IMPACT OF TREASURY BILLS RETURNS ON FINANCIAL INTERMEDIATION IN NIGERIA

By

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A THESIS SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, AHMADU BELLO UNIVERSITY, ZARIA, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTERS OF SCIENCE DEGREE IN ECONOMICS

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Declaration

I hereby declare that the work in this thesis entitled, IMPACT OF TREASURY BILLS RETURN ON FINANCIAL INTERMEDIATION IN NIGERIA has been carried out by me in the Department of Economics under the supervision of Dr. A. R. Sanusi and Dr. M. M. Usman. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this thesis was previously presented for another degree or diploma at this or any other institution.

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Certification

This thesis entitled, IMPACT OF TREASURY BILLS RETURNS ON FINANCIAL INTERMEDIATION IN NIGERIA by Shinkut Hilary SHEYIN meets the regulation governing the award of the degree of Master of Science in Economics of the Ahmadu Bello University, and is approved for its contribution to knowledge and literary presentation.

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Dedication

First and foremost, this thesis is dedicated to God Almighty for his infinite mercies, and the strength he granted to me during my studies. I equally dedicate this to my loving and caring parents Mr.and Mrs. Fidelis and Phibi Sheyin, who gave me this opportunity to be where I am in life today.

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Abstract

This study attempts to examine the impact of Deposit money banks' investment on treasury Bills and the impact thereof on the amount of credit extended by these banks to the private sector in Nigeria. The study estimated a model which suggests that supply of loans and advances by DMBs was a function of Total deposit, Treasury Bills, FGN Bonds, interbank rates, and the Yield spread between Loans and Treasury Bills. A Vector Error Correction (VEC) technique was used to estimate the model using quarterly data for the period of 2003-2013. The study finds that: (i) a negative relationship exists between loans to the private sector and treasury bills holding of DMBs (ii) the spread between credit to private sector and Treasury Bills returns determined their demand in the short run, and (iii) FGN Bonds had a more significant negative effect on financial intermediation than Treasury Bills. The study concludes that demand for government's deficit financing instruments reduced financial intermediation in Nigeria but the effect runs more through FGN Bonds than through Treasury Bills. From these findings, the study recommends that policies which could stabilize the economy and stimulate high investment returns in the longer term could encourage banks to concentrate more on intermediation activities, and policies that would re-align the returns government debt instruments and private sector debt instrument could further deepen the market and encourage competition between government and private sector debt instruments.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

With regards to the rising government deficit in Nigeria, the Nigerian government, while having several other financing options such as running down its cash reserves, selling some of its assets like properties or printing more currency (ways and means advances), has heavily relied on short term borrowing from the banking system – more specifically by means of Treasury Bills.

Deposit Money Banks (DMBs) are the most dominant players in the Nigerian financial system holding 68 percent of the total deposits of the financial sector in the year 2012 (CBN, 2013). However, some of the perennial policy challenges facing the banking sector in Nigeria, and indeed most developing countries, are the efficiency and effectiveness with which surplus funds are intermediated between surplus units and deficit units and how to improve it. These issues have been at the heart of various financial sector reforms in Nigeria. Most of the reforms have been focused on the liberalization of the financial system to ensure that the sector is proactively positioned to perform the role of intermediation and play a catalytic role in economic development (Ogege and Shiro, 2012). These policies have not yielded the desired result as the financial subsector has been periodically punctuated by several factors which have made it vulnerable to systemic distress, macro-economic volatility and policy fine tuning (Kama 2006).Credit to the private sector (as a % of total assets) from DMBs did not show any significant improvement between 2003 and 2013. It remained at an average of around 35.82% with the maximum being 42.28% in 2010. It rose from 31.70% in 2003 to 33.89% in 2004. It

then continuously declined to 30.43% in 2007. It however increased to 42.28% in 2010 before falling again to 35.85% in 2012 (CBN, 2013).

One of the major sources of short-term funding for the Nigerian government is generated through Treasury Bills. In 2012, Treasury Bills alone made up about 34% of total government debt instruments in Nigeria and about 67% of total issues are held by Deposit Money Banks (CBN, 2013). It is evident that the volume of Treasury Bills as a proportion of total assets of DMBs oscillated together with the discount rate on Treasury Bills. As at 2003 the discount rate on Treasury Bills was 15.02% which was consistent with a volume (as a % of total assets) of about 14.39%. Both the rate and volume held by DMBs (as a % of total assets) declined afterward to a decade minimum of 6.13% and 2.89% respectively in 2009. This period was consistent with the global recession that affected the global economy. Afterward Treasury Bills rate began to increase resulting to a rise in volume held by DMBs (as a % of total assets) from 2.89% in 2009 to about 10.21% in 2012 before slightly declining to 6.34% in 2013. This period was consistent with a rise in Treasury Bills rate from 6.13% in 2009 to 17.20% in 2012 and down to 13.34% in 2013.

Generally, one of the rationales behind the use of treasury bills in banks' portfolios is that economic volatility affects banks more and that banks need to manage a strong portfolio. Treasury bills may serve this function because they are almost similar to holding cash while receiving a reasonable return (Takele, 2013).The high return and high risk characteristic of loans vis-a-vis the high return and low risk nature of treasury bills have made these assets to become competitive in the asset portfolio of DMBs and the difference between the returns on both assets might serve as an incentive for the banks to increase their investment in a particular asset over the other. The risk premium on lending has been one of the reasons why lending rate has stayed

above Treasury bills rate in Nigeria. But the need to bridge an increasing fiscal deficit gap has resulted government to not only increase the supply of Treasury bills in the market, but also fix a attractive rate. Thus, reducing the spread between lending rate and treasury bills rate. This among several other factors has intensified the competition between the two assets (Obioma, 2012).

It has been argued that an attractive Treasury bills rate in a non-competitive market compel banks to shift their portfolio towards risk-free quality assets, which in turn reduces their intermediation role (Ndung'u and Ngugi, 2000). Furthermore, it has been shown on both theoretical and empirical grounds that excessive reliance of the government on borrowing from domestic sources (as shown by the rising accumulation of government debt instruments by Deposit Money Banks), particularly Deposit Money Banks (DMBs) to finance its deficit might crowed out the private sector from the credit market (Solido, 2003; Gaber, 2009; Emran and Farazi, 2009; Onyewu, 2011, Fayed, 2012; Kirchner and Wijnbergen, 2012).Kuttner and Lown (1998) also stressed this in their work by emphasizing that new issues of debt are taken up by banks and may serve as substitute for loans to the private sector, and therefore reduced the supply of bank credit to the private sector.

The effect of a rise in the accumulation of Treasury Bills by Deposit Money Banks in Nigeria is that it might lead to a change in the structure of intermediation in favor the public sector at the expense of the private sector. Sanusi (2012) states that a well functioning banking system should be able to efficiently diversify risk while maintaining their ability to enhance the flow of liquidity into the domestic economy. It is therefore imperative that while seeking lower risk investments opportunities, commercial banks do not relegate to the background their fundamental role of making financial resources available to the private sector. This is because

the inability of the private sector to access adequate finance will stall investment and output growth thereby hindering the attainment of macroeconomic stability and sustainable growth.

1.2 Statement of the Problem

In the light of unstable deficits, government may issue more debt instruments, and Deposit Money Banks (DMBs) on the other hand might be tempted by the risk-free high return motive and shift their portfolio away from risky private sector loans by shrinking overall credit to the private sector of the economy in favor holding more government debt-instruments. This behavior would limit the exposure of Deposit Money Banks toward the private sector, hence reducing private investment and adversely affecting the overall growth potential of the Nigerian economy in the future. Also, from the banking sector perspective, although lending to the government has a positive impact on banks' profitability, it distorts banks' incentives and the process of financial deepening since banks earning relatively risk-free returns from the government have little incentive to develop the banking market. This could be fatal to the stance of the economy because as the engine of growth, the reduction of overall credit to the private sector by DMBs could starve the sector of the necessary finance needed to address macroeconomic problems like growth, poverty and unemployment especially in a period where speedy economic growth is advocated

1.3 Research Questions

i. What is the composition of deposit money banks' assets investment in Nigeria?

ii. Are there systematic shifts in the type of assets Nigerian banks invest in?

iii. Do changes in the relative yields of these assets explain the relative shifts in assets investment by banks in Nigeria?

iv. Do Treasury Bills returns affect financial intermediation in Nigeria?

1.4 Objectives of the Study

The major objective of the study is to examine the impact of Deposit money banks' investment on treasury Bills and the impact thereof on the amount of credit extended by these banks to the private sector in Nigeria. In line with the major objective, the following specific objectives shall be achieved in the study:

i. To examine the composition of Deposit Money Banks' asset investment in Nigeria.

ii. To investigate if there are systematic shifts in the type of assets Deposit Money Banks invest in.

iii. To investigate if the shift in the relative yields of these assets explain the relative shifts in assets investment by Deposit Money Banks in Nigeria.

iv. To investigate if Treasury Bills returns affects financial intermediation in Nigeria.

1.5 Research Hypothesis

H_0: The demand for treasury bills by DMBs has no significant effect on financial intermediation in Nigeria.

H_1: The demand for Treasury Bills by DMBs has a significant effect on financial intermediation in Nigeria.

1.6 Significance of the Study

The treasury bills issuance program of the CBN is an integral part of its monetary policy, used in controlling inflationary pressure induced by excess liquidity in the system. Its attractive fixed income yield and short-term tenor offer good profit opportunities for local banks. However the negative effect of rising Treasury Bills holding by Deposit Money Banks (DMBs) have seldom been investigated in Nigeria which could be as a result of the under developed nature of

the financial market. However given the growing deficit of the government and its increasing reliance on risk-free debt-financing instrument to finance its deficit, one may suggest that the rising supply of such instrument may further deepen the financial market and consequently alter the portfolio behavior of DMBs. Thus, an empirical investigation of this nature is of utmost importance for both academic and policy purpose.

1.7 Scope of the Study

The study would be limited to determining commercial banks' demand for treasury bills and its impact on the capacity of the banks to extend credit to the private sector in Nigeria.

The study covered the period 2003-2013, a period concurrent with post Debt Management Office (DMO) act of 2003 which had a very huge influence on the supply of government debt instruments in Nigeria.

1.8 Organization of Work

The research is organized in five chapters. Chapter one gives the introduction to the research topic. This was then followed by statement of research problems, justification for the study, objectives of the study and research hypothesis. Chapter two concentrates on the conceptual, theoretical frame work and the review of empirical literatures. Chapter three would focus on the research methodology, which will include the model specification. Chapter four centers on the presentation and analysis of findings based on the statistical technique adapted in the study within the specified time frame. Chapter five contains summary, conclusions and recommendations.

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.0 Introduction

This chapter presents a review of researches in related area. It seeks to establish the rationale behind the increasing recognition of the possible negative impact of Treasury Bills demand by Deposit Money Banks (DMB) on the amount of credit they supply to the private sector. The chapter aims at providing the appropriate theoretical basis and other literature that can help to explain the relationship between Treasury Bills returns and financial intermediation in Nigeria.

2.1 CONCEPTUAL LITERATURE REVIEW

2.1.1 Financial Intermediation

Commercial banks are the largest depository institutions in Nigeria because of their ability to mobilize large funds through saving. They also have the function of transforming those deposits to loans to individuals, businesses, as well as government in other to enable them embark on investment and development activities as a means of aiding their growth in particular and contributing toward the development of the country in general (Olokoyo, 2011). By undertaking this task, commercial banks are said to be performing their functions as financial intermediaries by connecting surplus agents and deficit agents (Siklos, 2001). This process is known as “financial intermediation”.

In this study, financial intermediation is centered on the ability of commercial banks to extend credit to key sectors of the economy such as manufacturing, agriculture, mining,

construction, power, and so on. Various studies have stressed the importance of financial intermediation in accelerating the rate of economic growth and reduction of poverty and unemployment. Towards this goal, the volume of intermediation is very important.

2.1.2 AN OVERVIEW OF FINANCIAL INTERMEDIATION IN NIGERIA

Since its inception, the banking system has been providing credit to the Nigerian economy. The banking sector has been involved in providing credit to both the public and private sector of the economy to aid their development and growth. But studies (e.g. Beck *et al*., 2005; Levine, 2002; Odedokun, 1998; King and Levine, 1993; Boyreau-Debray, 2003; Liang, 2007; Crowley, 2008) have shown that credit to the private sector has more significant effect on economic activities than credit to public sector. Adekanye (1986) as cited in Nwanyanwu (2011) observed that in making credit available, banks are rendering a great social service, because through their actions, production is increased, capital investment are expanded and a higher standard of living is realized. Over the years, Nigeria has witnessed an unsteady growth in the loans market. Data on aggregate domestic credit of deposit money banks reveal serious fluctuations in lending activities in Nigeria.

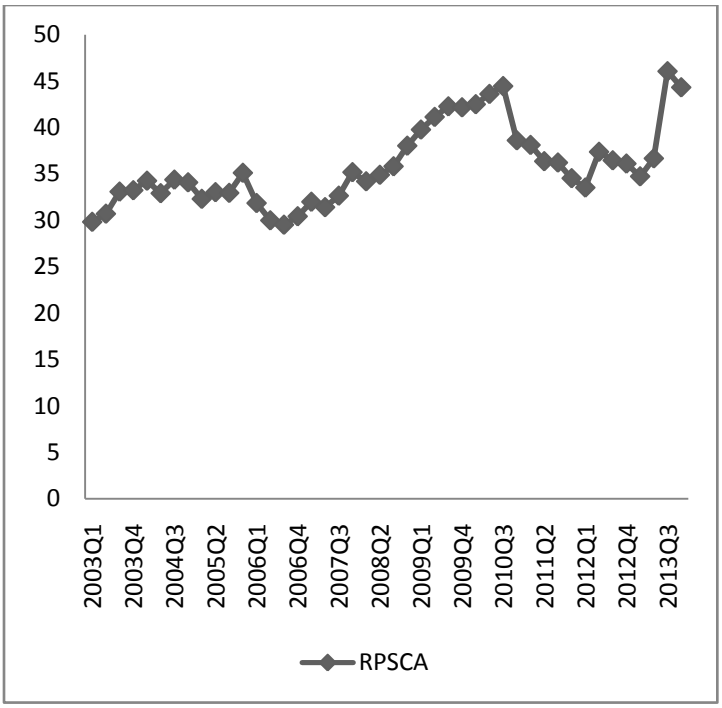


Figure 2.1: Proportion of Private Sector Credit to total assets of DMB's 2003-2013

Source: CBN Statistical Bulletin, 2013

Figure 2.1 shows the trend of credit to private sector as a proportion of total assets in the balance sheet of DMBs from 2003 to 2013. The data shows that the between 2003 and 2005, private sector credit has been relatively stable. It only began to rise after 2006 chiefly as a result of the increased lending to the so-called margin during the stock market boom. This growth may also partly be attributable to the after effect of the 2005 banking consolidation policy. This effect disappeared in 2009 as private sector credit began to take a downward dive from the spillover effect of the global financial crises.

2.2. TREASURY BILLS

Rufino (2008) defined Treasury Bills as short term instruments issued by the government under varying tenor to finance its operations. In other words Treasury Bills are debt securities issued by the government to finance its deficit budget. It may also be used by the central government for liquidity management, as the open market operation (OMO) asset.

2.2.1 THE NIGERIAN TREASURY BILLS (NTB)

Nigerian Treasury Bills(NTB) are short-term debt instruments that mature in one year or less and are issued by the CBN on behalf of the Federal Government, to raise surplus funds from both banks and non-bank publics. The NTB takes its origin from the Treasury Bills ordinance of 1959 and the first bill was issued in April 1960. NTBs are issued by auctions in various denominations. Interested investors usually make application for the purchase of the bill through an authorized dealer. The bills are issued in bear form and in book entry, and are therefore negotiable. The bills also double as monetary policy instruments, which the CBN uses to control the liquidity level in the banking system through Open Market Operation (OMO). They are the most liquid and marketable of all the money market instruments due to its ease of access, affordability and safety (CBN, 2008).

2.2.2 THE MARKET FOR TREASURY BILLS IN NIGERIA

The market for the NTB is divided into primary and secondary markets;

a. The Primary Market

The primary market is where Treasury securities are issued for the first time through regularly scheduled auctions. The process involves the CBN, which serve as conduits for the auctions. Participation in the primary market is typically concentrated among a small number of

primary dealers which are selected by the CBN as counterparties for open market operations (government securities transactions related to the CBN's implementation of monetary policy). They are required to participate meaningfully in both open market operations and Treasury auctions and to provide policy-relevant market information to the CBN.

Treasury bills are issued through a regular schedule of auctions process which begins several days before the scheduled auction. Bids begin when the CBN announces the details of the upcoming issue, including the amount to be auctioned and the maturity date. Two types of bids exist in the primary market;

i. **Competitive bids:** specify both the quantity of the security sought and a yield. If the specified yield is within the range accepted at the auction, the bidder is awarded the entire quantity sought (unless the specified yield is the highest rate accepted, in which case the bidder is awarded a prorated portion of the bid, as described below).

ii. **Non-competitive bids**: this is a bid where bidders agree to accept the yield determined at the auction and in return are guaranteed. The amount of the security sought account for a small proportion of auction amounts in part because of restrictions on their size, do not specify a yield.

b. The Secondary Market

The secondary market for Treasury Bills is an over-the counter market in which participants trade with one another on a bilateral basis rather than on an organized exchange. In the secondary market, trading activity takes place between primary dealers, non–primary dealers, and customers of these dealers, including financial institutions, nonfinancial institutions, and individuals. Many dealers, particularly the primary dealers, ‘‘make markets’’ in Treasury securities by standing ready to buy and sell securities at specified prices. In the process of

making markets, dealers purchase securities at the bid price and sell the same securities at a slightly higher price, the offer price. Through these sales and purchases, the dealer can facilitate transactions between customers while taking only temporary positions in the security. In doing so, the dealer earns the difference between the bid and offer prices, referred to as the bid–offer spread. In addition to transacting directly with customers, primary dealers frequently trade with one another. The majority of transactions between primary dealers and other large market participants take place through the six interdealer brokers. These brokers provide the dealers with electronic screens that display the best bid and offer prices among the dealers. Dealers can execute trades through an interdealer broker- either ‘‘hitting’’ a bid price or ‘‘taking’’ an offer price- for a small fee. In this structure, the interdealer brokers provide two important services: They disseminate price and trade information efficiently and provide anonymity to market participants.

2.2.3 THE DEMAND FOR TREASURY BILLS IN NIGERIA

Treasury bills were the first money market instruments issued by the CBN in April 1960. They are offered in fixed tenors of 91 days, 182 days and 364 days. In Nigeria treasury bills are held by various types of investors, including domestic financial intermediaries such as commercial banks; merchant banks; saving type institutions; statutory corporations, state and local governments; international investors; individuals; discount houses and the CBN, which participates actively in the market as part of its implementation of monetary policy.

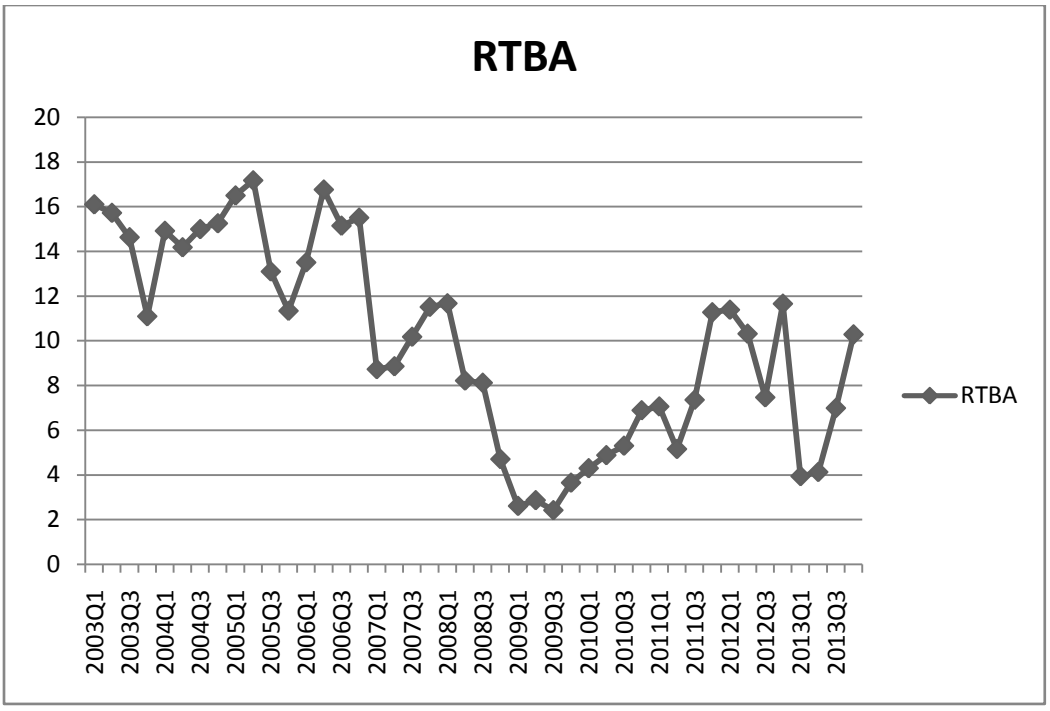


Figure 2.2: Total Treasury Bills as a Proportion of DMB Asset 2003-2013

Source: CBN Statistical Bulletin, 2013

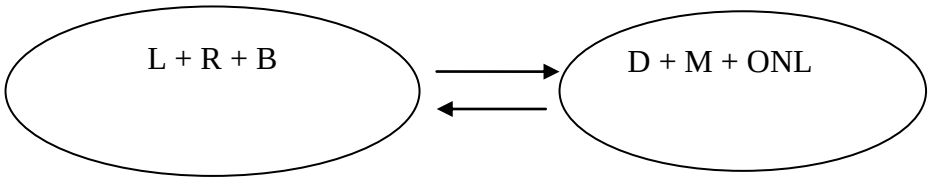
Figure 2.2 shows the ratio of treasury bills to total assets of DMBs in Nigeria between 2003 and 2013. Its shows that Treasury Bills holding by DMBs declined between 2003 and 2008 clearly indicating the effectiveness of the 2003 Debt Management Office (DMO) act. Prior to the DMO act in 2003 the central government used treasury bills to raise short term finance to address its fiscal deficit needs. The DMO act prompted a reduction in the supply of Treasury Bills as the central government resulted to long term finance which saw the introduction of FGN Bonds to replace the Development stock. But Treasury Bills holdings by DMBs began to re-emerge after 2009.

2.3 THEORETICAL LITERATURE REVIEW

In this section, the literature on Deposit Money Banks' asset investment behavior is reviewed. Some of the theories argue that access to safe government assets allows banks to take more risk and thus increase their lending to the private sector while others argue that increasing holding of government debt securities by commercial banks may create moral hazard and thus discourage the banks from lending to the risky private sector, and repress their incentives to seek out new profitable investment opportunities in the private sector. Whichever argument holds, efficacy and overall monetary stability would be greatly affected.

2.3.1 Intermediation Model

A simple intermediation model for the banking sector as described by Adrian and Shin (2009) is given by the following balance-sheet identity:



Where L = loans,

R = reserve requirements,

B = government securities,

D = deposits,

M = secondary market operations and

ONL = other net liabilities.

The variables on the left hand side are the assets while those on the right hand side are the liabilities. The relationship/identity indicates that banks allocate their resources between credit

(risky asset) and government securities (risk-free assets). It also is obligated by law to keep a certain proportion of its deposit ($R = \alpha D$) as reserves with the central bank. The relationship between loans and treasury bills would depend on the differences in the return on each asset. If the difference between loans and treasury bills is high, the relationship between the assets will be complementary while if their difference is low the relationship between the assets would be competitive.

With an increase in the returns on risk-free government securities, an increase in fiscal operations in the government securities market required to finance fiscal deficit would increase the holding of such assets over private sector lending.

2.3.2 Information Asymmetry: Adverse Selection and Moral Hazard

The framework for analyzing the economics of information asymmetry began with the breakthrough of Akerlof (1970) in his study of the market for used cars (lemons).The concept of information asymmetry has been widely applied to different facets of market analysis including labor markets (Spence, 1973), insurance market(Rothschild and Stiglitz, 1976) and the financial market (Akpansung and Babalola, 2010). It has widely been recognized that asymmetric information in the financial market is highly correlated with lending reduction. In financial markets, one party often does not know enough about the other party to make accurate decision. This inequality is called asymmetric information. Asymmetric information stems from the difficulty in differentiating less risky projects from those with greater risk. Accordingly, banks are motivated to keep the supply of credit (at the same interest rate) below the supply that eliminates surplus demand. The assumption is that, with a higher rate, only the riskiest borrowers would apply for loans. Under these circumstances, lending rates would not be expected to adjust immediately to change in market rates. For lack of complete information on client performance

and credit rating, financial intermediaries prefer to make the adjustment themselves by rationing credit (Akpansung and Babalola, 2010).

Adverse selection is the problem created by asymmetric information before the transaction occurs. Here borrowers have an information advantage over lenders causing the "lemons" problem, meaning that lenders cannot distinguish if a borrower is a good or bad risk. Thus, they charge a higher interest rate that reflects the average quality of good and bad borrowers, thereby causing good borrowers to drop out of the market. The increase in interest rates leaves a more risky pool of borrowers in the market for funds. Financial intermediaries are then more likely to be lending to high-risk borrowers, because those who are willing to pay high interest rates will, on average, be worse risks.

Moral Hazard is the problem created by asymmetric information after the transaction occurs. Moral hazard in financial markets is the risk (hazard) that the borrower might engage in activities that are undesirable (immoral) from the lender's point of view, because they make it less likely that the loans will be paid back. Because moral hazard lowers the probability that the loan will be repaid, lenders may decide that they would rather not make a loan

The implication for financial intermediaries is that adverse selection and moral hazard makes it most likely that loans might turn to 'bad credit', thus lowering the probability of repayment, lenders may decide not to make any loans even though there are good credit risks in the market place. The banks might seek out alternative investment that is relatively less risky

Fixed income securities like government debt instrument may provide such safe investment because payments on nominal government securities are specified in advance, providing the investor with a known stream of income. More so, payments of principal and interest on the securities are backed by the full faith and credit of the government, and are therefore considered to have the lowest risk of default of any major financial investment in the world. Moreover, the

interest income derived from Treasury securities is exempt from state and local taxes. They may see such assets as a perfect substitute to private sector lending.

These arguments suggests that the presences of safe government assets such as Treasury Bills in the financial market would encourage DMBs to attempt reducing the cost of acquiring information, and the cost of screening and monitoring potential borrowers. Thus, a high degree of lending to the government may create moral hazard and thus discourage the banks from lending to the risky private sector.

2.3.3 Risk Diversification Hypothesis

The risk diversification theory has been promoted by Kumhof and Tanner (2005). As in any other corporate firm, individual banks have a pre-defined criteria and policy with regard to the level and nature of risk they intend to take. The theory therefore argued that government borrowing which leads to the supply of riskless debt securities that assures the bank of a steady flow of income might actually induce the banks to undertake relatively more risky private lending. This is because higher investment in risk-free government securities leaves them with extra room to undertake riskier private sector ventures. In simple words, higher proportion of government securities (debt) would create incentives for banks to take on extra risk in their private sector lending activities. The theory therefore holds that that when the banks increase their lending to the government, there may not be any significant reduction of credit to the private sector.

This view suggests that when DMBs have excess liquidity, the relationship between safe government assets (treasury bills) and lending to the private sector would be complementary, thus, higher access to Treasury Bills and other safe government assets could allow the DMBs to take more risk and thus increase their lending to the private sector.

2.3.4 The Lazy Bank Model

The Lazy Bank Model of Manove, Padilla and Pagano (2001) provide an alternative view with regard to portfolio diversification between private and public sector exposure. The lazy Bank theory states that access to safe government assets discourage the banks from lending to risky private sector or repress their incentives to seek out new profitable lending opportunities in the private sector. In other words, as banks start accumulating risk-free government securities the moral hazard problem distorts their incentives inducing them to limit their exposure towards the private sector. This view is based on the idea that a Naira lent to the government means a Naira less to the private economy.

In the initial period when banks lend to the private sector, they accumulate non-performing assets or are uncertain about cash flows from their assets, which lead to higher volatility of earnings in the next period. This eventually causes banks to develop a conservative attitude towards lending to the private sector. In such circumstances if lending to government sector, which by definition offers sovereign guarantee, is possible then banks consider public sector as secure and start lending to and investing in government owned, sponsored and guaranteed securities.

The hypothesis attributes the risk-averse behavior of banks to be the major factor that dampened credit to the private sector.

2.3.5 Portfolio Management Theory

Studies in asset portfolio management began when Markowitz in 1952 studied the stock market and developed a model of selecting a portfolio of common stocks. The idea was later extended by different scholars to the field of asset allocation.

The Markowitz's idea is applied in a situation where the investor faces a trade-off between risk and expected returns. He assumed that investors prefer greater returns and less risk and thus faces a problem of dividing his wealth among securities. In this theory, diversification is seen as a powerful tool of achieving risk reduction (Baste et. al, 2002).The model consists of two interrelated modules;

First is a parametric stochastic return generating process by which, in each period, the investor determines a requisite vector of expectations and a variance-covariance matrix of the investor's anticipated rate of returns on all risky assets. Then the expected return of a portfolio is the weighted sum of each security's expected return given by the following equation;

$$\mu_p = \sum_{i=1}^{n} x_i \mu_i \qquad \text{..... 2.1}$$

Where μ= expected return of a given portfolio p consisting of n securities (S_1……..S_n)

Each security is weighted on a percentage basis by X_1…..X_n such that the sum of these weights equals one.

Second is a linear programming model that identifies all feasible portfolios that minimizes risk (as measured by variance or standard deviation) for a given level of expected returns and maximized expected returns for a given level of risk.

One measure of risk associated with the i^{th} security is the variance of its return. The variance of a portfolio is

$$\sigma^2 = \sum_{i=1}^{n} x_i^2 \sigma_i^2 + \sum_{i=1}^{n} \sum_{j<i} x_i x_j Cov_{i,j} \qquad \text{..... 2.2}$$

Where $Cov_{i,j}$, a measure of correlation, is the covariance between the i^{th} and j^{th} securities.

Agiobenbo and Agiobenebo (1997) added to the portfolio management theory by developing a model that captures the consideration of an optimizing agent subject to liquidity and safety constraints under conditions of uncertainty and risk. Their model posited that the factors that influence asset allocation behavior of investors include liquidity, risk, maturity, transaction cost and tax codes; and given that the term structure of interest rate is related to these variables, banks would consider making choices between assets of different maturities. And the fundamental decision criterion is to maximize expected returns on financial investment using the opportunity cost or loss concept adjusted for the constraints.

Pierce (1967) also posited that the different asset groups that commercial banks hold in their portfolio are not totally unrelated and their allocation of fund to each group is guided by the yield of each group. Thus, assuming a give supply of resources, a rise in returns from one group would change the composition of assets in the total asset portfolio in favor of the one with the highest expected returns.

It is assumed here that since banks are risk averse, they would hold on their loanable funds more tightly when they face or expect to face a downturn in the form of rising volume of non-performing assets on their balance sheets. A well-diversified portfolio therefore fetches a higher return for a given level of risk – a step towards portfolio optimization.

2.3.6 Shiftability Theory

The Shiftablity theory of Dodds (1982) posits that a bank's liquidity is maintained if it holds assets that could be shifted or sold to other lenders or investors for cash. This theory is of the view that a bank's liquidity could be enhanced if it always has assets to sell and provided the Central Bank and the discount Market stands ready to purchase the asset offered for discount. Thus this theory recognizes the fact that shiftability, marketability or transferability of a bank's

assets is a basis for ensuring liquidity. It therefore follows from this theory that highly marketable security held by a bank is an excellent source of liquidity. Dodds (1982) contends that to ensure convertibility without delay and appreciable loss, such assets must meet be liquid management criteria. Liquidity management according to Dodds (1982) consists of the activities involved in obtaining funds from depositors and other creditors (from the market especially) and determining the appropriate mix of funds for a particularly bank. This point of view contends that liability management must seek to answer the following questions:

- How do we obtain funds from depositors?
- How do we obtain funds from other creditors?
- What is the appropriate mix of the funds for any bank?

Management examines the activities involved in supplementing the liquidity needs of the bank through the use of borrowed funds. The liquidity management theory focuses on the liability side of bank balance sheet. This theory contends that supplementary liquidity could be derived from the liabilities of a bank. According to Nwankwo (1991) since banks can buy all the funds they need, there is no need to store liquidity on the asset side (liquidity asset) of the balance sheet. Liquidity theory has been subjected to critical review by various authors. The general consensus is that during the period of distress, a bank may find it difficult to obtain the desired liquidity since the confidence of the market may have seriously affected and credit worthiness would invariably be lacking. However, for a healthy bank, the liabilities (deposits, market funds and other creditors) constitute an important source of liquidity.

2.3.7 Commercial Loan Theories

Commercial loan theory attempts to reveal the factors that influence the amount of money that commercial banks allocate to their loan portfolio. Several studies have been carried

out in this area. Although details differ in terms of model specification, all the studies documented the important/major determinants of commercial bank's lending behavior.

Cookey (1997) for example posited that the amount of money that is allocated to the loan portfolio of commercial banks is determined by such factors as; total deposit liability, the general level and direction of economic activities as measured by gross domestic product (GDP), the average lending rate, and the domestic exchange rate.

In his model he assumed that total deposit liability, the general level and direction of economic activities as measured by gross domestic product (GDP) and the average lending rate are expected to lead to an increase in the size of the loan portfolio while the domestic exchange rate have a negative impact.

Olokoyo (2011) provided a variant of the model by including investment assets and posited that investment in assets leads to an increase in the size of the loan portfolio because the returns from those assets would be used to extend loan.

Ndung'u and Ngugi (2000), also developed a model of financial intermediation that took into consideration the fact that commercial banks' activities in the money market, especially the market for treasury bills has a very serious impact on financial intermediation. Their model gave cognizance to the fact that, as risk averse and profit oriented institutions, commercial banks in all instances will exhibit preferences for riskless financial assets. Since treasury bills are risk free assets, they have the tendency of substituting loans in the total asset portfolio.

The model therefore holds that the total amount that banks supply to their customers is highly sensitive not only to the availability of resources (i.e. total deposits), inter-bank rates and interest rate spread but also on returns they expect from other assets such as treasury bills.

2.4 EMPIRICAL LITERATURE REVIEW

Studies on the importance of financial intermediation to economic growth and development can be traced back to the work of Schumpeter (1911). Ever since, various literatures have emerged from advanced and developing countries, attempting to find evidence. Some of the studies carried out in Nigeria showed that the case is also empirically true in Nigeria.

Akpakpan and Ezirim (1999) attempted to model the economic relationships existing between the aggregate economic activity and the various facets of the intermediation activities of the financial superstructure using the financial institutions as a test case. Econometric procedure adopted by the paper follows the tenets of the regression analysis, partial adjustment mechanism and the causality analysis to provide an evidence of the existence of a positive relationship between aggregate output and the different aspects of the intermediation function.

Shittu (2012) also examined the impact of financial intermediation on economic growth in Nigeria using Time series data from 1970 to 2010. For the analysis, unit root test and co-integration test were done accordingly and the error correction model was estimated using the Engle-Granger technique. The paper established that financial intermediation has a significant impact on economic growth in Nigeria.

Given that profitability is the main survival strategy of financial intermediaries, several literatures have pointed out that loans- which are the primary assets of commercial bank would have a negative impact on the profit of banks if they underperform (Naïmy, 2005 and Rajeev, 2008). Kosmidou (2008) empirically supported this idea when he applied a linear regression model on Greece 23 commercial banks data for 1990 to 2002, using Return on Asset (ROA) and

the ratio of loan loss reserve to gross loans to proxy profitability and asset quality respectively. The results showed a negative significant impact of asset quality to bank profitability. This was in line with the theory that increased exposure to credit risk is normally associated with decreased firm profitability. Indicating that banks would improve profitability by improving screening and monitoring of credit risk.

The private sector in Nigeria has also been labeled risky for lending activities. This is evident in the high rate of non-performing loans recorded by banks in recent years, consequently affective banks' profit negatively. Several studies have pointed out that credit risk is the major factor that erodes banks' profit in Nigeria. Oladele, Abosede and Akeke (2012) for instance examined the changes in the profit efficiency of Nigerian banks after the recapitalization exercise of central bank of Nigeria for the period 2006 to 2008. Using stochastic frontier technique, their study found the effect of profit inefficiency significant.

Kolapo, Ayeni, and Oke (2012) also carried out an empirical investigation of the quantitative effect of credit risk on the performance of commercial banks in Nigeria over the period of 11 years (2000-2010). Panel model analysis was used to estimate the determinants of the profit function. The results showed that a 100 percent increase in non-performing loan reduces profitability (ROA) by about 6.2 percent, a 100 percent increase in loan loss provision also reduces profitability by about 0.65percent while a 100 percent increase in total loan and advances increase profitability by only 9.6 percent.

In a similar study, Kargi (2011) evaluated the impact of credit risk on the profitability of Nigerian banks. 2004-2008 and analyzed using descriptive statistics, correlation and regression techniques. The findings revealed that the ratio of non-performing loan to loans and advances negatively relates to profitability. The parameters show that increase in non-performing loans

reduce profitability by 51.60%, however increase in the level of loans and advances to total deposits significantly reduce profitability of the banks by 251.98%.

These studies therefore concluded that banks' profitability is inversely influenced by the levels of loans and advances, non-performing loans and deposits thereby exposing them to great risk of illiquidity and distress.

Agiobenebo and Agiobenebo (1997) undertook a macro-study of commercial banks' assets portfolio selection in Nigeria from 1986 to 1995 to decipher its optimality properties. The mean-variance expected value maximization model is adopted. The variant developed encapsulates the influences exercised by the fundamental factors that affect banks' assets portfolio selection including yield, risk, maturity, liquidity, solvency, transaction costs, tax codes, policy, and quantity constraints. The results show that given the term-structure of interest rates and the other assumed parameter values banks were better off subscribing to government securities, which exemplify short assets.

Ndung'u and Ngugi (2000) tested an empirical model of financial intermediation in Kenya on data covering the period 1981 to 1998. Their model included among several other variable, Treasury bills yields. They discovered that the yield on treasury bills significantly affects the size of commercial banks' loan portfolio. This they added reflects on the risk-averse behavior of financial intermediaries in an attempt to hold safe assets by avoiding lending to the risky private sector. They then suggested that financial intermediaries should rather improve on their screening and monitoring process in other to reduce lending risk.

Lambo (1977), provided evidence that commercial banks in Nigeria change the structure of their asset portfolios in response to expected yield from treasury bills. He used a decomposition analysis of data for the period 1962-1972 and found that structural changes in the

asset of commercial banks was not significantly influenced by structural changes in their liabilities but rather on the CBN policy which saw it raise issue rate of treasury bills in that period. The CBN action made local investment in treasury bills attractive, thus raising the demand for treasury bills in that period. This action greatly influenced the proportion of commercial bank's asset in treasury bills.

Empirically various literatures have focused on the effect of channeling scarce productive resources to the government which is evident in the increase in banks' holdings of government securities and treasury bills, reflecting banks' preference to invest excess liquidity in a low risk high return investment and its impact on private sector's access to credit for productive investment. Most of these evidences show that banks most especially in developing economies with less developed financial institutions and high risk business environment portray the "Lazy Banks" behavior.

Fayed (2012) used a co-integration approach to investigate the relationship between public borrowing and private credit in Egypt. His paper sheds light on the "quantity channel" of crowding out of private investment in Egypt by focusing on the volume of private credit. The central conclusions from the empirical analysis was that; there is a statistically significant negative effect of government borrowing on private credit, and the crowding out is more than one to one. This is evident in the increase in banks' holdings of securities and treasury bills which reflects banks' preference to invest excess liquidity in a low risk high return investment. These results go along with the lazy bank model of the endogenous response of banking sector to government borrowing

Onyiewu (2011) investigated the relationship between domestic debt and economic growth in Nigeria using Ordinary Least Squares Method (OLS), Error Correction and

parsimonious models to analyze quarterly data between 1994 and 2008. The findings of the study shows that the domestic debt holding of government is far above a healthy threshold of 35 percent of bank deposit as the average over the period of study is 114.98 percent of bank deposit presenting evidence of crowding out of private investments.

Emran and Farazi (2009) also studied the causal effect of government borrowing from domestic banking sector on private credit in developing countries using panel data on 60 countries from 1975 to 2006. They discovered that an increase in government borrowing say by one dollar may result in more than one dollar reduction of private credit. The evidence is consistent with a `lazy bank' model of bank behavior in developing countries.

Kirchner and Wijnbergen (2012) studied the interactions between fiscal policy, sovereign debt, and financial fragility in the Euro area. They used a structural macroeconomic model with frictions in the financial intermediation process, and introduced asset choice and sovereign debt holdings in the portfolio of banks. Their results show that, when the government makes clear its intention to borrow more for spending expansion it implies a higher expected growth rate of bonds and total assets. The intermediaries have an incentive to accumulate assets due to a rise in the expected discounted marginal gain of assets. This incentive, however, makes financial intermediaries to shift their portfolios into assets with higher expected returns. They therefore concluded that there could be a reduction of private access to credit when banks accumulate government debt under a leverage constraint.

Majumder (2007) found a different result when he studied the Bangladeshi economy. The main intention of the study is to investigate the crowding-out effect of public borrowing on private investment in the Bangladesh context. Using Unit root test (test of stationarity) and Johansen co-integration and an error correction method, he tested data covering the period 1976

to 2006, and discovered that public borrowing leaves no crowding-out impact on private investment, this result they added was because of the existence of excess liquidity in the economy.

2.5 Theoretical Framework

From our theoretical literature review we saw theories that provided us with explanations of the behavior of commercial banks when they increase their holding of risk free government debt securities. The "risk diversification hypothesis" (the view that commercial banks increase their credit to the private sector) and the "Lazy Bank hypothesis"(the view that banks see risk-free assets as better investment than channeling credit to the private sector) provides us with two alterative views of bank loan behavior in the presence of riskless assets. In our study, we shall adopt the two hypotheses with the view of rejecting the application of one to the present behavior of commercial banks in Nigeria.

2.6 Analysis of Deposit Money Banks Consolidated Assets

The asset side of DMBs' balance sheet is analyzed in this section to observe any possible changes that might have occurred and analyze the factors that influenced the changing structure of the portfolio over the years. The central premise of this thesis is that rising accumulation one type of asset such as government debt instruments might have been accomplished at the expense of the traditional asset of commercial banks- loans, as predicted by the Lazy Bank Model.

2.6.1 Commercial Banks' Claims on the Private Sector

A survey of DMBs balance sheet was carried out here to determine the structure of DMBs' claims on the private sector (see Appendix I). DMBs' claim on the private sector has shown that, loans and advances was dominant since 2003 as expected, claiming at least 70% of the total claims on the private sector, though its share in the total claims have slightly been on the decline (see Appendix I). Other assets under this category, though relatively much smaller than

government securities in size, are private securities. This segment of the commercial banks assets has been dominated by Commercial Papers. The market for Bankers Acceptance has declined consistently from 2003. A large and significant increase from 2011 is the aggregation of assets that are classified under other investments of which its decomposition is not known. This is an indication that other investments and inter-bank assets are emerging in the banks' portfolio which is eroding lending to private sector and thus, requires noting.

2.6.2 Commercial Banks' Claims on the Central Government

To examine which type of asset dominates the claims on the central government, we decompose the total claims on the central government. The commercial banks' claim on the central government was dominated by government debt securities. Before 2002, government debt was predominantly short-term. The debt instruments that dominated at that period were Treasury bills and Treasury Certificates (see Appendix II). With the termination of Treasury Certificates in 1995, Treasury Bills rose into dominance. The realization of the essence of sourcing long term domestic fund for execution of developmental projects by the government led to the birth of the Debt Management Office (DMO) in 2003 which facilitated the supply of more long-term debt securities. This saw a growth in dominance of longer tenure debt instruments (Development stock/FGN Bonds) from 2004 taking up more than 50% of total government debt securities held by commercial banks as at 2005. Government's preference for longer term financing over short-term finance could possibly explain the rise in the proportion of long term debt securities in the portfolio of commercial banks. Since then Treasury Bills have been used primarily for monetary policy purposes.

In summary credit to private sector remains the dominant asset of DMBs, though its share in the total claims on the private sector seems to be declining. Also, some assets which were uncategorized in the DMB's balance sheet showed a significant rise in 2011. On the other hand,

claims on the central government have been rising, with FGN Bonds dominating Treasury Bills. Both securities are used as instruments for deficit financing as prescribed by the DMO act of 2003. This finding supports our claim that the structure of DMBs' asset investment has shifted during the study period.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Analytical Framework

The empirical model here is adapted from the work of Ndung'u and Ngugi (2000) whose work centered on banking sector interest rate spread in Kenya. Their model showed DMBs' supply of loan to the core private sector is highly sensitive to availability of resources (D).It also indicates that banks' invest in different assets and that changing spread in the yields of the competing assets affects the structure of the portfolio. The model is built on the assumption that banks allocate their available funds to credit (risky asset) and treasury bills (risk-free asset). The Ndung'u and Ngugi (2000) model is specified as follow;

$$\text{Loan} = \beta_0 + \beta_1 \text{Deposit} + \beta_2 \text{T-Bills} + \beta_3 \text{interbank} + \beta_4 \text{Spread} + \varepsilon_t \quad \ldots\ldots 3.1$$

Equation 3.1 was therefore modified to fit the financial system condition in Nigeria. This was done by including longer term deficit financing instruments using Development Stocks/FGN Bonds as proxy. More so, the volumes of credit to the private sector (loans), Treasury Bills, and Development Stocks/FGN Bonds were taken as a proportion of total assets of DMBs. The spread variable was also redefined as the difference in the rate of returns between the two variables of interest (loan and treasury bills). The theoretically basis is there is a negative relationship between treasury bills and lending rate. The relationship indicates competition for financial assets and the incentive for investment or premium between treasury bills on the one hand and lending on the other hand. The yield spread between the two assets is an indication of the relative attractiveness of one asset over the other (in this case loan over treasury bills). A rise in the spread in the spread increases the amount of loans while a reduction in the spread would lead to more competition between the two assets. Thus it is expected that disequilibrium in the loan market will widen with an increase in the yield spread.

3.2 Model Specification

Following the adjustments made to Equation 3.1 the following model was therefore derived;

RPSCA = f(LTD$_t$, RTBA$_t$, FGBt, IBR$_t$, SP$_t$, ε_t)……3.2

Where

RPSC = Proportion of credit to private sector to total assets of DMBs,

LTD = log of total deposits

RTBA= proportion of Treasury Bills to total assets of DMBs

FGB= proportion of FGN Bonds to total assets of DMBs

IBR= inter-bank rates

SP = yield spread between loans and treasury bills (ie, lending rate less treasury bills rates)

Equation 3.2 transformed in a VAR form as below:

$$RPSCA_t^i = \beta_o + \sum_{j=1}^{k} \beta_1 LTD_{t-j} + \sum_{j=1}^{k} \beta_2 RTBA_{t-j} + \sum_{j=1}^{k} \beta_2 FGB_{t-j} + \sum_{j=1}^{k} \beta_4 IBR_{t-j} + \sum_{j=1}^{k} \beta_5 SP_{t-j} + \varepsilon_t \ldots\ldots (3.3)$$

A Priori Expectations

LTD and SP are expected to have a positive sign while RTBA, FGN and IBR are expected to maintain a negative sign.

3.3 Estimation Techniques

3.3.1 Unit Root Test

Due to the non-stationary nature of time series data, unit root tests shall be conducted to reveal the qualities of the data to see if their properties make them suitable for econometric analysis. On this note the Augmented Dickey-Fuller (ADF) and Philip-Perron (PP) test shall be conducted to test for the stationarity of the data.

3.3.2 Vector Autoregressive (VAR) Model

This study adopts the Unrestricted Vector Autoregressive Model (UVAR) or Vector Error Correction model (if the variables are co-integrated) technique to isolate the effect of each variable in the model estimate the parameters in the model. The model shall be used to estimate the dynamic response of the explanatory variable on the dependent variable.

3.3.3 Impulse Response and Variance Decomposition

The impulse response traces out the time path of the effect of structural shocks on the dependent variables of the model. In other words, it traces the responsiveness of the dependent variable(s) in the VAR/VEC to a unit shock in the error term.

The variance decomposition on the other hand measures the relative importance of different shocks on macroeconomic variables. It tells how much of a change in a variable is due to its own shock and how much due to shocks to other variables. In the short run most of the variation is due to own shock. But as the lagged variables' effect starts kicking in, the percentage of the effect of other shocks increases over time.

Impulse response and variance decomposition would therefore be used here to examine the shocks imposed on the stated macroeconomic variables over the study period.

3.4 Nature and Source of Data

The data used in this study was collected from quarterly balance sheet and income statement reports submitted by commercial banks to the Central Bank of Nigeria. The study covers the period from the first quarter of 2003 to the fourth quarter of 2013. It is worth noting that variables such as TD are entered in log form while TB, PSC, and FGN are taken as a proportion of total assets. More so, the deposit portfolio was entered individually rather than as a ratio of one another because using this approach helps to capture the individual influence of

deposit portfolios on the holdings of treasury bills. It is also worth noting here that Development Stock/FGN bonds were taken as proxy for long-term government securities (CBN, 2013).

CHAPTER FOUR

EMPIRICAL RESULTS AND DISCUSSION

4.1 Trend Analysis

Figure 4.1a-c: Graphical Representation of Trend Relationship between Treasury Bills and Explanatory Variables

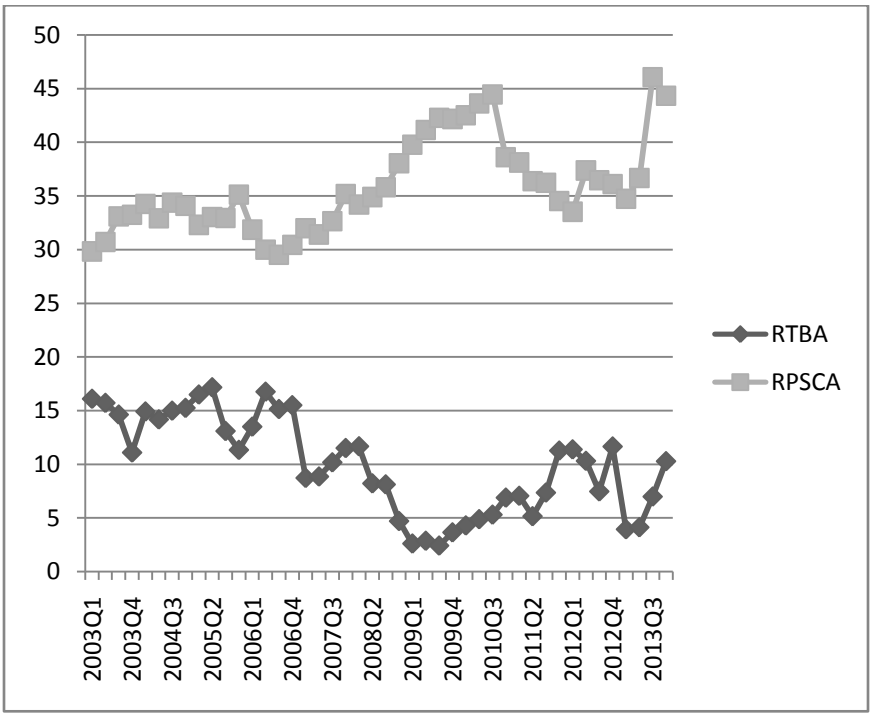


Figure 4.1a: Proportion of Treasury Bills to total assets of DMBs and proportion of Private sector credit to total assets of DMBs in Nigeria (2003-2013).

In figure 4.1a, there appears to be a negative relationship between treasury bills holding of deposit money banks and treasury bills. This relationship is visible by the trend of the two variables throughout the study period. The graph reveals that the proportion of treasury bills to total assets of DMBs reduce when the proportion of credit to private sector increases and vice versa. This relationship is consistent with a priori expectation on the relationship between the supply of credit to private sector and Treasury Bills holding by DMBs.

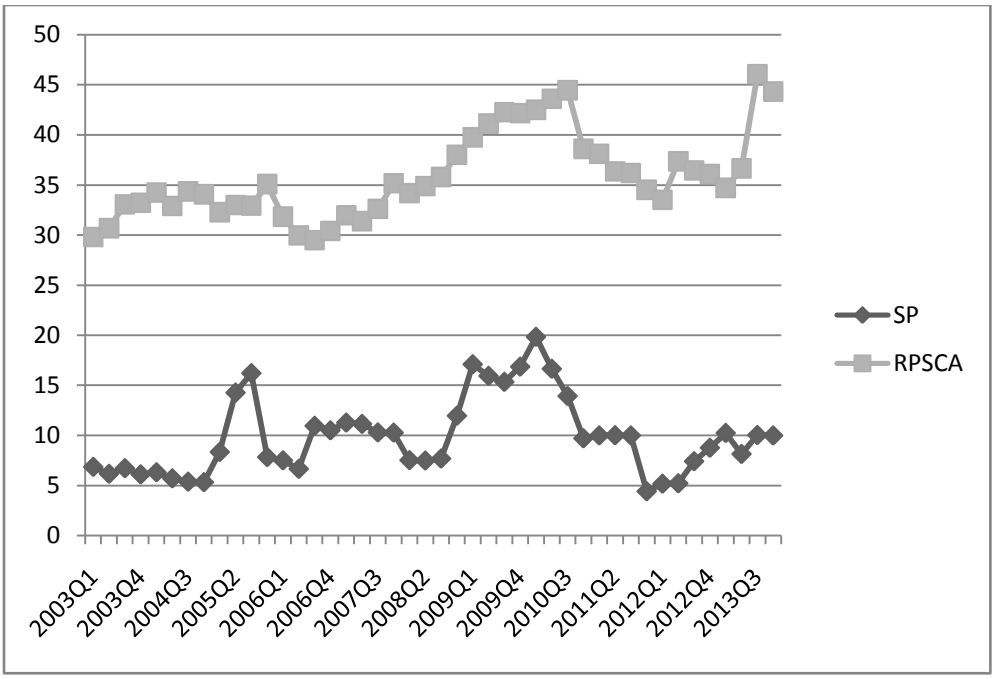


Figure 4.1b: Proportion of Credit to Private Sector to total assets of DMBs and relative yield differential between Lending and Treasury Bills in Nigeria (2003-2013).

Figure 4.1b shows that the relationship between credit to private sector (PSC) and spread between its returns and returns on Treasury Bills (SP) is positive as expected. Since SP is the yield spread between PSC and TB rates, an increase in the lending rate over TB rate would increase SP, which would in turn make PSC more profitable thereby increasing PSC. The reverse would also be the case (see Figure 4.1c). The relationship between credit to private sector and Treasury Bills as revealed by Figures 4.1b and 4.1c was consistent with expected negative relationship between Treasury Bills (TB) and Yield Spread (SP) and the positive relationship between Yield Spread (SP) and credit to private sector (PSC).

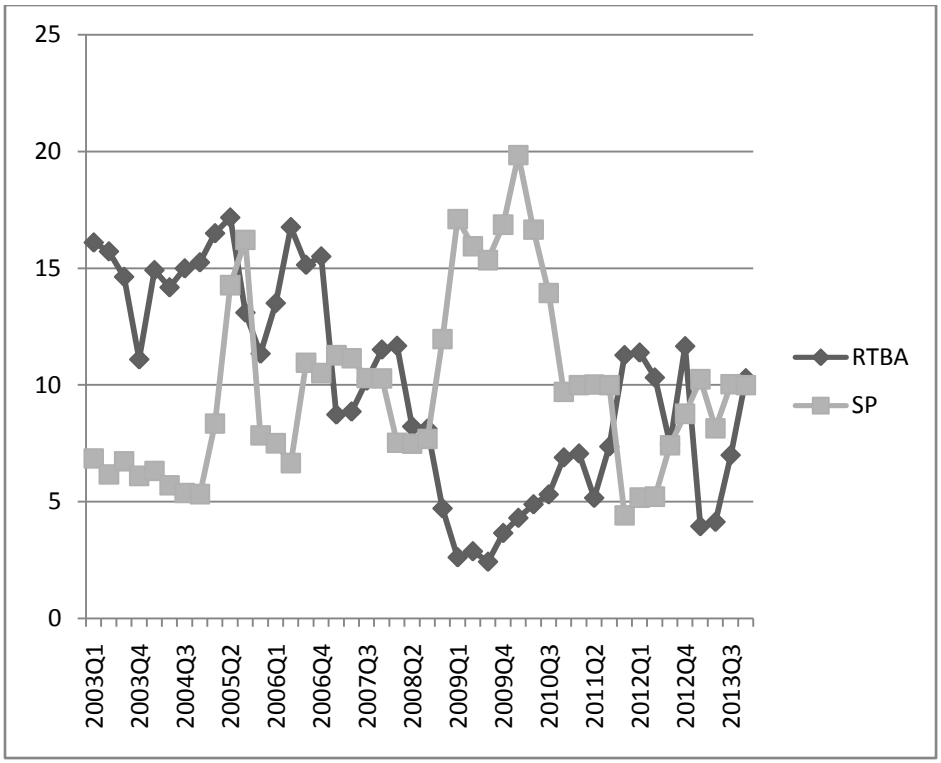


Figure 4.1c: Proportion of Treasury Bills to total assets of DMBs and relative yield differential between Lending and Treasury Bills in Nigeria (2003-2013).

The graphical inspection of the properties of interest namely PSC, TB and SP in Figures 4.1a-c revealed results that are consistent with our a priori expectations on the relationship that exists between these variables. PSC and TB had a negative relationship. Also SP which is the relative attractiveness of the two assets over each other showed a positive relationship with PSC and a negative relationship with TB.

This graphical analysis, though informal, gives us an insight to objective iii and iv. A more formal analysis would be carried out in the next section to further investigate these relationships.

4.2 Unit Root Test

It has been shown in econometric studies that most macroeconomic time series are not stationary at levels. Given this information, testing for stationarity of variables to obtain a more reliable result becomes very essential. Stationarity test was therefore carried out using both Augmented Dickey-Fuller (ADF) and Phillip Perron (PP) approaches for unit root testing which are reported in table 4.1. In order to examine the unit root status of the variables, their line graphs of the series was plotted to determine whether the series have intercept and trend (see APPENDIX IV).

Table 4.1: Unit Root Test using Augmented Dickey-Fuller (ADF) and Phillip-Peron (PP) Tests

	Levels		First Difference		
Variable	ADF	PP	ADF	PP	Comment
RPSCA	-4.369936*	-2.192020	----	-6.348953*	I(1)
LTD	-1.300503	-1.461955	-1.758771*	-7.087338*	I(1)
RTBA	-2.382257	-2.317286	-6.963449*	-7.915655*	I(1)
RFGB	-1.013073	-0.752110	-7.005326*	-7.005326*	I(1)
IBR	-9.29095	-2.932991	-7.243925*	-7.349408*	I(1)
SP	-2.33124	-2.301343	-5.633406*	-8.462810*	I(1)

Note: For the levels, we included trend and intercept, as the line plots of the series indicate; the 5% critical value is -3.518090. For their first differences, line graphs indicate that only intercepts can be included; the 5% critical value is -2.933158. (*) indicates rejection of unit root at 5%.

[1] the ADF and PP tests statistics are less than the absolute values at 5% level of significance. Thus we cannot reject the null hypothesis that there is presence of unit root in the series. However after the first difference, both the ADF and PP test statistics were found to be greater than the critical values at 5% level of significance. Thus, we reject the null hypothesis that there is presence of unit root in the series.

The ADF test result shows that all the variables were stationary at first difference, that is, they are integrated of order one [I(1)] with the exception PSC which was I(0). The PP test results on the other hand shows that all the variables are stationary at first difference, that is, they are all integrated of order one [I(1)]. Going with the PP results, which showed that all the variables are I(1), the time series have to be differenced once to avoid obtaining spurious results.

4.3 Co-Integration Tests

Both the ADF and PP standard test for stationarity were used to identify the order of integration of the series. The test indicates that all the variables in the model are integrated of order one [I(1)](See table 4.1.). This finding implies that a co-integration test needs to be carried out. This is because a long-run relationship may exist among them, which connotes that they may wander from one another in the short-run but in the long-run will move together. This will also tell us whether the restricted or unrestricted VAR is appropriate for estimating the model. To establish whether or not a long-run relationship exists among the variables, co-integration test using the Johansen's multivariate method was carried out and reported in table 4.2

Table 4.2 shows that Trace test indicates 2 co-integrating equations at 5% and 1 at 1% level. While the Maximum-Eigen test indicates no co-integrating equations at both 5% and 1% level between RPSCA and other variables in the model. The Trace value points out that the null hypothesis of no co-integration among the variables is rejected in favor of the alternative hypothesis that one co-integrating equation exist at 5% significant level because the value exceed the critical values[2]

[2]the null hypothesis of no co-intergrating equation has been rejected by the trace statistic as its values were greater than the critical value at both 5% and 1% level. Though the Maximum Eigen value showed otherwise, the result suggested by the trace statistics was accepted because of its superiority in testing the null hypothesis of no-cointegration over the Max-Eigen test (Lutkepohl, Saikkonen and Trenkler, 2005).

Table 4.2 Summary of Co-integration Test Result

Trace Rank Test					
Hypothesis	r=0*	r≤1	r≤2	r≤3	r≤4
Trace statistics	112.37	75.59	47.61	23.71	6.48
95% Quantiles	95.75	69.82	47.86	29.80	15.49
99% Quantiles	104.96	77.82	54.68	35.46	19.94

Maximum Eigen Values					
Hypothesis	r=0*	r≤1	r≤2	r≤3	r≤4
Trace statistics	36.78	27.98	23.90	17.23	5.50
95% Quantiles	40.08	33.86	27.58	21.13	14.26
99% Quantiles	45.87	39.37	32.72	25.86	18.52

Estimation of the (idendified) Long Run Equation

	RPSCA	LTD	RTBA	FGB	IBR	SP
CV	1.00	3.01	3.10	0.80	1.56	2.88
t-stat**		(0.76937)	(5.37849)	(0.89092)	(5.01060)	(5.84084)
Adj.α	-0.08	-0.002	-0.10	0.03	-0.23	-0.12
t-stat	(-0.06146)	(-0.00316)	(-0.07184)	(0.03179)	(-0.09806)	(0.07138)

*Note: trace statistics indicates two co-integrating equation at 5% level and one co-integration at 1% level. Max-Eigen value indicates that there is no co-integrating equation at both 5% and 1% level.

**Note that the distribution of errors for the long run co-integration are non-normal because all the variables included are I(1). Hence, cannot be used for statistical inference using the normal tables.

This means that there is at least one integrating equation, implying that a unique long-run relationship exists among the variables. This therefore implies that the correct model is VEC, which allows us to incorporate the long run information in the dynamic analysis of the relationship. Using the model information selection criteria (FPE, SIC and HIC) it was observed that the optimal lag length that makes the residual of the model free from serial correlation is 1 (see Appendix V).

The long run equation shows that all the variables in the model (LTD, RTBA, FGN IBR and SP) impacted negatively on RPSCA in the long run. The sign on RTBA, FGN and IBR were

as expected but that on LTD and SP were contrary to expectation. However, the negative impact of SP on RPSCA in the long run indicates that in the longer term DMBs may no longer react to rising lending rate by giving out more loans to the private sector. In other word, the supply of risky private sector credit may reach a threshold and DMBs would begin to invest in less risky asset to avoid the risk of default.

4.4 VAR Stability Test

Figure 4.5: Inverse Root Polynomial

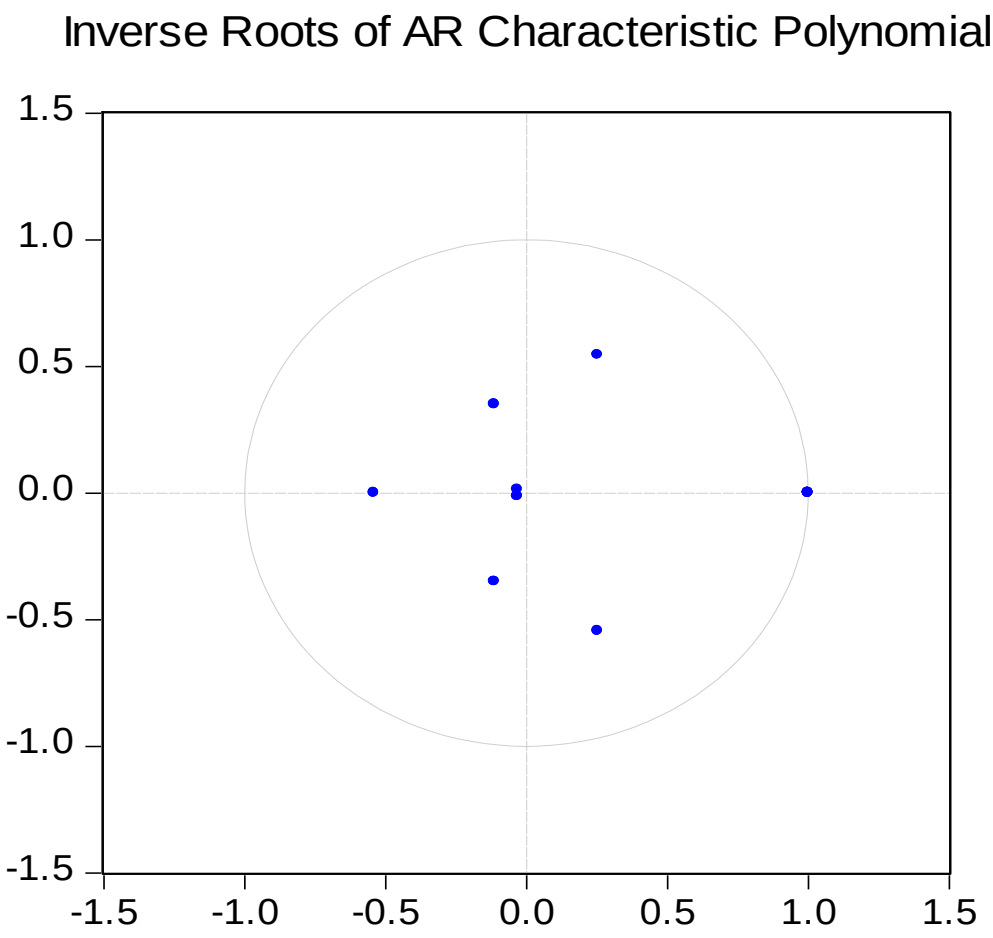


Figure 4.3 shows the stability test for the estimated VEC model. From the result it is evident that VEC satisfies the Stability conditions for all components of the model as none of the roots is outside the unit circle.

Table 4.3: LM Residual Test for Serial Correlation

VEC Residual Serial Correlation LM Tests
Null Hypothesis: no serial correlation at lag order h
Date: 06/30/14 Time: 12:26
Sample: 2003Q1 2013Q4
Included observations: 42

Lags	LM-Stat	Prob
1	14.58154	0.9994
2	18.02185	0.9946
3	50.01315	0.0603
4	49.23289	0.0697
5	34.32008	0.5486
6	40.05630	0.2949
7	51.97914	0.0413
8	37.11481	0.4174
9	41.96959	0.2279
10	34.15770	0.5564
11	38.54617	0.3551
12	51.69524	0.0437

Probs from chi-square with 36 df.

Table 4.8 presents the test for the presence of serial correlation in the model within the period of the study. The result shows that there is no serial correlation in the model. This is because the probability value of the LM statistic is less than unity. Therefore, the null hypothesis of no serial correlation has been accepted.

4.5 Vector Error Correction Estimates

Given the co-integration result as discussed above, the study went further to estimate the regression (equation 3.3) using vector error correction approach. This is reported in table 4.4. However, the full estimates are shown in Appendix VI.

Table 4.4: Error Correction result of RPSCA

	Dependent variable: RPSCA	
variables	Coefficients	t-values
Constant	0.450030	1.23278
dRPSCA(-1)	0.020904	0.13092
dLTD(-1)	-3.196747	-1.00397
dRTBA(-1)	-0.057666	-0.37120
dRFGB(-1)	0.211527	0.61220
dIBR(-1)	-0.035106	-0.36007
dSP(-1)	0.006710	0.03663
ECM(-1)	-0.386909	-3.53536
R-squared	0.351575	
Adj. R-squared	0.194381	
S.E	2.031483	
F-statistic	2.236568	

$$dRPSCA = 0.450030 + 0.020904dRPSC(-1) - 3.196747dLTD(-1)$$
$$- 0.057666dRTBA(-1) + 0.211527dFGB(-1) - 0.035106dIBR(-1)$$
$$+ \ 0.006710dSP(-1) - 0.386909ECM(-1)\ldots 3.4$$

The estimation specification in table 4.5 suggests that the speed of adjustment (error correction mechanism) to the long run is high, specifically 39%. This implies that about 39% of the disequilibrium error which occurred in the previous period is corrected in the current period. The short run adjustment model suggests that past changes in RPSCA are positively related to current changes in RPSCA. The result also showed that past changes in RTBA was negatively related to current changes in RPSCA as expected. On the other hand SP appeared to be positively related to RPSCA as expected. The lagged value of LTD, and IBR appeared to be negatively related with current changes in RPSCA while the lagged value of FGB was positively related to current changes in RPSCA.

This suggests that in the short run, an increase in DMB's holding of Treasury Bills in the previous period is followed by a reduction in their supply of Private Sector Credit in the current period. Also a rise in the yield spread (SP) between Private Sector Credit and Treasury Bills in the previous period is followed by a rise in the current supply of Private Sector Credit in the current period as is theoretically expected. This implies that the relative price of the two assets affects the choice between them.

The R-squared value of 0.351575 implies that the predictive power of the model is low as the model only explains about 35% variations in the dependent variable.

Given the low predictive power of the model we decided to estimate the impulse response function (IRF). This is because the impulse response function (IRF) sums up all the dynamics in

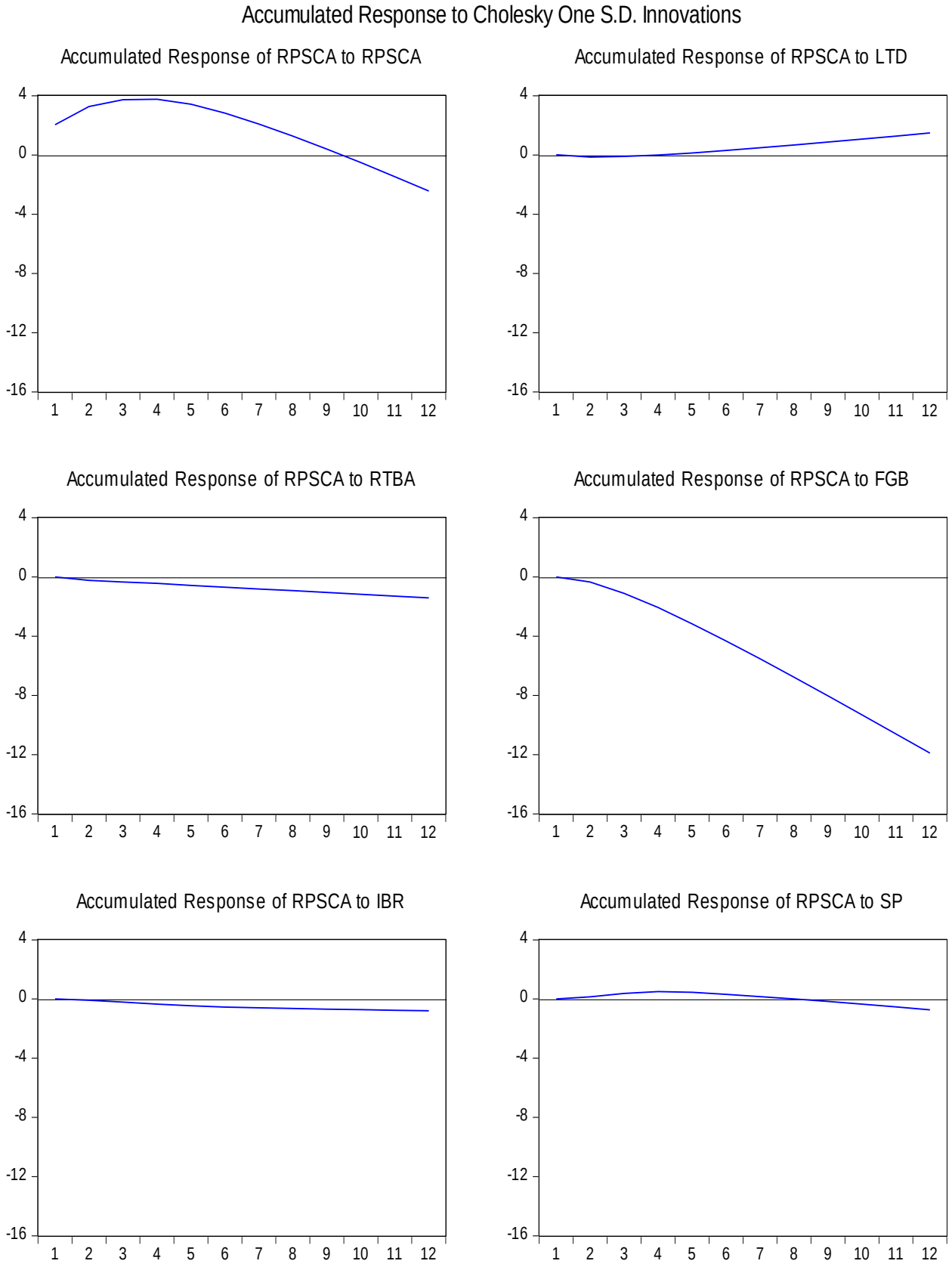
the model, that is, an effect of a shock on an *i*-th variable directly affects the *i*-th variable, and is also transmitted to all of the endogenous variables through the dynamic structure of the VAR.

4.6 Impulse Response Function

Figure 4.8 depicts the Accumulated responses of a one-standard error shock in LTD, RTBA, FGN, IBR and SP on RPSCA whereas Appendix VII provides the numerical values of the effect of each shock separately over 12 quarters.

The first interesting observation, which is common in the four graphical representations of IRF, is that they are all explosive, which means that the effect of the shock does not die over time, but it propagates over time with higher fluctuations into the future. This is evidence that the financial sector, or more precisely the banking sector, has an inherent instability in the face of shocks.

Figure 4.2 Accumulated response of RPSCA to one SD shock



Own shock impacted positively on RPSCA by 3.26% after the first two quarters. A possible explanation behind this result is that as some banks extend more credit to the private sector, this, through the process of competition and increasing confidence in the private sector, pushes more banks to do the same, hence raising banks' overall private credit with a geometric ratio. This effect however last through to the 6 quarter but eventually dies out, and becomes negative from the seventh quarter onward. This observation could be attributed to DMBs' attempt to balance their portfolio to better position themselves in the face of shocks.

RPSCA did not respond positively to a one standard deviation shock on LTD in the first 2 quarters as expected. This result indicates that DMBs do not quickly convert new deposits into loans. However after six quarters the response became positive and by 0.30% and by about 1.48% after 12 quarters.

Furthermore RPSCA responded negatively to a one standard deviation shock on RTBA. It responded by 0.24% after two quarters. The impact became larger (0.70%) after six quarters and even larger by about 1.14% after 12 quarters. This result is broadly consistent with the empirical findings of Ndung'u and Ngugi (2000); Fayed (2012) and Takele (2013).

A one standard deviation shock on FGB impacted negatively and persistently into the future. This indicates that DMBs channel most of their long term funds to the purchase of long term government debt instrument (Development stock/FGN Bonds). This result does not come as a surprise as the DMO act of 2003 resulted to a large increase in the volume of long term debt instruments specifically the FGN Bonds). The magnitude of the effect after 6 quarter was 4.33% and 11.91% after 12 quarters.

Finally a one standard deviation shock on SP impacted positively after 2 and 6 quarters but became negative from the 8th to the 12th quarters. The positive sign was expected because DMBs as profit maximizing units would invest their resources where the return in higher and

lending to the private sector would yield more returns because of the risk premium attached to the lending rate. The magnitude of the impact was 0.14% after 2 quarters. It went up to about 0.50% in the 4th quarter and down to 0.30 after 6 quarters. The low magnitude of the impact reflects the low level of price competition among DMBs in Nigeria. However, in the long run, the impact became negative with a magnitude of about 0.73% after 12 quarters. This result suggests that in the longer term, banks become concerned about safety and therefore would not continue to respond to higher lending rate by increasing their appetite for more profit by giving out more credit to the private sector, rather, they would begin to diversify their portfolio as the theory explains by investing in less risky assets with attractive returns.

4.7 Variance Decomposition

Having shown the dynamic effect of each disturbance, the relative contribution of each variable to fluctuations of RPSCA was assessed. The forecast variance decomposition provides information on the dynamic behavior of the variables in the system. It decomposes the historical variations in the variables and attributes some to the effect of all the variables in the system.

Table 4.5: Variance Decomposition of RPSCA

Period	S.E	RPSCA	LTD	RTBA	FGB	IBR	SP
T=1	2.031483	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
T=2	2.424880	96.23014	0.334740	0.947989	2.046047	0.127348	0.313732
T=4	2.781393	75.96851	0.394268	0.978853	20.95064	0.524158	1.183569
T=6	3.021177	58.28891	0.711118	1.011831	38.37763	0.560889	1.049625
T=8	3.902984	49.60127	0.960783	0.865789	47.03480	0.429740	1.062321
T=10	4.500758	45.23843	1.110161	0.826512	51.38653	0.342973	1.095391
T=12	5.061932	42.90841	1207358	0.765327	53.68222	0.282600	1.154087

The assessment of the relative contributions of LTD, RTBA, FGN, IBR and SP to the changes in RPSCA, as measured by the analysis of variance showed that the impulse responses above were no coincidences. From Table 4.6 RTBA has no contribution to changes in RPSCA in the first quarter. But it accounted for 0.95% in the second quarter. After six quarters lag, RTBA accounted for 1.01%. However, the size of this contribution dropped and the fall was sustained from the seventh quarter to an average of 0.76% in the 12^{th} quarter. For FGB, its effect on RPSCA was not also noticed in the first quarter and its contribution was on average of 2.05% in the second quarter. After 6 quarters lag FGB contributed 38.38% to variations in RPSCA and this contribution drastically increased to 53.68% in the 10^{th} quarter. Furthermore, SP contributed 0.31% after 2 quarters. It contribution increased consistently to 1.05 after 6 quarters and 1.15% after 12 quarters lag.

4.8 Summary of Findings

The coefficient of ECM presented the conventional negative sign and was statistically significant at 5 percent, which further confirmed the long run relationship (co-integration) between the variables. This also suggests that any disequilibrium in the RPSCA of DMBs results in the banks adjusting upward by 39% every period. The coefficients of our variable of interest RTBA appeared with expected negative signs in both the short and long run equations. SP also appeared with the expected positive sign in the short-run but with a different sign in the long-run equation.

The impulse response function captured the relationship between some of the explanatory variables and RPSCA. It showed that a negative relationship exists between private sector credit and treasury bills holding of DMBs. The relative yield differential (SP) between the two assets (Treasury Bills and loans and advances) showed the expected positive sign in the short and medium term (2^{nd} and 6^{th}quarters respectively) but became negative throughout the remaining quarters. This suggests that the relative returns on the two assets influenced DMBs' decision to either supply credit to the private sector or invest on Treasury Bills in the short run, but the long run relationship is determined by other factors such as term to maturity, relative riskiness, and liquidity and so on, as was discussed in the literature. The IRF also showed that FGN Bonds had a more significant negative effect on financial intermediation than Treasury Bills. This result was supported by the variance decomposition result which saw FGN Bonds contributing significantly to variations in lending to the private sector than Treasury Bills.

In summary, the results indicates that as the government issues more debt instruments to finance its deficit, DMBs tempted by the risk-free high return motive shift their portfolio away

from risky private loans and opt for lazy behavior characterized by channeling overall credit toward government debt-instruments at the expense of the private sector.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The study aimed at examining the impact of treasury bills return on financial intermediation in Nigeria spanning from 2003-2013. The study began by arguing the case that government's increasing reliance on Treasury bills with attractive rates of returns to finance its deficit was one of the factors responsible for the increasing investment on the instruments by DMBs who are the primary holders of deposits. An increased supply of Treasury Bills encouraged banks to invest more of its resources on Treasury Bills, as a rising Treasury bill rate meant that the banks could increase their profit margin by investing in treasury Bills. This results to DMBs reducing their supply of credit to the private sector.

In order to empirically determine the case in Nigeria, the empirical analysis began by checking the unit root properties of the data and it was discovered that they were all I(1), meaning that the data needed to be differenced once to become stationary. Given that the data was I(1), a test for co-integration was carried out to test for the long run properties of the variables. Co-integraion was however discovered, which resulted to the use of the VEC technique in estimating the regression model. The empirical estimates of the impulse response function and variance decomposition were used to examine the direction of effects of Treasury Bills holding of DMBs on the disbursement of credit to the private sector. In addition, the long run and short run models indicated the expected relationship among the variables of interest.

5.2 Conclusion

The empirical analysis presented in the previous chapter allows us to draw the following conclusions;

i. Evidence from the balance sheet structure analysis showed that DMBs' debt instrument portfolio is largely dominated by government instrument with negligible private sector instruments even as the philosophy and policy posture is for the private sector to take the initiative in most spheres of economic development.

ii. Evidence from the impulse response functions shows that the effects of shocks on the determinants of supply of credit to private sector emanating from DMBs do not die down but extends into the future, which indicates that the banking sector is fragile and may not recover quickly when hit by crises.

iii. In the longer term, the willingness of the DMBs to increase their holdings of government debt securities increases when their supply of credit to the private sector reaches a certain threshold. This reflects their desire to balance their portfolio immediately after holding a certain amount of private credit.

iv. Finally, and consistent with the lazy bank model, the effect of a positive government borrowing shock is contractionary with regard to the overall credit extended to the private sector by DMBs. This implies that a positive shock in the credit extended to the government would limit to a great extent the availability of banking sector credit to the private sector in the future.

5.3 Recommendations

In light of these conclusions, some policy recommendations that would follow logically from them can be outlined:

i. Stability of key prices, including interest rates, commodity prices and exchange rate should be used to stimulate high investment returns and reduce the credit risk on lending.

ii. Treasury bill rates should be re-aligned with other returns on short run financial assets; this could help in deepening the financial market thereby pushing for competitiveness among both private and public sectors debt instruments in the market, thus reducing the specific interest on Treasury Bills by DMBs.

iii. Government should improve on her tax revenue generation and other source of income and also limit her expenditure to growth enhancing projects. This could help to diversify its revenue generation sources thereby reducing dependence on financial securities like Treasury Bills and FGN Bonds.

iv. A deeper financial market with derivatives where loan asset can be made more liquid by repackaging (securitization) can help raise the relative attractiveness of loans to the private sector.

v. Other developed financial markets have credit data base whereby all loan application have some credit rating for banks to check before lending. Nigeria has been trying to develop this, though with slow progress. The National Identity Management project can help reduce this information asymmetry.

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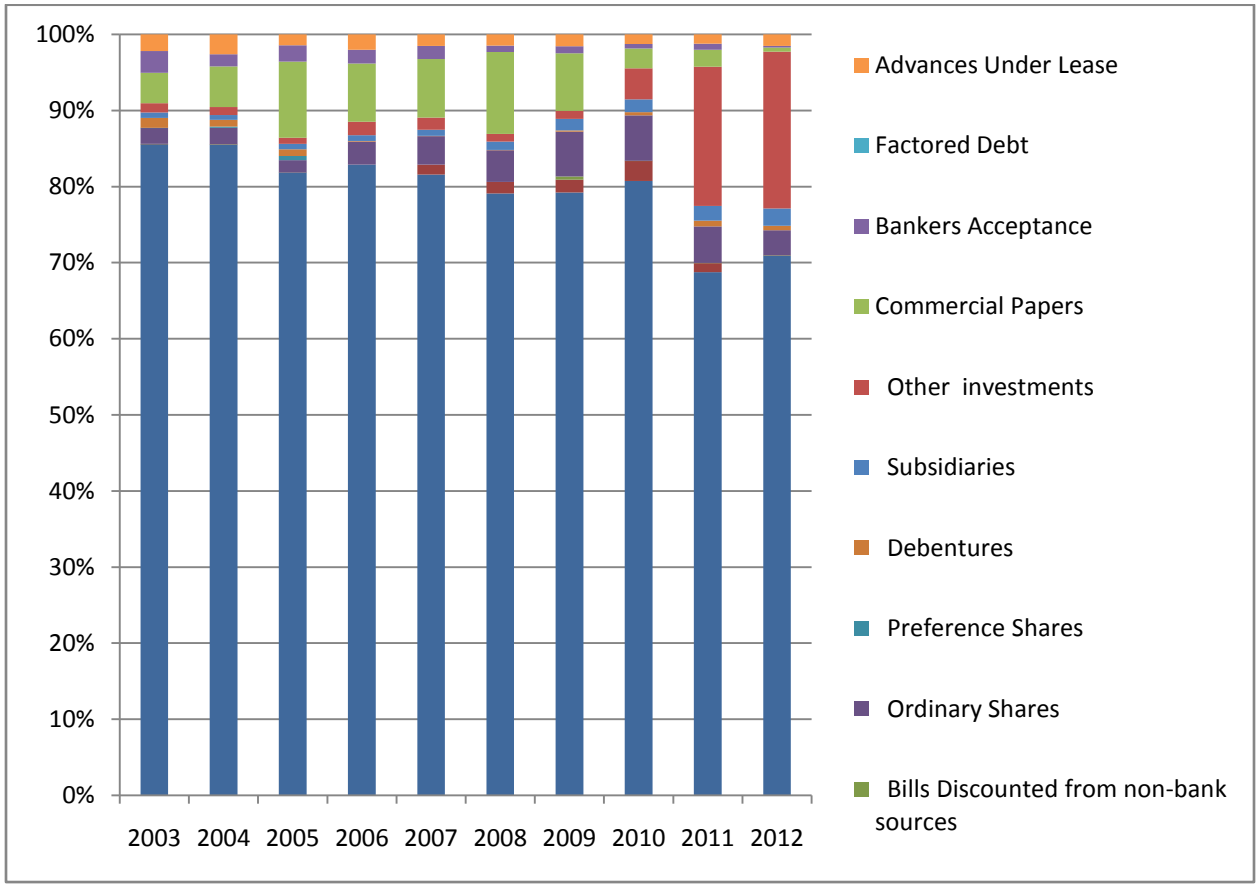
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APPENDICES

Appendix I

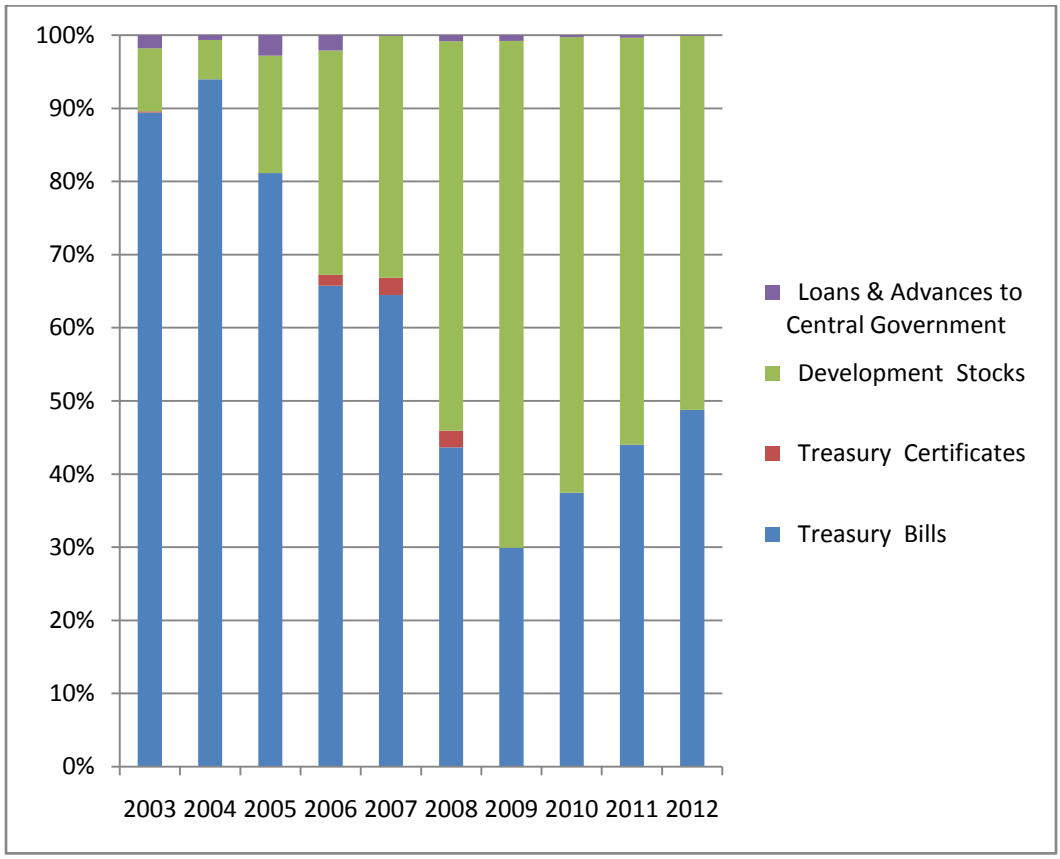
Fig 2.5.1: A Decomposition of Commercial Banks' Claims on the Private Sector



Source: CBN Statistical Bulletin, 2013

Appendix II

Fig 4.1.2:A Decomposition of commercial Banks' Claims on the Central Government



Source: CBN Statistical Bulletin, 2013

Appendix III

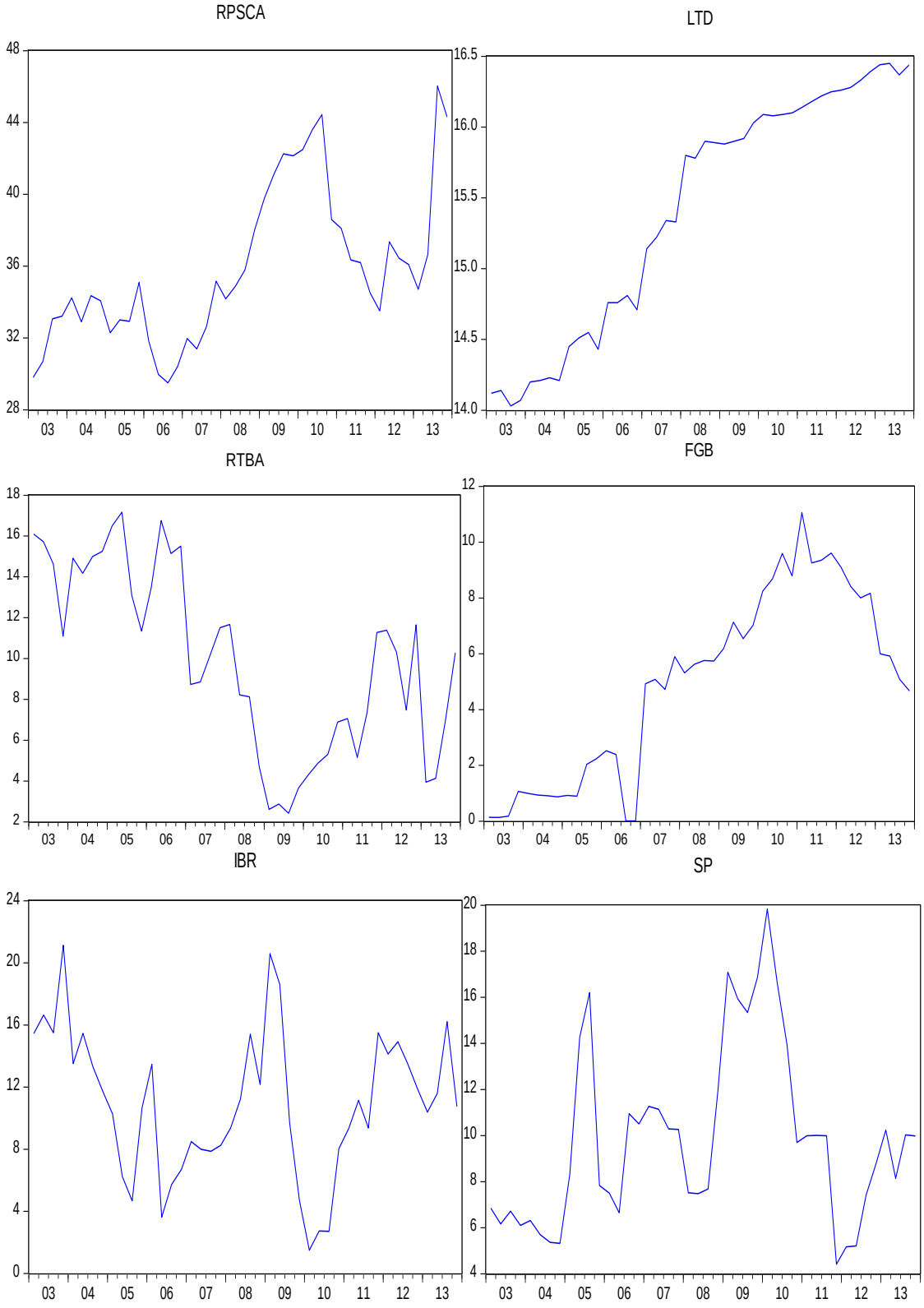
	SP(Average Lending rate –T-Bills rate)	RPSCA	RTBA	IBR	LTD	FGB
2003Q1	6.85	29.81111	16.10036	15.45	14.12	0.136389429
2003Q2	6.16	30.6877	15.71997	16.64	14.14	0.135434266
2003Q3	6.72	33.06955	14.62925	15.5	14.03	0.177539596
2003Q4	6.1	33.21565	11.09355	21.13	14.07	1.066484007
2004Q1	6.31	34.24107	14.91536	13.51	14.2	0.997556696
2004Q2	5.7	32.89709	14.17883	15.46	14.21	0.936655728
2004Q3	5.37	34.35796	14.99203	13.32	14.23	0.911786603
2004Q4	5.32	34.06741	15.25137	11.74	14.21	0.872802434
2005Q1	8.34	32.28621	16.49691	10.27	14.45	0.925534514
2005Q2	14.27	33.00868	17.17264	6.23	14.51	0.898044845
2005Q3	16.21	32.93201	13.09681	4.67	14.55	2.035656051
2005Q4	7.83	35.09363	11.33799	10.66	14.43	2.24493599
2006Q1	7.5	31.83748	13.50339	13.47	14.76	2.528403558
2006Q2	6.65	29.97048	16.76117	3.62	14.76	2.391638286
2006Q3	10.95	29.49975	15.14382	5.72	14.81	0.011096768
2006Q4	10.5	30.41054	15.5037	6.69	14.71	0.011248622
2007Q1	11.27	31.97483	8.727851	8.49	15.14	4.921937415
2007Q2	11.14	31.3914	8.85664	8	15.22	5.084601001
2007Q3	10.29	32.62855	10.17789	7.86	15.34	4.724824494
2007Q4	10.27	35.16344	11.51257	8.25	15.33	5.898843326
2008Q1	7.52	34.17757	11.67342	9.37	15.8	5.317418312
2008Q2	7.48	34.87549	8.216869	11.23	15.78	5.623208077
2008Q3	7.68	35.79498	8.121689	15.42	15.9	5.758319368
2008Q4	11.96	38.01414	4.706952	12.17	15.89	5.742030982
2009Q1	17.1	39.75144	2.610659	20.6	15.88	6.190022644
2009Q2	15.94	41.11612	2.868324	18.6	15.9	7.134259309
2009Q3	15.34	42.25425	2.421429	9.7	15.92	6.544214184
2009Q4	16.86	42.14928	3.651489	4.68	16.03	7.013979391
2010Q1	19.84	42.48626	4.298531	1.5	16.09	8.24750762
2010Q2	16.65	43.59183	4.881552	2.73	16.08	8.689947509
2010Q3	13.93	44.44015	5.304271	2.71	16.09	9.598725656
2010Q4	9.7	38.59558	6.889472	8.03	16.1	8.788480878
2011Q1	9.99	38.096	7.05955	9.33	16.14	11.05742695
2011Q2	10.01	36.3457	5.15729	11.15	16.18	9.253268485
2011Q3	9.99	36.20028	7.357301	9.37	16.22	9.354801279
2011Q4	4.41	34.51288	11.27381	15.5	16.25	9.607514376
2012Q1	5.17	33.50541	11.38547	14.13	16.26	9.104541525
2012Q2	5.21	37.35603	10.31507	14.92	16.28	8.409577106
2012Q3	7.41	36.43981	7.468402	13.5	16.33	8.002604995

2012Q4	8.76	36.08844	11.65614	11.88	16.39	8.166951224
2013Q1	10.24	34.71401	3.942193	10.39	16.44	6.000588548
2013Q2	8.14	36.65109	4.1291	11.59	16.45	5.916832894
2013Q3	10.0292	46.0401	6.98892	16.22	16.37	5.084652727
2013Q4	9.985	44.30623	10.28348	10.75	16.44	4.667947861

Source: CBN Statistical Bulletin, 2013

Appendix III

Unit root Properties of Variables



Appendix IV

Date: 06/19/14 Time: 06:36
Sample (adjusted): 2003Q3 2013Q4
Included observations: 42 after adjustments
Trend assumption: Linear deterministic trend
Series: RPSCA LTD RTBA FGB IBR SP
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.583470	112.3722	95.75366	0.0022
At most 1 *	0.486302	75.58877	69.81889	0.0161
At most 2	0.433920	47.61176	47.85613	0.0527
At most 3	0.336498	23.71293	29.79707	0.2129
At most 4	0.122815	6.483574	15.49471	0.6383
At most 5	0.023063	0.979992	3.841466	0.3222

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.583470	36.78345	40.07757	0.1122
At most 1	0.486302	27.97701	33.87687	0.2146
At most 2	0.433920	23.89882	27.58434	0.1383
At most 3	0.336498	17.22936	21.13162	0.1615
At most 4	0.122815	5.503581	14.26460	0.6774
At most 5	0.023063	0.979992	3.841466	0.3222

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

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

RPSCA	LTD	RTBA	FGB	IBR	SP
0.172942	0.520440	0.536445	0.138024	0.269779	0.498381
-0.303286	3.133126	0.185951	-0.445010	0.148655	0.268536
0.025990	0.642327	-0.327327	-0.529656	0.112837	-0.076821
0.199562	0.791737	0.301807	0.094238	0.150743	-0.113959
-0.326349	-1.990353	-0.193847	0.703374	0.085374	0.150870
0.221195	2.788632	0.141702	-0.493439	-0.021643	-0.008194

Unrestricted Adjustment Coefficients (alpha):

D(RPSCA)	-0.439431	1.025147	0.669023	-0.311046	0.153258	0.105688
D(LTD)	-0.011966	0.010630	-0.011182	-0.008528	-0.015025	-0.014168

D(RTBA)	-0.560368	-1.135597	0.688701	-0.351502	0.398280	-0.074325
D(FGB)	0.187753	0.056767	0.060404	-0.465306	-0.238904	-0.003960
D(IBR)	-1.315748	0.214340	-1.602842	-0.570917	-0.053031	0.249015
D(SP)	-0.718596	0.244353	0.758232	0.735513	-0.539007	-0.008461

1 Cointegrating Equation(s): Log likelihood -398.1437

Normalized cointegrating coefficients (standard error in parentheses)

RPSCA	LTD	RTBA	FGB	IBR	SP
1.000000	3.009328	3.101877	0.798096	1.559938	2.881779
	(3.91231)	(0.57637)	(0.89795)	(0.31134)	(0.49308)

Adjustment coefficients (standard error in parentheses)

D(RPSCA)	-0.075996
	(0.06146)
D(LTD)	-0.002069
	(0.00316)
D(RTBA)	-0.096911
	(0.07184)
D(FGB)	0.032470
	(0.03179)
D(IBR)	-0.227548
	(0.09806)
D(SP)	-0.124276
	(0.07138)

2 Cointegrating Equation(s): Log likelihood -384.1552

Normalized cointegrating coefficients (standard error in parentheses)

RPSCA	LTD	RTBA	FGB	IBR	SP
1.000000	0.000000	2.263818	0.949059	1.097463	2.031943
		(0.41401)	(0.41777)	(0.23261)	(0.37405)
0.000000	1.000000	0.278487	-0.050165	0.153680	0.282401
		(0.04781)	(0.04824)	(0.02686)	(0.04319)

Adjustment coefficients (standard error in parentheses)

D(RPSCA)	-0.386909	2.983218
	(0.10782)	(0.98083)
D(LTD)	-0.005293	0.027077
	(0.00636)	(0.05782)
D(RTBA)	0.247500	-3.849606
	(0.12811)	(1.16540)
D(FGB)	0.015254	0.275573
	(0.06409)	(0.58305)
D(IBR)	-0.292555	-0.013213
	(0.19755)	(1.79708)
D(SP)	-0.198384	0.391602
	(0.14336)	(1.30419)

3 Cointegrating Equation(s): Log likelihood -372.2058

Normalized cointegrating coefficients (standard error in parentheses)

RPSCA	LTD	RTBA	FGB	IBR	SP
1.000000	0.000000	0.000000	-1.142704	1.039773	0.785842
			(0.30567)	(0.26504)	(0.33269)

0.000000	1.000000	0.000000	-0.307487	0.146584	0.129109
			(0.03568)	(0.03094)	(0.03883)
0.000000	0.000000	1.000000	0.923998	0.025483	0.550443
			(0.12098)	(0.10490)	(0.13167)

Adjustment coefficients (standard error in parentheses)

D(RPSCA)	-0.369521	3.412949	-0.264093	
	(0.10038)	(0.92906)	(0.18790)	
D(LTD)	-0.005584	0.019895	-0.000782	
	(0.00634)	(0.05866)	(0.01186)	
D(RTBA)	0.265399	-3.407235	-0.737203	
	(0.12162)	(1.12572)	(0.22767)	
D(FGB)	0.016824	0.314372	0.091503	
	(0.06417)	(0.59390)	(0.12012)	
D(IBR)	-0.334212	-1.042762	-0.141316	
	(0.17314)	(1.60256)	(0.32412)	
D(SP)	-0.178678	0.878635	-0.588240	
	(0.13636)	(1.26211)	(0.25526)	

4 Cointegrating Equation(s): Log likelihood -363.5911

Normalized cointegrating coefficients (standard error in parentheses)

RPSCA	LTD	RTBA	FGB	IBR	SP
1.000000	0.000000	0.000000	0.000000	0.320735	-1.361805
				(0.29572)	(0.35077)
0.000000	1.000000	0.000000	0.000000	-0.046900	-0.448795
				(0.08326)	(0.09877)
0.000000	0.000000	1.000000	0.000000	0.606903	2.287044
				(0.27574)	(0.32708)
0.000000	0.000000	0.000000	1.000000	-0.629243	-1.879442
				(0.30869)	(0.36617)

Adjustment coefficients (standard error in parentheses)

D(RPSCA)	-0.431594	3.166683	-0.357969	-0.900517	
	(0.11352)	(0.93969)	(0.20326)	(0.20049)	
D(LTD)	-0.007286	0.013142	-0.003356	-0.001263	
	(0.00727)	(0.06019)	(0.01302)	(0.01284)	
D(RTBA)	0.195252	-3.685532	-0.843289	0.030109	
	(0.13787)	(1.14125)	(0.24685)	(0.24349)	
D(FGB)	-0.076034	-0.054028	-0.048930	-0.075190	
	(0.06649)	(0.55039)	(0.11905)	(0.11743)	
D(IBR)	-0.448145	-1.494779	-0.313623	0.518164	
	(0.19535)	(1.61705)	(0.34977)	(0.34501)	
D(SP)	-0.031898	1.460968	-0.366257	-0.540212	
	(0.14850)	(1.22922)	(0.26588)	(0.26226)	

5 Cointegrating Equation(s): Log likelihood -360.8393

Normalized cointegrating coefficients (standard error in parentheses)

RPSCA	LTD	RTBA	FGB	IBR	SP
1.000000	0.000000	0.000000	0.000000	0.000000	-1.644232
					(0.28706)
0.000000	1.000000	0.000000	0.000000	0.000000	-0.407496
					(0.08326)
0.000000	0.000000	1.000000	0.000000	0.000000	1.752628
					(0.30536)

0.000000	0.000000	0.000000	1.000000	0.000000	-1.325355
					(0.31062)
0.000000	0.000000	0.000000	0.000000	1.000000	0.880562
					(0.26289)

Adjustment coefficients (standard error in parentheses)

D(RPSCA)	-0.481610	2.861644	-0.387678	-0.792719	0.075530
	(0.14544)	(1.08949)	(0.20955)	(0.28065)	(0.10405)
D(LTD)	-0.002382	0.043048	-0.000444	-0.011832	-0.005478
	(0.00926)	(0.06937)	(0.01334)	(0.01787)	(0.00663)
D(RTBA)	0.065274	-4.478250	-0.920494	0.310249	-0.261261
	(0.17384)	(1.30222)	(0.25046)	(0.33545)	(0.12437)
D(FGB)	0.001932	0.421474	-0.002619	-0.243229	-0.024631
	(0.08288)	(0.62084)	(0.11941)	(0.15993)	(0.05929)
D(IBR)	-0.430839	-1.389228	-0.303343	0.480863	-0.594547
	(0.25134)	(1.88271)	(0.36211)	(0.48499)	(0.17981)
D(SP)	0.144007	2.533781	-0.261772	-0.919335	-0.007125
	(0.18498)	(1.38565)	(0.26651)	(0.35694)	(0.13234)

Appendix V

VAR Lag Order Selection Criteria
Endogenous variables: RPSCA IBR LTD FGB RTBA SP
Exogenous variables:
Date: 06/06/14 Time: 23:27
Sample: 2003Q1 2013Q4
Included observations: 39

Lag	LogL	LR	FPE	AIC	SC	HQ
1	-370.9869	NA	47.40074*	20.87112	22.40672*	21.42208*
2	-343.1409	38.55598	80.28973	21.28928	24.36047	22.39120
3	-324.1389	20.46370	266.7788	22.16097	26.76776	23.81385
4	-287.6713	28.05203	564.3184	22.13699	28.27937	24.34082
5	-203.5389	38.83035	279.1976	19.66866*	27.34664	22.42345

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Appendix VI

Vector Error Correction Estimates
Date: 06/19/14 Time: 06:39
Sample (adjusted): 2003Q3 2013Q4
Included observations: 42 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1	CointEq2
RPSCA(-1)	1.000000	0.000000
LTD(-1)	0.000000	1.000000
RTBA(-1)	2.263818	0.278487
	(0.42023)	(0.04853)
	[5.38705]	[5.73894]
FGB(-1)	0.949059	-0.050165
	(0.42405)	(0.04897)
	[2.23807]	[-1.02447]
IBR(-1)	1.097463	0.153680
	(0.23611)	(0.02726)
	[4.64805]	[5.63659]
SP(-1)	2.031943	0.282401
	(0.37967)	(0.04384)
	[5.35181]	[6.44126]
C	-94.76654	-22.36835

Error Correction:	D(RPSCA)	D(LTD)	D(RTBA)	D(FGB)	D(IBR)	D(SP)
CointEq1	-0.386909	-0.005293	0.247500	0.015254	-0.292555	-0.198384
	(0.10944)	(0.00645)	(0.13003)	(0.06506)	(0.20052)	(0.14552)
	[-3.53536]	[-0.82050]	[1.90335]	[0.23447]	[-1.45901]	[-1.36329]
CointEq2	2.983218	0.027077	-3.849606	0.275573	-0.013213	0.391602
	(0.99558)	(0.05869)	(1.18293)	(0.59182)	(1.82411)	(1.32380)
	[2.99646]	[0.46138]	[-3.25430]	[0.46564]	[-0.00724]	[0.29582]
D(RPSCA(-1))	0.020904	0.004636	0.098715	-0.054796	0.017318	0.096419
	(0.15967)	(0.00941)	(0.18972)	(0.09491)	(0.29255)	(0.21231)
	[0.13092]	[0.49261]	[0.52033]	[-0.57731]	[0.05920]	[0.45415]
D(LTD(-1))	-3.196747	-0.355380	3.601367	-0.854968	-12.60355	1.203934
	(3.18412)	(0.18769)	(3.78330)	(1.89277)	(5.83396)	(4.23384)
	[-1.00397]	[-1.89339]	[0.95191]	[-0.45170]	[-2.16038]	[0.28436]
D(RTBA(-1))	-0.057666	0.003462	-0.020398	-0.104347	-0.037316	0.341733
	(0.15535)	(0.00916)	(0.18458)	(0.09235)	(0.28463)	(0.20656)
	[-0.37120]	[0.37808]	[-0.11051]	[-1.12996]	[-0.13110]	[1.65438]
D(FGB(-1))	0.211527	0.032107	-0.548836	-0.116309	0.769326	-0.109374
	(0.34552)	(0.02037)	(0.41054)	(0.20539)	(0.63306)	(0.45943)
	[0.61220]	[1.57639]	[-1.33687]	[-0.56628]	[1.21524]	[-0.23806]

D(IBR(-1))	-0.035106	9.11E-05	0.221108	0.025258	-0.152082	-0.006732
	(0.09750)	(0.00575)	(0.11585)	(0.05796)	(0.17864)	(0.12964)
	[-0.36007]	[0.01585]	[1.90864]	[0.43581]	[-0.85135]	[-0.05193]
D(SP(-1))	0.006710	-0.008070	0.266825	-0.047717	0.166242	0.267526
	(0.18318)	(0.01080)	(0.21766)	(0.10889)	(0.33563)	(0.24358)
	[0.03663]	[-0.74739]	[1.22590]	[-0.43820]	[0.49531]	[1.09833]
C	0.450030	0.069523	-0.324414	0.169080	0.419328	0.056251
	(0.36505)	(0.02152)	(0.43375)	(0.21700)	(0.66885)	(0.48540)
	[1.23278]	[3.23078]	[-0.74793]	[0.77916]	[0.62694]	[0.11588]
R-squared	0.351575	0.196818	0.314672	0.098016	0.276582	0.167832
Adj. R-squared	0.194381	0.002108	0.148532	-0.120647	0.101208	-0.033906
Sum sq. resids	136.1884	0.473224	192.2664	48.12371	457.1817	240.7857
S.E. equation	2.031483	0.119750	2.413763	1.207599	3.722095	2.701210
F-statistic	2.236568	1.010825	1.894013	0.448251	1.577096	0.831932
Log likelihood	-84.29918	34.60756	-91.54087	-62.45363	-109.7311	-96.26641
Akaike AIC	4.442818	-1.219407	4.787661	3.402554	5.653860	5.012686
Schwarz SC	4.815176	-0.847050	5.160018	3.774912	6.026218	5.385044
Mean dependent	0.324251	0.054710	-0.129440	0.107917	-0.140238	0.091071
S.D. dependent	2.263332	0.119877	2.615835	1.140744	3.926068	2.656549

Determinant resid covariance (dof adj.)	15.07163
Determinant resid covariance	3.546078
Log likelihood	-384.1552
Akaike information criterion	21.43596
Schwarz criterion	24.16659

AppendixVII
Impulse Response Function

Period	RPSCA	LTD	RTBA	FGB	IBR	SP
1	2.031483	0.000000	0.000000	0.000000	0.000000	0.000000
2	3.269000	-0.140295	-0.236098	-0.346855	-0.086534	0.135822
3	3.735429	-0.094230	-0.343796	-1.109801	-0.206992	0.376321
4	3.768695	-0.000976	-0.435363	-2.068121	-0.343195	0.499914
5	3.417811	0.134300	-0.571400	-3.170266	-0.462385	0.449838
6	2.819161	0.303925	-0.698465	-4.332586	-0.542570	0.306906
7	2.085713	0.487169	-0.818781	-5.536254	-0.590387	0.152923
8	1.273664	0.674805	-0.936825	-6.773043	-0.635014	-0.000752
9	0.399443	0.870011	-1.056390	-8.038769	-0.680685	-0.165889
10	-0.519090	1.071056	-1.176147	-9.320280	-0.724572	-0.346982
11	-1.467083	1.275746	-1.296152	-10.61099	-0.764150	-0.537456
12	-2.432448	1.482100	-1.415629	-11.90709	-0.801154	-0.731212

Cholesky Ordering: RPSCA LTD RTBA FGB IBR SP

Appendix VIII
Variance Decomposition

Period	S.E.	RPSCA	LTD	RTBA	FGB	IBR	SP
1	2.031483	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	2.424880	96.23014	0.334740	0.947989	2.046047	0.127348	0.313732
3	2.601106	86.84809	0.322283	0.995322	10.38162	0.325140	1.127551
4	2.781393	75.96851	0.394268	0.978853	20.95064	0.524158	1.183569
5	3.021177	65.73704	0.534656	1.032393	31.06539	0.599898	1.030623
6	3.302825	58.28891	0.711118	1.011831	38.37763	0.560889	1.049625
7	3.601315	53.17474	0.857025	0.962669	43.45051	0.489395	1.065662
8	3.902984	49.60127	0.960783	0.911080	47.03480	0.429740	1.062321
9	4.204922	47.05612	1.043270	0.865789	49.58331	0.382036	1.069470
10	4.500758	45.23843	1.110161	0.826512	51.38653	0.342973	1.095391
11	4.787025	43.91139	1.164191	0.793460	52.69432	0.310015	1.126621
12	5.061932	42.90841	1.207358	0.765327	53.68222	0.282600	1.154087

Cholesky Ordering: RPSCA LTD RTBA FGB