688)	(2.83742)	(0.06887)

APPENDIX III

Vector Error Correction Model Estimates

Vector Error Correction Estimates
Date: 06/08/14 Time: 00:37
Sample (adjusted): 1985 2012
Included observations: 28 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LRGDP(-1)	1.000000
MPR(-1)	0.033804 (0.00200) [16.8636]
LREER(-1)	0.177551 (0.02026) [8.76511]
INF(-1)	0.002759 (0.00065) [4.22794]
LER(-1)	0.031870 (0.01425) [2.23714]
@TREND(81)	-0.039813
C	-13.96844

Error Correction:	D(LRGDP)	D(MPR)	D(LREER)	D(INF)	D(LER)
CointEq1	-0.534476 (0.19249) [-2.77661]	-22.95073 (16.8550) [-1.36166]	4.472268 (1.63356) [2.73775]	201.8958 (113.210) [1.78338]	-0.416216 (13.0509) [-0.03189]
D(LRGDP(-1))	0.127657 (0.20728) [0.61586]	56.18167 (18.1503) [3.09536]	-4.852611 (1.75909) [-2.75859]	-106.5250 (121.909) [-0.87380]	7.689271 (14.0538) [0.54713]
D(LRGDP(-2))	0.312975	22.14315	-8.228529	-132.5737	-4.508797

	(0.24762)	(21.6821)	(2.10139)	(145.632)	(16.7885)
	[1.26393]	[1.02126]	[-3.91575]	[-0.91034]	[-0.26856]
D(LRGDP(-3))	0.398815	9.542044	0.361805	-31.12393	4.392737
	(0.22702)	(19.8786)	(1.92660)	(133.518)	(15.3920)
	[1.75672]	[0.48002]	[0.18779]	[-0.23311]	[0.28539]
D(MPR(-1))	0.012077	-0.284408	-0.074892	-4.945466	0.060300
	(0.00488)	(0.42741)	(0.04142)	(2.87079)	(0.33095)
	[2.47411]	[-0.66542]	[-1.80793]	[-1.72268]	[0.18221]
D(MPR(-2))	0.004299	-0.233780	-0.078052	-0.235619	-0.047838
	(0.00331)	(0.28957)	(0.02807)	(1.94498)	(0.22422)
	[1.29991]	[-0.80732]	[-2.78113]	[-0.12114]	[-0.21336]
D(MPR(-3))	0.002811	-0.282816	-0.010563	-0.562659	0.148322
	(0.00263)	(0.23061)	(0.02235)	(1.54893)	(0.17856)
	[1.06748]	[-1.22639]	[-0.47261]	[-0.36326]	[0.83065]
D(LREER(-1))	0.091694	5.171857	-0.816279	-61.02804	1.783658
	(0.04775)	(4.18127)	(0.40524)	(28.0842)	(3.23756)
	[1.92021]	[1.23691]	[-2.01431]	[-2.17304]	[0.55093]
D(LREER(-2))	0.079790	2.960670	-1.005204	-37.66874	-1.106166
	(0.03563)	(3.11969)	(0.30235)	(20.9539)	(2.41558)
	[2.23950]	[0.94903]	[-3.32458]	[-1.79769]	[-0.45793]
D(LREER(-3))	0.027716	-2.625831	-0.831057	-28.02318	1.097250
	(0.03918)	(3.43060)	(0.33249)	(23.0422)	(2.65632)
	[0.70741]	[-0.76541]	[-2.49951]	[-1.21617]	[0.41307]
D(INF(-1))	0.001763	0.065889	-0.016755	-0.678399	-0.019899
	(0.00073)	(0.06355)	(0.00616)	(0.42681)	(0.04920)
	[2.42948]	[1.03688]	[-2.72061]	[-1.58945]	[-0.40443]
D(INF(-2))	0.001767	-0.043323	-0.009237	-0.875655	0.007143
	(0.00076)	(0.06655)	(0.00645)	(0.44701)	(0.05153)
	[2.32427]	[-0.65096]	[-1.43213]	[-1.95890]	[0.13861]
D(INF(-3))	0.000596	-0.090073	0.000804	-0.495317	-0.009227
	(0.00054)	(0.04686)	(0.00454)	(0.31476)	(0.03629)
	[1.11372]	[-1.92208]	[0.17702]	[-1.57364]	[-0.25430]
D(LER(-1))	0.022345	-0.179236	-0.113780	-10.92774	0.039979

	(0.00910)	(0.79724)	(0.07727)	(5.35481)	(0.61731)
	[2.45417]	[-0.22482]	[-1.47256]	[-2.04073]	[0.06476]
D(LER(-2))	0.016068	-0.534685	-0.110604	-5.434250	-0.217330
	(0.00739)	(0.64683)	(0.06269)	(4.34458)	(0.50084)
	[2.17513]	[-0.82662]	[-1.76429]	[-1.25081]	[-0.43393]
D(LER(-3))	-0.010586	-0.173714	-0.132334	-7.452960	0.375434
	(0.01512)	(1.32371)	(0.12829)	(8.89090)	(1.02495)
	[-0.70027]	[-0.13123]	[-1.03151]	[-0.83827]	[0.36630]
C	-0.006237	3.013360	-0.134044	5.337389	1.014143
	(0.01880)	(1.64587)	(0.15951)	(11.0547)	(1.27439)
	[-0.33181]	[1.83087]	[-0.84032]	[0.48281]	[0.79578]
@TREND(81)	0.001639	-0.363751	0.032232	0.198534	-0.071064
	(0.00106)	(0.09289)	(0.00900)	(0.62390)	(0.07192)
	[1.54513]	[-3.91599]	[3.58035]	[0.31821]	[-0.98805]
R-squared	0.775648	0.893229	0.850860	0.789308	0.351979
Adj. R-squared	0.394249	0.711719	0.597323	0.431131	-0.749657
Sum sq. resids	0.005637	43.22183	0.405988	1949.895	25.91329
S.E. equation	0.023743	2.078986	0.201492	13.96386	1.609760
F-statistic	2.033694	4.921104	3.355956	2.203683	0.319506
Log likelihood	79.41754	-45.80825	19.54061	-99.13685	-38.64600
Akaike AIC	-4.386967	4.557732	-0.110044	8.366918	4.046143
Schwarz SC	-3.530550	5.414150	0.746373	9.223335	4.902560
Mean dependent	0.048711	0.071429	-0.055338	-1.003571	0.125202
S.D. dependent	0.030506	3.872076	0.317525	18.51397	1.216984
Determinant resid covariance (dof adj.)		0.004818			
Determinant resid covariance		2.80E-05			
Log likelihood		-51.88266			
Akaike information criterion		10.49162			
Schwarz criterion		15.01160			

APPENDIX IV

Data

YEAR	LRGDP	MPR	LER	LREER	INF
1981	12.4334	6	7.7935	5.94288	21
1982	12.416	8	6.93391	5.96653	7.6
1983	12.3475	8	6.66147	6.13592	23.2
1984	12.3338	10	7.04211	6.45919	39.6
1985	12.4412	10	7.40312	6.3501	5.5
1986	12.4599	10	8.18518	5.74492	5.4
1987	12.4529	12.75	8.44318	4.60148	10.2
1988	12.526	12.75	8.09337	4.60665	56.1
1989	12.595	18.5	9.50726	4.49057	50.5
1990	12.7026	18.5	10.4618	4.41521	7.5
1991	12.7027	14.5	10.6976	4.25015	12.9
1992	12.7287	17.5	9.54628	4.06306	44.6
1993	12.7441	26	11.1161	4.15457	57.2
1994	12.752	13.5	10.324	4.7735	57
1995	12.7732	13.5	10.6049	4.60832	72.9
1996	12.8137	13.5	12.0686	4.81638	30.4
1997	12.8422	13.5	12.4769	4.96513	8.2
1998	12.87	14.31	12.3314	5.07159	10.3
1999	12.8818	18	13.734	4.38572	6.7
2000	12.9296	13.5	13.9376	4.39896	6.9
2001	12.9757	14.31	13.6779	4.50497	18.9
2002	13.021	19	13.7618	4.50285	12.9
2003	13.1123	15.75	14.6583	4.44636	14
2004	13.176	15	15.1391	4.4726	14.9
2005	13.2391	13	15.5123	4.60517	17.9
2006	13.2977	12.25	15.5066	4.67241	8.2
2007	13.3602	8.75	15.6165	4.65213	5.3
2008	13.4183	9.81	15.7651	4.75695	11.6
2009	13.4856	7.44	15.6623	4.6911	13.7
2010	13.5623	6.13	10.5282	4.77001	10.8
2011	13.634	9.19	10.3915	4.78553	10.3
2012	13.6977	12	10.5478	4.90974	11.5