
Thesis

By

TAIWO PEACE OGUN

OBAFEMI AWOLOWO UNIVERSITY, ILE-IFE, NIGERIA

# FINANCIAL STRUCTURE, BANK CREDIT CHANNEL AND MONETARY POLICY IN NIGERIA (1970-2003)

2006

# FINANCIAL STRUCTURE, BANK CREDIT CHANNEL AND MONETARY POLICY IN NIGERIA (1970-2003)

**By**

**TAIWO PEACE OGUN**

B.Sc.(Econs) Ilorin, 1994, M.Sc. (Econs) O.A.U. Ife, 2001



A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF **DOCTOR OF PHILOSOPHY(Ph.D) IN ECONOMICS** OF OBAFEMI AWOLOWO UNIVERSITY, ILE-IFE, NIGERIA.

**2006**

## DEDICATION

This thesis is dedicated to the ALMIGHTY GOD for his infinite mercies and protection over me. HE is my REDEEMER WHO is worthy to be praised.

## CERTIFICATION

I certify that this work was carried out by Taiwo Peace Ogun, under my supervision in the Department of Economics, Obafemi Awolowo University, Ile-Ife, Nigeria.

---------- ----------

Professor A.E. Akinlo
(Supervisor)
Department of Economics
Obafemi Awolowo University,
Ile-Ife, Nigeria.

Date

---------- ----------

Professor A.E. Akinlo
(Head)
Department of Economics
Obafemi Awolowo University,
Ile-Ife, Nigeria.

Date

## AUTHORIZATION

**AUTHOR:** OGUN Taiwo Peace

**TITLE:** A Study of Financial Structure, Bank Credit Channel and Monetary Policy in Nigeria (1970-2003).

**DEGREE:** Doctor of Philosophy (Economics)

**YEAR:** 2006

I, OGUN Taiwo Peace, hereby authorize the Hezekiah Oluwasanmi Library to copy this thesis in part or in whole in response to request from individuals or organizations for the purpose of private study or research.

---------- ----------

Signature Date

## ACKNOWLEDGMENTS

In the course of this research, several people have played one vital role or the other towards its successful completion.

My special thanks goes to my supervisor, Professor A.E Akinlo, for his intellectual guidance, counsel, constructive criticism and for painstakingly going through the manuscripts several times before arriving at this final copy.

My regards also go to by my able lecturers in the Department, Professor J.A Fabayo and Professor Oladeji, S.I, for providing necessary comments when the work was still at infancy. I also thank other academic staff of the Department, Professor Soetan, Dr. (Mrs.) Olusi, Dr. Olomola, Dr. Adebayo, Dr. Yinusa, Dr. Akinbobola, Dr. Folorunso, Mr. Adeyemo, Mr. Ajilore, Mr. Saibu, Mr. Adedokun, Mr Tokede, Mr. Olayeni, and Mr. Arawomo for their useful suggestions and comments while writing this thesis.

Besides, my gratitude goes to all the non-academic staff of the Department for responding to my needs at one time or the other. I am grateful to the able secretary of the Department, Mr. Ibitara for his moral support. My thanks also go to Mr. Oyelakin and other non-academic staff for their kindly gestures.

At this juncture, my great appreciation goes to the Council for the Development of Social Science Research in Africa (CODESRIA) for their grants towards the completion of this thesis. This grant provides the necessary succor when everything was tight and difficult. I also thank Markus, Kratzig for writing and freely making available JMulTi, a Java based front end for Gauss Modules. Most of the estimations in this thesis were done using this econometric software.

I am particularly indebted to my wife Mrs. Blessing Nwakaego Ogun, for her endurance, encouragements and moral support. Also my children Chiamaka Okeoghene Becky Ogun, Efeoghene Favour Ogun and Gideon Ogheneruemu Chukwuemeka Ogun for their patience and endurance. May the ALMIGHTY FATHER continue to shower HIS infinite blessings on them all.



**TABLE OF CONTENTS**

**Chapter Three: Research Methodology**



**Chapter Four: Monetary Policy and Macroeconomic Environment in Nigeria**

## LIST OF TABLES

**Table No.** **Title** **Page**

## LIST OF FIGURES

**Figure No.** **Title** **Page**

**ABSTRACT**

The study examined the impact of monetary policy on bank lending and investigated the importance of bank credit channel with the deregulation of the financial sector in Nigeria. It also considered the issue as to whether money or credit aggregate was the main cause of variability in economic activity and prices in Nigeria. This was with a view to providing empirical evidence on the implication of the structure of the financial markets on bank credit channel of monetary transmission in Nigeria.

Secondary data sourced from the Central Bank of Nigeria's Statistical Bulletin and IMF's International Financial Statistics for the period 1970-2003 were used for the analysis. Both descriptive statistics and econometric techniques were employed in the study. The Structural Vector Autoregressive (SVAR) econometric technique was applied in the analysis of the Bernanke and Blinder's Commodity and Credit (CC) framework. In addition, other complementary techniques like the Impulse Response Functions (IRFs), Forecast Error Variance Decomposition (FEVD) and Granger Causality Test (GCT) were used as analytical tools.

The results showed that though the Nigerian financial sector was important in the light of its contribution to the macroeconomy, it was still underdeveloped relative to international standard. The results further showed that though Nigeria was a bank-dominated economy, the structure of the financial system, had in recent times tended towards a capital market-based system. The SVAR econometric results indicated that, using nominal values of bank balance sheet variables, an unanticipated 1.71% hike in treasury bill rate led to a decline of only 0.9% and 1.2% in bank securities after the first and second quarter and increased afterwards. A negative response occurred in bank deposit and bank credit (total loans and advances) and the maximum impact of monetary policy on both variables was a decline of 2.2% which occurred after 13$^{th}$ and 19$^{th}$ quarter respectively. Real GDP and consumer prices also declined by 0.9% and 2.8% after the 1$^{st}$ and 5$^{th}$ quarter respectively, while nominal exchange rate depreciated immediately

following monetary policy shock (measured as unanticipated hike in treasury bill rate) and appreciated after the 2nd quarter. Also, the average lending rate of banks increased immediately following the unanticipated 1.71% hike in treasury bill rate. The estimation of the SVAR using real values of bank balance sheet variables also indicated that these variables showed positive though declining innovations. The FEVD revealed that after 12 quarters bank credit contributed only 3% to the forecast error variance of the real GDP and 30% to the forecast error of consumer prices, while nominal exchange rate contributed 27% to the fluctuation in output. Monetary policy shock also accounted for only 1% and 7% of the forecast error variance of bank loans and advances after the 4th and 12th quarter respectively. The GCT also indicated that while bank deposits was the main source of variability in prices, nominal exchange rate was the basic cause of fluctuation in real activity in Nigeria.

The study concluded that the bank credit channel was weak in the Nigerian economy. The major source of variability in economic activity was the nominal exchange rate while the main cause of fluctuation in prices was bank deposits.

# CHAPTER ONE

# INTRODUCTION

## 1.1 Background of the Study

In an attempt to attain desired macroeconomic objectives in developed and developing countries, the authorities have crucially relied on monetary policy as one of the cornerstones of economic policy thrust. In developing countries in particular, it is presumed as Montiel (1991) noted that the authorities have access to monetary policy instruments and could manipulate them to achieve desired objectives.

Monetary policy is a deliberate measure designed by monetary authorities to affect the volume, costs and availability of money and credit in the economy. As one of the basic macroeconomic policies, great emphasis on monetary policy as stabilization tool could be ascribed to the rebirth of interest on the impact of monetary changes and the wide acceptance of the philosophical view that money does matter in the economy in the 1960s[1]. In justification of the importance of money in the American economy, Friedman and Schwartz (1963) emphasized the large correlation between money supply and output, particularly during the great depression. Since it regained equal billing vis-à-vis fiscal policy, monetary policy has been greatly acknowledged in most circles as an economic stabilization technique (Crouch, 1972).

Although monetary policy is one of the basic macroeconomic policies in developed and less developed countries, how and through what channel(s) monetary shocks transmit to affect real sectors of the economy have been open questions in

[1] The Keynesian Revolution of the 1930s emasculated the earlier economic doctrine which attached great importance to the stock of money as the determinant of the level of output and prices. The scholarly work of Milton Friedman, his collaborators, students and other followers of the Chicago school in the mid-1950s, however, witnessed the revival of interest in the role of money and monetary policy in the1960s.

monetary economics. The traditional 'money view,' of monetary transmission mechanism is based on the so-called interest rate channel which operates within the IS-LM framework. The basic assumptions of this view are: (i) sticky price adjustment to money supply shocks, (ii) direct control of monetary authority on nominal money supply by adjusting reserves, (iii) presence of only two financial assets - money and bonds, of which the latter is supposed to be representative of the whole capital market, (iv) bonds and bank credit are perfect substitute to firms, and (v) perfect financial markets. Under these assumptions, an open market purchase of bonds by the central bank increases bank reserves, thereby boosting the banking system's ability to create deposits. Since the asset portfolio of economic agents is now in disequilibrium (that is, short in bonds and long in money), this causes a movement into bonds. The demand for the latter increases, thereby raising their prices. As this occurs, the capital market interest falls, thereby reducing the user cost of capital for a range of planned investment activities, and interest sensitive spending rises.

With several empirical evidence from advanced countries, that investment expenditure is less sensitive to interest rates relative to "accelerator variables" (e.g. lagged output, sales, or cash flow); coupled with the growing literature on asymmetric information in financial markets in the 1970s[2], modern literature on monetary transmission mechanism have assigned a central role to the financial structure of an economy. According to the financial structure hypothesis, information asymmetries or imperfect information in the financial markets has led to the propagation of the *credit channel* as either an alternative or amplifying channel of monetary policy. This credit

[2] Economics of information, as a new field in economics could be attributed to the celebrated work of Akerlof (1970): The Market for `Lemons': Quality Uncertainty and the Market Mechanism," Quarterly Journal of Economics, 84, 488-500.

channel popularly known as the *credit view* places emphasis on changes in the lending by banks and other financial intermediaries as an alternative to internal finance. According to the credit view, monetary policy transmits to its operating target via two "sub-channels" known as the bank-credit channel and the balance sheet channel. The bank-credit channel holds that because of asymmetric information in the credit market, banks are able to play special role[3] (i.e. gathering information, evaluating projects, and monitoring performance) by providing loans to some categories of firms that their demand for credit would have been turned down in the capital market. In this respect, monetary policy affecting the supply of loan, therefore, affects the performance of these firms. The balance sheet channel, on the other hand, does not specifically concentrate on bank loans but refers more generally to the overall supply of funds. It states that a monetary tightening may worsen borrowers' risk characteristics (e.g. by lowering the net worth of potential borrowers) and as a reaction, leads to reduction of funds.

The implications of the credit view, if it exists, as Worms (2001) observes are: first; marginal cost and earnings consideration are no longer the sole factors relevant to investment and funding decisions, but additionally the availability of funds. Second, the overall effect of monetary policy on aggregate expenditure can no longer be completely characterized by a vector of price variables. Third, the assumption of perfect workings of the financial markets characterizing the traditional macroeconomic analysis no longer holds. For instance, under the Modigliani–Miller (1958) world, real economic decisions were assumed independent of financial structure in a setting of perfect market.



[3] This view also stressed that banks enjoy some economies of scale resulting from their ability to provide loan facility to some categories of firms which under normal circumstance would have found it difficult to obtain finance from the capital market.

In analyzing the impact of a country's financial structure on monetary policy transmission, Kashyap and Stein (1997a) focused on the importance of the banking system and emphasized the distributional effects of monetary policy. The conventional wisdom has always been that some industries are more sensitive to interest rate changes than others. Therefore, changes in policy–controlled interest rates have differential effects across industries. The credit view, which is based on financial structure, formalizes the above reasoning and maintained that some firms are more dependent on banks for financing than others. As such, monetary policy reducing banks reserves affects the supply of bank loans and therefore the willingness of banks to lend. In this dimension, monetary policy has a bigger impact on firms that are reliant on banks for their financing.

The distributional effect of monetary policy, according to Cecchetti (1999) implies that in economies where financial structures are characterized by small banks, less healthy banking system, and poorer direct capital market access, such countries are likely to display a greater sensitivity to monetary policy than do countries with big, healthy and well- developed capital market.

In Nigeria, the financial markets before the adoption of financial deregulation programme in 1987 were highly under intensive regulation. In the money market, the level and structure of interest rates were fixed and administratively determined by the Central Bank of Nigeria. At the same time, there were predominance of mandatory sectoral allocation of bank credit to prioritized sector of the economy, restrictions on bank licensing and quantitative ceiling on bank credit to the private sector of the economy. In the capital market, inflows of private investments were severely restricted

due to the Exchange Control Act of 1962 and Nigerian Enterprise Promotion Decree of 1989(Akinlo, 2004).

The regulation of the economy in the pre-SAP era has several impacts on different sectors of the economy. In the financial markets, in particular, bank finance was relatively more important than equity finance during the controlled regime[4]. This implies that the structure of the financial markets in this period was dominated by banks and credit from these institutions forms the bulk of financial liabilities to the private sector. In assessing monetary policy under this regime, Nnanna (2002) maintained that empirical evidence during the regulated regime revealed that the flow of credit positively influenced investment output and domestic price level. The National Centre for Economic Management and Administration (NCEMA, 1994) also indicated that bank credit has been the channel through which monetary impulse are transmitted to expenditure stream in Nigeria. These studies are in line with Tseng and Corker (1991). These authors maintained that in an underdeveloped and regulated financial system, monetary policy works mainly by directly affecting the availability of credit. Another effect of economic regulation was the failure of interest rates to intermediate effectively between lender and borrowers. This consequently led to its insignificance in money demand as well as in the transmission of monetary policy to the real sector[5]. The overall consequence of policy measures adopted during the controlled regime on the economy, therefore, was a lot of distortions and inefficiencies engendered (Anyanwu, 1995).



[4] Ikhide (1997) found that the average debt-equity ratio of quoted companies in Nigeria stood at 40.83% and 58.36% in 1983 and 1984 respectively. This ratio further increased to 63.92% in 1985.

[5] Studies by Tomori, (1972); Ajayi (1974a); Teriba (1974); Ojo, (1974a, 1974b); and Iyoha (1976) unambiguously supported the view that interest rate is not a good channel of monetary transmission mechanism in Nigeria under the controlled regime.

Upon the liberalization of the financial markets in 1987, measures such as interest rates deregulation, removal of credit controls, liberal licensing of new banks, deregulation of foreign exchange market and institutional and regulatory changes were adopted (Ogwuma, 1993). The primary objective of financial deregulation programme in Nigeria is to enhance efficiency through a greater reliance on market forces as well as to improve the effectiveness of monetary management. Given that financial structure affect monetary transmission mechanism, an understanding of the extent to which deregulation has altered the structure of financial markets in Nigeria is important in the light of its implication for monetary policy as a stabilization tool.

The main thrust of this study, therefore, is to empirically assess the structure of the financial markets under the pre and post deregulation era and test for the existence or otherwise of the bank credit channel in Nigeria. This study is important because if the bank credit channel is found to be an important channel of monetary transmission mechanism during the deregulated regime, then any factor affecting the availability of bank credit may affect the macroeconomy.



## 1.2 The Research Problem

The financial structure of an economy has been postulated to be affected by deregulation and innovations in financial markets (Tseng and Corker, 1991 and Estrella, 2001). This, as theoretical and empirical studies have shown, impinges on monetary transmission mechanism (Thornton, 1994, Cottarelli et. al., 1995, Cecchetti, 1999 and Estrella, 2001). The implication of this proposition is that in a regulated financial system characterized by mandatory sectoral allocation of bank credit and other direct control measures, a reform of financial markets could alter the mode(s) of transmission of

monetary impulse to the real sector. In particular, the bank credit channel which has been postulated to depend on the financial structure of the economy may become less operative.

With regard to Nigerian economy, available data reveals that despite the deregulation of the financial markets, some features prevalent under the regulated regime persist. The banking sector which has been the dominant sector in the financial markets before the adoption of deregulatory measures still leads. As such, this sector remains the provider of the bulk of financial liabilities to the private sector of the economy. The activities in this sector also dominate that of non-bank financial intermediaries (Iniodu, and Udomesiet, 2004). As CBN (2003) and SEC(2003) indicate, while the ratio of deposit money banks' credits to the gross domestic product stood at 18.9 % and 14.1% in 1985 and 1995 respectively, the ratio of stock market capitalization to the gross domestic product was only 9.2% and 6.3% in these years. In 2000, 2001 and 2003, deposit money banks' credit to the private sector as a percentage of the GDP was 11.8%, 16.3% and 15.5% respectively, while the stock market capitalization as a percentage of the GDP for these years stood at 9.4%, 11.8% and 18.5% respectively. The computations derived above sources also showed that the number of banks per million of the population increased from approximately 5 in 1970 to 23 in 1990, while this figure stood at 27 in 2003. Other salient feature of the Nigerian banking industry is that it is still characterized by many small and unhealthy banks. This is indicated by the ratio of non-performing credit to total credit of the banking industry which was 21 percent in 1999 while in 2000 and 2001, this ratio stood at 17% and 16% respectively. This ratio is still very high when compared with other countries.

The above features seem to lend credence to the credit view, in particular, the bank credit channel of monetary transmission mechanism. Moreover, since several studies have indicated that the dominant channel of monetary transmission mechanism under controlled regimes is the credit channel, it becomes skeptical whether the financial structure as well as existing channel(s) have been altered due to deregulation. The theoretical foundation of the credit channel is that the asymmetric information in the financial markets enables banks to play special role in the economy by providing finance to some class of borrowers who would have been turned down in the capital market. Since banks are special under this framework, monetary tightening constraining loan supply ultimately reduces the investment of these firms and ultimately aggregate output. The first implication of this, therefore, is that given that the credit channel exists, monetary policy constraining bank credit may have critical effects on economic activity and may amplify swings in the macroeconomy (Bliss and Kaufman, 2002). Second, variation in monetary aggregate will have lesser impact relative to bank credit on the real sector of the economy.

For bank credit channel to be effective, however, two necessary conditions must hold. First, banks must play special role in the credit market by making loans to a particular class of borrowers (i.e. small and medium scale enterprises) who find it very costly to obtain credit from the capital market. Second, monetary policy actions should be able to constrain the supply of bank loans. Given the theoretical conditions for the existence of the bank credit channel, the issue of its existence or otherwise under the financial deregulation programme in Nigeria is therefore an empirical one. Though a lot of studies (Bernanke and Blinder, 1992; Romer and Romer, 1990, King, 1986, Kashyap,

Stein and Wilcox, 1993) have empirically investigated the bank credit channel and confirmed its existence in the United States, it has been argued recently that financial deregulation have altered the structure of financial markets in a way that should have weakened the bank credit channel of monetary policy overtime (Thornton, 1994). One of these arguments is that the deregulation of financial markets have subjected banks to stiff competition from non-bank intermediaries and this have opened up other financial options for some firms(especially small and medium scale firms) who initially relied on banks for finance. The deregulation of financial markets and associated financial innovation, in this case, has therefore reduced the share of bank credit in total amount of funds available to the private sector (see Edwards, 1993; Gorton and Pennacchi, 1993 and Thornton, 1994). It has also been argued that banks' access to financial markets has increased significantly, resulting in greater proportion of bank funds coming from sources that are not affected directly by the central bank actions. Under these conditions, proponents of the above view hold that banks are no longer special.

While the above views are to a large extent tenable in the United State and other advanced countries, the lack of extensive studies on monetary transmission mechanism, coupled with the feature of the Nigerian financial markets in post deregulation has made it difficult to draw precise conclusion about the existence or otherwise of the credit channel. Given this backdrops, the main research questions, which this study intends to pursue, include: to what extend has deregulation policy affected aggregate financial structure in Nigeria? Does monetary policy constrain bank lending in Nigeria? How important is the bank credit channel with the deregulation of the financial sector in

Nigeria? Which aggregate, money or bank credit is the primary cause of variability in economic activity and prices?

### 1.3 Justification for the Study

The Nigerian economy, since the 1980s has witnessed a lot of macroeconomic imbalances. High inflation, massive unemployment, balance of payments disequilibria and low rate of economic growth have been the dominant phenomena. According to CBN(2003), the average rate of inflation in period 1980-85 and 1986-91 were 17.8% and 19.2% respectively while this rate stood at 44.9% and 13.9% in 1992-1997 and 1998-2003 respectively. Moreover, within the period 1986-2003, the average rate of growth in real gross domestic product was only 3.1%. With respect to the balance of payments, evidence also indicates that, except for the years 1997, 2000 and 2001, deficits have been recorded persistently since 1986. In the face of these problems, it becomes obvious that the conduct of monetary policy has not been successful, given its fundamental objective which include the control of inflation and maintenance of relative price stability consistent with high rate of employment, healthy balance of payments and enhancement of rapid economic growth the development (Onyido, 2000). The macroeconomic situations in Nigeria, therefore, means that a proper understanding of how and through what channel monetary impulse transmits to the real sector is crucial, if the overriding objective of price stability[6] is to be attained by monetary authorities.

Decrying the problem of understanding monetary transmission mechanism, especially in LDCs, Montiel (1991) reiterated that the structure of the financial markets

[6] Recently, most central banks have adopted price stability as the overriding objective of monetary policy. The focus on price stability as Nnanna (2002) noted 'derives from the overwhelming empirical evidence that sustainable growth cannot be achieved in the midst of price volatility'.

(characterized by limited menu of financial assets to private agents) in these countries has made such mechanism very problematic[7]. Tseng and Corker (1991) also maintained that the channels through which monetary policy operate in these countries depend on the financial structure of the economy. In particular, the aggregate financial structure, in line with these authors, is influenced by the maturity and depth of financial markets, the flexibility of interest and exchange rates, and the degree of external capital mobility.

The implication of the foregoing is that if the credit channel is operative, macroeconomic policy formulation and implementation based on only traditional interest rate as a transmission mechanism will be largely inadequate. Traditional models based on this conventional channel presume that interest rate changes affect investment by changing the required rate of return on an investment project. However, interest-rate elasticities of macroeconomic aggregates have been found to be surprisingly low[8].

In the light of the foregoing, the main reasons for the test of the bank credit channel of monetary transmission are: first, research into the monetary transmission process will provide insight into new policy instrument(s) in addition to traditional instruments (money supply or interest rates). For instance if the credit channel is observed to be an alternative channel of monetary transmission in the Nigerian economy, then the Central Bank of Nigeria could affect the real spending of borrowers directly through this channel and improve the trade-off between inflation and output objectives, or exchange rate and domestic economic objectives.



---

7 Montiel (1991) extensively discussed the transmission mechanism of monetary policy in developing countries.

8 See, for example analysis of inventory investment in Kasyap, Stein and Wilcox (1993), and empirical studies on business fixed investment in Chrinko (1993) and Cummins, Hassett, and Hubbard (1994, 1996).

Second, given that monetary policy operates through the credit channel, a reduction in the share of bank credit in the total amount of funds available to the private sector due to changes in the structure of financial system may affect the stance of monetary policy. In this respect, Edwards (1993), Gorton and Pennachi (1993), have shown for the U.S. economy that financial deregulation and innovations have reduced the share of bank credit in the total amount of funds available to the private sector. Corroborating this view, Morris and Sellon (1995) argued that if bank credit plays a central role in monetary transmission mechanism, changes in bank lending practices or in the role that banks play in financial markets could alter the mechanism and have important policy implications.

The third motivation for studying the credit channel is to develop a more reliable information variable for monetary policy. The experience in many countries is that the short-term relationship between monetary aggregates and the economy tends to break down from time to time. If the credit channel is important, bank credit may be more reliable indicator of monetary policy. Fourth, an empirical investigation of the credit channel will strengthen the case for the proposition that monetary policy affects the real economy. In Nigeria, the conduct of monetary policy has been a very great challenge and demands an in-depth study and understanding of the mechanism that transforms monetary policy actions into real economic activity.

Last, the justification for this study also stems from the dearth of empirical findings on monetary transmission mechanism in Nigeria. To our knowledge, the only few studies that have attempted to examine monetary transmission mechanism in Nigeria

are Jimoh (1990), Uchendu (1997) and Oyaromade (2003). This study, however, is basically different from the existing ones in terms of objective and methodology.

Given the above justifications, this study appraises the structure of the financial markets prior and after the adoption of financial deregulation and empirically tests for the existence of bank credit channel in the Nigerian economy. The study also investigates the implications of the bank credit channel for the conduct of monetary policy in Nigeria.

## 1.4 Objectives of the Study

The broad objective of this study is to empirically assess the structure of the financial markets and test for the existence of bank credit channel of monetary policy transmission in the Nigerian economy. The broad objective is decomposed into the following specific objectives; namely to:

(i) evaluate the structure of financial markets before and after the adoption of financial deregulation policy in Nigeria.

(ii) investigate the impact of monetary policy on bank lending in Nigeria.

(iii) examine the importance of the bank credit channel in the light of the deregulation of financial markets in Nigeria.

(iv) determine whether money or bank credit, is the primary cause of variability in economic activity and prices in Nigeria.

## 1.5 Scope of the Study

This study focuses on the bank credit/lending channel as a channel of monetary policy transmission as distinct from the broad credit channel or balance sheet channel. The bank credit channel emphasizes the role played by banks in the transmission of

monetary policy. The broad credit channel, on the other hand, relates to the supply of credit by all financial intermediaries, and it emphasizes the role played by asymmetric information in the existence of an external financing premium[9]. The focus on the bank credit channel stems from the fact that the investigation of the broad credit channel requires data on the balance sheet positions of firms. Being constrained by paucity of data the study focused on the test of bank credit channel in the Nigerian economy. Both annual and quarterly time-series data covering the periods 1970-2003 and 1986-2003 respectively are used. The annual series is further broken into sub-samples 1970-1985 and 1986-2003 to take account of the period before and after the adoption of financial deregulation policy in Nigeria.

### 1.6 Plan of the Study

This study is made up of seven chapters. Chapter one gives the background of the study. In chapter two, attention is focused on the survey of theoretical and empirical literature. Chapter three delves into the theoretical framework and research methodology employed in the study. In chapter four, the conduct, strategies and macroeconomic environments under which monetary policy has been operated in the Nigerian economy are examined. In chapter five, the issue of financial deregulation and Nigeria's financial structure is investigated. The analysis of data and interpretation of results is carried out in chapter six, while chapter seven contains the summary, conclusion and policy implications of this study.



[9] This premium is defined as the difference in the costs of financing externally vis-à-vis financing internally.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 Introduction

This chapter focuses on the concept of financial structure as well as the review of theoretical and empirical literature on monetary transmission mechanism. In an attempt to carry out this exercise, the various definitions of financial structure is explored and the perspective of this study with respect to this concept is stated in section 2.2. Section 2.3 surveyed the theoretical literature on the channels of monetary transmission mechanism as well as the link between financial structure and aggregate economic activity. In this section, the impact of deregulation on the bank credit channel is also explicitly reviewed. Moreover, section 2.4 attempts a review of empirical literature in sequence of evidences drawn from developed countries, other developing countries, and the Nigerian economy. In Section 2.5 we conclude this chapter.

## 2.2 Definition of Financial Structure

The definition of financial structure as used in the literature has followed either a macro or micro perspective. In his seminal book titled *Financial Structure and Development*, Goldsmith (1969) defines financial structure as "a mixture of financial instruments, markets and institutions operating in the economy". This author argued that financial structure affect economic development. Moreover, Cottarelli and Kourellis (1994) view financial structure broadly to include such features as the degree of development of money and financial markets; the degree of competition within the banking system, and between banks and other intermediaries (as affected by both the

regulatory environment and the number and size of intermediaries); the existence of constraints on capital movements; and the ownership structure of financial intermediaries. Following Rene (2000), financial structure is defined as consisting of the institutions, financial technology, and the rule of the game that defines how financial activity is organized over a point in time. According to Rene (2000), the same function of a financial system can be performed by different institutions or according to different rules. The above definitions have looked at financial structure from macro perspective.

From the perspective of corporate finance, financial structure is defined as the way in which firm's assets are financed such as short-term borrowing, long-term debt, and owners' equity (Campbell, 1984). Financial structure, in this direction, is the right side of a firm's balance sheet, detailing how its assets are financed including debt and equity issues. This definition is microeconomic in nature since it focuses on how a particular firm finances its assets. Since macroeconomics have a microfoundation, the financial structure of a country using this definition, connote the dominant mode of finance available to firms in a country, whether debt or equity finance.

In view of the various definitions of financial structure, it therefore implies that there is no single acceptable definition of the concept.[10] Though, the term 'financial structure' has been variously defined, Beck et. al. (2000) maintained that historians, economists and policy makers have stressed financial structure in terms of the relative importance of the banking sector and the securities market as a major source of finance to the private sector of the economy. In a situation where the banking sector is the dominant provider of finance to the private sector, then the financial structure is said to be bank-

[10] See, Beck, et. al. (2000): Financial Structure and Economic Development: Firm, Industry and Country Evidence.

based. On the other hand, if the capital or securities market is the main source of finance for the private sector, then the financial structure of the economy is said to be market based.

Defining financial structure in this context, several studies in developed and developing countries have recently emerged to re-investigate the impact of bank-based or market-based financial system on economic development of a country as well as monetary transmission mechanism. For instance, in recent studies, it has been documented that asymmetries in monetary policy transmission may result from differences in financial structure[11]. The implication of financial structure is that if a country is found to be bank-based (such that the banks are the provider of the bulk of financial liability to the private sector) then the bank credit channel is expected to amplify the traditional interest rate channel. In this respect Ceccheti (1999) argued that the "prediction is that overall, the transmission mechanism will be stronger in those countries where firms are more bank dependent, and where the banking system is less healthy and less concentrated".

This study adopts the latter definition of financial structure. As such, the focus is on how changes in financial markets resulting from deregulation affect the transmission of monetary policy.



### 2.3 Survey of Theoretical literature

This section surveys the theoretical literature on monetary transmission mechanism, the impact of deregulation on the credit channel and the link between financial structure and aggregate economic activity.

[11] See chapter 6 of Eijffinger, S.C.W and J. De Haan (2000), European Monetary and Fiscal Policy, Oxford, Oxford University Press.

### 2.3.1 Theories of Monetary Transmission Mechanism

For successful conduct of monetary policy, policy makers must have prior knowledge about the timing and effect of their action on the economy. This exercise further requires an understanding of the monetary transmission mechanism (MTM). Monetary transmission mechanism is the mechanism through which monetary policy affects the decisions of firms, households, financial intermediaries, investors and ultimately alters the level of economic activities and prices. Taylor (1995) further defines monetary transmission mechanism as the process through which monetary policy decisions are transmitted into changes in income and inflation.

While there seems to be consensus in macroeconomics that monetary policy has real effects and that money is not simply a veil, there is still an open question about how monetary policy is transmitted to real variables. Attempts to explain how monetary policy transmits can be found in the traditional or "money" view and the "credit view" of monetary transmission mechanism.

#### 2.3.1.1 The "Money View"

The traditional view of monetary transmission mechanism is explicitly embedded in the Keynesian IS-LM framework and emphasized the role of interest rates in transmission of monetary impulse to affect the real sector of the economy. This view is the widely accepted benchmark or textbook model for analysis of monetary transmission mechanism (Hubbard, 2001). This framework implicitly assumes that financial markets are complete and information and transaction costs are non-existent; that is, the Modigliani, and Miller (1958) theorem holds. In this version of monetary transmission

mechanism popularly known as the “money view”, all agents in the economy are assumed to maintain their wealth only in the form of two financial assets: money and bonds. The latter asset is supposed to be representative of the whole capital market (Kakes, et.al.1999). Moreover, there is the underlying assumption in this view that banks offer no special services on the asset side of their balance sheet. However, on the liability side of their balance sheet, banks perform a special role: the banking system creates money by issuing demand deposits.

Under the Keynesian IS-LM model, monetary policy works primarily through its impact on the capital market interest rate. An open market purchase of government securities (bonds) leads to a rise in the amount of reserves and deposits. As the economy is made up of only two financial assets, agents tend to hold more money and fewer bonds. This disequilibrium in asset portfolio causes a movement into bonds. The demand for bonds increase, bonds prices rise and real interest rate falls (Levacic and Rebmann, 1982). The fall in real interest rate on bond decreases the cost of financing investment, thereby causing the growth of investment spending which drives aggregate demand and output up. Schematically, the interest rate channel can be depicted as follows:

Expansionary Monetary Policy => ↓Real Interest Rate =>↑Investment =>↑Output

In monetary contraction, the central bank sells bonds. This reduces reserves, limiting the banking system ability to sell deposits. Depositors must then hold more bonds and less money in their portfolio. If prices do not instantaneously adjust to changes in money supply, the fall in household money holding represent a decline in real money balances. To restore equilibrium, the real interest rate on bond increases, raising the user

cost of capital for a range of planned investment activities, and interest-sensitive spending falls.

The Keynesian IS-LM framework focuses on the equilibrium position between the demand for and supply of money to determine the rate of interest. This in turn provides the link to real spending and investment.

Let the demand for real money balance (L) and its supply ($\frac{\overline{M}}{\overline{P}}$) be[12]

Real Money demand $L = ky-hi$……..…….……(2.1)

Real supply of money $=\frac{\overline{M}}{\overline{P}}$

Equilibrium $L=\frac{\overline{M}}{\overline{P}}$ ……..……..(2.2)

LM curve $i=\frac{1}{h}(ky-\frac{\overline{M}}{\overline{P}})$……..……(2.3)

Where y is the real income and $\overline{M}$ and $\overline{P}$ nominal money supply and the price level. The nominal money supply is assumed to be under the control of the central bank while the price level is assumed constant. Moreover, k and h are the slopes of the demand function, while i is the rate of interest.

For the IS curve, assuming a two-sector economy for simplicity, the equilibrium in the goods market is given by the equation:

$S = I$……..……..(2.4)

[12] See Dornbush and Fisher(1990)

Given that saving(S) is positively related to the level of income(y) and interest rate(i) while investment(I) also depends on interest rate, then the saving and investment functions could be expressed as:

$$S = a_0 + a_1 y + a_2 i,\ a_0 < 0,\ 0 < a_1 < 1,\ a_2 > 0 \quad \text{.....(2.5)}$$

$$I = b_0 + b_1 i \quad \text{.....(2.6)}$$

By substituting equations (2.5) and (2.6) into (2.4), the IS curve is given as

$$i = \phi_0 + \phi_1 y \quad \text{.....(2.7)}$$

where **Erreur ! Signet non défini.** $\phi_0 = \frac{a_0 - b_0}{b_1 - a_2}$, and $\varphi_1 = \frac{a_1}{b_1 - a_2}$

Equilibrium in the money and goods market is derived by equating equation (2.3) and (2.7).

$$\frac{1}{h}(ky - \frac{M}{P} = \frac{a_0 - b_0}{b_1 - a_2} + \frac{a_1}{b_1 - a_2} y$$

$$y = \frac{h(a_0 - b_{0)}}{k(b_1 - a_2)} + \frac{b_1 - a_2}{k(b_1 - a_2) - a_1 h} \frac{\overline{M}}{\overline{P}} \quad \text{.....(2.8)}$$

From (2.8) a change in money supply (given that the price level is constant) clearly affects the level of income through the parameters $a_1$, $a_2$, $b_1$, h, and k which are the slope of the IS-LM curves. Thus, the real money supply multiplier can be written explicitly as

$$\partial y / \partial \left( \frac{\overline{M}}{\overline{P}} \right) = \frac{b_1 - a_2}{k(b_1 - a_2) - a_1 h} \quad \text{.....(2.9)}$$

Based on equation (2.9) it is obviously clear that the interest rate channel operates through the following schematic diagram:

h: $\left[\Delta\left(\frac{\overline{M}}{\overline{P}}\right) \Rightarrow \Delta i\right]$, $b_1 : (\Delta i \Rightarrow \Delta I)$ and $a_1$: $(\Delta I \Rightarrow \Delta y)$ with k: $(\Delta y \Rightarrow \Delta L)$ acting as a feedback effect. The schematic diagram means that changes in real money supply lead to changes in interest rates through h and changes in interest rates affect investment spending through $b_1$. Changes in investment spending, in turn, lead to changes in the level of income through $a_1$ while changes in the latter also affect money demand through the parameter k.

Following Hubbard (2001), the four key assumptions upon which the money view or the interest rate channel is based are:

(i) the central bank must control the supply of "outside money", for which there are imperfect substitutes;

(ii) the central bank can affect real as well as nominal short term interest rates and affect longer-term interest rates, that is, prices do not adjust instantaneously;

(iii) policy induced changes in real short-term interest rates affect longer-term interest rates that influence household and business spending decisions; and

(iv) plausible changes in interest –sensitive spending in response to a monetary policy innovation match reasonably well with observed output responses to such innovations.

Farinha and Marques (2002) observed that since monetary policy operates through the liability side of bank's balance sheet under the money view, it therefore implies that two basic necessary conditions are essential for its effectiveness. First, banks cannot perfectly shield transaction balances (deposits) from changes in reserves. Second, there are no close substitutes for money in the conduct of transactions in the economy.

Under the money view, policy induced changes are transmitted via interest rates to aggregate demand through various sub-channels: exchange rate, Tobin–Q, and wealth channels.

*Exchange rate channel*

This channel essentially depends on the traditional interest rate channel in propagating monetary stimuli to the economy[13]. When the central bank loosens monetary policy and domestic interest rates fall, assets dominated in local currency become less attractive relative to foreign assets. As the demand for foreign assets increases, the domestic country experiences capital outflow, this subsequently increases the demand for foreign exchange. The increase in demand for foreign exchange further increases the prices of foreign exchange thereby depreciating the nominal exchange rate. As the exchange rate depreciates, imports becomes more expensive, this in turn raises the attractiveness of locally produced goods in the export market, thus stimulating net exports and output in the economy. This channel of monetary transmission can be represented schematically below.

Expansionary Monetary Policy => ⇓ Real Interest Rate =>⇓Exchange Rates

(depreciates) => ⇑Net Exports => ⇑Output

*Tobin's q Ratio Channel*

This channel of MTM works mainly through the prices of equities and like the exchange rate channel, its operation is not independent of the interest rate channel. The

[13] See Mishkin (2001)

Tobin's-q[14] ratio predicts the effect of monetary policy on q (that is, the ratio of market value of the firm to the replacement cost of its real assets) and hence on the level of investment. An expansionary monetary policy by the central bank induces a portfolio adjustment from money into equities. As the demand for equities increases, their prices rise; thereby increasing the market value of firms relative to the cost of replacing their real assets (this is, an increase in q ratio). As this occurs, businessmen are motivated to increase their level of investment. The rise in the level of investment further stimulates the level of aggregate demand and output in the economy. The link of causation under Tobin's - q ratio is as follows:

Expansionary Monetary Policy =>↑ Equity Prices =>↑ Tobin q-Ratio

=>↑Investment =>↑Output

*Wealth Channel*

This channel of MTM operates through the prices of assets (both financial and real) which are the basic components of household wealth. When an easy monetary policy is adopted by the central bank, the increase in stock of money resulting from this policy induces a switch from money to other financial and real assets. The increases in demand for these assets raise their prices and the value of households financial wealth increase. Since one of the basic determinants of household consumption is financial wealth, an increase in the latter stimulates consumption, the level of aggregate demand and the level of output. This channel can be represented below.

Expansionary Monetary Policy =>↑Assets Prices => ↑Value of Financial Wealth =>

↑Consumption => ↑Output

[14] J. Tobin, " A General Equilibrium Approach to Monetary Theory" Journal of Money, Credit and Banking , Vol. 1 (February, 1969)

With several empirical evidence that investment expenditure is less sensitive to interest rates relative to "accelerator variables" (e.g. lagged output, sales, or cash flow); coupled with the growing literature on asymmetric information in financial market, further search for a broader transmission mechanism led to the propagation of the credit view.

#### 2.3.1.2 The Credit Channel

Under an imperfect capital market characterized by information asymmetry, Bernanke and Blinder (1988), Bernanke and Gertler (1989), Bernanke (1993) and Kashyap and Stein (1994) have recently emphasized the crucial role of the credit channel in the monetary transmission process. This channel stresses that monetary policy actions affect output, in part, by affecting the amount and conditions of credit supplied by financial intermediaries. The theoretical underpinning of this channel is based on information failures/asymmetries existing between borrowers and lenders in financial markets and how these credit market frictions might affect real variables in the economy.

An important function of credit market is to support the efficient allocation of saving and investment. Two forms of credit can be observed: direct credit and indirect credit via financial intermediaries. The reasons for the existence of financial intermediaries, following Holtemöller (2002) are credit market imperfections like incomplete and asymmetric information as well as transaction costs. The informational problems on credit markets can be divided into adverse selection, moral hazard, monitoring costs and agency cost (Walsh, 1998). Adverse selection describes a situation in which different types of agents exist but the type of the respective contract partner is not known before conclusion of a business contract. A bank, for example, does not know

in advance whether a potential lender is a good or bad credit risk. A situation in which one contract partner cannot observe the actions of the other contract partner is denoted by moral hazard. This is the case if the creditor cannot observe how the debtor spends the borrowed money. Monitoring cost occur, if the actions of the contract partner are observable in principle but this is costly. This is, for example, relevant if the repayment amount does depend on the wealth of the debtor in case of default. Agency costs are a more general category of costs than the other ones. Agency costs results from all kinds of principal-agent relationship. In case of credit, external financing becomes expensive for a firm than internal financing using retained earnings. The cost differential is called external finance premium (EFP) and is an important component of the financial accelerator model of Bernanke and Gertler (1989) and Bernanke et. al. (1996, 1999).

Two versions of the credit channel have been described in the literature[15]: the bank credit/lending channel and the broad credit channel otherwise known as the balance sheet or financial accelerator channel.

*The Bank Credit/Lending Channel*

This channel of MTM relies on the dual nature of banks as holders of reserve-backed deposits and as originator of loan[16]. The bank-lending channel centres on the premise that bank loans are of special importance particularly for bank-dependent small firms in monetary transmission. The special nature of bank loans is attributable to the more realistic presumption that loans differ from publicly issued securities in a meaningful way. It is presumed under this channel that small and medium-sized firms,

[15] See Miskin (1996) in his summary article.

[16] The description of the bank lending channel can be found in Blinder and Stiglitz (1983), Romer and Romer (1990), Bernanke and Blinder (1988, 1992) and Oliner and Rudebusch (1995, 1996).

facing informational frictions in financial markets rely primarily on bank loan for external finance because it is prohibitively expensive for these borrowers to issue securities in open market. In other words, the basic idea surrounding the bank-lending channel is that the cost of obtaining information about a firm's condition as well as liquidation or bankruptcy costs, are differentially greater for smaller firms. Thus, small firms find it difficult and more costly to obtain credit. However, the special feature of banks make them have comparative advantage over other intermediaries in information processing and monitoring that enables banks to lend to smaller firms at lower cost[17]. Schematically, the bank credit channel of monetary policy can be summarized schematically as follows:

M↑=> Bank Deposit ↑ =>Bank Loans ↑ =>Investment ↑=> Output

or

M↓=> Bank Deposit ↓ =>Bank Loans ↓ =>Investment ↓=> Output

The above scheme indicates that an expansionary (contractionary) monetary policy leads to a rise (fall) in bank reserves and bank deposits. This subsequently results in a rise (decline) in bank loans, which in turn leads to a rise (decline) in investment spending and output.

*The Broad Credit Channel*

This is otherwise refers to as the Balance Sheet Channel or Financial Accelerator Channel. This second version of the credit channel focuses on the supply of funds from all financial intermediaries and markets and has no special role for banks. The broad

[17] Hubbard, R, Glenn (1994): "Is There a Credit Channel For Monetary Policy?" Federal Reserve Bank. St. Louis Economic Policy Conference, October, 20-21.

credit channel stresses that all forms of external finance are imperfect substitute for internal funds. Information asymmetries induce a cost premium for external funds as compensation to lenders for the expected costs of monitoring and evaluation. As noted by Oliner and Rudebusch (1996), the size of the premium depends on the stance of monetary policy. In particular, a tight monetary policy can boost the premium for all types of external funds, which depresses the value of spending. This rise in premium occurs because the tighter policy causes the borrower's balance sheet to deteriorate, reducing the value of the collateral that could be offered to a potential lender.

There are broadly two ways in which the balance sheet channel can operate. One mechanism is that an adverse shock to aggregate demand or a contractionary monetary policy shock may reduce the current cash flows of small and some medium – sized firms; increase the proportion of project finance which must be obtained from external (intermediary) sources, and so raise the external finance premium. In other words, under the broad credit channel, higher interest rates resulting from tight monetary policy increase the interest expenses of small firm and some medium-sized firms who basically depend on short-term debt increase. This situation reduces the net cash flow of these firms thereby weakening their balance sheet positions[18]. As this occurs, the need for external finance intensifies and external finance premium increases, which, because of the effect on expected default, depends on the degree of leverage or indebtedness. This ultimately leads to decline in investment by these firms. Another mechanism by which the balance sheet channel operate is that a tight or contractionary monetary policy reduces the value of assets which otherwise could have been used as collateral. In essence, contractionary monetary policy leads to a reduction in firms' net worth, thereby

[18] It should be noted at this point that rising interest rates are usually associated with falling asset prices.

raising the premium for external finance[19]. As the Balance Sheet positions of these firms deteriorate, they draw down their inventories by cutting investment more than large firms. The shrinkage in investment according to Kim (1999) provides an additional source of amplifying and propagating the initial decline in investment that would be predicted if the interest rate channel alone is operative subsequent to tight monetary policy. This phenomenon is consistent with what has been referred to as the financial accelerator.

Oliner and Rudebusch (1996) demonstrated the amplifying effect of the broad credit channel during tight monetary policy. According to these authors, the increase in risk free interest rate arising from monetary contraction causes a greater reduction in investment when the credit channel is at work than under the normal interest rate channel.

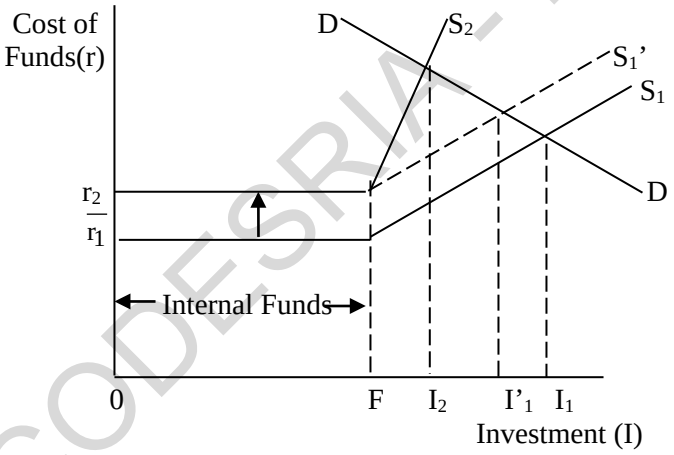



Figure 2.1: Broad credit channel-Magnification of an interest rate increase

Using Figure 2.1, Oliner and Rudebusch illustrated the cost of funds schedule for borrower (DD) and lenders (SS) and the amount of internal funds (F) that a firm has on hand. The cost of internal funds (F) according to these authors is $\overline{r_1}$, which can be

[19] Since weak balance sheet position implies that that the firm is more risky to lend to, the premium on external finance increases.

decomposed into $r_1^f + \theta$, where $r_1^f$ is the risk-free rate (i.e. the instrument of monetary policy), and $\theta$ the risk adjustment appropriate for the firm. Under perfect capital market, external funds which are the marginal source of finance when investment exceeds F would also be available at a rate of $\overline{r_1}$. However, the asymmetry of information between borrowers and lenders produces a moral hazard, as a firm is more likely to default on its debt to outsiders than on its (implicit) debt to itself. This moral hazard raises the cost of external funds above $\overline{r_1}$ by a premium $\Omega$.[20] Following Oliner and Rudebusch (1996), Farmer (1984), and Gertler and Hubbard (1988), $\Omega$ depends on the level of borrowing B (that is, greater B intensifies the moral hazard problem) and the level of risk-free rate[21]. The implication of the dependence of $\Omega$ on the risk-free rate, is that credit market imperfections can act to magnify monetary shock. This magnification effect has been termed the "financial accelerator" or the "collateral effect".

Figure 2.1 demonstrates that as a firm increases the level of borrowing (I-F), moral hazard problem increases and the link between $\Omega$ and borrowing produces an upward slope for $S_1$. However, an increase in the risk-free rate shifts the cost of fund schedule from $S_1$ to $S_2$, and investment falls from $I_1$ to $I_2$. The fall in investment is magnified by the increase in premium for external funds, which causes the new supply to be $S_2$ rather than $S_1$'.

The equations behind the supply and demand schedule in Figure 2.1, as indicated by Oliner and Rudebusch (1996) are:

[20] It therefore implies that the total risk premium embedded in the cost of external funds is $\theta + \Omega$.

[21] Note that investment I = B+F, which implies that B =1-F. Moreover, as $r_1^f$ increases, the discounted value of borrowers' collateral decreases thereby increasing moral hazard.

$$r = -\kappa I + \nu \qquad [2.10]$$

$$r = \bar{r} + \Omega(B, r^f) = r^f + \theta + (\lambda r^f)(I - F),\ \partial\Omega/\partial B > 0, \partial\Omega/\partial r^f > 0, \qquad [2.11]$$

Where equation {2.10} and {2.11} represent the demand and supply schedule respectively, $\Omega$ (B, $r^f$) =$\lambda$ $r^f$B, B =I-F, and the parameters, $\kappa$ and $\lambda$ are greater than zero. With $\lambda$ >0, $\Omega$ depends positively on $r^f$ and B. By equating supply and demand, we derive the equation {2.12} which is the equilibrium investment $I^e$.

$$I^e = \frac{\nu}{\lambda r^f + \kappa} + \frac{\lambda r^f F}{\lambda r^f + \kappa} - \frac{r^f + \theta}{\lambda r^f + \kappa} \qquad [2.12]$$

The sensitivity/elasticity of equation {2.12} to changes in internal fund (F) is

$$\Phi = \frac{\partial I^e}{\partial F} = \frac{\lambda r^f}{\kappa + \lambda r^f} \qquad [2.13]$$

Moreover, the sensitivity of $\Phi$ to changes in risk-free rate is greater than zero. This implies that an increase in the latter leads to increased demand for F for investment purpose. This could be written symbolically as

$$\frac{\partial \Phi}{\partial r^f} = \frac{\lambda}{(\kappa + \lambda r^f)} > 0 \qquad [2.14]$$

The implication of equation {2.14} is that if the broad credit channel is at work, the coefficient on cash flow, $\Phi$, which is a measure of internal liquidity, should be relatively high during the period of high risk-free rates after a monetary tightening. As $r^f$ increases, the cost premium for external funds rises, and internal funds take on special importance as a source of finance. A significant increase in $\Phi$ after a monetary contraction would provide evidence of a broad credit channel.

Following Holtemöller (2002), a broad credit channel is operative if (i) monetary policy has a systematic impact on the external finance premium and if (ii) the external finance premium does systematically affect aggregate output. It should be noted that the existence of a broad credit channel also has microeconomic implications. Under the assumption that the external finance premium of different borrowers is not affected to the same extent, monetary policy does not only change the aggregate level of economic activity but also the income distribution.

This study basically focuses on the bank lending channel. As such, it seeks to empirically assess whether there has been a significant change in the structure of financial markets (due to financial deregulation) and test for the relevance of bank credit channel of monetary policy transmission in Nigeria. Specifically, the motivation for this study is to examine the importance of the bank credit channel upon the deregulation of the financial market in Nigeria.



### 2.3.2 Financial Deregulation and the Bank Credit View

With the deregulation of financial markets in several countries recently, there has been strong argument that the role of banks in financial intermediation and therefore the bank credit channel has weakened. Proponents of this view hold that the change in the structure of the financial markets and the accompanied financial innovation has enabled banks to compete with non-bank financial intermediaries for funds that they could use to augment loan supply during monetary tightening.

Since the credit channel implies that the transmission process of monetary policy depends on the structure of the financial system, the above argument if substantive could affect the relevance of this channel. As generally acknowledged in the literature, two

necessary conditions must be satisfied for a separate bank credit channel to be operative. First bank credit must be special. This means that there must be some borrowers who perpetually rely on bank credit to carry out their operations. Second, monetary policy must affect bank lending. This means that during monetary tightening banks must find it prohibitively costly to raise fund from other sources to augment the fall in loan supply.

Proponents of the view that financial deregulation and innovation have weakened the bank credit channel maintained that as the structure of the financial market changes due to deregulation, the specialness of banks get eroded as they face stiff competition from non-bank financial intermediaries. This argument can be appreciated by considering two cases: one in which there is no special role for the bank because borrowers are free to obtain credit either from banks or in the open market, and one in which the access to bank borrowers to the open market is limited.

Figure 2.2 illustrates the effect of central bank actions on the supplies of bank and non-bank credit when lenders are indifferent to whom they supply credit. The banks' credit supply curve is vertical under the assumption that the supply of bank credit is totally determined by their deposit liabilities which, in turn, are assumed to be determined by the quantity of reserves supplied by the Central Bank. Under these assumptions, an open market sale of government securities reduces the supply of bank credit and, thereby, total credit. This is shown by the leftward shift in bank credit and total credit supply curves in Figure 2.2, panel a and c, respectively. The decrease in the supply of bank credit initially raises banks' lending rate relative to the rate on alternative sources of credit, from $i_b$ to $i'_b$. As some borrowers go somewhere, the demand for other credit increases and the demand for bank credit falls. This is illustrated by a rightward shift in

the other credit demand curve in Figure 2.2, panel b, and a leftward shift in the demand for bank credit in panel a. Eventually, a new equilibrium is achieved, where once again bank rates and other rates are equal.

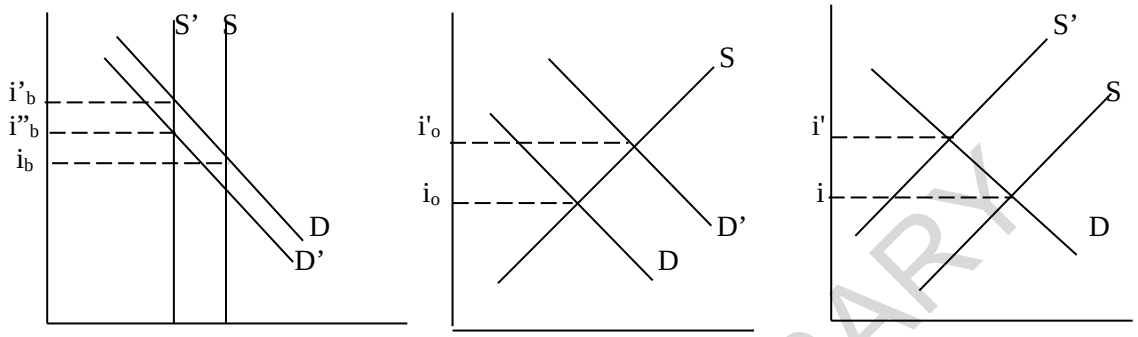



Figure 2.2 (a) Bank Credit (b) Other Credit (c) Total Credit

The Central Bank actions fell disproportionately on bank credit, as the rise in interest rates resulted in an increase in the equilibrium level of other credit. Nevertheless, there was no separate bank credit channel for monetary policy. The decline in the supply of bank credit merely induced bank borrowers to go elsewhere.

Assume now that some bank borrowers do not have access to alternative forms of credit (which is usually the case where capital markets are underdeveloped and bank credit is the major form of finance to firms). The fact that bank credit and other credit are not perfect substitutes requires this illustration to begin from an equilibrium in which the rate on bank loans is above the rate on other credit[22]. In this case, the same policy-induced decline in the quantity of bank credit is associated with a smaller increase in demand for other credit (as illustrated in Figure 2.3) as not all bank borrowers can obtain

[22] Thornton (1994) argued that the fact that the rates on bank loans are generally higher than the rates on government securities and other credit is not sufficient for the credit view. According to him, loans, securities, bank debt and other debt are not equally risky, so neither banks nor the market will be indifferent about their portfolio structures. In line with the authors view, the rates paid on each form of debt will differ by a risk premium that reflects both the banks' and the market's perception of their respective risk characteristics, including differences in the liquidity characteristic of the various assets.

credit in the market. Consequently, when the new equilibrium is established, the bank loan rate would have risen relative to the rate on other credit. Under this assumption, the change in the total quantity of credit is larger than in the previous case. This is most easily seen by noting that in the extreme case where none of the banks' customers can access the other credit market, there would be no mitigating effect of the open market operation on total credit resulting from a rise in the interest rate in the other credit market. Note that the effect of monetary policy actions on total credit will be larger, the smaller the proportion of bank borrowers who have access to other credit sources.

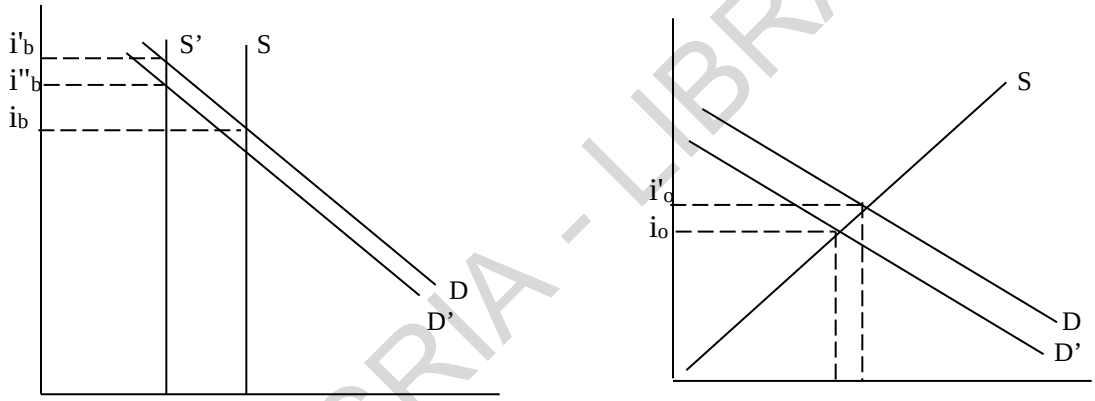



Figure 2.3. (a) Bank Credit (b) Other Credit

In the above analysis, the Central Bank's ability to alter the spread between bank lending rates and other rates depend critically on the assumption that some borrowers were unable to obtain credit in the open market. Less obvious is the results' dependence on the implicit restriction that banks themselves cannot arbitrage the spread between the bank loan rate and market interest rates.

It is important to realize that since banks aim at profit maximization, as the bank loan rate rises relative to other rates, they will have the incentive to arbitrage the larger

interest rate differential by inducing more depositors to, in effect, more bank loans. Suppose that the banking industry is competitive so that individual banks are powerless to influence the rates paid on either bank loans or other earning assets like government securities and given that banks can access other credit market by issuing debt. A restrictive monetary policy action reducing the supply of bank credit causes the rate on bank loans to rise relative to other assets. As this occurs, individual banks would have an incentive to borrow more from the private credit market to make more loans. Banks would raise the rate they pay depositors to induce more private creditors to intermediate credit through banks. If the banking system is competitive and banks are as creditworthy as other debtors, the supply of bank credit will rise and the supply of other credit will fall until the rate differentials once again reflect the banks' and the market's perception of the differential risk. Consequently, if banks are free to arbitrage the interest rate differential, monetary policy actions will not be able to alter the spread between bank loan rates and open market interest rates, and there will be no separate bank credit channel for monetary policy[23].

In the light of the above, it becomes glaring that the bank credit channel depends crucially on the relationship between monetary policy actions and bank lending and is weakened by the extent to which banks have access to funds that are not affected by central banks actions. In a deregulated financial system where banks can raise money market instrument that are not under reserve requirement to offset their sources of funds



[23] It has been stressed that this does not rule out the possibility that monetary policy actions have an indirect effect on the rate differential. For example, if monetary policy actions affect economic activity, this could raise the rate on bank loans relative to open market rates by increasing the likelihood of default by bank-dependent borrowers relative to other borrowers. This effect might be considered as part of a broader role for credit in the propagation mechanism of monetary policy influences to the economy (See Gertler and Gilchrist (1993b, 1993c) and Bernanke (1993).

the bank credit channel following its theoretical underpinning may be weakened and may cease to be a separate channel of monetary transmission mechanism.

Juxtaposing the theoretical underpinning of the credit view in the light of the financial deregulation and innovation in the United States, Romer and Romer (1990) reiterated that:

> …….banks' ability to raise funds on the margin ……in particular, through issuance of large CDs and other "managed liabilities"……..has become less restricted. Regulation Q has been removed. Market for bank liabilities have greatly deepened, although new equity issues remain (as they have always been) a costly source of funds for banks, particularly in periods of economic stress. Reserve requirements have been eliminated for most bank liabilities, with the exception of pure transaction accounts. Clearly, the Bernanke –Blinder model is a poorer description of reality than it used to be, at least in the United States.

Corroborating Romer and Romer's (1990) view, Thornton (1994) stressed that the reform in the financial markets in the United States have widened the array of financial options available to many small and medium – size firms, reducing their dependency on banks. The author further noted that changes in technology and the structure of financial markets have reduced the information and monitoring costs associated with making loans to many businesses, increasing firms' direct access to financial markets and non-bank sources of funds.

Upon the deregulation of the financial markets in several countries recently several financial innovations have emerged. Taking the United States as a concise example, these innovations include large negotiable certificate of deposit, emergence of Eurodollar market and Money Market Mutual Funds. With these financial innovations the existence of the bank credit channel as a separate channel has been challenged. Even

Bernanke and Gertler (1995) who are the main protagonists of the credit view surmised in the face of the reforms in the financial market in the United States that:

> …….because of financial deregulation and innovation, the importance of the traditional bank lending channel has most likely diminished over time; while we believe it is still empirically relevant, obtaining sharp measurements of its potency is a challenging task. In any case, however, this framework may still be of value for interpreting historical data, for assessing the impact of institutional changes on the transmission mechanisms across countries. (Bernanke and Gertler, 1995 pp. 22)

The main thrust of this study is examine the structure of the financial markets and test for the existence or otherwise of the bank credit channel in Nigeria. Specifically, the study sets out to investigate whether the adoption of financial deregulation in Nigeria has affected the importance of the bank credit channel of monetary transmission mechanism. Prior to 1987, the financial system was characterized by fixed and relatively low interest rates, mandatory sectoral allocation of bank credit, and quantitative ceilings on bank credit to the private sector. The motivation for this study, therefore, stems from the observation that despite the deregulation of the financial system, some of the features of the regulated regime still persist. For instance, the activities of the banking sector still dominate that of the capital market and other non-bank financial intermediaries. This evidence seems to lend credence to the bank credit channel.



### 2.3.3 Link between Financial Structure and Economic Activity[24]

Modern macroeconomic theory were largely influenced by the seminal work of Modigliani and Miller(1958) which propounded the idea that financial structure was indeterminate and irrelevant for investment decision. Given this proposition, there is the

[24] This section draws from Gertler (1988) and Rapallo (2003) and Claus and Grimes (2003).

preposition in modern macroeconomic theory that the workings of financial markets are smooth, thereby justifying abstraction from financial consideration. The implication of this is that the interaction between the real and financial sector of the economy stems from the activity in the money market rather than the market for borrowing and lending (Gertler, 1988). With the on-going beliefs of applied macroeconomists and policy-makers that financial markets and institutions play important role in the growth and fluctuation of output, coupled with development in academic research, interest has grown recently in exploring the possible link between the financial system and aggregate economic behavior.

Traditional literature on the link between financial structure and economic activity focused on earlier work from Fisher (1933) and Keynes (1936) to Friedman and Schwartz (1963) and Gurley and Shaw (1955) to Tobin (1975). Following the collapse of the financial system along with real economic activity during the Great Depression of the 1930s, Fisher (1933) argued that the severity of the economic downturn resulted from poorly functioning financial markets. He pointed out both the direct and indirect propagation mechanism of the poorly functioning financial markets. The direct propagation, according to Fisher was the heavy debt burden of the borrowing class in the wake of prosperity preceding 1929. The economic downturn precipitated severe financial distress, therefore aggravating the downturn. The second mechanism, which is possibly the more important channel in the propagation mechanism, was the price deflation caused by the downturn. Given that debt contracts were written in nominal terms, the protracted fall in prices and money incomes greatly increased real debt burden. The deterioration in borrowers' net worth due to higher debt induced borrowers to reduce spending, sending

the economy into further decline, thus continuing the spiral of falling output and deflation.

Although the financial system did not have an explicitly role in Keynes' (1936) theory of output determination, it was however, an integral part of the broad picture. In his "General Theory", a key factor of investment behaviour is the "state of confidence". This state, as Minsky (1975) noted is determined by two factors: the borrower's belief about prospective yields from investment project, and the "state of credit". Keynes (1936) argued that the latter is governed by the confidence that lenders have in financing borrowers. A collapse in the confidence of either borrowers or lenders, according to him, is sufficient to induce a downturn.

Though Hicks(1937) and Modigliani(1944) emphasized the central importance of money, Gurley and Shaw (1955) redirected attention towards the interaction between financial structure and real activity by emphasizing the role of financial intermediaries in the credit supply process as opposed to the money supply process. According to Gurley and Shaw (1955), the economy's overall financial capacity is more relevant to macroeconomic behaviour than money. Financial capacity is the borrowers' ability to absorb debt, without having to reduce spending in order to avoid default. Financial capacity, according to these authors, is an important determinant of aggregate demand and balance sheets (a key determinant of financial capacity) can enhance the movements in spending and magnify business cycles. Financial intermediaries are important because they extend borrowers' financial capacity.

The aftermath of Gurley and Shaw thesis was the proliferation of studies expounding the relevance of financial consideration to macroeconomic behavior. Kuh

and Meyer (1963) presented evidence linking investment to balance sheet variables. Tobin and Dolde (1963) stressed that capital market imperfections provided an avenue for reconciling the Keynesian and life-cycle theories of consumption. Brainard and Tobin (1963) elaborated the financial sectors of macroeconomic models, and formally integrated some of the ideas in Gurley and Shaw with existing theory. Minsky (1975) and Kindleberger (1978) described how crises in financial markets could severely disrupt real activity. Furthermore, Tobin (1975) argued that Fisher's debt-deflation theory complement the Keynesian theory of income determination as it provided a rationale for why expansionary policy could restore equilibrium output to its full capacity during deflation.

After Gurley and Shaw (1955) expository work, several studies greatly emphasized the role of money rather than that of the financial markets in aggregate economic activity. These studies include that of Modigliani and Miller (1958), Friedman and Schwartz (1963), Brock and Miller (1972) and Sims (1972). Modigliani and Miller (1958) derived the formal proposition that real economic decisions are independent of financial structure in the general equilibrium framework of Arrow Debrew. Brock and Mirma (1972) developed the stochastic competitive equilibrium growth model which was essentially an Arrow-Debrew Model. The study by Friedman and Schwartz (1963) focused on the historical relationship between money and output; while the reduced-form bivariate VAR model by Sims (1972) paid greater attention to the role of money thereby ignoring the role of credit in the macroeconomy.

To rekindle interest on the link between financial structure and aggregate economic activity, recent research starts by examining the allocative consequences of

informational asymmetries in financial markets at the micro level. Other aspect of the recent research also focused on the role of intermediaries (as optimal institutions that their existence is crucial as a response to inefficiency in financial markets) and macroeconomic behaviour.

Akerlof's (1970) seminal work on the "lemon" problem demonstrated how asymmetric information between buyers and sellers about product quality could cause a market to malfunction. He argued that since the market price mirrored buyers' perceptions of the average quality of the product being sold, sellers of low quality goods (lemons) would receive a premium at the expense of those selling high quality goods. This distortion, in turn, would affect the level of market activity since some high quality sellers would be driven out of the market.

Using Akerlof's basic idea that lemon problem could distort economic activity, several theoretical models have been developed. Jaffe and Russell (1976) developed a theoretical model which explained how unobserved differences in the quality of borrowers could induce credit rationing. The key feature of this model is that borrowers' default probabilities increased with loan size. Furthermore, for any given loan size, default probabilities differed across borrowers due to factors lenders cannot observe. Since borrowers could not be distinguishable ex-ante, the market interest rate incorporated lemon premium. As a result, good quality borrowers (those with low default probabilities) suffered at the expense of bad quality borrowers. Credit rationing in the form of restrictions on loan size can emerge under the above situation. Stiglitz and Weiss (1981) also developed a model of credit rationing where the market denied funds to borrowers with characteristics identical to those receiving loans. The key unobserved

factor in this model is the riskiness of borrowers' projects. The assumption of this model is that for a given loan rate, lenders earn a lower expected return on loans to bad quality borrowers (those with risky projects) than to good. A rise in interest rate lowers the average borrower quality since those with relatively safe projects drop out. Then further increases in the interest rate may lower lenders' expected return, making the loan supply curve backward bending. Rationing arises when the loan supply and demand do not intersect. Myers and Majluf (1984) and Greenwald, Stiglitz and Weiss (1984) discuss how asymmetric information about the value of a firm's existing assets can restrict its ability to issue new shares. Outside lenders must, therefore, discern whether the share issue is a legitimate effort to either obtain new financing or diversify risk or is instead simply an attempt to pass off bad assets.

The basic conclusion which emerged from studies that have elaborated on Jaffe and Russell (1976) and Stiglitz and Weiss (1981) is that the postulated incentive problems distort the market equilibrium, most often towards under-lending. They also make the equilibrium quantity of lending more sensitive than otherwise to exogenous disturbances. Moreover, a problem of the models discussed so far is that they are highly sensitive to exogenous restrictions made in the form of the relevant financial contracts, since they use a very restrictive form of debt contract (Gertler, 1988). For example, in some models, allowing borrowers to issue a richer menu of liabilities than the simple risky debt contract can eliminate the incentive problem (see DeMeza and Webb, 1987). This has raised the question of the robustness of the credit rationing results, thereby stimulating a new branch of literature that attempts to explore the effects of financial market inefficiencies without making a priori assumptions about financial structure.

Under this new approach, the real /financial interaction is a purely endogenous outcome, which arises explicitly from assumptions about the information structure, and other primitive factors, such as preferences and technology.

As a result of the problem above, Townsend (1979) derived the circumstances where standard risky debt contracts may be optimal. He considered a bilateral loan agreement between lender and borrowers, in which the lender must pay a fixed cost to observe the returns to the borrowers' project (costly state verification) and the borrower does not have sufficient collateral to fully secure the loan. Townsend assumed that the lender only used deterministic monitoring strategies and that he committed himself to monitoring in the default state. He also generalized the analysis to allow for random monitoring, while Moore (1987) relaxed the commitment assumption. The implication of these analyses is that, the optimal contract form need not be debt.

Several studies have used Townsend's (1979) costly state verification framework to study how financial consideration may have allocative consequence. Gales and Hellwig (1985) analyzed the interaction between the real and financial decisions of a firm that must borrow to finance factor inputs. These authors showed how this information problem ultimately constrained the firm's input demand. In a very similar set up, Williamson (1986) generated both endogenous financial intermediaries and equilibrium credit rationing. He demonstrated how it is possible to explain the type of credit rationing characterized by Stiglitz and Weiss (1981), without a priori restrictions on financial contracts. Rationing, according to this author, might occur because the expected default costs steaming from costly state verification may make it prohibitively expensive for borrowers to obtain funds from lenders with high opportunity costs. As with Gales and

Hellwig, Williamson maintained that the allocative effects arose because the informational problems effectively increase the marginal cost of funds.

Although the costly state verification model cannot be taken as literal description of many lending situations, similar types of qualitative conclusions regarding the link between information asymmetries, the joint determination of real and financial variables, and the inefficiency of the investment process emerged in settings with richer descriptive features (Gertler, 1988). In this dimension, Bernanke and Gertler(1987a) examined the endogenous interaction between financial structure and real activity in a market where a general type of lemons problem was present. In their setting, entrepreneurs (or, possibly corporate managers) evaluate potential investment projects and proceed with those which are profitable to them. As a result of insufficient resources, they must obtain at least some outside funding. Since, these entrepreneurs have private knowledge about project's success probability, they have strong incentive to carry on the project they have initiated and could pass to lenders poor quality projects as good quality ones. The optimal financing contract therefore is the one that accounted for the lemons problem by structuring the payoffs in a way to discourage this activity. The effect of the informational problem is that the cost of capital to entrepreneur increased by the extent of the lemon premium. This means that information distortions can, in theory, have quantitative significant effects on investment behavior. This conclusion extends beyond situations where simple debt contracts are the exclusive financial instruments. The optimal contracts which emerge in the analysis are general state-contingent contracts, which have a variety of institutional representations such as debt and equity, intermediary credit lines etc.

Since recent research work, like the traditional literature, were often sensitive to the postulated incentive problem, questions have arisen as to the types of general testable predictions(particularly ones related to aggregate behavior) that could be made from these models. In this respect, Bernanke and Gertler (1986) postulated that for a wide class of environments the market equilibrium level of investment is positively related to borrowers' balance sheet positions defined as the ratio of net worth to liabilities. The argument buttressing this proposition is that a strengthened balance sheet implies a borrower has more resources available to either use directly for project finance or as collateral in obtaining outside funds. This reduces the borrower's cost of obtaining external funds by lowering the informational risk that outside lenders face, and in turn stimulates investments. With this conclusion, there is therefore, a strong connection between new literature and the ideas which arose much earlier from informal discussions of Fisher, Gurley and Shaw and others. The theoretical link between balance sheets and investment were therefore the main concern in Bernanke and Gertler (1986, 1987b) and Calomaris and Hubbard (1987).

Other equivalent predictions which have emerged from recent literature is that borrower investment decisions will be "excessively sensitive" to current cash flow than they would be in the absence of capital market problems. Under perfect capital markets, cash flow may signal movements in the firm's future earnings potential. However, with capital market imperfections there is an additional effect. A rise in cash flow strengthens the firm's balance sheet and thus lowers its cost of capital, vice versa. With these links, it is possible to rationalize income –accelerator effects on investment.

Another prediction relevant to the empirical implementation of these models is

that new borrowers will face tighter financial constraints than those with long and reasonably successful track records, everything else equal. In a frictionless environment, young firms and mature firms should be able to obtain funds equally well at risk corrected interest rates (Gertler, 1988). The same need not be true when informational asymmetries are relevant, for several reasons. First, lenders will generally know about mature firms, since they will have some time and experience to learn about relevant characteristics. Second, mature firms may credibly enter repeated relationships with lenders, the significance being that long-term relationships help mitigate informational problems.

A final testable implication is, ceteris paribus, that financial constraints are likely to have more impact on the real decisions of individual borrowers and small firms than on large firms. First, the class of large firms consists primarily of mature firms who have the advantages described above. Second, there may be an informational economy of scale in lending to large firms, to the extent that lenders may face fixed costs of gathering certain types of critical data about borrowers.

Another vital aspect of recent research on the link between financial structure and aggregate economic activity is that which focused on the role of financial intermediaries. These researches build on the economics of imperfect information that emerged in the 1970s with the seminal contributions of Akerlof (1970), Spence (1973) and Rothschild and Stiglitz (1976). According to these studies, financial intermediaries exist because they reduce information and transaction cost that arise from an information asymmetry between borrowers and lenders. Financial intermediaries, thus, assist the efficient functioning of markets, and any factors that affect the amount of credit channeled through

financial intermediaries can have significant macroeconomic effects. The literature on the economics of information distinguishes two general types of informational problems that generate frictions in financial markets. These problems are: (i) adverse selection; and (ii) the principal-agent problem.

Following Mas-Colell et. al. (1995), the adverse selection problem *arises when an informed individual's trading decisions depend on her privately held information in a manner that adversely affects uninformed market participants.* In this case, asymmetries of information exist between individual at the time of contracting. With imperfect information about the quality or riskiness of the borrowers' investment projects, adverse selection creates a gap between the cost of financing in uninformed capital market (which incorporates a "lemon" premium) and internally generated funds.

In the case of principal-agent problem, asymmetries in information develop subsequent to the signing of a contract. Two types of problems have been distinguished in this setting: those resulting from hidden actions (also known as moral hazard) produced by the inability of, for example, owner of a firm to observe how hard his manager is working; and those resulting from hidden information, in which the manager possesses superior information about the firm's opportunities. In the credit market framework, it is the second type of problem, hidden information, that is considered in the literature. Due to the presence of incentive problems and costly monitoring of managerial actions, external suppliers of funds to firms require a higher return to compensate them from these monitoring costs and the potential hidden information problems associated with manager's control over the allocation of investment funds.

To formally explain the existence of financial intermediaries, two strands of

literature have emerged. The first strand emphasized financial intermediaries' ability to transform the risk characteristics of assets. The second strand, on the other hand, emphasizes the financial intermediaries' provision of liquidity. In both cases, financial intermediation can reduce the cost of channeling funds between borrowers and lenders, leading to a more efficient allocation of resources. Financial intermediaries play special role in the economic system because of asymmetric information in the financial markets. This perspective was aptly characterized by Fama (1980) who adopted the frictionless competitive market model as a working hypothesis. Fama maintained that since the Modigliani–Miller (1958) theorem applied under perfect market environment, banks and other financial institutions were simply veils over real economic activity.

Fama (1985) considered why financial intermediaries, particularly commercial banks, might indeed play an important role in the economy. He observed that borrowers who obtained bank loans typically paid a higher return than the market rate on directly placed securities of similar maturity. The implication of this, according to the author is that bank credit is "special" since open market credit is not a perfect substitute for bank credit. Fama further argued that banks have comparative advantage relative to other non-bank financial institutions in gathering information about borrowers and this made it possible for them to perform their traditional lending role. This advantage implies that intermediaries are not simply a veil but instead the most efficient way to minimize information distortions in the financial market.

In explaining the role of financial intermediaries, Diamond (1984) utilized a model with an information structure similar to the one in Townsend's (1979) costly state verification, where lenders cannot freely observe the returns to borrower's projects.

Similar to Townsend, the optimal bilateral financing arrangement is a risky debt contract, under which the lender monitors the borrower in the event of default. The only difference, when compared with Townsend's study, was that the project sizes and endowment patterns were fixed so that borrowers had to obtain funds from many individuals. Under this scenario, Diamond proved that in order to economize on monitoring costs, it is optimal for a competitive financial institution to channel funds between savers and borrowers. According to Diamond, financial institution, as its basic characteristics, (i) writes loan contracts with individual borrowers and monitors borrowers who default; (ii) holds a heavily diversified portfolio; (iii) transforms assets for savers – in particular, the individual liabilities which the institutions issue to savers have smoother payoff patterns than the individual securities they obtain form borrowers. Diamond identified the two latter characteristics to have arisen in order to solve a potential incentive problem between the financial institution and its depositors.

With Diamond's study, several researches have emerged to study the link between financial intermediation and real activity. Using the model of informational asymmetries, Williamson (1986) illustrated the relationship between financial intermediation and credit rationing. In his framework, rationing occurs because costly state verification adds a premium to loan rates. Intermediaries, therefore seek to minimize this premium – and thus minimize rationing by economizing on monitoring costs.

Boyd and Prescott (1986) emphasized the role played by intermediaries in evaluating loan projects ex ante and in minimizing lemons problem. These authors focused on an environment where individual, being endowed with limited amount of wealth and a project possessed private information about the project quality –good or

bad. Under this situation, intermediary coalitions emerged. Using project evaluation and financial contract structure, these coalitions structure incentives so that those with bad quality projects become savers while those with good quality ones seek funding. To achieve an optimal incentive scheme under this framework, diversification, following these authors is desirable.

The behavioral theories examined so far have focused exclusively on the ability of financial intermediaries to transform risk characteristics of assets. It is assumed, in these theories, that financial intermediation process works extremely well such that in a free market, where there is minimal government regulation, activities of financial intermediaries will always be optimal. This perspective is contrary to policy makers' position that some form of regulation is essential if financial intermediaries, especially commercial banks, are to function smoothly in the financial system.

One possibility, which could disrupt the financial intermediation process as found in subsequent literature is liquidity. On this issue, Friedman and Schwarz (1986) reiterated the need to protect financial institutions exposed to liquidity risk.

Diamond and Dybvig (1983) examined the view that liquidity consideration might justify the types of interventions in commercial banking such as the use of deposit insurance to protect savers deposits. These authors adopted a framework which emphasized the importance of banks in the provision of liquidity. In this model, individuals faced uncertain liquidity needs which were assumed to be publicly observable and therefore not directly insurable. In this setting, the incompleteness in markets for liquidity insurance created a role for banks. These institutions also provided insurance by accepting deposits from individuals which gave them flexibility over the timing of

withdrawal. Moreover, since banks in the course of their business, faced liquidity risk in their portfolio, they issued liabilities which are payable on demand. These institutions could also, as a result of circumstances, be unable to honor the claims on demand deposit. As Claus and Grimes (2003) note, "the optimal insurance contract in Diamond and Dybvig's model is demand deposit contract, which has undesirable equilibrium (i.e. bank run), in which all depositors panic and withdraw immediately, including even those who would prefer to leave their deposits in the bank if they were not concerned about the bank failing." Bank runs cause real economic problems because even "healthy" banks can fail, leading to a recall of loans and the termination of productive investment.

In Diamond and Dybvig (1983), the rationale for banks existence as well as their vulnerability to runs could be attributed to the problem of illiquidity in assets. These authors maintained that bank runs occurred because of shift in expectations. In a situation of normal and non-stochastic withdrawals, banks could prevent runs and therefore share risk optimally by converting illiquid assets into liquid liabilities. In the general case with stochastic withdrawals, deposit insurance could rule out runs without reducing the ability of banks to transforms assets. Diamond and Dybvig concluded their research by justifying policies such as creation of deposit insurance that could prevent costly liquidity crises by eliminating the incentive for depositors to panic.

Diamond and Dybvig paper has stimulated intensive debate. The issue at stake is whether private financial institutions, if left on their own, could make the types of arrangements necessary to avoid the problems like liquidity panics. As a response to the above issue, Jacklin (1985) argued that a bank could in theory avert a panic by eliminating the sequential service constraint (which required them to honour deposit

withdrawals at face value until they no longer have funds) and instead offered contracts of equity-like features by making deposit returns contingent on the total number of withdrawals. Resolution of the above issue has proved difficult. This is so because while there are theoretical models that focus on cases where private contractual arrangements eliminate the need for government intervention, these types of arrangements, as Diamond and Dybvig (1983) argue are often not possible in practice.

As a result of the problem of illiquidity of banks, Bhattacharya and Gale (1987) advocated for government intervention into financial intermediation process, without appealing to arbitrary restrictions on private contracts. In the framework adopted by these authors, banks were able to structure their deposit contracts so as to eliminate runs. Individual banks, however, still faced withdrawal risk due to their insufficient diversification. This led to the adoption of the clearing house system among banks such that those banks suffering heavy withdrawal could borrow from those that did not. Bhattacharya and Gale indicated that under high cost of monitoring banks portfolio, these institutions could invest optimally in liquid assets. Following these authors, it would be optimal for government to provide subsidized liquidity or deposit insurance to private banks.

Implicitly, Bhattacharya and Gale made the following submissions in their papers. First, where well functioning secondary markets for the assets of relevant financial institutions are non-existent, government intervention into particular forms of intermediation is necessary. Second, liquidity risk is not a problem for banks or other intermediaries if they can easily obtain funds by marketing their assets.

Recently authors, particularly, Fama (1985) and Bernanke and Gertler (1987a)

argued that a large proportion of commercial banks' assets consist of information intensive loans and securities which are not marketable due to their highly idiosyncratic and imperfectly collaterized nature. It is the above characteristics, following these author, that make banks candidates for special attention, rather than their role in money provision. It should be observed that other financial institutions, which are not banks, provide transactions and liquidity services to depositors and function perfectly well because they have marketable assets.

In view of the above, Bernanke and Gertler (1987a) developed a model of banking and macroeconomic behaviour and stressed the role of banks in facilitating credit flows. Their analysis demonstrated the importance of the financial health of the banking sector on the macroeconomy. They further examined how monetary policy could matter to real activity by affecting the flow of bank credit. In this setting, bank capital plays an important role in securing the liabilities bank issued to depositors. It is assumed that banks have private information about the returns to their portfolio, but that they cannot perfectly diversify independent risks from loan projects, due to spatial consideration. Greater net worth enables a bank to obtain more deposits and therefore allocate a larger fraction of its portfolio to risky loans. This also provides the bank with more collateral to guarantee its liabilities and to mitigate the informational risk that depositors face. Thus, bank net worth positions governs the scale of banking and hence the flow of bank credit. This in turn has implications for investment and output. Having analyzed the macroeconomic implications of the flow of credit, these authors also demonstrated how monetary policy could affect the availability of bank credit, in contrast to the traditional Keynesian and Monetarist framework. The transmission mechanism of monetary policy,

in this case, could be attributed, on the one hand, to the level of bank reserves which constrained bank lending and on the other hand, to the central bank that could control the real quantity of reserves due to temporary price stickiness. A crucial issue which is at stake in Bernanke and Gertler (1987a) is whether monetary policy affects economic activity by affecting bank liabilities or bank assets. Empirical evidence, on this issue, however, is mixed.

The survey in this section has indicated that a vital link exists between financial structure and aggregate economic activity. Understanding this link, this study initially examined the structure of the Nigerian financial system and tested for the existence of bank credit channel of monetary transmission mechanism in the Nigerian economy.

## 2.4 Survey of Empirical Literature

### 2.4.1 Empirical Evidence from Developed Countries

Monetary policy is a part of the overall macroeconomic policies and is relied upon for the achievement of macroeconomic stabilization goal. To this effect, economists have focused conspicuous interest on the channels through which monetary policy transmits to the real sector of the economy. In the light of the importance of monetary transmission mechanism for successful conduct of monetary policy, this section reviews existing literature on this issue by focusing on the empirical evidence from developed countries.

In an attempt to uncover the bank credit channel, Romer and Romer (1990) utilized aggregate time-series data on the American economy. In this study, the authors adopted the so-called “narrative approach” in which the “Romer dates” were used as a measure of the stance of monetary policy. The “Romer dates”, following Romer and

Romer (1990) is identified as the date on which the Federal Reserve Bank shifted to tighter monetary policy. This identification was achieved by reading the minutes of the Federal Open Market committee. Under this approach, the Romer date takes the value of one when a tight monetary policy is adopted and zero at any other date. Using structural econometric modeling (i.e. St. Louis Equation, Ordinary Least Squares, Two Stage Least Squares and Instrumental Variable approach), the results obtained from the monthly data covering the period 1941-1984 indicated that the forecast errors of credit supply is smaller than the forecast errors of money supply. This showed that the interest rate channel is more effective than the credit channel in the United States. Romer and Romer's (1990) study has, however, been criticized on two grounds. First, the assignment of the same weight to every Romer date without considering the difference between the hikes of the funds rate has been viewed as inappropriate. Second, it has also been maintained that the use of "Romer dates" may not be an appropriate indicator of an exogenous monetary policy shock since it concerns only the dates when the Federal Reserve Board changes its targeted level of the funds rate.

Instigated by the above study, Bernanke and Blinder (1992) also estimated six variable structural VAR models by applying aggregate time-series data covering the period 1959:01-1978:12. This VARs include the federal funds rate(indictor of monetary policy), the unemployment rate, log of consumer price index, and the log levels of three balance sheet variables (Deposits, securities, and loans) all deflated by the CPI. In alternative regressions, these authors also used the nominal values of these balance sheet variables as well as their differenced values. In testing for the existence of bank credit channel, the federal funds rate was used as an indicator of the stance of monetary policy.

The innovations to the federal funds rate equation in this structural VAR model were interpreted as the shocks to monetary policy. This study showed that following a contraction in U.S monetary policy, securities held by banks and deposits decline in the first nine months whereas loans change very little. Subsequently, security holding recovered while loans fell[25]. The fall in loans according to these authors coincided with a rise in unemployment rate. These findings also corroborated earlier work and imply that banks play a crucial role in monetary transmission mechanism in the United States.

Although Bernanke and Blinder (1992) maintained that their findings were in support of the bank credit channel, recent studies (see for example, Suzuki, 2001) have shown that these results are consistent with both the credit view and the money view. Moreover, the use of Choleski decomposition method in the identification of the VAR model in this study has been severely criticized as lacking theoretical justification in economics. This means, therefore, that a better identification approach is required to separate the demand and supply effect of restrictive monetary policy[26].

Kashyap, Stein and Wilcox (1993), attempted to resolve the identification problem existing in earlier studies by examining the relative movements in bank loans and commercial papers after monetary shocks. They argued that: if the underlying monetary shock is caused by a change in demand for loans this would lower all types of finance, whereas a monetary shock operating through a bank credit channel affects only the supply of bank credit. In this study, the authors regressed the change in the mix of bank and non-bank debt (i.e. ratio of bank loans to the sum of bank loans and commercial paper) on lag of itself and lag of monetary policy indicator defined by "Romer dates".



[25] Cecchetti (1995) indicates that the differences between loan and security responses to monetary policy shocks are not significant and the impulse responses shown in his study is much less pronounced.

[26] See Suzuki (2001) and Holtemöller, (2002).

Using data on manufacturing firms, this study found that the ratio of commercial paper to bank loans increased (i.e. bank loans decline relative to commercial paper) following restrictive monetary policy. These authors interpreted this result as evidence of a bank credit channel. A limitation of this analysis is the use of commercial paper as the only form of non-bank debt. These authors ought to have included other non-bank debt such as loans from finance and insurance companies and trade credit.

The Monetary Policy Committee (MPC, 2000), reported the process through which decisions about official interest rate affect economic activity and inflation in the United Kingdom. The Bank of England, in attempt to carry out its monetary policy, lend predominantly through gilt sale and repurchase agreement (repo) at two-week maturity. The repo rate, according to this report, is the official interest rate and serves as the policy instrument for the Bank of England. MPC's report further indicated that, monetary policy works largely via its influence on aggregate demand with little direct effect on the trend path of supply capacity. The key links in the transmission mechanism according to MPC are: first, official interest rate decisions affect market interest rates to varying degrees. At the same time, policy actions and announcements affect expectations about future course of economic activity. Second, these changes in turn affect the spending, saving and investment behaviour of individuals and firms in the economy. Third, the level of demand relative to domestic supply capacity is the key factor leading to domestic inflationary pressure. Fourth, exchange rate movements have a direct effect, though often delayed, on the domestic prices of imported goods and services, and an indirect effect on the prices of those goods and services that compete with imports or use imported inputs, and hence on the component of overall inflation that is imported.

Morsink and Bayoumi (2001) investigated the transmission mechanism of monetary policy in Japan using quarterly seasonally adjusted time-series data for the period 1980:1-1998:3. This period had been characterized by economic recession and banking crisis. In this study, the Vector Autoregression (VAR) technique was adopted. This methodology allowed minimal restrictions to be placed on how monetary shocks affect the economy. This approach also explicitly recognized the distinct simultaneity between monetary policy and macroeconomic development, as well as the dependent of economic variables on macroeconomic policy. The bank lending VAR model includes real private demand (real GDP minus government spending) as a measure of economic activities, price level (proxied by the consumer price index), interest rate (uncollaterised overnight rate: the operating target of policy in Japan), the broad money (M2+CDs), bank loans and banks' security holdings. Real private demand is expressed as a ratio of potential output where the IMF's measure is used for the latter. The broad money is also divided by potential output so that responses could be easily converted to policy multiplier[27]. The empirical results of this study indicated that both monetary policy and bank's balance sheet are important sources of shocks. The study further revealed that banks played crucial role in transmitting monetary impulse to the real sector of the economy. The main qualification of the above study, is that the authors, in identifying their VAR model, adopted the recursive scheme which is based on Choleski's decomposition. Since the impulse response functions emanating from this identification restriction depends on the ordering of variables, then the findings of the study may not be a tenable one.



[27] The authors maintained that the use of potential output to scale real private demand and broad money was not critical to the study since other estimation that employed the logarithms of activity and money yielded similar result.

Economic literature has recently indicated that there is a link between the structure of the financial system and the transmission mechanism of monetary policy. Tseng and Corker (1991) observed that the channels through which monetary policy operates depend on the financial structure of an economy which depends on the maturity and depth of financial markets, the flexibility of interest and exchange rates, and the degree of external capital mobility. According to these authors, monetary policy works mainly through bank credit which is the main source of finance in underdeveloped countries characterized by interest rate regulation, domestic credit controls, the segmentation of financial markets, etc.

Cottarelli and Kourelis (1994) argued that the effectiveness of monetary policy centred on a set of crucial structural parameters not directly controlled by central banks that reflected economic agents' reaction to policy impulses from money market. In an attempt to analyze the relation between bank lending rate stickiness and financial structure, these authors measured the speed of adjustment of lending rates in 31 industrialized and developing countries by regressing the lending rate on a distributed lag of money market rates. This procedure allowed the effect on lending rates of shocks in money market (impact and interim multipliers) to be estimated. These multipliers were further regressed on financial structure variables (such as, degree of concentration of the banking industry, existence of constraints on capital flow, the size and the efficiency of the money market) to explain the cross-country differences in these multipliers. Realizing that some of the cross-country data are non-stationary, two models were estimated –one in levels and the other in differenced form. The results obtained from the Ordinary Least Squares and Weighted Least Squares regression indicated that: (i) the speed of

adjustment of lending rates is higher in inflationary environments; (ii) the dynamics of adjustment of lending rates vary depending on the type of lending rate. The study found that prime posted rates adjust faster than actual rate; (iii) the stickiness of lending rate is strongly influenced by the structure of the financial system, including regulatory environment; (iv) the use by the central bank of the discount rate as a monetary policy signal stimulates the response of lending rates to changes in money market rates. However, evidence also supported the discount-rate-addiction hypothesis which stipulated that repeated use of the discount rate as a policy signal weakened the response of banks to money market changes that are not accompanied by discount rate changes. The main weakness of this study is that it focuses mainly on the issue of the link between financial structure and the degree of responsive of banks' lending rate with respect to money market rate in the countries under investigation. The study, therefore provides evidence on the relationship between the structure of the financial system and credit rationing but fails to investigate the impact of exogenous or unanticipated monetary policy on the real sector of the economy.

In the light of several literature on the role of bank credit in monetary transmission mechanism, Cottarelli, Ferri and Generale (1995) further examined the impact of financial structure on the behaviour of lending rates in Italy. This study, according to these authors became relevant due to the greater role of the banking sector and the stickiness of lending rates, which had been regarded as serious deterrent to monetary transmission in the Italian economy. To investigate the dynamic behaviour of the lending rate, the authors specified the equation

$$\phi(L)i_L = \alpha + \beta(L)i_M + \gamma(L)\Delta i_D + OTH + \varepsilon \quad \text{.....[2.15]}$$

Where $i_L$ is the lending rate, $i_M$ is the market rate (proxied by the treasury bill rate), $i_D$ is the discount rate, OTH represents other relevant variables, ε is the error term, and φ(L), β(L) and γ(L) are lag polynomials. For the purpose of measuring the degree of stickiness in Italy, both impact and interim multipliers were estimated from the equation above, using both monthly time-series data (covering the period 1986:6-1993:12) and micro data on 63 banks. Moreover, upon the realization that the lending rates and treasury bill rate were I(1) series, the error correction equation relating the lending rate to its long-term determinants (treasury bill rate) was estimated after specification search from the time-series data. The findings which emerged from both time-series and micro-data revealed that: in the long-run, a unit change in treasury bill rate resulted to a similar change in average lending rate(long-rum multiplier = 0.92); the impact multiplier is 0.07(indicating that a 100 basis point increase in treasury bill rate caused a 7 basis point change in treasury bill rate during the month which the shock occurred and the adjustment of treasury bill rate became much faster when the discount rate was changed; the degree of stickiness in lending rate varies across geographical areas – an indication of differences in financial structure across regions. Financial structure as reflected in the degree of competition in the banking market, significantly affect the degree of lending rate stickiness. This result corroborated the findings of Cottarelli and Kourelis (1994).

In the face of the problem of identifying whether the contraction in loan supply following monetary tightening could be ascribed to the shift in supply or demand for loans, some authors have directly tested for the existence of bank credit channel of monetary transmission mechanism by investigating whether banks ration credit. Using this approach, Afonso and Aubyn (1998) tested for the existence of credit rationing in

Portugal for the period 1990:01 to 1997:11. In this study the author initially tested the extent to which the lending rate responds to money market rate. After this, a four variable VAR that include real money, real credit(loan and advances), real loan rate and index of industrial production was estimated. The findings of this study showed that money market rate changes are transmitted to credit rate changes on a one to one basis. The VAR based tests also corroborated these findings. This result showed that banks do not ration credit in Portugal. The main limitation of Afonso and Aubyn's (1998) study is that it searches for the existence of credit channel through a prior investigation of credit rationing in Portugal. With respect to this method of inquiry, several authors (Bernanke and Blinder, 1988; Gertler and Gilchrist,1993 and Friedman and Kuttner, 1993) have recently shown that credit rationing is not a necessary nor sufficient condition for a credit view.

In an attempt to analyze the monetary transmission mechanism as well as the effect of monetary policy in Australia, Brischetto and Voss(1999) adopted a modified version of the small open economy model developed by Kim and Roubini(1999) for the G6(G7 minus the United States). The adoption of this model according to these authors was informed, in part, by its robustness[28] and due to the fact that its results could be systematically compared with those obtained in Kim and Robini's study. In its entirety, the model employed seven variables(namely: oil price index in current US dollar (denoted by o*),Federal Fund rate(i*), real GDP(y), the consumer price index(p), narrow money(m), official cash rate(i), and the exchange rate-defined as foreign currency unit per unit of domestic currency. The study found that monetary policy shocks have a

[28] Kim and Robinni (1999) Vector Autoregression model has been widely applied in several studies and has done well across countries. This suggests that the model is quite robust.

delayed and gradual effect on the price level and a small temporary effect on output. Evidence also suggested that monetary policy dampen both output and price fluctuation in Australian economy. With these results, the authors concluded that:

> "……..the Kim and Roubini model, amended slightly, provides a reasonable empirical description of important feature of the Australian macroeconomy. Most importantly, the qualitative responses of the price level and exchange rate to a change in monetary policy are consistent with other empirical work, both for Australia and for other countries. Finally the model also provides sensible predictions for the effects on Australian output and the price level of external interest rate and exchange rate shocks"( Brischetto and Voss, 1999 pp. 47)

Cecchetti (1999) investigated the modern view of monetary transmission mechanism, which assigned a central role to the financial structure. Using the sample of 23 countries and small structural model, the author estimated the impact of various index of financial structure (such as differences in size, concentration, and health of the banking system) on monetary policy. The study found that countries with many small banks, less healthy banking system and poorer direct capital access displayed a greater sensitivity of policy changes than do countries with big healthy banks and deep well-developed capital markets. The result of this study therefore suggested that there is interconnectivity between financial structure and monetary transmission mechanism.

In another study, Cecchetti and Krause (2001) provided further evidence on the effectiveness of monetary policy under financial structure characterized by more independent central banks and less government intervention in the banking system. These authors argued that the transmission of interest rate movement to domestic output and prices depends on the structure of the country's banking system, and financial market more generally. In this study data from 23 developed and emerging market economy

were employed and the policy efficiency gain in these countries were estimated using variance and covariance estimates computed as deviations from inflation of 2% and the full sample log-trend of output. This study revealed that changes in financial regulation influenced volatility through their impact on ability of central banks to use their policy tools. Under the banking system largely controlled by the government, there is little scope for monetary policy to stabilize activity. With privately owned bank, lending practices respond to market incentives and monetary policy becomes more effective. Evidence also indicated that when banks are private, central bank interest rate changes have the ability to affect the level of private lending.

Following the deregulation of financial markets in several European countries in the 1980s, Juselius (1998) employed a cointegrated Vector Autoregression Model to investigate the behaviour of money, income, prices and interest rates in Germany, Denmark and Italy. The results, particularly for Germany and Italy suggested that deregulation might have had a significant effect on the transmission mechanism in this country. The structural break considered in this study occurred after the "second Exchange Rate Mechanism" in March 1983. Juselius also found that in Germany where deregulation took hold more strongly in that period, there was a significant break in money demand and the transmission mechanism. However, in Italy where capital controls were in place until March 1990, a break was not detected in 1983.

Kakes, et. al. (1999) analyzed the role of bank lending in monetary transmission process in Germany - an issue that had not been conclusive in this country. In the light of the identification problem associated with the use of aggregate data, these authors utilized both the aggregate and disaggregated data over the period 1970:1 to 1997:4. Aggregate

variables used in this study include: short-term interest rate, real GDP, GDP deflator, total bank loans, broad monetary aggregate, long term interest rate, banks' securities holding and nominal exchange rate. These variables were included in real terms (except interest rate and price level) and logs (except both interest rates). The disaggregated data on the other hand include – industrial production, household expenditure, producer price index, household expenditures deflator, and banks' lending to firms and households. The findings which emerged using Vector Autoregressions technique indicated that banks responded to monetary contraction by adjusting their securities holding, rather than reducing their loan portfolio. The results of this study imply that bank lending is not an important transmission mechanism in Germany. The main qualification of this study, like most VAR studies, is that its identification is based on Cholesky decomposition, where the result of investigation depends on the ordering of variables. A change in the ordering of the VAR system may produce findings which are entirely different from that obtained by these authors.

To investigate the long-standing macroeconomic issue of how monetary policy affects the real economy, Suzuki (2001) studied the importance of the bank credit channel in Australia. Having realized that earlier studies suffered from the problem of identifying loan demand and supply effect of monetary policy shocks, the author proposed an identification scheme that could be used to circumvent this problem. In this study both the modified Kashyap, Stein and Wilcox (KSW) (1993) approach and the aggregate VAR model were used to test for the bank credit channel.

The equation estimated under the modified KSW approach is

$$\Delta MIX_t^j = \alpha_0 + \sum_{i=1}^{p} \beta_i \Delta MIX_{t-i}^j + \sum_{i=0}^{p} \gamma_i MP + \varepsilon_t \quad (j = S, T \text{ and } O) \ldots\ldots\ldots\ldots\ldots\ldots [2.16]$$

Where:

$\Delta MIX_t^j = MIX_t^j - MIX_{t-4}^j$ ;

MP = monetary policy indicator;

$MIX^S$ = ratio of bank loans outstanding to short-term financial debt;

$MIX^T$ = ratio of bank loans outstanding to total financial debt including long-term securities;

$MIX^O$ = ratio of bank loans outstanding to total financial debt + long-term securities+ trade credit.

Apart from the modified KSW approach, a VAR model that included both the loan supply and the price of loan as endogenous variables was also specified. Adopting a recursive identification scheme, variables were ordered as

$$X_t^{'} = (P_t, Y_t, R_t, M_t, LP_t, LQ_t, XR_t, CP_t)^{'} \ldots\ldots\ldots\ldots\ldots\ldots [2.17]$$

Where variables were defined as price level ($P_t$), real GDP ($Y_t$), cash rate-a short term interest rate($R_t$), base money ($M_t$) , price of loans($LP_t$), loans and advances ($LQ_t$), exchange rate ($XR_t$) and the world commodity price index($CP_t$). All variables entered this VAR model in logarithmic form except R and LP. Upon the estimation of the modified KSW model it was found that monetary policy indicator, MP, did not significantly affected any of the mix variables representing the non-equity financing pattern of the private non-financial corporate sector. This implied that the corporate sector in Australia had not substituted away from bank credit to non-bank credit even when the Reserve

Bank of Australia opted for a shift to tight money. This indicated that the lending view is not supported. The impulse response functions from the VAR model also supported these findings. This indicated that the lending channel is not operative in Australia.

In the light of the understanding that economic models often assume for simplicity that the impact on the wide economy of changes in financial conditions can be summarized by relatively limited set of financial variables, Hall (2001) explored the likely effects of credit channel in the monetary transmission mechanism in the United Kingdom. The author espoused that credit models provided a useful framework for analyzing and simulating some potential important interactions and feedbacks between the monetary stability and financial stability objectives of central banks. Following Hall (2001) the assumptions of irrelevance of finance to other economic decisions in much of mainstream macroeconomic model did not generally hold in actual financial markets since households and firms often cared about their source of finance. The various reasons why borrowers could have preferences for internal finance and for bank loans include: (i) the quest to avoid external scrutiny and possible intervention in their financial affairs; (ii) low search and transaction cost associated with internal and bank loans; and (iii) the efficiency of banks in reducing agency cost associated with imperfect information in the financial markets. The author concluded that since banking system distress and significant disruptions to bank loan supply are relatively rare in the United Kingdom, then bank credit channel effects may be relatively infrequent in this country. This implies those bank credit channels are unlikely to have significant impact on bank loans supply in countries with well functioning financial system.

Following the view that any phenomenon affecting the structure and condition of

financial markets has the potential to affect the transmission mechanism of monetary policy, Estrella (2001) examined the impact of financial innovation on monetary transmission in the United States. The author noted that the main sources of financial innovation include financial deregulation, securitization, derivative instruments, and financial risk management. Using VAR analysis, the evidence which emerged from this study suggested that financial deregulation and securitization has affected nearly every aspect of the monetary transmission mechanism and that monetary policy in industrialized economies has been weakened by these innovations in financial markets. As regards the impact of derivative markets and risk management, the author maintained that the impact of these sources of financial innovation remained unclear, which the author concluded might have been as a result of shortage of relevant data.

Following the mixed result from earlier studies based on Germany, Holtemöller (2002) estimated a vector autoregression model using data for the period 1975:01 to 1998: 12. Following the Friedman and Kuttner (1993) proposition that stressed that not only changes in quantity but also changes in prices should be analyzed in order to identify supply and demand side effects, the author also included these variables among others in the nine variable VAR model. Adopting the recursive identification scheme, variables were ordered in such a way that the logarithm of import price index came first while the logarithm of real loan stock was last. This study found that inflation is a monetary phenomenon in the long-run in Germany while the impact of monetary policy on output can be explained to a considerable extent by the credit view, especially the bank credit channel.

In a very recent study, Citu (2003) empirically searched for further evidence

about the transmission of monetary policy in New Zealand. This country, according to the author was particularly interesting because of its feature as a small open economy. To investigate the effect of unanticipated monetary policy tightening on macro-economic variables, the VAR methodology was adopted. Several findings emerged from this study. First, at the disaggregated level, it was found that the response of investment to an unanticipated change in monetary policy was stronger than the response of consumption and net exports. Second, the author also discovered that the exchange rate channel played an important role in the transmission mechanism in New Zealand and in deviations of real GDP trend. Third, there was an immediate liquidity effect on M1 and M2 monetary aggregates, but a more gradual response in M3 and M3R monetary aggregates. There was also evident that 1-year, 3-years, 5-years and 10-years rates responded in accordance with the expectation theory of the term structure to a temporary increase in the short term rates –shorter rates respond more than the longer rates.

Drawing on recent Euro system research which adopted a range of econometric techniques (structural models and VARs studies) and new data set, Angeloni et al. (2002) summarized the importance of the classic interest rate and bank credit channel in the euro area. In this study, the authors examined three basic research questions which centred on (i) the stylized facts about the transmission of monetary policy for the euro area as a whole and for individual countries (ii) whether the classic interest rate channel (IRC), which assumes perfect capital market alone explained there facts; and (iii) whether in the absence of (ii), the bank credit channel likely played a key role in monetary transmission mechanism. The evidence based on aggregate data for the whole of euro suggested that monetary policy has a sizeable and significant effect on output and prices. An unexpected

increase in the short-term interest rate temporarily reduced output; prices respond more slowly, with inflation hardly moving during the first year and then falling gradually over the next few years. These results according to these authors are quite similar to corresponding results from the United States. However, contrary to United States, investment rather than consumption tends to be more relevant in driving the changes in monetary policy induced GDP. Angeloni et al. (2002) also found the following country specific evidence.

In Austria, the interest sensitive components of GDP accounted for a large part of variations in GDP following monetary shock. Though this was an indication of strong interest rate channel, results based on firm –panel revealed that liquidity but not user cost of capital, is the most important determinant of investment. This result, therefore, ruled out the dominance of the IRC in Austria. The existence of strong bank networks and bank-firm relationships in this country also suggested that the bank lending or credit channel might not be a strong channel.

Results from VAR and structural models indicated that the interest rate channel did not seem to be important in Belgium. This finding was indicated by interest spending which did not respond sufficiently to give full account of the output dynamics. This suggested the likely role for some sort of financial mechanism affecting consumption. As previous evidence indicated that bank-lending channel is not likely to be important in this country, the broad credit channel seemed to play an important role in the monetary transmission mechanism.

The VAR and national econometric model in Finland indicated that the IRC offered a satisfactory account of monetary transmission. The bank panel estimates from

the post-banking crisis period also revealed that loan supply did not appear to be very responsive to monetary policy.

In France, there was the difficulty of getting a consistent assessment of the role of interest sensitive spending components using the VAR and the structural model. Therefore, keeping with the findings of other studies, Angeloni et al. (2002) maintained that the cost of capital does not have a strong effect on investment, while financial factors captured by a cash flow variable appeared to be most important in transmission mechanism in this country. The implication of this is that France is a candidate among the countries that demonstrated a strong bank credit channel. It was also found that though bank liabilities do not appear to be strongly affected by monetary policy, loan rates react strongly to monetary policy. This evidence, following these authors is further corroborated by panel evidence of banks suggesting that loans supply is responsive to monetary policy.

With respect to Germany, it was found that the interest sensitive spending components of output played a relatively small role in accounting for GDP movements in the wake of a monetary policy shift in this country. This result initially seemed as if the IRC was not a dominant channel of monetary transmission in Germany. However, the interest rate channel was certainly found to be present in the light of its role as the dominant factor determining the level of investment in this country. Since loan supply altered and substantial consumption adjustment occurred after monetary policy shift, it was also concluded that a strong bank credit channel is operative in Germany.

Though there was the difficulty of fitting a stable VAR in Greece, the findings based on structural model of the Greek economy revealed the dominance of IRC. Based

on earlier studies, Angelino et al. (2002) also pointed at Greece as a candidate for significant loan supply effects.

The findings on Ireland, though based only on structural model of this economy suggested that the interest rate channel is quite important as a transmission channel of monetary policy in the country. The lack of findings on firms and banks however made it rather difficult for these authors to concretized this conjecture

It was detected that the interest sensitive spending seemed to largely account for output movements in the wake of a monetary policy shift in Italy. The investment response, however, showed clear signs of being affected by financial factors. This result, according to Angeloni et al. (2002) seemed to reject the hypothesis of IRC dominance. It was also found that, bank lending responds to policy shifts. This result according to these authors corroborated a host of studies. They therefore concluded that Italy and Germany are countries where the bank credit or lending channel seemed quite strong.

The result based only structural econometric model in Luxembourg, showed that interest sensitivity spending movements dominated the monetary induced changes in GDP. The firm level evidence, also suggested that investment did not appreciably depend on firms' liquidity holdings. This suggested that bank loan supply is not likely to play a major role in monetary transmission.

With respect to Netherlands, the VAR and econometric model of this economy suggested that the IRC could be dominant, though there was lack of firm level analysis to verify this case. There was also clear evidence that bank loan supply shifted following changes in monetary policy, however, the authors could not obtain complete information to fully substantiate this.

Like in Greece, Ireland and the Netherlands, the assessment of Portugal was impaired by lack of data. The result based solely on structural econometric concluded that the IRC could be a dominant channel of monetary transmission, though there was lack of firm level evidence needed to test this proposition. It also appeared that bank loan supply changed following a shift in monetary policy but the authors cannot determine whether this was significant in monetary transmission.

In Spain, empirical evidence consistently revealed that this country has a strong and pure IRC of monetary transmission. In this country, a monetary policy shift, led to substantial movements in investment and this variable did not appear to be dependent on financial factors. Loan supply also appeared to be disconnected from monetary policy and the evidence on how banks shielded their lending after regulatory induced deposit outflows reinforced this presumption. This suggested that financial factors do not play an important role in the Spanish monetary transmission.

From the review of Angeloni et al. (2002) study of monetary policy transmission in euro area, one could conclude that neither the interest rate channel nor the credit channel emerges as clearly and exclusively dominant channel. As the interest sensitive spending plays a quantitatively large role in explaining output movements supporting the dominance of IRC, on the one hand, banks, on the other hand, play an overall role as provider of finance in the area, supporting the dominance of the credit channel. Although the interest rate channel is not dominant in the whole of the euro area, it is still a prominent channel of monetary transmission mechanism. In one group of countries (Finland, Luxemburg, Spain) the IRC is unambiguously dominant. In many cases, the IRC is complemented by financial factors, and the role of banks in supplying business

credit is also important. The bank credit channel is also found to operate significantly in Germany and Italy; and the mere fact that bank dominate the supply of credit in the euro area does not imply that the credit channel is operative in all countries in the area.

As regards the empirical studies on monetary transmission mechanism in other groups of countries that are not in the euro area, it is apparent that these studies suffer from the problem of identifying whether the contraction in bank loans following monetary tightening is due to demand or supply effect. Apart from this, results on bank credit channel are also quite mixed. This is attributed to differences in sample periods, identification scheme and changes in the structure of the financial markets in some of these countries. The common element to most of these studies is that they adopted vector autoregressions as an econometric methodology. This springs from the popularity of this technique in economic literature recently.

### 2.4.2 Empirical Evidence from Developing Countries

Unlike in developed countries, the process of monetary policy transmission in developed countries has been bisected by several problems. The structure of the financial markets (characterized by limited menu of financial assets to private agents) in these countries has made the transmission mechanism of monetary policy very problematic (Montel (1991).

Montiel (1991) examined the transmission mechanism of monetary policy in developing countries where the financial market is characterized by absence of organized markets for securities and equities, capital controls, and legal ceiling on bank borrowing and lending. The author analyzed how changes in monetary policy instruments are transmitted to the domestic aggregate demand in a financially repressed economy. In its

simplest form, the model employed by the author assumed that the stock of capital is constant and no market exist for either private or government securities. Although private households have access to domestic currency, bank deposits, curb market loans, foreign exchange, and bank credit; currency is ignored and bank credit and curb market loans are taken to be perfect substitute, in household portfolios. From the partial equilibrium model specified, analysis indicated that the wealth effects in addition to interest rate effect are the mechanisms through which monetary policy instruments affect aggregate demand in developing countries. Moreover, the general equilibrium analysis of the model suggested that the direct change in domestic aggregate demand in response to monetary policy instruments is determined by a combination of autonomous effects and other effects that operate through the premium in the foreign exchange market.

A proper analysis of Montiel's (1991) study indicates that some of its assumptions are rather too restrictive and unrealistic for developing countries. By adopting a model which assumes that the stock of capital is constant and no market exist for private and government securities makes the findings of this study questionable.

Juks (2003), reiterated that the conduct of empirical studies on monetary policy transmission in developing countries is rather complicated in the light of continuous changes in the economic structure and substantial data problem (i.e. shortness of time-series, structural breaks). This problem according to the author disrupted quantitative research and made them rather unreliable.

Taking note of the above fact, this section further survey existing literature on the importance of various channels of monetary transmission in developing and emerging market economy. In doing this special emphasis is laid on the credit channel since it is

main focus of this study.

Sirivedhin (1997) empirically assessed the impact of financial reform on the structure of financial markets and monetary policy in Thailand. In this country, a gradual approach to financial liberalization was adopted to allow financial institutions and consumers to adjust to the new environment. Prior to reform, the level of competition between financial institutions was relatively low while monetary management was effected largely through the use of direct control measures, such as interest rate ceilings and exchange rate control regulations. Upon the liberalization of the financial sector in Thailand, significant growth in financial markets, in terms of depth and breadth, as measured by the ratio of M2/GDP and M3/GDP was witnessed. In this study, a VAR model which include four endogenous variables (which include inter-bank rate, domestic credit, private investment index and consumer price index) and three exogenous variables (exchange rate, oil price index and LIBOR) was specified. The impulse response functions were used in analyzing the impact of inter-bank interest rate shock of domestic credit, private investment index and consumer price index. This study found that domestic interest rates have become a major channel of monetary transmission under the liberalized regime.

Lopes (1998) discussed the importance of different transmission channels in economic stabilization process using Brazil as a case study. He argued that under high inflation, the effectiveness of interest rate, wealth and credit channels of monetary policy transmission tend to reduce significantly. The inefficiency of interest rate channel in monetary policy transmission under high inflation, as the author noted, arose because monetary policy cannot easily control the direction of real interest rate as a result of the

existence of high volatility premium in agents, expectations. The inefficiency of the wealth channel and balance sheet channel under high inflation could also be ascribed to the absence of long-term debt instruments. The author maintained that these instruments are important because the longer the life cycle of an instrument the greater the impact of interest rate change on the value of the instrument. The bank-lending channel, according to Lopes, is also rather limited because credit offering is an important source of bank revenue in the context of high inflation. In the light of the inefficiency of the interest rate, wealth, balance sheet and credit channels in a high inflation economy, Lopes stated that the only channel through which monetary policy affect real activity in a high inflation economy is through the exchange rate channel. He reiterated that the floating exchange rate combined with high real interest rates in Brazil resulted in deterioration in the trade balance, which still increased GDP, however, due to consumption boom. The author concluded that in the process of stabilization, other channels of monetary policy transmission would be gradually restored and the need for very high interest rate would be somewhat reduced.

Eyzaguirre (1998) investigated the importance of different monetary transmission channels in Chile. He stated that Chilean policy has mainly focused on the interest rate channel due to the extent and level of indexation in this country. Most financial instruments in the Chilean economy were indexed to the UF which is the interest rate adjusted on a daily basis taking into account one-month lagged inflation. This process, according to Eyzaguirre allowed the Bank to control the development of the real interest rate through an open window for overnight borrowing at a given UF interest rate. The economic history of Chile indicated that during the first half of the 1990s the exchange

rate channel played a rather important role in controlling inflation in this country. However, the current account deficit strongly limited this role. Therefore, in an attempt to control inflation and at the same time maintained a competitive real exchange rate, the authorities imposed an unremunerated reserve requirement on all capital inflows, except foreign direct investment, which are long-term investment. This action led to a positive interest rate differential (ca 3%) between Chile and the rest of the world without massive capital inflow. The author concluded that the trade-off between controlling inflation and maintaining a competitive exchange rate has lessened significantly recently. In subsequent study, Carcia (2001) observed that the significant depreciation of the peso in Chile has not had a strong impact on inflation. He argued that the low exchange rate pass-though was due to low economic activity (i.e. output below potential level), which compensated the inflationary effect of exchange rate depreciation in the short-run. Carcia concluded that as economic activity increased, the pass-through would increase and the exchange rate channel would be an important determinant of inflation. Other monetary policy channels (other asset prices, and credit channels) have received little attention in Chile though they might be potentially important. The author further noted that the other prices channels could be induced especially through the household wealth effect when a monetary policy induced changes in well-developed stock markets thereby having strong impact on aggregate spending. It was also found in Carcia's study that the credit channel was relatively unimportant in Chile because reserve requirements are not used in monetary policy by the authorities in this country.

In Colombia, Carrasquilla (1998) employed both micro and macro data covering the period 1980-1996 in testing for both the traditional interest rate and credit channels in

Colombia. The author observed that consequent to the monetary contraction in 1981-1984, there was a temporary increase in interest rates and a fall in consumption and investment; while subsequent monetary expansion in 1990-1992 caused a reduction in interest rate and a lagged rise in consumption and investment. These results, according to the author, were consistent with an active interest rate channel. In an attempt to test for the credit channel, a preliminary exploration using graphical approach indicated that real deposits and loans in the banking sector did not respond to the monetary contraction in 1981-1984 but there was a strong lagged response of real deposits and loans to the monetary expansion that occurred in 1990-1992. Following these puzzling results for the credit channel, Carrasquilla argued that two possible reasons could be responsible for these findings. First, he maintained that there could be structural asymmetry between the effects of monetary contraction and those of expansion. Under this situation, there could be "over optimistic expectation" about the progress of economic liberalization leading to "over borrowing syndrome," in which banks to over extend themselves. Second, the author argued that the puzzling result could be explained by the degree to which the financial markets have developed. A high degree of government involvement in financial markets coupled with imperfect competition in the banking market might reduce banks' incentives to respond properly to monetary policy decision resulting in a high degree of moral hazard and thus a banking crisis. By further applying the VAR econometric approach to some micro data, the study found that interest rate and asset prices responded to monetary policy shock, while the response of expenditure to monetary policy was insignificant. The micro data result suggested that during the period of monetary contraction the implicit cost of external funds for smaller firms rose significantly relative

to those for larger firms, and the growth of their financial liabilities was significantly lower.

The Bank of Korea (1998) summarized recent studies on bank credit channel of monetary transmission mechanism in Korea. They found that the volume of loans among smaller banks shrinked more in the wake of monetary contraction. Furthermore, smaller banks were shown to attract external financing at a high interest rate cost. This suggested that credit allocated to bank–dependent borrowers might decline disproportionately. The implication of this finding is that policy makers need to take into account such distributional disadvantages, and would have to take appropriate action to facilitate steady credit extension to small firms from a long-term point of view. In this study, it was also argued that as an opening of the capital market continued and the use of derivatives increased, banks might rely heavily of non-deposit sources, reducing the importance of the credit channel. Moreover, if derivative facilitated asset switching between different maturities in different countries, the exchange rate channel might become important.

Following the recent financial crisis in Korea, Kim (1999) empirically investigated the effectiveness of the credit channel. Having examined the theoretical underpinning of the credit channel, the author adopted the "narrative approach" developed by Romer and Romer (1989, 1990) to capture the existence of distinctive bank lending channel. The narrative approach involves the identification of a sequence of focal episodes of restrictive monetary policy in which the central bank appears to have deliberately aimed at sacrificing output. In achieving this objective, Kim applied both the aggregate monthly financial data (1993:1-1998:5) and disaggregated bank balance sheet

data for identifying the existence of distinctive credit channel (especially, the bank lending channel). The author also specified and estimated a disequilibrium model of the Korean loan market. This model incorporated a separate loan demand and supply function. In the overall, this study found convincing evidence of the practical importance of the credit channel in the aftermath of the financial crisis in Korea. The study indicated that bank lending played a significant independent role in monetary transmission process. Moreover, strong evidence suggested that a marked decline in aggregated bank credit observed following the crisis was attributed to a restrictive monetary policy.

Martinez et al. (2000) explored monetary transmission mechanism in Mexico. These authors argued that in an environment of constant external and internal shocks the implementation of monetary policy based on the use of borrowed reserve target had been rather effective in distributing the impact of external shocks between the exchange rate and interest rate. Using VAR analysis, this study revealed that the interest rate, in addition to its effect through the exchange rate, significantly affected aggregate demand and ultimately on the price level in Mexico. Investigation of the credit channel also indicated that the interest rate significantly influence the lending-deposit rate spread, which in turn had a significant impact on output. It was also found that the alternative credit mechanisms such as the trade credit were also negatively affected by monetary contraction. The latter implies that the interest rate negatively affect the amount of credit in the economy in spite of the limited role of the bank credit in Mexico.

De la Rocha (1998) and Misaico (2000) provided empirical evidence on monetary policy transmission in Peru. They argued that the traditional interest rate channel seemed to be effective despite the highly dollarized economy of Peru. The evidence showed that

a rise in interest rate on Central Bank's CD increased banks' overnight interest rate, which in turn influenced long-term market rates thereby affecting aggregate demand. These authors argued that the effectiveness of the interest rate channel was not much affected by dollarization, since it reflected a process of asset substitution rather than currency substitution.

De la Rocha argued that the importance of the credit channel remained less unclear in Peru. This argument, following the author could be ascribed, on the one hand, to increased reliance by corporations on the banking sector as a source of credit; and on the other hand, increased access of domestic firms to other sources of credit(foreign credit and equity financing) which reduced the importance of the credit channel.

In an attempt to obtain a clear picture of the importance of the credit channel in the Peruvian economy, Misaico (2000) performed a VAR analysis using monthly data covering the period 1979-2000. The study found that the credit channel was not at work in this country. This finding, according to the author could be ascribed to various alternative external sources of finance different from the banking system. Misaico also concluded that the exchange rate channel was less important in Peru. This could be due to the near perfect substitutability between domestic and foreign assets, which resulted to interventions of the central bank in the exchange market in order to support the bank's monetary targets and minimize large fluctuations in exchange rate.

In subsequent study on Peru, Mihaljev (2001) stressed that there had been a significant decline in the exchange rate pass through into inflation in this central Southern American country. Dovciak (1999) also provided a discussion of monetary policy transmission in Slovakia. He maintained that the interest rate channel had played a rather

modest role in Slovakia - since changes in monetary policy (i.e. changes in the short-term interest rate) had been transmitted to the variables influencing the non-financial sector with considerable delay. The slow responsiveness of these variables, according to the author had been due, mainly to the low competition in the banking sector and the limited number of alternative sources of finance in Slovakia. With recent gradual liberalization of capital flows from abroad in this country, Dovciak argued that there had been increased access to non-banking credit and the importance of the interest rate channel had significantly rises in recent years.

Following the above findings, Kuijis (2002) conducted a VAR analysis and concluded that the changes in interest rate had significantly affected aggregate demand and exchange rate, which in turn had influenced the general price levels. In this studies, the exchange rate was found to play an important role in monetary policy transmission in Slovakia, however, there was lack of empirical evidence on how fluctuations in exchange rate influenced net exports. Moreover, evidence on credit channel was also rather incomplete in this country.

Lyziak (2001) presented a thorough overview of the relative importance of different monetary policy transmissions in Poland. He found that the exchange rate channel was the quickest way to affect inflation, though its effects on inflation were not very strong. Lyziak argued that though the use of the exchange rate channel was constrained by the objective to maintain international competitiveness, real appreciation in exchange rate constituted an important pillar of the Polish dis-inflationary process. Moreover, the effectiveness of the interest rate channel, as the author noted appeared to be constrained in Poland. This could be observed from the output gap which was

moderately sensitive to changes in the interest rate, but delayed in response to this variable. The link between inflation and output gap was also found to be weak. Concerning the bank credit channel, Lyziak empirically observed that this was rather ineffective in Poland. The ineffectiveness of this channel of monetary policy could be adduced to huge capital inflows connected with state enterprise privatization and foreign direct investment which ultimately made the monetary base uncontrollable by the central bank. In the face of excess liquidity, banks expanded their credit independently of monetary policy, making the bank credit channel ineffective.

Monetary policy in East Asia has undergone considerable changes in the last two decades. Many Asian economies have moved to a more flexible exchange rate regime since the Asia crisis in 1997. In the light of these changes, Fung (2002) empirically examined in seven East Asian countries (namely Indonesia, Korea, Malaysia, the Philippines, Singapore, Taiwan, China and Thailand) whether the use of identified VAR could generate a dynamic responses to monetary shock that are consistent with those observed in several empirical studies based on the United States. After estimating the VAR model, impulse response functions of the orthogonalised innovations to the monetary policy were generated by the author to trace out the dynamic responses of other variables in the VAR to monetary policy innovations. This study found that following a contractionary policy shock, the interest rate increased; output, the price level and money declined, and the local currency appreciated. The author interpreted these results as broadly consistent with the expected effect of monetary policy. This study further suggested that sample that excluded the Asian crisis period were more consisted with the expected effects for most economies.

Freimane (2004) studied the impact of various channels of monetary policy (interest rate, exchange rate, wealth and credit channel) on output and inflation in Latvia. Monetary policy, in this country, took a special dimension following the stabilization process adopted in the in the 1990s to diminish inflation and ensure a viable national currency. Having examined the various methods of estimating the effects of monetary policy, the author eventually adopted the structural vector autoregression (SVAR) technique. Using monthly observation from the period 1998:01 to 2003:09, the study revealed that the influence of exchange rate changes on the price level and output is more pronounced than the influence of interest rates and other channels. The study concluded that the structural VAR models and small structural models are more appropriate in estimating the effects of monetary policy.

The review of literature on developing countries, so far, indicates that the conduct of empirical studies on monetary policy transmission is rather complicated in the light of continuous changes in the economic structure and substantial data problem (i.e. shortness of time-series, structural breaks). This disrupted quantitative research and made them rather unreliable. In the face of these problems, the empirical evidence on the importance of various channels of monetary policy transmission (in particular, the bank credit channel) provides no clear cut implications. On the one hand, there are some countries (e.g. Chile, Columbia, Peru and Mexico) where the interest rate channel seems to play an important role in monetary policy transmission process. On the other hand, there exist other groups of countries (e.g. Brazil, Slovakia, Poland) where the role of the interest rate channel tend to be rather limited. The same pattern of mixed evidence across different countries also applies to the credit channel and exchange rate channel. Furthermore, the

reasons why certain channels are present or not in a particular country vary from country to country, which sheds some light on the link between a specific channel and the financial structure of the country.

### 2.4.3 Empirical Evidence from the Nigerian Economy

In Nigeria, despite the fact that monetary policy has been accorded prominent position in macroeconomic stabilization process, empirical inquiries into the nature and channels of monetary transmission mechanism has been very scanty. In earlier studies centered on money demand function, attention has been focused basically on its determinants as well as estimation of interest elasticities.

A quite related area, where little research effort has been made focused on the relative effectiveness of monetary and fiscal policy in Nigeria. Following this line of enquiry, Ajayi (1974b) examined the relative potency of monetary and fiscal policy in Nigeria. The hypotheses, which this study sought to test include: that fiscal policy exerts a larger influence on economic activity than monetary policy; that the response of economic activity to fiscal actions is more predictable than to monetary policy. To achieve this objective, the Anderson and Jordan (1968) model was adopted and the first difference of the gross domestic product (GDP) was regressed on five different measures of monetary influences and three fiscal variables. From this result, Ajayi concluded that monetary variables performed better than fiscal variables in influencing economic activities in Nigeria.

Uduebo (1985) argued that, the role of monetary policy is limited largely by the underdeveloped nature of the financial structure. Similarly, Okah (1986) argued succinctly that the efficacy of the conventional tools of monetary control is limited due to

the prevailing economic and social underdevelopment. Aigbokhan (1989) also discovered that fiscal policy had tended to be more effective, while monetary policy had, in fact, had a negative impact on economic activity due to the restrictive monetary policy adopted in the 1980s.

In the quest for further research on the same issue, Tella and Omitogun (1989) found that the current level of monetary variables performed better than, in most instances the dampened, current fiscal variables. Realizing that this result suggested the existence of multicollinearity between monetary and fiscal variables, lagged values of both variables were also used. The main implication of this study is that monetary policy is stronger in the short-run while fiscal policy becomes relevant only after an interval.

Being inspired by the major conclusion drawn from early studies that the demand for money is insensitive to interest rates, Jimoh (1990) specified and estimated a simultaneous equation model using the two-stage least squares technique. This model is made up of the money demand equation, price determination equation, private investment equation and output equation. Using data for the period 1958-85, the study revealed that money demand functions is sensitive to interest rate changes, but exogenously determined during the period under investigation. The author concluded that under this situation the interest rate did not act as an equilibrating mechanism but merely a policy variable. The main weakness of this study is that it failed to specifically address the main channel of monetary transmission mechanism in Nigeria. Since the interest rate was not an equilibrating mechanism according to the author, then it cannot be an effective channel of monetary transmission during the period covered by this study.

Ezeuduji (1994) examined the effects of monetary policy on the performance of

the banking industry in Nigeria. This study was informed by the need to identify the ways through which monetary policy impact on the banking industry. From his theoretical analysis, the author maintained that monetary policy exerted considerable influence on the banking industry under the administratively controlled and deregulated regimes. Ezeuduji further noted that although monetary policy influenced bank's pattern and direction of credit, interest rate, asset structure and liquidity, among other things, the observed effects have often fallen below the desired target.

Uchendu (1997) studied the various channels of monetary policy in Nigeria. To explore the bank credit channel, the author analyzed manufacturing firm's sources of finance, compiled by the Central Bank of Nigeria for the period 1982 to 1995. A survey of the sources of manufacturing firms' finance in the Lagos Area for the period 1994-1995 was also examined. This inquiry was informed by the view that changes in monetary policy (i.e. volume of credit allocation and level of interest rates) affect firms to the extent of their exposure to bank funds. From the study, Uchendu observed that various channels and mechanisms were applicable in the Nigerian case even though the importance and effectiveness of each of them varied over time. The study revealed that larger manufacturing firms have greater access to bank financing than smaller firms since all the three categories of firms faced the same monetary policy stance in 1994 and 1995. This evidence, according to the author, clearly supported the existence of the bank loan channel of transmission of monetary policy to the real sector. A major limitation of this study is that it failed to take into account the necessary conditions for the existence of a bank credit. Moreover, the use of only few years sample on firms is not enough to unravel the bank credit channel.

Bogunjoko (1997) further investigated the efficacy of monetary policy as a stabilization tool using the modified St. Louis Model to take account of the peculiarity of the Nigerian economy. The author specified an error correction model in this study and annual data covering the period 1970-1993 were applied. It was shown in this study that money matters in the Nigerian economy and that the appropriate monetary target is the domestic credit of the banking sector.

Following similar line of enquiry, Asogu (1998) examined the influence of money supply and government expenditure on gross domestic product - a proxy for economic activity. The study also adopted the St. Louis Model and annual and quarterly time-series on the Nigerian economy for the period 1960-1995 were applied. The variables used in this study entered the regression equation as first difference, percentage change, or lagged value of both. The findings, which emerged from this study, using the annual data, showed that money supply and export are statistically significant. The author maintained that this findings corroborated earlier work and suggested that monetary actions are more potent than fiscal action in the short-run. In another dimension, when interpolated quarterly series were applied to the same model, changes in government expenditure tended to influence gross domestic product very significantly, while the coefficient of M2 (an indicator of monetary policy ) is also very significant under first difference. This result implies that both monetary and fiscal policies influence the level of economic activity in Nigeria, however, the effect of the former is more pronounced in the short-run.

In the light of the heightened debate by macroeconomists on whether policy makers can systematically use aggregate demand policies to stabilize output around its full employment or natural level, Nwaobi (1999) examined money and output

interactions in Nigeria using a multivariate cointegration technique. A Barro-type reduced-form equation was derived and estimated in this study, using observed data on the Nigerian economy for the period 1960-1995. The Barro-type model is an adaptation of the Mundell-Fleming framework with imported intermediate goods, limited capital mobility and foreign exchange rationing. The specified model assumed the irrelevance of anticipated monetary policy for short-run deviations of domestic output from its natural level. The findings of this study supported the open-economy model of output determination and further indicated that unanticipated growth in money supply would have positive effect on output. This implies that monetary tightening; since it is anticipated by the Central Bank, would have no effect on real domestic output in the short-run.

In a very recent work, Oyaromade (2003) empirically tested for the existence of credit rationing in the Nigerian economy. In this study, both disequilibrium model and the structural VAR approach were adopted. In estimating this model, data for the period 1970:1-1999:12 was used. The study concluded that credit rationing and the two main channels of monetary transmission (interest and credit channels) exist in the Nigerian economy. A proper analysis of this study revealed several limitations. First, the study like Uchendu (1997) failed to draw its conclusion based on the theoretical underpinning of the bank credit channel. It has been shown that the mere decline in bank credit after monetary contraction is neither a necessary nor sufficient condition for the existence of the bank credit channel. Second, the study failed to justify empirically the choice of minimum rediscount rate as the indicator of monetary policy. Bernanke and Blinder (1992) adopted the federal funds rate as an indicator of monetary policy on the understanding that this

variable has the highest predictive power than monetary aggregate and other interest rates. Third, this study failed to include other balance sheet variables like banks' securities holding and deposit. Under this situation, one cannot genuinely determine the effectiveness of the bank credit channel. Fourth, the study assumes that credit rationing is a necessary condition for the existence of bank credit channel. This assumption is not supported theoretically[29].

The other weakness of this study is that it failed to take into cognizance the likely impact of the deregulation of the financial market and some structural breaks during the military era. The inclusion of dummies as exogenous variables in the VAR model to capture these phenomena may have led to a more interesting results.

## 2.5 Conclusion

This chapter started by exploring the concept of financial structure as well as the link between financial structure and economic activity. The theoretical survey indicated that the structure of financial system has a lot of macroeconomic implication on the economy. Financial institutions, banks in particular, are quite important in the economy in the light of the problem of asymmetric information in the financial market. Under a situation of informational asymmetries, the role of banks becomes conspicuous. A survey of empirical literature in sequence of developed, developing and the Nigerian economy also showed that that while a lot of studies have been conducted to test the existence of bank credit channel in developed countries, these studies are quite mixed and suffered

[29] Bernanke and Blinder (1988), Gertler and Gilchrist (1993), Kashyap and Stein (1993), Bernanke (1993) and Friedman and Kuttner (1993) have pointed out that credit rationing is not essential for the credit view. These authors stressed that in credit rationing models, individuals who are willing and able to pay the market interest rates are constrained from obtaining credit. In credit view models, however, this is not necessarily the case. All market may clear. Friedman and Kutner (1993) noted that "the fact that credit view models can encompass market non-clearing does not mean that they necessarily do so, however, and on this point, too, substantial confusion exist".

from the identification problem. Moreover, with respect to developing countries, the review also indicated that the conduct of empirical studies on MTM is rather complicated in the light of continuous change in financial structure and substantial data problem. Given these problems, the empirical evidence on the importance of the bank credit channel is also mixed in these countries. While the bank credit channel is very important in some developing countries, empirical evidence indicated that it is rather weak in others. These mixed results have been linked to the differences in the financial structure of these countries. In Nigerian ecocomy, in particular, most studies have been focused on the investigation of the relative effectiveness of monetary and fiscal policy by the estimation of money demand elasticities - an issue which has long waned in monetary economics literature. In the light of this backdrop, this study intends to fill existing gap by assessing the structure of the financial markets in Nigeria and examining the bank credit channel of monetary transmission under financial deregulation era in Nigeria.

# CHAPTER THREE

# RESEARCH METHODOLOGY

## 3.1 Introduction

This chapter focuses the methodology adopted in the process of carrying out this study. First, the theoretical framework for this study is presented in section 3.2. In section 3.3, we discuss the approaches to the test of bank credit channel. Moreover, the approaches adopted in achieving the basic objectives of this study are state in section 3.4. Section 3.5 focuses on the econometric methodology and the specification of model for this study. In this section the Structural VAR technique and the various identification restrictions imposed are considered. The measurement of specific variables is done in section 3.6. The estimation and technique of analysis is considered in section 3.7, while the section concludes by discussing the sources of data used in this study.

## 3.2 Theoretical Framework

A brilliant attempt to formally integrate the role of banks and bank credit channel in the conventional IS-LM is presented in the model of Bernanke and Blinder (1988). In this simple model the Keynesian IS Curve is modified as the so-called Commodities and Credit Curve (CC-Curve). While the conventional IS-LM framework consists of three markets (bonds, money and goods), Bernanke and Blinder incorporated the bank credit market as additional market. This model is therefore an extension of the well-known IS-LM model and the effects of monetary policy on the lending behaviour in the CC-LM framework can be investigated by focusing on a simplified version of a bank balance sheet.

Following Bernanke and Blinder (1988) the asset side of a bank's balance sheet is assumed to consist of bonds (B), loans (L) and reserves(R): the sum of required reserve (RR) and excess reserve(ER). These assets are assumed to be backed up by liabilities of which deposits (D) is dominant. This is symbolized by:

$$B + L + R = D \quad \text{.....[3.1]}$$

Since banks are required to set aside a certain proportion ($\delta$) of their deposits as required reserve, the relation between RR and D could be written explicitly as

$$\delta = RR / D \quad \Rightarrow \quad RR = \delta D \quad \text{.....[3.2]}$$

Substituting {3.2} into {3.1} and rearranging terms, the balance sheet equation of banks in this model is

$$B + L + ER = (1 - \delta)D \quad \text{.....[3.3]}$$

Equation {3.3} stipulates that the total volume of credit by the banking sector is represented by bond holdings, loans and excess reserves. By dividing every term by (1-$\delta$), equation {3.3} can also be written as

$$B/(1 - \delta)D + L/(1 - \delta)D + ER(1 - \delta)D = 1 \quad \text{.....[3.4]}$$

Drawing from (3.4), the proportion of bond held by the banking sector is positively related to interest rate or rate of return on bond ($r^b$) and negatively related to the rate of return on loan ($r^l$) and bonds and loans are also assumed to be imperfect substitutes from the perspective of borrowers (equation 3.5).

$$B/(1 - \delta)D = \varphi(\underset{+}{r^b}, \underset{-}{r^l}), \quad \text{.....[3.5]}$$

Similarly, the proportion of loans can also be written as

$$L/(1 - \delta)D = \psi(\underset{+}{r^l}, \underset{-}{r^b}) \quad \text{.....[3.6]}$$

The loan supply function can be derived by rearranging equation {3.6} and this yield

**Erreur ! Signet non**

**défini.** $L^s = \psi(\underset{+}{r^l}, \underset{-}{r^b})(1-\delta)D$ ……[3.7]

The demand for loan ($L^d$) on the other hand, is a negative function of the rate of interest on bank loan, a positive function of the interest rate on bonds and the level of income(y) which serves as the scale variable. This is written symbolically as

$$L^d = \lambda(\underset{-}{r^l}, \underset{+}{r^b}, \underset{+}{y}) \text{ ……..[3.8]}$$

Equilibrium is the loan market is achieved when the demand for loan equate its supply.

$$L^d = L^s = \lambda(\underset{-}{r^l}, \underset{+}{r^b}, \underset{+}{y}) = \psi(\underset{+}{r^l}, \underset{-}{r^b})(1-\delta)D \text{ ……..……...[3.9]}$$

From the equilibrium situation depicted by equation {3.9} above, the interest rate on bank loan can be derived as a function of the rate of return on bond, reserve of banks and the level of income.

$$r^l = \mu(\underset{+}{r^b}, \underset{+}{y}, \underset{-}{R}\} \text{ ……[3.10]}$$

The analysis of the deposit and reserve market begins by considering the private sector demand for deposit/money which is negatively related to the bond market interest rate and positively related to the level of income as the relevant scale variable (equation 3.11)[30].

$$D^d = \gamma(\underset{-}{r^b}, \underset{+}{y}) \text{ ……..……..[3.11]}$$

[30] For the purpose of simplification, Bernanke and Blinder (1988) ignore currency in their analysis.

According to Bernanke and Blinder (1988) equation {3.8} and {3.11} implicitly define the non-bank public demand for bond since money demand plus the demand for bond minus loan demand is the total demand for financial wealth.

Next, the supply side of the deposit market is derived by noting that in the absence of currency, the supply of deposit ($D^S$) equals the product of the money multiplier (m) and the reserve (R)[31].

$$D^s = m(r^b)R \quad \text{.....[3.12]}$$

Equating equation {3.11} and {3.12} gives the equilibrium in the deposit and reserve market, which also implies equilibrium in the money market.

$$D^d = D^s = \gamma(r^b, y) = m(r^b)R \quad \text{.....[3.13]}$$

Using equation {3.13} to replace D on the right hand side of equation {3.9} and solving for $r^l$ gives

$$\lambda(r^l, r^b, y) = \psi(r^l, r^b)(1-\delta)m(r^b)R \quad \text{.....[3.14]}$$

$$r^l = g(\underset{+}{r^b}, \underset{+}{y}, \underset{-}{R}) \quad \text{.....[3.15]}$$

Furthermore, the goods market can be represented by the IS-curve relation

$$y = y(\underset{-}{r^b}, \underset{+}{r^l}) \quad \text{.....[3.16]}$$

By substituting {3.15} into {3.16}, we derive the "commodity and credit" curve is represented as

---

[31] Since currency is ignored in this model, then the supply of money(M) equal equals bank deposits (D) and the money multiplier( m) could be derived thus:
$M = D$ and $H = R = RR + ER$ ; where H is the high –powered money and R, RR and ER are as previously defined. The ratio of M to H therefore
gives $M/H = D(RR+ER)^{-1} \Rightarrow D(\delta D + ER)^{-1} \Rightarrow 1/(\delta + ER/D)$. Since it is assumed in this model that $ER = \chi[r^b](1-\delta)D$, then $M/H = 1/\{\delta + \chi[r^b](1-\delta)\} \Rightarrow M = H/\{\delta + \chi[r^b](1-\delta) \Rightarrow m[r^b]R$
where $m[r^b] = \{\delta + \chi[r^b](1-\delta)\}.^{-1}$

$$y = y[r^b, g(r^b, y, R)] \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots [3.17]$$

It could be observed in equation {3.17} that the CC–curve like the IS-Curve is negatively sloped. However, unlike the latter, the former is shifted by monetary policy since it is affected by the level of bank reserves(R) and credit market shock affecting either the demand or the supply of loan. The implication of this is that monetary policy goes beyond the traditional interest rate channel. The CC and LM curve are represented in Figure 3.1.

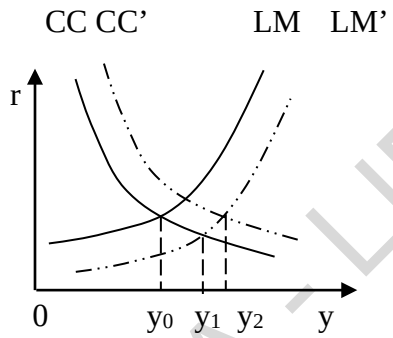



Fig. 3.1: CC-LM curve

In Figure 3.1 above, an expansionary monetary policy shifted out both the CC and LM curve and output expand increases from $y_0$ to $y_2$. Under the traditional interest rate channel, the increase in output would have been $y_0y_1$. This implies that the credit channel reinforces the interest rate channel.

The CC curve derived above reduces to the conventional IS curve if any of the following assumptions hold:

(i) if loans and bonds are perfect substitutes to either borrowers ($\lambda_r^l \rightarrow -\infty$) or to lender $\psi_r^l \rightarrow \infty$.

(ii) if the commodity demand is insensitive to the loan rate ($y_r^l = 0$).

These two conditions clarify the special assumptions implicit in money–only view. The opposite extreme or credit-only view would arise if money and bonds were perfect substitute ($D_r^b \rightarrow \infty$ ), which would make the LM curve horizontal.

Kashyap and Stein (1994) maintained that several necessary conditions must be present simultaneously for a bank credit channel of monetary policy to operate. According to them, the necessary conditions are: first, monetary policy must be able to affect the total volume of bank intermediation. A second element necessary for the effectiveness of the bank credit channel is the link between the bank's total volume of intermediation and the supply of bank loans. Banks must view loans and securities as imperfect substitutes. The third necessary condition is derived from the "uniqueness" of banks as a provider of fund. This condition required that alternative sources of financing are not readily available or their substitutability with bank loans is very limited. Under this situation, a credit squeeze results from quantity rationing or increases in spread between lending rates and market rates. The implications of these conditions are: if bank loans are perfectly substitutable, banks could hold other asset as liquidity buffer against their loan portfolio, while borrower could easily neutralize the impact of monetary policy by attracting alternative sources of funding, making a bank-lending channel impotent.

The prediction of the bank-lending channel as highlighted by Kashyap, Stein and Wilcox (1993) is that: after a monetary tightening, the supply of bank loans should decline by more than the supply of other types of debt (such as commercial paper and finance company loans).

In accordance with the bank-lending channel, monetary tightening reduces the reserves of banks, as well as the deposit base of banking system. As this occurs, the

amount of loans which the banking system can extend falls. The reduction of loans causes the investment of bank-dependent firms and to a less extent consumer spending to fall, thereby pushing down aggregate demand and output[32].

One of the central questions that have emerged from the bank-lending channel is whether it is independent of the traditional interest rate channel. In this respect, Bernanke and Gertler (1995) argued that the credit channel, along with its bank-lending component, is actually not an alternative view to the traditional MTM. These authors maintained that the bank lending rate is a feature that intensifies and extends the traditional interest rate effects and is not a truly independent mechanism. Kim(1999) also analyzed that as market interest rate rises subsequent to monetary tightening, business investment falls not only due to higher cost of capital but also due to a reduction of banks' loan supply to mostly the small and medium-sized firms(via the lending channel). Thus, the lending channel would reinforce the dampening effect of rising interest rates on investment by generating a further decline in those small firms' spending on investment which aggravate the downturn of the real economy.

### 3.3 Approaches to the Test of Bank Credit Channel

To investigate the existence or otherwise of the bank credit channel, four main approaches exist in the literature. The first, which is the natural approach, uses aggregate time series data and it examines the response of bank credit to a monetary tightening and thereafter assesses the implication of such policy stance on economic activity. This approach, which entails the use of Vector Autoregressions(VARs) has been widely

[32] It should be observed that the bank credit channel occurs because banks face a liquidity constraint during tight monetary policy. If all banks always have sufficient cash or liquid securities or can assess a frictionless market for some managed liability, there is no lending channel.

adopted in the literature. Bernanke and Blider (1992) and Bernanke and Gertler (1995) used this approach for the United States; Kakes et.al. (1999) and Holtemöller (2002), for Germany; and Morsink and Bayoumi (2001) for Japan; to mention only few.

The main problem with this approach, however, is that the results emerging from it are consistent with two alternative views, namely, the bank credit view and the money view (Suzuki, 2001). This evidence occurs because as bank loans contracted after monetary tightening, bank deposit (i.e. money) also contracted. Under this situation, Suzuki (2001) asserts that "one can argue that a monetary tightening depresses aggregate demand through the conventional money channel resulting in decrease of demand for credit". Stated in a more concise way, when loan supply contracted after monetary tightening it becomes difficult to identify whether the decline in the volume of loans reflects a restriction of loan supply (i.e. bank credit channel) or a decrease in loan demand because higher interest rates associated with monetary tightening reduces desired investment and consumer spending (Smant, 2002). This supply versus demand puzzle is therefore known as the identification problem.

The second approach to the test of bank credit approach is the Kashyap, Stein and Wilcox (1993), {henceforth KSW} approach and it cuts through the identification problem by examining the response of bank loans and alternative forms of credit (i.e. commercial paper) to a monetary tightening.. Explicitly, KSW bivariate specification could be stated as:

$$\Delta MIX_{i,t} = c + \sum_{i=1}^{4} \alpha_i \Delta MIX_{j,t-i} + \sum_{t=1}^{8} \beta_i MP_{t-i} + u_{j,t} \quad \text{.....[3.18]}$$

Where MIX is the variable that indicates the ratio of business bank loans to the sum of business bank loans and commercial paper outstanding while MP is the monetary policy

indicator which takes the value of one during monetary tightening and zero at any other period. The multivariable specification adopted by KSW is arrived at by including the lags of GNP growth on the right-hand-side of the bivariate specification above.

KSW's approach, has been faulted however, on some grounds. First, the decline in the aggregate bank loan to commercial paper ratio is not a conclusive evidence for a bank credit channel(Oliner and Rudebusch, 1996, Gertler and Gilchrist, 1993b). Second, the definition of the mix variable as used by KSW has also been regarded as contentious since it includes commercial paper as the only form of non-bank debt. In this respect, Oliner and Rudebusch (1996) argued that KSW's study failed to account for heterogeneity among firms. In the third place, the KSW approach has also be criticized by for failing to distinguish between endogenous and exogenous policy actions. Suzuki (2001) reiterated that the monetary policy indicator used by KSW "may not be an appropriate indicator of an exogenous monetary policy shock." According to the author, the Romer and Romer (1989) dates adopted as monetary policy indicator by KSW concerns only the dates when the Federal Reserve adopts a monetary tightening. Since it is not uncommon for a central bank to change the target level of its policy instrument to accommodate development in economic conditions such accommodation change should be distinguish from exogenous monetary policy shocks.

Last, the KSW approach requires microdata on firms' source of finance, which given the nature of the Nigerian economy, will be difficult to implement. In the face of these problems, this approach is virtually ill suited for a developing country with data constraints and is not employed in this study.

The third approach to unravel the bank credit channel is the credit rationing approach. In the face of the demand versus supply identification problem and the need to solve it, some studies have sought direct evidence of bank credit channel by investigating whether banks ration credit though non-price means. The problem of identifying loan demand and supply effects, according to these authors, disappears when independent evidence shows that banks use non-price credit rationing. In justification of the use of credit rationing approach, Afonso and Aubyn (1998) maintained that the possible existence of credit rationing opens the way to a credit channel in the transmission mechanism of monetary policy.

It has been emphasized, however, that the credit view should not be confused with credit rationing: the idea that banks limit the availability of credit regardless of prices. Bernanke and Blinder (1988), Bernanke (1993), Gertler and Gilchrist (1993b), Kashyap and Stein (1993) and Friedman and Kuttner (1993) have pointed out that credit rationing is not essential for the credit view. These authors stressed that in credit rationing models, individuals who are willing and able to pay the market interest rates are constrained from obtaining credit. In credit view models, however, this is not necessarily the case. All market may clear. Friedman and Kutner (1993) noted that "the fact that credit view models can encompass market non-clearing does not mean that they necessarily do so, however, and on this point, too, substantial confusion exist".

In the light of several indications in the literature that credit rationing is not a necessary condition for the existence of a separate bank credit channel, we feel that using it would be tantamount to the misconception of the theoretical propositions of the bank credit channel.

Given the problem of demand and supply puzzle, the test for the existence or otherwise of bank credit, therefore, requires great care (Hubbard, 2000). In essence, intelligent identification approach is needed to unravel the existence of bank credit channel using aggregate time-series data.

Distinct from the above three approaches; Structural Vector Autoregressions (SVARs) has been adopted in investigating the bank credit channel recently. The use of the SVARs stem from the disadvantage of the VAR approach where economic theory plays a limited role. Cooley and LeRoy (1985) criticized the VAR methodology because of its "atheoretical" identification scheme. They argued that Sims (1980a) did not explicitly justify the identification restrictions and claimed that a model identified by this arbitrary procedure cannot be interpreted as a structural model, because different ordering of variables yields different structural parameters. Given the weaknesses of the VAR methodology, this study adopts Structural Vector Autoregressive (SVAR) econometric methodology. Under this, Bernanke (1986) and Sims (1986) propose to set up the VAR(ρ) model as a system of simultaneous equations which requires the imposition of some restrictions in order to achieve identification.



### 3.4 Approaches to Study Objectives

This section affirms the approaches adopted in ensuring that the objectives or research questions, earlier stated are achieved.

*Objective One: To Evaluate the structure of financial markets before and after the adoption of financial deregulation policy in Nigeria*

To appraise the structure of financial markets prior and after the adoption of financial deregulation in Nigeria, simple statistical tools such as graphs, charts and

percentages are used. In assessing whether financial deregulation has brought about significant change in structure of money and capital markets, indicators of financial structure proposed by Demirguc–Kunt and Levine (1999), Beck et.al(2000) and Gallego and Loayza(2000) are employed. These financial structure indicators include:

(i). Structure–Activity (SA): This is the measure of the activity the stock markets relative to that of the banking sector. The measure of the stock market activity is the *total value traded ratio*, while the measure of banks activities is the *bank credit ratio.* Using these activities ratio, financial structure indicated as SA is defined as:

SA = Log {value traded ratio/ bank credit ratio}

Where:

Value traded ratio = value of domestic equities on the stock exchange/GDP,

Bank credit ratio = value of deposit money banks' credit /GDP.

The larger the SA ratio, the more stock market-based is the structure of the financial markets.

(ii). Structure-Size (SS): This is a measure of the size of the stock markets relative to that of the banking sector. The measure of the size of the stock market is the market capitalization ratio, while the size of the banking sector is measured by the bank credit ratio or alternatively total banking system assets ratio. Therefore,

SS = Log {market capitalization ratio/ bank credit ratio}; or

SS = Log{market capitalization ratio/ total banking system assets ratio}.

Where:

Market capitalization ratio =value of domestic equities/GDP,

Bank credit ratio = value of deposit money banks' credit /GDP, and

Banking systems assets ratio = banking systems assets/GDP

With respect to the two alternative methods for the computation of SS above, Levine (2000)and Beck et. al.(2000) has indicated in his study that these measures of stock markets size are equivalent.

(iii). Structure–Efficiency(SE): This ratio attempts to measure financial structure in terms of the efficiency of the stock markets relative to that of the banking sector. The stock markets efficiency can be measured by the total value traded-ratio or the turnover ratio. When measured by the value-traded ratio, this ratio reflects the liquidity of the domestic stock markets, while the turnover ratio measures trading relative the size of the markets. The efficiency of banks in the financial system can be measured by interest rate margin relative to banking systems assets. In this dimension, SE is defined as:

Log {traded value ratio x net interest margin relative to banks assets}, or

Log {turnover ratio x net interest margin relative to banks assets}.

Where:

Traded value ratio is as previously defined, and

Net interest margin = the spread on banks' average borrowing and lending rate,

Turnover ratio = stock markets' turnover/GDP x value of domestic equities.

The larger the values of SE, the more developed is the stock market relative to the banking market in the financial system.

*Objective Two: Impact of Monetary Policy on Bank Lending*

To empirically investigate the impact of monetary policy on bank lending in Nigeria, the basic research question under this objective is whether monetary policy constrains bank lending in Nigeria. To achieve this objective, this study estimates and examined the impulse response functions from the SVAR model. In doing this, we ensure that the theoretical propositions of bank credit channel are satisfied. Specifically, if the bank credit channel is operative, that is, the Central Bank of Nigeria can affect supply of bank loans by changing the amount of reserves available to banks, then following monetary tightening, the following conditions should be apparent:

(i) bank deposits, as well as bank loans and securities decline;

(ii) bank deposits decline sharply and relatively faster than bank loans;

(iii) fall in output roughly correspond in timing to the fall in bank loans;

(iv) the lending rate should increase and this increases must corresponding in timing to the fall in bank loans.

*Objective Three: Importance of the Bank Credit Channel under the Deregulated of the Financial Sector in Nigeria.*

To examine the importance of the bank credit channel under the deregulated regime in Nigeria, the SVAR model specified for this study is estimated using the data covering the sample period 1986:1-2003:4. The forecast error variance decomposition are computed (FEVD) and the proportion of forecast error in real GDP or prices accounted for by innovation to bank credit and money is estimated. If the bank credit channel is important, we expect bank credit to account for a large proportion in the forecast error in real GDP and prices.

*Objective Four: The Primary Cause of Variation in Economic Activity and Prices*

With respect to the issue of whether money or credit is the primary cause(s) variation in aggregate economic activity and prices, the Granger Causality Test is employed to find out whether money or bank credit is the main cause of variation in economic activity and prices.

## 3.5 Econometric Framework and the Model

To investigate the existence or otherwise of the bank credit channel of monetary policy transmission in the light of the deregulation of the financial markets in Nigeria, this study adopts the Structural Vector Autoregressive (SVAR) econometric framework. The adoption of this framework is inspired by its extensive use within both close and open economy environments to model monetary transmission mechanism (Brischetto and Voss, 1999) as well as to examine the relative importance and effect of various shocks on macroeconomic variables. Bernanke (1986), Bernanke and Blinder (1992), Bernanke and Mihov (1998) and Christiano, Eichenbaum, and Evans (1996, 1999) have used structural VAR models to describe the effects of monetary policy on key macroeconomic variables.

Given that the dynamics of the economy could be typically approximated by a system of linear equations, the n-variate SVAR representation, assuming ρ lags, could be explicitly summarized as

$$\mathbf{A}_0\mathbf{y}_t = \mathbf{a} + \mathbf{A}_1\mathbf{y}_{t-1} + .....\mathbf{A}_\rho\mathbf{y}_{t-\rho} + \mathbf{U}_t \quad \text{.....[3.19]}$$

where $\mathbf{y_t} = (y_{1.t}, y_{2,t}, .....y_{n,t})'$ is an nx1 dimensional vector of endogenous non-policy and policy variables. $\mathbf{U_t}$ is an nx1 dimensional vector of structural shocks or innovation in policy and non-policy variables which is assumed to be i.i.d.N (0,$\mathbf{\Omega}$), where $\mathbf{\Omega}$ is the

variance-covariance of $\mathbf{U_t}$ which is symmetric and positive definite and $\mathbf{A_0}$ , $\mathbf{A_1}$,.....,$\mathbf{A_\rho}$ are nxn dimensional coefficient matrices. The matrix $\mathbf{A_0}$ represents the contemporaneous relations between the components of $\mathbf{y_t}$. Moreover, **a** in equation (3.19) above captures deterministic terms like a constant, a linear trend, and/or dummy variables.

Given that $\mathbf{A_0}$ is invertible, the reduced form VAR representation of the structural equation (3.19) above is

$$y_t = \pi_0 + \pi_1 y_{t-1} + ..... + \pi_\rho y_{t-\rho} + \varepsilon_t \quad \text{..... [3.20]}$$

where $\pi_0 = \mathbf{A_0^{-1}}.\mathbf{a}$ , $\boldsymbol{\pi_1 = A_1 A_0^{-1}}$ , $\boldsymbol{\pi_\rho = A_\rho A_0^{-1}}$ and $\boldsymbol{\varepsilon_t = U_t A_0^{-1}}$ . The covariance of $\varepsilon_t$ , that is, cov($\varepsilon_t$ ) is represented by the matrix $\boldsymbol{\Sigma = A_0^{-1}\Omega(A_0^{-1})'}$ and is also symmetric and positive definite since $\mathbf{\Omega}$ is positive definite and $\mathbf{A_0}$ is invertible. **Erreur ! Signet non défini.**

A necessary (but not sufficient) condition for the estimation of the structural VAR (3.19) is that the number of parameters in it must not be greater than that in the reduced form VAR (3.20). This implies that it must be possible to recover the structural parameters in (3.19) from the parameters in the reduced -form VAR.

Since $\mathbf{y_t}$ is nx1 dimensional vector, the Structural VAR (3.19) above has n, $(\rho+1)n^2$ and $n(n+1)/2$ parameters in the deterministic term, **a**, the coefficient matrix, ($\mathbf{A_0}$, $\mathbf{A_1}$,.....,$\mathbf{A_\rho}$) and the covariance matrix $\mathbf{\Omega}$ respectively. This gives a total of $\{n + (\rho+1)n^2 + n(n+1)/2\}$ parameters. Moreover, with respect to the reduced–form VAR in (3.20) there are n, $n^2\rho$ and $n(n+1)/2$ parameters in ($\pi_0,\pi_1$……$\pi_\rho$) and covariance, $\mathbf{\Sigma}$ respectively. Thus, the number of structural parameters to be estimated exceeds that of the reduced-form VAR and equals

$$\{n + (\rho + 1)n^2 + n(n+1)/2\} - \{n + n^2\rho + n(n+1)/2\} = n^2$$

Under the above scenario, the structural VAR in (3.19) is unidentified and the implication of this, following Gujarati (1995) is that the reduced-form VAR equation may be compatible with different structural equations or different models, making it difficult to say precisely which particular model is being investigated. This problem is therefore known as the identification problem. To avoid this problem, imposition of $n^2$ restrictions is required.

Since $n^2$ restrictions are required for the recovery of the structural parameters from the reduced-form VAR, most studies based on structural VAR (e.g. Sims, 1980a) have adopted the so-called Wold Causal ordering (see, Wold, 1954). Under this ordering, identification of the structural VAR equation required that **Ω,** the covariance matrix, be restricted to be diagonal[33]. This yields n(n-1)/2 restrictions, and it implies that the structural residual $\mathbf{U_t}$ are contemporaneously uncorrelated. The remaining restrictions can now be imposed either on the contemporaneous or on the long-run properties of the VAR system. For instance, to achieve further n(n-1)/2 restrictions, Sims(1980a) assumed that the matrix of contemporaneous effects of structural shocks on the variables, $\mathbf{A_0}$ is lower triangular. This assumption implies that the first variable in the VAR system is only influenced by innovations in the first equation and lagged variables; the second variable is affected by innovations in the first equation, by innovations in the second and lagged variables and so on.

The total identifying restrictions, so far, gives n(n-1). However, to exactly identify the parameter of equation (3.19), at least n additional restrictions are needed. This is

[33] Brischetto and Voss(1999) maintained that though it is standard to restrict **Ω** to be diagonal, this restriction or assumptions, according to them, is not an innocuous one since it affects the interpretation of restrictions on $\mathbf{A_0}$.

achieved by either restricting all the diagonal elements of $\mathbf{A_0}$ or of $\mathbf{\Omega}$ to unity. These two choices of the n normalizing assumptions, following Warner (2000, p.11) are equivalent for impulse response functions and variance decompositions.

When $\mathbf{\Omega}$ is restricted to be $\mathbf{I_n}$, then $\Sigma = A_0^{-1}(A_0^{-1})'$. Moreover, since $\mathbf{A_0}$ is a lower triangular matrix, its inverse is also lower triangular. If we denote the inverse of $\mathbf{A_0}$ as $\mathbf{\Delta}$ then $\mathbf{\Sigma = \Delta\Delta'}$ and $\mathbf{\Delta}$ is called the Choleski factor of $\mathbf{\Sigma}$. In another dimension if we choose to let all the diagonal elements in $\mathbf{A_0}$ to be equal to 1 then $\mathbf{\Sigma = A_0^{-1}\Omega(A_0^{-1})'}$.

The Wold's recursive identification approach expounded so far is based on the imposition of short-run restrictions on the matrix of contemporaneous effects $\mathbf{A_0}$ and the results of this scheme (as observed in several studies) depends on the ordering of the variables, especially, if there are large off-diagonal elements in the variance–covariance matrix of the innovations of the reduced-form (Lack and Lenz,2003). With respect to this identification approach, Cooley and LeRoy (1985) argued that Sims(1980a) did not explicitly justify the identification restrictions and claimed that a model identified by this arbitrary procedure cannot be interpreted as a structural model, because a different variable ordering yield different structural parameters.

As an alternative to the recursive identification scheme, Bernanke (1986), Blanchard and Watson (1986) and Sims (1986) introduced non-recursive restrictions on the contemporaneous interactions among variables for identification. The main similarity between this identification scheme and Wold's causal approach is that in both schemes, a contractionary monetary policy shock is a positive innovation in the nominal interest rate and the line in which the nominal interest rate appears as endogenous variables is interpreted as a reaction function of the monetary authorities. The difference between

these schemes rests on their assumptions. While the recursive structure based on Wold's ordering implicitly assumes that monetary authorities choose the interest rate by looking at the current level of prices and output and assumes that output and the price level do not change in the impact period but react only with one period delay, each line has its own interpretation in the non-recursive identification approach (see Kim, 1999) and it is assumed that monetary authorities, due to an information delay do not see the current value of prices and output when choosing the interest rate[34].

As economic theory often does not provide enough meaningful contemporaneous restrictions, Blanchard and Quah (1989), Shapiro and Watson (1988), and Galì (1992) have imposed long-run restrictions on the system's long-run properties, which are usually based on neutrality postulates. This approach is quite attractive for macroeconomic applications on real and nominal variables as economic theory suggests that nominal shocks have no long-run influence on real variable.

For the purpose of this study, both the traditional Cholesky's identification method (that is, the recursive scheme) as well as the non-recursive scheme are adopted. The adoption of these two identification schemes is borne out of the need to carry out a robust study on the role of the banking sector on monetary transmission mechanism in Nigeria. To achieve this objectives a more general structural VAR(ρ) model[35] nesting both the recursive and non-recursive schemes is adopted and could be written as

$$\mathbf{A}\mathbf{y}_{\mathbf{t}} = \mathbf{A}_1^{*}\mathbf{y}_{\mathbf{t-1}} + \ldots\ldots\ldots + \mathbf{A}_{\boldsymbol{\rho}}^{*}\mathbf{y}_{\mathbf{t-\rho}} + \mathbf{B}_0^{*}\mathbf{x}_{\mathbf{t}} + \ldots\ldots\ldots + \mathbf{B}_{\boldsymbol{\rho}}^{*}\mathbf{x}_{\mathbf{t-\rho}} + \mathbf{C}^{*}\mathbf{D}_{\mathbf{t}} + \mathbf{B}\mathbf{e}_{\mathbf{t}} \ldots\ldots \quad [3.21]$$

where the **A**'s and **B**'s are n x n coefficient matrices. $\mathbf{y}_t = (y_{1t}, \ldots\ldots .. y_{nt})'$ is a vector of n observable endogenous variables, $\mathbf{x}_t = (x_{1t}, \ldots\ldots .. x_{n\,t})'$ is a vector of observable

[34] Sims and Zha (1995) made similar assumptions.
[35] See Lutkepohl, Kratzig and Boreiko (2005).

exogenous variables and $\mathbf{D_t}$ contains all deterministic variables which may consist of a constant, a linear trend, seasonal dummy variables as well as other specified dummy variables. Moreover, $e_t$ is assumed to be a white noise process with $(0,I_n)$. The reduced-form of the structural VAR representation (3.21) is therefore given by:

$$\mathbf{y_t = \Gamma_0 + \Gamma_1 y_{t-1} + ..... + \Gamma_\rho y_{t-\rho} + K_0 x_t + ..... + K_\rho x_{t-\rho} + \nu_t} \quad \text{[3.22]}$$

Where $\Gamma_\mathbf{i} = \mathbf{A}^{-1}\mathbf{A}_\mathbf{i}^*$ (i = 0, 1…..ρ) and $\mathbf{K_i} = \mathbf{A}^{-1}\mathbf{B}_\mathbf{i}^*$ (i = 0, 1…..ρ).

From (3.22) above, the relationship between the reduced-form VAR residual, $\boldsymbol{\nu_t}$ and the structural VAR residual is known as the **AB**-Model (see Amisano and Giannini, 1997) and could be written as[36]

$$\boldsymbol{\nu_t} = \mathbf{A^{-1}Be_t} \text{ or } \mathbf{A\nu_t = Be_t}, \quad \text{[3.23]}$$

The variance-covariance matrix, therefore, becomes $\boldsymbol{\Sigma} = \mathbf{A}^{-1}\mathbf{BB}'(\mathbf{A}^{-1})'$ where $\mathbf{A} = \mathbf{A_0}$. Since the study focuses on imposition of short-run restriction, identification is achieved by placing restrictions on **A** and **B** matrices, which are assumed to be nonsingular.

When $\mathbf{B} = \mathbf{I_n}$, we have the **A**-Model and monetary policy shocks are identified by imposing restrictions on the contemporaneous relationship between the VAR residuals; that is, matrix **A** in the **AB**-Model. On the other hand, if $\mathbf{A} = \mathbf{I_n}$, we have the B-model and the identification scheme is recursive and $\mathbf{B} = \boldsymbol{\Delta}$, where $\boldsymbol{\Delta\Delta}' = \boldsymbol{\Sigma}$ and $\boldsymbol{\Delta}$ is a lower triangular. A general case of **AB**-Model exists where restrictions is placed on both **A** and **B** matrices.

For the **A**-Model and for the **B**-Model, at least n(n-1)/2 restrictions have to be imposed for identification of a system with n endogenous variables. Moreover, for the **AB** model, at least $n^2+n(n+1)/2$ restrictions are needed (see Breitung, Bruggemann and

[36] Kim (1999) adopted this same model in identifying monetary policy shocks in the G-7 countries.

Lutkepohl, 2004). In this study, the **AB** model is used and matrix **B**, is assumed to be diagonal.

Having expounded the econometric framework for this study, the next task is to choose a set of variables that will be employed in the model. In this respect, existing macroeconomic VAR models, such as Sims (1992), Smant (2002), to mention only few, have typically included four variables: output(Y), prices (P), money (M) and interest rate (r). These variables correspond to the variables in the standard IS-LM models. Using only these variables, these studies have tested the effectiveness of the interest rate channel without taking into cognizance the explicit role of bank in monetary transmission mechanism. The results of these studies have also been weakened by the existence of some puzzling results. The first of these is the price puzzle: a situation whereby a positive innovation in interest rate leads to positive response in prices. A liquidity puzzle, a situation whereby a monetary shock leads to a fall in interest rate, has also been found in these studies. To eliminate these puzzles, Sims (1992) has suggested the inclusion of either or both exchange rate and commodity prices in the VAR model.

To explicitly examine the role of banks in monetary policy transmission, the reduced-form VAR model specified for this study takes into cognizance Bernanke and Blinder (1988)'s theoretical model by including not only four variables but also banks' portfolio of assets and liabilities. Furthermore, since one of the contending issues in the literature on the credit channel has centered on the question of whether the decline in bank credit after tight monetary policy could be attributed to decrease in demand for loans or contraction in supply of loans, the model specified for this study also includes the price of bank loans as an additional variable in the SVAR framework. The inclusion

of this variable becomes justifiable in the light of the recent view {Kashyap, Stein and Wilcox, 1993; Suzuki, 2001; and Holtermoller, 2002} that a mere decline in loan stock after monetary tightening is neither a necessary nor a sufficient condition for a bank credit channel. Friedman and Kuttner (1993) also stressed that not only changes in quantities but also changes in prices should be analyzed in order to identify the bank credit channel.

Using the SVAR framework represented by equation (3.21) above, this study tests for the existence of bank credit channel under the deregulated regime by estimating the reduced-form VAR representation (3.22). The vector ($\mathbf{y_t}$) of endogenous variables included in the reduced–form VAR representation (3.22) is

$$\mathbf{y_t} = (cpi_t, ea_t\ lr_t, sh_t, tla_t\ btd_t\ tbr_t\ ner_t)' \ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.23)$$

Where:

$cpi_t$ = consumer price index(1985=100);

$ea_t$ = economic activity (captured by $rgdp_t$ or $ipi_t$);

$rgdp_t$ = real gross domestic product

$ipi_t$ = industrial production(1985=100);

$lr_t$ = average lending rate of banks;

$sh_t$ = securities holdings of banks;

$tla_t$ = banks' total loans and advances;

$btd_t$ = bank deposits;

$tbr_t$ = treasury bill rate;

$ner_t$ = nominal exchange rate(=N=/$).

All the variables entered the reduced-form VAR model above in their logarithmic form except the treasury bill rate (tbr) and average lending rate of banks (lr). The treasury bill rate serves as the monetary policy variable and its corresponding equation in the reduced-form VAR is known as the central bank reaction function. The innovation to tbr, defined as unanticipated hike in this variable reflects the unanticipated monetary policy shock. The adoption of the treasury bill rate as the policy variable, rather than monetary aggregates (M1 or M2) or minimum rediscount rate (MRR) is justified on three main grounds. First, in most studies of this nature, the short-term interest rate has been widely adopted as the policy variable. This is due to the existence of the recent empirical studies that the short–term interest rate is a better indicator of monetary policy actions than monetary aggregates (Sims, 1980, Litterman and Weiss, 1985 and Bernanke and Blinder, 1992). Second, there is the conventional textbook view that monetary policymakers execute their leverage over short-term interest rates to manipulate the cost of capital and spending on investment and consumer goods (Bernanke and Milhov, 1998). Third, the choice of the treasury bill rate rather than the minimum rediscount rate or monetary aggregate could be ascribed to the fundamental limitations in these variables. For instance, a host of non-policy factors such as changes in velocity induced by financial innovation and deregulation have been found to influence the growth of monetary aggregates (Bernanke and Milhov, 1998). Moreover, the minimum rediscount rate, which could alternatively serve as a policy variable, is an administered rate that changes only as a delayed response to already existing information. Since this variable changes less frequently, one could hold that it does not play an important role in quarterly central bank's policy decisions (Leeper, Sims and Zha, 1996).

The inclusion of the exchange rate as a variable in this VAR model stems from its centrality in monetary formulation in an open economy like Nigeria. This is in line with Cushman and Zha (1997) and Kim and Roubini (1999). Both studies argued that a structure allowing for interdependence between domestic monetary policy and the nominal exchange rate is critical for modeling monetary policy in small open economies. Moreover, since the overriding objective of monetary policy with the adoption of deregulation policy in Nigeria is price stability, variation in exchange rate is expected to affect the conduit through which monetary policy affects output and prices in the economy. The introduction of this variable is also crucial in order to eliminate the price and liquidity puzzles associated with most VAR studies.

Furthermore, the average lending rate of banks is included in the model as a proxy for the price of credit. If the decline in bank credit after tight monetary policy is due to shift in supply, one expects this variable to increase. This a priori expectation is derived from the fundamental law of demand and supply which indicates that a fall in supply of credit, given demand, leads to a rise in price of credit. Bernanke and Blinder (1988) also maintained that the spread between the lending rate and government bonds increases in response to monetary tightening and that economic activity decreases if the interest rate on loans increases.

Also included in the above model are bank balance sheet variables, which are intended to explicitly capture the response of banks to monetary policy shock. Banks' assets include total loans and advance as well as their securities holdings. The only bank liability included in the model is banks total deposits. Since some studies have used bank balances sheet variables expressed in their real terms, the robustness of our findings will

be investigated by estimating a structural VAR with bank balance sheet variables in real term.

Moreover, in making the choice of the optimal lag order of the reduced-form VAR, both the Akaike Information Criteria (AIC), Schwartz Information Criteria (SIC) and Hannan–Quinn (HQ) is used. The optimal lag order is determined at the point where each of these information criteria is at minimum.

Since the identification of the SVAR in (4.8) is crucial for the test of the bank credit channel and unraveling the effect of monetary policy on economic activity and prices, the recursive identification scheme is achieved by assuming that matrix B is (8x8) diagonal while Matrix A has the following structure:

| Lcpi | lrgdp | Lbtd | Lsh | LR | Ltla | TBR | Lner |
|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| * | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| * | * | 1 | 0 | 0 | 0 | 0 | 0 |
| * | * | * | 1 | 0 | 0 | 0 | 0 |
| * | * | * | * | 1 | 0 | 0 | 0 |
| * | * | * | * | * | 1 | 0 | 0 |
| * | * | * | * | * | * | 1 | 0 |
| * | * | * | * | * | * | * | 1 |

The recursive identification scheme above, like in Anzuini and Levy (2004) is just-identified and the asterisks (*) symbolizes freely estimated parameters.

Moreover, to adopt a non–recursive identification scheme, this study is guided Kim(1999) and Holtermoller(2002). Given that matrix B is diagonal and of order 8x8; matrix A now has the following structure:

| TBR | Lbtd | Lcpi | lrgdp | Lsh | LR | Ltla | Lner |
|---|---|---|---|---|---|---|---|
| 1 | * | 0 | 0 | 0 | 0 | 0 | * |
| * | 1 | * | * | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | * | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| * | * | 0 | 0 | 1 | * | 0 | 0 |
| * | * | 0 | 0 | 0 | 1 | * | 0 |
| 0 | 0 | * | * | 0 | * | 1 | 0 |
| * | * | * | * | * | * | * | 1 |

The identification scheme above is over-identified with six restrictions. The first line represents monetary policy rule or the reaction function of the central bank. The second line, which is banks' total deposits or quasi-money equation, proxied the standard money demand equation; with real GDP and the treasury bill rate as the scale and opportunity variables respectively. The hypothesis of price stickiness is incorporated in the third and forth lines of the scheme. The banking sector's behaviour, in terms of securities holdings is represented by line five and depends on the treasury bill rate and the lending rate. Line six and seven depict loans supply and demand respectively, while the last line is the arbitrage equation.

In both identification schemes above, the nominal exchange rate reacts immediately to the monetary shock, however, in the second scheme, there is the assumption that the central bank look at the contemporaneous value of the exchange rate while choosing nominal interest rate.

In the first scheme, we normalize monetary policy shock as 1 percent increase in interest rate, whereas under the second scheme, the size of the shock is the commonly used one standard deviation.

### 3.6 Measurement of Specific Variables

In this study, each variable can be categorized as either policy variable, non-policy variable or bank balance sheet variable. Policy variables are those that are potentially useful as indicators of the stance of monetary policy (e.g. short-term interest rates). Non-policy variables, on the other hand, are those not related to the Central Bank policy and include other macroeconomic variables capturing economic activity and prices. Economic activity and prices in this study are proxied by real GDP (or index of industrial production) and the consumer price index (cpi) respectively. The real gross domestic product is defined as the nominal GDP deflated by the composite consumer price index (1985=100).

Since the quarterly GDP which is one of the key variables in the model is not published by all the available data sources (Central Bank of Nigeria, Federal Office of Statistics and IMF's International Financial Statistics); this study adopts the Gandolfo's (1981)[37] algorithm for the interpolation of annual real GDP series using quarterly flow time-series. The use of this interpolation technique is justified on the ground that it is robust and is based on Order Statistical theory, which is not confined to any variable type, whether stock or flow. The Order Statistical theory is centered on the principle of accumulation of realizations or experiences in short intervals, e.g, hourly to daily to weekly to monthly and quarterly to annual. To test the robustness of the findings emerging from the use of interpolated real GDP series, a SVAR model with index of industrial production as an alternative proxy for economic activity will also be estimated.

[37] Asogu, J.O (1998) examines the various non-parametric methods of interpolating annual statistical series into quarterly time-series.

With respect to bank balance sheet variables, this is captured by bank deposits, bank securities holdings and loans and advances. Total bank deposits in this study, is defined as the total deposits with deposit money banks (i.e. commercial and merchant banks). Total deposits of banks is the sum of saving, demand and time deposits. Bank securities holdings is also obtained by summing deposit money banks' investments in treasury bills, treasury certificates and other securities; while total loans and advances( i.e. bank credit) is measured as the total loans and advances of deposit money banks. Since the literature is silent on whether it is nominal or real values of these variables is appropriate for the model, the bank balance sheet variables is also converted to their real terms by deflating them by the composite consumer price index (1985=100). The SVAR which include the real values of these bank-balance sheet variables is also estimated to test the robustness of the existing SVAR model specified for this study.

In the model above, the exchange rate variable is captured by the nominal effective exchange rate and its response to positive innovation in the treasury bill rate is expected to be positive. This means that a monetary policy shock resulting from the rise in treasury bill rate is expected to lead to an appreciation of the Naira.

### 3.7 Estimation and Techniques of Analysis

To estimate the model represented (3.23) above, we initially test for the stationarity of respective variables. This is necessary, given the recent innovation in econometric modeling which has indicated that many macroeconomic time series are not stationary in their levels and that many time series are most adequately represented by first difference (Dickey, Jensen and Thornton, 1991). A variable that is integrated of order 1 is denoted as I(1) series or alternatively, such variable is said to be of unit root.

To test for the existence of unit root in data series, this study employed both the Augmented Dickey Fuller(ADF) and the Philips-Perron tests. The choice of these two test statistics is informed by the fact the both tests control for higher–order autocorrelation.

After the unit root tests, the order of the reduced-form VAR from which the structural parameters were recovered was determined using both the Akaike Information Criterion (AIC), Schwarz Bayesian Criterion (SBC), and Hannan-Quinn Criterion(HQ). In determining the appropriate lag length, the criterion with minimum test statistic is selected. Given information about the stationarity of variables and the appropriate lag length, a cointegration test is also carried out. Although various approaches to testing for cointegration exists, a more powerful multivariate approach proposed by Johansen (1988) and Johansen and Juselius (1990) is adopted in this study. Under this approach two likelihood ratio test statistics (that is, trace test and maximum eigenvalue test) are used to test the null hypothesis of at most r cointegrating relationship among variables. In the trace test, the null hypothesis is that the number of cointegrating vectors is less than or equal to k, where k = 0, 1 or 2. In each case the null hypothesis is tested against the general alternative. The maximum eigenvalue statistic, test for the null hypothesis, k =0 against the alternative that k=1, k=1 is tested against the alternative k=2 etc.

After performing the unit root and cointegration tests, to investigate the time-series properties of variables employed, if variables are I(1) but are not cointegrated, we estimate the reduced form VAR model in first difference. However, if variables are found to be I(1) and cointegrated, the empirical strategy in the literature has adopted two main procedures. First, the impulse responses and forecast error variance decomposition, upon

which the dynamic analysis of the effects of monetary policy are based are estimated from the vector error correction model (VECM) with proper cointegration rank[38]. In small sample, Breitung (2000, p.75) claimed that this approach is particularly advantageous. The other empirical strategy, is to estimate impulse response function and forecast error variance decompositions from unrestricted VAR in levels. In respect of this, Breitung( 2000, p.75) noted that the impulse responses and forecast error variance decomposition from which dynamic analysis was based can be efficiently estimated from the unrestricted VAR as well as from a vector error correction model(VECM). Irrespective of the order of integration and cointegration properties, the VAR in levels can be estimated consistently with ordinary least squares (see Breitung, 2000) and appropriate confidence intervals for the impulse responses can be obtained by using a suitable Bootstrap procedure (Benkwitz, et. al. 2001). Under the bootstrapping procedure, model (3.23) above is estimated, and the estimated coefficients and the fitted residuals are saved. Then, the residuals are reshuffled with replacement, and an artificial data set is created using the estimated VAR model as the true data generating process. In this study, a series of 1000 such simulations are undertaken. With each of the 1000 data sets, the model is re-estimated and the impulse response functions are calculated.

This study adopts the latter approach. The choice of this latter technique is informed by three main reasons. First, the study, like existing ones focuses on the imposition of short-run restriction on the contemporary matrices of coefficient in the structural VAR model rather than long-run restrictions. Second, in studies on monetary transmission mechanism, the usual thing is the imposition of short-run restriction on the

[38] See Gunduz, L(2000): "Monetary Transmission and Bank Lending in Turkey," Paper presented at the International Conference on "Banking, Financial Markets and the Economies of the Middle East and North Africa," LUA, Byblos/Lebanon, May, 23-35.

contemporary matrices, only few studies have adopted long-run restrictions in identication of models. Last, this study, like Brisheto and Voss (1999) prefers estimation of the specified model(s) in level rather than adoption of VECM representation which could possibly lead to imposition incorrect restrictions on the data resulting to misspecification of model.

To analyze the SVAR model, impulse response functions (IRFs), forecast error variance decomposition (FEVD), and Granger–causality Test are used. The IRFs trace out the response of current and future values of each of the variables to a one-unit increase in the current value of one of the VAR errors, assuming that the errors are equal to zero. The FEVD, on the other hand is the percentage of the variance of the error made in forecasting a variable due to a specific shock at a given horizon; while the Granger–causality statistic examines whether lagged value of one variable help to predict another variable.

### 3.8 Sources of Data

To estimate the structural VAR model specified in this study, quarterly data covering the period 1986:1 to 2003:4 are used. In total, this sample is made up of 72 observations. The choice of quarterly data stems from the understanding that studies on monetary transmission mechanism require high frequency data. One expects the result obtained using high frequency data to be more reliable than those conducted using low frequency data. Moreover, since one expects to know the impact of monetary policy on economic activity in the short-run, studies of this nature are best conducted using high frequency data.

The main sources of data for this study include Central Bank of Nigeria –

Statistical Bulletin (various issue); Central Bank of Nigeria–Annual Report and Statement of Accounts (various Issues); the Nigerian Deposit Insurance Corporation (NDIC)-Annual Report (various issues); the Nigerian Stock Exchange Fact Book (various issues) and the IMF's -International Financial Statistics.

# CHAPTER FOUR

# MONETARY POLICY AND MACROECONOMIC ENVIRONMENTS IN NIGERIA

## 4.1 Introduction

This chapter focuses on monetary policy and the macroeconomic environment in Nigeria. In section 4.2, the evolution of monetary policy in Nigeria is discussed, while section 4.3 examines the strategy which the Central Bank of Nigeria had adopted in the conduct of its monetary policy so as the achieve the basic macroeconomic objectives. Moreover, in section 4.4 the macroeconomic environment, stance and objectives of monetary policy at one time and another are explored. Section 4.5 concludes this chapter.

## 4.2 Evolution of Monetary Policy In Nigeria

Monetary policy, in the Nigerian context, encompasses actions of the Central Bank that affect the availability and cost of commercial and merchant banks' reserve balances and thereby the overall monetary and credit conditions in the economy (Akatu, 1993). The primary goal of such actions is to ensure that over time, the expansion in money and credit will be adequate for the long-run needs of the growing economy at stable prices. The discretionary control of money stock involves the expansion or contraction of money and credit and influencing interest rates to make money cheaper or more expensive, depending on the prevailing economic conditions and thrust of policy.

The establishment of the Central Bank of Nigeria in 1958 marked the beginning of discretionary monetary policy in Nigeria. Prior to the establishment of the Central Bank of Nigeria, the financial sector operated under the currency board system (a British colonial monetary system) and the West African Currency Board (WACB) served as the

apex financial institution. The most important power given to the WACB, unlike the Central Bank, was the authority to issue a West African currency (notes and coins), which was fully backed and convertible into sterling. Thus, the currency board was not mandated to pursue a discretionary monetary policy, issue independent currency and supervise the banking system.

The establishment of the Central Bank of Nigeria, therefore, alleviated the problems of the currency board system, and in the greater part, provided the legal and regulatory base for an independent monetary management. In particular, the Central Bank of Nigeria was mandated to provide a framework for an effective monetary management, by supplying an independent and elastic currency, establishing effective means of supervision and monitoring the banks.

At the time it opened for business in 1959, the Central Bank of Nigeria had only a limited number of tools to prosecute its mandate. At this period, the financial structure was too rudimentary to permit the use of a full range of monetary policy instruments. With a large subsistence sector, poorly organized and very narrow and shallow financial markets, and very few institutions, the financial environment was severely restricted. All these seriously limited the scope of monetary policy (see Ghatak, 1983; Furness, 1975).

As a result of the above limitations, the Central Bank of Nigeria did not engage in any active monetary policy until 1964. In essence, the period 1960-64 can be classified as a period of passive monetary policy in Nigeria (see, Ajayi and Ojo, 1981 pp.171). Overtime, the nature and scope of monetary policy exercised by central banks have altered to accommodate changes in financial markets, institutional and macroeconomic environment.

## 4.3 Strategy of Monetary Policy in Nigeria (1970-2003)[39]

The main objectives towards which policy has been directed in most countries include the control of inflation and maintenance of relative price stability, achievement of high rate of employment, the maintenance of a healthy balance of payments position, and promotion of rapid economic growth and development(Onyido, 2000). The achievement of the above policy objectives, following Onyido (2000) has not been easy for various reasons, which include: the transmission question, stages of technological development and capacity, availability of instruments and the relationship between the central bank, government, and relevant agencies and the private sector. In the light of the above constraints, countries have adopted different strategies in the conduct of monetary policy, given peculiar circumstances. While some countries have attempted to target intermediate variables, on the assumption of the stability and reliability of relationship between changes in these variables and economic activities, others have focused directly on the ultimate goals.

The basic macroeconomic objectives of every nation are the ultimate targets of monetary policy. There are difficulties in the attainment of these broad objectives of economic policy for three main reasons. First, it is not easy to achieve all the targets simultaneously without trade-offs. Second, since the ultimate targets of monetary policy represent the broad objectives, there is difficulty in establishing the effect of monetary policy on relevant variables (output, prices, and balance of payment). Third, it is not usually possible to establish a direct link between monetary policy instruments and the ultimate targets.



[39] This section has benefited from Onyido (2000) "Current Strategy of Monetary Policy in Nigeria," Central Bank of Nigeria, Economic and Financial Review.

Given the indirect relationship between monetary policy instruments and ultimate targets, a strategy that has been adopted by several central banks is the targeting of intermediate variables. Intermediate targets of monetary policy, however, vary from country to country and depends on the stability of such target with the ultimate goals of policy. Intermediate targets includes, money supply and credit, short-term interest rates and exchange rate.

Under monetary targeting, the central bank sets the appropriate level of money supply, after this, it observes the actual changes in targeted variables and, when the objectives are not being attained, will adjust its policy instruments. For instance, if the rate of growth of the money stock is less than the targeted range of output growth, the central bank will increase its rate of purchase of government securities in the open market. Money supply growth is of greater significance as an intermediate variable where the interest rate channel of monetary policy is not a powerful one, i.e. where interest elasticities of money demand are quite small(Onyido, 2000)

With respect to interest rate targeting, the relevant interest rate is the rate on overnight funds, which is the rate that clears the market for banks balances. While the Keynesians are in favour of interest rate targeting, the monetarists stress money supply targeting.

In Nigeria, the strategy of monetary policy over the years, has involved monetary targeting. Though monetary policy has been conducted under wide-ranging environments (Ojo, 1992), the strategy of monetary policy has remained the same. Under the controlled regime (up to 1986), the framework of monetary control was the direct approach. Under this framework, quantitative ceilings were placed on bank credit expansion and banks

were bestowed limited freedom in their operations. Direct instruments of monetary control include: credit ceiling, sectoral allocation of credit and interest rate regulation. To restrain money supply growth to its target level, the central bank of Nigeria extensively used credit ceiling during the era of regulation. Prior to 1988, the relevant monetary aggregate for Central Bank's monetary policy was the narrow money stock (M1). With rapid institutional changes in the Nigerian financial system broad money stock(M2) which include the liabilities of commercial and merchant banks became the key benchmark variable.

In line with the policy of deregulation, the indirect approach to monetary control was adopted in 1993 in Nigeria. Despite the change in monetary policy regimes, the strategy of targeting money supply has remained the same, though the control framework was changed from bank credit to bank reserve balances. With monetary targeting under the indirect approach, the Central Bank of Nigeria aims at achieving a particular level of base money(or high-powered money) which is basically related to the money multiplier by the formula $M=mH$, where, M is the broad money stock and m and H are money multiplier and high-powered money respectively.

Having computed the base money, the CBN computes the level of bank reserves (a component of H), that needs to be drained from or injected into the banking system to keep money supply growth along the desired path. This level of bank reserves, therefore, serves as the operating target. The difference between the computed optimal level of reserves and actual reserves becomes the target for Open Market Operation within the framework of liquidity management, while the discount window plays the safety valve role by providing the short-run reserve needs of the banking system for purposes of

meeting short-term liquidity obligations. The market is then left to determine interest rates and credit allocation.

This section has indicated that the basic strategy of monetary policy between 1970-2003 involves the targeting of money supply. Though monetary targeting is the strategy of monetary policy throughout the whole period, bank credit was the operating target under the direct approach while bank reserves became the operating target with the adoption of indirect approach to monetary management.

## 4.4 Macroeconomic Environments, Objectives and Stance of Monetary Policy In Nigeria

### 4.4.1 Period Before the Structural Adjustment Programme

It is well known among economists in academic and public cycle that macroeconomic environment affect the formulation and the conduct of monetary policy. In Nigeria, the formulation and conduct of monetary policy has, therefore, been done under various macroeconomic environments. These environments have influenced the objectives and stance of monetary policy at one time or the other.

Although monetary policy is one of the crucial macroeconomic policies, there is no single document which stipulates the stance and objectives of monetary policy in Nigeria (Nwankwo, 1980). Therefore to survey Nigeria's macroeconomic environments, objectives and stance of monetary policy before 1986, this section, follows Ajayi and Ojo (1981) and uses various Annual Reports of the Central Bank of Nigeria as the basis of quantitative assessment. In this dimension, this section examines the sub-periods 1960-64, 64-70, 1970-75 and 1976-85.

**The Period 1960-64**

In this period, agriculture was the mainstay of the economy contributing about 50 percent to the GDP and accounting for about 70% of total employment. Moreover, a large part of the economy was characterized by very large subsistence sector. Other feature of the Nigerian economy at this period was significant increase in capital formation and domestic output, minimal role of government in economic activities and rudimentary nature of the financial system.

Under the above macroeconomic environment, the scope of monetary policy by the newly established Central Bank of Nigeria was highly limited. This environment, following Ojo (1992) was relatively stable and congenial for monetary management. The period as Ajayi and Ojo (1981) aptly noted, has been classified as a period of passive monetary policy. Within the period 1960-62, the overriding objective of monetary policy was to ensure sound and internal and external currency stability. All other objectives of monetary policy were subordinated to this objective during these years. Two main reasons could be attributed to the centrality of currency stability in CBN's monetary policy objectives. First, the CBN aimed at maintaining a national currency that was as at least as 'satisfactory and respected as the old'. Second, internal and external currency stability was considered 'essential to the attraction of the much needed domestic and external capital for development and the only basis on which the prosperity and progress of this great country can be maintained and strengthened'.

In the light of this overriding objective, this period is popularly referred to as the *currency phase*. To achieve this objective, the Central Bank of Nigeria held adequate level of external reserves in order to ensure acceptability and convertibility of the

Nigerian currency (pound), as it was initially fixed at par with British pound, before it was valued in terms of gold in 1962(Udegbunam, 2002).

With the launching of the First National development plan in 1962, a fundamental change appeared in the orientation of monetary policy in Nigeria. The policies pursued by the Central Bank of Nigeria, taking effect from this year were geared towards achieving the developmental objectives enunciated in the plan. Monetary authorities, henceforth, emphasized the need to ensure adequate supply of credit to the economy without excessive inflationary pressure being created.

Since the financial markets were still grossly underdeveloped at this period, there was the predominance of government securities. These securities were issued and managed by CBN on behalf of the treasury; the Central Bank being the holder of last resort, thus making even long-term government debts highly liquid and safe. The CBN's prescribed liquidity ratio for banks at this period was 25%. This ratio was however not actively used as monetary policy instrument since the ratio remains the same throughout this period.

**The Period 1964 to Mid -1970s**

The period 1964 to mid-1970s was characterized by high and increasing government expenditure, persistent fiscal deficits, high level of inflation, and persistent balance of payment problems, (Figure 4.1). This period corresponds with the time active monetary policy was fully adopted in Nigeria and the CBN's policy stance at this period was partly classified as easy and tight.

At the early years within this period, i.e. 1964-66, the stance of monetary policy was contractionary. Upon the adoption of tight monetary policy, the Central Bank of

Nigeria realized that the effectiveness of tight money was not an easy task partly because of deficit financing by the government and given the objective of encouraging capital formation.

Faced with the problem of financing the civil war and given the fall in government revenue relative to expenditure, the federal government fiscal deficit increased. The period 1964-70, therefore, falls within the deficit finance phase of 1962-70. To finance the deficit that resulted because of the civil war, the central bank of Nigeria adopted cheap money policy as its dominant policy stance from 1966-70. For instance, in an attempt to finance government expenditure, which had risen tremendously within this period, the fiduciary element in currency issue, which had remained 40 percent in 1958, was raised to 75% and 100% in 1968 and 1969 respectively.

With the deficit financing embarked upon to finance the war, the disruption of productive activities by the civil war, increased inflow of petrol–dollars (which were largely monetized due to the quadrupling of oil prices by the OPEC cartel in 1973), as well as a structural transformation of the economy from its dependence on agriculture to petroleum, a tremendous inflationary trend was witnessed in the Nigerian economy from early 1970s. The Udoji Award of 1974 also contributed immensely in intensifying the inflationary trend (see Figure. 4.1).

With the phenomenal growth in oil revenue as dictated by the oil boom, the role of the public sector in the economy increased and there was unsustainable dependence on the external sector. The aftermath of this was that the large surpluses in the balance of payments at the early part of 1970s declined gradually and eventually became deficit from the mid-1970s. Other effects of increased oil revenue were the over dependence of

the industrial sector on imported inputs, stagnating agricultural production, and declining non-oil export.

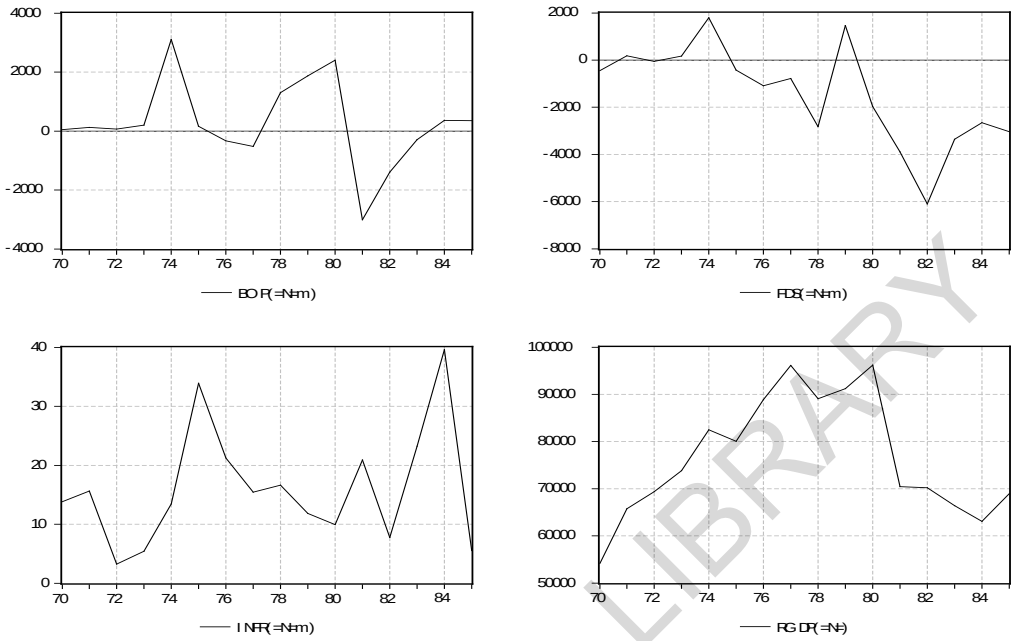



**Figure 4.1: Trends of Real GDP(RGDP), Inflation Rate (INFR), Balance of Payments(BOP) and Fiscal Deficit/Surplu(FDS), 1970-1985.**

In the light of the above problems, a restrictive monetary and financial policy was re-instituted by the Central bank of Nigeria from early 1970 to mid-1970s. The CBN's policy was strengthened through the powers it acquired under the Decree No. 50 of 1968. This new powers include the authority of the apex bank to prescribe (i) the minimum ratio of loans that must be made to indigenous borrowers, (ii) the cash reserves and special deposits commercial banks must hold in Central Bank, (iii) the liquid asset ratio that banks must keep, and (iv) the amount of stabilization securities each commercial bank must compulsorily acquire.

The main objectives of monetary policy, at this period, were the maintenance of relative price stability and a healthy balance of payments position. Monetary policy at

this period relied on the use of direct monetary instruments such as selective credit control, credit ceilings, interest rate controls, prescription of cash reserve requirements, exchange rate control and imposition of special deposits. The rediscount rate was raised from 4 to 5%, and in addition to quantitative and selective ceilings on bank credits, a ceiling of 15% annual rate of growth of bank credits was prescribed.

**Mid-1970s to 1980**

As the oil boom continued after the mid-1970, the role of government in the economy also became more pronounced. As a result of the factors earlier mentioned, the inflationary trend still continued although less than that prevailing in 1975. Other features of this period include: series of military coups, fiscal indiscipline, escalating government expenditure, excess liquidity in the banking system and persistent disequilibrium in the balance of payments. Given these problems, a restrictive monetary policy was adopted within this period and the central objective of monetary policy was to promote output growth and stable prices, and achievement of sustainable equilibrium in the balance of payments.

The CBN operating techniques continued to be direct monetary control mechanism. To achieve the objectives of monetary policy in this period, quantitative and selective credit ceilings and guidelines were, like in the preceding period, still the major operating instrument. Moreover, bank reserves serve as operating objectives while targeted credit and monetary aggregates act as intermediate objectives (Udegbunam, 2002). Specifically, cash reserve ratios between 5 and 12 per cent were imposed on banks. An additional instrument of monetary policy introduced in 1976, though stopped in 1979 was the stabilization securities. The stabilization securities were used as a last

resort policy instrument to force the required change in bank reserves, as bank compliance with credit guidelines had not been very satisfactory. It should as well be noted that the merchant banks were brought under the scope of credit guidelines with effect from 1976.

**The Period 1980-1985: The crisis period**

The oil boom of the 1970s was only temporary and could not persist in the 1980s. Major developments in the international oil market resulted to oil glut and consequently sharp decline in export prices in the early 1980s. Crude oil exports which reached a peak of 2.2 million barrels per day (mbd) fell to 1.23 and 1.0 mbd in 1981 and 1982, while crude oil export prices which climbed to a peak of US$40 in 1981fell to US$29 per barrel in 1983 and only US$14.85 per barrel in 1986(Ojo, 1992).

With the collapse in international oil market and given the prevailing background of increased role of public sector in economic activities, declining agricultural production, and overdependence on the external sector several macroeconomic imbalances ensued. First, the transformation of the economy from agriculture to oil dependent one resulted in gradual decline in agricultural output. The share of agriculture out of GDP declined and there was increasingly dependence on food imports. Second, with the increased role of the public sector in the economy, the collapse of the international oil market led to reduction in the country's foreign exchange earning capacity. Consequently, government revenue fell drastically below expenditure. Figure 4.1 indicated that the level of fiscal deficit was more pronounced in 1982 than in any other period between 1970-85. As a collorary of the increased level of imports, the third

impact of the oil syndrome on the Nigerian economy is that the balance of payments position remained consistently in deficit from 1981 to 1983.

In the face of severe macroeconomic disorder in the 1980s, the Federal Government, in April 1982 promulgated the Economic Stabilization Act to arrest further deterioration of the economy. Under this, a more stringent exchange control measures were adopted. This Act was further supported by appropriate monetary and fiscal policies. These measures further exacerbated the general price level and 1984 marked the peak of inflationary trend from 1970 to 1985(see Figure 4.1).

The objective of monetary policy, in the 1980s, remained as in the past the simulation of output and employment, promotion of stable prices and support of external equilibrium. The direct monetary control framework was generally retained and this entailed, among others, the prescription of aggregate credit ceilings, the use of selective credit controls, the imposition of reserve requirements and maintaining a lid on interest rate as a means of inducing an increase in productive capacity (Ojo, 1992).

### 4.4.2 Period of Structural Adjustment Programme and Financial Deregulation

**The Period 1986 -1992**

As a solution to serious economic crises in the early 1980s the Structural Adjustment Programme was adopted in 1986. The collapse of the international oil market in 1981 resulted in large and escalating fiscal deficits and external debt, high inflation and supply bottleneck in domestic economy. The SAP package was embraced with the objective of restructuring the production and consumption patterns of the economy, through the elimination of price distortions and reduction of the overdependence of the economy on the export of crude oil and imports of raw materials and consumer goods

(Ojo,1992). It was also aimed at providing the base for private sector driven economy and to promote macroeconomic stability (Udegbunam, 2002). For the purpose of achieving the stated objectives, the programme relied on a number of policy packages, the most central of which is the deregulation and liberalization of the financial sector of the economy.

Generally, the objectives of monetary policy from 1986-1992 remained as before and include the stimulation of output and employment, price stability and the promotion of external stability. Specifically, monetary policy measures at the time under consideration were designed to dampen inflationary pressures and restrict the demand for available foreign exchange resources. To achieve the above objectives, monetary control framework remained essentially the same compared with the preceding periods, except that some complex selective controls were relaxed while interest rates were free of control (Ojo, 1992).

In line with the general philosophy of economic management under SAP, monetary policy was aimed at inducing the emergence of a market-oriented financial system for effective mobilization of financial savings and efficient resource allocation (Ojo, 1992). To achieve the objectives of SAP, however required monetary policy reform or a shift from existing direct monetary control to indirect one. This shift is necessary because the prolonged use of direct monetary control instruments were counter-productive and generated considerable problems, which include: reduced competition in financial system, inefficiency and misallocation of resources etc. A major distinction between direct and indirect or market-based instruments is that while the direct instruments attempt to limit changes in prices(interest rate) and/or quantities(credit)

through specific guidelines, the market-based instruments operate through the market by influencing the demand and supply conditions(Ojo,1999).

Since the adoption of indirect or market-oriented approach to monetary policy required some necessary conditions for its effectiveness, the Central Bank of Nigeria adopted a phased approach for its eventual take-off in 1993. The gradual or phased approach is a rational one since the monetary authorities need to introduce some institutional, regulatory, technical and administrative changes/ or measures to enhance the process of monetary policy reforms.

Specifically, some of the changes or measures introduced by the Central Bank of Nigeria between 1986 and 1992 include:

(i) Mopping the excess liquidity in the banking sector and relieving pressure on the available foreign exchange reserves. To achieve this, combined measures were introduced and these include: an imposition of 10 per cent ceiling on the rate of bank credit expansion in January 1986, special deposit of the naira counterpart against external payments outstanding in 1986 and 1987, rejection of foreign guarantees/currency deposits as collaterals for naira loans, the withdrawal of public sector deposit from banks in 1989, and the issuance of stabilization securities beginning from October 1990. Stabilization securities are non-negotiable and non-transferable debt instruments of the Central Bank which banks are mandated to purchase at intervals in order to control their excess reserves. As a result of the CBN directive to banks to deposit at the Bank the naira equivalent of all outstanding external payments arrears, a total of =N=4.2billion was deposited. Moreover, the transfer of public sector

accounts to the CBN impacted significantly on the liquidity of the banking system as close to =N=8.3 billion went into the coffers of the CBN three months after the directive.

(ii) Interest rates deregulation in 1987. Though, a partial deregulation was initially attempted, however by August 1987, all rates became market determined. The purpose of interest rate deregulation was to enable banks to charge a market-based interest rates and thus enhance their savings mobilization and resource allocation effort. Throughout the period, however, the Central Bank continued to fix the Minimum Rediscount Rate(MRR).

(iii) Introduction of the auction-based system for issuing of treasury bills and certificates in 1989. This measure was adopted in furtherance of the flexible interest rate policy. These instruments started to carry market-based yields as a prelude to the introduction of the open market operations later in the liberalization programme.

(iv) Selective credit guidelines were reformed to give banks greater flexibility for banks' credit operations. The sector-specific credit distribution targets were further compressed into four sectors in 1986 from 8 and two sectors in 1987. Under this two-sector grouping, agriculture and manufacturing enterprises were regarded as priority sub-sectors while all other sub-sectors were grouped as others. Effective, first week in September 1992, the CBN on a selective basis lifted credit ceiling on individual banks which observed CBN guidelines in respect of statutory minimum paid-up capital, capital adequacy ratio, cash

reserve, liquidity ratio requirements, prudential guidelines on sectoral credit allocation and sound management (Oduyemi, 1993).

(v) Expansion of the base of cash reserve requirement beyond demand deposit to include all deposit liabilities in 1991.

(vi) Introduction of less stringent procedure for licensing of new banks. This led to phenomenal increase in the number of banks. To strengthen the banking system, the minimum paid-up capital for commercial and merchant banks were initially raised from its existing level to N20million s and N12 million respectively 1988. In 1990, the figure was raised to N50 million for commercial banks and N40million for merchant banks. These figure remained until 1997 when a single requirement of N500million was proscribed for both commercial and merchant banks.

(vii) Prudential regulations and guidelines were introduced in 1990s, which among other things stipulated the criteria banks would follow in classifying non-performing loans.

(viii) Establishment of Nigerian Deposit Insurance Corporation in 1988 as an additional regulatory agency to help in ensuring safety, soundness, and confidence in the deregulated banking sector, and

(ix) Promulgation of CBN Decree No. 24 of 1991 and Banks and Other Financial Institutions Decree to replace the CBN Act of 1958 and Banking Decree of 1969. These two decrees increased the powers of the Central Bank of Nigeria

in the conduct of monetary policy, bank supervision and examination, and prudential regulation (CBN, 1993).

The monetary and credit development from 1986-1992 indicated that except for the decline in M1 in 1986, this monetary aggregate continuously exceeded its programmed target from 1987 to 1992(see Table 4.1). For instance, while the M1 was targeted to growth at the rate of 11.8%, 14.6% and 24.3% in 1987, 1989 and 1992 respectively, the actual growth of this aggregate was 16.7%, 21.5% and 52.8% respectively in these years. The significant decline in narrow money in 1986 was due to the contraction in "other" assets (net) of the banking system which was attributable largely to the rapid build up of "other" liabilities of the CBN following the call on authorized dealers of foreign exchange in August and October 1986 to transfer to the Bank the naira lodgments in respect of foreign exchange arrears which could not be effected due to foreign exchange shortfall (Ojo, 1992). Between 1987 and 1992, M1 grew at annual average of 35.1% and this figure is greater than its target level in any year from 1986-1992. It could be observed from Table 4.1 that the actual rate of growth in M1 was 41.9%, 44.9%, and 52.8% in 1989, 1990 and 1992 respectively. These rapid increase in M1 has been attributed to rapid expansion of net foreign assets and increase in aggregate bank credit to the economy and in particular to the private sector. With respect to M2, this monetary aggregate grew moderately from 1986 to 1989 but latter increased rapidly at an annual average of 40.7% from 1990-1992. The rapid increase in M2 from 1990-1992 has also been attributed to increase in aggregate credit to the domestic economy. Under this period, banks generally failed to comply with the credit ceilings imposed by the Central Bank of Nigeria.

It therefore implies, in the light of the above, that the period 1986-1992 was characterized by rapid growth in domestic liquidity. Moreover, there is a wide disparity between policy intentions and actual performance in almost all monetary and credit aggregates.

**Table 4.1: Target and Actual Growth Rate of Monetary and Credit Aggregates (1986-2003)**

| Year | M1 (%) | | M2 (%) | | Aggregate Credit.(net) | | Credit to Private Sector (%) | | Credit to Government Sector (%) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | T | A | T | A | T | A | T | A | T | A |
| 1986 | 7.8 | -5.3 | n.a | 1.3 | 8.7 | 12.5 | 12.8 | 27.0 | 5.9 | 2.1 |
| 1987 | 11.8 | 16.7 | n.a | 33.2 | 4.4 | 27.4 | 8.4 | 46.6 | 1.5 | 10.3 |
| 1988 | 15.0 | 41.9 | n.a | 33.3 | 8.1 | 38.5 | 13.3 | 55.7 | 2.5 | 28.4 |
| 1989 | 14.6 | 21.5 | n.a | 8.2 | 9.5 | 14.1 | 10.7 | 3.9 | 8.3 | -33.5 |
| 1990 | 13.0 | 44.9 | n.a | 40.4 | 13.5 | 17.1 | 15.8 | 18.4 | 10.9 | 14.9 |
| 1991 | 14.6 | 32.6 | n.a | 32.7 | 10.6 | 45.3 | 16.4 | 23.7 | 0.0 | 82.9 |
| 1992 | 24.3 | 52.8 | 26.8 | 48.9 | 13.2 | 69.1 | 17.7 | 34.6 | 7.7 | 109.6 |
| 1993 | 20.0 | 59.7 | 18.0 | 50.0 | 17.5 | 91.4 | 20.0 | 51.6 | 14.5 | 121.6 |
| 1994 | 21.4 | 45.9 | 14.8 | 39.1 | 9.4 | 52.6 | 32.0 | 31.7 | 0.0 | 63.4 |
| 1995 | 9.4 | 16.3 | 10.1 | 19.1 | 11.3 | 8.2 | 21.9 | 48.0 | 5.6 | -9.5 |
| 1996 | 14.5 | 14.5 | 16.8 | 16.8 | 12.0 | -23.9 | 29.5 | 23.9 | 0.0 | 55.6 |
| 1997 | 13.1 | 18.2 | 15.0 | 16.9 | 24.8 | -2.8 | 45.4 | 23.9 | 0.0 | -55.5 |
| 1998 | 10.2 | 17.2 | 15.6 | 18.6 | 24.5 | 55.7 | 33.9 | 27.3 | 0.0 | 199.3 |
| 1999 | 4.1 | 18.0 | 10.0 | 31.6 | 18.3 | 30.0 | 19.9 | 29.2 | 10.2 | 32.0 |
| 2000 | 9.8 | 62.2 | 14.6 | 48.1 | 27.3 | -23.0 | 21.9 | 30.9 | 37.8 | -162.0 |
| 2001 | 4.3 | 28.0 | 12.2 | 27.0 | 15.8 | 79.7 | 22.8 | 43.5 | 2.6 | 95.2 |
| 2002 | 12.4 | 15.9 | 15.3 | 21.8 | 57.9 | 64.6 | 34.9 | 19.7 | 96.6 | -6320.6 |
| 2003 | 13.8 | 29.5 | 15.0 | 24.1 | 25.7 | 32.7 | 32.3 | 27.1 | -150.3 | 47.9 |

Note: M1, M2 indicate narrow and broad respectively, while T and A denote the target and actual growth rate of monetary and credit aggregates respectively.
Sources: Central Bank of Nigeria –Nigeria: Annual Reports and Statements of Accounts (various issues).



With respect to the performance of macroeconomic variables within the period 1986-1992, Table 4.2 reports mixed results. The real GDP recorded an impressive growth rate from 1986-1992. In 1988, 1989 and 1990 the annual rate of growth in the real GDP stood at 9.9%, 7.4% and 8.3% respectively. The growth pattern in real GDP during this period is most attributable to the growth in oil exports (Ikhide, 1996).

**Table 4.2: Selected Macroeconomic Indicators**

| Year | Inflation Rate(%) | | Real GDP Growth (%) | | Overall BOP Bal( in % of GDP) | Manufg. Capacity utilization (%) | Fiscal Deficit( % of GDP) |
|---|---|---|---|---|---|---|---|
| | T | A | T | A | | | |
| 1986 | n.a | 5.4 | n.a | 3.7 | -7.9 | 38.8 | -11.3 |
| 1987 | n.a | 10 | n.a | 0.5 | 17.1 | 40.4 | -5.4 |
| 1988 | n.a | 38.3 | n.a | 9.9 | -14.6 | 42.4 | -8.4 |
| 1989 | n.a | 40.7 | n.a | 7.4 | -10.3 | 43.8 | -6.7 |
| 1990 | n.a | 7.4 | n.a | 8.3 | -2.2 | 40.3 | -8.5 |
| 1991 | n.a | 13.0 | n.a | 4.7 | -4.8 | 42.0 | -11.0 |
| 1992 | 5 | 44.6 | 4.5 | 3.0 | -18.6 | 38.1 | -7.2 |
| 1993 | 25 | 57.2 | 3.5 | 2.7 | -6.1 | 37.2 | -15.5 |
| 1994 | n.a | 57.0 | n.a | 1.3 | -4.7 | 30.4 | -7.7 |
| 1995 | 15.0 | 72.8 | 4.2 | 2.1 | -10.0 | 29.3 | 0.1 |
| 1996 | 30.0 | 29.3 | 5.0 | 3.4 | -1.9 | 32.5 | 1.6 |
| 1997 | 15.0 | 8.5 | 5.5 | 3.2 | 0.0 | 30.4 | -0.2 |
| 1998 | 9.0 | 10.0 | 4.0 | 3.2 | -7.8 | 30.2 | -4.7 |
| 1999 | 9.0 | 6.6 | 3.0 | 2.8 | -3.1 | 35.9 | -8.8 |
| 2000 | 9.0 | 6.9 | 3.0 | 3.9 | 7.0 | 36.1 | -2.3 |
| 2001 | 7.0 | 19.8 | 5.0 | 4.2 | 0.5 | 39.6 | -4.3 |
| 2002 | 9.3 | 12.9 | 5.0 | 4.1 | -10.5 | 44.3 | -2.5 |
| 2003 | 9.0 | 14.0 | 5.0 | 3.8 | -2.3 | 46.2 | -2.6 |

Source: (i) Central Bank of Nigeria- Annual Reports and statements of accounts (various issue).
(ii) Central Bank of Nigeria-Statistical Bulletin (various issue).

With respect to the inflation rate, this remained very high for most of the period 1986-1992. The inflation rate was for the most period double digit except in 1986 and 1990. The average annual growth rate of this macroeconomic variable between 1987-1989 and 1991-1992 were 29.7% and 28.8% respectively. The period 1986 to 1992 also witnessed severe deterioration in external trading relations as the overall balance of the balance of payments remained in deficits for all the periods excepts in 1987. On average, the overall deficit in BOP as a percentage of GDP stood at 10.1%. Table 4.2 also indicated that government fiscal operation was consistently deficits for the period 1986-1992. The manufacturing capacity utilization for every year from 1986 to 1992 as seen in

Table 4.2 is also below average, specifically the average manufacturing capacity utilization for the period 1986-1992 stood at 40.8%.

Overall, the performance of selected macroeconomic variables, as indicated in Table 4.2 is not at all impressive. This indicates that the economy from 1986-1992 was characterized by a high level of macroeconomic instability.

**The Period 1993-2003: Shift from Direct to Indirect Monetary Policy**

Having put in place several regulatory and institutional framework between 1986-1992, the Central Bank of Nigeria introduced a major change in its monetary policy in June 1993. Contrary to its existing direct monetary control technique, this apex bank shifted to the use of indirect monetary control operating technique. Although the CBN still allowed its monetary policy objective to remain as in previous periods, the new approach was designed to achieve the ultimate objectives of monetary policy by focusing more attention on the behaviour of monetary aggregates and interest rates (Udegbunam, 1995). This is partly because in the new financial environment, monetary aggregates, interest rates and exchange rates have become increasingly important indicators of the direction of economic activity, employment and price level.

With indirect monetary control instruments, the CBN now controls the money stock by manipulation of the monetary base or the reserve aggregates. The manipulation of bank reserves is expected to move the inter-bank and other short-term interest rates to the desired direction, so that through their influence on monetary aggregates and market interest rates, the ultimate goals of monetary policy may be achieved. The key indirect monetary instruments used are open market operations (OMO), variation in reserve requirement, and discount rate mechanism. However, moral suasion, liquidity ratios and

special deposit requirements are used to supplement the key instruments. Another important feature of the new techniques is the shift from targeting credit aggregates to targeting interest rates, exchange rates and monetary aggregates as intermediate targets.

The various monetary instruments under the indirect monetary policy techniques are open-market operations, reserve requirement and discount rate mechanism, and moral suasion. These are discussed in turn:

**Open Market Operations**

Open market operations refer generally to the trading activities of a Central Bank in the open market in securities and bills (Ojo, 1999). Through these activities, the Central Bank directly induces changes in the cash reserves of banks and indirectly induces them to adjust their interest rates, which, all things being equal, should induce changes in the terms and availability of credit and ultimately, the money supply.

The OMO is the major instrument of indirect monetary control in Nigeria. It was introduced at the end of June 1993 and is conducted wholly on Nigeria Treasury Bills (NTBs), including repurchase agreements (REPOS). When the Central Bank sells securities in the market, the transactions result in contraction in bank reserves available to meet the cash reserve requirement immediately, and subsequently a rise in interest rates following contraction in credit and money supply. The reverse is true when the Central Bank buys securities from the market.

The framework of indirect monetary control basically involves the control of money stock through a manipulation of the monetary base defined as the sum of total bank reserves (vault cash and deposits with CBN) and currency in the hands of the non-bank public. The monetary base is derived from net foreign assets of the Central Bank

(NFACB), net domestic claims on government (NDCG), claims on banks(CB) and other assets(net) (OA). The monetary base so created is used up as reserves by the banks (R) and currency outside banks (C). These variables as normally stated in the Central Bank's balance sheet have the following identity:

$$H = NFACB + NDCG + CB + OA = R+C$$

and

$$\Delta H = \Delta NFACB + \Delta NDCG + \Delta CB + \Delta OA = \Delta R+\Delta C$$

Where H is the monetary base or high-powered money defined as reserve of banks plus currency in the hands of non-bank public. H can be derived either from the assets or liabilities side of the Central Bank's balance sheet. By influencing the reserves of banks in the desired direction, the CBN can alter the money supply since available funds to banks for credit operations are correspondingly affected.

Since the level of money supply(M) is postulated to be a function of the high-powered money (H) and money multiplier (m), the Central Bank, given that m is stable overtime, can control M by inducing changes in the high-powered money and currency in the hands of non-bank public.

**Reserve Requirements**

The Central Bank of Nigeria complements the use of OMO with reserve requirements. Reserve requirements serve as instrument for liquidity management and prudential regulation (Nnanna, 2002). The reserve requirements are the cash reserve ratio (CRR) and the liquidity ratio (LR). While the cash reserve ratio is a fixed proportion of banks' deposit liabilities required to be deposited with the Central Bank, the liquidity ratio refers to the proportion of banks' liquid assets to the total deposit liabilities. Reserve requirements are particularly effective for sterilizing excess liquidity in the

banking system. They are also easily monitored on day-to-day basis because they are held by the Central Bank.

Table 4.3 shows the trends of CRR and LR of deposit money banks in Nigeria since the adoption of indirect monetary techniques in Nigeria up till 2003. It could be observed that the CRR of commercial banks were fixed at approximately 6 percent between 1993-1995 from where it rose to 8.3 percent in 1998. Between 1999 and 2003, this ratio remained in the neighborhood of 9.8% and 11.7%. As regards merchant banks that their activities were abolished in 2001, their CRR has remained fixed at approximately 6% between 1993-1995, while this figure declined progressively and remained in the neighborhood of 0 -0.5% between 1996 to2000.

As far as Nigeria is concerned, the CRR and LR are very important instruments of indirect monetary control and have been used at one time or another by the Central Bank of Nigeria in an attempt to achieve its macroeconomic objectives. The CRR and LR have formed a vital aspect of the Central Banks monetary and credit guidelines.

**Table 4.3: Liquidity, Cash Reserve Ratios and Minimum Rediscount Rate of Central Bank of Nigeria (1993-2003)**

| | Commercial Bank | | Merchant Bank | | |
|---|---|---|---|---|---|
| Year | LR | CRR | LR | CRR | MRR |
| 1993 | 42.2 | 6.0 | 40.7 | 6.0 | 26.0 |
| 1994 | 48.5 | 5.7 | 58.7 | 6.0 | 13.5 |
| 1995 | 33.1 | 5.8 | 41.6 | 5.9 | 13.5 |
| 1996 | 43.1 | 7.5 | 46.5 | 0.6 | 13.5 |
| 1997 | 40.2 | 7.8 | 39.9 | 0.0 | 13.5 |
| 1998 | 46.8 | 8.3 | 38.2 | 0.5 | 14.3 |
| 1999 | 61.0 | 11.7 | 55.5 | 0.3 | 18.0 |
| 2000 | 64.1 | 9.8 | 54.8 | 0.3 | 13.5 |
| 2001 | 52.9 | 10.8 | n.a | n.a | 14.3 |
| 2002 | 52.5 | 10.6 | n.a | n.a | 19.0 |
| 2003 | 50.9 | 10.0 | n.a | n.a | 15.8 |

Source: Central Bank of Nigeria –Statistical Bulletin (2003)
*With effect from year 2001, Universal Banking commenced, hence Merchant Banking activities were abolished.

**Discount Window Operations**

Central Bank discount window operations form a vital compliment of open market operations, and fulfilling essentially the central bank's functions of lender of last resort to meet individual institutions unforeseen or expected funding needs to adjust their positions. The main goal of discount window operations is to provide collateralized overnight accommodation to discount houses as well as banks that could not obtain funds on reasonable terms at Discount Houses and or in the inter-bank market. The discount rate is a charge or cost of obtaining advances from the Central Bank. The Minimum Rediscount Rate (MRR) is used to influence the level and direction of other interest rates in the domestic money market. Thus, its rate of change determines whether the monetary authorities wish to adopt a policy of monetary ease or otherwise. Table 4.3 shows the trend of MRR charged by the Central Bank of Nigeria. It could be observed that this rate remained fixed from 1994 to 1997 after which it became variable afterward.

**CBN Certificate**

CBN Certificates were issued for the first time in 2001 to mop up the excess liquidity, which was generated by the rapid monetization of the windfall gains from crude oil receipts. This instrument has been increasingly used to complement traditional monetary policy tools to contain growth in liquidity to the desired level.

**Moral Suasion**

This is a gentle appeal by the Central Bank to banks to comply with respect to some specific issues. Moral suasion has a useful role to play in all systems of monetary management as a supplementary tool and is always vigorously used under indirect monetary control. With this instrument, close and constant interaction between deposit

money banks and the Central Bank is facilitated. Such interactions promote understanding and engender mutual confidence between the Central Bank of Nigeria and players in the financial sectors in Nigeria. The CBN engaged in moral suasion through regular dialogue with banks and other financial institutions, under the aegis of the Bankers' Committee and other communication channels, in order to encourage enhanced efficiency in the financial sector, especially with respect to interest and exchange rate management.

Between 1993-2003, monetary policy was predominantly tight, and the objectives remained like that of preceding periods which include promotion of price stability, ensuring strong and sustainable output growth and maintenance of exchange rate stability. In an attempt to achieve the above objectives, monetary policy relied on Open Market Operations as its primary instrument, complemented by the use of reserve requirements, discount window operations and other policy instruments discussed above.

In the light of the increased rate of unemployment in the Nigerian economy, the monetary policy thrust in 2000 also included enhanced growth in output and reduction of unemployment as one of the important objectives to be attained. Moreover, in 2001, the primary objective of monetary policy was to ensure stable prices and maintenance of single digit inflation rate. To attain these objectives the CBN kept the broad money growth within the target that is consistent with the assumed levels of GDP, inflation rate and accretion of external reserves. The CBN also actively supported the effort of the federal government to enhance real economic growth and reduction of the level of unemployment and poverty by increasing credit flow to the productive sectors, encouraging financial savings and private sector growth, improving financial sector

environment, strengthening its contributions to the development of SMEs and rural financing, and providing regular sectoral advice (Ezeuduji, 2001).

In 2002, the CBN adopted a medium-term perspective monetary policy framework covering 2002-2003. This was in recognition of the fact that monetary policy actions affect the ultimate objectives of policy with substantial lag. The shift was to minimize the problem of time inconsistency and over-reaction due to temporary shocks. The primary aim was to achieve price and exchange rate stability.

The monetary and credit developments between 1993-2003 also indicates that narrow money (M1) and broad money (M2), except in 1996, exceeded their programmed targets from 1993 to 2003. The divergence between targets and actual values had been attributed to several factors, which include: excessive growth in bank credit expansion, fiscal dominance, particularly the inability of the fiscal authorities to adhere strictly to expenditure targets, lack of credibility and untimely rendition of data and terms of trade shock, especially oil price volatility and instance monetization of oil receipts.

With respect to the performance of macroeconomic variables in the period 1993-2003, it is obvious from Table 4.2 that inflation rate reached a peak of 72.8% in 1995. While the average inflation rate between 1986-1992 stood at 22.7%, an average inflation rate of 26.8% was recorded between 1993-2003. It is also apparent from table 4.2 that while marginal growth was recorded in real GDP, the overall balance of payments (except 1997, 2000 and 2002), as well as fiscal deficits were consistently in deficit in all the period under investigation.

From the above, it is obvious that the period 1993-2003 has not been significantly different in terms of macroeconomic performance compared with the preceeding period

in Nigeria. This indicates that the macroeconomic environment(s) at which monetary policy operates since 1970 have been very severe. Given this scenario, there is the need for proper understanding of the modes of operation and channels of monetary policy in Nigeria.

## 4.5 Conclusion

This chapter has studied extensively, the evolution, strategy and objectives of monetary policy from 1970-2003. The macroeconomic environments under which monetary policy operated in this period was also examined. In overall, this chapter indicated that the basic strategy of monetary policy in Nigeria, has over the years, been directed towards monetary targeting. Under this, the growth of monetary aggregates is controlled by the Central Bank of Nigeria using bank credit or bank reserves as operating target. While bank credit was the basic operating variable or target during the period of direct monetary management, attention was shifted to bank reserves with the adoption of indirect approach to monetary policy in Nigeria. The chapter also revealed that the macroeconomic environments under which monetary policy had been formulated in Nigeria were characterized by high rate inflation, sluggish growth in real GDP, and persistent fiscal and overall balance of payments deficits. Given these situations, it becomes clear that monetary policy in Nigeria has not been successful and proper understanding of how and what channel it operates becomes necessary if overall macroeconomic objectives are to be realized.

# CHAPTER FIVE

# DEREGULATION, FINANCIAL DEVELOPMENT AND STRUCTURE IN NIGERIA

## 5.1 Introduction

Recently, there has been growing literature emphasizing the crucial role of financial structure in monetary transmission mechanism (see Cecchetti, 1999; Cecchetti and Krause, 2001; and Elborne, de Haan and Kiviet, 2003). The central tenet of these studies is that the structure of a country's financial system has implication for monetary transmission mechanism. Given the central role ascribed to financial structure in monetary transmission mechanism in above studies, this chapter explores the financial markets in Nigeria prior and after the adoption of financial deregulation programme in Nigeria. This becomes necessary in an attempt to investigate the impact of various reforms on the structure of these markets. In carrying out this analysis, section 5.2 of this chapter focuses on the Nigerian financial system. In section, 5.3 the various reforms introduced into the Nigerian financial market between 1986 to 2003 were examined. The analysis of the impact of financial deregulation of the structure of financial markets in Nigeria is done in section 5.4. The conclusion drawn in this chapter is looked into in section 5.5.

## 5.2 The Nigerian Financial System

A financial system is a conglomerate of various institutions, markets, instruments, and operators that interact within an economy to provide financial services. These services, among others, include resource mobilization and allocation; financial intermediation; and facilitation of foreign exchange transactions to boost international trade (Olorunshola, 2003). The Nigerian financial system is composed of regulatory/supervisory authorities, the financial markets, the development financial

institutions, and other financial institutions (CBN, 2000b). These aspects of the financial system are discussed in turn.

### 5.2.1 Regulatory Authorities in Nigeria Financial System

Figure 5.1 shows the regulatory/supervisory framework and institutions in the Nigerian financial system. The regulatory authorities include: the Financial Services Regulation Coordinating Committee (FSRCC), the Central Bank of Nigeria (CBN), the Federal Ministry of Finance (FMF), the Nigerian Deposit Insurance Corporation (NDIC), the Securities and Exchange Commission, National Insurance Commission (NAICOM), Federal Mortgage Bank of Nigeria (FMBN), and the National Board for Community Banks (NBCB).

Given the fact that the Nigerian financial sector is made up of several regulatory authorities, there was the need to facilitate formal framework for the coordination of regulatory and supervisory activities in this sector. To achieve this objective, the Financial Services Regulation Coordinating Committee (FSRCC) was established and accorded legal status in 1998 (through the amendment of CBN Act No. 24 of 1991 by the Amendment Decree No. 37 of 1998) and formally inaugurated in May, 1999. Specifically, the Committee is charged with the responsibility to articulate strategies for the promotion of safe, sound and efficient financial institutions; coordinate the supervision of financial conglomerates; harmonize regulatory and supervisory standards across the financial sector; and ensure information sharing among regulatory authorities (Sanusi, 2002). Charged with the primary responsibility to promote safe, sound and efficient financial sector in the country, the membership of FSRCC is drawn from the key regulatory and supervisory institutions in the nation's financial system, namely: Central

Bank of Nigeria (Chairman), Securities and Exchange Commission (SEC), National Insurance Commission (NAICOM), Corporate Affairs Commission (CAC) and the Federal Ministry of Finance (FMF). Moreover, in an attempt to enhance the effectiveness of the Committee, the Nigeria Deposit Insurance Corporation, the Nigerian Stock Exchange and National Board for Community Banks were co-opted as observers.

After the FSRCC comes the Central Bank of Nigeria (CBN) and the Federal Ministry of Finance at the regulatory and supervisory cadre. The Central Bank of Nigeria is the apex regulatory authority of the Nigerian banking system. It was established by the Central Bank of Nigeria Act of 1958. The Act conferred on the Bank a number of functions and powers to control the operations of banks in Nigeria. The main sources of CBN's legal authority for carrying out its functions are the CBN Decree No. 24 of 1991(amended in 1997, 1998 and 1999) and the Banks and Other Financial Institutions Decree No. 25 of 1991 (amended in 1997, 1998 and 1999) which superceded the CBN act of 1958 and Banking Decree of 1969 and later amendments (CBN, 2000a). The core functions of the Central Bank of Nigeria include: issuance of legal tender currency; acting as banker to other banks and to the Federal Government; promotion of monetary stability and sound financial structure; and maintenance of external reserves to safeguard the international value of the currency. Apart from the core functions, the apex bank also carry out developmental functions such as the promotion of the financial markets, introduction of money market instruments, facilitating capital market institutions and instruments and sponsoring specialized institutions ( Olorunshola, 2003).

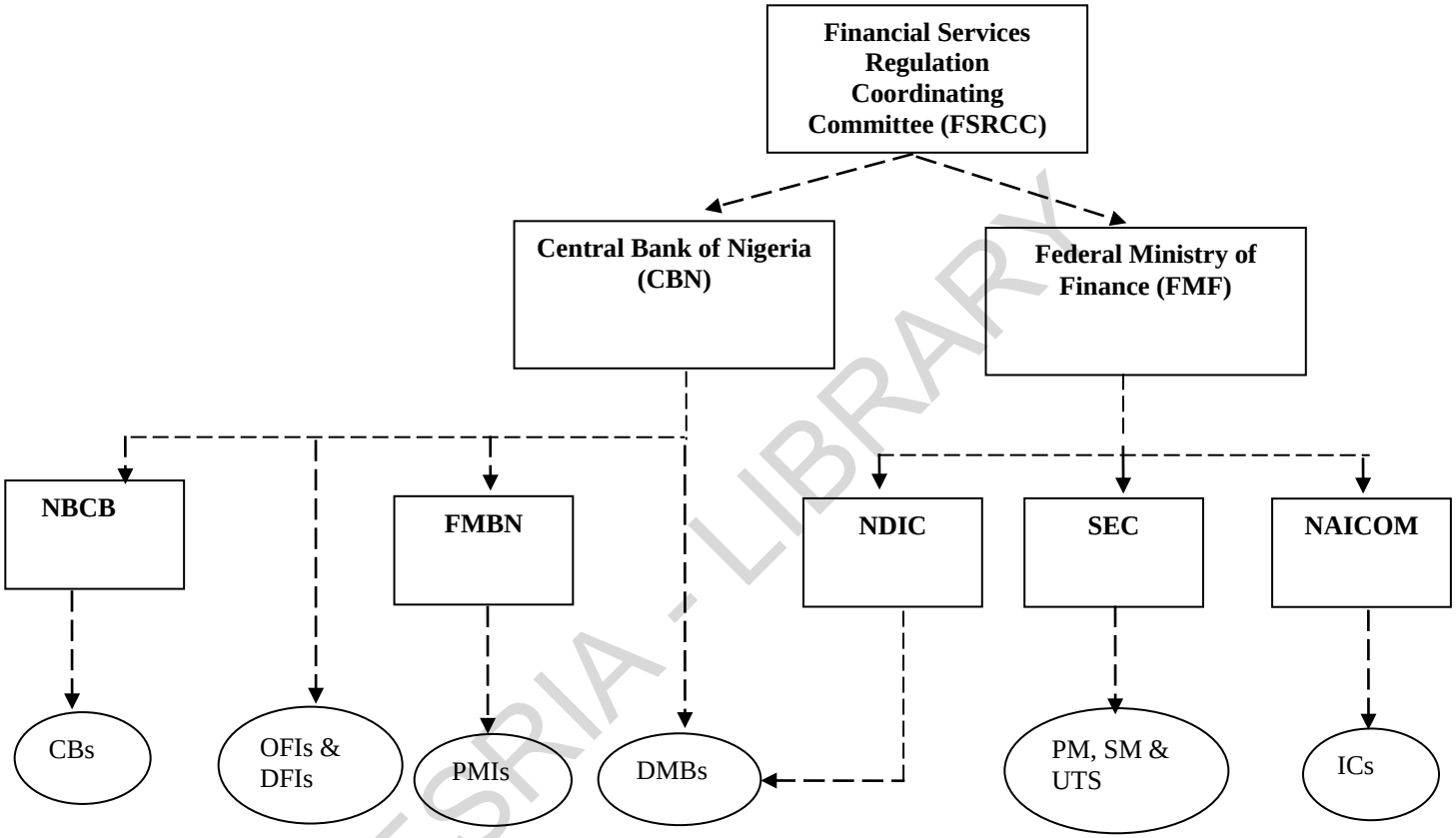



**Fig. 5.1 Regulatory/ supervisor authorities and institutions in the Nigerian financial system**

Source: Author

Notes:NDIC = Nigerian Deposit Insurance Corporation;
NBCB = National Board of Community Banks;
FMBN = Federal Mortgage Bank of Nigeria;
SEC = Securities and Exchange Commission;
NAICOM = National Insurance Commission;
DMBs = Deposit Money Banks
CBs = Community Banks;
OFIs = Other Financial Institutions;
DFIs = Development Finance Institutions;
PMIs = Primary Mortgage Institutions;
PM = Primary Market;
SM = Secondary Markets;
UTS = Unit Trust Scheme;
ICs = Insurance Companies.
FSRCC = Financial Services Regulation Coordinating Committee.

As figure 5.1 indicates, the Central Bank of Nigeria (CBN) regulates directly and supervises the activities of Deposit Money Banks (commercial and merchant banks), other financial institutions (Discount houses, Finance houses, and Bureaux-de-change) and development finance institutions. By virtue of its powers, the CBN also indirectly supervises/regulates some institutions in the financial system since their main regulatory bodies institutions have to report to the apex bank. These institutions include community banks, primary mortgaged institutions.

As a regulator in the Nigerian financial system, the FMF caters for the Federal Government's involvement in the financial system (Uffot, 2003). Though the Ministry is primarily in charge of the fiscal policy, it co-operates with CBN on monetary matters and it is the responsibility of some regulatory authorities in the financial system to submit their reports to it. As figure 5.1 shows, the FMF indirectly controls insurance companies(ICs) and activities in the securities market in Nigeria.

Another regulatory authority in the Nigerian Financial System is the Nigerian Deposit Insurance Corporation (NIDC). The NDIC was established by Decree No. 22 of 1988 but took off effectively in February 1989. This regulatory body was set up primarily to provide protection for bank deposits in order to promote confidence in the banking industry. It was empowered to examine the books and affairs of insured banks and other deposit taking financial institutions. With the licensing of more banks as a consequence of the adoption of financial liberalization programme in Nigeria, supervision of these banks became enormous task to the CBN and this led to the distress of several banks. To forestall this problem, the establishment of NDIC became a necessity to complement the

regulatory and supervisory role of the Central Bank of Nigeria (Olorunshola, 2003). Other functions of the NDIC include:

(i) Banking supervision - the supervision of banks becomes necessary in order to protect depositors, ensure monetary stability, promote an efficient and effective payment system; and promote competition and innovation in the banking system (Ogunleye, 2003). This function of NDIC adequately compliments the efforts of the CBN in the supervision of banks in Nigeria.

(ii) Resolution of failed Banks - by this function the NDIC ensures that the failing institutions are resolved in a timely and efficient manner to minimize the cost of failure to the Corporation as well as the banking system. In carrying out this function, the corporation is empowered to provide financial assistance to failing or distress banks in the interest of depositors. This responsibility of distress resolution is also share with the Central Bank of Nigeria.

(iii) Bank liquidation -this measure is usually adopted by the Corporation and the CBN when found to be the most cost effective, compared with other distress resolution measures. Liquidation process involves orderly and efficient closure of failed institution with minimum disruption to the banking system, cost-effective realization of assets and settlement of claims of depositors, creditors and where possible shareholders (Ogunleye, 2003).

(iv) Other functions – the other functions accorded the NDIC in its enabling Act is to assist monetary authorities (i.e. the Central Bank of Nigeria) in the formulation and implementation of banking policy so as to ensure unharmed banking system.

It should be observed that the NDIC is autonomous of the CBN and reports to Federal Ministry of Finance.

The Securities and Exchange Commission (SEC) was established under the SEC Decree of 1979 (to replace the Capital Issue Commission of 1973) and was further strengthened by the SEC degree of 1989 and Investment Securities Decree No. 45 of 1999(CBN, 2000). The SEC is the apex regulatory and supervisory organ of the capital market. With the enactment of the Investment and Securities Decree No. 45 of 1999, the SEC Decree of 1989 was repealed and the Commission was conferred wide range of regulatory powers over institutions operating in the capital market. The major objective of the Commission is to promote an orderly and active capital market and protection of the investing public. Within the ambit of it's enabling Decree: the functions of the SEC include: valuation role; regulatory role; developmental role; allotment role; and approval in respect of mergers, acquisitions and all forms of business combinations (Ikhide, 1997).

Under the valuation role, the SEC is responsible for determining the prices at which securities are to be issued, sold or transferred by public and private companies. With the adoption of deregulation programme in Nigeria, this function of the SEC has since 1993 been transferred to the issuing house. In line with the powers conferred under the SEC Decree of 1989, the Commission serves as the apex regulatory institution in the capital market. In discharge of this function, it demands the periodic inspection of books and records of its clients, and their regular returns to the Commission as well as constant surveillance of trading activities (Ikhide, 1997). This it does with a view to arresting abuses of insiders trading and preventing unfair manipulative trading in securities. The

regulatory role of the commission also covers rules making, reviews, investigation and enforcement actions.

The SEC Decree also confers the Commission with the responsibility of developing the Nigerian capital market. This is a very compelling role in the light limited development in the Nigerian capital market. The SEC has chosen public enlightment as it strategy for pursing the development role (Ikhide, 1997). Under section 20 of the SEC Decree 1989, the Commission was conferred the responsibility for the approval of allotment of securities of all public companies vested in the Allotment Committee of the Commission. It is also the responsibility of the SEC to approve merger, acquisitions, and all forms of business commission. This is necessary in order to: (i) salvage dying companies, which more efficient organization could take over; (ii) serve strategic response to competition especially where technical and technological changes in an industry threaten to push some companies toward liquidation (Akinghohungbe, 1994). As figure 5.1 shows, it is the responsibility of the SEC to summit reports to the Federal Ministry of Finance (FMF).

Other regulatory authorities in the Nigerian financial system include the National Insurance Commission (NAICOM-which regulates insurance companies); National Board of Community Banks (NBCB- regulator of community banks); and Federal Mortgage Bank of Nigeria (FMBN-apex regulatory body for primary mortgage institutions).

### 5.2.2 The Financial Markets

#### (a.) The Money Market

The financial market in Nigeria is made up of the money and capital markets. The basic function of the money market is to facilitate the mobilization of short-term funds from the surplus to the deficit unit in the economy. The deficit units could be from the public or private sectors of the economy who obtain funds from the market by trading in short-term securities. The money market instruments include Treasury bills (TBs), Treasury Certificate (TCs), Certificate of Deposit (CDs), Bankers' Acceptances(BAs), Commercial Papers(CPs), and Repurchase agreement(RP).

Money market institutions constitute the hub of the financial sector (CBN, 2000b). They are institutions that actively participate in the markets and include Commercial and Merchant Banks, Community Banks as well as Discount houses (Uffort, 2003). Until 2001, commercial banks operated at the retail end of the money market where small to medium savings are mobilized and disbursed in the form of loans and advances. The primary functions of commercial banks in Nigeria include: (i) acceptance of deposits in forms of current account, saving and time deposits accounts; (ii) granting of loans, advances and overdrafts to customers; (iii) provision of machinery for money transmission; (iv) provision of services to importers and exporters, and (v) provision of foreign exchange to end-users. Other services provided by commercial banks include facilities for safe-keeping of important documents, provision of business status reports and references, acting as agents for buying and selling of stocks and shares on behalf of their customers, provision of night safe facilities, provision of advice to customers on

insurance and investment matters, and provision of cash for bulk payments of non-customers salaries and wages (Umole, 1985).

Merchant Banks were initially established to serve as wholesale banker, providing services essentially for corporate and institutional customers and are required to accept deposit of =N=50,000.00 and above until 1991 and 1994 when the minimum deposit was changed to =N=25,000.00 and =N=60,000.00 respectively. Following the adoption of Universal Banking System in 2001, the dichotomy between commercial and merchant Banking was removed and the two types of banks were transformed into deposit money banks and were allowed to engage in both money and capital market activities as well as in insurance business, depending on individual banks operational preference. The number of deposit money banks in Nigeria in 2003 stood at 89.

Community banks are self-sustaining financial institutions owned and managed by local communities such as town unions, cooperative societies, farmers' group etc. They are established to promote rural development and enhance growth and development at the local levels (CBN, 2000b). Their activities include: acceptance of deposits, provision of ancillary banking services investing in various money market instruments. There were 881 and 747 community banks in Nigeria in 2000 and 2001 respectively.

According to Central Bank of Nigeria's Guidelines for Discount Houses dated December 27, 1991, a discount house is: "any person in Nigeria who transacts a discount house business which in the main consists of trading in and holding of treasury bills, commercial bills and other securities and whose operations are in the opinion of the CBN those of a discount house". Discount houses were established to serve as financial

intermediaries between the CBN, licensed banks and other financial institutions. They mobilize funds for investment in securities by providing discounting/rediscounting facilities in government short-term securities (CBN, 2000b). Prior to 1992 there was no Discount House Institutions in Nigeria. The absence of such intermediary institution in Nigeria somewhat evidenced that Nigeria's money market was "developing in a different pattern from the British model" (Nwankwo 1980). By 1992 however, a discount house institution commenced business in Nigeria. Thus, this institutional gap in the financial system was filled and Nigeria's money market followed the British model in this respect.

As at the end of year 2000 five discount houses were in operation in Nigeria.

**(b). The Capital Market**

The Capital Market is the long-term end of the financial system and is divided into three segments: the primary (PM) and secondary markets(SM) and Unit Trust Scheme (UTS). The primary market is the market for new issues of securities. The mode of offer for the securities traded in this market includes offer for subscription, right issues, and private placements. The secondary market is the market for existing securities. This market consists of stock exchanges and over-the-counter markets where securities are bought and sold after issuance in the primary market. The Unit trust scheme is a mechanism for mobilizing the financial resources of small and big savers and managing such funds to achieve maximum returns with minimum risks through efficient portfolio diversification. It offers the advantages of low cost, liquidity and high returns (Uffot, 2003).

Three groups of operators can be identified in the Nigerian capital market: the supplier of funds or lenders, the user of funds or borrowers and middlemen. The first

group of operators are the buyers of securities in the market. They dispose their excess liquidity and in return expects good yield in form of interest, dividends and capital gains. Included in this group are such institutions as commercial and merchant banks, insurance companies, pension funds organizations, governments and government corporations and individuals. The second group, i.e. the borrowers, normally demand funds for investment purposes. These are the sellers of securities and their demand can be in form of application for sales of debentures, shares and bonds to the public. The borrowers include the government, which needs funds for development purposes, and industrialists, who may need funds for further investment or to take advantage of new business opportunity. The third group, which is made up of middlemen, consists of institutions and individuals who make it possible for the supplier of funds to meet the borrowers. In this group are the stock exchanges, the issuing houses, the registrars and the individual dealers who are jobbers and stockbrokers.

The securities traded in the Nigerian capital market could be debentures, bonds or shares. Debentures and bonds are fixed interest securities and the bulk of this class of securities is issued by the government. The bulk of shares, however, are issued by private enterprises in the Nigerian capital market (Ikhide, 1997). The capital market, as distinct from the money market, performs the traditional role of mobilizing long-term financial resources from the surplus economic units to the deficit units of the economy. These long-term financial resources are utilized for long-term investment and development projects (CBN, 2000a). The main institutions in this market include the Securities and Exchange Commission (already discussed), the Nigerian Stock Exchange, the Issuing Houses, and the stock broking firms (Olorunshola, 2003).

The Nigerian Stock Exchange is the prime operational institution in the capital market. The Exchange is set up to provide avenue for the purchase and sale of stocks, and shares of any kind and for the investment of money. The Nigerian Stock Exchange evolved as the Lagos Stock Exchange (LSE) which was established in 1960. The LSE started trading activities on July 5, 1961 roughly ten months after its establishment.

The principal objectives of the then LSE, now known as the Nigerian Stock Exchange (NSE) as specified in its Memorandum and Articles of Association are to:

(1) provide facilities to the public in Nigeria for the purchase and sale of funds, stocks, and shares of any kind and for the investment of money;

(2) control the granting of a quotation on the Stock Exchange in respect of funds, stock, and shares of any company, government, municipality local authority or other body corporate;

(3) regulate the dealings of members' interest and with their clients;

(4) standardize and, from time to time, review and, if necessary or desirable, increase or decrease the fees or other charges to be made by members for services rendered to their clients or modify the method or methods of assessing or calculating such fees or charges;

(5) regulate the stockbroking activities of members and facilitate the exchange of information for their mutual advantage and for the benefit of their clients and to offer facilities whereby the public can be informed of prices of shares dealt in by member;

(6) co-operate with associations and stockbrokers and stock exchanges in other countries and to obtain and make available to members information and facilities likely to be advantage to them to their client;

(7) investigate any irregularities or alleged irregularities in the dealings of members and their clients, any complaint made against members by other members or any other parties provided that such differences, disputes or complaints shall relate to or touch the stockbroking business or activities of such members and to deal with and decide upon such irregularities, disputes or complaints and to make necessary steps for the enforcement of its decision and aware; and

(8) promote, support, or propose legislative or other measures affecting the aforesaid objects(Alile, 1992).

Apart from the SEC and NSE, the Issuing Houses and stock broking firms are other institutions in the Nigerian capital market. Issuing house activities essentially involve arranging the issue of equity and/or debt instruments on behalf of another company, local, state or federal governments and the provision of advisory services on funding opportunities, capital restructuring, etc. With the adoption of universal banking in Nigeria, commercial and merchant banks can engage in issuing house activities. Stock broking firms, on the other hand, act as agents for the buying and selling of securities to the public on a commission basis. In 2000, the number of stock broking firms in the NSE stood at 226.

### 5.2.3 Development Finance Institutions (DFIs)

These are specialized banks and development finance institutions established to contribute to the specific sectors of the economy. They include the Bank of Industry

(BOI), Nigerian Export-Import Bank (NEXIM), Urban Development Bank (UDB), Nigerian Agricultural and Rural Development Bank (NARDB), Nigerian Agricultural and Corporative Bank (NACB), and Nigerian Education Bank. The basic objectives of these specialized financial institutions is to contribute to the development of specific sectors of the economy.

### 5.2.4 Other Financial Institutions

Other financial institutions and funds under the financial system include Insurance companies, Finance companies, Bureaux de Change, Primary Mortgage Institutions (PMIs), the Nigerian Social Insurance Trust Fund (NSITF) and the National Economic Reconstruction Fund (NERFUND – now merged with the Bank of Industry). The major role performed by finance companies are fund mobilization, placement and management, project financing, equipment leasing, and granting of loans

## 5.3 Financial Deregulation in Nigeria[40]

Following the deregulation of the Nigerian economy in the 1986s, several reforms measures aimed at deregulating the financial sector were put in place in Nigeria. With these measures, it is believed that a significant financial development will be attained.

The broad objectives of financial deregulation are to promote financial savings, increase the level of domestic investment by providing effective intermediation between lenders and borrowers. To achieve these objectives, several measures, which can be categorized into five have been adopted in Nigeria (Ojo, 1993). These include: reform of the financial structure, monetary policy reforms, foreign exchange market reforms,

[40] This section has benefited greatly from Oresotu (1993), Ojo (1993), Udegbunam (1995) and Ikhide (1997).

liberalization of capital movement and capital market reform. These measures are discussed in turn.

**(a.) Reform of the Financial Structure**

Measures adopted here are aimed at fostering competition in the financial system, strengthening the supervisory role of the regulatory authorities, and streamlining public sector relationship with the financial sector.

With the view to fostering competition in the financial system, the authorities licensed more banks. In sharp response to this move at the early years of reform, the number of banks increased significantly from 40 in 1986 to 120 in 1992. The number of bank branches, at this same period, also increased from 1387 to 2385 respectively. Apart from sharp increase in the number of commercial banks, there was also an increase in the number of mortgage institutions. As at December 1992 there were 145 primary mortgaged institutions. Moreover, financial trust banks were also established during the period under consideration. In the light of the understanding that a lot of banks are constrained by inadequate capital base, the Federal Government raised the minimum paid-capital of commercial banks to =N=50 and =N=40 million respectively. And to instill public confidence in Nigerian banks the Nigerian Deposit Insurance Corporation (NDIC) was also established in 1988 to insure the deposit liabilities of banks.

In an attempt to strengthen the supervisory role of regulatory authorities, the CBN Decree No. 24 of 1991 which abrogated the CBN Act of 1958(as amended) and Banks and Other Financial Institutions (BOFI) Decree, No. 25 of 1991 were enacted. These two decrees, according to CBN (2000), made it easier for the Bank to introduce measures aimed at promoting monetary stability and soundness of the financial system. The CBN

was also legislatively accorded the powers to source data and other economic information from economic agencies in the country. Since the enactment of the CBN Decree No. 24 of 1991 and the BOFI Decree of 1991, other enactments and amendments that have been made to strengthen the financial system include:

(i) Failed Banks (Recovery of Debt) and Financial Malpractices in Banks Decree (1994) – to prosecute those who contributed to the failure of banks and to recover the debt owed to the failed banks.

(ii) CBN (Amendment) Decree No. 3. 1997 - this changes the composition of Board of Directors of the Bank to include a Chairman and four other Directors. The decree also subordinated the CBN Governor to the Ministry of Finance on banking and finance matters.

(iii) BOFI (Amendment Decree No. 5, 1997 - this extends the supervisory role of CBN to specialized banks and other financial institutions. The CBN is placed directly under the Ministry of Finance with respect to the supervision and control of banks and other financial institutions.

(iv) CBN (Amendment) Decree No. 37, 1998)-this decree provides a measure of operational autonomy for the CBN to carry out its traditional functions and enhances its versality.

(v) BOFI (Amendment) Decree No. 4, 1998: this repeals BOFI (Amendment) Decree No. 4; of 1997- this further strengthens the regulatory powers of the CBN.

(vi) BOFI (Amendment) Decree No. 4, 1999 – this conferred on the Governor and Board of Director of the Bank of Nigeria powers to revoke the operating

licenses of a bank granted under the principal decree. This Amendment also reviews upward penalties for offences and contraventions of the decree by banks and other financial institutions.

(vii) CBN (Amendment) Decree No. 41; 1999 – restoration of administrative autonomy of the Bank over its internal affairs, vesting on the Board of Directors powers to approve the annual Budget estimates of the Bank, reduction of the number of the Bank's Deputy Governors from 5 to 4.

Another vital aspect of the reform of the financial sector include such measures as withdrawal of all government accounts in commercial banks to be transferred to the Central Bank so as to forestall unhealthy competition in savings mobilization, prohibition of banks from granting loans on the security of foreign exchange deposits held abroad or on domiciliary accounts. An auction–based system for the issuance of treasury bills was also introduced in 1989 with the aim of promoting greater reliance on market forces in the determination of yields on government debt instruments through market –determined interest rates.

**(b.) Monetary Policy Reform**

Monetary policy reform measures are those designed to stabilize the economy in the short-run and to induce the emergence of market-oriented financial sector for effective mobilization of savings and efficient resource allocation (Oresotu, 1992). These measures included the following elements.

(i) Rationalization of credit controls: under this measure, credit ceiling on banks was not entirely removed but greater discretion was given to them in the sectoral allocation of credit. The former 18 sector classification was reduced

to only two sector categorization requiring 50 percent of bank credit to be channeled to agriculture and manufacturing while the remaining 50 percent of bank to go to other sectors. Apart from greater discretion to banks in the allocation of their credit, regulatory measures that used to discriminate between commercial and merchant banks (in relation to liquidity ratios, cash reserve requirement and credit ceiling) were unified to give similar treatment to banks in general.

(ii) Interest rate deregulation: Prior to January 1987, interest rates were fixed and administratively determined by the Central Bank in Nigeria. In the light of the distortions engendered by this policy on interest rate, a partial deregulation was attempted in January 1987. By August, 1987, all rates became market–determined. In 1989, banks were encouraged to pay interest (jointly negotiated by banks and their customers) on current deposit. Although interest rates were liberalized in 1987, the year 1991 and 1994 witnessed a policy reversal interest rate management. The policy stance in 1991 re-introduced a maximum lending rate of 21 % while saving rate was allowed a minimum of 13.5%. This cap on interest rates were removed in 1992 and interest rate regulation was further introduced in 1994. A market–based interest rate policy was later reintroduced and has been in operation since then.

(iii) The shift from direct to indirect monetary control: Prior to the introduction of indirect approach to monetary management in Nigeria, the direct approach was the modus operadi of the Central Bank of Nigeria in monetary control in Nigeria. The operational framework for the indirect monetary policy

management involved the use of market (indirect) instruments, namely, the open market operations (OMO), to regulate growth in major monetary aggregates. The OMO was introduced at the end of June 1993 and is conducted wholly on Nigerian treasury bills(NTBs), including repurchase agreements (REPOS)

**(c.) Foreign Exchange Market Reforms**

The principal instruments of foreign exchange management before 1986 were trade and exchange controls and export promotion. During this period, the exchange rate was administratively determined by the Central Bank of Nigeria, with the objective of reducing external sector imbalances. However, in the face of inability of exchange control system to achieve internal balances in the short term and guarantee external equilibrium, the Exchange control system was discarded and subsequently replaced with the Second-tier Foreign Exchange Market (SFEM) under the auspices of the Structural Adjustment Programme in September, 1986. Under SFEM a dual exchange rate system (first and section-tiers) was adopted. The first tier market, which was applied to debt service payments and other public sector disbursement, was managed while the second-tier was allowed to be controlled by the market forces. On July, 1987, the first tier and second tier markets were merged and a unified foreign exchange market (FEM) with a single rate came into being. The FEM was made up of the autonomous segment and the parallel market segment. The introduction of autonomous market, according to Obadan (1993), gave birth to three distinct exchange rates: FEM rate, autonomous rate and parallel market rate which failed to converge. The Dutch Auction System of foreign exchange pricing was extensively used under FEM. In the light of the unhealthy and

destabilizing deals associated with the operations in the autonomous market, it was merged with the official segment in January 1989 and the Interbank Foreign Exchange Market (IFEM) was introduced. The 1989 also witnessed the introduction of Bureaux de change. At its inception, the daily biding system was adopted under the IFEM. This system was, however, characterized by spurious demand for foreign exchange and was abolished in 1990. After this the DAS was reintroduced and continued throughout 1991. Other reforms in the foreign exchange market in Nigeria entailed the floating of the naira on March 5 1992, introduction of guided deregulation of foreign exchange market in 1995 Budget followed by institution of Autonomous Foreign Exchange Market (AFEM). Under this dispensation, there is the liberalization of foreign exchange dealing through the active participation of the bureaux de change in the AFEM. Most of the activities in the foreign exchange market in 1995 were retained in 1986, while in 1997 substantial liberalization of foreign exchange practices occurred. In 1998, the bulk of the policy measures in the preceding year were retained while some of the existing ones were either further liberalized or fine-tuned to align with developments in the economy. The year 1999 witnessed the abolition of the official exchange rate due to incidence of round tripping associated with this fixed rate. Thus, all public sector transactions were conducted at the AFEM rate which was market driven. Further reform measures introduced in the foreign exchange market in Nigeria was the reconstitution of AFEM into the Interbank Foregn Exchange Market (IFEM) in 1999. IFEM aims at promoting inter-bank activities with a view to encouraging privately sourced foreign exchange for its funding. The Dutch Auction System also became operational in July 2002. At this time, the gap between the parallel and official exchange rates was 17.5%. Since the

introduction of the system, the parallel market premium has fallen from 17.5% to 11.5% and the rapidly dwindling reserve position was stemmed by the end of December 2002(CBN Briefs, 2003).

**(d.) Liberalization of capital movement**

As a result of deregulation of foreign exchange market, existing restrictions on capital transfers were abolished. All that was needed to facilitate capital transfer was evidence of importation and exportation to be provided to the Federal Ministry of Finance (FMF). Moreover, with the introduction of Nigerian Enterprises Promotion Decree of 1989, foreigners are now free to invest in the country.

**(e.) Capital Market Reforms**

The basic reforms in the capital market include:

- interest rate deregulation;
- privatization of erstwhile public institutions;
- debt conversion programme;
- deregulation of the capital market;
- reconstitution of the Securities and Exchange Commission;
- the reduction of the withholding tax on dividend, and
- alleviating the difficulty involved in listing, disclosures and checking insider trading.

Apart from the above reforms, in attempt to break down the barriers to capital inflow, the Nigerian Enterprise Promotion Decree of 1989 as well as the Exchange Control Act of 1962 were repealed in 1995.

This section has indicated several reform measures aimed at deregulating the financial sector in Nigeria. This exposition becomes necessary in the light of the need to investigate the impact of these measures on financial structure in Nigeria. This analysis becomes important in an attempt to investigate the implication of financial structure for monetary transmission mechanism in Nigeria.

## 5.4 Performance of Nigerian Financial System

### 5.4.1 Overall Performance of the financial system in Nigeria

In assessing the overall performance of the financial system in Nigeria, this study following Demirguc-Kunt and Levine (1999) sums assets of deposit money bank, assets of non-bank financial institutions and stock market capitalization and divide by the GDP[41]. In carrying out this exercise, however, it is essential to initially distinguish between bank and non-bank financial institutions.

In Nigeria, an instutition is deemed to be a bank if its licensing is within the provision of Section 2 of Banks and Other Financial Institution Act of 1991(Esezobor, 2003). Such institution should have access to the clearinghouse and following the adoption of universal banking in 2001 must be able to carry out wide range of services with little or no limitations. It should also be noted that though some non-bank financial institutions bear the word "bank", they are not bank in the real sense (Esezobor, 2003).

Given the above distinction, non-bank financial institutions as the Banking Annual Report, 2001 listed include Community Banks, Primary Mortgage Institutions, and Bureaux the de Change. Other important non-bank financial institutions include:

[41] Gallego and Loayza (2000) used a similar indicator to measure the overall level of financial sector development.

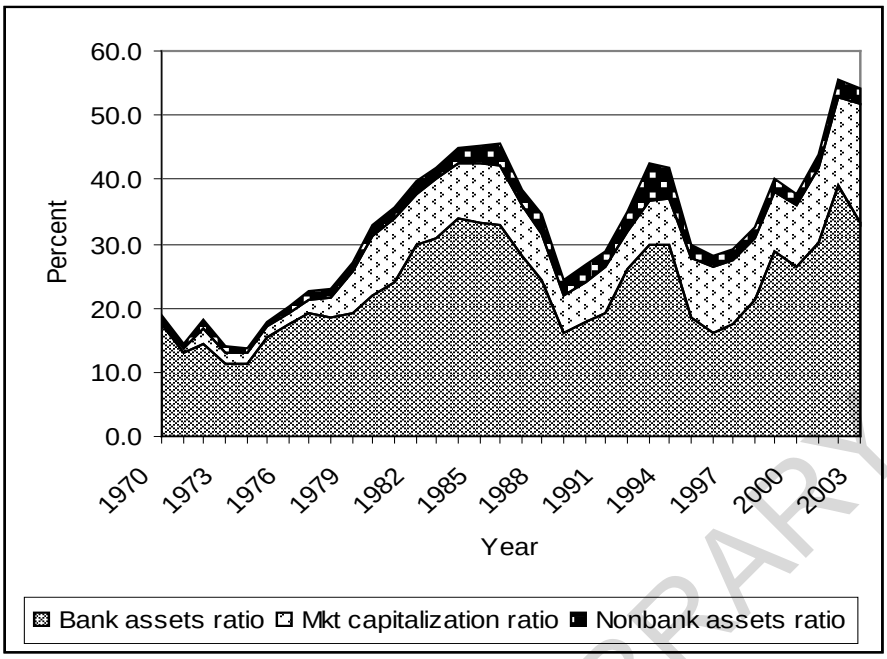
Development Finance Institutions, Discount Houses, Finance Houses, and Insurance Companies (Esezobor, 2003).

Having distinguished non-bank financial institutions in the Nigerian financial market, the only institutions that can be regarded as banks in the "real sense" are the commercial and merchant banks. With the adoption of Universal Banking in 2001 in Nigeria, these two banks became "Deposit Money Banks" and can now engage in wide area of business which are initially in the area of investment banking (CBN, 2000a).

Figure 5.2 presents the absolute size of the financial sector in Nigeria from 1970 to 2003. It shows the relative importance of the financial services performed by the stock market, banks and non-bank financial[42] institutions as a percentage of the GDP. Figure 5.2 indicates the contribution of the financial sector to the GDP. The average contribution stood at 24.2% between 1970-85, 27.6% (1986-1995) and 31.5 % from 1996-2003. From a bottom level of 13.7% in 1974, the financial sectors' contribution to GDP rose gradually and reached a higher level of 45.7% in 1986. Between 1986 and 2003, there has been a swing in financial sector performance as the overall contribution of the financial sector fell to 24.2% in 1989 and 28.1 % in 1996. This could be attributed to the banking crises which led to the distress of several banks in the Nigerian economy. Moreover, from 1970-2003, the highest contribution of the financial sector to GDP is 55.6%. It is also apparent in Figure 5.2 that the banking sector is the dominant, in terms of the size of its assets relative to the GDP, this is followed by the stock market.



[42] The non-bank financial institutions included in the study include: community banks, peoples bank of Nigeria, Discount Houses, Finance Houses, Insurance Companies and primary mortgage institutions. Other non-bank financial institutions were omitted in the light of pursity of data on their assets and liabilities.




Source: Author's Calculation Based on CBN, IFS and NSE data.

**Figure 5.2: Overall Size of financial sector in Nigeria**

Overall, the evidence in Figure 5.2 shows that the financial sector in very important in the economy. This also implies that this vital sector of the national economy is capable of stimulating economic growth and development.

**(a.) The Banking Sector**

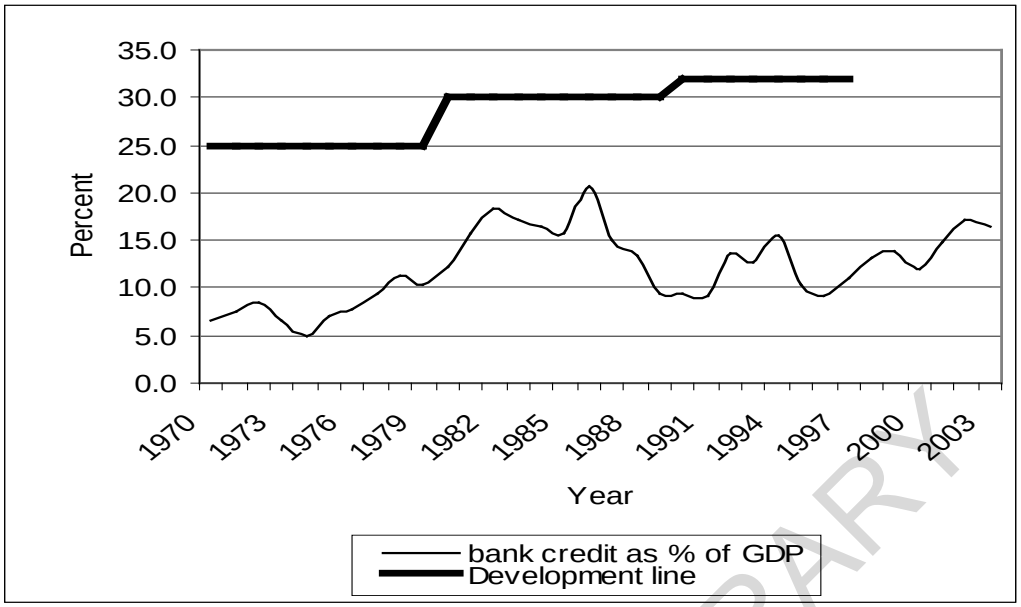
Size:

Figure 5.2 indicates the size of the banking sector relative to the GDP in Nigeria. Bank assets in this case, is defined as the sum of reserves, foreign assets, claim of central government, state and local government and claim on the private sector. Apparently, the banking sector grew stealthily starting from a low level of 11.3% of GDP in 1974 to 33.9% in 1984. Afterwards, the banking market declined between 1985-1989, increased from 1990-1993 and further fluctuation in banking market size has also been

experienced between 1994-2003. Moreover, the size of the banking market reached a peak of 55.6% in 2002. Though, the size of the banking market is largest compared with the stock market and other financial institutions, in Nigeria, its contribution to the GDP has been much lower than the world average. For instance, while the size of the banking sector was 17.4% in 1997, the world average which is a measure of the international standard was 52.6%. Since this world average has been increasing overtime (see, Demirguc-Kunt and Levine, 1999), there is strong evidence that bank market size in early 2000s in Nigeria is below international standard.

Activity:

In an attempt to examine the activity of the backing sector in Nigeria, a measure of the credit extended by the deposit money bank to the private sector relative to the GDP is used. Figure 5.3 shows the behaviour of bank activity in Nigeria between 1970-2003. It could be observed that bank activity measured by the amount of credit extended to the private (relative to GDP) peaked in 1986. The supply of credit in the banking sector, in the light of excessive demand for credit in this period (see Ikhide, 1997) rises gradually till 1982, after which it declined in the next three years before it reached its peak in 1986. The implication of this is that there was a credit boom in Nigeria in 1986. Moreover, between 1986 and 2003, as Figure 5.3 indicates, there was a swing in the bank credit ratio. Prior to the deregulation of the financial sector in Nigeria, the bank credit ratio was in the range of 5.0-20.7%. However, with deregulation this became 9.2-17.1%. One salient observation about the behaviour of bank activity in Nigeria is that it has consistently trended below the world average as indicated by the “development line” in Figure 5.3.




Source: Author's Calculation Based on data from Beck, et. al. (1999), CBN and IFS

**Figure 5.3: Bank Market Activity in Nigeria (1970-2003)**

Given the low level of bank market activity compared with international standard between 1970-1997, couple with existing trend, there is no indication that bank activity would ever approximate the world standard in 2000s. In the light of this, the banking sector in Nigeria can be regarded as underdeveloped.

Efficiency:

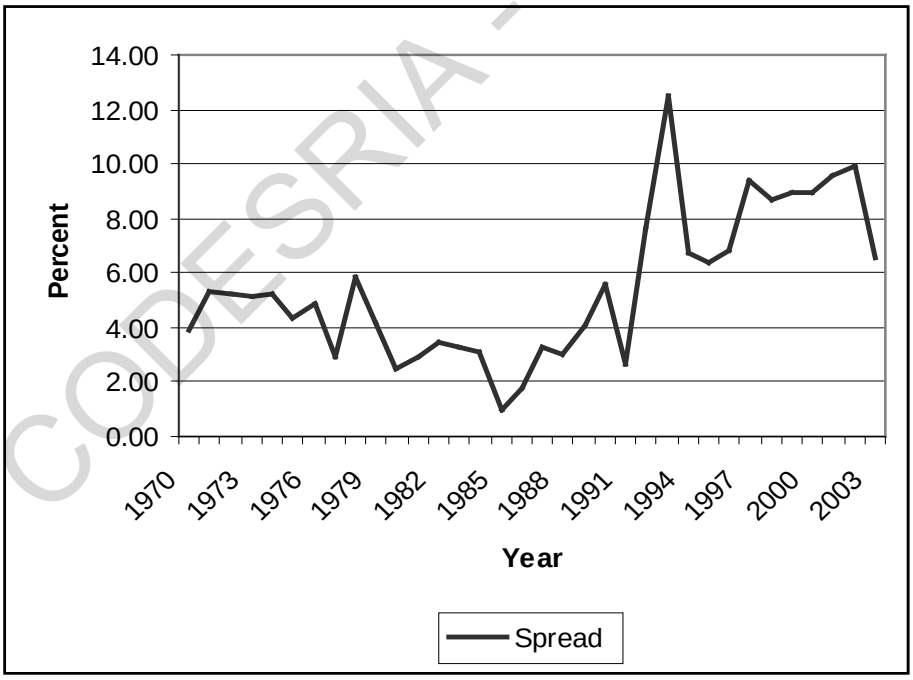
To measure the efficiency of the banking sector, Demirguc-Kunt and Levine (1999) and Beck et.al. (1999) used both the net interest margin and overhead cost[43] associated with banking operations. The net interest margin, equals the accounting value of a bank's net interest revenue as a share of its total assets. The overhead cost, on the other hand, equals the accounting value of a bank's overhead costs as a share of its total assets. An increase in net interest margin or a decrease in overhead costs, in this case,

[43] The increase in overhead cost of banks may not actually indicate inefficiency. This is so in a situation where large overhead cost is directed toward acquisition of investment goods.

indicates increased efficiency. Apart from these measures, Gallego and Loayza (2000) also complement their studies using the spread on banks lending and borrowing operations in measuring the efficiency of the banking sector in Chile.

Except the *Banking Supervision Annual Report* (2001) where data (for the period 1999-2001) on net interest margin as well as overhead cost of banks were published for the first time, these data, to authors' knowledge, are not conventionally published by the Central Bank of Nigeria. In the light of this paucity of data, this section examines the efficiency of banks using the spread on average lending and deposit rates of deposit money banks. Since this measure alone might not actually give sincere picture of the efficiency of the banking sector, available data on the net interest margin of banks are also explored.






Source: Author's Calculation Based on CBN and IFS Data

**Figure 5.4: Spread of average lending and deposit rates in Nigeria**

Figure 5.4 shows the spread on banks lending and borrowing operations between 1970-2003. It could be observed that banks spread ranged between 1.00-5.87% from 1970-1986. At this period, the average spread on banks lending and borrowing operation was 3.83%. With the deregulation of interest rates in 1987, the spread on banks' operations increased and ranged between 2.45 -12.45% while the average spread rose to 7.1%. Another remarkable observation about Figure 5.4 is that the spread on banks operation is lower prior to the deregulation of the financial sector. One needs to exercise caution in interpreting this result since lower spread prior to deregulation may not necessary imply that banks were more efficient but could be attributed to the administrative policy of the government which favoured lower interest rate at this period. The behaviour of banks' spread indicates that though the banking sector may have been efficient at one time relative to another, this efficiency has not been stable since 1970. This is corroborated by Demirguc-Kunt and Levine (1999) results which shows the average net interest margin of the banking sector in Nigeria for the period 1990-97 as 5% and recent data from the Central Bank of Nigeria which shows the net interest margins of banks as 4%, 3.8% and 4.1% in 1999, 2000, and 2001 as respectively.

Demirguc-Kunt and Levine(1999) overall results seem to indicate that the banking sector in Nigeria is efficient compared with international standard, since the net interest margin of 5% obtained for this country is higher than their sample mean of 4%. However, using overhead cost as a measure of bank efficiency, these authors in a sample of 63 countries also estimated the overhead cost of the banking sector to be 8% of total assets -a ratio that is on the high side compared with the sample mean of 4% obtained by these authors. The implication of this is that banks in Nigeria cannot be deemed as

efficient. The different conclusion obtained when net interest margin and overhead cost are used as a measure of efficiency may be attributed to fraudulent financial reporting in Nigerian banks[44].

**(b.) Stock Market**

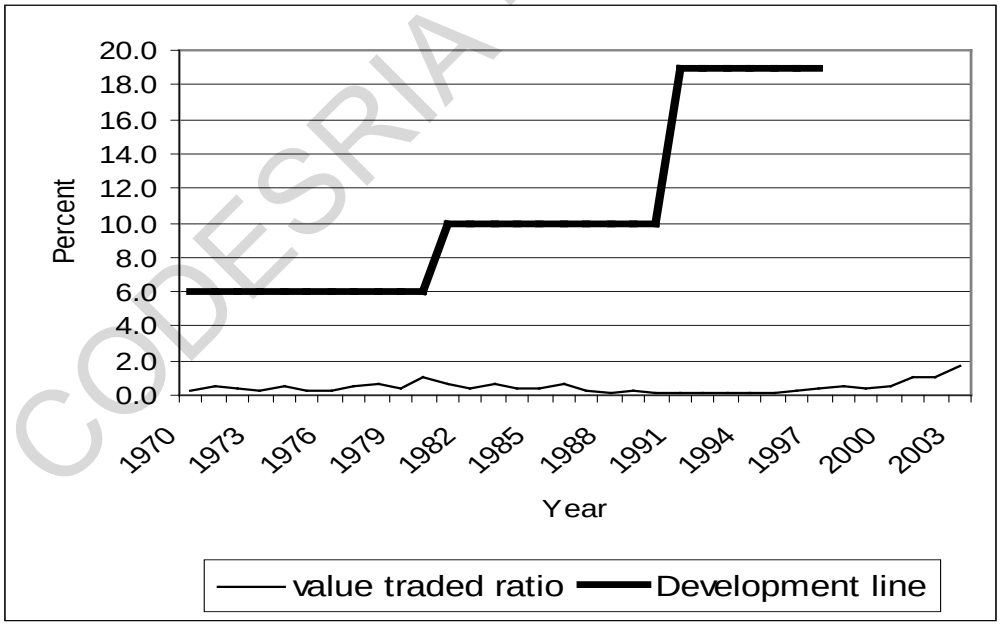
Size:

To assess the size of the stock market we use stock market capitalization as a percentage of GDP as proposed by Demirguc-Kunt and Levine (1999). The computation from figure 5.2 shows that the size of the stock market grew gradually from 1.5% of GDP in 1974 to 9.9% in 1981. Moreover, from 1982-88, the contribution of the stock market to GDP swinged between 7.0-9.4%. With adoption of measures aimed at liberalizing the capital market such as privatization and commercialization (which began in 1989) and the repealing of Nigerian Enterprise Promotion Decree (1962) and Exchange control Act(1962) in 1995, the size of the market gradually increased in the 1990s. However, comparing the stock market capitalization ratio in Nigeria with world average (which was 18.5% in the 1970s, 28.4% in the 1980s, and 38.2% in the 1990s), it could be observed that the level of stock market development has been much below international standard. Corroborating the above results, Nyong (1997) maintained that despite government huge investment in the development of the capital market in Nigeria, "the Nigeria market is still shallow (i.e. low volume of share and market capitalization) and narrow (i.e. low trading activity arising from few quoted companies. The available evidence in this study has also shown that the size of the stock market in 2003 has just reached the level which the world attained in the 1970s.

[44] The act of fraudulent financial reporting involves the preparation of "three different financial accounts by banks for themselves, regulatory authorities, and shareholders (Babajide (2005).

Activity:

Like existing studies, this study adopts the traded value as a percentage of GDP in measuring the activity of the stock market in Nigeria. It could be observed that between 1970-1986, the stock market activity measured as traded value as percentage of GDP was consistently below 2% . Morevoer, with the liberalization of the capital markets in the 1990s, stock market activity only peaked at 1.7%. Compared with international standard, the stock market in Nigeria can be regarded as underdeveloped since it conspicuously below the "development line" which represents the world average in the 1970s, 1980s and the 1990s. Though Figure 5.5 did not extend the development line above 1997, the trend of stock market traded ratio in the early 2000s indicates that there is no way it could caught up with the development line in this period.

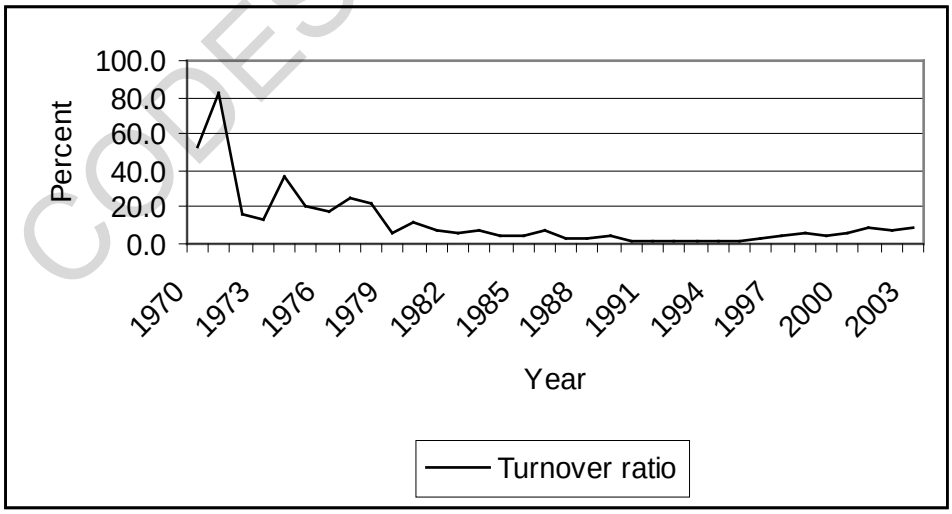



Source: Authors Calculation based on data from Beck et. al.(1999), CBN and NSE

**Figure 5.5 Stock Market Activities in Nigeria**

Stock Market Efficiency:

In an attempt to measure the efficiency of the Nigerian stock market, the turnover ratio is used. The turnover ratio is defined as total traded value on the stock market divided by market capitalization. This ratio indicates how often, on average, a share changes hands during the year (Ikhide, 1997). Figure 5.6 shows the behaviour of this index from 1970-2003. It is apparent that this ratio was quite high in early 1970s. This may be ascribed to the Indigenization Decree, which requires Nigerian to participate in the shareholding of some strategic business activity in Nigeria. The higher the turnover ratio, the higher the rate at which shares changes hand in the domestic stock market. From Figure 5.6, it is apparent that the rate of stock turnover in the Nigerian stock market has been quite low. Despite the deregulation of capital market activities in Nigeria in the 1990s the situation has not shown any improvement. Since turnover ratio remains below the world average of 35% in Nigeria, the stock market in Nigeria can be regarded as underdeveloped.




Source: Author's calculation based on CBN and NSE data

**Figure 5.6: Stock Market Efficiency in Nigeria**

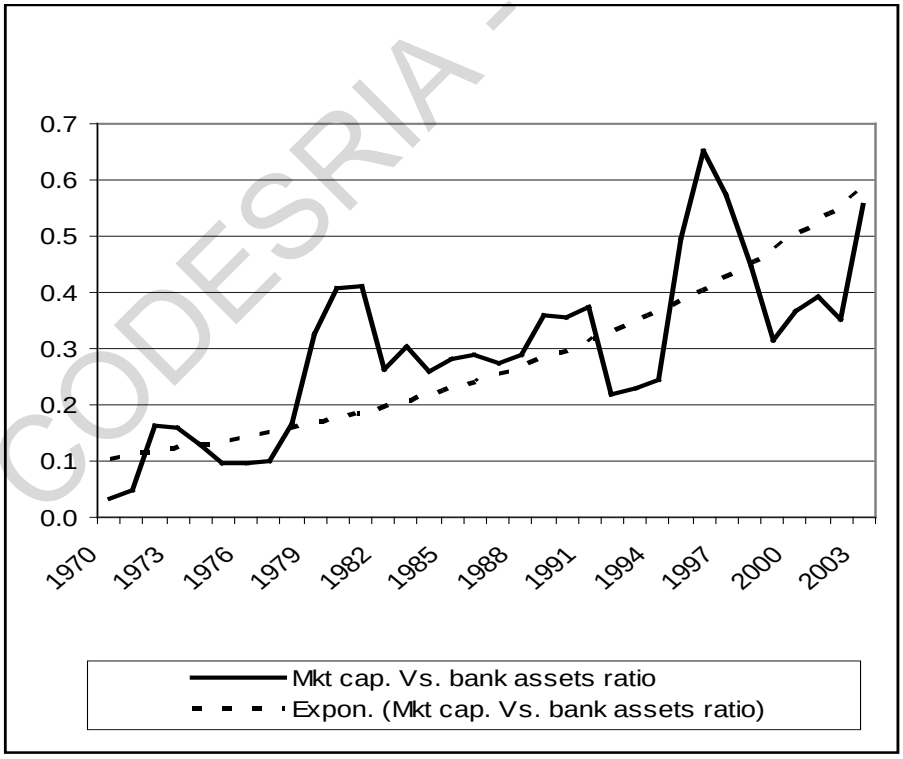
This section has explored the development in the overall financial sector in Nigeria as well as the banking and stock market in Nigeria. The salient observation is that the financial sector is crucial considering its contribution to the GDP in the country. Moreover, despite the contribution of the overall financial sector, the banking market though larger than other financial sector, and the stock market are still underdeveloped compared with international standard. Furthermore, evidence suggested that the adoption of deregulation policy in Nigeria, has not in any way change the development status of individual financial market. These phenomena calls for adequate consideration on the part of the authorities and required vibrant policy measure to address these critical problems.

## 5.5 Deregulation and Financial Structure in Nigeria

This section examines whether the financial structure in Nigeria in bank-based or market based. It also explores whether the deregulation of the financial market since the late 1980s in Nigeria has led to a shift in financial structure. To achieve these objectives, financial structure indicators proposed by Demirguc-Kunt and Levine (1999) are used. In this respect, the size, activity and efficiency of the banking sector is studied relative to that of the stock market in Nigeria. Since financial indicators suffer from high volatility in the short term and this phenomenon is usually exacerbated when two of such indicators are combined (Gallego, and Loayza, 2000), this section draws from Gallego and Loayza (2000) and focused on the long-run trends of these financial structure indices. To derive the long-run trend, financial structure ratios are smoothed by fitting a second order polynomial.

Relative Size:

To examine the relative size of the banking sector and the stock market, we divide market capitalization ratio by the bank assets ratio and determine the long-run trend of these combined indices by fitting a second order polynomial. Figure 5.7 indicates that the quotient of market capitalization ratio and bank credit ratio has been less than one with the period 1970-2003. This indicates that the banking sector has gained importance relative to the stock market over the study period. Despite the importance of the banking sector, Figure 5.7 also indicates that the financial structure has been tending towards market-based and this move has been very intense with the deregulation of the financial sector in Nigeria. This is indicated by the slope of the long-run trend which is lower in the 1970s than in the 1980s and 1990s.

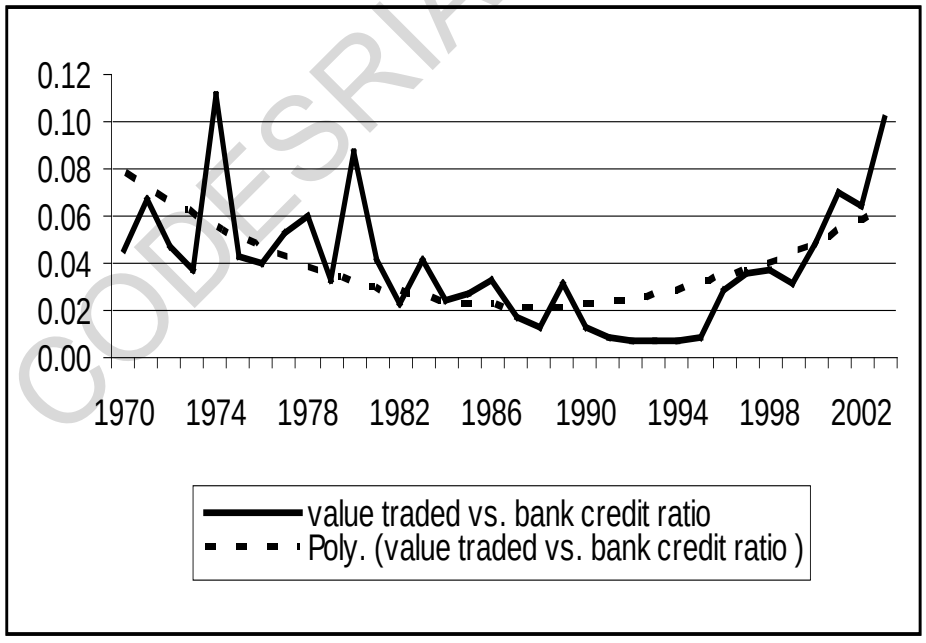



Source: Author's calculation based on CBN, IFS and NSE data

**Figure 5.7: Financial Structure Indicator (Relative size)**

Relative Activity:

Apart from the relative size measure of financial structure, existing literature has also measured financial structure by measuring the activity of the banking sector relative to the stock market. This is done by estimating the long run trend of the quotient of stock market traded ratio and bank credit ratio. Figure 5.8 shows the trend of the activity in Nigerian stock market relative to that of the banking market. It could be observed that downward trend is recorded between 1970-1986 after which an increasing trend is experienced. This trend also mimic that obtainable when financial structure is measured using relative size of these market. The overall conclusion using relative activity as financial structure indicator also revealed that the structure of financial markets in Nigeria is bank-based. This is indicated by relative activity which is less than one. Figure 5.8 also indicates that the Nigerian financial structure is tending towards a market-based.

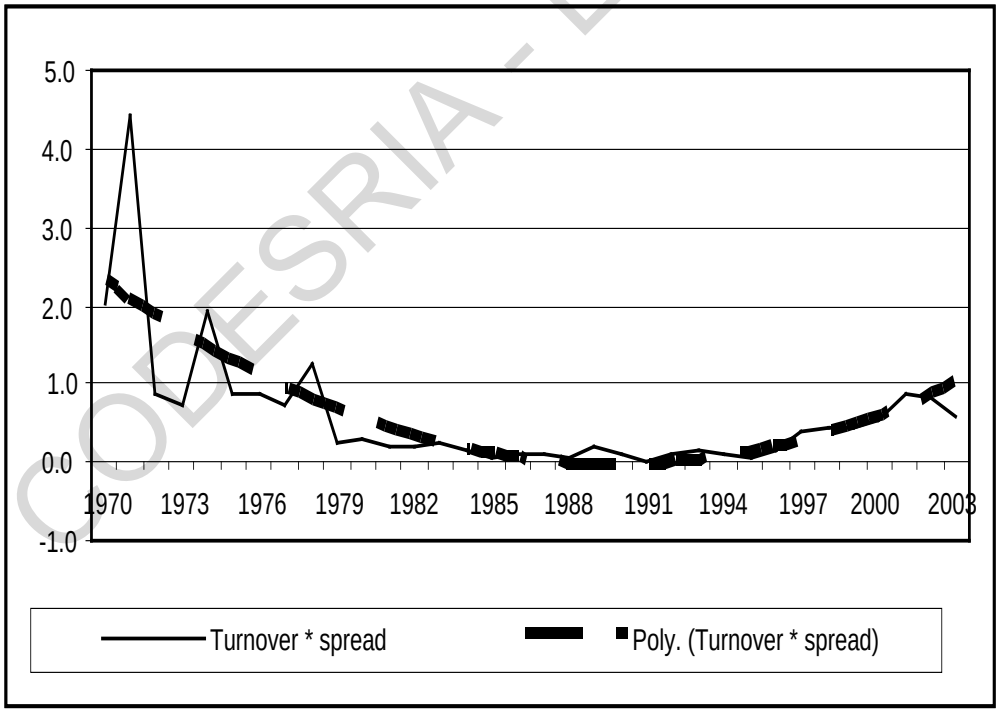



Source: Author's calculation based on CBN, IFS and NSE data

**Figure 5.8: Financial structure indicator (Relative activity)**

Relative Efficiency:

In an attempt to examine whether the structure of the Nigerian financial system is market or bank based using relative efficiency measure, the product of spread on banks borrowing and lending operation and stock market turnover is used. According to Gallego and Loayza ( 2000) a rise in the above measure of financial structure indicator implies that the stock market is more efficient that the banking market. Figure 5.9 indicates a downward trend in the efficiency of the stock market relative the banking sector in the 1970s and 1980s, however, with deregulation, the stock market has been gaining efficiency gradually. This is indicated by the positive trend in this financial structure indicator in the 1990s and early 2000s.




Author's calculation based on CBN and NSE data

**Figure 5.9: Financial Structure indicator (Relative Efficiency)**

Overall, this section has indicated that the Nigerian financial structure is dominated by banks. However, with the deregulation of the financial system in Nigeria, the structure of the financial system has been tending toward a market–based system.

## 5.6 Conclusion

This chapter began by exploring the composition of Nigerian financial system as well as the main reform measures adopted in deregulating the financial sector. To examine the extent of financial development and impact of deregulation on the structure of financial market both financial development and structure indicators were used. The chapter discovered that though the Nigerian financial sector is important in light of its contribution to the macroeconomy, it is still underdeveloped relative to international standard. Moreover, investigation using financial structure indicators showed that though Nigeria is a bank dominated country in terms of size, activity and efficiency, the structure of the financial system has been tending gradually towards a market-based system. Given that Nigeria is still underdeveloped and bank dominated country, one expects the proposition of bank credit view of monetary transmission mechanism to exist, though not quite strong, due to the gradual shift of the financial system towards a market-based one.

# CHAPTER SIX

# MODEL ESTIMATION AND

# DISCUSSION OF RESULTS

## 6.1 Introduction

In the preceding chapter, an analysis of the impact of financial deregulation on the structure of the Nigerian financial system was conducted. Using econometric methodology, this chapter tests for the existence of a distinctive bank credit channel in the Nigerian economy. This exercise becomes crucial since it sheds light on the issue of whether a link exists between the structure of the financial system and the nature of monetary transmission mechanism in Nigeria.

To achieve, the above objective, section 6.2 of this chapter focuses on the descriptive statistics of data employed in this study. In section 6.3, the time-series properties of these data series are examined. Under this section, a unit root test is embarked upon to ascertain whether the various data series are stationary in level or first difference. Testing for the time-series properties of variables, is of particular importance in the light of the recent observation that most economic time series are non-stationary and could adequately be represented by unit root. This section also tests for cointegration among variables so as to be guided in the estimation of the SVAR model specified for this study as well as testing for causality among variables. The innovation analysis and interpretation of results is carried out in section 6.4; both the impulse response function as well as variance decomposition are generated to investigate the existence or otherwise of bank credit channel in the Nigerian economy. Section 6.5, being the last section, summarizes the main findings of this study.

## 6.2 Descriptive Statistics of Data Series

In an attempt to carry out this study, the various descriptive statistics of the data used was initially examined. The descriptive statistics of data series gives information about sample statistics such as mean, median, minimum value, maximum value and distribution of the sample measured by the skewness, kurtosis and the Jaque-Bera statistic. Table 6.1 reports the descriptive statistics of data employed in this study. All data series data used for the econometric investigation of distinctive bank credit channel range from 1986:1 to 2003:4. For the purpose of the study, data on real activity(real GDP or industrial production), prices (consumer price index), and bank balance sheet variables( total deposits, securities holding and total loans and advances) are transformed to the logarithm of their levels, while data on interest rates (treasury bill rate and average lending rate) are however in levels without being transformed.

Table 6.1 shows that all the series display a high level of consistency as their mean and median values are perpetually within the maximum and minimum values of these series. Moreover, the low standard deviation of nearly all the data series indicates the deviations of actual data from their mean value are very small.

The skewness and kurtosis statistics provide useful information about the symmetry of the probability distribution of various data series as well as the thickness of the tails of these distributions respectively. These two statistics are particularly of great importance since they are used in the computation of Jarque-Bera statistic, which is used in testing for the normality or asymptotic property of a particular series.

As a basic assumption usually made in econometric modeling, testing for the normality or asymptotic property of data series becomes necessary since most probability distribution and other test statistics, such as t, F and $\chi^2$ are based on this assumption.

From Table 6.1, all data (except lipi) are normally distributed at either the 1% or the 5% level. This implies that the data series used in this study are not haphazardly distributed. The normality assumption is further buttressed by the nearness of the mean and median values for these series. The closer the mean and median of a data series, the greater the probability that such series will be normally distributed.

**Table 6.1: Descriptive Statistics of Data**
**(Sample period - 1986:1-2003:4)**

| Variable(s) | Lbtd | Lcpi | Lipi | Lner | Lr | Lrgdp |
|---|---|---|---|---|---|---|
| Sum | 855.4331 | 503.8858 | 360.4925 | 413.6495 | 1478.9867 | 722.7623 |
| Mean | 11.8810 | 6.9984 | 5.0068 | 5.7451 | 20.5414 | 10.0384 |
| Median | 11.9987 | 7.4022 | 5.0397 | 5.5795 | 20.2667 | 10.0207 |
| Max. | 14.1878 | 8.7525 | 5.1723 | 8.7333 | 34.8667 | 10.5465 |
| Min. | 9.7340 | 4.7816 | 4.5594 | 4.2078 | 9.7000 | 9.5295 |
| S.D | 1.4530 | 1.3211 | 0.1301 | 1.0862 | 4.8174 | 0.2127 |
| Skewness | -0.0060 | -0.3064 | -1.6611 | 0.6462 | 0.1428 | 0.0842 |
| Kurtosis | 1.6698 | 1.5286 | 5.5928 | 2.9569 | 4.2025 | 3.3482 |
| JB | 5.3089* | 7.6217** | 53.2778≠ | 5.0159* | 4.5825* | 0.4508* |
| Prob. | 0.0703 | 0.0221 | 0.0000 | 0.0814 | 0.1011 | 0.7982 |
| Obs | 72 | 72 | 72 | 72 | 72 | 72 |

**Note:**

(a) Critical values of $\chi^2$ at 5% and 1%levels are 5.99 and 9.21 respectively. *(**) denotes acceptance of the null hypothesis that variables are normally distributed at the 5% (1%) significant level, while (≠) implies the rejection of normality assumption at both levels

(b) Except for the average lending rate of banks (Lr), the letter, L, at the beginning of each variable notation implies their logarithmic form.

**Table 6.1ctd: Descriptive Statistics of Data**
**(Sample period - 1986:1-2003:4)**

| Variable(s) | Lsh | Ltla | tbr | Lrtla | Lrsh | Lrbtd |
|---|---|---|---|---|---|---|
| Sum | 749.2825 | 842.3139 | 1087.6267 | 670.0000 | 576.9686 | 683.1191 |
| Mean | 10.4067 | 11.6991 | 15.1059 | 9.3056 | 8.0135 | 9.4878 |
| Median | 10.5669 | 11.6150 | 14.6717 | 9.2848 | 8.0558 | 9.4772 |
| Max. | 13.0711 | 14.0062 | 26.5000 | 9.8768 | 9.1203 | 10.2073 |
| Min. | 8.1583 | 9.5840 | 8.5000 | 8.7769 | 6.5249 | 8.9762 |
| S.D | 1.5221 | 1.3970 | 3.8714 | 0.2939 | 0.6539 | 0.3200 |
| Skewness | 0.2828 | 0.0726 | 0.7422 | 0.1767 | -0.0675 | 0.4428 |
| Kurtosis | 1.7284 | 1.5742 | 3.4303 | 2.1676 | 1.9114 | 2.3433 |
| JB | 5.8099* | 6.1619** | 7.1650** | 2.4531* | 3.6096* | 3.6473* |
| Prob. | 0.0547 | 0.0459 | 0.0029 | 0.2933 | 0.1645 | 0.1614 |
| Obs | 72 | 72 | 72 | 72 | 72 | 72 |

**Note:**

(a) Critical values of $\chi^2$ at 5% and 1%levels are 5.99 and 9.21 respectively. *(**) denotes acceptance of the null hypothesis that variables are normally distributed at the 5% (1%) significant level, while (≠) implies the rejection of normality assumption at both levels

(b) Except for the average lending rate of banks (Lr), the letter, L, at the beginning of each variable notation implies their logarithmic form.

With respect to the data on Lipi which rejects the normality assumption, this could be attributed to the seasonal pattern of industrial production in Nigeria and could be rectified by seasonally adjusting the variable or by introducing seasonal dummies in the specified model.

## 6.3 Unit Root Test, Lag Length Selection Criteria, and Cointegration Test

### 6.3.1 Unit Root Test

Macroeconomists have been aware that most macroeconomic time–series or variables are non-stationary in their levels and that several of these series are most adequately represented by first difference. These time-series are therefore said to be integrated of order one and are denoted by I(1). The level of such variables can become arbitrarily large or small so that there is no tendency for them to revert to their mean level. Test for stationarity of variables is therefore known as the unit root test.

Since, the issue of stationarity of time series affects the consistency of the estimates of the SVAR model, it becomes essential to examine the order of integration of data employed in this study. In testing for the stationarity of variables, both the Augmented Dickey Fuller as well as the Philip-Perron unit root tests were adopted. Except otherwise stated, 1 lag is adopted under the Augmented Dickey Full test, while 3 lags was specified for the Philip-Perron test. The null hypothesis formulated using both test statistics is that the variable in question has a unit root.

Figure 6.1 and 6.2 showed the behaviour of variables in their levels and first-difference respectively. It could be seen that these series could adequately be regarded as a random walk when they are in their levels but revert to their mean level after first difference. Table 6.2 also showed that the null hypothesis that a variable under investigation has a unit root, against the alternative that it does not, cannot be rejected for all the data series in their levels at either the 1% and 5% significance level. Having taken the first difference of all the series, the ADF and PP test was further employed in testing for the stationarity of these differenced series. By carrying out unit root tests for individual variables in their first difference, the comparison of respective critical values with their reported test statistics (as indicated in Table 6.2) leads to the rejection of the null hypothesis for all the variables at either the 1% or 5% level.

The implication of the Augmented Dickey Fuller and Philips-Perron tests, therefore, is that all the data series for this study are I(1) series. This means that these series becomes stationary upon differencing them once.

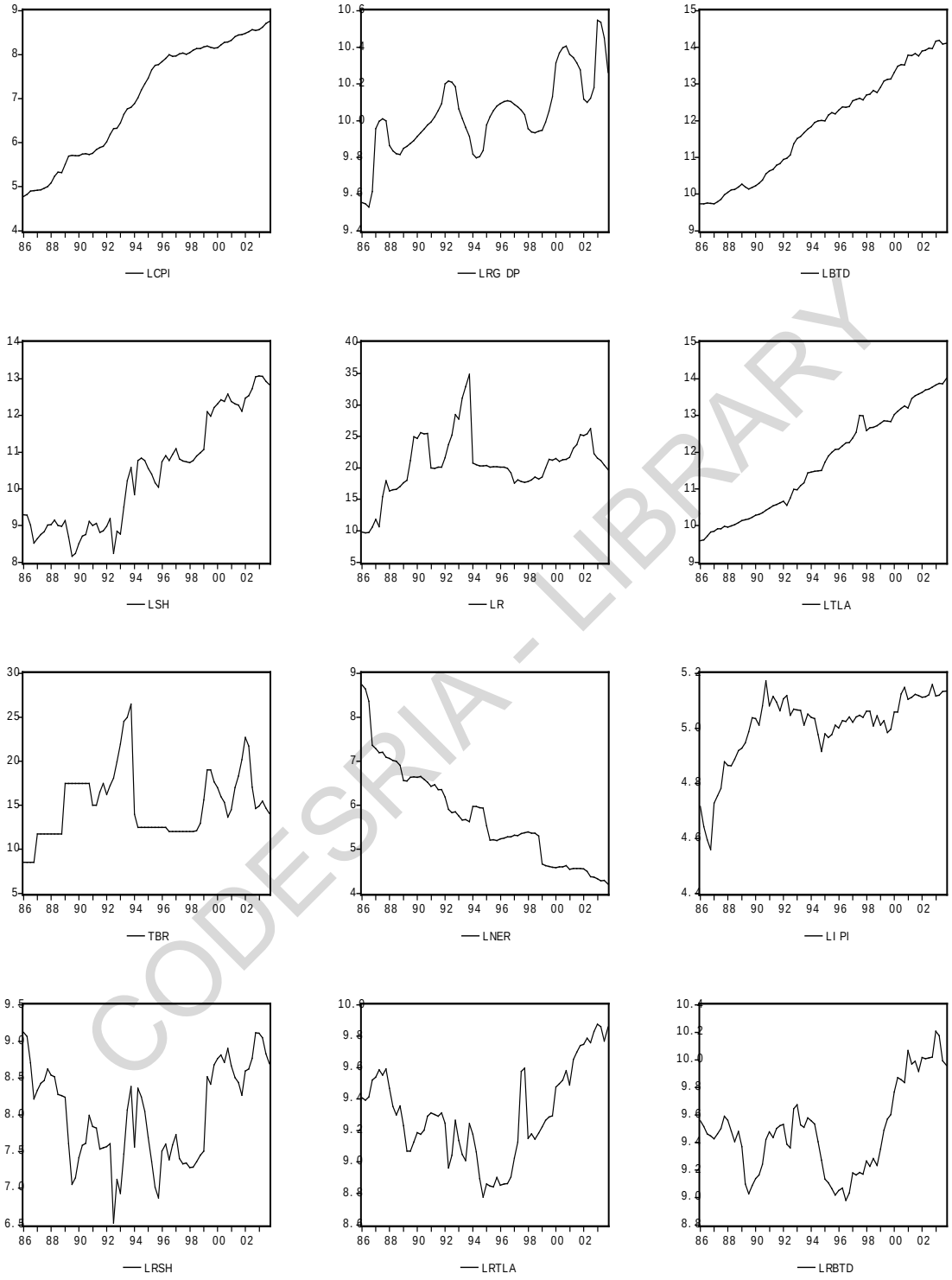
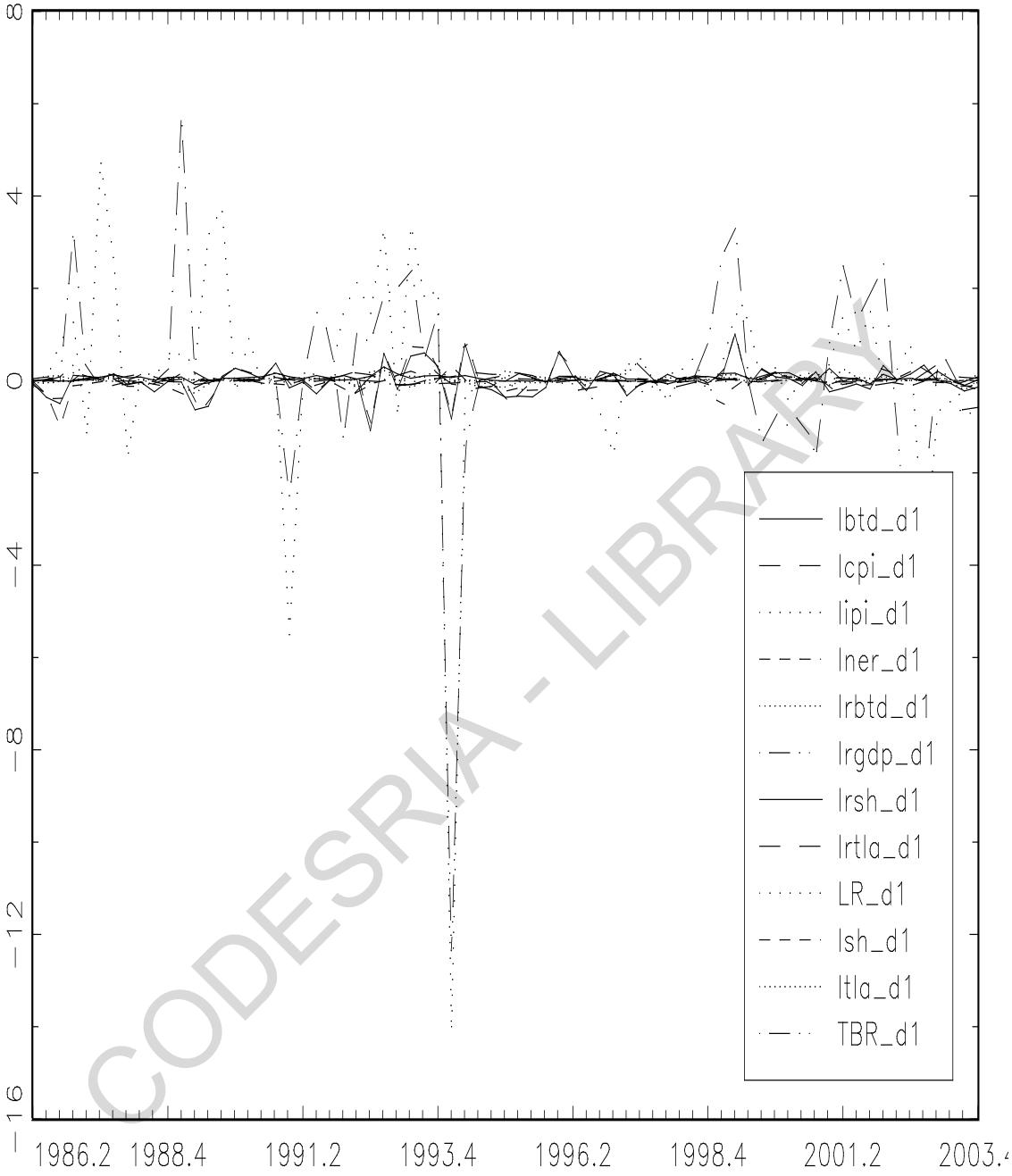





**Figure 6.1 Variables in Levels**






Source: Author's Computation

**Figure 6.2 Variables in First Difference**

**Table 6.2: Unit Root Test**

| Variable | ADF* (1 lags) | | PP* (3 lags) | | *d** |
|---|---|---|---|---|---|
| | With Constant ( No trend) | With Constant & trend | With Constant (No trend) | With Constant & trend | |
| Lbtd | -0.1663 | -2.3242 | -0.0033 | -2.4875 | I(1) |
| ΔLbtd | -6.3523 | -6.2333 | -8.4295 | -8.3580 | I(0) |
| Lcpi | -1.2533 | -1.0115 | -1.3220 | -0.6309 | I(1) |
| ΔLcpi | -5.1459 | -5.3062 | -4.5756 | -4.6894 | I(0) |
| Lipi | -2.8322 | -2.5726 | -2.1214 | -2.0919 | I(1) |
| ΔLipi | -7.1186 | -7.4872 | -9.4806 | -9.7352 | I(0) |
| Lner | -2.8220 | -3.0160[a] | -2.6029 | -4.4463 | I(1) |
| ΔLner | -5.3562 | -5.5315 | -6.6428 | -6.8750 | I(0) |
| LR | -2.8907 | -2.6420 | -2.7504 | -2.5186 | I(1) |
| ΔLR | -5.5948 | -5.7062 | -8.0374 | -8.1168 | I(0) |
| Lrbtd | -1.1710 | -1.8168 | -1.0092 | -1.6967 | I(1) |
| ΔLrbtd | -6.2099 | -6.3017 | -6.8360 | -6.8991 | I(0) |
| Lrgdp | -3.3717 | -2.4976[b] | -2.5842 | -3.22.97 | I(1) |
| ΔLrgdp | -4.5537 | -4.5449 | -5.3000 | -5.2992 | I(0) |
| Lrsh | -2.3370 | -2.7057 | -2.5209 | -2.7514 | I(1) |
| ΔLrsh | -5.7178 | -5.7770 | -8.8985 | -9.0150 | I(0) |
| Lrtla | -1.3455 | -1.7561 | -1.0821 | -1.4849 | I(1) |
| ΔLrtla | -7.2700 | -7.4917 | -7.5333 | -7.6461 | I(0) |
| Lsh | -0.1785 | -3.3126 | -0.2203 | -3.3352 | I(1) |
| ΔLsh | -5.9515 | -5.9582 | -9.1868 | -9.2300 | I(0) |
| Ltla | -0.0104 | -2.7660 | 0.1779 | -2.5777 | I(1) |
| ΔLtla | -7.5373 | -7.5127 | -8.1433 | -8.0909 | I(0) |
| TBR | -3.2281 | -3.1270 | -2.8829 | -2.7760 | I(1) |
| ΔTBR | -5.5569 | -5.5803 | -6.9409 | -6.9396 | I(0) |
| Mackinnon critical values: | | | | | |
| Level | | | | | |
| 1% | -3.5253 | -4.0928 | -3.5239 | -4.0909 | |
| 5% | -2.9029 | -3.4739 | -2.9023 | -3.4730 | |
| 1st Difference | | | | | |
| 1% | -3.5267 | -4.0948 | -3.5253 | -4.0928 | |
| 5% | -2.9035 | -3.4749 | -2.9029 | -3.4739 | |

Notes:

* ADF, PP and *d* denote Augmented Dickey Fuller, Philips-Perron test and decision about the order of integration, respectively.

[a, b] Indicates that the ADF is conducted at lag 3 and 4 respectively

Having realized that all the variables for this study are of unit root and therefore non-stationary, a cointegration test is further embarked on. However, to be able to ascertain whether there is cointegration among variables of interest, it becomes essential to initially determine the order or lag length of variables to be included in the VAR model.

### 6.3.2 Determination of the Order of Vector Auto regressions Model

For the purpose of testing for cointegration among variables as well as the estimation of the structural VAR model specified for this study, the determination of the appropriate and optimal lag length is important. If the lag length is too large, the SVAR is more likely to pick-up within sample random variation as well as any systematic relationship, because there is the need to estimate great number of parameters. If there are n variables with lag length k, it is necessary to estimate n(nk+1) coefficients. The lag length also influences the power of rejecting hypothesis. For instance if k is too large, degree of freedom may be wasted. Moreover, if the lag length is too small, important lag dependences may be omitted from the VAR and if serial correlation is present the estimated coefficients will be inconsistent.

In the light of the above observation, Table 6.3 showed the various alternative structural VAR models estimated in this study as well as the list of endogenous variables. The test statistics adopted in testing for appropriate lag length are the Akaike information criterion, Schwart Bayesian criterion, and Hannan-Quinn Criterion.

**Table 6.3: Scheme of estimated VAR models**

| Model | Endogenous Variables | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Lcpi | Lrgdp | Lipi | Lbtd | Lrbtd | Lsh | Lrsh | Ltla | Lrtla | tbr | Lner | Lr | LM1 | LM2 |
| 1 | ✓ | ✓ | × | ✓ | × | ✓ | × | ✓ | × | ✓ | ✓ | ✓ | × | × |
| 2 | ✓ | × | ✓ | ✓ | × | ✓ | × | ✓ | × | ✓ | ✓ | ✓ | × | × |
| 3 | ✓ | ✓ | × | × | ✓ | × | ✓ | × | ✓ | ✓ | ✓ | ✓ | × | × |
| 4 | ✓ | × | ✓ | × | ✓ | × | ✓ | × | ✓ | ✓ | ✓ | ✓ | × | × |

**Table 6.4: Test Statistics and Choice Criteria for Selecting the Order of VAR Models**

| k | Model 1 | | | Model 2 | | | Model 3 | | | Model 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | AIC | HQ | SBC | AIC | HQ | SBC | AIC | HQ | SBC | AIC | HQ | SBC |
| 1 | -25.33 | -24.42* | -23.03* | -26.61 | -25.69* | -24.31* | -25.33 | -24.42* | -23.03* | -26.61 | -25.69* | -24.31* |
| 2 | -25.59 | -23.86 | -21.22 | -26.70 | -24.96 | -22.33 | -25.59 | -23.86 | -21.22 | -26.70 | -24.96 | -22.33 |
| 3 | -25.23 | -22.66 | -18.76 | -26.61 | -24.04 | -20.14 | -25.23 | -22.66 | -18.76 | -26.61 | -24.04 | -20.14 |
| 4 | -25.73 | -22.31 | -17.11 | -27.59 | -24.17 | -18.99 | -25.73 | -22.31 | -17.11 | -27.59 | -24.17 | -18.99 |
| 5 | -28.23* | -23.96 | -17.44 | -29.49* | -25.22 | -18.69 | -28.23* | -23.96 | -17.44 | -29.49* | -25.22 | -18.69 |

(*) indicates the lag order selected by the criterion. AIC, SBC and HQ connotes Akaike Information Criterion, Schwarz Bayesian Criterion and Hannan-Quinn criterion respectively.

Table 6.4 shows the various test statistics used in the determination of the optimal lag length for the various unrestricted VAR model specified for this study. In model 1, the Akaike Information Criterion indicated an optimal lag of 5. The Schwartz and Hannan-Quinn criteria, on the other hand, jointly select an optimal lag of 1. With respect to model 2, the AIC also selects a lag of 5. Both the HQ and SBC also select a lag length of 1 respectively. Moreover, in model 3 and 4, the selected lags are also 5 for the AIC and 1 for both HQ and SBC. The choice of different optimal lag length by these information criteria could be ascribed to the fact that while the SBC and HQ impose heavy penalty for loss of degree of freedom, AIC, imposes less penalty.

In taking a decision about the lag structure of respective VAR model, one also acknowledges the fact that such lag should be able to produce a white noise residual as

well as conserves degree of freedom. Therefore, in making a choice between the lag of 5 or 1, a specification search was done using these lags. In this search, it was found that almost all the individual equation in the VAR models were not white noise when the lag of 5 is used, moreover, since the choice of this lag will amount to a loss of degree of freedom, an optimal lag of 1 which is common to the HQ and SBC information criteria is selected. This implies that the order of the various VAR model adopted in the study is 1. This lag length is also used in testing for cointegration among variables.

### 6.3.3 Cointegration Test

Given this multivariate time-series case, coupled with the fact that our data are of unit roots, this section investigates whether a linear combination of variables in the alternative models specified for this study are stationary. This exercise known as cointegration test is necessary in order to know the time series properties of the data employed in this study and their implication for the estimation of the structural VAR model. In testing for cointegration, the maximum likelihood approach by Johansen (1998) and Johansen and Juselius (1990) is adopted. If at least one cointegrating relationship exists among the variables, then the effect of monetary policy on the banks' balance sheet as well as the overall economy could be explored by estimating a Vector Error Correction Model (VECM).

Moreover, since most of the variables used in this study are highly trended, the Johansen test was performed under the assumption of linear deterministic trend in the data. Table 6.5 reports results obtained when the linear combination of variables as reflected in various VAR models were subjected to cointegration tests. It could be noted that the likelihood ratio statistics for model 1 and 3 as well as model 2 and 4 are the same.

This implies that model 1 and 3 have the same number of cointegrating relationships/or vectors, while model 2 and 4 also have the same number of cointegrating vectors.

Table 6.5 shows that the null hypothesis of no cointegrating vector (against the alternative of one or more) in model 1 is rejected at 1% and 5% level. The null hypotheses of at most 2 and at most 3 coitegrating vectors are also rejected for model 1 at 1% and 5% level but the null hypothesis for at most 4 cointegrating vectors is accepted at 5% level. This means that there are 4 cointegrating vectors in model 1 where real activity is proxied by real GDP and nominal values of bank balance sheet variables are used. With respect to model 2, the results of the cointegration test also indicates that the null hypothesis of at most 2 cointegrating vectors(against the alternative of more than 2 vectors) is rejected at 1% and 5% levels while the null hypothesis for 3 cointegrating vectors is accepted at both 1% and 5% levels. This shows that there are 3 cointegrating vectors in model 2. Since model 3 and 4 have the same likelihood statistics as model 1 and model 2 respectively, one therefore concludes that model 1 and 3 have 4 cointegrating vectors while model 2 and 4 have 3 cointegrating vectors each. One major problem of the Johansen cointegration procedure is that of properly identifying the cointegrating relations if r (the number of cointegrating vectors) is greater than 1. This means that this approach basically identifies the number of cointegrating relations present, but does not identify the actual cointegrating relationship(s)(Maddala and Kim, 1998). Under this situation, one needs to resort to economic theory to identify the true cointegrating relationships. This line of action, however is not pursued in this study.

**Table 6.5: Cointegration Rank Test**

| Model 1: [Lcpi Lrgdp Lbtd Lsh Ltla tbr Lner lr] | | | | |
|---|---|---|---|---|
| Eigenvalue | Likelihood Ratio | 5 Percent Critical Value | 1 Percent Critical Value | Hypothesized No. of CE(s) |
| 0.657240 | 229.8286 | 156.00 | 168.36 | None** |
| 0.466376 | 154.8779 | 124.24 | 133.57 | At Most 1** |
| 0.415879 | 110.9135 | 94.15 | 103.18 | At Most 2** |
| 0.336504 | 73.27824 | 68.52 | 76.07 | At Most 3* |
| 0.298795 | 44.56192 | 47.21 | 54.46 | At Most 4 |
| 0.159871 | 19.71508 | 29.68 | 35.65 | At Most 5 |
| Model 2: [Lcpi Lipi Lbtd Lsh Ltla tbr Lner lr] | | | | |
| Eigenvalue | Likelihood Ratio | 5 Percent Critical Value | 1 Percent Critical Value | Hypothesized No. of CE(s) |
| 0.599663 | 224.1833 | 156.00 | 168.36 | None** |
| 0.509875 | 160.1018 | 124.24 | 133.57 | At Most 1** |
| 0.451583 | 110.1851 | 94.15 | 103.18 | At Most 2** |
| 0.339834 | 68.13479 | 68.52 | 76.07 | At Most 3 |
| 0.211366 | 39.06627 | 47.21 | 54.46 | At Most 4 |
| 0.191330 | 22.44457 | 29.68 | 35.65 | At Most 5 |
| Model 3: [Lcpi Lrgdp Lrbtd Lrsh Lrtla tbr Lner lr] | | | | |
| Eigenvalue | Likelihood Ratio | 5 Percent Critical Value | 1 Percent Critical Value | Hypothesized No. of CE(s) |
| 0.657240 | 229.8286 | 156.00 | 168.36 | None** |
| 0.466376 | 154.8779 | 124.24 | 133.57 | At Most 1** |
| 0.415879 | 110.9135 | 94.15 | 103.18 | At Most 2** |
| 0.336504 | 73.27824 | 68.52 | 76.07 | At Most 3* |
| 0.298795 | 44.56192 | 47.21 | 54.46 | At Most 4 |
| 0.159871 | 19.71508 | 29.68 | 35.65 | At Most 5 |
| Model 4: [Lcpi Lipi Lrbtd Lrsh Lrtla tbr Lner lr] | | | | |
| Eigenvalue | Likelihood Ratio | 5 Percent Critical Value | 1 Percent Critical Value | Hypothesized No. of CE(s) |
| 0.599663 | 224.1833 | 156.00 | 168.36 | None** |
| 0.509875 | 160.1018 | 124.24 | 133.57 | At Most 1** |
| 0.451583 | 110.1851 | 94.15 | 103.18 | At Most 2** |
| 0.339834 | 68.13479 | 68.52 | 76.07 | At Most 3 |
| 0.211366 | 39.06627 | 47.21 | 54.46 | At Most 4 |
| 0.191330 | 22.44457 | 29.68 | 35.65 | At Most 5 |

Notes: *(**) denotes rejection of the hypothesis at 5%(1%) significance level. CEs connotes the no of cointegrating equations. The test was conducted under the assumption of linear deterministic trend in the data. Sample: 1986:1-2003:4.

In the light of the discovery that all the variables selected for this study are non-stationary and cointegrated, the empirical strategy in the literature has adopted two main procedures: First the impulse responses and forecast error variance decomposition, upon which the dynamic analysis of the effects of monetary policy are based could be estimated from the vector error correction model with proper cointegration rank[45]. In small sample, Breitung (2000, p.75) claimed that this approach is particularly advantageous. The other empirical strategy, is to estimate impulse response functions and forecast error variance decompositions from unrestricted VAR. In this dimension, Breitung( 2000, p.75) noted that the impulse responses and forecast error variance decomposition from which dynamic analysis are based can be efficiently estimated from the unrestricted VAR as well as from a vector error correction model(VECM). Irrespective of the order of integration and cointegration properties, the VAR in levels can be estimated consistently with ordinary least squares (see Breitung, 2000) and appropriate confidence intervals for the impulse responses can be obtained by using a suitable Bootstrap procedure (Benkwitz, et. al. 2001). Under the bootstrapping technique, the SVAR model specified for this study is initially estimated and the estimated coefficients and fitted residuals are saved. Then the residuals are reshuffled with replacement, and the artificial data set is created using the estimated VAR as the true data generating process. In this study, a series of 1000 such simulations is undertaken. With each of the 1000 data sets, the model is re-estimated and the impulse response functions are calculated.



[45] See Gunduz, L(2000): "Monetary Transmission and Bank Lending in Turkey," Paper presented at the International Conference on "Banking, Financial Markets and the Economies of the Middle East and North Africa," LUA, Byblos/Lebanon, May, 23-35.

In this study, the latter approach is adopted. The choice of the latter technique is informed by three main reasons. First, the study, like existing ones focused on the imposition of short-run restriction on the contemporary matrices of coefficient in the structural VAR model rather than long-run restrictions. Second, in studies on monetary transmission mechanism, the usual exercise is to impose short-run restriction on the contemporary matrices, only few studies have adopted long-run restrictions in identification of models. Last, this study, following Brisheto and Voss(1999) prefers estimation of specified model(s) in level rather than adoption of VECM representation which could possibly lead to imposition of incorrect restrictions on the data, resulting to misspecification of model.

## 6.4 Reduced-Form VAR Diagnostics Tests and Innovation Analysis

### 6.4.1 Reduced-for VAR Diagnostic Tests

In order to empirically test for the existence or otherwise of the bank credit channel under the period of financial deregulation in Nigeria, the various alternative structural VAR models specified for this study were estimated. Since the estimates of alternative structural models have to be recovered from their reduced-form VARs, these VARs were initially estimated. Given that the study relies on quarterly data for the realization of its objective, three seasonal dummies were introduced into the reduced-form VAR estimations to capture the seasonal variation in the level of economic activity and prices.

Table 6.6 and 6.7 report the diagnostic statistics of the reduced-form VARs on which the recovery of structural coefficients are based in this study. In Table 6.6 where the log of real GDP (Lrgdp) is used as a measure for real activity, all the residuals of individual equations in the reduced-form VAR model (except for real GDP which

indicate 1st and 4th order autocorrelation and consumer prices index which displays 1st order autocorrelation at the 5 percent level) are free from the problem of serial correlation. This is indicated by the marginal significance levels (or the p-values) of Breusch-Godfrey LM test which follows $\chi^2$ distribution. Apart from the Breusch-Godfrey LM test reported in Table 6.6, there is also the ARCH(1) and ARCH(4) Lagrange multiplier test which is also distributed as the $\chi^2$ distribution. These test indicate that almost all the equations in the reduced–form VAR model with real GDP as real activity (with the exception of real GDP) are without ARCH(1) and ARCH(4) effects.

**Table 6.6: Diagnostic statistics for reduced form VAR (Lrgdp as real activity)**

| | p | lcpi | lrgdp | lbtd | lsh | lr | ltla | tbr | lner |
|---|---|---|---|---|---|---|---|---|---|
| **Serial Correlation Of Residuals** | | | | | | | | | |
| LM $\chi^2$ (1) | 1 | 7.3989 (0.0070)* | 17.5068 (0.0000)* | 0.6009 (0.4380 | 0.0756 (0.7830) | 0.2367 (0.6270) | 0.2366 (0.6270) | 2.5132 (0.1130) | 0.0005 (0.9940) |
| LM $\chi^2$ (4D) | 1 | 9.1209 (0.0580) | 23.8422 (0.0000)** | 4.6184 (0.4510) | 0.8346 (0.9340) | 2.2449 (0.6910) | 5.6401 (0.9040) | 5.0163 (0.2860) | 5.8533 (0.2100) |
| **Arch of Residuals** | | | | | | | | | |
| ARCH(1) $\chi^2$ (1) | 1 | 3.4458 (0.0634) | 0.0970 (0.7554) | 1.5292 (0.2162) | 0.1307 (0.7177) | 2.8989 (0.0903) | 0.0851 (0.7705) | 2.8406 (0.0929) | 0.0007 (0.9788) |
| ARCH(4) $\chi^2$ (4) | 1 | 5.7845 (0.2158) | 16.8800 (0.0020)▪ | 3.6849 (0.4503) | 3.9010 (0.4196) | 2.9453 (0.5670) | 1.4035 (0.2742) | 0.24520 (0.1163) | 0.5231 (0.9707) |
| **System Diagnostics** | | Test statistic | Bootstrap p-value | Deg. of freedom | | | | | |
| Chow Break Point (1991: 2) | | 466.8680 | 0.0700 | 132 | | | | | |
| Chow Sample Split Test (1991:2) | | 188.9254 | 0.1400 | 96 | | | | | |

Notes: sample is 1986:1-2003:4. Marginal significance levels (or p-values) are in parenthesis. The serial correlation LM test is that described in Breusch (1978) andGodfrey (1978)[46], while the ARCH (1) and ARCH (4) statistics are the ARCH LM test. *(**) indicates the rejection of the null hypothesis for the non-existence of first and second order autocorrelation respectively. ▪ indicates ARCH (4) effect at the 5% significant level.

[46] Breusch, T. (1978) "Testing the autocorrelation in dynamic linear model", Australian Economic Papers, 17, 334-355. Godfrey, L.(1978): "Testing against general autoregressive and moving average error models when the regressors include lagged dependent variables", Econometrica, 46, 1293-1302.

With respect to Table 6.7 where the log of industrial production is used as a measure of real activity, the Breusch-Godfrey LM test also indicate that all the residuals of the individual equation in this VAR (except the equation for Lcpi which displays 1st and 4th order autocorrelation) are free from the problem of autocorrelation. The results in Table 6.7 also shows that all the residuals of the individual equation in the VAR [except for Lcpi which indicates ARCH (1)] are free ARCH (1) and ARCH (4) effects. These results show that the reduced-form VARs upon which the estimates of the Structural VARs are based are good to some extent and can be relied upon in recovering the parameters in the structural models.

**Table 6.7 Diagnostic statistics for reduced-form VAR (Lipi as real activity)**

| | p | lcpi | lipi | lbtd | lsh | lr | ltla | tbr | lner |
|---|---|---|---|---|---|---|---|---|---|
| **Serial Correlation Of Residuals** | | | | | | | | | |
| LM $\chi^2$ (1) | 1 | 8.6220 (0.0030)* | 3.2453 (0.0720) | 0.5097 (0.4750) | 0.0282 (0.8670) | 0.0343 (0.8530) | 0.3045 (0.5810) | 2.4532 (0.1170) | 0.0038 (0.9510) |
| LM $\chi^2$ (4) | 1 | 10.1125 (0.0390)** | 2.9516 (0.1010) | 4.3924 (0.3190) | 0.8291 (0.9350) | 2.4308 (0.6570) | 1.5530 (0.3211) | 4.8078 (0.3080) | 5.6082 (0.9510) |
| **Arch of Residuals** | | | | | | | | | |
| ARCH(1) $\chi^2$ (1) | 1 | 4.0942 (0.0430)▪ | 3.1479 (0.5356) | 1.2707 (0.2596) | 0.1012 (0.7504) | 3.1059 (0.0780) | 0.0201 (0.8873) | 0.6027 (0.9034) | 0.0001 (0.9924) |
| ARCH(4) $\chi^2$ (4) | 1 | 6.3219 (0.1764) | 5.7317 (0.2195) | 3.5317 (0.4731) | 1.0063 (0.2922) | 3.2545 (0.5162) | 11.4267 (0.2220) | 9.4247 (0.0513) | 0.5523 (0.9682) |
| **System Diagnostics** | | Test statistic | Bootstrap p-value | Deg. of freedom | | | | | |
| Chow Break Point (1991: 2) | | 543.3812 | 0.0600 | 132 | | | | | |
| Chow Sample Split Test (1991:2) | | 188.9254 | 0.2600 | 96 | | | | | |

Notes: sample is 1986:1-2003:4. Marginal significance levels (or p-values) are in parenthesis. The serial correlation LM test is that described in Breusch (1978) andGodfrey (1978), while the ARCH (1) and ARCH (4) statistics are the ARCH LM test. *(**) indicates the rejection of the null hypothesis for the non-existence of first and second order autocorrelation respectively. ▪indicates ARCH (4) effect at the 5 percent level.

As a result of the increasing emphasis on the issue of the stability of reduced–form VARs which serve as a basis for drawing meaningful inference in SVAR models recently, this study also carried out stability tests. In carrying out this exercise, the recursive residual approach, CUSUM of squares test approach, Chow break up point statistic as well as Chow sample split test were used. Figure 6.3-6.6 shows the results obtained in the course of using these stability-testing procedures.

Figure 6.3 shows the recursive residuals, $u_i$, (i =1, 2, 3…8), for each equation in the reduced-form VAR estimation, where the real GDP is used as a measure of real activity. The results indicate that these residuals have zero mean and constant variance since they display saw-tooth pattern. Figure 6.4 displays the results of the CUSUM of square test for the individual equation in the reduced-form VAR. The CUSUM, as it denotes, is the cumulative sum of the recursive residual up till certain period. This result also shows that not all the residuals are stable. This is indicated by some of the CUSUMS which wander beyond the 95% confidence interval. This implies that the unrestricted VAR, where real GDP is used as a measure of economic activity is unstable.

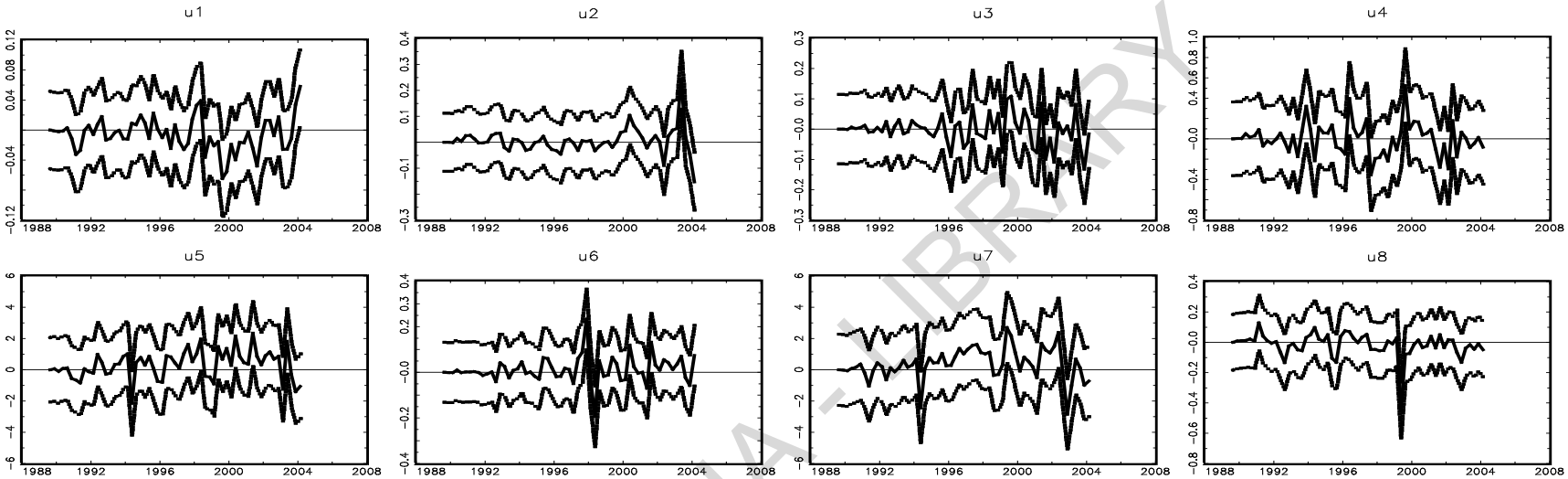





**Figure 6.3: Recursive Residual Test (Lrgdp as real activity**

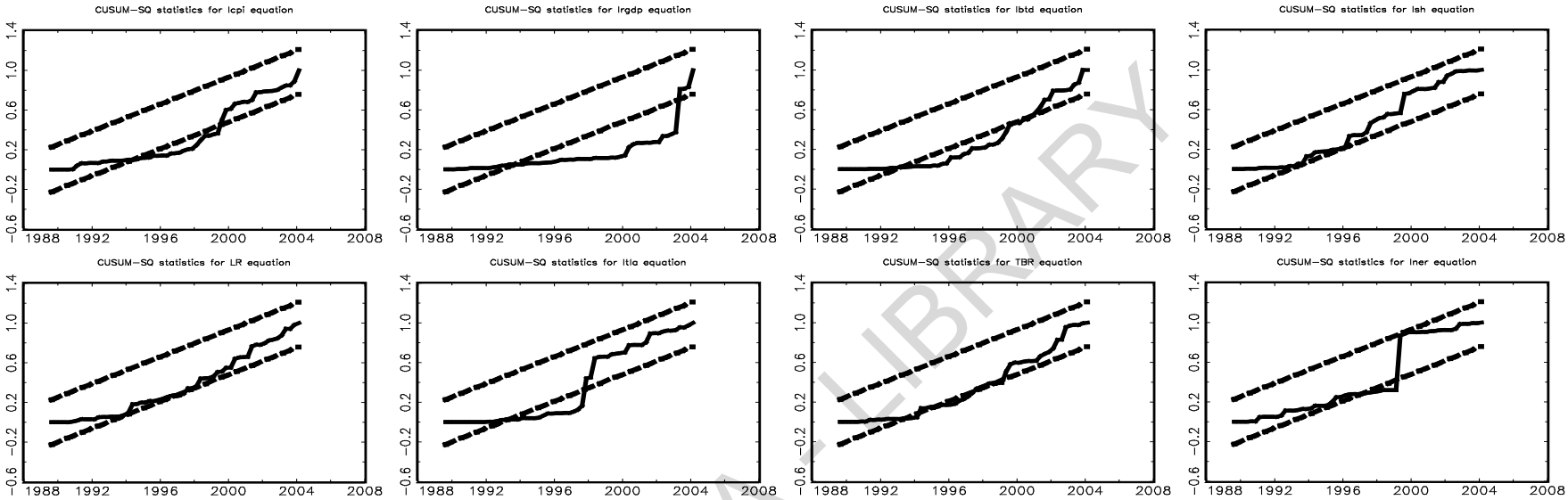





**Figure 6.4: CUSUM of Squares Tests (Lrgdp as real activity)**

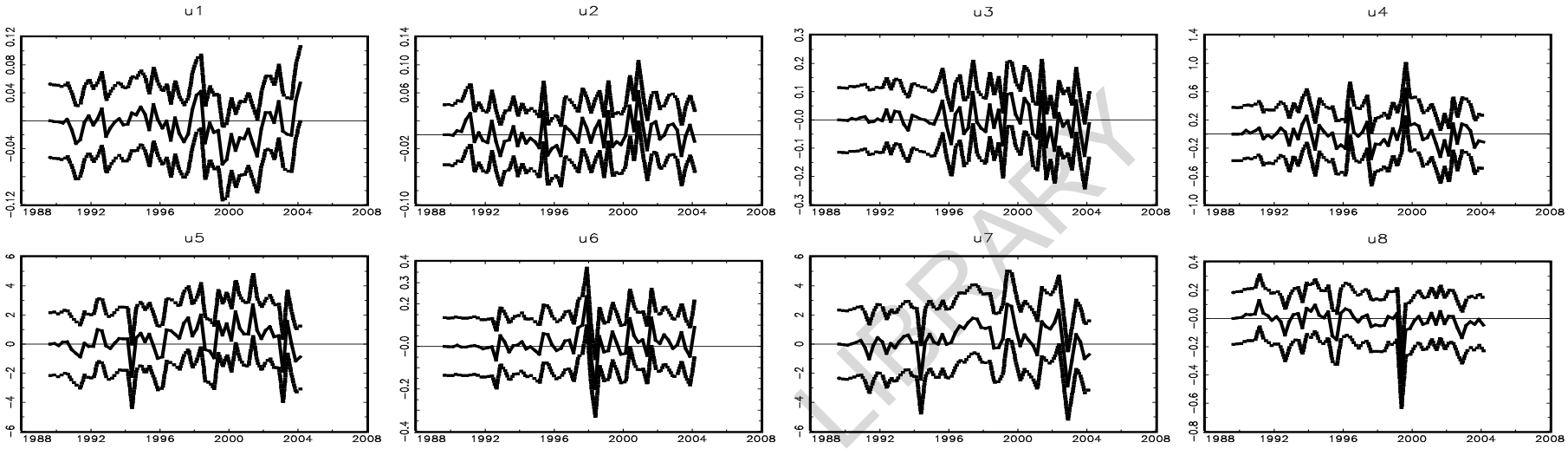





**Figure 6. 5: Recursive Residual Test (Lipi as real activity)**

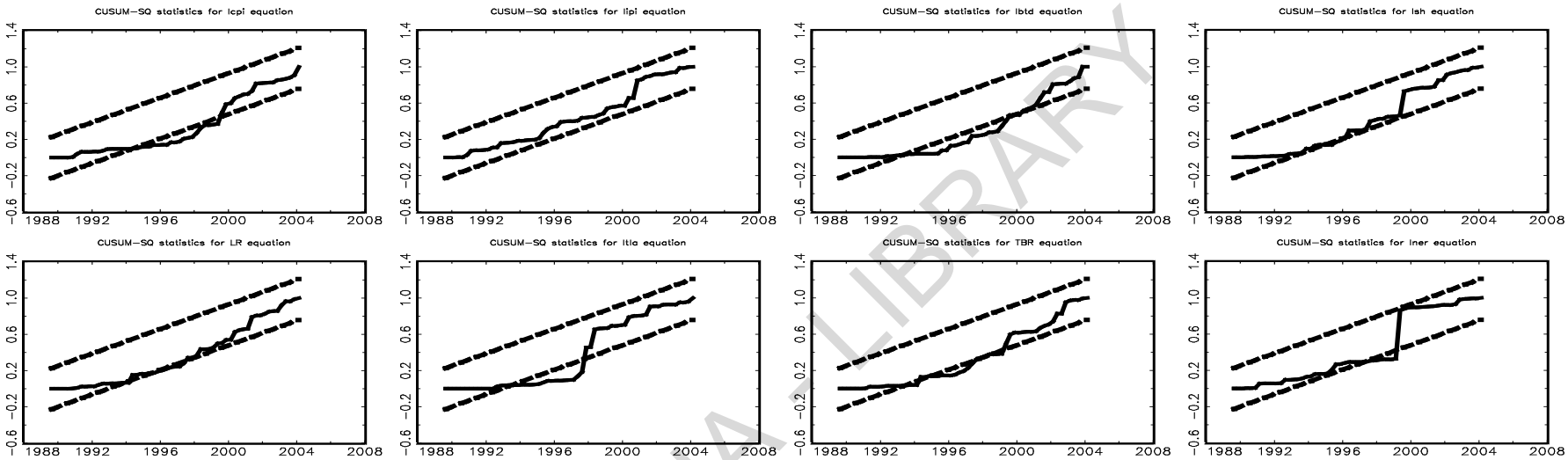





**Figure 6. 6: CUSUM of squares Test (Lipi as real activity)**

Figure 6.5 and 6.6 also point out that the reduced–form VAR model with log industrial production (lipi) as a measure of real activity is also unstable. This is indicated by the CUSUMs of squares test, which reveals that some of the CUSUMs wander away from their confidence interval at 95% levels.

The instability of the reduced form VAR is further buttressed by the Chow–break up and Chow–sample split tests. In computation of the Chow tests, an initial search for a break up point was done. The outcome of this search procedure revealed that the second quarter of 1991 is a break–up date. Upon investigation, it was found that this period correspond with the interest rate policy reversal which took place during Abacha regime in Nigeria. Both Chow–tests, also fail to reject the null hypothesis that the VAR systems are unstable.

Though the various diagnostic statistics have revealed that the reduced form VAR from which the estimates of structural parameters are to be recovered is unstable, this result is not too worrying since earlier studies based on VAR studies have detected this problem. Having examined the various diagnostics tests for the reduced-form VAR models specified in this study, the next section focuses on the innovation analysis.

### 6.4.2 Monetary Policy and Bank Credit In Nigeria –Impulse Response Analysis

#### (A) Recursive Identification

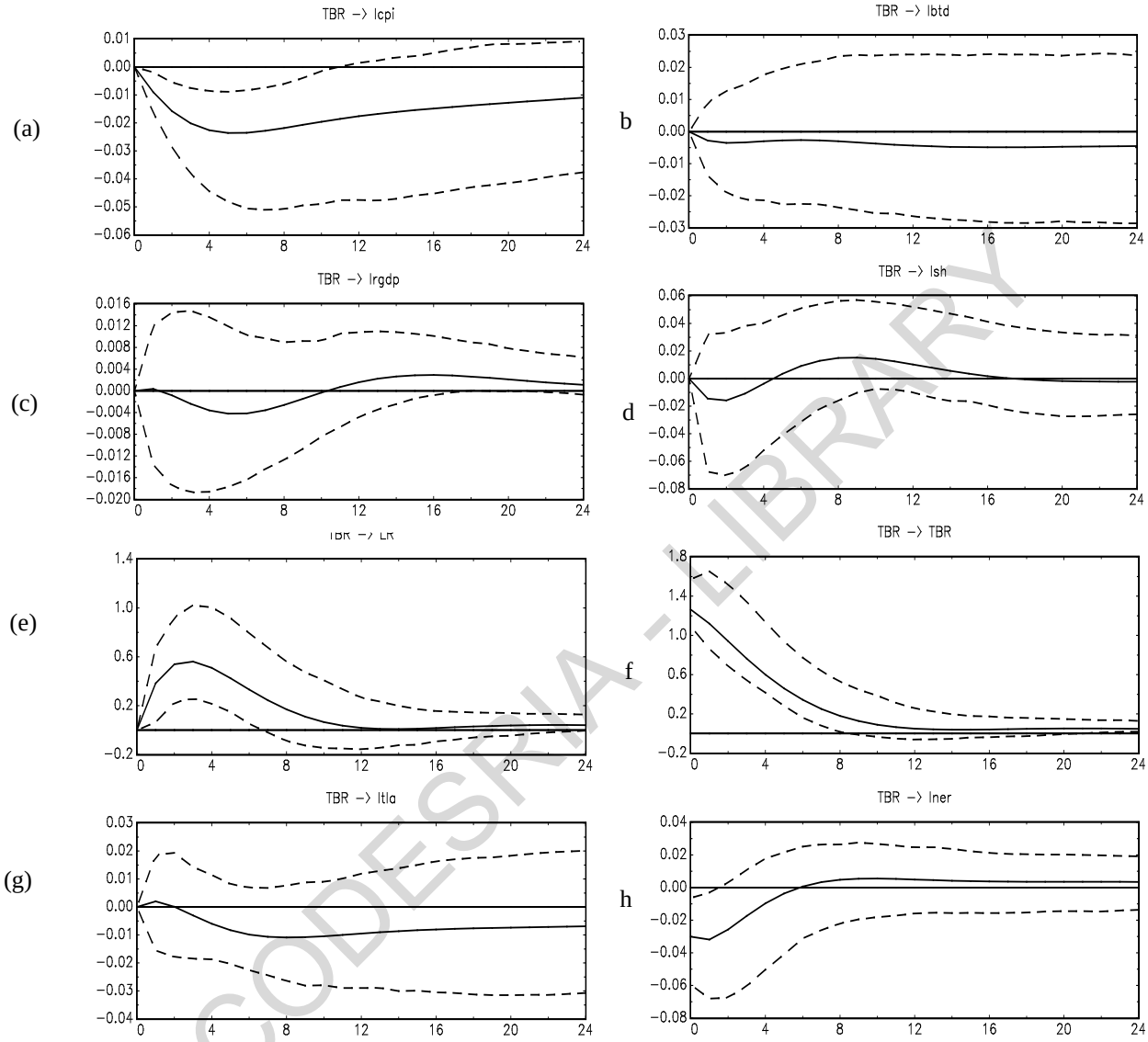
In the investigation of the role of bank credit in monetary transmission mechanism in Nigeria, this study takes caution by ensuring that the necessary conditions for the existence of this channel are fulfilled before drawing conclusion. In testing for bank credit channel, one has to examine how banks adjust their assets and liabilities to monetary policy shock. Bank assets in this study are captured by bank securities holding

(lbsh) and total loans and advances (ltla). The only bank liability included in the study is banks' total deposits (lbtd).

Figure 6.7 and 6.8 shows the impulse responses generated from two alternative recursive structural VAR models estimated in this study. These IRFs measures the dynamic responses of variables [Lrgdp or Lipi, Lcpi, Lbtla, Lbtd, Lsh, Lner, and Lr] to an unanticipated monetary policy shock measured as innovation in the treasury bill rate. In Figure 6.7(f) and 6.8(f), one standard deviation in the treasury bill rate is calculated as approximately 1.3 percent. For each of the variables, the horizontal axis of the IRF shows the number of quarters that have passed after the impulse has been given, while the vertical axis measures the response of relevant variable. Moreover, variables measured in logs are multiplied by 100, so that the impulse response approximates the percentage change of those variables in response to shock in the treasury bill rate.

Starting with the impact of monetary policy on banks' assets and liability, Figure 6.7 (where real GDP is used as a measures real activity) shows that monetary policy shock measured as unanticipated hike in treasury bill rate leads to a decline in bank deposit{Figure 6.7(b)} as well as securities holding of banks{Figure 6.7(d)}. The point estimate in Figure 6.7(b) also indicates that the maximum impact of the shock in Treasury bill rate on bank deposits occurs after 16 quarters when this variable decline by approximately 0.5%. This response conforms to theoretical expectation, since bank deposits are money and a hike in interest rate should lead to a decline in supply of money. Though bank deposits actually decline following monetary policy shock, it could be observed in Figure 6.7(b) that its extent of decline is rather negligible. The low negative response of bank deposits to monetary policy shock may be attributed to the adoption of

liability management which relies mainly on the issue of large negotiable certificate of deposits (NCDs) during the period under investigation. Figure 6.7(d) also shows that




Note: Solid lines indicate SVAR impulse responses while broken lines indicates 95% Hall's Percentile confidence intervals calculated with 1000 Bootstrap procedure.

Author's Calculation

**Figure 6.7: Structural VAR: Impulse Response Functions (Recursive Identification) – Lrgdp as a measure of Economic Activity**

bank securities holding declines by 1.6 percent in two quarters after the hike in treasury bill rate. Moreover, after 4 quarters, the hike in treasury bill rate eventually produced a permanent positive shock in bank securities holdings and this result does not perfectly fit the bank credit hypothesis. This implies that as tight monetary policy is instituted by the Central Bank of Nigeria, banks are not seriously affected and given this scenario, only few of their securities holdings are disposed within the first two quarters after which they beefed up their securities holdings later in attempts to satisfy the demand for credit.

The simulation in Figure 6.7(g) also indicates that with an unanticipated 1.3% hike in Treasury bill rate, there is an initial positive response in bank credit (measured as total loans and advances of banks) by 0.2% and 0.01% after the first and second quarters respectively. However, after 2 quarters, following the shock to the treasury bill rate, bank credit started to decline. In the $8^{th}$ quarter following the shock in treasury bill rate, there is a maximum impact of monetary policy on bank credit and this causes this variable to decline by 1.09%. Figure 6.7(g) also shows that after the $10^{th}$ quarter, there is a permanent negative effect of an unanticipated monetary policy on bank credit.

With respect to the impact of monetary policy on real activity and prices, Figure 6.7(b) shows that following unanticipated hike in treasury bill rate, real GDP (lrgdp) falls but with a delay of 2-quarters. The maximum impact of an unanticipated 1.3% hike in treasury bill rate is 0.4% decline in real GDP, which occurred after 6 quarters, this is followed by its gradual increase and eventual leveling out after 22 quarters of the simulation period. The response of real GDP indicates that monetary policy transmits to the real sector of the economy after a lag. Moreover, the delay in the response of output to unanticipated shock in treasury bill rate becomes plausible if the study, like Bauyoumi

and Morsink (2001), assumed that output is less responsive relative to prices following monetary policy shock. Though the above result conforms to a theoretical expectation, one could observe that the response of output to monetary policy shock is so small. This result is not surprising since the period under investigation has been characterized by financial deregulation, under which studies have shown that monetary policy tends to have less impact on the economy (see Estrella, 2001 and Gordon, 2002).

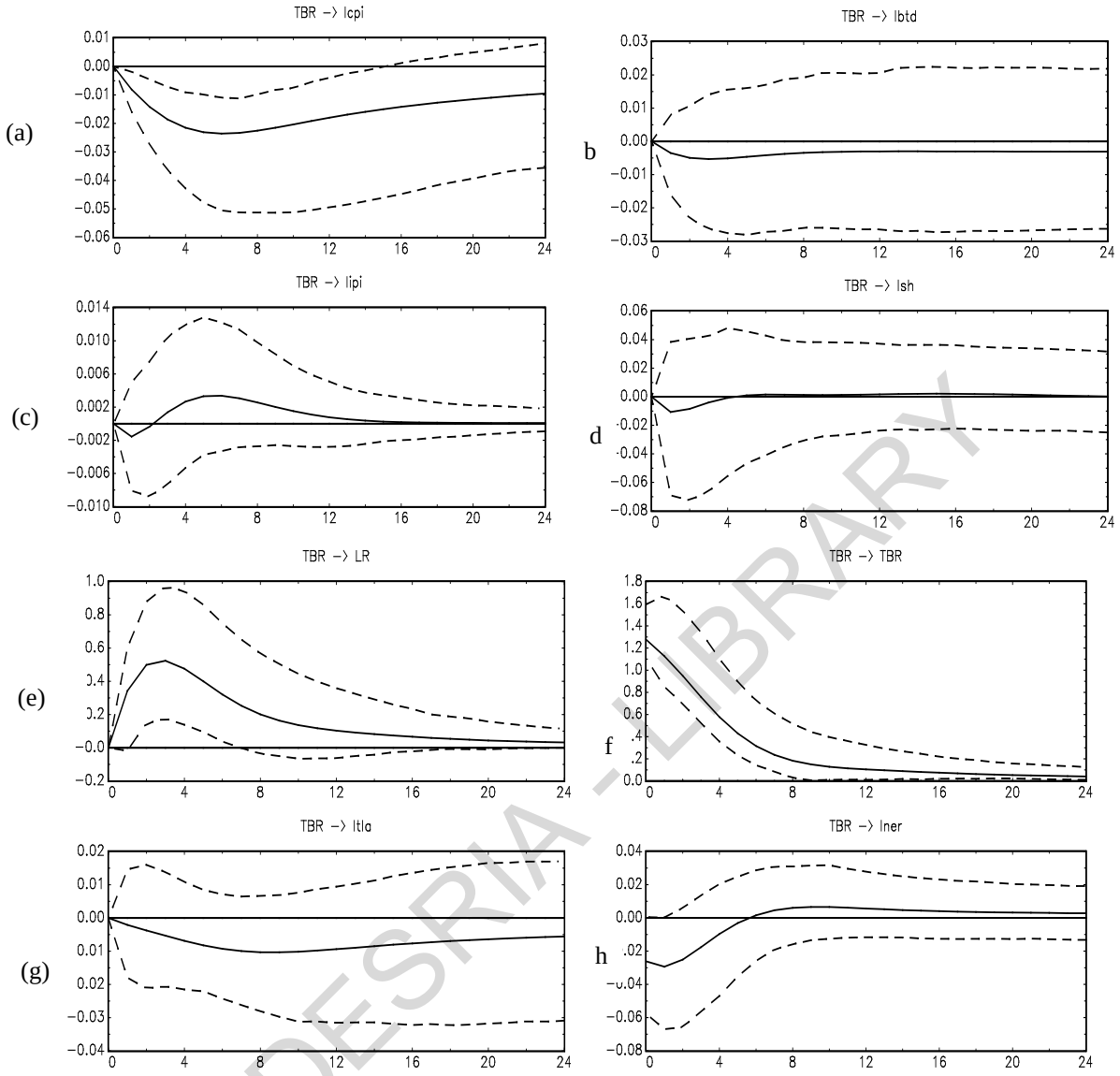
The impact of monetary policy on prices can also be studied by analyzing the response of consumer price index to the hike in treasury bill rate. From Figure 6.7(a), the point estimate reveals that the unanticipated hike in treasury bill rate has negative impact on prices (lcpi). Following the unexpected rise in treasury bill rate, prices decline by approximately 2.4% after 5 quarters, which is in line with theoretical expectation. This result indicates that monetary policy has more impact on prices than real activity during the period under investigation. This result corroborates the Fisher' Quantity theory of money which stipulates that an increase (or a fall) in money supply leads to an increase (or a fall) in the general price level. The greater impact of monetary policy on prices could be attributed to the fact that previous years monetary policy experience in Nigeria were driven by the need to accommodate government's budget deficit and a desire to reduce its inflationary impact on the economy[47].

One of the basic objectives of monetary policy is to ensure exchange rate stability and balance of payment equilibrium. The extent, to which this objective is realized, however, depends on the impact of monetary policy on exchange rate. Figure 6.7(h) reveals that the hike in treasury bill immediately leads to 0.3% depreciation in nominal

[47] See 2000 Country Reports on Economic Policy and Trade Practices on Nigerian, Released by the Bureau of Economic and Business Affairs, U.S Department of State, March 2001. www.state.gov/documents/ organization/1601.

exchange rate. Moreover, within 1-5 quarters after the unanticipated rise in treasury bill rate, the depreciation of the nominal effective exchange rate persist, then an appreciation occurs after the 6th quarter to the end of the simulation period. The depreciation of the nominal exchange following the unanticipated shock contradicts the theoretical expectation of the response of exchange rate to monetary policy and is popularly known as the *exchange rate puzzle*. Within the Nigerian context, the existence of this puzzle could be ascribed to the round-tripping of foreign exchange by Nigerian banks. Round tripping as a term refers to a financial malpractice in which banks obtain supply of foreign exchange from CBN at the official exchange rate and resell the same in the parallel market at higher rate.

To provide further empirical evidence on the existence or otherwise of the bank credit channel of monetary policy, the SVAR system was re-estimated using the index of industrial production as a measure of economic activity. This becomes important in the light of the need to further assess the impact of monetary policy on the assets and liability of banks as well as real activity and prices in Nigeria. The impulse response functions estimated from this system is indicated in Figure 6.8. In Figure 6.8(b) and 6.8(d) the shock in treasury bill rate causes bank deposits as well as securities holding to fall. Following, monetary tightening, bank deposits decline a little after the first two quarters, then it bottoms out. Bank securities also displayed the same trend following innovation to the treasury bill rate, falling a little within the first quarter, rising after and a positive permanent shock is eventually observed. Though bank deposits and securities declines following the innovation in treasury bill rate, it could be observed that their rate of decline in these variables are marginal.






Note: Solid lines indicate SVAR impulse responses while broken lines indicates 95% Hall's Percentile confidence intervals calculated with 1000 Bootstrap procedure.

Author's Calculation

**Figure 6.8: Structural VAR: Impulse Response Functions (Recursive Identification) -Lipi as a measure of Economic Activity**

With respect to bank loans (credit variable), Figure 6.8(g) indicates that the shock in treasury bill rate also caused bank credit (measured as bank loans and advances to the

private sector) to decline by 1.03% after 9th quarter and its decline remained permanently at 0.6% for the rest of the simulation period. The implication of this is that bank credit does not respond significantly to monetary policy shock measured by the innovation to treasury bill rate. Figure 6.8(e) also shows that the average lending rate of banks initially increased following the hike in the treasury bill rate. The rise in the average lending rate of banks also corresponds in timing with the fall in bank credit.

At this juncture, a question arises as to how the findings above fit a scenario where the bank credit channel of monetary transmission mechanism is at work. As shown in a number of studies, the existence of bank credit channel can be identified by examining how banks adjusts their portfolio consisting of loans, securities, and deposits during monetary contraction. Following Bernanke and Blinder (1992), and Romer and Romer(1990), the bank credit channel is operative if (i) bank deposits as well as securities fall immediately in response to monetary shock; (ii) total loans declines but only after a significant lag of two to three quarters; (iii) banks are able to maintain lending in the face of decline in deposit by selling securities; and (iv) the eventual decline in bank lending corresponds in timing with a decline in economic activity.

In addition to the above conditions for the identification of the bank credit channel, other economists (Friedman and Kuttner, 1993; Suzuki,2001 and Höltermöller, 2002) have also maintained the mere decline of bank loans and advances due to monetary policy shock is not a necessary nor sufficient condition for the existence of bank credit channel. The implication of this is that the decline in credit following monetary contraction could be ascribed either to a leftward shift in demand for loan or supply of loan. If monetary tightening causes a leftward shift in loan demand, this is interpreted as

the interest rate channel or the money view of monetary transmission mechanism. On the other, a decline in quantity of credit due to a leftward shift in supply of loan is called the bank credit channel. Given this observation, the above authors have suggested inclusion of price of credit in the VAR system. Following their arguments, if the price of credit rises and the quantity of credit declined under tight monetary policy, then the bank credit channel exist. However, if both the quantity of credit and price decline, then this result is consistent with the money view.

In the light of the findings above, it could be observed that though a negative permanent shock is observed in bank deposit after monetary policy shock (measured as hike in treasury bill rate) the actual rate of decline in this variable is very negligible. Moreover, with respect to bank securities holdings, one expects a very sharp decline immediately after monetary shock. The situation however, as evidenced in this study is that the maximum effect of monetary policy leads to approximately 1.6% decline in this bank asset after two quarters. Comparing this result with that obtained in Turkey, Gunduz(2000) found that the decrease in securities was initially quite strong after monetary policy shock running to almost 1.7% in the second month. Bernanke and Blinder(1992) also found that following the hike in federal fund rate the United States, the fall in bank assets is concentrated almost entirely on securities.

An important condition for the existence of bank credit channel is that with immediate fall in bank securities holding following monetary policy shock, bank credit should initially rise; then, the fall in securities holding subsequently cause a decline in bank credit after two to there quarters. The evidence above indicated that though bank credit actually rises {as indicated in Figure 6.7(g) and 6.8(g)} following the unanticipated

rise in treasury bill rate, this increase is very negligible within the first two quarters. The results also showed that though the fall in bank credit corresponds in timing with the fall in real GDP, the percentage decline in the latter is very negligible. On the last note, though the average lending rate of banks (a proxy for the price of credit) actually rises as bank credit declines, one cannot in totality agree that the bank credit channel is important since this result depends on the ordering of variables in the VAR.

The evidences, drawn from the recursive SVAR so far, has indicated that the bank credit channel, though exist, is very weak in the Nigerian economy under the study period. This is indicated by the low response of bank assets and liabilities to unanticipated monetary policy measure as unanticipated hike in treasury bill rate. The results above also shows that while unanticipated monetary policy has negligible effect of real activity, its effect on prices is more pronounced. Given these observation, we also analyze the results obtained when the structural VAR is recovered from the reduced form VAR using the non-recursive identification scheme.

**B. Non-recursive Identification Scheme**

The calculated impulse response functions analysed above is based on recursive identification scheme which is a special case of the **AB** model where the $\mathbf{A} = \mathbf{P}^{-1}$ and **B** is a diagonal matrix. In the light of the view that the impulse responses obtained from this identification scheme depends on the ordering of variables in the VAR system, a non-recursive identification SVAR system is further estimated.

Moreover, since the impulse response functions with industrial production as a measure of real activity produced the same results when compared with when real GDP is used, the subsequent analysis is done using the latter as the measure of real activity. In

the estimation, a maximum likelihood approach, which is based on the scoring algorithm proposed in Amisano and Giannini(1992) was employed. Table 6.8 shows the estimated matrices **A** and **B.**

As Table 6.8 indicates, the standard errors of the estimates are very low and in most cases less than the estimated coefficients. Moreover, nearly all the parameters of estimated matrix **A** conform to their a priori signs. It should be noted that the identification scheme imposed six over-identifying restrictions that are not rejected as at 5 % level (p-value0.63).

Figure 6.9 also shows the impulse response functions simulated under non-recursive identification scheme. In this case, Figure 6.9(a) indicates that a one standard deviation shock to monetary policy is calculated as 1.71% unanticipated increase in treasury bill rate. Since the structural VAR from which the impulse response functions are calculated is based on non-recursive identification scheme, the positive innovation to the treasury bill rate can be interpreted explicitly as economic shock.

Like in the preceding analysis, the investigation of the credit channel of monetary policy begins by examining the responses of bank securities holding, deposits, as well as total loans and advances after the shock to the treasury bill rate. Following the hike in treasury bill rate, bank securities holding, as indicated in Figure 6.9(e) declined by 0.9% and 1.2% after the first and second quarter then it begins to build up. The positive innovation in treasury bill rate, as shown in Figure 6.9(c), also causes bank deposits to decline. The maximum effect of the impact of monetary policy occurs after 13 quarters

**Table 6.8: Structural VAR Results (Non-Recursive Identification Restrictions)**

| A | | | | | | | | B | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TBR | Lbtd | Lcpi | Lrgdp | Lsh | LR | Ltla | Lner | $e^{TBR}$ | $e^{Lbtd}$ | $e^{Lcpi}$ | $e^{Lgdp}$ | $e^{Lsh}$ | $e^{LR}$ | $e^{Ltla}$ | $e^{Lner}$ |
| 1 | -9.8688 (0.0180) | 0 | 0 | 0 | 0 | 0 | 0.2560 (0.0902) | 1.8660 (0.3271) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0.0097 (0.0323) | 1 | 0.3465 (0.2559) | -0.0252 (0.1334) | 0 | 0 | 0 | 0 | 0 | 0.0754 (0.0231) | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0.2147 (0.0613) | 0 | 0 | 0 | 0 | 0 | 0 | 0.0377 (0.0032) | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0729 (0.0061) | 0 | 0 | 0 | 0 |
| -0.0006 (0.0268) | -1.2412 (0.4653) | 0 | 0 | 1 | -0.0425 (0.0246) | 0 | 0 | 0 | 0 | 0 | 0 | 0.2612 (0.0219) | 0 | 0 | 0 |
| -0.6855 (0.0834) | -4.2592 (2.1197) | 0 | 0 | 0 | 1 | 2.8017 (2.1489 | 0 | 0 | 0 | 0 | 0 | 0 | 1.2636 (0.1085) | 0 | 0 |
| 0 | 0 | 0.6665 (0.2911) | -0.0596 (0.1627) | 0 | -0.0087 (0.0085) | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0923 ( 0.0080) | 0 |
| 0.0226 (0.0347) | 0.4064 0.4173 | 1.0310 (0.4327) | 0.4247 (0.2306) | -0.0971 (0.0594) | 0.0034 (0.0126) | 0.1481 (0.1715) | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1306 (0.0110) |

Notes: Test for over-identification Restrictions is a LR test with $\chi^2$ (6) =11.9445(prob. =0.63). Samples is 1986:1-2003:4 and standard errors from the ML estimations are reported in brackets. The number of iteration steps is 3 and the maximized log-likelihood is 674.13

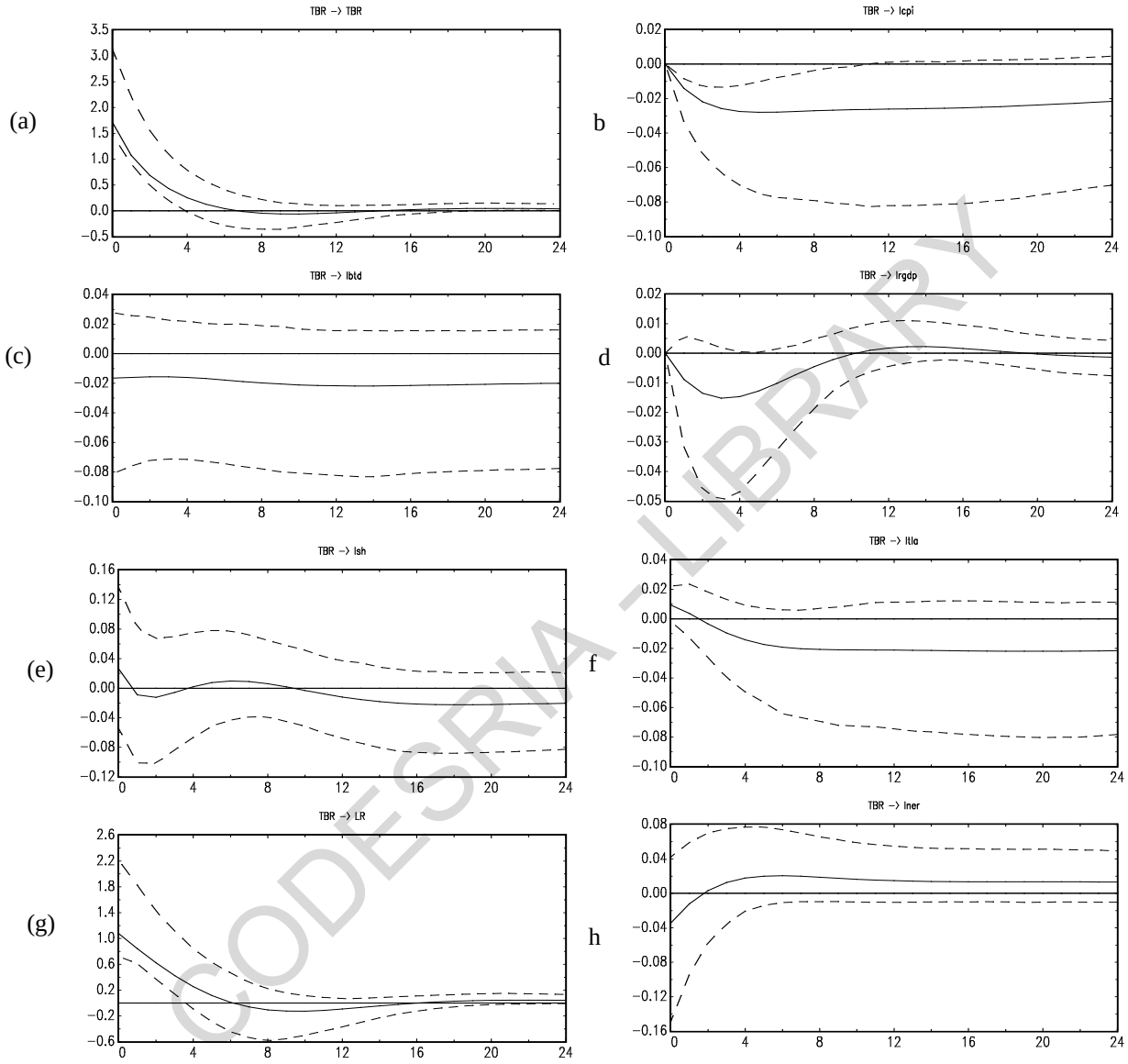
Source: Author's Calculation

when bank deposits decline by approximately 2.2%. As from 22 quarters, the effect of monetary policy on bank deposits becomes permanent till the end of the simulation period. Despite the decline in bank securities holding a quarter after the hike in treasury bill rate, bank loans and advances only decline by approximately 0.4% after the second quarters. Figure 6.9(f) further reveals that the maximum impact of the unanticipated hike in treasury bill is a 2.2% decline in bank loans and advances which occurs after 19 quarter following which a negative permanent shock set in till the end of the simulation period.

As regards the effect of the shock to the treasury bill rate on prices and real activity. Figure 6.9(b) shows that a negative response in prices occurs after the hike in treasury bill rate. Within 1 to the $5^{th}$ quarter, consumer prices declines after the unanticipated rise in treasury bill rate. After the $5^{th}$ quarters, monetary policy exerts its greatest influence on prices as the Lcpi declines by 2.8%. This result is also in line with that obtainable under the recursive identification system. Coming to the effect of positive innovation in treasury bill rate on real activity, Figure 6.9(d) indicates that there is no contemporaneous relationship between monetary policy and real GDP. With the unanticipated shock in treasury bill rate leading to monetary tightening, real GDP declines by 0.9% after the first quarter. The maximum effect of monetary policy occurs after 3 quarters when real GDP declines by 1.5%. Moreover, after 11 quarters real GDP starts to rise.

The behaviour of the nominal exchange rate as shown in Figure 6.9(h) does not substantially differ from that of the preceding analysis. Following the shock to the treasury bill rate, the nominal exchange rate initially depreciate later appreciate after the second quarter. After six quarters, the nominal exchange rate appreciates by 2.0%. The

effect of monetary policy on the nominal exchange rate also remains permanent within 17 to 24 quarters of the simulation period.






Note: Solid line indicate SVAR impulse response while broken lines indicate 95% Hall's Percentile confidence intervals calculated with 1000 Bootstrap procedure.

Author's Calculation

**Figure 6.9: Structural VAR: Impulse Response Functions (Non-Recursive Identification Restrictions)**

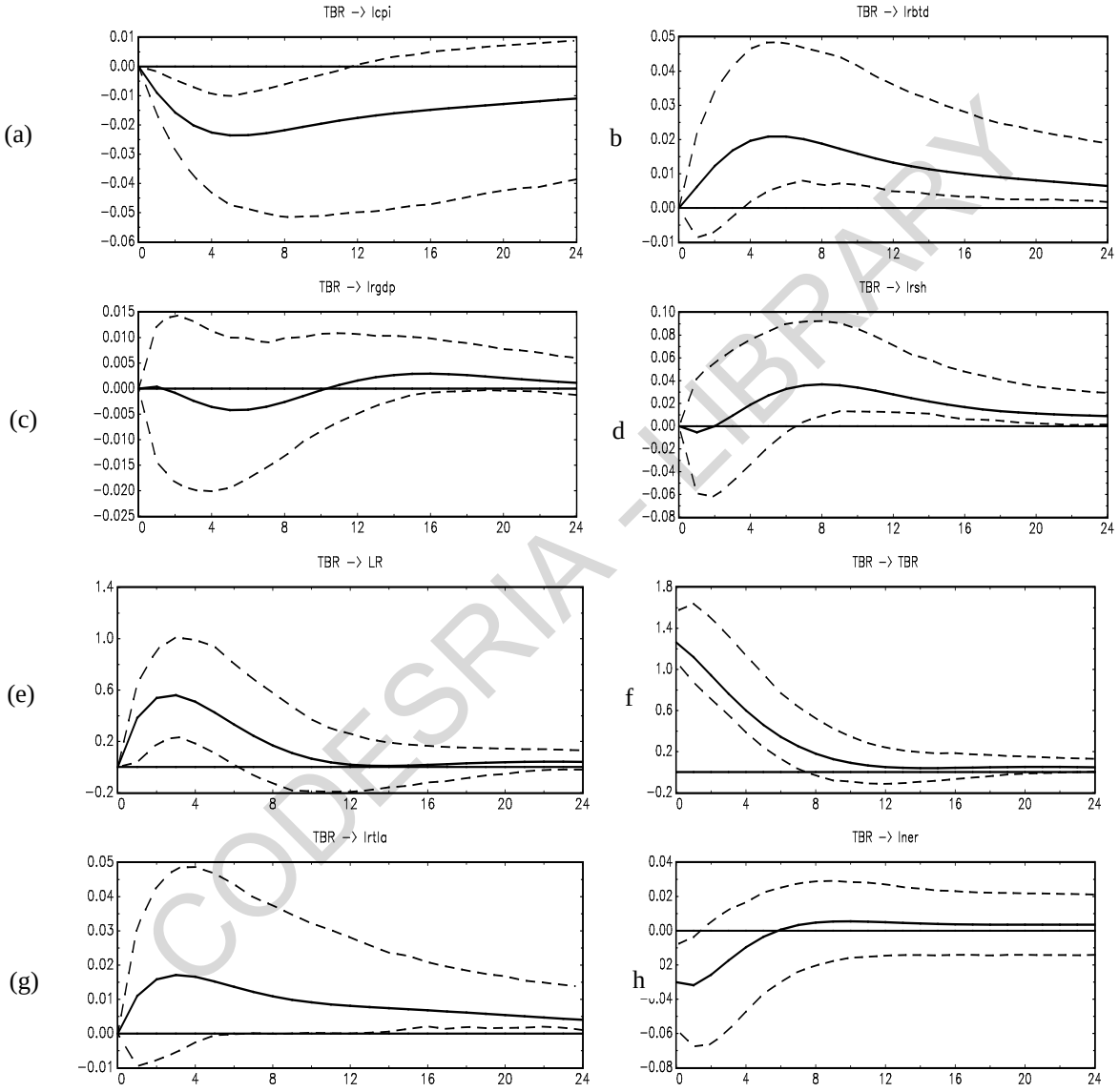
To identify whether the decline in bank loans and advances following monetary tightening is due to contraction in demand or supply of loans, an analysis of the response of the average lending rate(LR) to the shock in treasury bill rate is also embarked upon. Figure 6.9(g) indicates that following the shock in treasury bill rate, average lending rate of banks immediately rises by 1.3%. This result, following Holtermoller (2002), suggests that the credit channel exists though very weak during the period under study.

In sum, the results under non-recursive SVAR scheme nearly approximate that of the preceding analysis. The impulse response functions indicated the average lending rate of banks(Lr), under recursive identification scheme showed a positive response throughout the simulation period while an immediate 1.3% increase in Lr also occurred under the non-recursive scheme after the shock in treasury bill rate. Moreover, the IRFs of both scheme revealed that the response of bank balance sheet variables to monetary policy shock are unimpressive. With these results, one cannot give credence to the efficiency of bank credit channel in Nigeria.

### 6.4.3 Robustness Test

To provide more empirical evidence on the findings obtained so far, we also test the robustness of the above findings by estimating a structural VAR with banks' balance sheet variables in real terms. This exercise becomes crucial since in the study of bank credit channel of monetary transmission mechanism, some authors have used only the nominal bank balance sheet variables, while others have used the bank balance sheet variables in real terms. Bernanke and Blinder (1992) studied the bank credit channel in the American economy using both nominal and real balance sheet variables and these authors found little or no difference in their results.

By estimating the recursive SVAR using balance sheet variables in real terms, the empirical test of the existence of bank credit channel in the Nigerian economy becomes unambiguous and could be seen in Figure 6.10 and Figure 6.11. Using banks' balance sheet variables in real terms, it becomes evident in Figure 6.10 that the bank credit




Note: Solid line indicate SVAR impulse response while broken lines indicate 95% Hall's Percentile confidence intervals calculated with 1000 Bootstrap procedure.

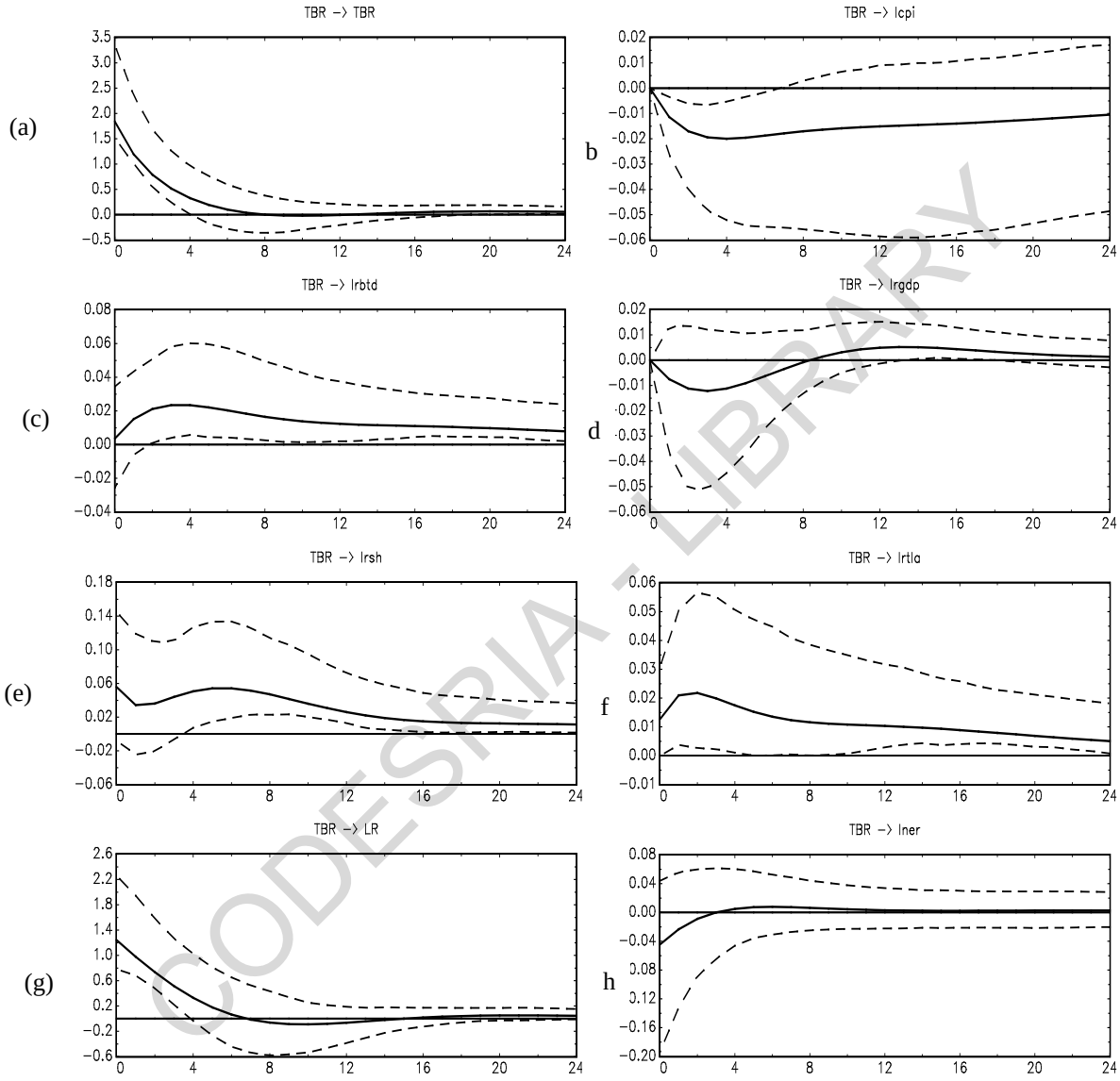
Author's Calculation

**Figure 6.10: Structural VAR: Impulse Response Functions (Recursive Identification)**

channel of monetary transmission mechanism is without doubt very weak during the period under investigation. This is indicated by the little decline in bank securities holdings, in real term, {see Figure 6.10(b)} during unanticipated monetary policy shock (calculated as 1.3% hike in treasury bill rate. Figure 6.10(b) also shows that bank deposits (which is money) initially increases at increasing rate during monetary tightening and later increases at decreasing rate afterwards. This latter result is quite contrary to the mode of operation of monetary policy and this scenario has been very common in studies using SVAR in modeling monetary transmission mechanism and is called liquidity puzzle. It describes a situation in which money stock does not respond negatively to positive interest rate innovations. In the above dimension, Holtermoller (2002) noted that the liquidity effect is only a short-run effect, which is possibly overcompensated by income, and Fisher effect. The existence of liquidity puzzle, as shown in this study may be ascribed to the adoption of financial deregulation coupled with the innovation in the banking and entire financial system. With liberalization of financial markets in Nigeria, Ikhide and Alawode (1993) observed that the increased use of money market instruments (as well as other near monies) may alter the sensitivity of money balances to interest rate and these induced changes may affect the effectiveness of monetary policy. Figure 6.10(g) also indicates that bank credit in real terms, initially increases at an increasing rate despite the marginal decline in securities holding and later increase at decreasing rate.

When a non-recursive identification is also applied to a SVAR system with bank balance sheet variables in real terms, Figure 6.11 shows that the result is also the same.

The weakness of the bank credit channel becomes more apparent when bank balance sheet variables are used in the SVAR system.




Note: Solid line indicate SVAR impulse response while broken lines indicate 95% Hall's Percentile confidence intervals calculated with 1000 Bootstrap procedure.

Author's Calculation

**Figure 6.11: Structural VAR: Impulse Response Functions (Non-Recursive Identification Restrictions)**

Overall, the analysis in this section has shown that unanticipated monetary policy did not actually constrain bank lending in Nigeria during the period under investigation. The inability of monetary policy to affect bank lending could be attributed to the excess liquidity in the banking system during this period[48]. Moreover, the use of liability management in Nigerian banks could also be partly responsible for the failure of the Central Bank of Nigeria to affect bank lending in Nigeria[49]. In support of the above view, Ojo(1992) observed that in the 1980s and 1990s aggregate bank credit consistently exceeded its targeted level. The results of the impulse response analysis also suggest that monetary policy affect prices than real activity in Nigeria.

### 6.4.4 Variance Decomposition

The results in the preceding section has indicated that the bank credit channel is very weak in Nigeria. To shed more light on this issue, this section tests the importance of the bank credit channel in the light of the deregulation of financial markets in Nigeria. In carrying out this analysis, the forecast error variance decomposition (FEVD) for the SVAR model based on the non-recursive identification scheme is used. The recourse to the SVAR model with non-recursive identification stems from the understanding that its results is unambiguous and seem more plausible compared with that under the recursive identification scheme. In analyzing the FEVD, results are reported for forecast horizons 1, 4, 12 and 24. Table 6.9 shows the FEVD which gives an idea of the share of fluctuations in various variables that are caused by different shocks. The results indicate that after 12 quarters (3 years) treasury bill rate contributes

[48] Ojo(1992) surveyed monetary policy in the 1980s and in the 1990s.

[49] See Ikhide, S.I and A.A. Alawode (1993): "Impact of Stabilization Programmes and Growth of Money Market in Nigeria," The Developing Economies, Vol. 31, No. 2 (June).

**Table 6.9 SVAR Forecast Error Variance Decomposition**

| Forecast Horizon (quarters) | TBR | Lbtd | Lcpi | Lrgdp | Lsh | LR | Ltla | Lner |
|---|---|---|---|---|---|---|---|---|
| Proportion of forecast error variance in TBR accounted for by: | | | | | | | | |
| 1 | 0.86 | 0.14 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 0.53 | 0.12 | 0.00 | 0.02 | 0.21 | 0.10 | 0.01 | 0.01 |
| 12 | 0.38 | 0.11 | 0.01 | 0.07 | 0.23 | 0.15 | 0.01 | 0.05 |
| 24 | 0.36 | 0.11 | 0.02 | 0.07 | 0.22 | 0.14 | 0.03 | 0.05 |
| Proportion of forecast error variance in Lbtd accounted for by: | | | | | | | | |
| | TBR | Lbtd | Lcpi | Lrgdp | Lsh | LR | Ltla | Lner |
| 1 | 0.05 | 0.91 | 0.03 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 0.05 | 0.88 | 0.02 | 0.03 | 0.01 | 0.00 | 0.00 | 0.01 |
| 12 | 0.06 | 0.78 | 0.01 | 0.06 | 0.02 | 0.00 | 0.01 | 0.06 |
| 24 | 0.07 | 0.72 | 0.00 | 0.06 | 0.02 | 0.00 | 0.03 | 0.10 |
| Proportion of forecast error variance in Lcpi accounted for by: | | | | | | | | |
| | TBR | Lbtd | Lcpi | Lrgdp | Lsh | LR | Ltla | Lner |
| 1 | 0.00 | 0.00 | 0.85 | 0.15 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 0.11 | 0.06 | 0.52 | 0.12 | 0.02 | 0.01 | 0.16 | 0.00 |
| 12 | 0.12 | 0.15 | 0.30 | 0.05 | 0.04 | 0.02 | 0.30 | 0.01 |
| 24 | 0.11 | 0.21 | 0.22 | 0.02 | 0.06 | 0.01 | 0.31 | 0.04 |
| Proportion of forecast error variance in Lrgdp accounted for by: | | | | | | | | |
| | TBR | Lbtd | Lcpi | Lrgdp | Lsh | LR | Ltla | Lner |
| 1 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 0.04 | 0.01 | 0.00 | 0.73 | 0.01 | 0.02 | 0.00 | 0.20 |
| 12 | 0.05 | 0.05 | 0.02 | 0.49 | 0.06 | 0.02 | 0.03 | 0.27 |
| 24 | 0.04 | 0.09 | 0.05 | 0.45 | 0.06 | 0.01 | 0.05 | 0.25 |
| Proportion of forecast error variance in Lsh accounted for by: | | | | | | | | |
| | TBR | Lbtd | Lcpi | Lrgdp | Lsh | LR | Ltla | Lner |
| 1 | 0.01 | 0.16 | 0.00 | 0.00 | 0.79 | 0.03 | 0.00 | 0.00 |
| 4 | 0.01 | 0.28 | 0.03 | 0.03 | 0.59 | 0.04 | 0.01 | 0.01 |
| 12 | 0.00 | 0.41 | 0.06 | 0.04 | 0.41 | 0.03 | 0.03 | 0.01 |
| 24 | 0.02 | 0.48 | 0.05 | 0.06 | 0.30 | 0.02 | 0.02 | 0.04 |
| Proportion of forecast error variance in LR accounted for by: | | | | | | | | |
| | TBR | Lbtd | Lcpi | Lrgdp | Lsh | LR | Ltla | Lner |
| 1 | 0.35 | 0.17 | 0.00 | 0.00 | 0.00 | 0.46 | 0.02 | 0.00 |
| 4 | 0.29 | 0.15 | 0.00 | 0.04 | 0.25 | 0.21 | 0.06 | 0.01 |
| 12 | 0.18 | 0.10 | 0.01 | 0.09 | 0.28 | 0.18 | 0.08 | 0.08 |
| 24 | 0.17 | 0.10 | 0.01 | 0.09 | 0.27 | 0.18 | 0.08 | 0.09 |
| Proportion of forecast error variance in Ltla accounted for by: | | | | | | | | |
| | TBR | Lbtd | Lcpi | Lrgdp | Lsh | LR | Ltla | Lner |
| 1 | 0.01 | 0.00 | 0.07 | 0.02 | 0.00 | 0.01 | 0.88 | 0.00 |
| 4 | 0.01 | 0.11 | 0.05 | 0.05 | 0.00 | 0.01 | 0.77 | 0.00 |
| 12 | 0.07 | 0.47 | 0.03 | 0.03 | 0.01 | 0.01 | 0.35 | 0.03 |
| 24 | 0.09 | 0.56 | 0.03 | 0.03 | 0.02 | 0.01 | 0.20 | 0.07 |

**Table 7.9Ctd SVAR Forecast Error Variance Decomposition**

| Forecast Horizon (quarters) | Proportion of forecast error variance in Lner accounted for by: TBR | Lbtd | Lcpi | Lrgdp | Lsh | LR | Ltla | Lner |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.05 | 0.06 | 0.04 | 0.02 | 0.03 | 0.00 | 0.01 | 0.79 |
| 4 | 0.03 | 0.11 | 0.04 | 0.01 | 0.07 | 0.04 | 0.01 | 0.69 |
| 12 | 0.05 | 0.23 | 0.04 | 0.01 | 0.06 | 0.03 | 0.04 | 0.55 |
| 24 | 0.06 | 0.32 | 0.03 | 0.02 | 0.05 | 0.02 | 0.05 | 0.45 |

Source: Author's Calculation

38% to the forecast error of itself while bank securities holding account for 23% of the forecast error in this variable.

Since the contribution of shock in treasury bill rate (monetary policy shock) to economic activity and prices is very important for this study, the FEVD results show that this shock contributes 5% and 12% to the forecast error of real GDP and prices after 12 quarters respectively. Analysis also shows that shock in money (i.e. Lbtd) accounts for 5% and 15% of the forecast errors in output and prices after 12 quarters respectively. Moreover, while shock in bank loans and advances contributes 3% to variation in output after 12 quarters, the shock to this variable accounts for 30% in the forecast error variance of the consumer price index (Lcpi) over the same period. These results further reinforce the findings in the preceding analysis and indicate that monetary policy has more impact on prices than output and that changes in prices is basically a monetary phenomena in the Nigerian economy. It is also obvious that after 12 quarters, the fraction in the fluctuation in the real GDP accounted for by international factor captured by the nominal exchange rate is 27%. This result is not amazing in the light of the understanding that the Nigerian economy is a monocultural economy where the bulk of domestic

resources emanate from oil exports. Given this scenario variation in the nominal exchange rate will have significant effect on the economy.

Overall, the results from this section also support that of the existing section. It clearly indicated that the credit channel of monetary policy transmission was not important during the study period characterized by financial deregulation and innovation. This is also indicated by monetary policy shock which accounted for only 1% of the forecast error variance of total loans and advances (Ltla) after 4 quarters.

Finally, both the impulse response analysis and FEVD results indicate that monetary policy exerts more influence on prices than real activity. This suggests that the quantity theory of money is applicable in Nigeria.

### 6.4.5 Granger Causality

To provide empirical evidence on the fundamental question of whether money or bank credit is the primary cause of variability in economic activity and prices, this section adopts the Granger Causality Test(GCT).

Given that all the variables for the study, as earlier established, are of unit root and have been ascertained to be cointegrated, the causal relationship among variables is investigated in the context of Vector Error Correction Model (VECM)[50]. In the estimation of the VECM model, a period lag of the first difference of variables as well as the error correcting term is used[51]. Table 6.10(a) and (b) reports the p-value of the Wald statistics which follows the F-distribution. Moreover, the significance of the error

[50] It is also possible to use the VAR to conduct 'block Granger non-causality' tests rather than the use of VECM. However, Morley (2000) has indicated that there are problems with this method where the variables are I(1), in which case the causality needs to be divided into it's short-term and long-term components. Following this approach has been proved to yield robust results.

[51] To avoid the problem of having to identify the actual cointegrating vector among the four found in the preceding section, error correcting term was estimated using Engle and Granger's(1987) procedure.

correction term determines the long-run direction of causality, while the significance of the first differenced explanatory variables determine the short-term direction of causality.

In Table 6.10(a) and (b) the Granger Causality Test (GCT) is carried out with bank balance sheet variables expressed in nominal and in real terms respectively and the decision rule is based on 5 or 10 percent significance level. The results in Table 6.10(a) and (b) show that there is a short-run uni-directional causality between consumer prices and bank lending rate (LR). This implies that variation in lending rate (Lr) Granger Causes (GC) consumer prices (Lcpi) at 10% significance level. This is possible in the light of the understanding that lending rate is a cost of capital. An increase in lending rate may affect cost of production which could be passed to consumers in form of higher prices. The results also shows that bank deposit(lbtd) Granger Causes consumer prices index while nominal exchange rate (Lner) Granger Cause real GDP(Lrgdp) at 10% and 5% significance levels respectively in the short-run. These results reinforced earlier findings that the shocks in nominal exchange rate and bank deposits (which are money) are the dominant factors explaining variations in real activity and prices respectively in Nigeria. Table 7.10(a) and (b) also point out that bank securities holding (lbsh) as well as bank loans and advances (btla) are vital sources of variation in average lending rate of banks (Lr).

With respect to long-run causality, Table 7.10(a) also indicates that both short-run and long -run causality exist between bank deposits (in nominal terms) and total loans and advances. This implies that bank deposits is the main cause of variability in bank credit. As bank deposits increase, banks find it easier to satisfy loans demand.

Coming to the question of whether money or bank credit is the main cause of variation in prices, Table 6.10(a) and (b) indicates that the hypothesis of no causality between money (proxied by bank deposit -Lbtd)[52] and prices (Lcpi) has to be rejected at the 10% significance level. This further supports the quantity theory that attributes variation in money stock as the predominant cause of change in prices. However, the hypothesis that there is no causality between bank credit (ltla) and prices (lcpi) cannot be rejected at the 5% level. This means that lagged value of credit variable cannot efficiently predict change in prices, while money (btd) can effectively do. As regards the issue of which variable, money or bank credit is the main cause of variation in economic activity, both tables indicate that neither money nor credit Granger causes real GDP(lrgdp) which is a measure of economic activity in this study.

**Table 6.10(a): Granger Causality Test Result from Vector Error Correction Model (Bank Balance Sheet Variables in Nominal terms)**

| Dependent variable | DLcpi(-1) | DLrgdp(-1) | DLbtd(-1) | DLsh(-1) | DLr(-1) | Dltla(-1) | DTBR(-1) | DLner(-1) | Ecm(-1) |
|---|---|---|---|---|---|---|---|---|---|
| DLcpi | 0.0000* | 0.9404 | 0.0910** | 0.1727 | 0.0724** | 0.4105 | 0.4522 | 0.8022 | (-1.4364) |
| DLrgdp | 0.2517 | 0.0071* | 0.1877 | 0.2113 | 0.2249 | 0.4944 | 0.2288 | 0.0003* | (-0.3884) |
| DLbtd | 0.0912** | 0.9603 | 0.7635 | 0.4622 | 0.6836 | 0.3983 | 0.3090 | 0.8844 | (-0.0830) |
| DLsh | 0.1967 | 0.4933 | 0.6005 | 0.6153 | 0.8138 | 0.8921 | 0.5127 | 0.8787 | (-1.4327) |
| DLr | 0.1419 | 0.8199 | 0.8100 | 0.0668** | 0.9683 | 0.0536** | 0.3303 | 0.8731 | (-0.1613) |
| Dltla | 0.1966 | 0.5619 | 0.0802** | 0.1200 | 0.8219 | 0.8878 | 0.7255 | 0.3816 | (-2.2056)* |
| DTBR | 0.9177 | 0.8118 | 0.8660 | 0.1810 | 0.6512 | 0.1392 | 0.1122 | 0.5076 | (-1.2985) |
| Lner | 0.9881 | 0.8180 | 0.2812 | 0.9551 | 0.9750 | 0.4656 | 0.7466 | 0.1176 | (-0.3068) |

Notes: * (**) indicates statistical significance at 5% and 10% levels respectively. Values in parentheses are t-statistics, while others are the p-value of the Wald statistics. The Wald statistic follows F-distribution and the hypothesis is that each of the coefficients of lagged explanatory variables is zero.

[52] An alternative VECM with M1 and M2 as the monetary aggregate was also estimated but the conclusion remains the same.

**Table 6.10(b): Granger Causality Test Result from Vector Error Correction Model (Bank Balance Sheet Variables in real term)**

| Dependent variable | DLcpi(-1) | DLrgdp(-1) | DLrbtd(-1) | DLrsh(-1) | DLr(-1) | Dlrtla(-1) | DTBR(-1) | DLner(-1) | Ecm(-1) |
|---|---|---|---|---|---|---|---|---|---|
| DLcpi | 0.0000* | 0.7561 | 0.0883** | 0.2226 | 0.0705** | 0.4327 | 0.5951 | 0.5935 | (-0.7606) |
| DLrgdp | 0.0522** | 0.0137* | 0.1390 | 0.2578 | 0.2190 | 0.6011 | 0.3051 | 0.0013* | (-1.5476) |
| DLrbtd | 0.0010* | 0.9454 | 0.1539 | 0.8948 | 0.1512 | 0.1802 | 0.3250 | 0.4922 | (-1.6739) |
| DLrsh | 0.1292 | 0.3014 | 0.6809 | 0.4165 | 0.4165 | 0.9898 | 0.9696 | 0.3656 | (-0.8314) |
| DLr | 0.8448 | 0.8972 | 0.7859 | 0.0610** | 0.9688 | 0.0608** | 0.2981 | 0.7758 | (-0.4541) |
| Dlrtla | 0.8938 | 0.9040 | 0.6005 | 0.1004 | 0.3216 | 0.8538 | 0.8404 | 0.9348 | (-1.1686) |
| DTBR | 0.4351 | 0.8898 | 0.7573 | 0.1466 | 0.6334 | 0.1582 | 0.1505 | 0.3993 | (-0.8648) |
| Lner | 0.5202 | 0.4562 | 0.3960 | 0.8769 | 0.9936 | 0.2720 | 0.3883 | 0.0073* | (-2.8560) * |

Notes: * (**) indicates statistical significance at 5% and 10% levels respectively. Values in parentheses are t-statistics, while others are the p-value of the Wald statistics. The Wald statistic follows F-distribution and the hypothesis is that each of the coefficients of lagged explanatory variables is zero.

In conclusion, the empirical findings of this section have indicated that neither money nor bank credit is the main cause of variability in economic activity and prices in Nigeria. The findings of this section also suggest that changes in bank deposits (a main component of money suppy) cause variation in prices level, while nominal exchange rate is found to be the main cause of variation in real GDP in Nigeria. These results seem plausible, given the importance of nominal exchange rate in determination of foreign exchange proceeds in the Nigerian economy. The fact that neither money nor credit Granger Causes real GDP in this study did not, however, imply that both variables are not significant in the economy. The results above, only stand out to underscore the fact that, movement in economic activity are caused by other variables different from monetary and credit aggregates.

## 6.5 Conclusion

This study has empirically investigated the issue of existence or otherwise of the bank credit channel of monetary policy transmission in the Nigerian economy. Relating to this issue are the questions of whether monetary policy constrains bank lending in the Nigerian economy, how important is the bank credit channel in the light of the

deregulation of the financial markets in Nigeria as well as the issue of whether it is bank credit or money that primarily causes variation in economic activity and prices in Nigeria.

Using the impulse response analysis, the result of this study has indicated that the bank credit channel of monetary policy transmission, though exists in Nigeria is very weak. This is indicated by the marginal response of bank assets and liabilities to monetary policy shock. In all the analysis, the monetary policy shock measured as the unanticipated hike in treasury bill rate caused a negligible decline in bank securities holding as well as credit (measured as bank loans and advances to the private sector). In the various alternative SVAR analysis, bank deposits showed either a negligible decline or increase in response to monetary shock (depending on the extent of the shock). The low response of bank assets and liabilities to monetary policy shock could be attributed to the adoption of financial deregulation and its associated innovations such as the introduction of negotiable certificate of deposits (NCD). Given a situation of low decline in bank deposit and securities, the response of bank credit to unanticipated increase in treasury bill rate produced marginal decline in bank credit. It is also apparent in all the impulse response analysis that the exchange rate channel is a dominant channel of monetary policy in Nigeria. Moreover, evidence also suggests that monetary policy has more impact on prices than on real activity.

Our analysis of the importance of bank credit in the Nigerian economy, using FEVD indicates that the exchange rate channel rather than the former (i.e. bank credit) is more important for monetary transmission mechanism in Nigeria. This could be partly explained by the monocultural nature of the economy depending predominantly on oil exports.

The results which emerged from the Granger causality test also reinforced the existing findings. It showed that the main cause of variation in real activity is the nominal exchange rate while bank deposit which is a vital component of money is the cause of changes in prices. These results justified the role of the quantity theory of money in the Nigerian economy. The implication of the Granger causality test is that while changes in money causes variation in prices, neither money or bank credit is the cause of variation in real activity in Nigeria.

To link the findings of this chapter with that of the preceding one, the evidence in this study has shown that the structure of a country financial system affects monetary transmission mechanism. Being an underdeveloped and bank dominated country, one expects bank credit channel to be the dominant channel of monetary policy transmission. The empirical evidence in this study has shown that though this channel exists, it is very weak. One basic factor that could be attributed to this, as the study suggests, is the deregulation of the financial markets in Nigeria coupled with innovations in financial sector. Given that one of the necessary conditions for the existence of bank credit channel is that banks must be special, the innovations in financial markets, coupled with the liberalization of the capital markets in Nigeria should have made bank credit to be of less importance. In the light of the liberalization of capital movements in Nigeria, coupled with the growing importance of the capital market in Nigeria, the interest rate channel would have been enhanced thereby reinforcing the exchange rate channel.

# CHAPTER SEVEN

# SUMMARY, CONCLUSION AND POLICY IMPLICATIONS

## 7.1 Summary

The traditional description of how monetary policy works is embedded in the Keynesian IS-LM model. Under this approach, monetary policy transmits to affect the real sector of the economy through the interest rate channel. Given this framework, banks have no explicit role to play in the propagation of monetary impulse to the real economy. Recently, the bank credit channel has received increasing attention and stressed the idea that monetary policy actions not only affect the economy through their effect on the quantity of money but also through their direct effect on bank lending.

The bank credit channel maintained that because of capital market imperfection, some firms find it easier to obtain finance in this market than the other. However, since banks are credit institutions that specialize in project screening and maintaining long-term relationships with individual clients, they are able to provide finance to worthy borrowers who perhaps would have found it rather difficult to obtain external finance. For this channel to exist, bank credit must be special and monetary actions must affect the supply of bank loans.

The bank credit channel implies that a country's financial structure matters for monetary transmission mechanism. In support of this, Ceccheti (1999) and Elbourne et. al.(2003) have shown that countries with many small banks, less healthy banking system and poorer direct capital access display a greater sensitivity to policy changes than do countries with big healthy banks and deep, well developed capital market.

In the light of the proposition of the credit view, the study empirically investigated the structure of the financial markets and tested for the existence of the bank credit channel of monetary transmission under the era of financial deregulation in Nigeria. In the introductory chapter, the situation in the financial market before and after the adoption of financial deregulation in Nigeria was discussed. The justification for testing for the bank credit channel in the light of these changes was also stated.

Chapter two of the study focused basically on the review of relevant literature. This chapter explored the theories of monetary transmission mechanism as well as the link between financial structure and economic activity. In this chapter, the evolution and growth of theories of financial intermediation overtime was explored and the review of literature was conducted in sequence of evidences drawn from developed, developing countries as well as the Nigerian economy. In the survey, it was found that while extensive researches have been conducted to test for the existence of bank credit channel in developed countries these studies have been bedeviled with the problem of identifying loan supply versus demand effects, differences in sample periods and in the imposition of identification restrictions in the VAR model. In developing countries, in general, though some studies have been conducted to test for the existence of the bank credit channel, their results have been quite mixed. As regards the Nigerian economy, only few studies have been carried out on the area under study and this reason, among others, partly informed this study.

In chapter three, the research methods employed in this study is examined. In this chapter, the various approaches to the testing of bank credit channel as obtained in the survey of literature were explained and the weaknesses of each of the approach

enunciated. In the light of the popularity of structural VAR in estimating the impact of monetary policy on real economy, this study adopted this approach. In recovering the structural parameters from the reduced form VAR, both recursive identification scheme which depends on the ordering of variables as well as the non-recursive identification approach were employed. The adoption of these two different methods of identification was borne out of the need to compare the results of the two methods. The non-recursive identification scheme, unlike the recursive one, relied on economic theory, as such, shock to economic activity and prices are regarded as economic shock. The last section of this chapter spelt out the source of data for the study.

Monetary policy is one of the crucial macroeconomic policies in the economy but there has been lack of consensus on how it actually works. In developing countries, it has been maintained that the conduct of monetary policy has been very difficult due to limited menu of financial assets and other problems. In chapter four of this study, the evolution of monetary policy in Nigeria was discussed. Moreover, the various macroeconomic environments under which monetary policy has been implemented were also considered. This chapter concluded that monetary policy had been conducted under wide ranging environments characterized by high rate of inflation, sluggish growth in output and balance of payment disequilibria. These unpleasant situations indicated that the conduct of monetary policy has not been successful and called for proper understanding of monetary transmission mechanism, in particular, bank credit channel.

The basic tenet of the bank credit channel of monetary transmission mechanism is that banks play a crucial role in the transmission of monetary policy shock to the real sector of the economy. This channel implies that the structure of the financial system

matters. It also maintained that in financial system where banks are special by providing credit to some class of borrowers, then monetary policy constraining loan supply would have significant effect on real activity. Since studies have also indicated that deregulation and innovation in financial markets tend to weaken the credit channel, this study carried out an assessment of the Nigerian financial markets prior and after the reform of the financial sector in chapter five. In assessing the extent of financial development and impact of deregulation on the structure of financial market both financial development and structure indicators were used. The chapter found that though the financial sector of the economy is important in light of its contribution to the macroeconomy, it is still underdeveloped relative to international standard. Moreover, investigation using financial structure indicators showed that though Nigeria is a bank dominated country in terms of size, activity and efficiency, the structure of the financial system, however, has in recent time tended towards market-based system.

In chapter six, the analysis of data and interpretation of results was done, this chapter found that:

(i) Using nominal values of bank variables, bank assets measured by securities and total loans and advance declined marginally after unanticipated monetary policy shock measured as a hike in treasury bill rate. With real values of bank balance sheet variables, these assets showed positive responses which declined afterwards. Also, the average lending rate of bank initially increased following the hike in Treasury bill rate. These are indication that the bank credit channel is weak in the Nigerian economy;

(ii) the negative response of real activity measured by real GDP or industrial production is very negligible and this further reinforced the earlier findings;

(iii) the deregulation of the financial sector in Nigeria is the main factor responsible for the reduced importance of the bank credit channel, this is indicated by the gradual shift of the financial system from bank –based to capital market-based economy;

(iv) monetary policy has more impact on prices than real activity;

(v) shock in nominal exchange rate accounted greater proportion of the forecast error variance of real GDP while shock in bank credit (which functionally related to bank deposits) accounted for greater proportion of forecast error in prices.

(vi) neither bank credit nor money is the cause of variability in economic activity.

## 7.2 Policy Implications

From the findings which have emerged in this study, several policy implications can be deduced. First, if the Central Bank of Nigeria uses bank credit as a control framework, the realization of macroeconomic objectives would be a fluke. This is so since banks, following unanticipated monetary shock would always finds other means of supplementing their deposits liabilities thereby continuing in their line of credit extension. Second, financial deregulation and innovation affect the structure of financial markets and is one possible cause of ineffectiveness of monetary policy in Nigeria. In recognition of this fact, the Central Bank of Nigeria (2000b) noted that “the increased

competition in the banking sector as well as the liberalization of foreign exchange market would have affected the monetary transmission mechanism which is a function of the financial structure and macroeconomic environment." Third, the weakness of the bank credit channel presupposed that there are alternative sources of borrowing for much of the non-financial private sector. This means that bank credit and other forms of credit in the financial system are becoming perfect substitute. Finally, given the causal relationship between nominal exchange rate and real activity, the use of exchange rate as an intermediate target of monetary policy would be the best leading indicator of real activity.

### 7.3 Contribution to Knowledge

This study has contributed to knowledge in three main ways. First, it has provided additional insight into the issue of monetary policy transmission in Nigeria. This insight emanated from the findings that the bank credit channel is weak and therefore of less importance in Nigeria during the period under study. Second, the study has shown the ability of the central bank of Nigeria to affect the banking sectors' loans and advances is limited under the era of financial deregulation in Nigeria. Finally, the study has contributed to knowledge by showing that neither money nor bank credit are the main sources of variability in real activity in Nigeria. This study has also suggested that the nominal exchange rate (which explained a greater proportion of forecast error in real activity) is the best leading indicator of real activity in the Nigerian economy.

## 7.4 Limitation of the Study and Possible Areas of Further Research

The main limitation of this study is that it focused only on macroeconomic, rather than microeconomic implication of the bank credit channel of monetary policy transmission. Going by the theoretical underpinning of bank credit channel, the asymmetric information in the credit market caused some firms (especially small and medium scale firms) to be bank-dependent. This informational problem, therefore, made banks to be a unique provider of finance to these firms. The macroeconomic implication of the bank credit channel is that monetary policy constraining bank credit will negatively affect the investment behaviour of small and medium scale firms, this in turn; affect the real sector of the economy. The microeconomic implication of bank credit channel, on the other hand, maintained that monetary tightening has differential effect on firms and monetary policy shocks affect small and medium scale firms than large firms. To empirically examine the microeconomic implication of the bank credit channel panel data on small and medium scale firms are required.

In the light of paucity of data on small and medium firms in Nigeria, this study focused on the macro implication of the bank credit channel. The results of our findings, therefore do not necessary imply that there are no firms that depend heavily on bank finance. Furthermore, our results does not in any way connote that there is no banks, at least at the micro level, that is not affected by monetary policy.

In the light of this limitation, further effort needs to be directed towards studying the implications of the bank credit channel at microeconomic level. The possible areas of research which focused on the above issue are those that examined such questions as: does monetary policy has differential impact on firms? What are the impacts of monetary

policy on small and large banks? Does deregulation of the financial market affect the size of debt relative to equity finance in firms' balance sheet? Researches directed towards the above questions will go a long way in providing adequate insight into the bank credit channel of monetary transmission mechanism in the Nigerian economy.

## 7.5 Conclusion

This study has assessed the structure of the financial markets prior and after the adoption of deregulation policy in Nigeria. Moreover, an empirical investigation of the existence of bank credit channel of monetary transmission was also done. Overall, the study found that Nigeria financial markets is still underdeveloped relative to international standard. Though Nigeria is a bank-dominated economy in terms of size, activity and efficiency, the structure of the financial system, had in recent times tended towards a market-based system. The econometric analysis also showed that the bank credit channel is very weak during the period of investigation. The evidence in this study also indicates that the Central Bank of Nigeria action has little or no influence on bank lending in Nigeria. This result is quite robust and provides an explanation why monetary targeting using bank credit as operational instrument has consistently deviated from the desired level. The study has also reinforced the theoretical view that financial structure affects monetary transmission mechanism. Before the deregulation, empirical evidence indicated that debt finance was considered more important that equity finance in Nigeria. With the deregulation and innovation in financial markets in Nigeria, the role of banks has been reducing gradually, under this scenario, one expects the credit channel to be declining in importance in favour of other channels of monetary transmission mechanism.

## BIBLIOGRAPHY


Afonso, A. and M.S. Aubyn (1998): "Credit Rationing and Monetary Policy Transmission: Evidence for Portugal" Instituto Superior de Economia e Gestao (ISEG), Portugal, Economics Department Working Paper No. 7/98, *ww.iseg.utl.pt/departamentos/economia/wp/wp71998.pdf*

Angeloni, I., Anil, K., Benoit, M. and Daniele, T.,(2002): "Monetary Transmission in Euro Area: Where Do We Stand?" ECB Working Paper, No. 114.

Aigbokhan, B.E., (1989): Monetary Policy in Nigeria and the Economic Crisis of the 1980s. Paper Presented at the National Conference on The Financial System in Nigeria's Economic Recovery, Ahmadu Bello University, Zaria.

Ajayi, S. I.,(1974a): "The Demand for Money in the Nigerian Economy: Comments and Extension", The Nigerian Journal of Economic and Social Studies, Vol. 16, No. 1 (March), pp. 165-73.

Ajayi, S. I.,(1974b): "An Econometric Study of the Relative Importance of Monetary and Fiscal Policy in Nigeria" Bangladesh Economic Review, Vol 1, No. 2 (April), pp. 559-576.

Ajayi, S.I., and O.O. Ojo(1981): Money and Banking: Analysis and Policy in the Nigerian Context, Allen and Urwin

Akatu, P.A.(1993): "The Challenge of Monetary Policy Since 1986," Central Bank Economic and Financial Review, Vol. 31, No. 4. pp. 321-339.

Akerlof, G.A.,(1970): "The Market For Lemons": Quality Uncertainty and the Market Mechanism," Quarterly Journal of Economics, Vol. 84, No. 3(August) pp. 488-500.

Akingbohungbe, S., (1994): "Meeting the Regulation Requirements of the Securities and Exchange Commission", Securities and Exchange Monthly (SEC, Lagos) Vol. 4, No. 2 (February).

Akinlo, A.E., (2004): "Globalization, International Investment and Stock Market Growth in Sub-Sahara Africa," Institute of Developing Economies, V.R.F series. Japan External Trade Organization.

Alfaro, R., H.Franken, et. al. (2002): "The Bank Lending Channel and the Monetary Transmission Mechanism: The Case of Chile" A Paper Presented at the 6th Annual Conference of the Central Bank of Chile, Dec. 12th and 13th, 2002.

Alile, H.I, (1992): "The Nigeria Stock Exchange by the Year 2010', *being a paper presented at the Vision 2010 Workshop* NIIA, Lagos, May 9.

Amisano, G., and C. Giannini (1997): Topics in Structural VAR Econometrics, 2ed. Berlin.

Anderson, L.C and J.L Jordan (1968): Monetary and Fiscal Actions: A Test of their Relative Importance in Economic Stabilization. Reserve Bank of St. Louis Review ,(November), pp. 11-24.

Angeloni, I., Anil, K., Benoit, M. and Daniele, T. (2002): "'Monetary Transmission in the Euro Area: Where Do We Stand?", ECB Working Paper, No. 114.

Anyanwu, J.C.,(1995): "Structural Adjustment Programmes, Financial Deregulation and Financial Deepening in Sub-Saharan African Economies: The Nigerian Case, Nigerian Economic and Financial Review, Vol. 1, No. 1 pp. 1-23.

Anzuini, A. and A. Levy(2004): Financial Structure and The Transmission of Monetary Shocks: Preliminary Evidence For the Czech Republic, Hungary and Poland. *Banca d'Italia, Temi di discussione del Servizio Studi*, Economic Research Department, No. 514.

Asogu, J.O.,(1998), "The Relative Potency of Monetary and Fiscal Policies In Nigeria", Central Bank of Nigeria, Economic and Financial Review, Vol. 36, No. 2.

Asogwa, R.C., (2003). "Liberalization, Consolidation and Market Structure in Nigerian Banking", African Economic Research Consortium, Nairobi, Kenya. AERC Biannual Workshop, Group C.

Babajide, K.,(2005), "Banks and Fraud Incorporated" Vangard Newpaper (online) (October 3).

Bank of England(1999): The Monetary Policy Committee Report - Bank of England staff on Monetary Transmission Mechanism *http://www.bankofengland.co.uk.*

Bank of Korea (1998), "Korea's Experience of the Monetary Transmission Mechanism", Bank of Internatianal Settlement, Working Paper.

Barro, R.J., (1998): "Unanticipated Money, Output and Price Level in the United States," Journal of Political Economy, 86, pp. 549-80.

Beck, T, A. Demirguc-Kunt, R.Levine and Vojislav.(2000) "Financial Structure and Economic Development, Firm, Industry and Country Evidence. World Bank.

Beck, T., A. Dermiguc-Kunt, and R. Levine.(1999): "A New Database on Financial Development and Structure". Policy Research Working Paper 1829. The World Bank.

Benkwitz, A., H. Lutkepohl, and J. Wolters (2001): "Comparison of Bootstrap Confidence Intervals for Impulse Responses of German Monetary Systems," Macroeconomic Dynamics, Vol. 5, pp. 81-100.

Berger, A,N. and G.F Udell (1992): "Some Evidence on the Empirical Significance of Credit Rationing," Journal of Political Economy, Vol. 100, (October), No. 5, pp. 1047-1077.

Bernake, B., and A.S. Blinder(1988 “Credit, Money and Aggregate Demand,” American Economic Review, Papers and Proceedings Vol. 78, (May), pp. 435-439.

Bernake, B., and A.S. Blinder(1992): “The Federal Funds Rate and the Channels of Monetary Transmission,” American Economic Review, Vol. 82, (September), pp. 901-921.

Bernanke, B.S.,(1983): "Non—Monetary Effects of the Financial Crisis in the Propagation of the Great Depression," American Economic Review Vol. 73, (June), 257-76.

Bernanke, B.S.,1986): “Alternative Explanations of the Money-Income Correlation,” Carnegie Rochester Conference in Public Policy, Vol. 25, pp. 49-100.

Bernanke, B.S.,(1987): "Banking and Macroeconomic Equilibrium", In New Approaches to Monetary Economics, edited by William A. Barnett and Kenneth Singleton, New York: Cambridge University Press, pp. 89-111.

Bernanke, B.S,(1993): “Credit in the Macroeconomy,” Federal Reserve Bank of New York Quarterly Review, Vol. 18 (Spring), pp. 50-70.

Bernanke, B.S. and M. Gertler(1986): "Agency Costs, Collateral, and Business Fluctuations", NBER Working Paper no. 2015.

Bernanke, B.S. and M. Gertler(1987a): “Banking and Macroeconomic Equilibrium,” In New Approaches to Monetary Economics, edited by William A. Barnett and Kenneth Singleton, New York: Cambridge University Press, pp. 87-111.

Bernanke, B.S. and M. Gertler (1987b): “Financial Fragility and Economic Performance,” NBER Working Paper No. 2318.

Bernanke, B.S. and M. Gertler (1989): “ Agency Costs, Net Worth, and Business Fluctuations,” American Economic Review, Vol. 79, (March), pp. 14-31.

Bernanke, B.S. and M. Gertler (1995): “Inside the Black Box: The Credit Channel of Monetary Policy Transmission,” Journal of Economic Perspectives, Vol. 9(Fall), pp. 27-48.

Bernanke, B.S., Gertler, M., and Gilchrist, S.(1996): “The Financial Accelerator and the Flight to Quality,” The Review of Economics and Statistics Vol. 78, pp.1-115.

Bernanke, B.S., Gertler, M., and Gilchrist, S,(1999): “The Financial Accelerator in a Quantitative Business Cycle Framework, In Taylor and Woodford(1999), pp. 1341-1393.

Bernanke, B.S. and I. Mihov (1998), "Measuring Monetary Policy," Quarterly Journal of Economics, Vol. 113, (August), pp. 869-902.

Besanko, D. and Takor, A.V.(1987): “Collateral and Rationing: Sorting Equilibria in Monopolistic and Competitive Credit Markets,” International Economic Review, Vol. 28, pp. 671-689.

Bhattacharya, S. and D. Gale (1987): "Preference Shocks, Liquidity and Central Bank Policy". In New Approaches to Monetary Economics, edited by William A. Barnett and Kenneth Singleton, New York: Cambridge Press, pp. 69-88.

Blanchard, O.J. and D. Quah(1989): "The Dynamic Effects of Aggregate Demand and Supply Disturbances," The American Economic Review Vol. 79, pp. 655-673.

Blanchard, O.J. and M.W. Watson (1986). "Are Business Cycles All Alike?" in R. Gordon, ed., The American Business Cycle –Continuity of Change, *NBER Studies in Business Cycles*, Vol. 25, Chicago, University of Chicago.

Blinder, A.S., and J. Stiglitz, (1983): "Money, Credit, and Economic Activity," American Economic Review, Papers and Proceedings Vol. 7, (May), pp. 297-302.

Bliss, R.R., and Kaufman, G.G.,(2002): "Bank Procyclicality, Credit Crunches, and Asymmetric Monetary Policy Effects: A Unifying Model" Federal Reserve Bank of Chicago Working Paper No. 2002-18.

Bogunjoko, J.O.,(1997): "Monetary Dimension of the Nigerian Economic Crisis: Empirical Evidence From a Cointegrated Paradigm" Nigerian Journal of Economics and Social Studies, Vol. 39, No. 2.

Boschem, J. and M. Leonard (1995): "The Effects of Countercyclical Policy on Money and Interest Rates: An Evaluation of Evidence from FOMC Documents," Working Paper No. 91-20, Federal Reserve Bank of Philadelphia.

Boyd, J. and E. Prescott (1986): "Financial Intermediary-Coalitions", Journal of Economic Theory (April ), pp. 221-232.

Brainard, W. and J. Tobin(1963); "Financial Intermediation and the Effectiveness of Monetary Control," American Economic Review, (May) pp. 383-400.

Breitung, J.,(2000): Structural Inference in Cointegrated Autoregressive Processes. *Habilitation thesis*, Humboldt, University zu Berlin.*http://www.xplorestat.de /ebooks.html.*

Breitung, J., Bruggemann, R. and Lutkepohl, H. (2004): Structural Vector Autoregressive Modelling and Impulse Response in H. Lutkepohl and M. Kratzig(eds.) Applied Time Series Econometrics, Cambridge University Press.

Breusch, T. (1978) "Testing the autocorrelation in dynamic linear model", Australian Economic Papers, 17, 334-355.

Brischetto, A. and G. Voss (1991): "A Structural Vector Autoregression Model of Monetary Policy in Austrialia", Research Discussion Paper, Economic Department, Reserve Bank of Australia.

Brock, W.A., and L.J. Mirman (1972): "Optimal Economic Growth and Uncertainty: The Discounted Cases", Journal of Economic Theory," Vol. 4, pp. 479-5 13.

Butzen, P., F. Catherine and Vermeulen, P.(2001): "The Interest Rate and Credit Channels in Belgium: An Investigation With Micro-Level Firm Data", European Central Bank, Monetary Transmission Network Frankfurt, Germany.

Calomiris, C., and G. Hubbard (1986): "Imperfect Information, Multiple Loan Markets, and Credit Rationing", Northwestern University, mimeo.

Campbell, R.H.,(2004): "The FreeDictionary.Com *www.thefreedictionary.com/ Financial +structure*

Carcia, C.J. and Restrepo, J.E. (2001), "Price Inflation and Exchange rate Pass-through in Chile", Working Paper of Central Bank of Chile, No. 128.

Carrasquilla, A., (1998): "Monetary Policy Transmission: the Colombian Case", Bank of International Settlement Policy Papers, No. 3, pp. 81-104.

Ceccheti, S.G.,(1995): "Distinguishing Theories of the Monetary Transmission Mechanism," Federal Reserve Bank of St. Louis Economic Review Vol. 77, (May/June), pp. 83-97.

Ceccheti, S.G.,( (1999): "Legal Structure, Financial Structure, and the Monetary Policy Transmission Mechanism," Federal Reserve Bank of New York Economic Policy Review (July), pp. 9-28.

Cecchetti, S.G. and S. Krause (2001): "Financial Structure, Macroeconomic Stability and Monetary Policy", *Working Paper* 8354, National Bureau of Economic Research, Massachusetts Avenue, Cambridge (July).

Central Bank of Nigeria (1993): CBN Brief – Research Department, Series No. 93/103.

Central Bank of Nigeria (2000a): The Changing Structure of the Nigerian Economy. Central Bank of Nigeria, Abuja.

Central Bank of Nigeria (2000b): CBN Briefs, Research *Department. (June).*

Central Bank of Nigeria(2003): Statistical Bulletin, (December) Vol. 14

Chirinko, R.S. (1993): "Business Fixed Investment Spending: A Critical Survey," Journal of Economic Literature Vol. 31, (December), pp. 1875-1911.

Christiano, L.J., M. Eichenbaum and C. Evans (1996): "The Effects of Monetary Policy Shocks: Evidence from the Flow of Funds," Review of Economics and Statistics Vol. 78, No. 1, pp. 16-34.

Christiano, L.J., M. Eichenbaum and C. Evans (1999): "Monetary Policy Shocks: What Have We Learned and to What End?" Handbook of Macroeconomics, Vol. 1A, Elsevier Science B.V.

Citu, F.V.,(2003): "A VAR Investigation of the Transmission Mechanism in New Zealand," Federal Reserve Bank of New Zealand. *www.ifk-cfs.de/papers/Citu.pdf*

Claus, I., and A. Grimes (2003):"Asymmetric Information, Financial Intermediation and the Monetary Transmission Mechanism: A Critical Review. New Zealand Treasury Working Paper, 03/19. (September).

Cooley, T.F. and S.F. Leroy (1985): "Atheoretical Macroeconometrics, A Critique." Journal of Monetary Economics, Vol. 16, pp. 283-308.

Cottarelli, C., and Angeliki Kourellis(1994) "Financial Structure, Bank Lending Rate, and the Transmission of Mechanism of Monetary Policy," IMF Staff Papers, Vol. 41, No. 4, pp. 587-623.

Cottarelli, C., Giovanni. F., and Andrea Generale (1995): "Bank Lending Rates and Financial Structure in Italy," IMF Staff Papers, Vol. 42 (September), pp. 670-700.

Crouch, R.L.,(1972): Macroeconomics, Harcourt Brace Jovanovich, Inc., New York.

Cummins, J.G., Kevin A. Hassett, and R.G. Hubbard (1994): " A Reconsideration of Investment Behaviour Using Tax Reforms as Natural Experiments." Brookings Papers on Economic Activity No. 2, pp. 1-74.

Cummins, J.G., Kevin A. Hassett, and R.G. Hubbard (1996): "Tax Reforms and Investment: A Cross-Country Comparison," Journal of Public Economics Vol. 62, (October), pp. 237-273.

Cushman, D.O. and T.A. Zha(1997): "Identifying Monetary Policy in a Small Open Economy Under Flexible Exchange Rates", Journal Monetary Economics Vol. 39. No. 3, pp. 433-448.

De Arcangelis, G. and G. Di Giorgio (1998) "In Search of Monetary Policy Measures: The Case of Italy in the 1990s." in Giornale degli Economisti ed Annali di Economia, Vol. 2.

De la Roca, J., (1998): "The Transmission Mechanism of Monetary Policy in Peru", Bank of International Settlement Policy Papers, No. 8, pp. 181-194.

deMeza, D. and D. Webb(1987): "Too Much Investment: A Problem of Asymmetric Information", Quarterly Journal of Economics, Vol. 102, (May), pp. 281-292.

Demirguc-Kung, and R, Levine (2001): **"**Bank-Based and Market-Based Financial Systems: Cross-Country Comparisons", Development Research Group, The World Bank, and Finance Department, University of Minnesota.

Diamond, D.(1984): "Financial Intermediation and Delegated Monitoring," Review of Economic Studies, Vol. 51, (July), pp. 393-414.

Diamond, D. and P. Dybvig (1983): "Bank Runs, Deposit Insurance, and Liquidity," Journal of Political Economy Vol. 91, (June), pp. 401-419.

Dickey, D.A., D.W., Jesen and D.L., Thornton(1991: " A Primer on Cointegration with an Application to Money and Income," Federal Reserve Bank of St. Louis, pp. 58-78.

Dornbusch, R. and S. Fisher(1990): Macroeconomics, McGraw-Hill Publishing Company, 5th edition.

Dovciak, P., (1999): 'Transmission Mechanism Channels in Monetary Policy', DOV/0008.National Bank of Slovakia, Institute of Monetary and Financial Studies. *http://www.nbs.sk/BIATEC/DOVCAN.HTM*

Edwards, F.R.,(1993): "Financial Markets in Transition-or the Decline in Commercial Banking," in Changing Capital Markets: Implications for Monetary Policy. Federal Reserve Bank of Kansas City, pp. 5-62.

Eichenbaum, M. and C. Evans (1995): "Some Empirical Evidence on the Effects of Shocks to Monetary Policy on Exchange Rates," Quarterly Journal of Economics, Vol. 110, No. 4, pp. 975-1009.

Eichenbaum, M.,(1992): "Comment on 'Interpreting the Macroeconomic Time Series Facts: The Effects of Monetary Policy," European Economic Review Vol. 36, pp. 1001-1011.

Eijffinger, S.C.W and J. De Haan (2000), European Monetary and Fiscal Policy, Oxford, Oxford University Press.

Elbourne, A., Jakob de Haan, B.MC. Kiviet (2003): "Financial Structure and Monetary Policy Transmission in Transition Countries", University of Groningen, the Netherlands.

Engle, R.F. and Granger, C.W.J. (1987): "Co-integration and error correction: Representation, estimation and testing", Econometrica, 55, 251-276.

Esezobor, E.A.(2003): "The Peculiarities and Challenges for the Surveillance of Non-Bank Financial Institutions," *Seminar on Issues in Financial Institutions Surveillance in Nigeria,* Central Bank of Nigeria, Training Centre, Lagos, No. 3.

Estrella, Arturo (2001): "Financial Innovation and the Monetary Transmission Mechanism", Federal Reserve Bank of New York.

Eyzaquirre, N., (1998): "Monetary Policy Transmission: The Chilean Case", Bank of International Settlement Policy Paper, No. 8, pp. 73-80.

Ezeuduji, F.U.,(1994): "The Effects of Monetary Policy On the Performance of Banking Industry in Nigeria", Central Bank of Nigeria, Economic and Financial Review, Vol.32, No. 3, pp.268-278.

Ezeuduji, F.U. (2001): "Monetary and Financial Sector Policy in Budget 2001," NCEMA Policy Analysis Series, Vol. 7, No. 1.

Fama, E.,(1980): Banking in the Theory of Finance," Journal of Monetary Economics, Vol. 10, pp. 10-19.

Fama, E.,( (1985): "What's Different About Banks?" Journal of Monetary Economics Vol. 15, (January), pp. 29-40.

Farinha, L., and C. R. Marques (2002): "The Bank Lending Channel of Monetary Policy: Identification and Estimation Using Portuguese Micro Bank Data", *A Paper Presented at the Conference on Monetary Policy Transmission in the Euro-Area*, held in Frankfurt, Dec 18-19, 2001.

Farmer, R.,(1984): " A New Theory of Aggregate Supply", American Economic Review, Vol. 74, (December), pp. 920-30.

Favero, C.A., F. Giavazzi and L. Flabbi (1999), The Transmission Mechanism of Monetary Policy in Europe: Evidence from Banks' Balance Sheets, CEPR Discussion Paper, No. 2303

Fisher, I.,(1933): "The Debt-Deflation Theory of Great Depressions," Econometrica, Vol. 1 (October ), 337-57.

Freimane, R.,(2004): "Estimating the Effects of Monetary Policy," LDN Project Participant. *www.eurofakultetas.vu.lt/Nordic/Freimane_MTM in Latvia.pdf*

Friedman, B.M., and Kuttner, K.N. (1993): Economic Activity and the Short-Term Credit Markets: An Analysis of Prices and Quantities. Brookings Papers on Economic Activity, Vol. 2, pp. 193-283.

Friedman, M., and A. Schwartz (1963): A Monetary History *1867-1960*, Princeton University Press.

Friedman, M., and A. Schwartz (1986):"Has Government any Role in Money,' Journal of Monetary Economics, pp. 37-62.

Fung, B.S.C.,(2002): "A VAR Analysis of the Effects of Monetary Policy in East Asia", Bank of International Settlements Working Papers No. 119.

Furness, E.L.(1975): Money and Credit in Developing Africa. London: Heinemann Educational Books Ltd.

Gale, D. and M. Hellwig(1985): "Incentive-Compatible Debt Contracts I: The One-Period Problem", Review of Economic Studies 52 (October), 647-664.

Gali, J.,(1992): "How Well Does the IS-LM Model Fit Postwar U.S Data?" Quarterly Journal of Economics, CVII, pp. 709-735.

Gallego, F. and N. Loayza (2000): "Financial Structure in Chile: Macroeconomic Developments and Microeconomic Effects." Paper presented at the conference "Financial Structures and Economic Development," Organized by Asli Demirguc-Kunt and Rose Levine, The World Bank, Feb. 10-11.

Gambacorta, L.,(2001): "Bank Specific Characteristics and Monetary Policy Transmission: The Case of Italy", European Central Bank Working Paper Series, No. 103.

Gertler, M.,(1988): "Financial Structure and Aggregate Economic Activity: An Overview," NBER Working Paper Series, (April), pp. 1-51.

Gertler, M., and H. Glein(1988): "Financial Factors in Business Fluctuations", In Financial Market Volatity: Causes, Consequences, and Policy Recommendations, *Federal Reserve Bank of Kansas City*.

Gertler, M., and S. Gilchrist,(1993a): "The Role of Credit Market Imperfections in the Monetary Transmission Mechanism: Arguments and Evidence," Board of Governors of the Federal Reserve System, Finance and Economic Discussion Series, pp. 93-95.

Gertler, M., and S. Gilchrist (1993b): "Monetary Policy, Business Cycle and the Behaviour of Small Manufacturing Firms," Board of Governors of the Federal Reserve System, Finance and Economic Discussion Series, pp. 93-94.

Ghatak, S.(1981): Monetary Policy in Developing Countries. London: The Macmillan Press Ltd.

Godfrey, L.(1978): "Testing against general autoregressive and moving average error models when the regressors include lagged dependent variables", Econometrica, 46, 1293-1302.

Goodfriend, M.,(1993): "Interest Rate Policy and Inflation Scare Problem: 1979-1992." Federal Reserve Bank of Richmond Economic Quarterly, Vol. 79, No. 1(Winter), pp. 1-24.

Goldsmith, R. W. (1969) Financial Structure and Development. Yale University Press, New Haven, CT.

Gordon, H.S. Jr.(2002): "The Changing U.S. Financial Sytem: Some Implications for the Monetary Transmission Mechanism," Federal Reserve Bank of Kansas City, *www.kc.frb.org*.

Gorton, B. and G. Pennacchi, (1993): "Money Market Funds and Finance Companies: Are They Banks of the Future?" in M. Klausner and L.J. White (ed.) Structural Change in Banking, Irwing Publishing, pp. 173-214.

Granger, C.W.J.,(1983): Cointegrated Variables and Error Correction Models. Discussion Paper, University of Califonia, San Diego.

Greenwald, B., J. E. Stiglitz, and A. Weiss (1984): "Informational Imperfections in the Capital Market and Macroeconomic Fluctuations", American Economic Review, Vol. 74, (May), pp. 194-200.

Gunduz, L.,(2000): "Monetary Transmission and Bank Lending in Turkey," Paper presented at the International Conference on "*Banking, Financial Markets and the Economies of the Middle East and North Africa*," LUA, Byblos/Lebanon, May, 23-35.

Gujarati, D.N.,(1995): Basic Econometrics, McGraw-Hill International Editions.

Gurley, J., and E. Shaw(1955): "Financial Aspects of Economic Development," American Economic Review Vol. 45, (September), pp. 515-38

Haberler, G.,(1941): Prosperity and Depression (Geneva: League of Nations, ) pp. 242.

Hall, S.,(2001): "Credit Channel Effects in the Monetary Transmission Mechanism," Bank of England Quarterly Bulletin, Winter pp.442-448.

Hicks, J. R.,(1937): "Mr. Keynes and the 'Classics' A Suggested Interpretation" Econometrica Vol.5, (April), pp. 147-159.

Holtemöller, O.,(2002): "Identifying a Credit Channel of Monetary Policy Transmission and Empirical Evidence for Germany", a Paper Presented at the Freie Universität Berlin: http://amor.rx.hu-berlin.de/h32330ay.

Hoover, K.D., and S. Perez (1994): "Post Hoc Ergo Propter Once More: An Evaluation of 'Does Monetary Policy Matter?' in the Spirit of James Tobin." Journal of Monetary Economics, Vol. 34, (August), pp. 47-73.

Hubbard, R.G.,(2001): Capital-Market Imperfections, Investment, and Monetary Transmission Mechanism. In Deutsche Budesbank (Ed.) Investing Today for the World of Tomorrow, Studies on the Investment Process in Europe, Berlin: Springer.

Hubbard, R.G.,(1994): "Is There a Credit Channel for Monetary Policy?" *Paper Presented at Federal Reserve Bank of St. Loius Economic Policy Conference*, (October), pp. 20-21.

Hülsewing, O., Winker, P. and Worms, A. (2001): "Bank Lending in the Transmission of Monetary Policy: A VECM Analysis for Germany. Working Paper 08/2001, International University in Germany Bruchsal.

Ikhide, S. I. and A. A. Alawode (1993): 'Impact of Stabilisation Programmes on the Growth of the Money Market in Nigeria', The Developing Economies, Vol. 31, No. 2 (June).

Ikhide, S.I.(1996): Financial Sector Reforms and Monetary Policy in Nigeria, IDS Working Papers 68, Institute of Developing Economies, Tokyo, Japan.

Ikhide, S.I.,(1997): "Financial Sector Reform and Growth of Capital Market in Nigeria," Institute of Developing Economies, V.R.F Series, No. 291, (February).

Iniodu, P.C. and C.U. Udomesiet, (1994) "Commercial Banking System Efficiency and Financing of Small –Scale Enterprises (SSEs) in the 21st Century," in Leading Issues in Macroeconomic Management and Development, Edited By Abdul-Ganiyu Garba, et. al. Nigerian Economic Society. pp.161-183.

Iyoha, M. A., (1976): "The Demand for Money in Nigeria", Social and Economic Studies, Vol. II, No. 3, pp. 386-96.

Jacklin, C.,(1985): Essays in Banking, PhD Thesis, *Stanford Graduate School of Business.*

Jaffee, D., and T. Russell (1976): "Imperfect Information and Credit Rationing,' Quarterly Journal of Economics 90, 651-666.

Jimoh, A., (1990): "The Demand for Money and the Channels of Monetary Shocks Transmission in Nigeria, Nigerian Journal of Economic and Social Studies, Vol. 32, No. 1, pp. 91-103.

Johansen, S.,(1988): "Statistical Analysis of Cointegrated Vectors," Journal of Economic Dynamic and Control, Vol. 12, pp. 231 -254.

Johansen, S.,(1991). Estimation and Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models. Econometrica, Vol. 59, No. 6, pp. 1551-1580.

Johansen, S. and K. Juselius (1990) "Maximum Likelihood Estimation and Inferences on Cointegration—with applications to the demand for money," Oxford Bulletin of Economics and Statistics, Vol. 52, pp. 169–210.

Juks, R.,(2003): "Monetary Policy Transmission Mechanism: A theoretical and Empirical Overview. *http://www.eestipank.info/pub/en/dokumendid/publikatsioonid/seeriad/muud_uuringud/_2004/_2.pdf?objId=533623*

Juselius, K.,(1998): "Changing Monetary Transmission Mechanisms within the EU," Empirical Economics Vol. 23, pp. 455-481.

Kakes, J., J.E. Sturm and P. Maier (1999): "Monetary Transmission and Bank Lending and Germany", *De Netherlands Bank.*

Kamin, S., Turner, P. and Van't Dack, P. (1998): "The Transmission Mechanism of Monetary Policy in Emerging Market Economies: an Overview," Bank of International Settlement Policy Paper, No. 3, pp. 5-65.

Kashyap, A.K., and Jeremy, Stein,(1994): "The Impact of Monetary Policy on Bank Balance Sheets," NBER Working Paper No. 4821 (Cambridge, Massachusetts: National Bureau of Economic Research).

Kashyap, A.K., and Jeremy, Stein (1997a): "The Role of Banks in Monetary Policy: A Survey with implications for the European Monetary Union", Economics Perspectives, Federal Reserve Bank of Chicago.

Kashyap, A.K., and Jeremy, Stein,(1997b): "What Do a Million Observations on Banks Say About the Transmission of Monetary Policy?" NBER Working Paper, No. 6065(Cambridge, Massachusetts).

Kashyap, A.K., J.C. Stein and D.W. Wilcox (1993): "Monetary Policy and Credit Conditions: Evidence from the Composition of External Finance," American Economic Review, Vol. 83, (March), pp. 78-98.

Keeton, W.R.,(1979), "The Impact of Monetary Policy on Bank Lending: The Role of Securities and Large CDs," Federal Reserve Bank of Kansas City Economic Review (Second quarter,) pp. 35-47.

Keynes, J.M.,(1936): The General Theory of Employment, Interest and Money, Macmillan.

Kim S. and N. Roubini (1999): "Exchange Rate Anomalies in the Industrial Countries: A Solution With a Structural VAR Approach", University of Illinois, Urbana – Champaign, Mimeo.

Kim, H.E.,(1999): "Was Credit Channel a Key Monetary Transmission Mechanism Following the Recent Financial Crisis in the Republic of Korea? Policy Research Working Paper , No. 3003.

Kindleberger, C., (1978*): Manias, Panics, and Crashes*, New York: Basic Books.

King, S.R.,(1986): "Monetary Transmission: Through the Bank Loans or Bank Liabilities" Journal of Money, Credit and Banking, Vol. 32, No. 1, ( February), pp. 121-141.

Kuh, E., and J. Meyer (1963): "Investment, Liquidity and Monetary Policy," in Commission on Money and Credit: Impacts of Monetary Policy, pp. 339-474.

Kuijs, L., (2002): "Monetary Policy Transmission Mechanisms and the Inflation in the Slovakia Republic", IMF Working Papers WP/02/80.

Lack, C. and C. Lenz (2003): "A Program for the Identification of Structural VAR – Models," pp. 1-17. http://www.unibas.ch/wwz/makro/svar.

Laurent, R.D., (1988): "An Interest Rate-Based Indicator of Monetary Policy," *Economic Perspectives*, Federal Reserve Bank of Chicago, Vol. 12. No.1( January/February), pp. 3-14.

Leeper, E.M., Christopher, A. Sims and T. Zha (1996): "What Does Monetary Policy Do?" Brookings Papers on Economic Activity, Brookings Institution, Vol. 2, pp.1-78.

Levacic, R., and A. Rebmann (1982): Macroeconomics: An Introduction to Keynesian-Neoclassical Controversy, English Language Book Society/Macmillan Publishers Ltd, London and Basingstoke.

Levine, R., (2000): “Bank-Based or Market–Based Financial Systems: Which is Better? National Bureau of Economic Research, Working Paper 9138 http://www. nber.org/papers/w9138.

Litterman, R., and L. Weiss (1985): "Money, Real Interest Rates, and Output: A Reinterpretation of Postwar U.S. Data," Econometrica Vol. 53, pp. 129-156.

Lopes, F., (1998): “The Transmission Mechanism of Monetary Policy in a Stabilizing Economy: Notes on the Case of Brazil”, Bank of International Settlement Policy Papers, No. 3, pp. 65-73.

Lown, C.S.,(1988): “The Credit–Output Link vs. the Money–Output link: New Evidence,” Federal Reserve Bank Dallas Economic Review, Nov. 1-10.

Lutkepohl, H. and M. Kratzig and D. Boreiko(2005): VAR Analysis in JMULTI, *www. Jmulti.de*.

Lyziak, T., (2001): “Monetary Transmission Mechanism in Poland: Theoretical Concepts vs. Evidence”, The National Bank of Poland, Paper No. 19.

Maddala, G.S., I.M., Kim (1998): Unit Roots, Cointegration, and Structural Change (Cambridge University Press: Cambridge).

Martinez, L. Sanchez, O. and Werner, A. (2001): “Monetary Policy and the Transmission Mechanism in Mexico”, Papers Presented at Banco de México's 75th Anniversary Seminar Mexico City November 14-15, 2000, Banco de México, pp. 197- 261.

Mas-Colell, A. Whinston, M.D., and Green, J.R.,(1995): Microeconomic Theory, New York: Oxford University Press.

Mihaljek, D. and Klau, M. (2001): “A Note on the Pass-through from Exchange Rate and Foreign Price Changes to Inflation in Selected Emerging Market Economies”, Bank of International Settlement Policy Paper, No. 8, pp. 69-82.

Minsky, H.,(1975): John Maynard Keynes, New York: Columbia University Press.

Misaico, Z.Q.,(2001): “Transmission Mechanisms of Monetary Policy in an Economy with Partial Dollarization: the Case of Peru”, Bank of International Settlement Policy Paper , No. 8.

Mishkin, F.S.,(1978): "The Household Balance Sheet and the Great Depression", Journal of Economic History 38 (December ), pp. 918-37.

Mishkin, F.S. (1995): “Symposium on the Monetary Transmission Mechanism” Journal of Economic Perspectives, Vol. 9, (Fall), pp. 3-40.

Mishkin, F.S.(1996), “The Channels of Monetary Transmission: Lessons for Monetary Policy”, NBER Working Paper, No. 5464, (February).

Mishkin, F.S.,(2001): The Economics of Money, Banking, and Financial Markets. Boston, Toronto: Little, Brown and Co.

Modigliani, F. and M. Miller (1958): "The Cost of Capital, Corporation Finance and the Theory of Investment," American Economic Review, Vol. 48, (June), 261-297.

Modigliani, F.,(1944): "Liquidity Preference and the Theory of Interest arid Money", Econometrica, pp. 45-88.

Modigliani, F.,(1963): "The Monetary Mechanism and its Interaction with the Real Phenomena," Review of Economics and Statistics, Supplement, (February), pp.79-107.

Montiel, P.,(1991): "The Transmission of Mechanism for Monetary Policy in Developing Countries," IMF Staff Papers, Vol. 38. No. 1 (March), pp. 83-108.

Moore, R.,(1987): "Three Essays on Asymmetric Information and Financial Contracting, University of Wisconsin, PhD Thesis.

Morley, B.(2000): "Money, Stock Prices and Deregulation of Financial Markets," Research Paper 2000-1, School of Management and Business, University of Wales

Morris, C.S. and G.H. Sellon, Jr. (1995): "Bank lending and Monetary Policy: Evidence on a Credit Channel,' Federal Reserve Bank Kansas City Economic Review, Vol. 80, No. 2, ( Second Quarter), pp. 59-75.

Morsink, J., and T. Bayoumi,(2001): "A Peek Inside the Black Box: The Monetary Transmission Mechanism in Japan," IMF Staff Papers, Vol. 48, No. 1.

Myers, S.C., and N.S. Majluf (1984): "Corporate Financing and Investment Decisions When Firms Have Information that Investors Do Not Have", Journal of Financial Economics Vol. 13, (June), pp. 184-221.

NCEMA (National Centre for Economic Management and Administration) (1994): Macroeconomic Policy Analysis and Management: Training Programme Report, Ibadan, Nigeria.

Nnanna, O.J.,(2002): "Monetary Policy and Exchange Rate Stability in Nigeria," Proceedings of a One-day Seminar held on 23 May 2002 Federal Palace Hotel, Lagos, The Nigerian Economic Society.

Nwankwo, G.O., (1980): The Nigerian Financial System; Macmillan Publisher.

Nwaobi, G.C.,(1999): "Money and Output Interactions in Nigeria: An Econometric Investigation", Central Bank of Nigeria, Economic and Financial Review, Vol. 37, No. 3 (September.).

Nyong, M.O.,.(1997): "Capital Market Development and Long-Run Economic Growth: Theory, Evidence and Analysis," First Bank of Nigeria PLC Bi –Annual Review, Vol. 5. No. 11(December).

Oduyemi, O.S.,(1993): "Open Market Operations as an Instrument of Monetary Policy in Nigeria: Administration, Problem and Prospects," Central Bank of Nigeria, Economic and Financial Review, Vol. 31, No. 1, (March).

Ogunleye, G.A.(2003): "Official Safety-Nets for the Nigerian Financial System – the Role of the Nigerian Deposit Insurance System," *Seminar on Issues in Financial Institutions Surveillance in Nigeria,* Central Bank of Nigeria, Training Centre, Lagos, No. 3.

Ogwuma, P.A.,(1993): *Recent Development in the Nigerian Financial Service Industry: Problems and Challenges* Lagos: Central Bank of Nigeria.

Ojo, M.O., (1992): "Monetary Policy in Nigeria in the 1980s and Prosperity in the 1990s, Central Bank of Nigeria, Economic and Financial Review, Vol. 30, No. 1 (March) pp. 1-31.

Ojo, M.O.(1999): "The Evolution and Appraisal of Open Market Operations as an Instrument of Monetary Policy in Nigeria," Nigerian Journal of Economics and Social Studies, Vol. 41, No. 1, pp. 1-44.

Ojo, O., (1974a): "The Demand for Money in the Nigerian Economy: Some Comments", The Nigerian Journal of Economic and Social Studies Vol. 16. No. 1 (Mar.), pp. 149-52.

Ojo, O., (1974b): "The Demand for Money: Evidence from an Underdeveloped Money Market", The Nigerian Journal of Economic and Social Studies. Vol. 16, No. 2(July), pp. 235-42.

Ojo, O.,,(1993): "A Review and Appraisal of Nigeria's Experience with Financial Sector Reforms," *Central Bank of Nigeria* Research Department, Occasional Paper, No. 8 (August).

Okah, G.O., (1996): Lesson from Nigeria's Recent Monetary and Fiscal Policy Experience: CBN Economic and Financial Review, (June), pp. 18-25.

Oliner, S.D., and G.D. Rudebusch (1995): " Is There a Bank Lending Channel for Monetary Policy?" Federal Reserve Bank of San Francisco Economic Review, Vol. 2, pp. 3-20.

Oliner, S.D., and G.D. Rudebusch,(1996): "Monetary Policy and Credit Conditions: Evidence from the Composition of External Finance: Comment," American Economic Review, Vol. 86, No. 1, pp. 300-309.

Olorunshola, J.A.,(2003): "Financial System Regulation in Nigeria: Theoretical Framework and Institutional Arrangements," *Seminar on Issues in Financial Institutions Surveillance in Nigeria,* Central Bank of Nigeria, Training Centre, Lagos, No. 3.

Onyido, B.C.(2000): "Current Strategy of Monetary Policy in Nigeria," Central Bank of Nigeria, Economic and Financial Review, Vol 39.

Oresotu, F.O., (1992): "Interest Rate Behaviour Under a Programme of Financial Reform: The Nigerian Case, Central Bank of Nigeria Economic and Financial Review, Vol. 30, No. 2 (June). pp. 109-129.

Oyaromade, R.,(2003): Credit Rationing and the Transmission Mechanism of Monetary Policy in Nigeria, A Ph.D Thesis Submitted to the Department of Economics, University of Ibadan, Nigeria.

Patinkin, D.,(1948): "Price Flexibility and Full Employment," American Economic Review, Vol. 38.

Phillips, P.C.B. and P. Perron (1988) "Testing for a Unit Root in Time Series Regression," Biometrika, Vol. 75, pp. 335–346.

Pigou, A.C.,(1943) "The Classical Stationary State," Economic Journal, Vol. 53, (December), pp. 343-51.

Ramey, V.,(1993): "How Important is the Credit Channel in the Transmission of Monetary Policy?" CRCS on Public Policy, Vol. 39, (December), pp. 1-46.

Rapallo, P.,(2003): "Credit Market Imperfections and Aggregate Economic Activity: A Literature Review: Department of Economics, University of California, San Diego.

René, M.S.,(2000): "Does financial structure matter for economic growth? A corporate finance perspective", Being a paper presented at the 1999 ABCD *World Bank Conference,* in Washington, Revised in 2000.

Romer, C.D and D.H. Romer,(1989): "Does Monetary Policy Matter?" A New Test in the Spirit of Friedman and Schwartz," In Olivier Jean Blanchard and Stanley Fisher, eds. NBER Macroeconomics Annual, Cambridge, MA: MIT Press pp.121-183.

Romer, C.D and D.H. Romer, (1990): "New Evidence on the Monetary Transmission Mechanism" Brookings Paper on Economic Activity, Vol. 1, pp. 149-213.

Rothschild, M. and J. Stiglitz (1976): "Equilibrium in Competitive Insurance Markets An Essay on the Economics of Imperfect Information," Quarterly Journal of Economics, Vol. 90, pp. 629-650.

Sanusi, J.O.(2002): "Repositioning the Nigerian Financial Markets for Competitiveness in the 21st Century," A National Workshop Organized by the Financial Services Regulation Coordinating Committee, June 24th-26th Abuja, Nigeria.

Sargan, J.D. and A. Bhargava (1983): Testing Residuals from Least Squares Regression for being Generated by the Gaussian Random Walk, Econometrica, Vol. 51, No. 1, pp. 153-67.

Securities and Exchange Commission (SEC 2003): Annual Reports, Nigeria

Shapiro, M.D. and M.W. Watson (1988): "Sources of Business Cycle Fluctuation," in S.Fisher(ed.), NBER Macroeconomic Annual. The MIT Press, Cambridge(Mass.) and London.

Sims, C.A.,(1972): "Money, Income and Causality", American Economic Review, Vol. 62, pp. 540-542.

Sims, C.A.,(1980a): "A Macroeconomics and Reality," Econometrica, Vol. 48, (January) pp. 1-48.

Sims, C.A. (1980b): "Comparison of Interwar and Postwar Business Cycles Monetarism Reconsidered," American Economic Review, Vol. 70-2, (May), pp. 250-257.

Sims, C.A. (1986): "Are Forecasting Models Usable for Policy Analysis" Federal Reserve Bank of Minneapolis Quarterly Review, Vol. 10, No. 1, pp. 2-16.

Sims, C.A. (1992). Interpreting the Macroeconomic Time-Series Facts: The Effects of Monetary Policy. European Economic Review, Vol. 36, pp. 5, pp. 875-1011..

Sims, C.A. and T, Zha(1995): "Does Monetary Policy Generate Recessions?" Manuscript, Yale University.

Sims, C.A. (1996): "System Methods for Bayesian Forecasting Models," mimeo, October.

Sirivedhin, T., (1997): "Financial Reform and Monetary Transmission Mechanism: the Case of Thailand," pp. 195-222. www.bis.org/publ/plcy03i.pdf

Smant, David, J.C.,(2002): "Bank Credit in the Transmission of Monetary Policy: A Critical Review of the Issue and Evidence". Erasmus University Rotterdam, Dept. of Economics, pp. 1-30 *http://people.few.eur.nl/smant/bankcreditchannel-2002.pdf*

Sofianos, G., Wachtel, P. and Melnik, A., (1990): "Loan Commitment and Monetary Policy," Journal of Banking and Finance, Vol. 14, (October), pp. 677-689.

Spence, M.(1973): "Job Market Signaling," Quarterly Journal of Economics, Vol. 87, pp. 355-374.

Stiglitz, J. and A. Weiss (1981): "Credit Rationing in Markets with Imperfect Information", American Economic Review Vol. 71, (June) pp. 393-410.

Strongin, S.(1995): "The Identification of Monetary Policy Disturbance: Explaining the Liquidity Puzzle." Journal of Monetary Economics, Vol. 35, pp. 3, pp. 463 -93.

Suzuki, T.,(2001): "Is the Lending Channel of Monetary Policy Important in Australia? Working Paper in Economics and Econometrics, Australian National University, Australia, Working Paper No 400, ISBN 086831 4005.

Svensson, L.E.O.(1985): "Money and Asset Prices in a Cash-In-Advance Economy," Journal of Political Economy, Vol. 93, pp. 919-944.

Taylor, J.B and Woodford, M. eds.(1999): Handbook of Macroeconomics, Amsterdam: Elsevier.

Taylor, J.B.(1995): "The Monetary Transmission Mechanism: An Empirical Framework," Journal of Economic Perspective, Vol. 9, No. 4. pp. 11-26.

Tella, S.A and O. Omitogun (1989): Potency of Monetary Policy for Economic Recovery in a Less Developed Country, The Case of Nigeria, *Paper Presented at the National Conference on the Financial System and Nigeria's Economic Recovery, Ahmadu Bello University, Zaria.*

Teriba, O., (1974): "The Demand for Money in the Nigerian Economy: Some Methodological Issues and Further Evidence", *The Nigerian Journal of Economic and Social Studies* Vol. 16 (Mar.) No. 1 pp. 153-63.

Thornton, D.L.,(1994): "Financial Innovation, Deregulation and the "Credit View" of Monetary Policy," Federal Reserve Bank of St. Louis Review, Vol. 76, No. 1, ( January/February), pp. 31-49.

Tobin, J. and W. Dolde (1963), "Wealth, Liquidity and Consumption," in Consumer Spending and Monetary Policy: The Linkages, Monetary Couterance Series 5, Boston: Federal Reserve Bank of Boston, pp. 99-146.

Tobin, J.(1969): "A General Equilibrium Approach to Monetary Policy" Journal of Money, Credit and Banking, Vol 1, (February), pp. 15-29.

Tobin, J, (1975): "Post Hoc Ergo Propter Hoc", Quarterly Journal of Economics, Vol. 84, (May), pp. 195-202.

Tomori, S., (1972): "The Demand for Money in the Nigerian Economy". The Nigerian Journal of Economic and Social Studies. Vol. 16, No. 1(March) pp. 337-45.

Townsend, R.N.(1979): "Optimal Contracts and Competitive Markets with Costly State Verification," Journal of Economic Theory, Vol. 21, pp. 265-93.

Townsend, R.N.(1986): "Arrow-Debreu Programs as Microfoundations for Macroeconomics," University of Chicago, mimeo.

Tseng, W., and Corker, R., (1991): "Financial Liberalization, Monetary Policy in Asian Countries", International Monetary Fund, Occasional paper, Vol. 84, (July), pp. 11-22.

Uchendu, O.A.,(1997): "The Transmission Mechanism of Monetary Policy In Nigeria", Central Bank of Nigeria, Economic and Financial Review, Vol. 34, No. 2, pp. 606-625.

Udegbunam, R.I.(1995): "Financial Deregulation and Monetary Policy in Nigeria: An Examination of the New Operating Techniques," The Nigerian Economic and Financial Review, Vol. 1. No. 1. pp. 24-34.

Udegbunam, R.I.(2002): "Monetary and Financial Policy," in Nigerian Economy, Structure, Growth and Development, Edited by Iyoha, M.A and Itsede, C.O. Mindex Publishing, Benin City, pp. 253-279.

Uduebo, M.A. (1985): The Role of Monetary and Fiscal Policies in Industrial and Agricultural Development in Nigeria, Central Bank of Nigeria: Economic and Financial Review, (March), pp. 5-19.

Uffot, L.,(2003): "The Nigerian Financial System and the Role of Central Bank of Nigeria," *Seminar on Issues in Financial Institutions Surveillance in Nigeria*, Central Bank of Nigeria, Training Centre, Lagos, No. 3.

Umole, J.A.,(1985): Monetary and Banking Systems in Nigeria, Gaskiya Corporation Limited, Zaria.

Walsh, C.E.(1998): Monetary Theory and *Policy*. Cambridge: MIT Press.

Warner, Anders (2000): Lecture Notes on Structural Vector Autoregression, pp. 1-32 (online).

Watson, M.W.(1994): Vector Autoregressions and Cointegration, in Handbook of Econometrics, Vol. IV. Edited by R.Engle and D.L. McFadden pp. 2844-2915.

Williamson, S.D.(1986): Costly Monitoring, Financial Intermediation, and Equilibrium Credit Rationing, Journal of Monetary Economics, Vol. 18, (September), pp. 159-79.

Wold, H.O.A.(1954): "Causality and Econometrics," Econometrica, Vol. 22, pp. 162-177.

Worms, Andreas, (2001) "The Reaction of Bank Lending to Monetary Policy Measures in Germany," Eurosystem Monetary Transmission Network, European Central Bank, Working Paper Series, Frankfurt, Germany, (December).