Commercial Banks' Pricing of Loans, Assets Quality and Financial Intermediation in Nigeria

BY

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DECLARATION

I hereby declare that this research is purely a product of my research efforts. It has not been submitted anywhere for award of Doctor of Philosophy Degree (Ph. D) or any lesser degree. All citations are duly acknowledged at the reference section.

Tijjani Mohammed JUME Signature ……. Date ……..

CERTIFICATION

This Thesis titled **Commercial Banks' Pricing of Loans, Assets Quality and Financial IntermediationIn Nigeria,**meets the regulations governing the award of the degree of **Doctor of Philosophy (Ph. D) Economics,**of Ahmadu Bello University, Zaria, and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This study is dedicated to Almighty Allah (SWT) for everything and my parents;*(Late) Alhaji* Muhammad Jume and HajiyaBinta for their parental support in all aspects of my life from childhood to adulthood.

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Abstract

Despite the interest rate liberalization policy that gave rise to commercial banks' pricing of loans models which is expected to enhance quality of banks assets and improve financial intermediation, poor assets quality of banks, bank failures and poor intermediation role of banks are still prevalent in Nigeria. Therefore, the focus of this study is to estimate commercial banks' pricing of loans model and use the model to evaluate assets quality of banks and level of financial intermediation in Nigeria since the financial liberalization reforms of 1986 - 2002. Based on a sample of nine Deposits Money Banks (DMBs) with data sourced from their annual balance sheet and income statements of accounts from 2002 – 2016, the study used one-way fixed effect Least Squares Dummy Variable (LSDV) model to estimate the banks' pricing of loans model. The estimated LSDV parsimonious model revealed R^2 of 0.60 for the 'low risk' credit market. Most significant is the revelation that the coefficient of the credit risk variable is significantly negative in the 'low risk' and 'high risk' credit markets, contrary to the a priori theoretical expectation. This finding shows that the DMBs underprice credit risk to 'buy' market share in the spirit of relationship banking with support from non-interest income (fee–based products) that evolved due to product innovations brought about by financial liberalization. These attitudes of the DMBs are in response to stiff competition provoked by financial liberalization which has adverse consequences for assets quality of banks that deteriorated and successively led to bank failures, high cost banks bailouts and low level of financial intermediation, with financial disintermediation and 'inverted intermediation' militating against economic growth. This study, therefore, recommends that Central Bank of Nigeria (CBN) should up-step its focus on prudential regulations with greater emphasis to macro-prudential regulations to enhance assets quality of banks, reduce bank failures and improve financial intermediation for economic growth.

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HAPTER 1

INTRODUCTION

1.1 Background to the Research

The relationship between financial liberalization reforms and economic growth has been widely discussed and documented in the literature. Consequently, there is considerable degree of agreement among economists that financial liberalization facilitates economic growth. The theoretical foundation linking liberalization reforms to economic growth comes from the neoclassical approach to efficient distribution of financial and economic resources. This approach dominates the policy thinking and therefore, recommendations of multilateral financial institutions such as the International Monetary Fund (IMF), the World Bank (WB) and the Bank for International Settlement (BIS) in the last 2 decades. According to the theoretical postulation, the impact of liberalization on investment and economic growth is centered on competition which promotes, among other things: financial deepening, expansion of financial markets, resource efficiency in mobilization and allocation through market-based banks' pricing of financial products, innovation as a result of technology developments. All these lead to economic growth and consumer welfare (Kaufman, 1972; Mackinnon, 1973; Shaw, 1973).

Following these theoretical expectations, policymakers in some developing and emerging economies in Africa, Asia and Latin America such as Nigeria, Kenya, Malawi, Ghana, Malaysia, Indonesia, Chile and Venezuela, to mention a few, implemented interest rate deregulation policy in the 1980s and 1990s. Quite unexpectedly, a large strand of empirical studiesparticularly in developing economies reveals findings that financial liberalization policies had resulted in domestic banking crises that highly correlate with increase in banks' non-performing loans (NPLs) and macroeconomic volatilities in real Gross Domestic Product (GDP), inflation,

exchange rate etc(Demirguc-Kunt and Detragiache, 1998; Kaminsky and Reinhart, 1999; Garba and Garba 2002).This contradiction provokes researchparticularly in developing economies like Nigeria,where banking problems erupted in the aftermath of liberalization reforms.

Financial liberalization reforms started in Nigeria with interest rate deregulation policy of the Structural Adjustment Program (SAP) in 1986. This was concluded in 2002 with Universal Banking System and Capital Account Deregulation reforms. According to the Central Bank of Nigeria (CBN), the driving force to interest rate deregulation (liberalization) policy shift is the desire to achieve; enhanced efficiency in the mobilization and utilization of resources for financial intermediation, restore macroeconomic stability, sustainable economic growth as well as develop an efficient framework for monetary management (Sanusi 2002).Thus, the interest rate deregulation reform allows commercial banks (known as Deposit Money Banks (DMBs) to use market forcesto set the lending rate for the credit markets without regulatory intervention.

Since I986 whenthe DMBs commencedthe market-based pricing ofloans,assets quality of the banks had successively declinedwith rise in NPLs.Over the years, both the proportion and level of NPLs in Nigeria had escalated, leading to banks insolvency and closure of many banks. For instance, in 2008 after banks consolidation, the DMBs were exposed to the tune of N1.6 trillion margin loans in capital market and oil and gas sectors which turned to NPLs (Sanusi (2010). By 2009, the proportion of NPLs to total loans was 33% while the level of NPLs stood at N2.9 trillion. These proportion and level of the NPLs were drastically reduced to2.88% and N363.31billionrespectively in 2014 when the Assets Management Corporation (AMCON) purchased over N3 trillion banks NPLs to enhance bank intermediation (CBN 2016). However, by 2016 the proportion and level had escalated to 12.80% and N2.1 trillion respectively, suggesting a fresh banking crisis in the post- AMCON era.

The phenomenal rise in NPLs and the corresponding fall in assets quality of banks over the years are suspected to be linked to portfolio capital surge and reversal. The capital account deregulation allowed freecapital flows which intensified market risk in the Nigerian Stock exchange Market (NSE) that resulted to accumulation of banks NPLs. For instance, the rise in NPLs was always preceded by portfolio equity net inflows, first in 2008 when the outflow was ($959.8) million and secondly, in 2005 when the net outflows was ($476.6) million.

Therapid increase in proportion and level of NPLs has impeded the DMBs' capacity to playeffectively their traditional role of financial intermediation for economic growth. In fact, since liberalization reform started,financial intermediation had never been achieved; instead, financial disintermediation and 'inverted intermediation' have become common features of the Nigerian banking sector. From the financial statistics, it is obvious that the DMBs havefailed to effectively discharge their primary role of financial intermediation. For instance, the banks total assets grew significantly from N1.568 trillion in 2000 to N3.753 trillion in 2004 and by 2009, total banks assets stood at N17.52 trillion. Thisincreased rapidly to N31.68 trillion in 2017 (CBN statistical bulletin 2016). Likewise, total banks deposits grew from N11.49 billion in 1986 to N343.17 billion in 2000. By 2014 and 2016, total savings mobilization had risen to N11.9 trillion and N12.14 trillion respectively (CBN statistical bulletin 2017). Over the years, these rapid increases in banks assets and liabilities failed to stimulate growth in investment and employment in the real sector. This is evident by the decline in ratio of loans and advances to total deposits which stagnated from 83.3% in 1986 to 51% in 2000. The trend deteriorated further after consolidation when the ratio declined to 38% in 2013 and by2016 it increased to 75.9 %(CBN Statistical bulletin 2017).Disturbed by the low level of bank intermediation, the CBN in August

2018 introduced the Differentiated Cash Reserve Ratio (DCRR) Regime to channel long term banks creditto the real sector to enhance intermediation and economic growth (CBN 2018).

The persistence of poor assets quality of banks and weak financial intermediationof banks in the aftermath of financial liberalization reform in Nigeria raisea number of questions particularly the question ofwhy the Nigerian banking system features recurring episodes of weak assets quality and poorbank intermediation. In the drive to investigate this problem, we suspect thatstructural and operational features and weaknesses of the banks' pricing of loans model may have been responsible for these banking problems.This study, therefore, focuses on commercial banks' pricing of loans framework to investigatethe weak assets quality of banks and low level of financial intermediation.

1.2 Research Problem

There are serious concerns about the weak assets quality of DMBs in Nigeria as demonstrated by high proportion of banks NPLs to total loans which jumped from 2.88 % in 2014 to 15.02% in 2017 (CBN statistical bulletin 2017). The poor assets quality of banks has led to high cost of bank bailouts in Nigeria. For instance, in 2009, the CBN spent N620 billion (as tier 1 capital) to bail out 10 banks that were at the verge of collapse. Poor assets quality of banks also led to high cost of bank restructuring as clearly reflected by the cost of intervention of the Assets Management Corporation of Nigeria (AMCON) which purchased over N3trillion banks NPLs from 2009 to2013. This diverted resources from development projects.

Poor assets quality of bank can also lead to bankfailures, which lead to huge losses andcan substantially drag dawn the real economy as it undermines the flow of credits to households and businesses, reducing investment and consumption which are major components of aggregate

demand. Diamond and Dybvig (1983) observe that bank failures can also raise the cost of credit intermediation which reduces aggregate demand. Friedman and Swartz (1965); Kaufman (1972) argue that bank failures can reduce money supply which reduces income, employment and production. In this way, bank failures strongly undermine the growth of national income and employment.In 2009, 6 banks failed and there is strong indication that another round of bank failures looms high. Bloomberg (2016) reported that 7 out of 21 DMBs are close to insolvency as their assets quality had deteriorated following the rise in their NPLs from the CBN threshold limit of 5% to 12.80% and 15.02% in December, 2016 and June, 2017 respectively.

There is also concern about low level of financial intermediation to productive sectors of the economy such as agriculture, manufacturing and mining which has slowed down the growth rate of the economy. (Hesse 2007) concludes that financial intermediation had never taken off in Nigeria; instead, financial *disintermediation* and *inverted intermediation* are the common features of the Nigerian economy. *Financial disintermediation* occurs when community's savings are not passed onto intermediaries like banks for financial intermediation. This problem reflects the poor savings culture of communities in Nigeria over the years in relation to low interest rate on savings account. The CBN's financial inclusion strategy is designed to address *financial disintermediation*. *Inverted intermediation* exists when banks mobilize community's savings but are unable to pass them to deficit units for the purpose of consumption and investment in the productive sectors of the economy. In this case, the savings are either recycled in the financial sector as financial investment by the banks for profit or extended to investors in the capital market for speculative trading like, purchase of secondary shares (margin loans), foreign exchange dealings by the banks, treasury bills, and even deposits in the discount window of the CBN standing deposit facility (SDF), or simply left *'idle'* in the banks vaults for

speculative trading. This problem is bank-based.Economic theory predicts that, there is the tendency for real investment to decline due to fall in intermediation efficiency.

In addition, there is contention in the literature that consolidation of the banking sector in 2005 improved the flow of financial resources to the real sector thereby improving economic growth. This is supported by studies like Saibu (2013); Bebeji (2013); Barros and Caporale (2012), among others. On the other hand, studies like Garba (2014), Radwan (2010) argued that consolidation led to high liquidity and growth in net credit with excessive risk taking by banks that crystalized in assets price bubble, which contributed to poor assets quality of banks and *inverted intermediation.* This obstructed financial intermediation for economic growth. These contentions provoke continuous academic debate and research with mixed results.

In summary, poor assets quality of banks, bank failures and the associated high cost of bank restructuring and bailouts, low level of bank intermediation for economic growth and the concern that risk of another round of bank failures looms high after the AMCON's purchase of NPLs in 2010 are the basic issues addressed by this research. These issues are addressed with a focus on banks' pricing of loans.

.1.3 Research Questions

In analyzing assets quality of banks and financial intermediation by the Nigerian banking sector through the banks' pricing model, this study addresses the following specific research questions:

(i) What are the determinants of DMBs' pricing of loans and advances?

(ii) What is the effect of banks' pricing of loans on assets quality of banks and deposit money banks (DMBs) intermediation?

(iii) What is the impact of banking consolidation on assets quality and intermediation by DMBs?

1.4 Objectives of the Study

The main objective of this research is to evaluate DMBs assets quality and intermediation through the banks' pricing model. Other objectives of the research are to:

(i) Analyze the determinants of DMBs' pricing ofloans in Nigeria.

(ii) Assess the effects of DMBs' pricing of loans on assets quality of banks and financial intermediation.

(iii) Investigate assets quality of DMBs and extent of intermediation between the banking sector and the real economy following the consolidation of DMBs.

1.5 Justification of the Study

This study assesses the determinants of DMBs' pricing of loans. The pricing model focuses on the internal characteristics of the banks such as: cost efficiency in terms of deposit mobilization (funds raising), size, capital, risk appetite. It is also focused on industry regulatory policies such as monetary policy shocks like monetary policy rate (MPR), cash reserve ratio (CRR). There are also macroeconomic factors like the GDP and inflation. The findings are expected to contribute to the existing literature in 5broad ways.

First, the study estimates the banks' pricing of loans model at the individual bank's level. This gives us a clue, in a systematic way, how banks price their loans in Nigeria as well as the determinants of loan pricing. It also sheds light on whether the DMBs price loans in the same way and manner.

Second, there are contending views on bank consolidation in Nigeria. Sanusi (2002); Soludo (2004) submitted that consolidation promotes good assets quality of banks and financial intermediation for economic growth (CBN EFR December 2010).This is against some empirical findings that bank consolidation promotes banks competition which encourages excessive risk taking. Excessive risk taking by banks increases credit expansion with high leverage which leads to excess liquidity. These developments contribute to speculative assets price bubble which explodes and destroys the pricing system. The research findings can give an insight into the impact of bank consolidation on the economy through the banks' pricing of loans model.

Third, monetary policy transmission mechanism. The findings of this studyare expected to shed light on potency of monetary policy transmission mechanism through response of banks to policy shocks like changes in monetary policy rate (MPR) and cash reserve ratio (CRR). This is important to the CBN for tracking the bank interest channel and interest pass- through analysis.

Fourth, and most important, results of the estimated banks' pricing of loans model are used to assess assets quality of the DMBs. Given the persistent episodes of bank failures and low level of banks intermediation in Nigeria, it is important to investigate how the DMBs are pricing borrowers' credit risk. The pricing of credit risk, which should be based on risk-based pricing model, can reveal whether or not the DMBs are correctly risk-pricing loans. Mispricing or underpricing credit risk on loans has important implications for assets quality of banks and intermediation. Therefore, credit risk pricing is a critical barometer for evaluating assets quality of banks and bank intermediation for economic growth.

Fifth, on theoretical, empirical and methodological grounds, this research is justified in Nigeria where problems of the banking sector are largely assessed within 'traditional framework'. The traditional framework focuses on economic theory and micro-prudential regulations. This

framework promotes safety and stability of individual financial institutions and depositors against losses. For instance, in Nigeria, studies that use this framework include, among others; Saibu (2013), Bebeji (2013), Onodugo et al. (2013), Uguani (2013), Egbo (2013), Funso et al (2012), Barros and Caporale (2012), Haruna (2012), Kargi (2012) and Bello (2010). Following the lessons of the global financial crisis of 2007-2009, there is consensus among economists and other stakeholders that macro-prudential regulations are needed to complement the micro-prudential regulations for safely of the financial institutions to collectively achieve financial stability, prevent bank failures and deliver the expectations of financial intermediation theory.

This study fills these theoretical, empirical and methodological literature gaps by adopting the 'emerging framework' in assessing assets quality of banks and bank intermediation. The emerging framework focuses on economic theory, micro-prudential and macro-prudential regulations. In trying to fill these literature gaps, this study used broad analytical views, focusing on global and national macroeconomic policies, aggregates, interdependencies, contagion risk, values and behavior to analyze assets quality of banks and financial intermediation in Nigeria in the period of analysis.

1.6 Scope and Limitations of the Research

The study is confined to the analysis of DMBs' pricing of loans, assets quality of the banks and financial intermediation in Nigeria from 2002 to 2017.The 2002 marks the period of full blown liberalization of the banking sector in Nigeria when interest rates were fully deregulated (after CBN temporary administrative fix of deposits and lending rates)and Universal Banking System introduced. This period also witnessed the deregulation of capital accounts in Nigeria. Availability and credibility of data are some limitations of this research in Nigeria, where data generation processes are marred by some human and institutional lapses, such as differences in

data reporting time among the sample, quality of financial reporting system as well as the CBN and National Bureau of Statistics (NBS) data generating processes.

1.7 Organization of the Study

This study is organized into 5 chapters. Chapter 1 covers the general introduction, the background of the study, statement of research problem, research questions and objectives, justification of the study, scope and limitations, and organization of the study respectively. Chapter 2 is the literature review. The chapter opens up with introduction which is followed byconceptual literature. The conceptual literaturereviews the basic concepts in the study as conceptualized in various related studies.The conceptual literature closes with the conceptual framework of the study. This is followed by theoretical literature which reviewstheories of the banks' pricing models, financial liberalization theory and prudential regulations literature.The theoretical literature closes with the theoretical framework of the study. The empirical literature reviews past empirical studies in chronological order. This is followed by overview of the Nigerian banking system (2002-2017) which presents a historical background of banking in Nigeria as well as the institutional banking reforms that were implemented to address assets quality of banks and financial intermediation for development of the Nigerian economy. The last section of chapter 2 evaluates the literature review to trace the research gap. Chapter 3is the research methodology. It starts with introduction to methodology of the research and discusses analytical framework,empirical specification of banks' pricing of loans models, the equations to be estimated as well as data sources and limitations. Chapter 4is estimation, presentation and analysis of results. The chapter presents results and analyses of results of the banks' pricing of loans model with introduction to the chapter taking the lead. This is followed by presentation of descriptive statistics, focusing on summary statistics and correlation matrices. These are

followed by presentation and analyses of results of the econometric models of banks' pricing of loans.Chapter 5 discusses summary, conclusion and recommendations. This chapter laid the groundwork for this thesis and on this foundation, the thesis proceeds to the next chapter for literature review.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Thischapter aims to reviewconceptual, theoretical and empirical literature respectively. To achieve this aim, the chapter is divided into 6 sections as follows. Section 2.1 is the introduction while Section 2.2 is the conceptual literature reviewwhich reviews key concepts in this study like: banks' pricing of loans models, assets quality of banks, financial intermediation and bank consolidationfrom different perspectives of researchers in the respective fields.This is followed by the conceptual framework of the study under Section 2.2.1.Section 2.3 focuses on the theoretical literature review, which isdivided into three components. First, section 2.3.1 focuses on theories of banks' pricing of loanswhich presentacomprehensive survey of theories of banks' pricing of loans models from the original model of Ho and Saunders (1981) to the current stage of the literature. The second componentof the theoretical literature in section 2.3.2 is the theory of financial liberalization which discusses MacKinnon (1973) and Shaw (1973) theses.

The third componentof the theoretical literature comes under section 2.3.3 reviews the prudential regulations literature. The prudential literature discusses micro-prudential and macro-prudential regulations, focusingon Basel Accords 1, 11 and 111. From the theoretical literature review, Section 2.3.4presents the theoretical framework of the study. The empirical literaturereview in section 2.4reviews past and current empirical studies that are related to this study. The empirical literature review is divided into two components. First, section 2.4.1 reviews empirical studies on banks' pricing of loans in developed economies as well as studies on Nigeria in chronological

order. The second component of the empirical literaturein 2.4.2 reviews studies onassets quality of banks, bank intermediation and bank failures in developed economies and Nigeria in chronological order.Section 2.5 is the overview of the Nigerian banking system from 2002 to 2017. The overview of the banking system traces the historical developments and evolution of financial liberalization reforms in the Nigerian financial system. Finally, section 2.6 evaluates the conceptual, theoretical and empirical literature to analyze the research gap.

2.2 Conceptual Literature Review

This section of the literature reviews somekey concepts of the study in adefined conceptual relationship. We start with review of banks' pricing of loans models and then proceed to examine, assets or loans quality of banks, financial intermediation and consolidation of banks.

2.2.1 Conceptualization of Commercial Banks' Pricing of Loans

Commercial banks' pricing of loans is the unrestricted authority accorded commercial banks to set the lending rate for the credit markets. This framework is critical in the assets and liabilities management of banks. Pricing of loans has considerable impact on earnings, profitability and stability of the banks because in practical banking, loan is the largest and most important asset of a bank. In bank-dominated financial economies like Nigeria, loans are between 80% and 90% of the total assets of banks. It includes, among other things, bank overdraft, term loans, finance lease and other short and long term credit facilities extended by banks to their customers for consumption and investment. There are various types of loans such as personal loan, building loan, real estate loan, house purchase loan, agricultural loan, margin loan and so on. Traditionally, the banking firm operates under oligopolistic market conditions. On the liability side of the balance sheet, it takes deposits from savers (surplus spending units) and pays interest

to compensate them. On the assets side, it uses the same savings mobilized to fund requests for loan facility from prospective borrowers, who invest to produce goods and services or use the loan to purchase goods and services for consumption.

According to Gestel and Baesens (2009),loan pricing is very critical in decision making process facing financial institution managers, particularly, banks. The ability to discriminate good customers from bad ones is a highly decisive element of being a successful player in the banking and credit industry. Price review is a continuous process in the light of competition and risk to acquire market share. Banks have historically used several traditional methods, different strategies and theoretical models to set the lending rate for the borrower. We review below the popular models banks use in pricing loans.

(i) Risk Based Pricing of Loans Model

Risk-based pricing of loans is the most widely articulated,recommended and globallyaccepted and recognized model of loan pricing in a deregulated banking system. The Bank for International Settlement (BIS) through its Committee on Banking and Supervision (BCBS) articulated Basel Accords 1 and II to all central banks, that commercial banks should apply risk management techniques in pricing their assets (loan) and also provide capital adequately to cover all the different types of risks that emerge in banking operations, to protect banks from insolvency and failure. Under the BIS Basel II framework, banks are required to conduct credit rating of their borrowers, categorize them into classes and calibrate the rating classes to their respective probability distribution of default (Repullo and Suarez 2004). Basel Committee on Banking and Supervision (BCBS) is one of the committees of the Bank for International Settlement (BIS). It was established in 1974 as a result of large scale bank failures across the

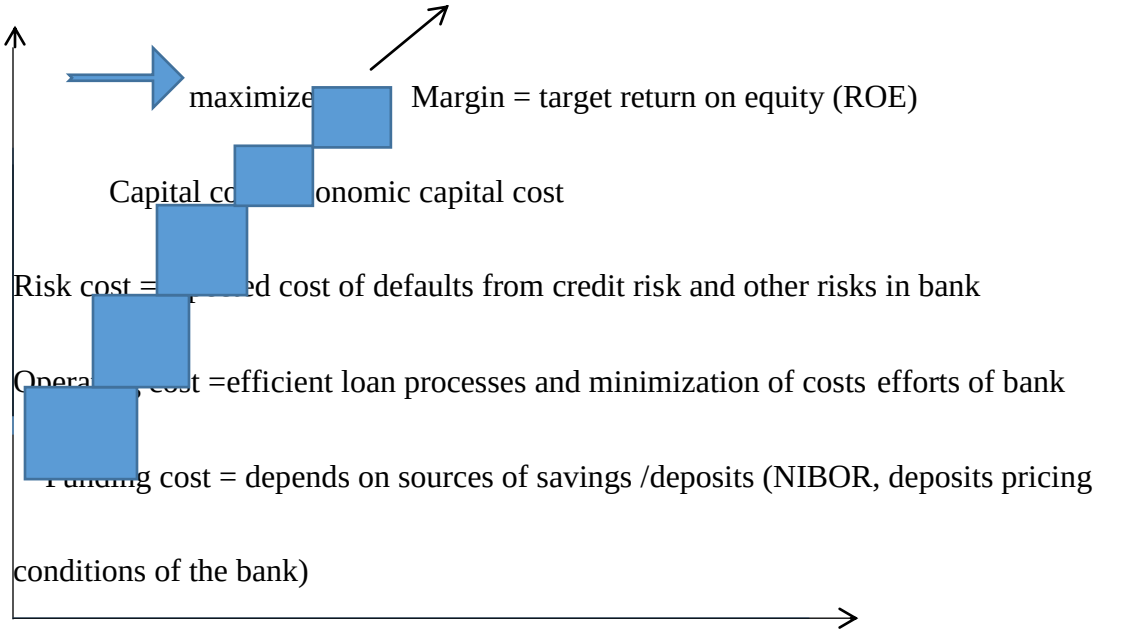
world. The objective is to stem banking system instability and promote assets quality of banks through the Basel Accords 1 and 11.

Specifically, BCBS emphasizes that banks need to manage credit risk arising both from individual creditors, transactions and the risk in their entire portfolio. They also need to consider, the relationships between credit risk and other risks.Credit risk is the possibility that an obligor will not meet his/her obligations in line with the agreed terms, resulting in financial loss to the bank.BCBS (2000) defined credit risk as the potential that a bank borrower or counterparty will fail to meet its obligations in accordance with agreed terms.Credit risk is the most critical risk in banking and there is compelling need to understand and consider the relationship between credit risk and other risks in banking such as; liquidity risk, market risk etc. For instance, market risk that arises from foreign exchange rate risk and equity price risk are very important in macro-prudential regulations (See Appendix D for interaction of risks in banking).

According to Magri (2015), Layegue (2011), Gestel and Baesens (2009), commercial banks risk-based pricing of loans is the alignment of loan pricing with the expected credit risk. The credit risk of a borrower is used to determine the acceptance or rejection of a loan and is the major driver of loan pricing. In practice, this is interpreted as charging a higher lending rate for a higher credit risk loan and a lower interest rate for a lower credit risk loan. This practice is beneficial forstability of the banks and the economy.

First, loanable funds pooled by the banks are allocated in a more efficient manner, as businesses with better prospects and associated lower risk would find credit cheap for investment which boosts production, employment and income. Secondly, risk-based pricing of loan reduces disruptive rationing of credit, especially during economic downturn. The risk-based methodology is presented in figure 2.1 below.

Pricing strategy



Source: Adapted from Layegue (2011)

Fig 2.1 Risk Based Methodology

The risk-based pricing of loan as demonstrated in figure 2.1 shows the factors banks consider in setting the lending rate. These are:

Funding Cost: This is interest expense that can be calculated on monthly average volume of deposits and other funds reported in the banks monthly returns. The lending rate charged on loans is influenced by the interest rates paid on the various sources of deposits and funds generated from say, savings accounts, fixed deposits account, term deposits accounts, and money market and so on. The higher the interest rates paid to depositors, the higher the lending rate and vice versa.

Operating Costs: operating costs include overhead cost, deposit insurance premium, cash reserve requirements (CRR) as idle funds, or precisely, opportunity cost of holding liquid cash in

excess of the minimum requirements and the cost of holding any assets that does not yield income. Operating costs are also positively related to the price of loans.

Credit Risk Cost: The credit risk of the borrower can be represented by the expected loss that a bank will suffer from the loan approved for the borrower. It is measured by the Probability of Default (PD), loss given default (LGD) and exposure Default (ED). The probability of default is estimated from the bank's internal rating system as shown in appendix A. This component is the most important component of risk- based pricing and is fully in line with Basel II requirement.

Capital Cost: Capital cost depends on 'hurdle rate' and economic capital. Economic capital depends on default cost of the asset portfolio. The 'hurdle rate' is a subjective factor which is determined by bank management decision through some appropriate capital pricing. Economic capital is the capital liability that represents a cushion against losses that can arise unexpectedly. The capital cost component is an integral part of Basel II requirement.

Margin: Margin is the target return on equity (ROE). Shareholders, particularly 'common shareholder' are guided by expected returns on their investment. This expectation depends on the economic fundamentals, competition and management ambition as well as the long term sustainability of the bank. Therefore, the higher the shareholders' expected returns in terms of ROE, the higher the lending rate, since the bank must factor in the expected rate.

(ii) Price Leadership Loan Pricing Model

Price leadership loan pricing is the technique of pricing whereby a bank, as a market leader, adopts competitive strategies in setting the lending rate for its customers. The deregulation reforms and banks competition for profits and market share has influenced big banks to adopt this loan pricing strategy in order to remain the market leaders.

Diette (2000) articulated that in a deregulated banking system, banks are inclined to use the price leadership model in their pricing of loans. The banks which are highly capitalized in the industry establish the prime or base they charge their most creditworthy customers on short-term loan and overdraft facilities. Pricing of loans with credit risk starts with reference to this base rate.

This 'price leadership' rate is significant to the extent that it establishes a benchmark for many other types of loans and competitors in the industry are lured to adopt the prime rate. The prime rate is sometimes called the base rate and is the lowest or 'best' rate posted by commercial banks. It is the rate commercial banks charge their most credit-worthy customers (whether judged in terms of 'low risk', deposits size or bank transactions). All other borrowers would pay a rate above the prime rate, called maximum lending rate. The CBN defines maximum lending rate as the rate charged by banks for lending to customers with 'high risk'.

The strategy 'price leaders' follows to remain profitable is to be as most efficient as possible in funds raising (deposits mobilization) as well as operating costs. In addition, the banks maintain competitive pricing in the risk component of the model. Banks that use price leadership model must invest in information strategy to be up to date in pricing decisions. Price leadership rate is basically a variant of competitive pricing model.

(iii) Simple Cost Plus Loan Pricing Model.

According to Diette (2000), a simple cost plus loan pricing model assumes that the rate of interest charged on any loan is predicated on four factors.

(a) Funding Cost. This is incurred by the bank to raise funds to lend. The sources of the funds are from customer's deposits, money market or even the central bank – lending facility.

(b) Operating Costs of servicing the loan. These include application and payment processing, staff salaries and other overhead expenses.

(c) Risk premium to compensate the bank for the probability of default risk in loan and interest repayment.

(d) Profit margin on loan that provides the bank with an adequate return on its capital. This can be shareholders expected returns in the form of returns on equity (ROE). As long as repayment default (losses) does not exceed the premium risk determined by the bank, the bank makes more money by giving out more loans at the prevailing rates and subject to some usual constraints.

The problem with simple cost plus loan pricing approach is that banks price loans with little regard to competition and when a banking firm is not competitive in the oligopolistic market, it faces decreasing trend in market share and profitability.

(iv) Relationship Pricing of Loans Model.

Relationship pricing in banking is the pricing of product or services, particularly a loan, based on the total business that the customer transacts with the bank. Generally, in relationship pricing, the customer is offered a price (lending rate) below the standard or usual price, as a strategy to

enhance patronage, market share or profitability in a competitive environment. Banks accomplish this by cross-selling financial products and services to strengthen their relationships with customers for increased market share,revenue and customer loyalty. Relationship banking involves offering customers a broad array of financial products and services that go beyond simple checking and savings accounts to retain market share of business.

Patnaik and Jolly (2017) analyzed the implications of relationship pricing in a competitive banking environment, where customer acquisition is more difficult than customer retention. In such an environment, banks struggle to retain their market share in order to enhance revenue to remain in business. The benefits of relationship pricing can be realized under: higher revenue,minimized opportunities for revenue leakage, better stickiness of assets and customer loyalty.

Greenbaum, et al. (1988) analyzed a model of loan pricing under the bank-client relationship in a competitive market. This model presupposed that incumbent lender prices loan higher than his competitor who is ready to offer a loan lending rate lower than the incumbent bank rate. This happens because the incumbent bank has customer default information advantage over other competitors, at least, over a range of time. This can be realized for some time before the customer changes custom to competitors who are prepared to offer lower rates to the customer.

The significance of relationship banking on pricing of loans lies on the impact of relationship banking on lending rate offered to borrower and the type of loan involved. Loans are special traditional products that contain some elements of credit risk that banks take into account in pricing. If the pricing of loans contains an externality, loans quality may deteriorate to force insolvency and subsequently bank failures.

(v) Options Pricing of Loans Model

Das (1985) developed a loan pricing model based on option pricing theory originated by Black and Scholes (1973).The Black-Scholes option pricing (also called Black-Scholes-Merton) was the first widely used model for option pricing. It is used to calculate the theoretical value of *European-style options*. Merton (1977) expatiates that the essential terms of a *European put option* on common stocks include, among others, that its owner has the right to sell a specified number of shares of a given stock at a specified price per share- *the 'exercise price' , on a specified date and the 'expiration date'*.The *European* is applied to options that can only be exercised on the expiration date. An *American* type option can be exercised on or before the expiration date. The option pricing theory was originally applied for valuation of corporate equity debt, securities and capital investment. The study's main objective was to show how the option pricing theory techniques can be applied to banks' pricing of loans.

The author stressed that the process of financial intermediation in banking entails a number of functions that makes the bank prone to excessive interest rate risk in facing dissimilar demands on the timing of interest rate reset dates by depositors and borrowers. This process of temporal intermediation can itself be categorized as refinance risk and interest reset risk. Refinance risk refers to the situation where the investment or deposit matures prior to the termination of the loan it supports. This may require the bank to refinance on the current terms, in particular, at current interest rates. Here, the bank is subjected to interest rate risk. Interest reset risk here is where the maturity of both loan and deposit are matched but the basis of interest determination on one is different to the other. For example, a fixed rate loan is funded by a floating rate on liability, exposing the intermediary to interest rate exposure.

The applicability of options theory is where the interest reset terms on assets and liabilities diverge. This scenario provides series of options that can be created and priced to cover the expected cost of this temporal intermediation service.

The study applied option theory on pricing of overdraft(which is subject to interest rate risk) and later loan facilities under two frameworks: assets and funding hedge approaches. The option theoretic approach to overdraft pricing becomes more relevant to the borrowers who enjoy the benefits of the options identified and, conversely, the lending institution bears the risk of providing the revolving credit line. Consequently, the overdraft cost (payment) to the borrower (lender) should reflect the 'true' cost of the options which underlie the facility in additionto the pure cost of the security (cost of funds to the lender). The Das (1985: 10) used Black-Scholes (1973) option pricing model to derive the option prices as follows:

$$C(P, T, Ex) = P.N(d_1) - Ex.e^{RfT}N(d_2) \quad \ldots\ldots\ldots\ldots \quad (2.1)$$

$$d_1 = \frac{\log(P/Ex) + Rf\,T + S^2T/2}{S\sqrt{T}}$$

$$d_2 = \frac{\log(P/Ex) + Rf\,T - S^2T/2}{S\sqrt{T}}$$

Where; C = market price of a European call; P = price of underlying security; T = time to exercise date; Ex = exercise price of option; N (d) = cumulative normal probability density function; Rf = risk-free interest rate continuously compounded; S = standard deviation per period of the instantaneous rate of return on the security.

The equation (2.1) is divided into 2 parts: $P.N(d_1)$ *and* $Ex.e^{RfT}N(d_2)$.The first part, P.N (d_1) calculates the expected benefit of purchasing the underlying instrument (security) while the

second part, $Ex.e^{RfT}N\ (d_2)$ provides the current value of paying the exercise price upon expiration. The value of the option is calculated by taking the difference between the two parts, as shown in the equation.

The import of application of option theory to banks overdraft and loan pricing relates to the pricing of the risks posed by asset/liability mismatches of banks. This applies to situations where interest rates banks charged to borrowers are fixed and where the loans are not funded by matching liabilities to eliminate any interest rate reset risks. Banks have two alternatives to avoid lower profitability or losses due to unfavorable interest rate movements: to avoid assuming interest rate risk by passing the risk on to the borrower. This is achieved through the correct pricing of risk. Option theoretic loan pricing models provide a means of pricing risk, enabling banks to provide products such as fixed rate, long term loans where the borrower does not wish to assume the interest rate risk itself.

It is important to understand that when applying option theory to banks' overdraft and loan pricing, the option pricing formula in equation (2.1) should be applied to suit the underlying concepts in bank operations and lending. For instance, the option price does not constitute the price of an overdraft or loan facility, but rather an additional cost to the funding. Therefore, the cost of 'insurance' against interest rate risk is an addition to the cost of funding the loan which can be built into the interest rate charged on the loan facility. This suggests that in setting the interest rate on overdraft and loans, a bank can factor in the option price to guard against the volatility or interest rate risk the bank is subjected to.

2.2.2 A Critique of Models of Banks' Pricing of Loans

A critique of the models of banks pricing of loans traces the evolution and development of different theoretical models that exist in the literature. The evolution and proliferation of the pricing models is shaped by technological innovations, level of sophistication of banking operations, products and services and emerging challenges. From the review, regardless of the model a bank uses, it is revealed that risk must be an integral part of loan pricing to compensate for the probability of default in loan repayment, apart from enhancing revenue profile of banks. More importantly, the basis for risk-based pricing of loans is driven by the desire to achieve high quality assets portfolio of banks that promotes stability of banks. This financial stability enables the banks to play effectively their traditional role of financial intermediation.

From the foregoing review, it is obvious that the risk-based model of banks' pricing of loans is the most advanced and widely used pricing model among all the models presented above. This is justified by the increasing emphasis paid by the BIS in articulating its global recommendations for the adoption of the risk-based pricing model by all commercial banks. In spite of this, additional efforts need to be made in management and interaction of three main sources of risk: credit risk, market risk and operational risk that banks must work with to enhance their stability and assets quality.

Bekhet and Eletter (2014) argued that credit risk is the most critical and biggest challenge facing banks' management. This is supported by the principles of credit risk management in the literature which provides clearly that banks must identify, understand, measure and correctly price (and re-price) borrowers 'credit risk. This suggests that for a good assessment of credit risk and by implication, it's pricing, interactions of other financial risks and spillover effects of the risks must be assessed at the banks level to arrive at the correct level of borrowers' credit risk for appropriate pricing. Against this background, there is ample evidence in the empirical literature

to suggest that interaction among financial risks, particularly foreign exchange risk and equity price risk which are the major components of market risk, have spillover effects on credit risk (BCBS 2009; Jovic 2016).

BCBS (2009) articulated that for a number of reasons, both historical and practical, market and credit risk, and indeed, other financial risks have often been treated as if they are unrelated sources of risk because the risk types are measured and managed separately.This suggests that any assessment of credit risk that simply neglects the interaction of risks in banking particularly, market risk (at the macro level) on credit risk, is likely to under measure borrower's credit risk and by extension, banks that use the model are likely to *underprice* credit risk. Market risk majorly comes from macroeconomic fluctuations. This means that assessment of credit risk at the banks level must focus on the macro economy. Therefore, banks must critically assess, understand and factor in macroeconomic environment in their risk-based pricing model. This is a critical issue in developing market economies where macroeconomic fluctuations are common feature of the national income aggregates. It is critical because it raises the possibility of underpricing credit risk and its potential impacts on banking stability and assets quality of banks across market economies.

Assets Quality of Banks (Loan Quality)

Assets quality also called loans quality in banking, refers to the degree of financial strength and risk in a bank's loan assets. Assets quality of banks is one of the indicators of financial soundness and strength of a banking firm captured by the capital adequacy, management, earnings, liquidity and sensitivity (CAMELS). It is one of the most critical areas in determining the overall condition of a bank. The primary factor affecting overall asset quality is the quality of the loan portfolio. In evaluating a bank's asset portfolio, bank examiners focus on loan quality

(Dirmirgue-kunt 1989). Loans quality is a very important outcome of good management of risk. Bank managers are very much concerned with quality of their loans because it is the major component of bank assets that provides substantial earnings and profitability to the bank. High quality of loans reflects good financial health of a bank which impacts positively on bank's ability to perform its traditional role of financial intermediation. To be able to sustain high quality loans, a bank must have good credit risk pricing and maintenance of balanced credit allocation between the productive sectors of the economy to prevent concentration risk. *Concentration risk* refers to the probability of defaults in loan repayment or interest on loans concentrated in a particular line of business or sector of the economy. Concentration risk affects credit risk. For example, if there is any adverse performance or calamity in any loan concentrated sector, obligors in that sector are likely to default loan and interest repayment obligations, *en mass*. This results in rising trend in NPLs and fall in assets quality of the lender (bank). A simple commonsense argument says: we should not put our eggs in one basket; better spread it to reduce the risk of damage due to concentration in one basket, should any unexpected happens.

According to Alhassan, et al. (2014),asset quality of bank refers to the timely manner with which borrowers are meeting their contractual obligations. The authors used the ratio of NPLs to gross loans and advances as the indicator for asset quality. A higher ratio indicates lower asset quality of bank while a lower ratio indicates high assets quality. Accordingly, asset quality for bank *i* at time *t*is given by Alhassan et al. (2014: 5):

$$\text{Assets Quality}_{i,t} = \frac{NPLs_{i,t}}{GLA_{i,t}} = \frac{SSL_{i,t} + DL_{i,t} + LL_{i,t}}{GLA_{i,t}}$$

Where; $SSL_{i,t}$ = substandard loans

$DL_{i,t}$ = doubtful loans

$LL_{i,t}$ = loss loans

$GLA_{i,t}$= gross loans and advance for bank $_I$ at time $_t$.

Assets quality of bank is evaluated with respect to five basic ratings.A rating of one which is the best, indicates strong (good) asset quality and credit risk management practices. The quality is of minimal supervisory concern. When assets quality of bank is rated two, it means satisfactory asset quality and credit management practices. When asset quality is rated three, credit risk management practices are less than satisfactory. A rating of four means deficient asset quality or credit risk management practices. A rating of five represents critically deficient asset quality. This position is the worst and reflects poorassets quality of bank. In addition, this rating presents an imminent threat to bank's failure and insolvency

The literature of bank failures indicates that poor assets quality of banks is a significant predictor of bank failures. Furthermore, bank failures tend to emerge when the macroeconomic environment is weak; in particular, low GDP growth is significantly correlated with increased risk to the banking sector. For instance, at the micro level, Dirmirgue-kunt and Detragiache (1998) andDe Bock and Demyanets (2012) found high credit risk, indiscriminate approval of loans and excessive risk taking by a bank as well as high leverage and credit risk as the major factors. At the macro level, episodes such as portfolio capital inflows, which is characterized by sudden inflows and reversal, 'systemic risk' or interconnectedness and interdependencies of banks' risks as well as business cycles were found relevant in explaining poor assets quality of banks.

Hou (2006), Dirmirgue-kunt (1989a) and Swamy (2013) observed that assets quality of banks is one of the measures employed to determine the extent of credit risk exposure of a banking firm. Assets quality is also a statistically significant predictor of insolvency for the cause of bank failures and failing banks always have high level NPLs prior to failure.

From the point of view of this study, assets or loans quality is important to a bank not only in terms of earnings and profitability, but also signifies good condition of health and stability of the bank to perform its traditional function of financial intermediation. Generally, assets quality of a bank is measured by the level of NPLs.

Non-Performing Loans (NPLs)

There is no global definition of NPL at the practical level because variations exist in terms of classification system, scope and content. According to BIS, the standard loan classification is based on the 5 –tier classification as follows;

Table 2.1: BIS Standard Loan Classification

Classification/Category	Characteristics Interest/principal outstanding	% Provision
a. Passed	Solvent loans	0
b. Special Mention	Loans that may pose collection difficulties	0
c. Substandard	over 90 days	10
d. Doubtful	over 180 days	50
e. Loss	over 365 days	100

Sources: Adapted from Hou (2006)

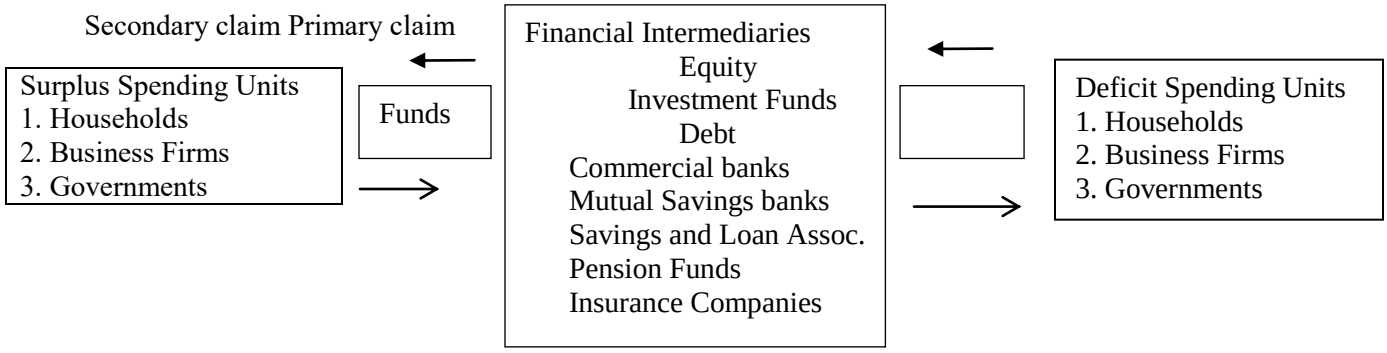
From the table, the standard BIS definition of NPLs includes the last three categories: Substandard, Doubtful and Loss. The 5-tier system classification is the most popular risk classification method. The advantage of the standard classification allows for international comparison of banks and countries. It is also based on loans with uncertainty in collection (substandard and doubtful) in addition to the virtual loss category.

NPL is simply a loan that is not earning income to the bank and full repayment of principal or interest or both is outstanding for 90 days in the bank books. The CBN adopts the standard BIS classification in its prudential guidelines classification of NPLs to all commercial banks in Nigeria. The CBN latest prudential guidelines on loan loss provisioning of the licensed banks dated 1/7/2010 is attached in Appendix J.

Financial Intermediation

Matthews and Thompson (2005) and Dilley (2008) defined financial intermediation as borrowing by deficit units from financial institutions rather than directly from the surplus units themselves. Hence, financial intermediation is a process which involves surplus units depositing funds with financial institutions who in turn lend to deficit units for investment in the real sectors of the economy. The financial intermediation theory highlights the role of financial intermediaries in economy. Most empirical studies highlighted the role of intermediaries in achieving economic growth, and the impact of regulations on financial intermediation, stressing the role of the central bank in the regulation, supervision and control of financial intermediaries (Andries 2009).

Kaufman (1972) conceptualized financial intermediation in terms of flow of funds from surplus spending units (SSUs) to financial intermediaries and then to deficit spending units (DSUs). An intermediary like commercial bank issues and sells claims on itself. The intermediary sells secondary claims to SSUs and uses the proceeds to purchase primary claims from DSUs. Unlike the direct flow of funds from SSUs to DSUs on the private capital market, flows on the intermediation market are indirect. Funds flow from the SSUs to the intermediaries, and then to the DSUs for investment as shown in figure 2.2.



Source: Adapted from Kaufman (1972)
Fig. 2.2.: Financial Intermediation.

Financial intermediation is measured by three indicators in the literature. These are: the ratio of broad money supply (M_2) to GDP, the ratio of domestic credit to the private sector (CPS) to the GDP andthe ratio of banks loans and advances to total deposits. This study adopts the ratio of banks loans and advances to total deposits as indicator of financial intermediation.

Also, in the context of this research, financial intermediation is only complete when total deposits mobilized by the banking system connect to the productive sectors of the economy. This means the proportion of banks loans and advances to total deposits must not only be high, but also exclusively channeled to the real sectors of the economy without any leakage. This brings us tothe concept of bank consolidation which is reviewed below.

Bank Consolidation

BIS (2001) conceptualized bank consolidation as the reduction in the number of banks and other deposit taking institutions with a simultaneous increase in size and concentration of the consolidation entities in the sector.

Consolidation can be defined as the act of bringing together of businesses or business activities into one single unit or merging (merger) many business processes into one. In financial analysis, consolidation is similar to merger where firm A buys firm B to form firm C. In a broader analysis, consolidation can be achieved through acquisition or merger and the aim is usually to enhance the capital base to become stronger. Bank consolidation, therefore, is the coming together of many banks to form one single, strong bank. The coming together or merger of banks into one single entity can be deliberate when a number of banks agree to pool their capital, assets and liabilities to form one single bank. Consolidation can also be regulator-induced, when regulatory authority like CBN directs or encourages some banks to 'merge' based on some criterion. Generally, consolidation aims to address some performance and stability issues in the banking sector.

According to Soludo (2004), bank consolidation in Nigeria is based on recapitalization of banks with stronger capital and liquidity standards to redress the challenges of low capital base (undercapitalization) and illiquidity in the banking system. The basic objective is to solve the recurring problem of bank distress and failure, strengthen the banking system, embrace globalization, improve healthy competition, exploit economies of scales, adopt advanced technologies, raise efficiency and improve profitability. The ultimate goal is to strengthen the intermediation role of banks which subsequently leads to an improvement in the overall economic performance and societal welfare.

Based on the above submissions, consolidation in the context of this research is the CBN reform of bank recapitalization which directed all DMBs to have a minimum capital of N25 billion on or before 31/12/2004.

Following the review of key concepts in this study namely; commercial banks' pricing of loans models; (risk based pricing of loans, price leadership loan pricing, simple cost plus loan pricing, relationship pricing of loans and options pricing of loans), assets quality of banks, financial intermediation and bank consolidation, we present below the conceptual framework of this study.

2.2.3 Conceptual Framework

In a liberalized banking system (interest rate deregulated), banks' pricing of loans is based on risk-based pricing model with *healthy competitive* pricing.Risk-based pricing of loans is based on risk-averse behavior of bankswhich enhances quality of assets of banks. Good quality of assets of banks reflects *healthycompetitive* financial condition of banks to effectively mobilize savings from surplus units and channel all mobilized savings in the economy to deficit units for investment in the productive sectors of the economy.Competitive pricing is based on market mechanism of demand and supply. The idea is that competition brings down cost through efficiency in resources mobilization and utilization. This indicates good bank intermediation for economic growth. On the other hand, the competitive pricing in the model provokes *healthy competition* among banks which brings down the cost of financial intermediation without compromise to the risk-based pricing philosophy. Decreased cost of intermediation enhances flow of funds from banks to deficit units who invest in the productive sectors of the economy.

In the context of this study, we present below the conceptual framework of this studyin figure 2.3 below.

Figure 2.3 above illustrates the conceptual framework of the risk-based loan pricing model inthe process of financial intermediation for economic growth. It also demonstrates conceptually how non-risk based loan pricing can lead to poor assets quality of banks which leads to bank failures. Where the banks are considered Too-Big-to-Fail (TBTF), government spend huge amount of money to bail out the *ailing banks*. The Too-Big-To-Fail doctrine received attention in the literature in 1984, when US bank regulators intervened to financially support a big US bank, Continental Illinois, for the fear that its failure can cause systemic crises in the US financial system. Because of this concern of systemic risk today, no government allows its big banks to collapse. In the last global financial crises of 2007-2009, the US government and indeed most developing economies supported their banking system from collapse.In some instances, regulatory authorities take the alternative step to restructure the banks in order to move them out of the problem of poor assets quality. The cost of restructuring can be a high %of GDP.

2.3 Theoretical Literature Review

The theoretical literature review is divided into 3 components. The first component reviewstheories of banks' pricing of loans under oligopolistic market structure. This is extended to risk aversion approach of portfolio selection by Tobin (1958) which demonstrates the applicability of banks' pricing of loans inloan portfolio selection. The second component briefly reviews the theory of *financial liberalization* which is the context of banks' pricing of loans. The third component is the review of prudential regulations literature which arises from theoretical issues of financial liberalization thesis. Prudential regulations focus on micro-prudential and macro-prudential regulations.

2.3.1Theories of Banking Firm and Pricing of Loans.

In the theoretical literature, the starting point of analyzing the behavior of a banking firm is the seminal work of Ho and Saunders (1981), called the ***dealership model*.** The theoretical model assumes that the bank is a firm that operates under oligopolistic market condition. Over time, the seminal work of Ho and Saunders (1981) was reviewed by Santomero (1984) and extended by several authors like: Angbazo (1997),Maudos and Guevara (2004), Gambacorta (2004) andmost recently, Camba-MendDurréez and Mongeli (2016). We present briefly, the original theoretical construct of the Ho and Saunders' model and discuss the later contributions of other researchers in building the theoretical framework.

According Ho and Saunders (1981), the bank is viewed as 'a dealer' that requires deposits from a class of economic agents (savers) and use the deposits to provide loans to another class of

economic agents (investors) in its operations. In trying to carry out this function, the bank is assumed to be risk-averse intermediary in the financial market. The demand and supply functions of bank loans and deposits follow stochastic processes, resulting to deposits supply at different times than loan demands. This creates uncertainty for which banks demand a positive spread as the price for providing immediacy of service in face of this transactions uncertainty. The bank sets loan and deposit rates, at which it extends new loans and accepts deposits as presented below:

$RL = r + b$ (2)

$RD = r - a$ (1)

The net interest margin or spread, s is equal to the sum of these two mark-ups or the difference between the rates earned on loans minus the rate paid on deposits:

$s = RL - RD = (a + b)$

Where:

s is the pure margin

RL is the rate on loans

RD is the rate set on deposits

(a + b) is the spread.

The question which Ho and Saunders tried to answer was what influences the spread or the pure margin?

Accordingly, the theoretical framework suggests that the spread, s will always exist as a result of transactions uncertainty faced by the bank. This will depend on 4 factors: (i) the degree of bank

management risk aversion; (ii) the market structure in which the bank operates; (iii) the average size of bank transactions; and (iv) the variance of interest rates.

Another factor driving the optimal interest setting by the bank is the market structure, since the bank facing relatively inelastic demand for loans and supply of deposits can exercise market power and increase spread. Finally, this study suggests that the size of bank spreads or margins is directly amenable to theoretical and empirical modeling. In summary, Ho and Saunders conclude that the interest margin has two basic components: the degree of competition of the markets and the interest rate risk to which the bank is exposed. The major shortcoming of the Ho and Saunders' theoretical model is that it fails to consider the role of bank as an intermediary.

Maudos and Guevara (2004) improved the Ho and Saunders model by incorporating the role of operating costs as well as providing some detailed description of risk associated with banking operations. More specifically, the model differentiates between market risk and credit risk, as well as their interaction.

Gambacorta (2004) extended further the 'dealership model' while recognizing the contribution of Maudos and Guevara (2004). In the extended model, which is presented below, Gambacorta (2004) assumed a one-period model of a risk neutral bank that operates under oligopolistic market conditions. This means that the bank does not act as a price-taker but sets its loan rates taking into account the demand for loans and deposits. The complete theoretical model is presented as follows:

Let the bank's balance sheet be represented by:

$L + S = D + B + K$ …….. (2.2)

Where;

L stands for loans, *S* for liquid assets like cash (the assets side)

D for deposits, B for bonds, *K* for capital (the liability side)

The bank holds liquid assets as a buffer against uncertainty in demand for withdrawal of deposits. Let this cash security be a fixed share of deposits or a compulsory free reserve (α), so that we have:

$S = \alpha D$ ……. (2.3)

Bank capital, K is exogenously given in the period and greater than regulatory capital requirements.

With these assumptions, the bank faces a loan demand and deposits demand functions specified as, $L^d$and, D^din equations (2.4) and (2.5) respectively.

$L^d = c_0 i_L + c_1 y + c_2 p + c_3 i_{\mathrm{m}}$ ..... (2.4)

$(co<0, c_1>0, c_2>0, c_3>0)$

Equation (2.4) says: The loan demand is negatively related to the interest rate on loans, (i_L); it is positively related to real income, (Y) and prices (P) and the opportunity cost of self-financing, proxied by the money market interest rate (i_M).

$D^d = d_0 i_D + d_1 y + d_2 P + d_3 i_M$…… (2.5)

$(d_o>0, d_1>0, d_2>0, d_3<0)$

Equation (2.5) says:The deposits demand is standard. It depends positively on the interest rate on deposits (i_D), the level of real income (Y) and the price level (P) and negatively related to the interest rate on securities (i_M) that represent an alternative to the investment to deposits.

Since bonds, B are risky and not secured, interest on bonds incorporate a risk premium that depends on banks internal characteristics (size, risk appetite, efficiency etc), it is assumed that this is captured by:

$i_b(i_m, X_{t-1}) = b_0 i_{m+} b_1 i_M X_{t-1} + b_2 X_{t-1} \ldots\ldots\ldots\ldots\ldots\ldots$ (2.6)

$(b_0 > 0)$

This assumption implies that the bank can substitute deposits with bonds or the likes where the need arises.

From (2.6), the effects of bank capital channel can be stated in equation (2.7) below:

$C^{MT} = \rho_{t-1} \Delta i_m (L + S)$ …….. (2.7)

($\rho > 0$) = cost or gain in respect of rise or decline in monetary policy rate

Where; C^{MT} = cost of maturity transformation that occurs whenever there is change in the monetary policy rate.

The cost of intermediation is given by:

$C^{IN} = g_1 L + g_2 D$ …… (2.8)

($g_1 > 0$, $g_2 > 0$)

Where; CIN = cost of intermediation

$g_1 L$= cost of screening and monitoring borrowers

$g_2 D$ = cost of branching

Loans are risky and in each period of time, a proportion of the total loans, j goes bad thereby reducing banks profitability.

In consideration of all the preceding assumptions, statements and equations from (2.2) to (2.8), the bank tries to maximize its profit under the oligopolistic market, subject to its balance sheet constraints. The bank optimally sets the interest rates on loans and deposits (i_L, i_D), while it takes the money market interest rate (i_M) as given (because it is fixed or controlled indirectly, by the central bank through the monetary policy rate). This can be stated clearly as:

$Max_{iL,iD} \prod = (i_L - j)\, L + i_m S - i_D D - i_B B - C^{MT} - C^{IN}$

subject to

$$L + Q = D + B + K$$

Solving the maximization problem, the optimal levels of the two interest rates i_L and i_D; yield the first order conditions as follows:

$\beta_0 = \frac{g_1}{2} > 0;$ $\beta_1 = \frac{c_2}{-2c_0} > 0; \beta_2 \frac{b_0}{2} > + \frac{c_3}{-2C_0} > 0;$ $\beta_3 = \frac{b_1}{2};$ $\beta_4 = \frac{c_1}{-2C_0} > 0; \beta_5 = \frac{1}{2};$ $\beta_6 = \frac{1}{2}$; $\beta_7 = \frac{b_2}{2} \gamma_0 = -\frac{g_2}{2} < ; \gamma_1 = - \frac{d_2}{2d_0} < 0;$ $\gamma_2 = \frac{b_0(1-\alpha)}{2} + \frac{-d_3}{2d_0} + \frac{\alpha}{2} > 0$; $\gamma_3 = \frac{b_1(1-\alpha)}{2d_0}$; $\gamma 4 = \frac{d_1}{2d_0} < 0$; $\gamma_5 = -\frac{\alpha < 0;}{2}$ $\gamma_6 = \frac{b_2(1-\alpha)}{2}$

$$i_L = \beta_0 + \beta_1 P + (\beta_2 + \beta_3 X_{t-1}) i_m + \beta_4 Y^p + \beta_5 \rho_{t-1} \Delta i_m + \beta_6 j + \beta_7 X_{t-1} \ldots\ldots\ldots \text{(2.9)}$$

Equation (2.9) is lending rate equation with its determinants. It implies that a monetary tightening determines an increase in the interest rate on loans ($\beta 2>0$): The total effect is divided into 2 parts the 'bank lending channel' ($b0/2>0$) and the 'opportunity cost' effect ($-c3/2c0>0$). The effect of a monetary squeeze is smaller if the bank-specific characteristic reduces the impact

of monetary policy on the cost of funding (b_1<0 and β_3<0). In this case banks compensate the deposit drop by issuing uninsured funds at a lower price. Loan interest rate reacts positively to an output expansion (β_4>0) and to a raise in prices (β_1>0). The effect of the bank capital channel is also positive (β_5> 0); due to the longer maturity of bank assets with respect to liabilities (ρ>0), in case of a monetary tightening ($m\Delta i$>0) the bank suffers a cost and a subsequent reduction in profit; given the capital constraint, this effect determines an increase in loan interest rates (the mirror effect is a decrease in lending).

$$i_D = \gamma_0+\gamma_1 P + (\gamma_2 + \gamma_3 X_{t-1}) i_m + \gamma_4 Y^P+\gamma_5 \rho_{t-1} \Delta i_m + \gamma_6 X_{t-1} \quad \ldots\ldots\ldots\ldots\ldots \quad (2.10)$$

Equation (2.10) for deposit interest rate is quite different from lending rate equation. In this case, the impact of a monetary tightening is positive (γ_2>0). It can now be split in three parts: the "bank lending channel" (b_0(1-α)/2>0), the 'opportunity cost' (-*d*3/*2d*0>0) and the "liquidity buffer"(α/2>0) effects. The percentage of deposits invested in securities (α) act, on the one hand, as a simple 'reserve coefficient' that reduces the effectiveness of the 'bank lending channel' while, on the other, it increases the revenue on liquid portfolio and the market power of the bank to offset the interest rate on deposits.

Summarizing the simple analytical model, Gambacorta (2004) presents the theoretical factors that influence the pricing of loans and deposits as:

i. The costs of intermediation (screening, monitoring, branching costs, etc.) have a positive effect on the interest rate on loans and a negative effect on that of deposits (efficiency is represented by *e).*

ii. The riskiness of the credit portfolio; banks that finance risky borrowers or project will charge a higher rate of return in order to compensate the higher percentage of bad loans that have to be written off *(j).*

iii. Interest rate volatility. A high volatility in the money market rate (σ)should increase lending and deposit rates. Interest rate on loans should be more affected by interbank interest rate volatility with respect to that on deposits *(diL/dσ>diD/dσ).* This should reveal a positive correlation between interest rate volatility and the spread.

Camba-Mendez, Durré, and Mongelli (2016) presented an extension of Ho and Saunders (HS) model and Angbazo-Gambacorta (AG) model which is the latest contribution in the theoretical literature of banks' pricing of loans. The HS-AG theoretical framework is extended by adding the endogenous issuance of corporate debt as a source of financing. The approach set endogenously the role of debt financing in contrast to Gambacorta (2004) which acknowledged the role of debt financing but treated it exogenously.

In the extended model, like the previous models, the bank is risk-averse and sets price for loans and deposits for a margin. It maximizes expected utility of wealth, $W_{0,}$ defined as the difference between loan assets and deposits liabilities plus net cash holdings. At the starting point, it is assumed that W= 0, so also deposits and loans. The bank can finance its activities through three ways: deposit, interbank money market or issuing debt. The objective is to maximize expected utility of wealth in (2.10):

$$U^e(W) \ldots\ldots\ldots\ldots\ldots\ldots \quad (2.11)$$

$$E(W - W_0) = BS_B - \lambda_{DQ} a + \lambda_L Qb$$

$$E(W - W0)^2 = \sigma^2_r[B^2 + \lambda_D Q^2 + \lambda_L Q^2 + 2BQ(\lambda_L - \lambda_D)] + \sigma^2_L Q^2 \lambda_L$$

By setting the margins a and b, and by either borrowing or lending in the form of debt B, the following results are obtained.

$$a = \frac{1}{2}\frac{\alpha}{\beta} - \frac{1}{4}\rho Q\delta_r^2 + \frac{1}{2}\rho B\,\delta_r^2 \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (2.12)$$

$$b = \frac{1}{2}\frac{\alpha}{2\beta} + \frac{1}{4}\rho Q\delta_r^2 + \frac{1}{4}\rho Q\delta_L^2 + \frac{1}{2}\rho B\,\delta_r^2 \ldots\ldots \quad (2.13)$$

$$B = \frac{S_B}{\rho\delta_r^2} - Q\,(\lambda_L - \lambda_D) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (2.14)$$

Where: $\rho = \frac{U''(W_0)}{U'(W_0)}$ $\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$ (2.15)

Equations (2.12) to (2.14) are familiar results in the HS-AG model. They summarize that the spread between the deposit and loan lending rates and the money market rate reacts to a certain market power for setting bank rates, and compensation for funding risks and credit risk.

We can summarize the impact of the endogenous debt issuance (bond) on deposits' remuneration and lending rates. The impact of debt is that, if the bank borrows in the form of debt, it will be less inclined to compete for deposits by offering higher deposit rates. The demand for deposits for granting new loans is partly covered by the debt. On the lending rate, it allows the bank to lower the spread charged when granting loans.

The equation for B is also new. Decisions on debt issuance or investing in debt, are dependent on the spread *sB*. But this cost is in relative terms with the risks associated with financing in the money market. Also, the higher the probability of a loan arrival and the lower the probability of a deposit arrival, the more inclined the bank will be to borrow in the form of debt.

Therefore, if banks operate in an environment of well-functioning debt markets, it is to be expected that they will operate with both lower deposit and lower loan rates than banks in an environment of less developed debt financing markets or fragmented markets

We have presented a survey of the theory of banks' pricing of loans in the theoretical literature, starting from the seminal work of Ho and Saunders (1981), reflecting improvements and extensions of the model to the most recent literature presented by Camba-Mendez, Durré, and Mongelli (2016). Our next review is the risk aversion model of portfolio theory of Tobin (1958).

Risk Aversion Model of Portfolio Selection of Tobin (1958)

Tobin (1958) presented a risk-aversion theoretical model of portfolio selection which can be applied to banking firms in portfolio optimization process. Tobin's analysis is a theoretical support to the risk-based pricing model in an oligopolistic market structure, where the firm is a price-setter. The model supports the two important behavioral characteristics of risk-based pricing;

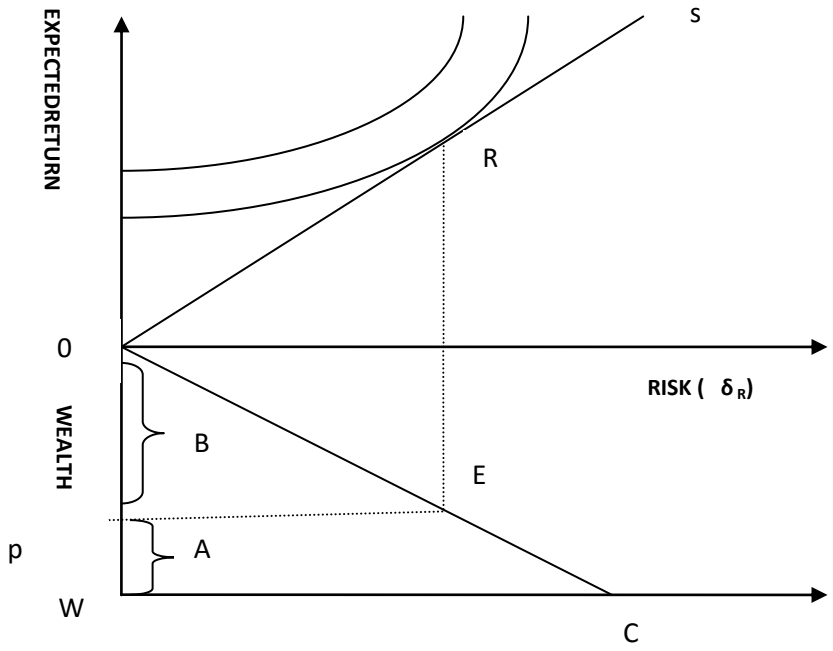
(i) Banks' pricing of loans should be based on the risk of default of the borrower, called credit risk, such that higher risk of default attracts higher interest on loans to compensate for the probability of default.

(ii) Diversification of loans to different sectors and borrowers lowers risk in the banks' portfolio to avoid concentrating credit risk: that is, banks should diversify their operations (loans) both as to sector, geographical area and individual borrowers to reduce risk.

Briefly, the Tobin's risk aversion theory of portfolio selection was originally a critique and extension of Keynesian liquidity preference theory. As compared to the Keynesian theory of

liquidity preference, the risk aversion theory widened the applicability of the liquidity preference theory. The question investigated is: why economic agents hold liquid assets like cash in their *investment* portfolio instead of holding *totally* an interest bearing assets like bond, which is risky but can fetch high income returns to the agent's wealth. And the answer to this question lies on uncertainty: that cash is 100% liquid, safe and not risky to fluctuations in value, except when there is inflation. Whereas bonds are not liquid, not safe because there is uncertainty expressed in risk of default in repayment promised.

The theory of portfolio selection assumes that investors are typically risk averters. Risk averters are prepared to bear some additional risk only if they expect to receive some additional returns on bonds, provided every increase in risk brings greater increases in returns. Investors therefore diversify their portfolio and hold both money and bonds. In order to trace risk averters preference between risk and expected return, the analysis of indifference curves with positive slopes was used to show that the risk averter demands more expected returns in order to take more risk. This is illustrated by means of figure 2.4 below:



Source: Adapted from Jhingan (1997:352)
Fig 2.4: Equilibrium of the Risk Averter.

From figure 2.4, an investor can tolerate risk if it is compensated with adequate returns from the bond. The horizontal axis measures risk while the vertical axis measures expected returns. The line OS is the budget line. It shows the combination of risk and expected returns. I_1 and I_2 are the indifference curves showing that the risk averter is indifferent between all pairs of expected returns and risk that lie on I_1 curve. The investor achieves equilibrium position between expected return and risk where his budget line is tangent to the indifference curve I_1 at point R.

In the lower segment of the figure, the risk averter's total wealth is defined by the vertical line OW. The risk averter diversifies his total wealth by putting partly in bond (op) and partly in cash (pw), hence he is called a diversifier.

In summary, the risk aversion theory of Tobin when applied to banking implies that banks, as investors and risk averters in the model, manage their assets and liabilities to maximize their

wealth. They do this by pricing their loans according to borrowers risk to compensate for the probability of borrowers default in repayment of principal loan and interest accrued. Banks also spread their loan portfolio in the assets side of the balance sheet to avoid risk of concentration. The risk of concentration in assets portfolio of banks takes the form of allocation of assets into liquid and non-liquid assets ranging from cash to fixed assets but concentration risk in loan portfolio is about approval of large quantum of loan to a particular sector or geographical location or even an obligor in a particular line of business.

The major shortcoming of the Tobin's risk aversion model, like any other portfolio model, in pricing of assets is that, it focuses only on the assets portfolio side of the bank balance sheet. This contrasts sharply with optimization models of Ho and Saunders (1981), Angbazo (1997), Maudos and Guevara (2004), Gambacorta (2004) and most recently, Camba-Mend Durréez and Mongeli (2016) that reflect the two sides of the balance sheet (assets and liabilities) in the pricing decision. We have presented the first component of the theoretical literature, consisting theories of banks' pricing of loans models and Tobin's risk aversion model of portfolio selection. The second component of the theoretical literature is the theory of financial liberalization which is presented below.

2.3.2The Financial Liberalization Theory

Financial liberalization is the freeing of financial markets from any intervention or government control and letting the market determines the allocation of credit (Arestis 2005). Financial liberalization is the abolition of direct controls on the domestic pricing of loans by banks and allocation of credit to some preferred sectors of the economy. In an open economy, it involves the abolition of controls on international capital movements. Kaminsky and Schmukler (2003)

explained that financial liberalization is the deregulation of capital account, domestic financial sector and the stock market.

This process has domestic and foreign sector dimensions. In the domestic financial sector dimension, there are two markets: money and capital markets. In the money market, interest rate deregulation reform eliminates government control on interest rates on deposits and loans, and allocation of credit to sectors of the economy in favour of banks' pricing of deposits and loans which allocates credits to the sectors of the economy. In the capital market, restrictions on equity and bond trading are removed completely to allow participation of global investors on equal basis. At the foreign sector dimension,capital account deregulation reform allows free capital flows to any part of the world in search of better returns to its owner.

The financial liberalization thesis was propounded by Mackinnon (1973) and Shaw (1973) to show the positive relationship between interest rate reforms and financial deepening. According to the 'Theses'financial liberalization fosters economic growth as basic connection exists between money and physical capital such that a high real interest rate policy stimulates savings and investment which impacts positively on economic growth. McKinnon-Shaw hypotheses state categorically, that financial repressiondescribe a structure of economy where government controls the workings of the financial system through directed lending to the government and sectors of the economy, imposition of interest rates ceilings (deposits and lending rates), regulation of international capital movement. The basic characteristics of financial repression are:

(i) regulated interest rates on deposits and loans.

(ii) direct allocation of credit to priority sectors.

(iii) ceilings on credit expansion.

(iv) high reserve requirement (CRR) and

(v) restrictive entry into the financial sector especially the banking industry.

These characteristics of financial repression, particularly artificial ceilings on interest rates, tend to reduce savings, leading to poor savings mobilization by banks, reduced capital accumulation and inefficient allocation of financial resources in developing economies. Consequently, these characteristics slow the process of economic growth in developing countries. Therefore, interest rate deregulation policy aims to remove interest rates ceilings and allow banks to price deposits (savings) and credits (loans) freely. In this way, financial deepening and financial intermediation will be enhanced which, in turn, facilitate investment and economic growth.

Therefore, in the Mackinnon and Shaw theses, given the basic assumption of perfect competition in the finance industry, banks are important agents of growth and development through financial intermediation supported by banks'pricing of loans. This connects the financial sector with the real sector of the economy. This theoretical postulation has led many developing economies to implement interest rates deregulation reform which allows commercial banks to source and price deposits and loans in the intermediation market for economic growth.

2.3.2.1 A Critique of the Theory of Financial Liberalization

Following the financial liberalization theory, some theoretical issues sprang up, limiting the potency of the policy and in some cases obstructing the expected outcome of the policy. Some of the key theoretical issues of financial liberalization include: market imperfections (information asymmetries), moral hazards, animal spirits (mood swings), self-interest motive, conflicts of interests etc.

Market Imperfections:

Information asymmetries in liberalized financial markets can generate strategic advantages and promote excessive leverages, risk taking and high level of short term debts and liquidity which leadto adverse selection.The adverse selection and moral hazard issues that are inherent in the credit markets present challenges and market risks in the system (Duffie and Singleton 2003). Information asymmetry problem between buyers and sellers can cause market malfunctioning. In banking, information asymmetry in the form of moral hazard or adverse selection plays significant role in mispricing of risk which could lead to credit failure and poor assets quality of banks. According to Brownbridge (1998), the severity of bad debt problems in Kenya, Nigeria, Uganda and Zambia was attributable to problems of moral hazards and adverse selection. The long run effects of information asymmetry in banking are accumulation of NPLs and deterioration of assets quality of banks which leads to bank insolvency, distress and bank failures.

Animal Spirits/Herds Behavior:

The free market is characterized by animal spirit mood when in good times; excessive optimism shapes the behavior of participants and drives the market prices in positive direction. In particular, the stock market bullish trading moves the market with no justifications from any positive change in fundamentals, against the efficient market hypothesis. Market participants tend to underestimate risk. In bad times, when market is bearish, players are pessimistic and market participants overestimate risk to the extent that agents want to get rid of the assets at the same time. This impairs the functioning of the market as participants will all move to sell to

avoid loss. This depresses market price further and the whole market system collapses (Keynes 1936).

Homo Economicus/Purpose of Economic Man:

The self-interest motive and rationality of human beings and the associatedgreed.Human beings always want more money for material accumulation. There is conflict of interest between the interest of man and the society as a whole. Economic man pursues his self- interest (profit) motive even when it is against the societal interest.

Against this background of numerous theoretical issues relating to financial liberalization, Stiglitz (1998) stressed that economic theory postulated that financial markets are different from ordinary markets and therefore, more likely to be characterized by market failures that require intervention. In the absence of this intervention (regulations), there may be a tendency towards excessive risk taking, leading to financial instability. This is the basis ofprudential regulations which are the next focus of this study.

2.3.3 Review of Prudential Regulations

Prudential regulations are measures or banking laws that are created to promote financial stability and mitigate structural and idiosyncratic risks from affecting financial institutions. The most important function of banks is managing risks they face. If there is poor risk management, banks will face bankruptcy. Banking regulations are enacted to prevent banks from excessive risk taking as well as guide them in managing the various types of risk they face.

These risks have cross sectional and time series dimensions among financial institutions in the economy. The spread of risk from one financial institution to another in the domestic economy and across the borders is called systemic risk or contagion risk. Prudential regulations are very necessary in supporting financial system stability by mitigating systemic risk. Apart from causing instability and collapse of financial institutions, systemic risk prevents financial institutions from playing their traditional role of financial intermediation for economic growth.

Prudential regulations are broadly divided into 2: micro-prudential regulations and macro-prudential regulations which are explained below.

Micro-prudential Regulations

Micro-prudential regulations are measures bank regulators take to protect individual banks and their depositors against external risk that could lead to insolvency or any threat for the corporate existence of the bank. The focus of this approach is directly on individual banks through their balance sheet. The bases for micro-prudential regulations in banking stems from the understanding that risk is inherently present in the industry.

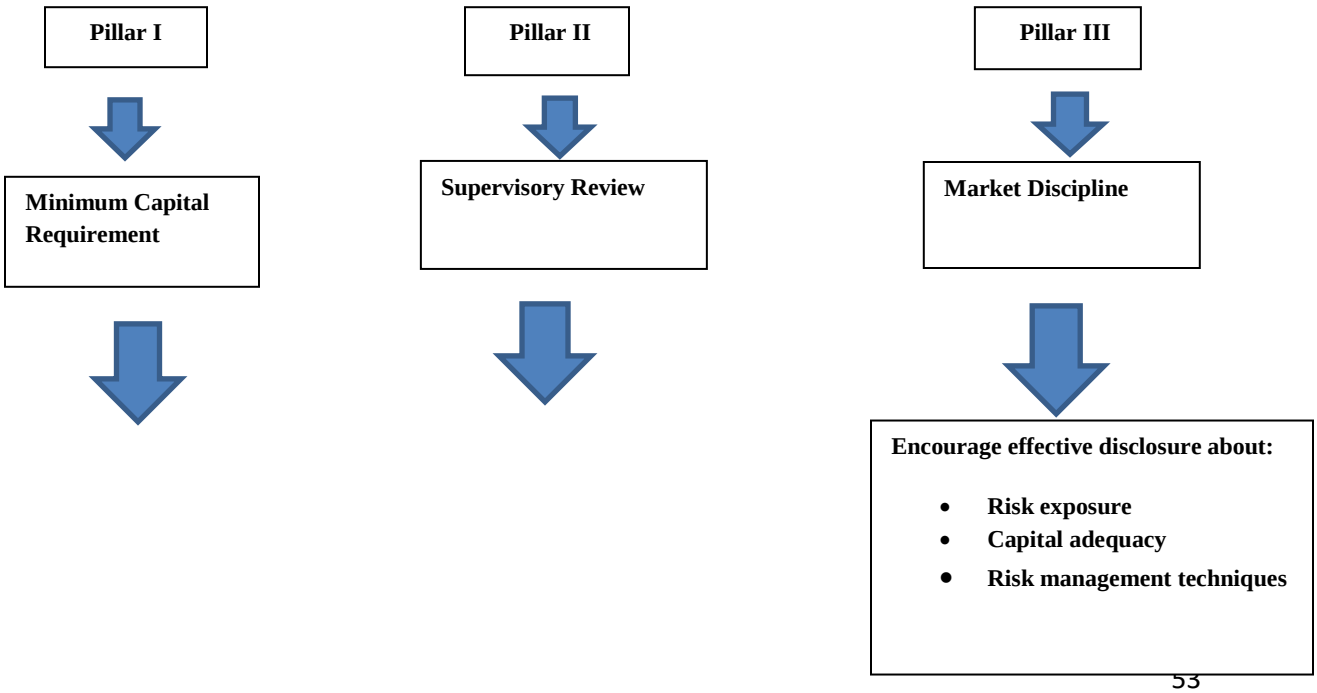
Micro-prudential Regulations and Basel Accords I, II and III

Basel Accords (I, II and III) are recommendations on banking laws and regulations articulated by the Bank for International Settlement (BIS) through its Basel Committee on Banking Supervision (BCBS). The BIS set up the BCBS in 1974 as a result of large scale banking failures globally. The primary focus is stability and soundness of the financial system through individual bank regulations. The regulations, therefore, focus on banks through their balance sheet to protect banks and their customers against losses from insolvency. The BIS is very active in micro-

prudential regulations, trying to protect individual banks from risk inherent in their balance sheet based on the idea that risk is exogenous

The BCBS articulated the Basel Accords I and II in1988 and 1999 respectively to address bank failures arising from bank runs and bank capital inadequacies which led to solvency issues. According to BIS (2010), the basic aims of the Accords are to:increase the quality and the stability of the international banking system, create and maintain a level playing field for internationally active banks and promote the adoption of more stringent practices in the risk management field.

Basel Accord II is most important in managing bank capital and credit risk in banks' balance sheet. The Accord was built on three main pillars:Pillar one is concerned with the quantification of new capital charges that depend on banks' internal risk-weighting, pricing models and external rating agencies. Pillar twodefines the supervisory review process while Pillar threefocuses on market discipline. The Basel II framework is illustrated in figure 2.5 below.



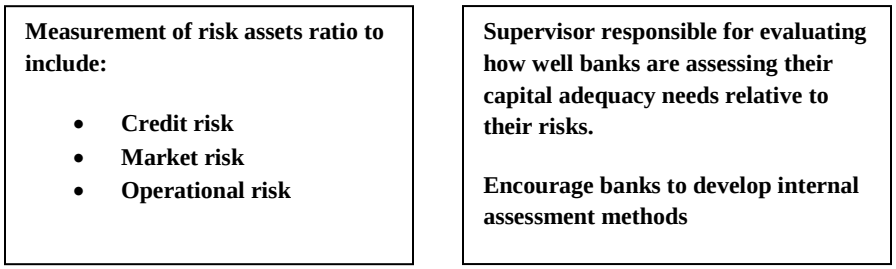


Figure 2.5: Basel Accord II Framework.
Source: Adapted from Casu, Girardone and Molyneux (2006)

Macro-prudential

Regulations

The term macro-prudential regulation is the approach to financial regulation that aims to mitigate the risk of the financial system as a whole or 'systemic risk'. The aim of such regulations is to lower both the probability and potential costs of financial accident through enhancing the resilience of the system, establishing circuit breakers to prevent problem in one area from spreading to others, as well as containing the impact of failures on the broader economy (Bloomberg 6/2014). Macro-prudential analysis, therefore, studies the global and national interconnectedness of financial institutions and the associated risk with a view to monitoring and mitigating the risk for stability of the global financial system. It recognizes that risk in the financial system is endogenous. This approach is backward and forward looking in its focus and strategy.

According to Choudhry and landuyt (2010), systemic risk is the risk of a chain reaction of financial failures, the end result of which is the dislocation and failure of the global banking system. Because of this implication, it is not sufficient for regulators to ensure that each bank has sufficient capital and liquidity arrangements in place as well as good credit risk management practices. They also have to oversee the soundness of the industry as a whole.

Claessens and Kodres (2014:4) in their study on regulatory responses to the global financial crises, aptly summarizes the new focus in the following words: "Systemic risk in modern

financial systems arises endogenously and cannot just be captured by individual institutions' balance sheets, or specific market or asset price-based measures alone, especially when these metrics are static or backward looking"

Micro-prudential and Macro-prudential regulations have become very important and necessary in the wake of financial liberalization reforms, particularly in the last two decades, when bank failures became widespread in developed and developing economies. Specifically, with financial liberalization policies, macro-prudential analysis has become very relevant after the global financial crisis of 2007 – 2009. This is so because despite all the efforts of the BIS and central banks globally to promote micro-prudential regulations, the global financial crises became inevitable, prompting the collapse of numerous banks across the world through contagion effects. This is why economists and policymakers globally agree to the shift in framework of analysis from the *traditional framework* (economic theory and micro-prudential regulations) to *emerging* framework. (See the differences between the traditional framework and emerging framework in Appendix E)

From the review of the three components of theoretical literature: theories of the banks' pricing of loans, theory of financial liberalization and the prudential regulations literature, the next section presents the theoretical framework of this study.

2.3.4 Theoretical Framework

The theoretical framework of this study is the Ho and Saunders (1981) theoretical model as extended by Angbazo (1997), Maudos and Guevara (2004), Gambacorta (2004) and most recently, Camba-Mendez, Durré and Mongeli (2016). In the credit market and generally in financial economic analysis, theoretical framework is predicated on economic theory and

prudential regulations because there are risks that must be regulated to prevent market failures (Stiglitz 1998). These risks are categorized into *idiosyncratic* and *structural risks* in the financial market such as: credit risk, liquidity risk, market risk, operational risk, and systemic or contagion risk. This study, therefore, focuses on both economic theory and prudential regulations as its framework.

Economic Theory:

The theoretical base of this study stems from the classical and neoclassical theory of perfect competition which predicts efficiency in the distribution of financial and economic resources for investment in productive sectors of the economy for economic growth. The Mckinnon and Shaw theses (1973), which emphasize market competition against regulation in the financial market, is an extension of the main classical and neoclassical philosophy of free market economy at the macro level. *Financial liberalization* leads to competition and financial deepening which promotes economic growth and societal welfare. In general, the benefits of such policies are realized under; expansion of financial markets, increased competition, different choices and cheaper financial products (pricing), increased products innovation as a result of technology developments, enhanced consumer welfare and fostering of economic growth. This is the prediction of the theory of competition.

Micro-prudential Regulations:

In financial economics literature, it is necessary to add *prudential regulations* to economic theory because of the inherent risk in the financial markets. The inherent risk stimulates adverse selection and moral hazards to cause financial instability in the system. To support the system stability, national and international financial regulators such as central banks, BIS and IMF have been very active in addressing risks at the financial institutions level. For instance, the BIS had

articulated Basel Accords 1, 11 and 111 to address the issues of credit risks and capital adequacy at the financial institutions level for safety of banks and their customers. The emphasis is to raise assets quality of banks and the level of banks intermediation within and across the market economies.

The classical and neoclassical theoretical reasoning, as well as the micro-prudential regulations that support the line of thought came under severe attacks after the financial and economic crises of the 1990 and the recent global financial crisis of 2007-2009. These crises engulfed most liberalized market economies in developing and emerging markets particularly in Asia and Latin America. For instance, empirical studies like: Pill and Pradhan, (1997); Demirguc-Kunt and Detragiache, (1998); Rodrik, (998); Kaminsky and Reinhart, (1999) revealed dismal performance of the market system in mobilization and allocation of resources despite the micro-prudential regulations. The studies also revealed that market participants *'under-estimate'* and *'over-estimate'* risks through *animal spirit* or *herds behaviour* to produce booms and bust outcomes respectively, which distort market pricing and eventual collapse of the system. These developments raise concerns that the *traditional framework* is quite ineffective in preserving and raising assets quality of banks for intermediation.

Macro-prudential Regulations:

Owing to these concerns, this study adds a macro framework for the regulation of the economic system, a broad analytical framework which can be used to analyze assets quality of banks and financial intermediation in Nigeria. Specifically, this study employs the *general equilibrium theory* under Mundell-Fleming (M-F) Theory of Impossible Trinity of a small open economy with capital account deregulation to investigate broadly, the basis for poor assets quality of banks and financial *disintermediation* and *inverted intermediation* in Nigeria.

2.4 Empirical Literature Review

The empirical literature review is divided into two parts for orderly presentation. In the first part, we review studies on banks' pricing of loans in developed and developing countries with the most recent empirical literature leading the presentation in descending order**.** The second part of the empirical literature review focuses on bank failures across the world and then in Nigeria, in descending order.

2.4.1 Review of Empirical Studies on Banks' Pricing of Loans Model

Camba-Mendez, Durré and Mongeli (2016) estimated the most up-to-date model of banks' interest rate setting to analyze banks' interest-setting under stress financial condition in euro area. The study aimed to show how recent financial tensions in the euro area were ultimately reflected in bank interest rate setting. The study presented a theoretical model that extended Gambacorta (2004), capturing banks financing and the rate setting choices. Banks in the model can finance themselves through deposits, on the money market, or issuing bonds. The empirical model follows the form:

$$(rL)_{it} = \beta_0 + \upsilon_i + \psi_i + \beta_1(rMRO)_t + \beta_2(\delta_t) * h_{it}\text{mm} + \beta_3(\sigma_r{}^2)_t + \beta_4(\sigma^2{}_L)_t + \beta_5(\sigma_r{}^2 * B)_{it} + \beta_6 BEDF_{tc} + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (2.16)$$

The coefficient on *r* measures the pass-through from the short term rate to the bank lending rate. Once more, the model has bank specific random effects,υ_i, is the proxy among other things, for disparities in operating costs and, country specific random effects, ψ_i, to account for disparities in the market power of banks across countries. The model (2.16) was estimated for floating and fixed rate lending using panel data regression.

Results of the estimated model (2.16) showed that both the deposit rate and the bank lending rate respond to money market uncertainty, and banks widen the spread between lending rates and deposit rates to compensate for the higher refinancing risks in money markets. Also, higher risk of default on the loan leads to higher bank lending rates and banks with access to money markets, who are also less-reliant on European Central Bank (UCB) support offer lower deposit rates and lower bank lending rates. And, lastly, banks that choose to finance through debt offer both lower deposit rates and lower lending rates.

Williams (2007) empirically tested the applicability of Ho and Saunders (1981) model of bank net interest margins and its subsequent developments, using Australian banks data between 1989 and 2001. The author specified the empirical model with the following variables: The structure of the market for loans and deposits, operating costs, managerial risk aversion, volatility of the market interest rate, credit risk, the interaction between credit risk and market risk, the average size of the bank's operations, implied interest/payments, the opportunity cost of reserves and management quality.

Results from econometric model revealed that the core elements of Ho and Saunders model apply in Australia. For instance, bank market power is found to increase net interest margin. Other findings of the research include the importance of operating costs in determining net interest margins. This aspect of the result is consistent with Maudos and Guevara (2004).

The study also revealed an interesting result when the credit risk variable was negative and significant in the model. The negative credit risk variable contradicts the theoretical expectation of the model, which prescribes a positive relationship between credit risk and loan pricing. William (2007:160) claimed that: "Bank credit risk, as measured by provisions for doubtful debts was found to have a negative and significant relationship with bank net interest margins. This is

opposite to the conventional hypothesis for this variable (Angbazo, 1997). Indicating that this mispricing for risk extended beyond a few extreme values"

In response to this revelation, the author explained that banks in Australia *mispriced* credit risk, resulting in a negative relationship between credit risk and net interest. Furthermore, the study analyzed that in a similar study in the Italian economy, Guiso, *et al.* (2006) found a negative coefficient of credit risk, suggesting that market liberalization in Italy was followed by a reduction in rate spreads at the cost of an increase in NPLs. Therefore, Williams (2007) ascribedthe negative coefficient of credit risk variable to*market liberalization reform* in Australia which resulted in competition that pushed banks to 'buy' market share, resulting to mispricing for risk. This was interpreted as the impact of *financial liberalization* in Australia. According to this reasoning, *liberalization reform* led to 'unhealthy' competition that significantly reduced the traditional income of banks (interest on loan income) pushing banks to *underprice* credit risk in their portfolio in order to 'buy' or improve their market share which can improve their net income and profitability.

In conclusion, the study asserts that the reduction in net interest margin could reflect increased market competition among banks, or a process towards de-emphasizing traditional margin income (interest on loans) and an associated move to disintermediation and fee-based income.

Gambacorta (2004) constructed the empirical model of pricing of loans for a sample of 73 Italian banks for a period of 10 years. The main objective of the study is to study the cross-sectional differences in price setting behavior of Italian commercial banks for the purpose of analyzing how monetary policy shocks affect individual banks in the interest pass-through process. Based on this understanding, the author specified the following loan pricing model using panel data econometric technique with variables at their levels;

$$i_L = f(y^p, Y^T, P, i_M, X_{t-1}, iMX_{t-1}, P_{t-1}\,\Delta_{iM}, j, ,\square\sigma\,, \mu_{k)} \ldots\ldots\ldots\ldots\ldots\ldots \quad (2.17)$$

Where; i_L= dependent variable =interest rate on domestic short term loan, $y^{p\ and}\ y^T$ = permanent and transitory components of real GDP, P = Inflation rate, i_M = monetary policy indicator, $\boldsymbol{X_{t-1}}$ = bank specific factors; Size, Liquidity, Excess Capital, Deposit strength, $\boldsymbol{P_{t-1}\Delta_{iM}}$ = cost per unit of assets bank incurs, J = credit risk,□ σ = interest volatility coefficient, μ_k= bank specific dummy variable.

The results of the estimated model in equation (2.17) revealed that commercial banks' pricing of loans in Italy is influenced by micro and macroeconomic variables such as permanent and transitory changes in income, interest and credit risk, interest rate volatility, banks' efficiency. The results also reveal that interest rates on short-term lending of liquid and well-capitalized banks react less to a monetary policy shock.

In their empirical estimation of banks interest margin models for the US banks, Ho and Saunders (1981) and Angbazo (1984) estimated the empirical interest margin models based on quarterly data from 1976 to 1979. Results from regression analysis in Ho and Saunders's model indicate that the degree of managerial risk aversion, size of transactions, bank market structure and variance of interest rates are important determinants of interest spreads. The authors conclude that liability and assets structures need to be analyzed together since they are interested through transaction uncertainty. They also conclude that the size of the spread, s, is directly amenable to theoretical and empirical modeling. On the other hand, the results from Angbazo (ibid) suggests that default risk, opportunity cost of non-interest bearing reserves, leverage and management efficiency are all statistically significant and positively related to bank interest margins.

With the above review of empirical studies on banks interest on loan rate setting in developed economies namely; US, Italy, Euro area and Australia, our next empirical literature review focuses on studies on Nigeria with the CBN pricing of loans model taking the lead.

The CBN (2010 and 2011b) developed an empirical model for DMBs risk based pricing with due consultation with stakeholders in the banking industry. The CBN risk-based pricing model underscores the importance of risk pricing in commercial bank credit risk management and implementation of monetary policy. In articulating the risk-based model, the CBN mandated all DMBs to specify and estimate their individual bank's pricing of loan model and send results to their office for adoption.

The empirical model with explanatory notes aims to serve as a guide to DMBs in computation of their Risk-Based Lending Rates (RBLR). In essence, it was a practical guide to DMBs on how to adopt the RBLR asarticulated by the BIS.

The template which was articulated through a circular to commercial banks and discount houses in Nigeria with reference (BSD /DIR/GEN/GR//04/015) is based on some key cost elements as follows: direct cost of funds indirect cost/ overheads, statutory cost, opportunity cost of holding non-liquid assets, credit risk, target return on equity (ROE).

The CBN model can be stated as;

$$I_{it} = f\,(av.\ deposit\ rate, operating\ cost, risk\ premium, ROE) \quad \ldots\ldots \quad (2.18)$$

Where; I_{it} = lending rate for bank I, C= cost of funds/operating expenses, CRR = Cash reserve ratio, ROE = Return on equity

The CBN further advised the following empirical definition of the six elements of the risk based pricing model for estimation.

(a) The monthly average deposits balance is to be used in the computation of 'direct cost of fund' and all other costs that use average deposit as a denominator.

(b) Only the proportion of indirect costs attributable to the generation of interest income should be used in the computation of "indirect cost" for the purpose of RBLR.

(c) The basis for the computation of the "Opportunity cost of funds sterilized in CRR" should be the Standing Deposit Facility (SDF) rates.

(d) The opportunity cost of holding liquid assets in excess of the minimum requirement was expunged from the computation of the RBLR.

(e) The opportunity cost of holding non-earning assets should be benchmarked against the risk free rate, that is, the 90 days treasury bills rate. This will eliminate the inconsistencies observed in the rates currently being used by banks, thus improving standardization and making the RBLR more sensitive to movements in the MPR.

(f) Cash is to be excluded in the computation of opportunity cost of holding non-earning assets.

(g) Banks are encouraged to use a combination of transparent and verifiable process for the determination of their Risk Premium. This process, which should be systematic, should be verifiable by interested third parties and regulators alike.

(h) The model used by any DMB should take into cognizance available credit information on the customer from the credit bureau and the obligor rating of the customer from one or more accredited agencies.

(i) The latest fiveyear industrial average is to be used as "Target Return on Equity" or as may be advised by the CBN from time to time. DMBs were to apply the industry rate of 12.15 per cent.

Equation (2.18) is the CBN empirical model for DMBs pricing of loans. It is expedient to comment on this specification that the CBN specified the empirical model toreflect practical application of banking, and not strictly based on theoretical construction.

Hesse (2007) investigated the intermediation efficiency in Nigeria in pre-consolidation period using unique bank-by-bank balance sheet and income statement information during 2000-2005. The study used interest rate spread as a measure of intermediation efficiency which leads to estimation of a model of net interest margin. The paper analyzed the trend in the banking system for 20 years and concluded that the system experienced a boom and bust cycle. The study also revealed that despite the deregulation policies such as interest deregulation under the SAP and the universal banking model in the pre consolidation period, financial intermediation never took off, instead the Nigeria's banking sector was still characterized by a high degree of fragmentation and low levels of financial intermediation up to 2004.

The author specified and estimated a general class of panel regressions model of the form:

$$Spread_{ij} = \alpha + \beta B_{ij} + \gamma_{ij} + \delta M_i + \varepsilon_{ij} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (2.19)$$

Where; i = $bank_{it}$ = time t; *B* = a vector of bank-specific variables for bank i at time t; *I* = time varying, banking industry-specific variables; *M* =a vector of time-variant macroeconomic variables, and ε_{it} = the residual.

The results of the panel regression revealed that higher overhead costs increased narrow and wider spreads, indicating that banks passed on all overhead cost to borrowers. There is also some evidence that banks with higher liquidity holdings charged lower and wider spreads in 2004 and

2005. It was also revealed that banks subject to increased liquidity holdings charged lower rate. This may be associated with the tendency to look for lending outlets.

The results of the panel estimation also indicate that loan loss provisions have **a significantly negative effect on both spread measures in all the models.**This significant negative coefficient was interpreted as higher provision for NPLs (bad debts)resulted in lower interest income on the banks' income statements.

Liquidity was negatively related to spreads as announcement of consolidation led to higher liquidity which lowered interest spreads. Banks with higher intermediation, that is, high loan portfolio relative to total liabilities have lower interest spreads. These findings also revealed that concentration leads to lower spread which was attributed to large scale operations that the consolidation policy aimed to achieve. On macroeconomic variables such as inflation and rate of treasury bills (TB), the relationship was found to be positive that is, inflation and higher TB rate affects spreads positively.

In conclusion, the study confirmed that financial intermediation never took off in Nigeria before consolidation despite the deregulation policies of 1986 and 2002. It recommends that CBN should up step its regulatory activities to enhance financial intermediation. The study supports the CBN adoption of the consolidation reform to enhance financial intermediation.

Having reviewed some empirical works on pricing of loans models in some developed economies and Nigeria, we present below some review of the literature on bank distress and bank failures across the world and then in Nigeria.

Afolabi, Ogunleye and Bwala (2003) investigated interest rate spreads in Nigeria with a view to ascertaining the determinants of interest spread as well as profferingsome suggestions. The study

noted that prior to deregulation of the banking sector in Nigeria, government used interest rate ceilings and sectorial allocation of credit as means of channeling credit to the priority sectors of the economy for investment and economic growth. Following the structural adjustment program in 1986, liberalization of the banking industry was introduced to remove the interest rate ceiling to provide for efficient allocation of savings to the private sector for investment. The liberalization reform empowered banks to price deposits and loans efficiently to reduce interest spread for financial intermediation and enhanced assets quality of banks.

The study used panel data regression analysis to estimate the specifiedmodel for interest rate spreads in Nigeria. The results of the estimated model revealed that regardless of the definition of interest spread, operating cost is positive and significant in all the models at 1% level. The study also found Q, assets quality, measured by the ratio of NPLs to total loans, consistently negative but significant at 1% level for 3 out of the 4 models of spread. This result was expected to show a positive relationship between credit risk and spread. The negative relationship in the model was explained to mean that insured banks classification of loans into performing and NPLs are suspects and probably not done in accordance with the prudential guidelines. Finally, the results revealed that the stance of monetary policy: CRR, MPR and liquidity ratio were relevant and significant at varying degrees in two models. In conclusion, the study recommended for a reduction of large fiscal deficits, downward adjustment in monetary policy stance: CRR, MPR and liquidity ratio. It also recommended that banks' staff wage bill should be moderated in addition to providing working infrastructure to reduce cost of doing business in Nigeria which will bring down the cost of financial intermediation for enhanced investment and economic growth.

2.4.2 Empirical Literature on Bank Distress and Bank Failures in Developed Countries

The empirical literature below reviews studies on bank distress and bank failures in developed countries first and then in Nigeria.

GAO (2013) estimated relationships among bank failures, income and unemployment. It also focused on impact of bank failures on credit availability using linear dynamic panel model and Granger causality tests on data from 1994 to 2011. Results from estimated dynamic panel model revealed that bank failures were largely related to NPLs in real estate as credit losses and charge-offs from NPLs significantly contributed to bank failures in the US.

An interesting finding of the research shows that failed banks pursue aggressive growth strategies using non-traditional funding and weak credit administration practices. This aggressive strategy is consistent with most findings in the literature that banks continually shift emphasis from traditional products to fee-based product as they face declining revenue in traditional products. It is also evident that they pursued weak credit administration practices to remain in the market, and in some cases, they underprice credit risk to increase or maintain their market share.

In conclusion, the study acknowledged that the concept of granger causality used in the research to determine the extent to which variables are associated with each other is subject to some limitations. For instance, granger causality measures the correlation of the current value of a variable with past values of another variable and does not imply that one variable is the cause or effect of another variable. It also admits that the results presented are likely the factors specific to the data period 1994- 2011 and may not apply to other time periods.

In a study of capital flows, impossible trinity and financial crisis in India, Gupta and Manjhi (2011) analyzed the control and management of foreign capital flows with respect to 'impossible trinity' in India over three decades. The study focused on India's approach to liberalization of

capital account which the authors described as gradualist and calibrated, whereby certain agents and flows were accorded priority in order to ensure macroeconomic financial stability in the country.

The study observed the sharp reversal of net capital outflows in the emerging economies where private capital flows dropped from $ 1.3 trillion in 2007 to $530 billion in 2009 and subsequently $746 billion in 2011. According to the author, such sharp swings in capital flows created problems for macroeconomic management, prompting the debate on the extent to which developing economies can open their capital accounts. The paper noted that capital inflows into developing countries after the global financial crisis was driven by high interest rate differential due to extremely low interest rates prevailing in most industrialized countries like the US, UK Japan and Germany. The problem is that some of these flows are likely to be reversed once monetary easing in industrialized countries is reversed.

The study recommended that countries need to actively manage capital account to avoid financial crisis. It contends that while theoretically, it is widely agreed that capital flows provide external capital to sustain an excess of investment over domestic savings for growth. In recent years, many emerging markets, including India, received capital flows that are far greater than their current account financing requirements. This created macroeconomic management challenges. From empirical studies, there are concerns that excess capital flows leads to real exchange rate misalignment, excesses in credit market, asset price booms, building up of inflationary pressure and overall financial and banking crisis.

In a cross-country study, KPMG (2009) conducted a risk management study on banking crises around the world, using primary data study based on online interviews involving a sample of over 500 banks senior managers from leading banks around the world. According to the study,

the causes of bank failures include: weaknesses in risk culture and governance, gaps in risk expertise at senior level, compensation culture too oriented to year on year profit increases. The empirical survey concludes that there is considerable focus now on improving the risk management culture in banks all over the world.

The most important finding of the research revealed that risk management across the banks did not have sufficient robust data when making decision that led to the credit crises. This finding is important in the analysis of risk management. It portrays a serious problem of information asymmetry in banking that can lead to bank failures.

Prasad and Rajan (2008), Rajan and Subramanian (2005), Johnson et al. (2007) and Prasad et al. (2007) revealed that in developing economies, where the financial system is underdeveloped, foreign capital flows are directed to easily investment areas like real estate, leading to asset price booms, with subsequent busts thereby disrupting the economy. Similarly, in the foreign portfolio component of the flows, foreign investors are likely to patronize the shallow equity markets. This can also cause sharp increases in equities prices with the effect that assets price bubble would likely form and when there is any observed risk, divestment would follow which can lead to sharp decline in equities prices, spreading losses to domestic investors while increasing banks NPLs. In most cases, massive unintended capital inflows could result in exchange rate appreciation, which can decrease exports. This problem becomes more glaring when the central bank sterilizes the inflows to check the exchange rate appreciation. Sterilization of foreign exchange inflows increases money supply, which leads to inflationary pressures.

Fofact (2005) investigated macro and micro causes of NPLs in 16 Sub-Saharan Africa Countries (7 CFA and 9 non-CFA). The research used correlation, causality and pseudo-panel technique and granger causality to trace the direction of a possible causal relationship between the key

variables and NPLs. Estimated results of the research show evidence of increased NPLs and heightened credit risk. In the same vein, the model traces the causes of NPLs to macroeconomic factors in the following order: volatility and terms of trade, inflation, real interest rate, net interest margins, and returns on assets. On microeconomic front, rise in NPLs is associated with deterioration of banks assets. These could pose serious challenges to macroeconomic stability. Therefore, the study recommended that future studies should analyze welfare implications of the banking and financial crises in sub Saharan Africa.

Vodoba (2003) investigated causes of banking crises in Czech Republic using simple historical, descriptive statistics and proportion analysis. The study highlighted some features of reforms implemented by regulatory agencies in Czechs. This includes consolidation and state transfer of the NPLs to special institution, Konsolidacni banka. The NPLs exceeded 30% of the total credits which was caused by: macroeconomic factors; instability, lending booms, inadequate preparation for financial liberalization. Microeconomic factors include; information asymmetry, management frauds and risk exposure and risk management.

Results of the research revealed that credit risk is the principal factor that caused banking crisis in Czech Republic despite the consolidation policy. The author recommended that regulatory authorities in the republic need to strengthen banking practices that are anchored on sound credit risk management to ensure good quality of assets to avoid banking stress and failures.

Kaminsky and Reinhart (1999) explored the links between banking crises, exchange rate crises and financial liberalization. In a sample of 24, of which 14 are developing countries, the study found a sharp increase in banking and currency crises since 1980. The average number per year of banking crises in their sample rose from 0.3 during 1970- 1979 to 1.4 in 1980 to 1995. The

two authors found that the banking crises and the currency crises are closely related. More importantly, the results show that banking crises are often preceded by financial liberalization.

Demirgue-Kunt and Detragiache (1998) investigated features of economic environment that lead to bank distress and failure in 65 market economies across the world using multivariate legit econometric model that rely on annual data from 1980 to 1994. The focus of the study is therefore macroeconomic factors. Results from the estimated model revealed that factors responsible for banking crises are: low GDP, excessive real interest rate, high inflation, adverse terms of trade, deposit Insurance, effectiveness of the legal system.

The study found that banking crisis is more likely to occur where the financial system is liberalized. They also found a two-way interaction between banking and currency crisis. This is explained to mean, where the banking systems are not sufficiently developed, capital account liberalization, is likely to make banks vulnerable to external economic shocks. The findings suggest that vulnerability is reduced with institutional development and strengthening of the banking system through prudential regulations.

Finally, the study revealed that financial liberalization heightened competition among banks which leads to greater moral hazard and risk-taking and subsequently, bank failure. Therefore, it was recommended that future research should focus on microeconomic factors such as concentration, capitalization, ownership structure, quality of regulatory supervision, degree of liquidity of interbank market which are potential causes of distress and bank failures.

As indicated in the introduction, there are several studies on bank distress and bank failures in Nigeria with different methodological approaches to analysis. We present below review of some studies on bank failures in Nigeria:

Egbo (2012) examined the causes of bank failures in Nigeria using simple descriptive, historical facts and figures to report incidences of bank failures in Nigeria and across the world. The study investigated the causes of bank failures in Nigeria to include deteriorating economic factors such as regulation of banks, government insurance scheme, ceiling on deposit interest rates, capital requirements, inadequate reserve requirement, forbearance, poor risk management procedures, frauds and corruption. Based on these findings, the author recommended banks to be cautious on investment in risky projects, good corporate governance, CBN to ensure banks adhere to credit risk management policies as well as use credit risk scoring system and finally, credit scoring agencies should be made CBN consultants to regulate rating procedures.

Uguani (2012) evaluated the influence of credit risk management on bank failures in Nigeria in 2012 using primary data over sample randomly selected from banks in Aba, Owerri and Umuhia in south eastern Nigeria. Results from the questionnaires study reveal that poor credit risk management influences bank failures. The study recommended that banks in Nigeria should establish sound credit risk management, CBN should use integrity and credibility in approving appointment of banks chief executive, regulatory authorities to review micro and macro prudential guidelines for banks to streamline credit risk management.

Garba and Garba (2002) examined the options for globalization of capital for Nigeria. The study presented empirical findings supporting the view that deregulation and globalization of finance policies have not been beneficial to most emerging and developing economies. The policies are not beneficial because there are policy games both at the multilateral and local levels. At the multilateral level, the system is weak, volatile and its payloads and contagion effects are direct product of a system founded on golden rule; *privatize gains and socialize or export losses,* where

possible. Consequently, cases of banking and financial crises are common challenges for countries that implemented capital account deregulation policy.

The paper was built on the argument that historically, *deregulation is known to be behind every banking crisis in the past and present,* causing assets boom and bubbles which are fuelled by explosion of credit and *mispricing of risk*. Deregulation promotes competition which leads to excessive risk taking by financial institutions. This leads to excessive credit expansion which causes boom and speculative trading, facilitating formation of assets price bubbles, which eventually burst and collapse the assets pricing by transferring loses to market participants. The impact of this can be analyzed in terms of wealth effects, reducing consumption and investment, causing decline in national income and employment. A good example is the banking and financial crises in the East Asian countries of Thailand, Indonesia, Malaysia, Singapore and Hong Kong in 1997-1998 as well as the impact of the global financial crisis of the 2007-2009 on the Nigerian capital market.

The study noted that *capital account deregulation* reform in a fragile economy like Nigeria must address certain fundamental requirements before implementation. These requirements are: sound domestic financial systems, adequate supervision and prudential regulation, good risk management capacities in banks and businesses, greater transparency and market discipline. The study argued that in Nigeria, none of these requirements is available. In conclusion, the authors warned that governments and regulatory authorities that open doors for liberalization policies take the risk of planting financial crises in their countries regardless of the economic fundamentals. The study drew lessons from Thailand, Indonesia, Malaysia, Philippines, South Korea, Russia and Brazil that regulators need to take adequate care and plan well before delving into financial liberalization and globalization of capital.

Based on the lessons from history and the prevailing weaknesses in the Nigeria financial sector as well as the macroeconomic fundamentals, the study recommended that Nigeria should not *liberalize its capital accounts* to exercise prevention which is better than cure.

Brownbridge (1998) analyzed bank distress in Nigeria, Kenya, Zambia and Uganda using simple qualitative and descriptive, ratio analyses. The study revealed that commercial banks failed in Nigeria, Kenya, Uganda and Zambia due to NPLs attributable to moral hazards and adverse selection. The study also revealed that banks' lending at high interest rates to high risk borrowers contributed to bank failures in Nigeria, Kenya, Uganda and Zambia, suggesting that credit risk in the countries under study was poorly managed. The author suggested two recommendations. First, local banks in the four countries could potentially contribute to development of financial markets in sub-Saharan Africa by providing loans to small scale business sector. Secondly, there is need for effective prudential supervision of local banks and enforcement of banking laws to reduce bank financial distress and failure. These recommendations suggest that there is poor on-site supervision and monitoring of banks by the regulatory authorities in these four countries. In the following section, we present overview of the banking sector and developments from 2002 to 2017.

2.5 Overview of the Banking Sector, Structure and Developments in Nigeria: 2002 - 2017.

The Nigerian banking sector comprises the CBN, 21 DMBs (structured into three operations license categories- international, national and regional) 4 merchant banks, specialized banks and other deposit-taking banks. The development of banking institutions in Nigeria dates back to the 1894 when the African Banking Corporation opened a branch which was acquired by the British Bank for West Africa (BBWA), now First Bank of Nigeria Plc. The indigenous banking boom of

the 1930s and 1940s facilitated the emergence of Nigerian owned banks and interests of indigenous entrepreneurs in bank ownership.

Between 1960 and 1986, the development and growth of both merchant and DMBs were modest with government regulation spearheading the sector. For instance, there were only 12 DMBs in 1960. This number rose to 19 in 1977 and 29 in 1986. There was no merchant bank in operation in 1960 but by 1970, the first merchant bank commenced operations. The growth in the number of merchant banks was slow as the number rose to only 4 by 1977. However, by the end of 1986, the number of merchant banks in operation in Nigeria had risen to 12.

The period between 1986 and 1994 marked an unprecedented growth in the number of banking institutions in Nigeria due to *interest liberalization* policy under the Structural Adjustment Program (SAP) of 1986. For the first time, the government abolished controls on credit ceilings and empowered the DMBs to set deposit and lending rates in the intermediation process. This major shift in policy trust was to enhance the assets quality of the banks for effective financial intermediation. Under the deregulation regime, new deposit-taking institutions like the peoples bank, community banks and primary mortgage institutions were also established in order to develop and enhance savings culture by small savers in both urban and rural areas of the economy. This period witnessed the increase in the number of banks and other financial institutions than in any other period in Nigeria since 1960. For instance, the number of DMBs and merchant banks were 19 and 5 respectively, in 1977. However, by 1990, these figures had risen significantly to 58. The universal banking system model was introduced when the dichotomy between the DMBs and merchant banks was removed. Under this system, all the commercial and merchant banks were transformed into DMBs and were allowed to engage in both money and capital market activities, insurance and mortgage businesses. Universal banking

is the practice whereby commercial banks are allowed by regulatory authorities to discharge the functions of merchant banks or investment banks so that the distinction between commercial banks and merchant banks does not exist physically and practically. Under the universal banking model, commercial banks are generally regarded as financial super markets where bank and non-bank financial services like insurance, mortgage finance, capital market functions and stock broking activities are offered by the bank under one umbrella, called universal bank. Consequently, the number of DMBs in operation in the country increased to 89 between 2002 and 2004.

Bankconsolidationpolicy was introduced by the CBN in July 2004, to strengthen the banking industry. The major policy trust of consolidation is to promote the soundness, stability and efficiency of the Nigerian banking system as well as enhancing its international competitiveness. And the major policy directive of consolidation provided that all the 89 universal banks should raise their minimum capital base to N25 billion, with a compliance deadline of December 31, 2005. This directive triggered mergers and acquisitions (M&A) in the industry. The banks raised capital funds from the domestic capital market and through foreign direct investment which resulted in increase in the share of the Nigerian banking industry's capitalization as a percentage of stock market capitalization. The share increased from 24% in 2004 to 38% by 2006.

By December 31, 2005, only 25 out of 89 DMBs met the N25 billion capital requirement. Therefore, as at 1st January, 2006, there emerged 21 private publicly-quoted banks, 4 foreign banks with no government-owned bank in Nigeria (CBN, 2008). Bank consolidation brought about changes in the size, structure and operational characteristics of the Nigerian banking system. For instance, total assets of commercial banks increased from N3.75trillion in 2004 to

N15.92 trillion in 2008 and subsequently N27.48 trillion and N28.12trillion in 2014 and 2015 respectively.

Development in the Nigerian banking sector revealed that after the bank consolidation of 2005, the industry was plagued into crisis that was fuelled by the global financial crises of 2007-2009, which resulted into bank distress and failure of some 6 DMBs. These banks are; Afribank, Bank PHB, Spring Bank, Fin Bank and Intercontinental Bank.

As a result of this development, the CBN had initiated and implemented various reform agenda which include the abolition of the universal banking model in favour of the specialized or core banking model. Other reforms addressed the corporate governance issues, credit risk management in banks, bank monitoring and supervision as well as the creation of Assets Management Company of Nigeria (AMCON) to deal with problems of NPLs.

The impacts of the CBN micro-prudential policies have manifested in different forms. While there are contentions whether the AMCON established by the CBN could stand the test of time in resolving bank distress and bank failures in Nigeria, it is clear that AMCON is 'a one-off dumping ground for NPLs' transferred from distress and failed banks with total liabilities standing at N4.5 trillion as at December 2016 (CBN FSR 2016). AMCON was established in Nigeria by legislative Act in 2010 to buy NPLs from DMBs. It is a strategy by the CBN to deal with the problem of NPLs in banks which had risen to 33% of the total loans in the industry in 2009. It was expected to reduce the NPLs from the 33% to CBN regulatory threshold of 5%.

The most fundamental issue to this study is the continuous deterioration of assets quality of banks and the threat of bank failures in Nigeria. For instance, analysis of bank failures in Nigeria after the interest deregulation policy from 1986 to 1998 shows 32 banks failed; under the

universal banking policy from 1999 to 2004; 5 banks failed; and with consolidation of banks, 6banks failed in 2009.

In addition, the CBN bailed out 4 distress banks, followed by AMCON's purchase of banks NPLs in 2010 (which brought the ratio of NPLs within the 5% CBN regulatory threshold). AMCON acquired over 12,500 banking sector NPLs accounts worth over N3.0 trillion (Ani 2012). Despite the AMCON's purchase of banks NPLs, a fresh round of bank failures is looming high. This is evidenced by the rapid increase in the ratio of NPLs to total loans from 4.87%, at the end of 2015, to 12.80 % in December, 2016. Bloomberg (2016) reported that 7 DMBs are under-capitalized. Unity bank and Skye bank are reported to be closed to insolvency. Actually, the CBN declared Skye bank as a 'problem bank' and replaced the bank's management with a new management team in June 2017. This is not a healthy condition in the banking industry that witnessed series of bank failures. It calls for deep analysis to determine the root cause of these problems for immediate and lasting solution.

The AMCON strategy for overcoming NPLs in the banking industry raises a lot questions such as: to what extent can AMCON solve banks distress and failure issues in Nigeria? What are the alternative strategies to AMCON? To answer these questions and many other relevant ones, we must see NPLs as symptoms of banks distress and bank failures. Consequently, to solve these banking sector problems, we must attack the cause, not the symptom.These questions are apt but fall outside the scope of this study. The fresh rise in NPLs after AMCON purchase of NPLs raises serious concern about post-AMCON round of bank failures which clearly suggests that bank failures in Nigeria have become a permanent trend in the financial system.

The preceding section described the characteristics of the banking sector, financial reforms and development of the Nigerian banking sector when *interest rate deregulation* was introduced to

replace government control of credit pricing and allocation. Other reforms in the deregulation policy include the licensing of multiple financial intermediaries particularly, the DMBs which reached its peak with 89 banks after the introduction of the universal banking model in 2001. There was also the CBN–induced consolidation policy which was completed in December, 2005 with 23 DMBs. Since the consolidation, the banking sector was characterized by series of banking crises ranging from bank distress to bank failures. The global financial crisis of 2007-2009 that started from the US dislocated the global financial system which affected Nigeria and reinforced the consolidation problems, leading to collapse of 6 banks with many other banks in distress condition. The next section evaluates the conceptual, theoretical and empirical literature reviewed.

2.6 Evaluation of Conceptual, Theoretical and Empirical Literature: Research Gap

This chapter surveyed the conceptual, theoretical and empirical literature, reviewing a number of models of banks' pricing of loans as well as studies on bank failures in developed market economies across the world and developing economies including Nigeria. From the review, it is evident that there are issues with *financial liberalization* as a model of growth for developing and emerging economies. First, excessive competition among banks generates high risk behavior which results in deterioration of assets quality of banks that leads to bank failures and fall in the level of bank intermediation. The lesson cited from East Asia, Latin America and parts of Africa are instructive. Competition also generates adverse selection and moral hazards. It is also argued that reliance on market mechanism leads to assets price bubble which eventually collapses and bring down the market system with losses across all market participants. These drawbacks require appropriate financial regulations to minimize the market failures.

Apart from the above problems, there is problem of measurement of credit risk. There is widening gap between the theory and empirical measurement of credit risk variable.In practice, market risk, credit risk and indeed, other financial risks have often been treated as if they are unrelated sources of risk because the risk types have been measured separately and managed separately, contrary to the fact that market risk and credit risk do interact in practical realities. This implies that the credit risk variable can have borrowers' component and macroeconomic component from market risk. For instance, at the macro level, portfolio component of inflows can trigger market risk in equity market when there is boom and bust cycle which increases and decreases equity market prices. If the impact of market risk is not captured and priced in the credit risk pricing then, credit risk will, perhaps, be underestimated and underpriced. This has important implications on assets quality of banks and survival of banks. These research gaps need to be investigated.

Using *emerging framework*, this study employs panel data analytical technique to fill the identified literature gaps.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter aims to build on the previous chapter by developing a suitable methodology to fill the literature gap. In order to accomplish this aim, the chapter is divided into 6 sections in the following order: Section 3.1 is the introduction while section 3.2 discussesanalytical framework of the study. Section 3.3 deals with specification of the econometric models to be estimated. Byusing panel data regression techniques, the section discusses the three methods of panel regression analysis (pooled OLS, fixed effect and random effect). Sections 3.4, 3.5 describe the data sources and models expectationswhile section 3.6 discusses somelimitations of data in the study.

3.2 Analytical Framework.

The research problem of this study enables us use the following twoanalytical techniques:

3.2.1 Panel Data Regression Technique:

This study usedpanel data econometric technique to specify the models, estimate and analyze results of the models. This enables us interpret the model parameters and make some useful inferences to achieve the objectives of the research set out in Chapter 1, Section 1.4. To achieve this, we used micro annual data culled from financial and income statements of some nine DMBs from 2002 to 2017.

3.2.2 Descriptive Statistical and Trend Analyses.

Usingsummary statistics, correlation matrixes and macroeconomic aggregate data from 2002 to 2017 (historical data, trend and graphs analysis), this study, adopts the *general equilibrium framework* under M F model with capital account deregulation in Nigeria to assess assets quality of banks and financial intermediation to answer the research questions in Section1.3. This deserves further explanation. The static general equilibrium framework is the word-based (textual) informal analysis and not quantitative equilibrium analysis. The trend analysis, which utilizes graphs, descriptive and correlation matrix is based on data culled from and outside the econometric model.

3.3 Specifications of Banks' Pricing of Loans Model.

This study adapted CBN (2011), Ho and Saunders (1981) as extended by Gambacorta (2004) and Camba-Mendez, Durré and Mongelli (2016).

The empirical model takes the general form:

$$L_{i,t} = f(X_{i,t}, Y_{i,t}, Z_{i,t}, +\varepsilon_{i,t}) \quad \text{..... (3.1)}$$

(3.1) is the general form of Panel Data Regression Model that can be represented by the following equation:

$$L_{it} = +\alpha + \beta X_{i,t} + \gamma Y_t + \delta Z_t + \mu_{i,t} \ldots\ldots\ldots\ldots\ldots\ldots \quad (3.2)$$

Where; L_{it}= Interest rate

Equation (3.2) says, the commercial bank lending rate of bank iat time t or specifically, the lending rate depends on individual bank characteristics, $X_{i,t}$; industry specific factors, Y_t and macroeconomic factors, Z_t.

Where; Interest $_{i,t,}$ the dependent variable, is the lending rate for bank i at time, t.

α is a constant = intercept that vary across the banks but not time.

β, γ and δ are coefficients of the variables *X, Y* and *Z* respectively.

X_{it} is a vector bank specific variables for bank i at time t

Y_t is a vector of banking industry specific factors at time t

$Z_t$is a vector of macroeconomic variables at time t

μ_{it} the error term for bank i at time t

Assumptions:

There are different perceptions regarding the nature and characteristics of the DMBs in the Nigerian banking sector. Some stakeholders assume that the DMBs are the same in terms of the market structure, operations and behaviorwhile others regard them as heterogeneous in characteristics like size, efficiency, pricing and risk culture, reflecting oligopolistic market structure. Because of these different views, our model specificationis built on the three types of panel data models: **PooledOrdinary Least Squares** (OLS) regression,**Fixed Effect** and**Random Effect** panelmodels to reflect these divergent views. It is expected that results from these various

specifications of panel data regression would shedlight on whether the DMBs are heterogeneous in the oligopolistic market.

In all our specifications, the error term μ_{it} (is white noise) is assumed to be independently and identically distributed *(iid):N* ~ $(0, \delta^2)$ for all i and t.

The Pooled Ordinary Least Squares(OLS) Model

The pooled OLS model is the simplest estimation method of panel data regression used under the assumption that the individual cross-sectional units are one andbehave in the same way. Following this, we specify below the pooled OLS model which assumes that the banks are the same:

$$L_{i,t} = a + bCF_{i,t} + cL_{i,t} + dS_{i,t} + eCR_{i,t} + fCRR_t + gMPR_t + hROE_t + iINF_t + jGDP_t + \varepsilon_{i,t} \quad \text{..... (3.3)}$$

Where:

$L_{i,t}$= lending rate of bank i at time t

a = a constant or intercept for the banks.

b, c, d, e, f, g, h, i, and *j* are parameters of the variables;

CF = cost of funds

L= liquidity

S= size

CR= credit risk

CRR= cash reserve ratio

MPR= monetary policy rate

ROE= return on equities

INF= inflation rate measured by the rate of change in CPI

GDP= real GDP growth rate

$\mu_{i,t}$ = error term

Equation (3.3) describes Pooled OLS regression model.The pooled OLS model is based on the assumption that the individual units (banks) have a common intercept, *a*, and also a common slope parameterfor each explanatory variable (*b, c, d, e …j*).This model is more restrictive compared to fixed effect or random effect models which are discussed below. The pooled OLS is used when the fixed effect model is not appropriate.However, if the fixed effect model is appropriate and pooled OLS is used, the estimated coefficients will be ***inconsistent.***This study estimates thepooled OLS model using two alternative dependent variables: prime and maximum lending rates, to fit and analyze the banks'pricing of loans in the two credit markets that exist in the banking industry of Nigeria.Results of the estimated equation (3.3)are presented and discussed in Chapter 4.

The Fixed Effect Model

The fixed effect model allows for heterogeneity among cross-sectional units by allowing each entity to possess its own intercept value. The fixed effect model can be estimated using two techniques:the Least Squares Dummy Variable (LSDV) model and the fixed effect within-group (WG) model.These twotechniques give the same result numerically. The advantage of fixed effect LSDV model over the fixed effect within-group (WG) model is that the former computes unique differential intercept values directly while the later calculates the differential intercept of a unit by subtracting from the mean value of the dependent variable, the mean values of explanatory variables for that unit times the estimated slope coefficients from the WG estimators.

Gujarati and Porter (2009) suggest the application of the Least Squares Dummy Variable (LSDV) regression model because it allows for heterogeneity among the subjects (banks) by allowing each unit (bank) to have its own unique intercept value while the slope parameter for each explanatory variable remains the same for the period of analysis (time invariant). In the literature, this is called one-way fixed effect Least Squares Dummy Variable (LSDV) model.

As stated earlier, some stakeholders in Nigeria claim that the DMBs are heterogeneous, because there are big, medium sized and small banks under the different layers of banking licenses, reflecting the oligopolistic market structure. The differences in the banks' licenses, size, style, corporate governance, credit risk appetite, customer service relationships and marketing strategy give rise to diverse behavior in loan pricing in the oligopolistic market.

Following the above argument, we specify the **fixed effect Least Squares Dummy Variable (LSDV)** modelin equation (3.4).The model includes N-1 dummy variables (to avoid dummy variable trap) to capture the (9-1) eight different intercepts for the sample banks as follows;

$$L_{i,t} = a_1 + a_2D_{2i} + a_3D_{3i} + a_4D_{4i} + a_5D_{5i} + a_6D_{6i} + a_7D_{7i} + a_8D_{8i} + a_9D_{9i} + bCF_{i,t} + cL_{i,,t} + dS_{i,t} + eCR_{i,t} + fCRR_t + gMPR_t + hROE_t + iINF_t + jGDP_t + \varepsilon_{i,t} \quad \text{..... (3.4)}$$

$$i = i^{th} \text{ bank} = 1,2,3,4,5,\ldots\ldots,9$$

$$t = \text{time} = 1,2,3,4,5\ldots\ldots,15$$

Where:

$L_{i,t}$= lending rate of bank i at time t

a_1 = a constant or intercept for bank 1 which is the base or reference for other banks while a_2, a_3 .... a_8 are coefficient values of other banks, representing their respective

differences with the intercept value of bank 1. The sum $(a_1 + a_2)$= value of intercept of bank 2, etc. The dummies are; D_{2i} =1 for bank 2, 0 otherwise, D_{3i} =1 for bank 3, 0 otherwise and so on and forth.

b, c, d, e, f, g, h, i, and *j* are parameters of the variables and the ***a priori*** expectations are:

CF = cost of funds *(f ' > 0)*

L= liquidity *(f '> 0)*

S= size *(f' > 0; < 0)*

CR= credit risk *(f' > 0)*

CRR= cash reserve ratio *(f' > 0)*

MPR= monetary policy rate *(f' >0)*

ROE= return on equities *(f' > 0)*

INF= inflation rate measured by the rate of change in CPI *(f' >0)*

GDP= real GDP growth rate *(f' >0; < 0)*

μ_{it} = error term

CF, L, S, CR are individual bank characteristics

CRR, MPR, ROE are industry specific factors

INF and *GDP* are macroeconomic factors.

The model in equation (3.4) is the fixed effect LSDV model. The basic assumption is that the intercepts vary across the units (banks) but not time.The LSDV model can be applied where N, the number of units (banks) is not large with *k* regressors in order to avoid the problem (running short of observations) of degrees of freedom to be provided in the estimation of the model. The LSDV model in (3.4) can also be extended to include time dummies which are introduced as T-1,

to avoid dummy variable trap (a situation of perfect collinearity). It is obvious that the disadvantage of application of LSDV model is the number of dummies (parameters) to be estimated. If too many dummies are introduced in the model, the estimation will consume degrees of freedom, thereby making it impossible to do a meaningful statistical analysis.The fixed effect (FE) estimators are **alwaysconsistent whether the appropriate model is pooled OLS or random effect.**Equation (3.4)is estimated using prime and maximum lending rates as alternative dependent variables. The prime and maximum lending rates reflect interest rate for ***'low risk'*** and ***'high risk'*** markets respectively.In addition, the fixed effect WG model is also estimated with same panel data to show its similaritywith the fixed effect LSDV model.

The Random Effect Model

The random effect model assumes heterogeneity in subjects (banks) like the fixed effect model. However, the substantive assumption that distinguishes random effect model from fixed effect model is that the time-invariant individual-specific effect $\varepsilon_{i,,}$ is uncorrelated with explanatoryvariables X_{is}in the modelwhereas the fixed effects (FE) specification allows the individual- specific effects to be correlated with explanatory variables $X_{is..}$Unlike the pooled OLS and LSDV models which are estimated by the OLS, the random effect model is estimated using the Generalized Least Squares (GLS). Therandom effect model specification can be used if the data are large sampledrawn at random from a large population. This approach attempts to model the individual effect as drawings from a probability distribution. In the random effect model, the individual-specific component is not treated as a parameter, like in the LSDV model, and it is not being estimated because it is considered as a random variable with mean variance. The general structure of the random effect model is represented by equation (3.5):

$$y_{i,t} = + X_{i,t}\beta + w_{i,t} \text{……..……...(3.5)}$$

where; $w_{it} = \varepsilon_i + \mu_{it}$

The random effect model can be specified as follows:

$$L_{i,t} = a + bCF_{i,t} + cL_{i,t} + dS_{i,t} + eCR_{i,t} + fCRR_t + gMPR_t + hROE_t + iINF_t + jGDP_t + w_{i,t} \ldots\ldots (3.6)$$

Where; $w_{it} = \varepsilon_{i+} \mu_{it}$(composite error term)

a = average individual effect

ε_i= cross-section or individual-specific error component

μ_{it}= combined time series and cross-section error component.

Other parameters and explanatory variables are as defined before.

The choice between fixed effect and random effect depends on whether the time-invariant effect is correlated with regressors or not. As indicated earlier, the random effect model assumes that the composite error term, w_{it} is not correlated with any of the explanatory variables of the model.When the true model is random effect, application of OLS will produce consistent estimates of β but the standard errors will be understated, so that we would be rejecting the null hypothesis more than we should which will increase the probability of committing type 11 errors. In addition to this prediction, OLS is not efficient compared to the GLS estimator.Generally, when the random effect model is valid, the use of OLS will still produce consistent estimates of β.The decision whether to use fixed effect or random effect model is based on ***Hausman test.***The*Hausman test* tests the null hypothesis that the error component, $w_{it}$is not correlated with the explanatory variables, $X_{is.}$ (i e the random effect estimator is correct) as depicted below:

(i) If the effects are uncorrelated with the explanatory variables, the random effect estimator is **consistent** and **efficient** while the fixed effect estimator is still**consistent** but **not efficient**. In this case, random effect model is appropriate.

(ii) If the effects are correlated with the explanatory variables, the fixed effect estimator is **consistent** and **efficient** while the random effect is **inconsistent. In this case, fixed effect is preferred.**

The properties of the random and fixed effects estimators are clearly depicted in table 3.1.

Table 3.1: Hausman Test of Properties of the Random and Fixed Effects Estimators

Model /Correct hypothesis	***Random effect model used***	***Fixed effect model used***
H_o***: Cov (***a_i***,*** x_{it}***)= 0*** ***Exogeneity***	*Consistent* *Efficient*	*Consistent* *Inefficient*
H_I***: Cov (***a_i***,*** x_{it}***)*** $\neq$ ***0*** ***Endogeneity***	*Inconsistent*	*Consistent* *Possibly Efficient*

Sources: Adopted from Sheytanova (2004)

Following the implications of the Hausman test regarding theproperties of the estimators, Johnson and Dinardo (1984) argued that generally, the fixed effect estimator is to be preferredto

random effect and many researchers apparently find a precisely estimated fixed effect estimates more persuasive than a precisely estimated random effect estimate.

In addition to the Hausman test, Bruesch and Pagan (1980) devised the Lagrange Multiplier test that can be used to test the hypothesis that there are no random effects (ie $\delta^2_u = 0$). Generally, the Bruesch - Pagan (BP) testreinforces the Hausman test.

We used Gretl, one of the latest but user friendly software packages, to estimate individually equations; (3.3), (3.4) and (3.6)specified under the pooled OLS model, fixed effect LSDV model (and WGmodel) and random effect(GLS) model respectively, using 9 cross sectional units (banks) data from 2002 – 2017.

3.4 Data Description and Source

Table 3.2: Data Source

Variables	Description, Measurement	Source
prime_rate	Average prime lending rate	CBN statistical bulletin (various issues)
max_rate	Average Max. lending rate	CBN statistical bulletin (various issues)
cost_of_funds	Ratio of operating expenses to total assets	Banks annual income and statement of account (2002 to 2016)
liquidity	Ratio of liquid reserves to total assets	Banks annual income and statement of account (2002 to 2016)
size(capital)	Total assets (N billion)	Banks annual income and statement of account (2002

		to 2016)
credit_ risk	Ratio of Non-performing loans to total loans	Banks annual income and statement of account (2002 to 2016)
c_r_r	(cash reserve ration) % or fraction of deposits required to be kept in cash as legal reserve	CBN statistical bulletin (various issues)
m_p_r	(monetary policy rate) CBN short term interest rate	CBN statistical bulletin (various issues)
r_o_e	(return on equity) industry average return on equities	CBN statistical bulletin; CBN Banking and Superv annual reports 2008, 2001, 2002 2006, 2007; NDIC Reports 2014; 2015; FSR Dec. 2016
inflation	Rate of change in C P I level (year on year all items)	CBN statistical bulletin; NBS (various issues)
real_gdp	Rate of change in real gdp constant prices 2010 =100	CBN; NBS (various issues)

3.5Model Theoretical Expectations.

It is a common practice in the literature to provide details of the empirical model in a tabular form to show definition, proxies of variables as well as the *a priori* theoretical expectations of the parameters as summarized under equation (3.4) above. (see, for instance, Gambacorta, (2004); Ariefianto and Soepomo, 2011). In line with this reasoning, the definition of the variables and theoretical expectations of models equations (3.3-3.6) are presented at Appendix F.

Panel Unit Root Test

The basic assumption of the model in equations (3.3), (3.4) and (3.6) is that the time-series and cross-sectional data are stationary.In time-series regressions, the data need to be stationary in

order to avoid spurious regression. The quality of forecasting power of the model for planning and policy is determined, to a large extent, on the stationary property of the time-series variables. We carry out the panel data unit root test which enables us identify the order of integration of each variable and use the stationary data in our computations. Some of the most accepted methods for testing the panel unit root are; Maddala-Wu (1999) MU test, Levin-Lin-Chu (2002) LLC test and Im-Pesaran-Shin (2003) IPS test. This study adopts the IPS test.

Sample Selection Procedure

We draw a sample of 9 banks from the population of 21 DMBs that survived the consolidation reform. The banks are sorted into 3 groups; big, medium and small banks based on the CBN revised banking model which classified existing banks licenses into; international, national and regional status. Based on the CBN new model, 20 banks fall under international status and national status while Suntrust bank (a new licensed bank) falls under regional authorization. Because of this limitation, our sample of 9 banks is modified as follows:

(a) Three biggest banks with international authorization and balance sheet (assets) size > N2 trillion as at December 2016 (Zenith Bank, First Bank and UBA)

(b) Three medium sized banks with international authorization and balance sheet (assets) size > N1 trillion as at December 2016 (Union Bank, FCMB and Fidelity Bank)

(c) Three small banks with national authorization and balance sheet (assets) size < N1 trillion as at December 2016 (Wema Bank, Sterling Bank and Stanbic IBTC Bank)

As at balance sheet period, December 2016, the share of assets of the sample banks from the industry total assets stood at 57% while the share of loans and advances of the sample banks from the industry total loans and advances stood at 61%. From the above procedure, we have a

balanced panel data of 135 observations, consisting of nine DMBs over a period of 15 years (2002- 2016).

3.6 Data Delimitations and Limitations of the Study

One of the limitations of this study is the issue of differences in the balance sheet reporting period. Some banks used March ended, June ended and December ended reporting period before 2009 when the CBN prescribed the use of December ended period for all banks to ensure uniformity in the statement of accounts reporting period. This issue is given as it is beyond the researcher's control.

It is also important to note that until the CBN reform of 2009, the DMBs used the *Generally Accepted Accounting Principle (GAAP)* in preparation of their statements of accounts. From 2012, all the banks adopted the International Financial Reporting Standards (IFRS) method in their financial statements in line with the CBN directive. This mix up in reporting periods and method of reporting, which gave rise to variations and overlap of figures, is hereby acknowledged. It is important to note that these issues are beyond the researcher's purview.While these limitations are acknowledged, they do not undermine the significance of the findings.

With presentation of the methodology, the next chapter presents resultsof all the estimated panel models using Gretl software for analysis in line with the objectives of the study.

CHAPTER 4

ESTIMATION, PRESENTATION AND ANALYSIS OF RESULTS

4.1 Introduction

The objectives of this chapter are to present and analyze results of the panel data regression models we specified in the previous chapter. In order to achieve these objectives, the chapter is organized into 4 sections. Section 4.2 presents descriptive statistics (summary statistics and

correlation matrices). Section 4.3 illustrates results of the panel unit root test based on Im-Pesaran-Shin (IPS)test.Section 4.4 is results and analysesin line with the research objectives.

4.2 Descriptive Statistics: Summary Statistics and Correlation Matrices

Table 4.1is the summary statistics with alternative dependent variables.

Table 4.1: Summary Statistics, Using the Observations 1:01 - 9:15

Variable	Mean	Median	Minimum	Maximum
prime_rate	17.8940	16.9400	15.1400	24.8500
max_rate	22.994	22.620	18.360	30.190
cost_of_funds	0.0781699	0.0576148	0.0201888	0.796623
liquidity_b_	0.306802	0.266707	0.0255693	0.833147
size_b	872725.	529839.	14950.0	4739820
credit_risk	9.74286	5.13059	0.0219876	134.196*
c_rr	16.3500	10.0000	1.00000	75.0000
m_pr	11.6667	12.0000	6.00000	16.5000
r_oe	21.5020	20.3400	-64.7200	162.980
i_fl	11.9881	11.5652	6.56395	23.8114
real_gdp	6.86667	7.01000	-1.51000	14.6000

Variable	Std. Dev.	C.V.	Skewness	Ex. kurtosis
prime_rate	2.29202	0.128089	1.82590	3.10030
max_rate	3.3906	0.14746	0.37668	-0.64875
cost_of_funds	0.104361	1.33506	5.80713	34.3814
liquidity_b_	0.208721	0.680311	0.548083	-0.778682
size_b	1.00605	1.15277	1.93091	3.65913
credit_risk	14.8869	1.52799	4.96694	35.2541
c_rr	19.8054	1.21134	1.95862	2.85731
m_pr	2.93159	0.251279	-0.424067	-0.467763
r_oe	44.2902	2.05982	1.68085	5.02793
i_fl	4.35153	0.362987	1.32283	1.35306
real_gdp	3.54172	0.515785	-0.206418	0.90875

Source: Gretl Output

*This % ratio of 134.19 depicts Wema Bank's provisionsof NPLs in 2009, when the regulatory authority enforced the prudential guideline classification of NPLs and directed the Wema Bank to make provisions of past NPLs (which were not provided appropriately) during the year.

From table 4.1, the mean of prime lending rate, the dependent variable is 17.894 and the standard deviation is 2.29202, indicating the spread is not wide. This also applies to the maximum rate which has a mean of 22.994 and standard deviation of 3.3906. Similarly, a close observation of other variables in the table shows that the pattern of the data is similar to the prime rate and maximum rate, except the cost of funds, credit risk, CRR and ROE, which their standard deviation values are larger than the means of the variables. This indicates greater spreads as well

as a warning that the data may not have constant means over the sample period, suggesting that a unit root analysis cannot be simply ignored, if regression analysis is to be conducted.

Tables 4.2(a) and 4.2(b) below present correlation matrices of the variables.

Table 4.2 (a) Correlation Coefficients with Prime rate, Using the Observations 1:01 - 9:15
5% Critical Value (two-tailed) = 0.1690 for n = 135

prime_rate	*cost_of_fund*	*liquidity*	*size_b*	*credit_risk*	
1.0000	0.3299	0.2834	-0.3563	0.0877	***prime_rate***
	1.0000	0.0269	-0.2197	0.1230	***cost_of_fud***
		1.0000	-0.2061	-0.0665	***liquidity***
			1.0000	-0.2468	***size_b***
				1.0000	***credit_risk***

c_rr	*m_pr*	*r_oe*	*i_fl*	*real_gdp*	
-0.1922	0.4632	0.0488	0.2832	0.7164	***prime_rate***
-0.0928	0.2175	0.0222	0.1624	0.2856	***cost_of_fd***
-0.2714	0.1237	-0.0086	0.0906	0.3883	***liquidity_***
0.3609	-0.0869	-0.0695	-0.0708	-0.5014	***size_b***
-0.2015	-0.0850	0.0235	0.1183	0.1549	***credit_rik***
1.0000	0.3126	-0.0812	-0.2276	-0.2882	***c_rr***
	1.0000	-0.1099	0.2350	0.1003	***m_pr***
		1.0000	-0.0542	0.2801	***r_oe***
			1.0000	-0.0330	***i_fl***
				1.0000	***real_gdp***

Source: Gretl output

The correlation matrices of the raw data in tables 4.2(a) and 4.2(b) are matrices of Pearson-type correlations that show the strengths of association between all the variables using the actual data values. From table 4.2(a), banks' application of prime lending rate appears to be based on size, cost of funds and liquidity. The low correlation between credit risk and prime lending rate suggests that banks give little or no consideration to the risk profiles of clients (obligors): This provides preliminary evidence against the use of risk-based pricing models by banks in pricing

loans.

Table 4.2 (b): Correlation Coefficients with Max. Rate, Using the Observations 1:01 - 9:15

5% Critical Value (two-tailed) = 0.1690 for n = 135					
max_rate	***Cost of_fund***	***liquidity_b***	***size_b***	***credit risk***	
1.0000	0.0758	-0.2845	0.2874	-0.0988	***max_rate***
	1.0000	0.0269	-0.2197	0.1230	***cost_of_fus***
		1.0000	-0.2061	-0.0665	***liquidity***
			1.0000	-0.2468	***size_b***
				1.0000	***credit_risk***
c_rr	m_pr	r_oe	i_fl	real_gdp	
0.4431	0.4358	-0.0133	0.1559	-0.0788	***max_rate***
-0.0928	0.2175	0.0222	0.1624	0.2856	***cost_of_fus***
-0.2714	0.1237	-0.0086	0.0906	0.3883	***liquidity__***
0.3609	-0.0869	-0.0695	-0.0708	-0.5014	***size_b***
-0.2015	-0.0850	0.0235	0.1183	0.1549	***credit_risk***
1.0000	0.3126	-0.0812	-0.2276	-0.2882	***c_rr***
	1.0000	-0.1099	0.2350	0.1003	***m_pr***
		1.0000	-0.0542	0.2801	***r_oe***
			1.0000	-0.0330	***i_fl***
				1.0000	***real_gdp***

Source: Gretl Output

The results in table 4.2 (b) show some level of strong and weak correlation between the dependent (maximum lending rate) and explanatory variables. For instance, the size, crr and liquidity have strong correlation with the dependent variable. On the other hand, some variables have weak positive/negative correlation. For example, similar to the prime lending rate, these results appear to suggest that banks' pricing of loans has very little to do with risk considerations. This is supported by the low but negative correlation between the maximum lending rate and credit risk (0.099). The key consideration in loan pricing appears to be bank size, crr and liquidity.

With presentation of the descriptive statistics, we move to the time series properties of the data as prelude to presentation of main results of the panel regression analysis.

4.3 Presentation of Results of Im-Pesaran-Shin (IPS) Test.

Before presenting the panel regression results, we examine the panel dataunit rootas discussed in Chapter 3. In addition, we are mindful of the warning from summary statistics that the data are spread, suggesting that panel unit root test isrelevant.

Table 4.3: Summary of Im-Pesaran-Shin (IPS) Panel Unit Root Test Results with Constant and Trends.

Variables	***Level Critical Values: 1%= -2.99 5%= -2.73 10%= -2.59***	***1st Difference Critical Values: 1%= - 3.04 5 %= -2.75 10%= -2.61***	***Order of Integration***	***Remark***
Prime_rate	-4.01645	-5.87148	*I*(0)	***Stationary @ level***
Max_rate	-6.85032	-5.02842	*I*(0)	***Stationary @ level***
Cost_of_funds	-2.3109	-5.89871	*I*(1)	***Non-Stationary***
Liquidity	-2.54543	-5.44318	*I*(1)	***Non-Stationary***
Size	-2.04908	-4.94395	*I*(1)	***Non-stationary***
Credit_risk	-3.65054	-7.8543	*I*(0)	***Stationary @ level***
C_r_r	-2.27193	-4.34716	*I*(1)	***Non-stationary***
M_p_r	-1.4399	-4.10885	*I*(1)	***Non-stationary***
R_o_e	-5.86554	-8.24363	*I*(0)	***Stationary @ level***
Inflation	-3.14528	-8.94736	*I*(0)	***Stationary @ level***
Real_GDP	-2.58607	-5.31356	*I*(1)	***Non-Stationary***

Source: Author's Computation (Extracted from Gretl output).

The results of the IPS test show that 5 variables (2 dependent variables and 3 explanatory variables) are stationary at levels of the variables. The other explanatory variables: cost of funds, liquidity, size, CRR, MPR, and real GDP are stationary at first difference. Therefore, given the ADF test results in table 4.3, this study used the stationary data to estimate the models specified in Chapter 3. Generally, in regression analysis, results of the unit root test at stationary have significant implications for forecasting, planning and policy. With stationary variables established, we proceed to present and analyze results of the econometric models, in line with the objectives of the research.

4.4 Presentation and Analyses of Results.

We present below results and analyses of the panel data econometric models in line with the 3 objectives of this research stated in Chapter 1 of this thesis. We start with the first objective.

4.4.1 The Determinants of DMBs' Pricing of Loans

The objective here is to estimate the loanpricing model and identify the determinants as well as whether the DMBs are homogeneous or heterogeneous in their pricing behavior. The estimated results of the 3 panel models (pooled OLS, fixed effect or LSDV model and random effect model) are presented here. These results are expected to reveal the relevant model for DMBs pricing of loans in Nigeria in the 2 credit markets ('low risk' and 'high risk' markets). First, we presentresults of the estimated pooled OLS method.

Results of the Pooled OLS (Unrestricted General) Model

Table 4.4 illustratesthe results of the Pooled OLS(unrestricted) model of banks' pricing of loans. The Pooled OLS (unrestricted general)model is strictly guided by theoretical relevance of all the 9 explanatory variables included in the model specification in Chapter 3, equation (3.3),using 2 alternative dependent variables: prime lending rate in Panel 'A' and maximum lending rate in panel 'B' respectively.

The prime lending rate is the interest rate for 'low risk'credit market. It is a theoretical market for banks' prime borrowers. The banks' prime customers are the large ticket customers in terms of business and are expected to have low credit risk. They are regarded as the 'best customers' because they have adequate cash flow and good net-worth which attract the lowest rating in terms of risk. For each bank, the prime lending rate also represents the minimum lending rate (CBN Annual Reports 2015). In practice, all business outfitscan be risky, depending on a number of risk factors. These risk factors are assessed at three different levels: the individualobligor's

level, the banking industry level and the macroeconomic level. Empirical evidence has attested to the fact that most large business concerns that are regarded as *lowrisk* are indeed very risky, not only in terms of credit risk but also liquidity and operational risks.

The ‘high risk’credit market has maximum lending rate (higher than prime rate) to compensate for potential default in loan and interest repayment. The separation of the 2 markets is one of the fundamental principles of risk–based loan pricing that ensures good assets quality of banks with bank intermediation.

Table 4.4: Estimated Results of Pooled OLS Model (3.3) in two Different Credits Markets(Unrestricted General Model).

	Panel A (Low Risk Market)				Panel B (High Risk Market)			
	Model 3.3: Pooled OLS, using 126 observations Included 9 cross-sectional units Time-series length = 14 Dependent variable: prime_rate Robust (HAC) standard errors				Model 3.3: Pooled OLS, using 126 observations Included 9 cross-sectional units Time-series length = 14 Dependent variable: max_rate			
	Coefficient	*Std. Error*	*t-ratio*	*p-value*	*Coefficient*	*Std. Error*	*t-ratio*	*p-value*
const	16.0532	0.100452	159.807	<0.0001	21.7137	0.298465	72.7513	<0.00001
d_cost_of_funds	0.813254	0.492474	1.6514	0.10137	4.7306	1.24588	3.7970	0.00023
d_size_b	−2.089e6	3.835e-07	-5.4485	<0.0001	1.09065e-07	1.42327e-06	0.0766	0.93905
d_liquidity_b_	0.201419	0.548277	0.3674	0.71401	−0.326054	1.49394	-0.2183	0.82762
d_credit_risk	−0.00864	0.00352621	-2.4505	0.01576	−0.00640019	0.00480243	-1.3327	0.18524
d_c_rr	0.012155	0.00170561	7.1238	<0.0001	−0.00728727	0.003422	-2.1295	0.03532
d_m_pr	−0.30344	0.0132305	-22.9337	<0.0001	0.327582	0.0439782	7.4487	<0.00001
r_oe	0.002475	0.000852146	2.8983	0.00449	−0.00514696	0.000518693	-9.9229	<0.00001
i_fl	0.119388	0.00539486	22.1300	<0.0001	0.0639911	0.0140395	4.5579	0.00001
d_real_gdp	−0.07353	0.016645	-4.4064	0.00002	−0.160107	0.0555112	-2.8842	0.00468
Mean dependent var	17.39714	***S.D. dependent var***	1.378034	***Mean dept var***	22.48000	***S.D. detp var***	2.886091	
Sum squared resid	105.9791	***S.E. of regression***	0.955831	***Sum sqd resid***	888.0517	***S.E. of reg***	2.766879	
R-squared	0.553532	***Adjusted R-squared***	0.518892	***R-squared***	0.147080	***Adjusted R-sqd***	0.080905	
F(9, 116)	15.97967	***P-value(F)***	9.42e-17	***F(9, 116)***	2.222601	***P-value(F)***	0.025196	
Log-likelihood	−167.887	***Akaike criterion***	355.7694	***Log-likelid***	−301.8094	***Akaike crit***	623.6188	
Schwarz criterion	384.1323	***Hannan-Quinn***	367.2924	***Schwarz crit***	651.9816	***Hannan-Quin***	635.1417	
rho	0.068266	***Durbin-Watson***	1.762632	***rho***	0.706484	***Durbin-Watson***	0.615361	

Source: Gretl output

Notes

The results of the pooled OLS (unrestricted) model show an R^2 of 0.55 and adjusted R^2 of 0.52 for the 'low risk' credit market. Results for the 'high risk' credit market revealed an R^2 and adjusted R^2 of 0.15 and 0.08 respectively. These results are suspect in recognition of the fact that the banking industry is heterogeneous in market structure and operations based on the CBN classification of banks' licenses into three categories as discussed in Chapter 3. We, therefore, conducted panel diagnostic test using Gretl (results of the diagnostic test are presented in appendix H) which revealed significant differences in units, in favor of the fixed effect model. Following this test, we used the LSDV technique to estimate the fixed effect model in equation (3.4).

Results of Fixed Effect(Unrestricted General) Model

Results of the estimated fixed effect LSDV**(**unrestricted general) model equation (3.4) for the 'low' and 'high'risk credit markets are presented in table 4.5 below. It is also important to note that the fixed effect LSDV model yields similar results with the fixed effects (WG) model. Thejustification for our choice of fixed effect LSDVmodel, as explained in Chapter 3, is that it gives direct values of the intercepts coefficients of the banks which are interpreted as the differences between the banks, whereas the fixed effects (WG) does not give direct values of the intercepts coefficients. However, the values of the intercept coefficientsof the WG model can be computed from group means (to confirm that LSDV model and WG model produce similar results, compare results of the LSDV model in table 4.6 with results of the WG model in Appendix K).

The estimated LSDV model for the 'low risk' market in table 4.5 reveals a significant improvement over results of the pooled OLS models in table 4.4. Firstly, in the LSDV model, the differential intercepts coefficients of the 9 DMBs are statistically significant at 1% level, confirming the view that DMBs in Nigeria are heterogeneous. This suggests that the results of the pooled OLS model in table 4.4 are suspicious. Secondly, 5 coefficients of the explanatory variables have the expected theoretical signs in the LSDV model and all of them are highly statistically significant. Thirdly, the values of R^2 and Adjusted R^2 in the LSDV modelare 0.59 and 0.53 respectively, indicating, a better fit to the pooled OLS model whose R^2 and Adjusted R^2 are 0.55 and 0.52 with the prime lending rate as the dependent variable. Lastly, the DW statistic of 1.84 and 1.76 for LSDV model and pooled OLS model respectively suggest that there is no auto-correlation (serial correlation among the error terms) in the models.For the 'high risk'

market, there appears to be no remarkable improvement of the LSDV model over the pooled OLS as revealed in tables 4.4 and 4.5.

Table 4.5: Estimated LSDV Model (3.4) in two Different Credit Markets (General Unrestricted Model).

Panel A **Low Risk Market** **Model 3.4: LSDV Model, using 126 observations** **Included 9 cross-sectional units** **Time-series length = 14** **Dependent variable: prime_rate** **Robust (HAC) standard errors**					**Panel B** **High Risk Market** **Model 3.4: LSDV Model, using 126 observations** **Included 9 cross-sectional units** **Time-series length = 14** **Dependent variable: max_rate** **Robust (HAC) standard errors**			
	Coefficient	***Std. Error***	***t-ratio***	***p-value***	***Coefficient***	***Std. Error***	***t-ratio***	***p-value***
const	16.965	0.207278	81.8469	<0.00001	21.6142	0.929779	23.2466	<0.00001
d_cost_of_funs	0.50917	0.591622	0.8606	0.39135	5.16316	1.35717	3.8044	0.00024
d_size_b	−3.43757e6	4.69958e07	-7.3146	<0.00001	2.66159e-07	2.40553e-06	0.1106	0.91210
d_liquidity_b_	0.360359	0.608739	0.5920	0.55510	−0.385199	1.60826	-0.2395	0.81116
d_credit_risk	−0.008344	0.00346253	-2.4093	0.01768	−0.00659919	0.00464743	-1.4200	0.15850
d_c_rr	0.0121082	0.00271285	4.4633	0.00002	−0.00694414	0.00371444	-1.8695	0.06426
d_m_pr	−0.272214	0.0206977	-13.1519	<0.00001	0.320455	0.0643067	4.9832	<0.00001
r_oe	0.00203961	0.00098052	2.0801	0.03988	−0.00497967	0.000741419	-6.7164	<0.00001
i_fl	0.118576	0.00824441	14.3825	<0.00001	0.0623149	0.0151419	4.1154	0.00008
d_real_gdp	−0.058099	0.0245832	-2.3631	0.01991	−0.167769	0.0642187	-2.6125	0.01027
du_2	−0.061522	0.0108902	-5.6491	<0.00001	0.00386303	0.0533446	0.0724	0.94240
du_3	−0.580412	0.0791015	-7.3376	<0.00001	0.0477188	0.418453	0.1140	0.90942
du_4	−0.961981	0.130783	-7.3555	<0.00001	0.0645713	0.693096	0.0932	0.92595
du_5	−0.872918	0.117217	-7.4470	<0.00001	0.0848129	0.620641	0.1367	0.89156
du_6	−0.820863	0.11471	-7.1560	<0.00001	0.338895	0.631131	0.5370	0.59240
du_7	−1.04229	0.145931	-7.1423	<0.00001	0.0816566	0.74128	0.1102	0.91249
du_8	−0.93877	0.126614	-7.4144	<0.00001	0.0903571	0.645508	0.1400	0.88894
du_9	−0.910503	0.13165	-6.9161	<0.00001	0.0677615	0.682641	0.0993	0.92111
Mean depett var	17.39714	***S.D. dept var***	1.378034		***Mean dep var***	22.48000	***S.D. dept var***	2.886091
Sum squared resid	95.47994	***S. E.of reg***	0.940252		***Sum squared***	887.1008	***S. E.of reg***	2.865990
R-squared	0.597763	***Adj. R-sqd***	0.534448		***R-squared***	0.147994	***Adj. R-sqd***	0.013881
F(17, 108)	9.441073	***P value F***	1.25e-14		***F(17, 108)***	1.103506	***P value F***	0.360023
Log-likelihood	−161.3122	***Akaike crit***	358.6244		***Log-likelihood***	−301.7419	***Akaike crit***	639.4838
Schwarz criterion	409.6775	***Hannan-Qui***	379.3657		***Schwarz crit***	690.5368	***Hannan-Qui***	660.2250
rho	0.022849	***Durbin-Wat***	1.845338		***rho***	0.703680	***Durbin-Wat***	0.620619

Sources: Author's extraction from Gretl output.

Notes: The coefficients' level of significance are based on the respective *p*-values such that the lower the p-value, the better the level of statistical significance of an estimate. The low *p* value counts against the null hypothesis, that the coefficient is statistically significant. For instance, when the *p*-value of an estimate is 0.01 or less, the coefficient is statistically significant at 1% level; if it is 0.5, it is statistically significant at 5% level and 0.10 is statistically significant at 10%.

In line with Campos, Ericsson and Hendry (2005) methodology of general-to-specific (GETS) modeling procedure,we excluded two explanatory variables (cost of funds and liquidity) that are statistically insignificant in the LSDV (unrestricted general) model in table 4.5. GETS modeling simplifies a general (unrestricted) model to a reduced form that adequately characterizes some empirical evidence. This encompasses model parsimony. The procedure for selecting useful empirical models include the theory of reduction, dynamic specification, model selection procedures, model selection criteria, model comparison, encompassing, computer automation and empirical implementation. The approach discusses the econometrics of model selection, noting that general-to-specific modeling is the practical embodiment of reduction. Results of the estimatedLSDV parsimonious model for DMBs pricing of loans are illustrated in table 4.6.

Empirically, judging performance of a model is based on some three criteria: increase in the size of the R^2 and adjusted R^2, lower Schwarz criterion and lower Akaike criterion (Johnston and Dinardo, 1984; Gujarati and Porter, 2009). GETS is built under these criteria. In comparing the LSDV (*unrestricted general) model* in table 4.5 with the LSDV*parsimonious model* in table 4.6 under the 'low risk' market, we observe that while the R^2 remains the same, the Adjusted R^2 increased from 0.53 to 0.54.We also observe that the Schwarz criterion reduced from 409.677 to 400.548. Similarly, the Akaike criterion reduced from 358.624 to 355.167. Under the 'high risk' market, the Adjusted R^2 increased from 0.013 to 0.020, Schwarz criterion decreased from 690.536 to 682.388 while Akaike criterion reduced from 639.483 to 566.750.

Table 4.6:Results of the Estimated LSDV Model in 2 Different Credit Markets (Parsimonious Model)*.

	Panel A (Low Risk Market)				Panel B (High Risk Market)			
	Model 3.4: LSDV Model, using 126 observations Included 9 cross-sectional units Time-series length = 14 Dependent variable: prime_rate Robust (HAC) standard errors				Model 3.4: LSDV Model, using 126 observations Included 9 cross-sectional units Time-series length = 14 Dependent variable: max_rate Robust (HAC) standard errors			
	Coefficient	***Std. Error***	***t-ratio***	***p-value***	***Coefficnt***	***Std. Error***	***t-ratio***	***p-value***
const	16.9367	0.189455	89.397	<0.00001	21.5278	0.862391	24.9629	<0.00001
d_size_b	−3.43e06	4.538e-07	-7.5651	<0.00001	1.29586e-07	2.330e-06	0.0556	0.95576
d_credit_risk	−0.007906	0.003612	-2.1870	0.03086	−0.00410202	0.0052792	-0.7770	0.43882
d_c_rr	0.0121288	0.002629	4.6131	0.00001	−0.0111342	0.000628	-17.704	<0.00001
d_m_pr	−0.27148	0.018632	-14.5702	<0.00001	0.367312	0.0484	7.5891	<0.00001
r_oe	0.0019303	0.000963	2.0040	0.04753	−0.00652245	0.000729	-8.9423	<0.00001
i_fl	0.119751	0.006925	17.2926	<0.00001	0.0846343	0.004586	18.4540	<0.00001
d_real_gdp	−0.057775	0.013629	-4.2390	0.00005	−0.0929919	0.0170257	-5.4619	<0.00001
du_2	−0.055738	0.006572	-8.4791	<0.00001	−0.00478342	0.0307467	-0.1556	0.87665
du_3	−0.572135	0.073843	-7.7480	<0.00001	0.0179974	0.384024	0.0469	0.96271
du_4	−0.945662	0.121197	-7.8027	<0.00001	0.0279547	0.632631	0.0442	0.96483
du_5	−0.866558	0.111595	-7.7652	<0.00001	0.0267423	0.581036	0.0460	0.96337
du_6	−0.831989	0.108104	-7.6962	<0.00001	0.0276596	0.560197	0.0494	0.96071
du_7	−1.03739	0.140026	-7.4086	<0.00001	0.0446894	0.710666	0.0629	0.94997
du_8	−0.945579	0.123796	-7.6382	<0.00001	0.0333191	0.63891	0.0521	0.95850
du_9	−0.885988	0.117257	-7.5560	<0.00001	0.0337129	0.601611	0.0560	0.95541
Mean depent var	17.39714	*S.D. dept var*	1.378034	***Mean dep var***	22.48000	***S.D. dep var***	2.88609	
Sum squardred	95.89265	*S.E. of reg*	0.933676	***Sum sqd resid***	897.8952	***S.E. of reg***	2.85704	
R-squared	0.596024	*Adjusted R-sqd*	0.540936	***R-squared***	0.137626	***Adj R-sqd***	0.02003	
F(17, 108)	10.81956	*P-value(F)*	1.41e-15	***F(15, 110)***	1.170326	***P-value(F)***	0.30552	
Log-likelihood	−161.589	**Akaike criteron*	355.1679	***Log-likelhood***	−302.509	***Akaike cri***	637.007	
Schwarz criterion	400.5484	*Hannan-Qui*	373.6046	***Schwarz crit***	682.3882	***Hanan-Qui***	655.444	
rho	0.018297	*Durbin-Watson*	1.849258	***rho***	0.711177	***Durbin-Wat***	0.60699	

Notes:*This Result (fixed effect LSDV model) is similar to fixed effect (WG) shown in Appendix K.

Tests for Model Adequacy (Low Risk Market)	Tests for Model Adequacy (High Risk Market)
Joint test on named regressors - *Test statistic: F(7, 110) = 23.1848* *with p-value = P(F(7, 110) > 23.1848) = 4.6148e-019* *Test for normality of residual -* *Null hypothesis: error is normally distributed* *Test statistic: Chi-square (2) = 8.15309* *with p-value = 0.016966* *Distribution free Wald test for heteroskedasticity -* *Null hypothesis: the units have a common error variance Asymptotic test statistic: Chi-square(9) = 8.84351 with p-value = 0.451844* *Durbin-Watson Statistic= 1.849258* *Null Hypothesis: No 1st order autocorrelation* *@ 5% level, D_L= 1.528; D_U =1.826* *1.826<1.84925<2* *No serial correlation*	*Joint test on named regressors -* *Test statistic: F (7, 110) = 2.50784* *with p-value = P(F(7, 110) > 2.50784) = 0.0197948* *Test for normality of residual -* *Null hypothesis: error is normally distributed* *Test statistic: Chi-square (2) = 20.4035* *with p-value = 3.71059e-005* *Distribution free Wald test for heteroskedasticity -* *Null hypothesis: the units have a common error varianceAsymptotic test statistic: Chi-square (9) = 0.0203792with p-value = 1* *Durbin-Watson Statistic = 0.606999* *Null Hypothesis: No 1st order autocorrelation* *@ 5% level, D_L= 1.528; D_U =1.826* *0 <0.060699 < 1.826* *Positive serial correlation is present*

Random Effect(restricted) Model

The random effect model is estimated using the same banks' data for the parsimonious model.Results of the estimated equation (3.6) are presented in table 4.7 below. The results show the performance of the model in the two credit markets. The question is which model is appropriate? fixed effect or random effect?

Hausman Test

Result of the Hausman test in table 4.7, 'low risk' market revealed that the *Null hypothesis (H_o):**GLS estimates are consistent*** (ie the random effect model is appropriate), is not significant (***p*value is0.0549497**). Therefore, the fixed effect model is appropriate (see table 3.1 in Chapter 3). In the 'high risk' market, the Hausman test also revealed that fixed effect model is appropriate.

Bruesch–Pagan (BP) LM Test

Similarly, the BP test revealed that the *Null hypothesis (H_o)*: ***variance of the unit-specific error = 0***, is not significant (***p* value is0.725446).** Therefore, fixed effect model is appropriate. This test reinforces the Hausman test that fixed effect is the appropriate model because unit-specific errors are correlated with explanatory variables. In the 'high risk' market, the BP test also reinforces the Hausman test that fixed effect model is appropriate.

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4.7: Results of the Estimated Random Effect Model in two Different Credit Markets (Parsimonious Model).

	Panel A (Low Risk Market)				Panel B (High Risk Market)			
	Model 3.6: LSDV Model, using 126 observations Included 9 cross-sectional units Time-series length = 14 Dependent variable: prime_rate Robust (HAC) standard errors				Model 3.6: LSDV Model, using 126 observations Included 9 cross-sectional units Time-series length = 14 Dependent variable: max_rate Robust (HAC) standard errors			
	Coefficient	*Std. Error*	*t-ratio*	*p-value*	*Coefficient*	*Std. Error*	*t-ratio*	*p-value*
const	16.0231	0.284647	56.2913	<0.00001	25.7122	0.819672	31.3689	<0.00001
d_size_b	−2.0937e06	4.894e-07	-4.2781	0.00004	−2.10818e06	1.1758e 06	-1.7929	0.07556
d_credit_risk	−0.0081186	0.00423229	-1.9182	0.05751	−0.008371	0.0099234	-0.8436	0.40062
d_c_rr	0.0117744	0.00563823	2.0883	0.03892	0.0125727	0.0114924	1.0940	0.27618
d_m_pr	−0.298729	0.0483712	-6.1758	<0.00001	−0.0044804	0.106781	-0.0420	0.96660
r_oe	0.00225674	0.00199581	1.1307	0.26046	0.00744975	0.0048128	1.5480	0.12431
i_fl	0.12224	0.0254295	4.8070	<0.00001	0.0945702	0.0445156	2.1244	0.03572
d_real_gdp	−0.0662495	0.0607473	-1.0906	0.27768	−0.673266	0.0842008	-7.9960	<0.00001
Mean depent var	17.3974	***S.D. dep. var***	1.378034		***Mean dep var***	22.48000	***S.D. dep var***	2.886091
Sum squared resid	106.394	***S.E. of regression***	0.945540		***Sum sqd resid***	583.7309	***S.E. of reg***	2.214791
Log-likelihood	−168.3	***Akaike criterion***	352.2587		***Log-likelih***	−275.3752	***Akaike crit***	566.7504
Schwarz criterion	374.949	***Hannan-Quinn***	361.4770		***Schwarz crit***	589.4407	***Hannn-Qui***	575.9688
	Test	***Decision***			***Test***	***Decision***		
	Breusch-Pagan test - ***Null hypothesis: Variance of the unit-specific error = 0*** ***Asymptotic test statistic: Chi-square (1) = 0.123334*** ***with p-value = 0.725446***	***Estimated Chi Sq. value is not significant. fixed effect is appropriate***			***Breusch-Pagan test-*** ***Null hypothesis: Variance of the unit-specific error = 0*** ***Asymptotic test statistic: Chi-square(1) = 3.45807*** ***with p-value = 0.0629438***	***fixed effect is appropriate.***		
	Hausman test - ***Null hypothesis: GLS estimates are consistent*** ***Asymptotic test statistic: Chi-square (7) = 13.795*** ***with p-value = 0.0549497***	***The estimated Chi Sq value is not significant. GLS is inconsistent andfixedeffect is appropriate.***			***Hausman test -*** ***Null hypothesis: GLS estimates are consistent*** ***Asymptotic test statistic: Chi-square(7) = 2.42205*** ***with p-value = 0.932851***	***Estimated Chi Square value is not significant. Fixdeffect model is appropriate.***		
	Test for normality of residual - ***Null hypothesis: error is normally distributed*** ***Test statistic: Chi-square(2) = 7.56326*** ***with p-value = 0.0227855***	***Estimated Chi Sq. value is significant. Reject the H_O.***			***Test for normality of residual -*** ***Null hypothesis: error is normally distributed*** ***Test statistic: Chi-square(2) = 12.7319*** ***with p-value = 0.0017191***	***Estimated Chi Sq. value is highly significant. Reject the H_O.***		

The results of the Hausman and Bruesch-Pagan tests indicate that the fixed effect estimator is **consistent and efficient** while the random effect is **inconsistent.** The conclusion is that the fixed effect LSDV parsimonious model is the suitablemodel for DMBs' loan pricing in Nigeria. Therefore,usingresults of the LSDV parsimonious model in table 4.6, we present below theestimatedLSDV modelspecified in equation(3.4)with prime ($PL_{i,t}$) and maximum ($ML_{i,t}$) lending rates for the 'low risk' and 'high risk' markets respectively.

$$PL_{i,t} = 16.9367 - 3.43e06S_{i,t} - 0.0079CR_{i,t} + 0.012CRR_t$$
t = (89.397) (-7.5651)(-2.1870) (4.6131)
p=0.00001 0.00001 0.03086 0.00001

$$-0.27MPR_t + 0.0019ROE_t + 0.119INF_t - 0.057GDP_t \ \ldots\ldots \quad (4.1)$$
(-14.5702)(2.0040) (17.2926) (-4.2390)
0.00001 0.047530.00001 0.00005

$$R^2 = 0.60; \quad Adjusted\, R^2 = 0.54$$
$$F(7,110) = 23.1848; \quad P\ value = F(7,110) > 23.1848) = 4.6148e - 019$$
$$DW = 1.8492$$

$$ML_{i,t} = 21.5278 + 1.2958e07S_{i,t} - 0.0041CR_{i,t} - 0.0111CRR_t$$
t = (24.9629) (0.0556) (-0.7770) (-17.7044)
p = 0.00001 0.95576 0.43882 0.00001

$$+0.37MPR_t - 0.00652ROE_t + 0.0846INF_t - 0.0929GDP_t \ \ldots. \quad (4.2)$$
(7.5591) (-8.9423) (18.4540) (-5.4619)
0.00001 0.00001 0.00001 0.00001

$$R^2 = 0.137; \quad Adjusted\, R^2 = 0.020$$
$$F(7,110) = 2.50784 \quad P\ value = F(7,110) > 2.50784) = 0.0197948$$
$$DW = 0.606999$$

Notes: tratios (in bracket) are reported beneath the coefficients of the explanatory variables while the *p* values are reported under the *t* ratios. The values of 8 other intercepts for the 2 markets can be obtained from table 4.6 under panel 'A' and 'B'

From equations (4.1) and (4.2) above, the determinants of the DMBs pricing of loans are; bank's size, credit risk, cash reserve ratio (CRR), monetary policy rate (MPR), returns on equities (ROE), inflation and real gross domestic product (GDP). In the 'low risk' market, the

estimated values ofR^2 and *adjusted* $R^2$are 0.60 and 0.54 respectively. All the explanatory variables in the model are statistically significant. In addition, the regressors are jointly significant from the F test. And finally, the *DW*test statistic revealed that there is no serial correlation.Therefore, thefixed effect LSDV model is the suitable model for DMBs pricing of loans for the 'low risk' market.

With the above conclusion, it is interesting to compare the performance of the 2 credit markets in the banking industry with different risk profiles (prime lending rate for 'low risk'obligors and maximum lending rate for 'high risk'obligors).In the 'low risk' market, for instance,the pricing of loans model tells us thatwhen bank size (total assets) increases by 1%, the prime lending rate decreases by 3.4e06 units. When there is increased credit risk of an obligor by 1%, prime lending rate decreases by 0.0079 units. Similarly, if the CBN raises the CRR by 1%, the prime lending rate will increase by 0.012units. When the price level (CPI) increases by 1%, the prime lending rate increases by 0.119units and finally, whenthere is increased macroeconomic risk by 1%, prime lending rate will decrease by 0.057.

On the other hand, the pricing of loans model in the 'high risk' market, does notappears to explain the data. The R^2 is extremely low and statistically insignificant. However, 6explanatory variables are statistically significant in the model while the DW statistic shows first order serial correlation of the residual term.

In summary, the estimated LSDV model confirms that DMBs in Nigeria are empirically heterogeneous with9 differential intercepts that are highly significant. These intercepts reflect the banks' differences in risk pricing behavior, managerial style, corporate governance, risk appetite and marketing segmentation in the oligopolistic market. The pricing model, particularly in the 'low risk' market reveals that there is indeed a stable relationship between

banks pricing of loans and a few identifiablevariables in Nigeria, including, for instance, bank size, credit risk, CRR, ROE, inflation and real GDP.

4.4.2. Effects of Pricing of Loans on Assets Quality of Banks and Intermediation.

Underpricing Credit Risk: The objective is to analyze and evaluate the DMBs' pricing of loans on assets quality of banks and financial intermediation**.** In evaluating the DMBs' pricing of loans on assets quality of banks, we focus on the coefficient of credit risk variable in the pricing model. In the econometric model, credit risk is measured by the proportion of NPLs to total loans which is inversely related toassets quality of banks**.** In table 4.6, the values of the coefficient of credit risk variable in panel 'A' and 'B' markets are −0.0079 and −0.0041 respectively. These results reveal that the credit risk variable is not only negative in the two markets, but also statistically significant in the 'low risk' market.According to the theoretical framework of this study, the credit risk variable is positively related to loan pricing, as risk averse banks charge a premium for probability of default in loan and interest repayments. Risk averse banks are also prepared to take additional risk only if it is compensated.

Following this result, we interpret the negative credit risk variable as ***underpricing of credit risk*** by DMBs. Underpricing of credit risk has implications for assets quality of banks and financial intermediation. This is an interesting result in Nigeria where assets quality of banks had successively deteriorated over the last two decades, particularly after bank consolidation in 2009. This result (negative coefficient of credit risk) is consistent with Hesse (2007), Williams (2007), Guiso, *et al.* (2006) and Afolabi, Ogunleye and Bwala (2003). William (2007) interpreted it as *mispricing of credit risk* by Australian banks whereas Hesse (2007) acknowledged the negative sign of the credit risk variable in model for net interest margin for Nigerian banks but was silent on its implications. Afolabi, Ogunleye and Bwala

(2003)explained that insured banks' classifications of loans into performing and NPLs are suspect and not done according to the prudential guidelines. Similarly, Brock and Rojas-Suarez (2000) explained the negative credit risk variable as an attempt by banks to move out of problems of NPLs by charging lower lending rate to increase market share. This interpretation is consistent with our understanding of DMBs in Nigeria.

This result is not surprising for the banking sector in Nigeria. For instance, in the 'low risk' market, it is evident that big ticket obligors are the major loan defaulters and they are known to harbor huge credit risk in their profile. In spite of thehigh credit risk of big ticket obligors and in disregard to risk-based pricing of loans, commercial banks in Nigeria simply recognized big ticket obligors as *prime customers* or *low risk* customers that should fall under the prime lending rate. Therefore, it is not surprising that on 18/08/2009, when the CBN published the list of loan defaulters from fiveailing banks, all the defaulters were large ticket obligors (see Appendix G for the details). This practice assists DMBs retain obligors' patronage to increase their market share in the spirit of relationship banking.

The DMBs*underpricing* of credit risk is the leading cause for deterioration in assets quality of banks over the years. The AMCON's purchase of banks NPLs between 2010 and 2014 temporarily slowed down the rising NPLs of banks to the lowest position, 2.88%.This improved the assets quality of the DMBs but the trend reversed in the mid-2015 and by December 2016 and June 2017, the proportion of NPLs to total loans had escalated to 12.8% and 15.02% respectively, against the CBN threshold limit of 5% (CBN FSR June, 2017). Bloomberg (October, 2006) reported that seven banks were close to insolvencywithUnity bank and Skye bank taking the lead while First bank, Diamond bank, Fidelity and FCMB were among the banks harbouring huge NPLs in the industry as at December 2016. This could lead to another round of bank failures after AMCON intervention.

Table 4.8 below reveals the poor assets quality of banks in the period under reference.

Table 4.8: Assets Quality of Banks (2005 – 2016)

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
TL	1,477	2,081	3,802	6,170	8,955.8	7,166.7	7,273.7	8,150.3	10,042.7	12,629.9	13,328.7	16,293.5
NPLs	357	222	388	462	2,957.8	1,110.1	360.09	282.86	324.13	363.31	649.63	2,084.92
NPL/ T L	24.17	10.67	10.21	7.50	33.0	15.49	4.95	3.47	3.23	2.88	4.87	12.80

Sources: CBN Financial Stability Reports (FSR) (Dec., 2015 and 2016; June 2017*)
CBN Consolidated Banking Supervision Annual Reports (2009 – 2015)
TL = Total loans (N' billion)
NPLs = Non-performing loans (N' billion)
NPL/TL = Non-performing loans/total loans
***The ratio of NPLs to total loans increased to 15.02%**

From table 4.8, it is revealed that assets quality of banks (NPLs over total loans) deteriorated most in 2009 when the proportion of NPLs to total loans increased to 33%. The AMCON's purchase of banks' NPLs improved the ratio down to 4.95% and 2.88% in 2011 and 2014 respectively, but mid-2015, the trend reversed itself as NPLs surged to push the ratio to 12.80% in 2016.

Capital Account Deregulation: The rapid deterioration in assets quality of banks shown in table 4.8 was partly linked to macroeconomic volatilities. Macroeconomic volatilities are captured by the rate of change in real GDP variable in the estimated LSDV parsimonious model which revealed a negative coefficient of −0.057and −0.092in the 'low risk' and 'high risk' markets respectively. This result is contrary to the *a priori* specification and it reflects partly,*under-estimation and underpricing* of macroeconomic risk, or *systemic risk* by the DMBs. In Nigeria, macroeconomic volatilities are linked to capital account deregulation policy. Capital account deregulation policy allows capital to flow free between countries, leading to *capital surge* and *capital withdrawal*which contributed to poor assets quality of banks.The source of this fluctuation is policy contradiction articulated by Mundell-Fleming Model (Fleming, 1962; Mundell, 1963). The M F theory postulated an important *static*

general equilibrium theory that portrays the short-run relationship between nominal exchange rate, interest rate, and output in a small open economy. Specifically, the M-F theory analyzes the role of macroeconomic policies (monetary and fiscal policies) in the context of a small open economy. The model usingIS-LM-BOP framework predicts that macroeconomic policy choices in open economies are constrained by the trilemma; that an economy cannot simultaneously maintain 3 desirable but contradictory macroeconomic objectives; a fixed exchange rate, free capital movement, and an independent monetary policy.

In Nigeria, the CBN pursues the 3 basic macroeconomic policy objectives simultaneously, contrary to Mundell-Fleming (1963). First, the CBN maintains an independent monetary policy committee (MPC). Secondly, the CBN pursues exchange rate stability objective (by maintaining 2 markets to keep the naira exchange rate stable: a pre-determined band of N305 -306 to US D for some official transactions; and the Nafex rate (interbank for investors and exporters, called I & E window) currently at N362 -365 to US D. These rates are being managed with regular CBN interventions in the NAFEX). And, thirdly, the capital account deregulation policy which opened up the NSE and money markets for foreign investors. The parallel market also exists.

The most important component of capital inflows that causes fluctuations in GDP is the *portfolio inflows (hot money).* The size of the inflow is determined by monetary policy stance. For instance, an increase in MPR (monetary tightening) can attract capital inflows by way of short term, portfolio investments in capital and debt markets and this leads to ***capital surge***and ***capital withdrawal***. These swings create assets price bubble and burst which affect assets quality of banks. Capital withdrawal affects assets quality from 2 perspectives**: Spillover effects of equity market risk on credit risk in banks' balance sheet and impact of currency depreciation on credit risk and bank insolvency.**

First, the spillover effects of equity market risk: This is explained from the CBN monetary tightening from 2010 to 2013. The CBN increased the MPR by 100%, from 6.5% to 13% between 2010 and 2013 when the US Federal Reserve Bank (FED) pursued accommodative monetary policy with its short term rate at 0%. At the same time, the Bank of England (BOE) and European Central Bank (UCB) pegged their rates at 0.5% and 0.05% respectively in response to the global financial crisis. These developments attracted *hot money* inflows to Nigeria, leading to *capital surge.*

Capital Surge: The impact of the monetary tightening and exchange rate stability policy of the CBN attracted huge capital inflows particularly for short term portfolio investment, 'hot money' which increased from net outflow of $-953.7 million in 2008 (following the global financial crisis) to an all-time high net inflows of $10 billion in 2012. Figure 4.1 below shows the portfolio equity capital surge from 2010 to 2012.

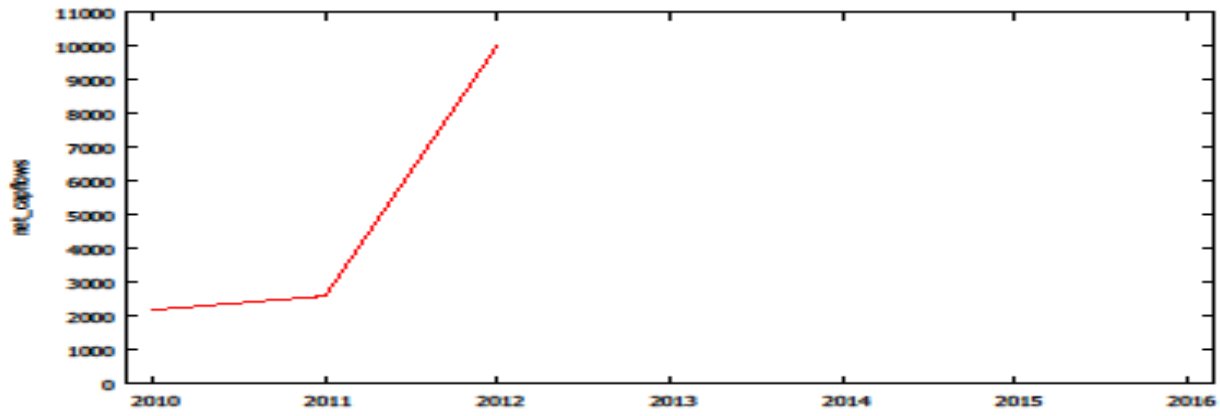


Fig. 4.1: Portfolio capital surge

The surge in portfolio equity investment capital by foreign investors particularly in favour of banks stocks increased liquidity and the share price of the banking stocks which led to appreciation of the Bank Share Index (BKSI) by 61% from 272.86 in December 2011 to 439.03 in May, 2013 to support the booming market.

Capital Reversal: Significant crash in bank share prices (burst) directly leads to a risein NPLs in margin loans as well as all loans (irrespective of the sector) secured by banks shareholding. This leads to poor assets quality of banks. The domestic security challenges particularly in the South-South and North East geo-political zones became tensed from 2012. And, developments in the external sector revealed a sharp drop in the price of crude oil at the international oil market from $114.49 per barrel in December, 2012 to $37.80 per barrel in December, 2015. Furthermore,in the last quarter of 2015, the US FED monetary policy committee decision increased short term interest rate from 0% to 0.25%, with the BOE and UCB maintaining their short-term interest rates at 0.5% and 0.05 % respectively. These domestic and external volatilities increased uncertainty and market risk significantly rose to the extent that foreign investors felt unsafe and tilted their decision in favour of divesting their stake in the NSE to safer and more lucrative markets in the USA, Britain and Europe. This led to net outflow of portfolio equity capital totaling $-486.6 million! in 2015.

This downward slope in net equity flows shown in figure 4.2 below was accompanied with demand for foreign exchange that put pressure on the naira which depreciated consistently in the FOREX, in the wake of weak foreign exchange inflows from oil.

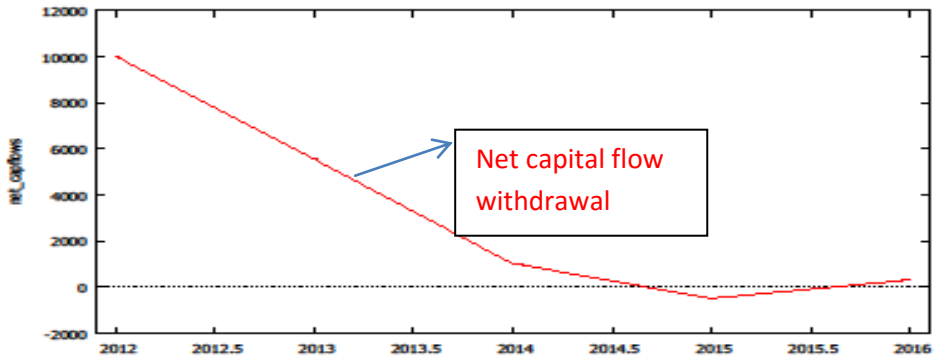


Fig. 4.2: Portfolio Equity Net Inflows Reversal

The swing also led to the sharp but gradual drop in stocks prices in the NSE particularly, the banking stocks which decreased the BKSI by 51% from 439.03 in May, 2013 to 215.47 in

March, 2016. These valuation swings (capital surge and withdrawal) aptly describe the boom-bust cycle character of the BKSI in the period under reference. Figure 4.3 below shows the boom- burst trend of the BKSI graphically.

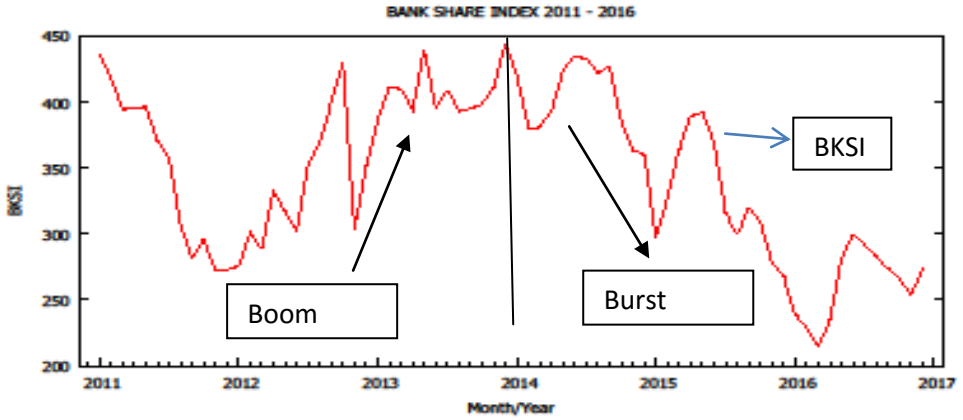


Fig. 4.3. Boom-Burst Cycle Trend in BKSI

The volatilities of the short term capital flows (portfolio equity inflows), the sharp drop in crude oil prices and quantity, as well as speculative attacks in the FOREX led to massive depreciation of the naira exchange rate in the FOREX market (N 455.26 =$ @ BDC rate as at December, 2016). This, in turn, caused serious inflation in the import dependent economy (all items year on year 18.55% as at December 2016) and eventually economic recession (-1.51% decline in real GDP for the year 2016). These developments which compelled the CBN in 2016 to deregulate FOREX market initially, impacted negatively on assets quality of banks and financial intermediation as attested by the rise in NPLs from N282.86 billion in 2012 to N2.1trillion in 2016! This represents a rise in NPLs from 5% CBN regulatory threshold to 12.88% as at December, 2016.

In summary, there is a link between portfolio equity net inflows and the rising trend in NPLs from 2014 to 2016. The surge in portfolio equity net inflows created bullish trading in the market that led to a boom in the banking sub sector. The NSE BKSI increased significantly as banks share prices appreciated well between 2012 and 2014. When foreign investors divested

their interest following some internal and external shocks, the market experienced a burst and prices of banks shares crashed, leading to massive default in margin loans as well as banks loans that are secured by bank share certificates.

Figure 4.4 below reveals the sharp decline in NPLs due to AMCONs intervention up to 2014. From 2014 to 2016, NPLs have risen phenomenally. This rapid increase in NPLs was always preceded by **portfolio equity net outflows(first in 2008 when net outflow was $-959.8million and in 2015 when net outflow was $- 476.6 million)** as revealed by table 4.9. Figure 4.5 below illustrates the graphical relationship between equity net inflows and the rise in NPLs.

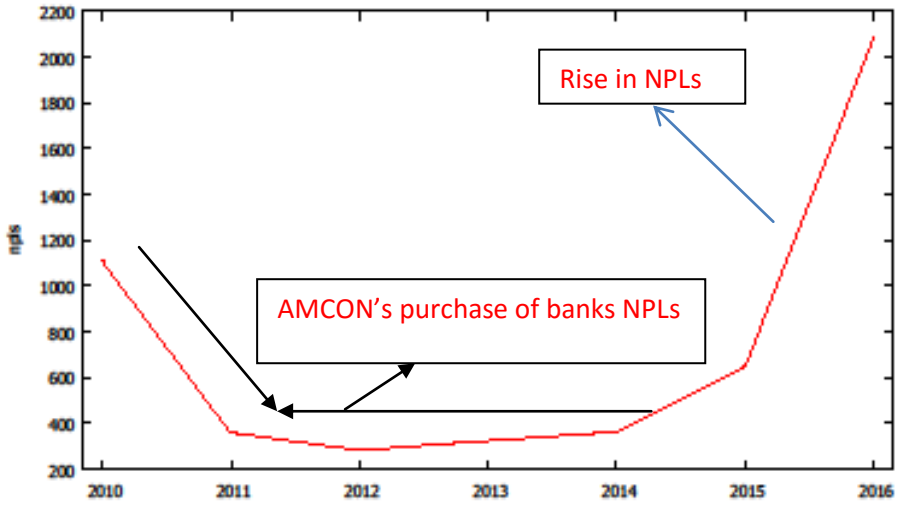


Fig. 4.4. Rise in NPLs

Table 4.9: Equity Net Inflows and Rise in NPLs (2005 – 2016)

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Equity Net Inflows ($M)	750,000	1,785.00	1,459	**(959.8)**	492.67	2,179.28	2,592.28	10,039.98	5,577.41	1,044.96	**(476.62)**	325.13
NPLs (N M)	375,000	222,000	388,000	462,000	2,957,800	1,110,100	360,090	282,860	324,130	363,310	649,630	2,084,920

Sources: CBN Bulletins (2016); CBN Financial Stability Reports (Dec., 2015 and 2016)

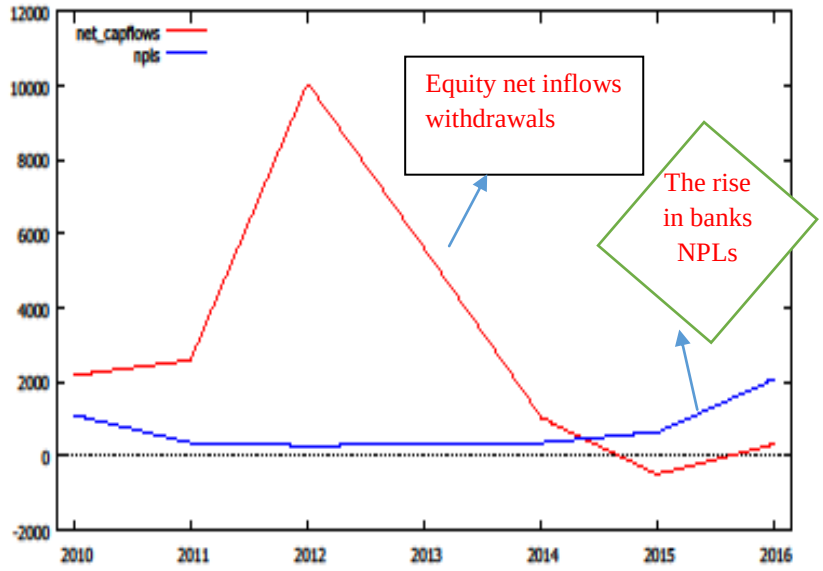


Fig. 4.5: Portfolio Equity Net inflows and Rise in NPLs (2010 – 2016)

Secondly, the impact of currency depreciation on credit risk and bank insolvency: The second link between capital account deregulation and poor assets quality of banks in Nigeria is through *currency depreciation*. The primary impact of *portfolio capital withdrawal* is on *currency depreciation*. Domestic currency depreciation affects banks directly in two ways: private domestic loans denominated in foreign currency and banks foreign borrowing. When currency depreciates, domestic loans denominated in foreign currencyare extremely difficult to repay because more domestic currency is needed to repay the loan. This increases credit risk and defaults leading to deterioration in assets quality of banks. Currency depreciation also makes banks repayment of foreign loans difficult as banks have to raise more domestic currency in their balance sheet to repaythe foreign loans in foreign exchange. This affects banks' balance sheet and can lead to insolvency. From these two ways, there is evidence that the depreciation of the naira as a results of*capital withdrawal* as well as the CBN's introduction of flexible exchange rate have affected banks that utilized foreign loans and bonds. For example, Bloomberg (2016), reported that seven banks were*undercapitalized* because of this problem.

In summary, less-developed countries (like Nigeria) that liberalized their capital accounts are prone to banking instability due to short-term portfolio inflows which cause*capital surge* and capital *reversal*,leading to poor assets quality of banks.

Our analysis reveals that the DMBs'***underpricing of credit risk*** and ***capital account deregulationpolicy***are the two major causes of poor assets quality of banks in Nigeria.Poor assets quality of banksled to high cost of banks restructuring and bank failures in Nigeria. For instance, between 1986 and 2004, 37 banks failed and CBN revoked their licenses. The losses incurred by depositors and shareholders have adverse consequences on consumption and investment through *wealth effect*.When failed banks were rescued by the CBN in 2009, there were high cost of bank rescue operations in Nigeria. For instance, after consolidation of banks, the CBN spent N620 billion to bail out six'problem banks'that were characterized by poor assets quality. Apart from the fact that the CBNrescued banks were finally taken over by other banks in the system(see Appendix C), there is the issue of AMCON's purchase of NPLs which engulfed an estimated cost of N3 trillion. Significant part of this amount is still outstanding in AMCON's balance sheet as at 2016. This has implications for the Nigerian economy which stakeholders are yet to understand. Table 4.10 depicts history of bank distress and failures in Nigeria since independence.

Table 4.10: Analysis of Bank Failures and Distress in Nigeria (1952 – 2016).

Phases of Banking Sector Reform	*Banks Taken Over (Failed/)/Liquidated)*	*Total No. of Banks*
(1952 -1959): Unregulated(free banking)	21	25
(1960- 1985): Regulated period with government Indigenization Policy	-	28
*(1986- 1998): Deregulation and re-regulation period**	32	54
(1999–2004): Return of liberalization in full with Universal Banking Model	5	89
(2005–2016):Consolidation/Repeal of Universal Banking Model	29 ** 6***	23
Total	**93**	

Sources: CBN Bulletins 2015, NDIC Annual Reports (various issues); NDIC (2015) Closed Financial Institution.
**Re-regulation was a temporary control in interest and credit when bank distress was more pronounced in Nigeria. In this case, re-regulation is used specially to mean reversal of deregulation policy.*
*** 14 banks out of 29 failed as CBN revoked their licenses as a result of consolidation.*
**** 6 banks failed in 2011after the consolidation*

From table 4.10, it is evident that there were widespread bank failures in Nigeria. This trend is likely to continue if it is not addressed. For instance, a number of banks had serious problem of rising NPLs which deteriorated their assets quality in thelast quarter of 2016. In addition, the CBN in June, 2016 took over the Skye bank and appointed new management team to address the rising level of NPLs and poor assets quality of the bank.

With poor assets quality of banks looming high, financial intermediation in Nigeria has not been effectively achieved. Financial *disintermediation and invertedintermediation* in Nigeria are some of the major problems militating against adequate flow of resources from DMBs to the productive sectors of the economy for economic growth. In analyzing *financial disintermediation*, it is obvious that the rate of interest on savings has been very low and sticky to attract domestic savings over the years, contradicting the Mackinnon–Shaw (1973).For instance, analysis of interest rate spreads over the years shows that the average deposit rate has remained very low and unattractive for domestic savings. Table 4.11 below illustrates the trend.

Table 4.11: Interest Rates Behaviour 2000 – 2016

Interest Rates	2000	2004	2009	2010	2011	2012	2013	2014	2015	2016
MRR*MPR(from 2006)	13.5	15	7.44	6.13	9.19	12	12	13	11	14
Av. Deposit Rate	10.60	13.69	12.96	6.52	5.69	8.40	7.94	9.34	9.15	8.80
Av. Lending rate	21.55	20.82	22.62	22.51	22.42	24.68	24.94	25.80	26.71	27.29
Interest Spread	10.95	7.13	9.66	15.99	16.73	16.28	17	16.46	17.56	18.49

Sources: CBN Bulletins (various issues)
****MRR is minimum rediscount rate (before 2006)***

In analyzing *inverted intermediation*, we focus on the ratio of banks loans to total banks deposits as the traditional measure of financial intermediation. Table 4.12 below reveals the low level of financial intermediation over the years. For instance, between 2011 and 2013, the average level of intermediation was 42.77%, against the CBN standing target of 80%. In the last three years (from 2014 to 2016), the average level of intermediation was 68.79% which is also below the CBN target. A critical argument on level of financial intermediation reveals that the ratio has an element of *inverted intermediation* hidden as loans and advances are not entirely used up for productive activities like production in the sectors of the economy.

Table 4.12: Ratio of Banks Loans and Advances to Total Deposits (2005 – 2016)

Period	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
L/D	70.8	63.6	70.8	80.9	85.7	74.2	44.8	45.5	38.0	61.88	68.55	75.95

Source: CBN Bulletins 2016; CBN FSR, Dec., 2016
L /D = Total loans over total deposits.

From table 4.12, financial intermediation, measured by total loans and advances to private sector over total deposits was at its lowest ebb in 2013 when the proportion was 38%, against the CBN regulatory target of 80%.A large chunk of the total loans to the private sector was used for speculative trading in secondary shares in the capital market by beneficiaries of margin loans.A critical analysis of margin lending shows that there is no intermediation in it, since the investment only changed hands and no new investment takes place.Also, a large quantity of savings mobilized by the DMBs is recycled within the financial sector by the banks through speculative trading in foreign exchange market and sometimes deposits at the CBN standing deposit facility (SDF) window to get attractive CBN interest income. Again, there is no intermediation in this. These practices by banks and other market participants tend

to*disconnect* the financial sector from the real sector, reversing financial intermediation to *inverted intermediation.*

In conclusion, it is clearly analyzedusingthe estimated pricing of loansmodel that DMBs *underprice credit risk* which led to significant rise in banks NPLs. It is also illustrated that *capital account deregulation* policy led to *capital surge* and *capital withdrawal* which caused volatilities (boom and bust) in NSE,particularly the banking share prices and banking share index which increased the level of banks NPLs. The impact of these two developments significantly affected the assets quality of bankswhich deteriorated and led to banking crises and failures over the last two decades. This contributed to poor level offinancial intermediation of the DMBs for economic growth.

4.4.3. Effects of Bank Consolidation on Assets Quality of Banks and Intermediation.

Bank Consolidation through recapitalization and mergers and acquisition implies increase in banks' operations and capacity to undertake large ticket lending.*Size* is the proxy of consolidation in the fixed effect LSDV model. It is measured by the total assets of banks in the balance sheet. Consolidation implies recapitalization of banks to a minimum capital base of N25 billion. This increases the size of banks to finance loans and other investments. Theoretically,bank consolidation follows a parallel line of reasoning in the *a priori* specification (Gambacorta 2004).

First, negative coefficient: According to this reasoning, banks that increase their capital are less likely to go bankrupt, and are more creditworthy. They enjoy economies of large scale in provision of products and services.The sense of security they provide their customers enables them to source funds at a lower rate relative to their lending rate. In a competitive banking environment, this makes them efficient to charge lower lending rate. In this way

consolidation leads to efficiency and a negative sign on the *size* variable means that consolidation led to a reduction in the lending rate.

Second, positive coefficient: In this reasoning, it is possible for big banks (highly capitalized banks) to form monopoly and charge higher lending rate for their loans, where competitive pricing is not in place. Therefore, a positive coefficient of the *size*variable means higher lending rate for banks consolidation.

Bank consolidation in Nigeria brought about changes in the size, structure and operational characteristics of the Nigerian banking system. For instance, the total assets of commercial banks grew from N3.75 trillion in December, 2004 (before consolidation) to N7.18 trillion in 2006 and by 2008, it had increased by more than 100% to N15.92 trillion and subsequently N27.48 trillion in 2014. This rapid increase in banks' assets supported by competition among banks led to decline in banks' prime and maximum lending rates.

Results from our fixed effect LSDV parsimonious model reveal a highly significant negative coefficient of the *size* variable taking the values of −3.4337e06 and1.29586e-07in the 'low risk and 'high risk' markets respectively, suggesting that bank consolidation in Nigeria has led to reduction in the pricing of loans. This is expected to influence investment and GDP positively.

However, the excessive growth in banks assets between 2006 and 2008 reflects the explosive growth in credit in the banking system (Garba 2014; Radwan 2010). It increased the risk taking by DMBs and an unprecedented leverage in the system which resulted in banking boom leading to the growth in speculative financial bubbles characterized by rapid increase in assets prices, particularly the stock prices. The explosive growth in credit accelerated the actual growth rates of money supply against the targets in M_1 (narrow money), M_2 (broad money) as well as net domestic credit between April, 2007 and December, 2008. These

explosive growth in credit, M_1 and M_2 were unprecedented, dangerous and causal to the Nigerian financial crisis that became very obvious in March 2008. In March 2008, the NSE Share index and market capitalization collapsed, marking the beginning of the Nigerian financial crisis that precipitated the collapse of six banks.Figure 4.6 shows volatilities in M_1, M_2 which are connected to the excessive rise in net domestic credit.

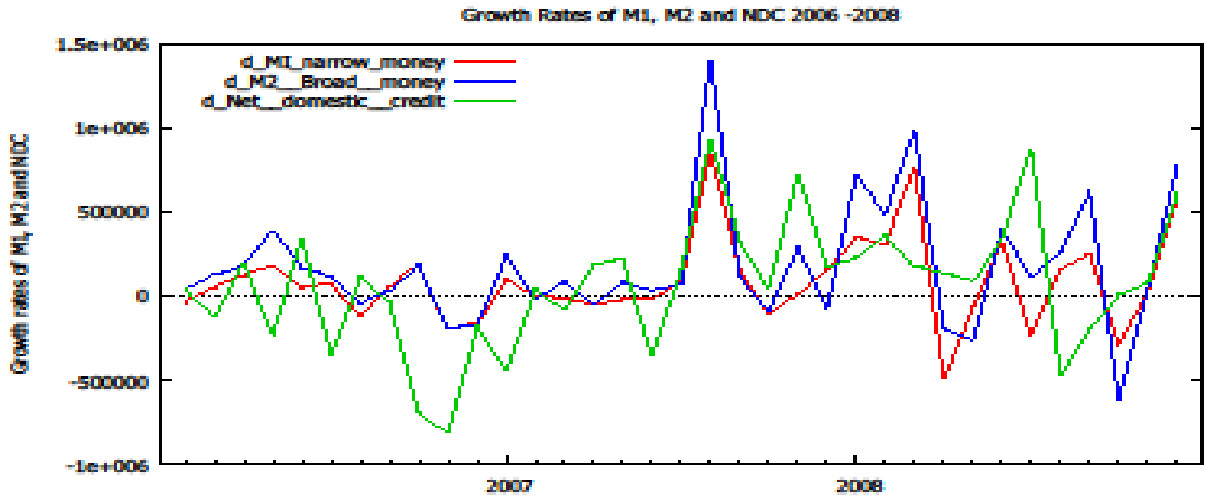


Fig. 4.6: Excessive Growth Rates in M_1, M_2 and Net Domestic Credit (NDC)

In the Nigerian Stock Exchange (NSE), All Market Share Index (ASI), the Bank Share Index (BKSI) and Market Capitalization (MKT CAP) sharply increased with the boom and when the bubble busted during the global financial crisis, the ASI collapsed by 70% in 2009 with the size of NPLs to the capital market and downstream oil and gas approaching N1.6 trillion (Sanusi 2012; 2010). These developments are depicted in figure 4.7 below, showing volatilities through boom and bust cycle in the NSE.

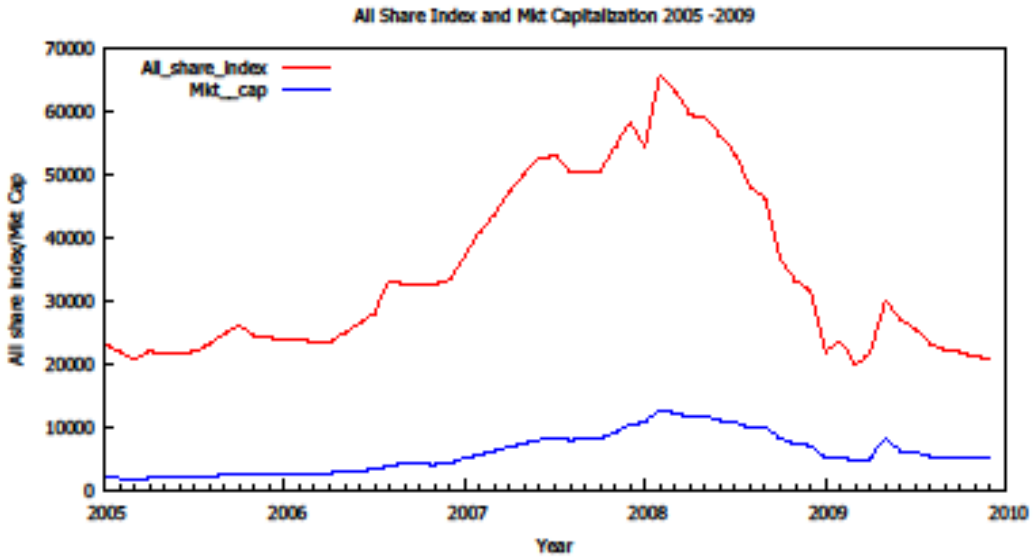


Fig. 4.7: NSE All Market Share Index and Market Capitalization.

In summary, our analysis reveals that the effect of consolidation on assets quality of banks and financial intermediation is twofold. First, bank consolidation in Nigeria had increased banks efficiency by reducing the cost of lending as shown by the *negative* and statistically significant coefficient of the *size* variable in the LSDV parsimonious model. This is expected to accelerate investment and economic growth, given the inverse relationship between interest rate and investment. Second, bank consolidation increased liquidity in the Nigerian banking system which led to excessive growth in banks credit, money supply (M_I and $M_{2)}$ and excessive risk taking by banks. The excess liquidity in the system led to speculative buying in the booming capital market,resulting to assets price bubble. When the bubble collapsed, it caused massive decline in prices of banking stocks and banking share index (BSI). This led to significant rise in the NPLs, particularly margin loans. The ultimate impact of consolidation was massive deterioration in the assets quality of banks which contributed to the collapse of some six banks in 2009 and many other banks in distress condition.

CHAPTER 5

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings

This studyfocused on 3 keyresearch objectives on the Nigerian banking sector in the context of *financial liberalization* reform for economic growth.The first objectiveisto analyze the determinants of DMBs' pricing of loans by estimating commercial banks' models for pricing of loans in the *liberalized* banking system. The second objective is theeffect of banks' pricing of loanson their assets quality as well as financial intermediation. This is important because as poor assets quality of banks rises, financial *disintermediation* and *inverted intermediation* trend high among the DMBs especially in the aftermath of the *financial liberalization* reforms. The third objective isthe effect of bank consolidation on assets quality of banks and financial intermediation.

The estimated fixed effect LSDV parsimonious model presented in table 4.6 illustrates clearly the various empirically important factors to the DMBsin pricing their loans in Nigeria. These different banks, however, share some common slope parameters, in line with the theoretical expectations as specifiedin the fixed effect LSDV model. The empirically important explanatory variables of the model are: *bank size, credit risk, cash reserve ratio, return on equity, inflation and real GDP*. These explanatory variablesexplained 60% movements in the prime lending rate and 0.4% in that of the maximum lending rate. The implication of thisfinding is that the DMBs across the banking industry in Nigeria are indeed heterogeneous in their loan pricing behavior and this is consistent with the literature of oligopolistic market structure.

The study also assessed theestimated banks' pricing of loans model in the twocredit markets:'low risk'market and 'highrisk' market(represented by prime and maximum lending

ratesrespectively) and found the coefficient of credit risk to be negative. This contradicts the theoretical expectation of the model, which prescribes a positive coefficient for credit risk, implying that the within each market, the greater the risk of an individual borrower, the higher the interest rate he is charged. The negative coefficient of credit risk found here implies that for a given level of borrower default risk, DMBs charge a lower default risk premium, thereby *underpricing* credit risk. This result is consistent with Afolabi, Ogunleye and Bwala (2003); Guiso, *et al.* (2006); Hesse (2007) and Williams (2007).This is the most interesting finding of this study because banks'*underpricing* of borrowers' credit risk not only contradicted the risk-based pricing but also ledto the rise in NPLs and deterioration of assets quality of banks.

The study alsofound ***capital account deregulation***fundamentally responsible for the poor assets quality of banks and bank failures in Nigeria over the period under reference.The *underpricing* of credit risk by the DMBs and the impact of capital accounts deregulation policy on assets of banks haveimportant implications on poor level of banks intermediation for economic growth. First, with the persistence of poor assets quality of banks, financial intermediation in Nigeria has not been effectively achieved. Financial *disintermediation and invertedintermediation* in Nigeria are the major problems militating against adequate flow of resources from DMBs to the productive sectors of the economy for economic growth. For example, it is obvious that the rate of interest on savings has been very low and sticky to attract domestic savings over years as revealed in table 4.11. Secondly,the persistent bank failures illustrated in table 4.10led to closure of 43banks after the interest deregulation policy of 1986,with loses incurred by depositors and shareholders. The bank failures disrupted the flow of credits to households and businesses, reducing consumption and investment which are the major components of aggregate demand.

Finally, the study assessed the effects of consolidation on assets quality of banks and intermediation. Theeffects of consolidation on the banking sector and the economy are twofold. First, bank consolidation in Nigeria had reduced the cost of lending as shown by the negative and *statistically significant coefficient of the size variable* in the LSDV parsimonious model. Second, consolidation increased liquidity in the banking system which led to unprecedented growth in bank credit, money supply and risk taking by banks. These developments increased speculative buying in the booming capital market, leading to assets price bubble. When the bubble collapsed, it caused massive decline in prices of banking stocks and banking share index (BSI). This led to significant rise in the NPLs, particularly margin loans. The ultimate impact of consolidation was massive deterioration in assets quality of banks which contributed to the collapse of 6 DMBs.

Our analysis revealed that consolidation led to deterioration of assets quality of banks which contributed to the collapse of 6 banks (see list at Appendix C) with high cost of rescue operations and restructuring through the CBN bailout package of N620 billion to 'ailing banks' as well as the cost of AMCON initial purchase of NPLs conservatively put at N3 trillion. This finding is consistent withRadwan (2010) and Garba (2014).

5.2Conclusion

*Financial Liberalization*has led to *excessive bank competition,*massive financial inflows, particularly the *unstable portfolio inflows* which increased liquidity and risk taking among banks, leading to *mispricing* of credit risk which *has adverse consequences for assets/loan quality of banks that deteriorated and successively led to bank failures, high cost of banks rescue operations and restructuring and low level of bank intermediation for economic growth in Nigeria*. This conclusion is consistent with (Kaminsky and Reinhart,1999; Demirgüç-Kunt and Detragiache,1998; 2001; Garba and Garba 2002;Williams 2007).

Financial liberalization reforms brought about technological development resulting to products innovations in the banking industry across the world in the 2 decades. In developed financial system like the U S, new derivative products like collateralized debt obligations (CDOs) were developed. In liberalized developing economy like Nigeria, *financial liberalization* led to the introduction of new electronic banking products and fee-based services like; collection and remittances of taxes and revenue for the different layers of government: federal, states and local. For instance, from 2005 to 2016, the DMBs earned N59.84 billion commission and fees for collection of N39.8 trillion taxes for Federal Inland Revenue Service (FIRS) for the federal government consolidated and VAT accounts. Similarly, banks collection of customs and excise duties as well as states IGR fetched the banks huge commission and fees that enhanced their non-interest income. These non-traditional products led to massive growth in banks non-interest income compared to net interest income from loans as depicted below.

Year	***Growth rate 2002-2004***	***Growth rate 2005-2006***	***Growth rate 2012-2013***
Net Interest Income (N' billion)	2.80%	5.70%	17%
Non- Interest Income (N' billion)	55.90%	7.50%	51.70%

Consequently, the DMBs were able to support their lost interest income (as a result of *underpricing* of loans) from the new non-interest income (fee-based) which was rising in importance.

5.3 Recommendations:

Given the above findings, the following recommendations are made.

5.3.1 Micro-prudential Regulations for Micro-prudential Stability:

With *underpricing of credit risk* variable at the individual bank's level, there is need to improve regulatory and legal framework including strengthening regulatory agencies to ensure that the risk-based pricing model is adopted by all DMBs without compromise. This means that banks should be compelled to assess and price borrower's credit risk in line with the Basel Accords.The BIS recommended central banksgloballyto focus on banks under them to take an active part in credit risk management for micro-prudential stability. At the same time, there is need for review and increased regulations to match the level of competition present in banks' pricing of credit risk. The inadequacy and non-adherence to the risk-based pricing by banks in Nigeria has exposed the danger of weak supervision of CBN against the best practices.

There are two ways the regulatory authorities could address this infraction. Credit risk models in banks must be up-dated with risk interaction parameters to capture market risk that has spillover effect on borrowers' credit risk at the bank's level. After addressing this, CBN must ensure that on-site supervision goes deep in banks' books to detect whether borrowers' credit risk is estimated and priced appropriately. Specifically, the CBN is recommended to review DMBs pricing of loans, particularly to blue chip obligors, where we suspect the shoddy practice of *underpricing* credit risk takes place. CBN should also regulate and impose credit limits to sectors of the economy, especially margin loans and oil gas sectors, to check against risk of concentration which has become a problem in the Nigerian banking sector. Addressing this problem will enable banks to play well, their traditional function of intermediation.

5.3.2 Need for Increased Macro-prudential Regulations for Macro-prudential Stability:

With the negative sign of real GDP macroeconomic variable in the model, attention should be focused on the role of *systemic risk (arising from market risk: foreign exchange risk, equity price risk)* at the macro economy. Macroeconomic instability implies spread of structural risk

or contagion risk to the banking system as a whole. Regulatory authorities must address how to mitigate the market risk which plays an important role in obligors' defaults on loan repayment which increases NPLs, bank failures and poor level of bank intermediation.

With implementation of the above recommendations, the problems of poor assets quality and bank intermediation will disappear from the Nigerian banking sector. However, because risk in banking is not static, review of policies and monitoring must be on continuous basis and most importantly, it must be forward looking.

5.3.3 Regulating Equity Capital Flows:

This recommendation is focused on the need to address equity capital flows from the perspective of *capital control debate (given monetary policy independence).* This is implied because, the NSE is still a shallow market, speculative trading by domestic and foreign investors with short term profit making motive can destroy the NSE through capital surge and withdrawal. Evidence had emerged from East Asian countries in 1997-98 and in Nigeria in 2009 and 2015 (shown in chapter 4) that free capital flows had laid the foundation for the collapse of some 6 banks and the next round of banks failures looms high with the current level of NPLs in some Nigerian banks.

Given this background, it is strongly recommended that capital account deregulation policy should be reviewed (at least, in the short and medium terms) to check the NSE trading, money and debts markets as well as impose some taxes and levies that can check volatilities in short term portfolio investment and foreign exchange remittances. This is a macro-prudential regulation policy recommendation for stability of the financial system as a whole.

5.3.4 Future Research:

Interactivity and non-additivity of risk: Credit risk is the most important risk in banks' pricing of loans. One of the assumptions of the pricing of loans model is that credit risk is

correctly assessed by banks. From the review of theoretical and empirical literature in Chapter 2, there is compelling evidence that credit risk assessment modelingmay have been compromised. Following this, there is the need to review the risk-based pricing modeling, particularly in respect of the statistical procedures for assessment and estimation of borrowers' credit risk at the individual bank's level. The history of development of risk assessment models is associated with separate observation and assessment of the most important financial risks, without considering their affiliations and interactivity**(**Jović 2016). Similarly, BCBS (2009) submits that for a number of reasons, both historical and practical, market and credit risk, and indeed, other financial risks have often been treated as if they are unrelated sources of risk because the risk types have been measured separately and managed separately. Risk assessment models, models for the assessment of credit risk are separated from models for the assessment of market and operational risks. For instance, market risk (foreign exchange risk and equity price risk) from the capital market has spillover effect on credit risk. The challenge here is to have a general theoretical framework that connects all risk types in a way that borrowers' credit risk can be captured and assessed in totality for appropriate pricing of loans at the bank's level**.**

This study recommends for future research, a study on the link between equity capital flows (*capital surge and reversal)* and assets quality of banks in Nigeria, using vector auto regressive (VAR) technique.

This study expands the frontier of knowledge threefold:

First, it presents an up-to-date analysis of the determinants of DMBs pricing of loans in Nigeria and also confirms that commercial banks in Nigeria are heterogeneous in loan price setting behavior, marketing strategy, managerial style, which is consistent with the literature on oligopoly market structure. Second, and the major contribution of this study to knowledge

is the finding that the DMBs *underpricecredit risk* to 'buy' market share, in response to stiff competition provoked by *financial liberalization* reforms that started in 1986. This finding traces the fundamental problems of the banking sector in Nigeria (poor assets quality of banks, bank failures and poor level of bank financial intermediation) to *underpricing of credit risk* at the individual bank's level, and the macro economy through macroeconomic instability caused by portfolio capital flows. The third contribution to knowledge is the use of 'emerging framework' in assessing assets quality of banks and financial intermediation.

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APPENDICES

APPENDIX A:

(i) Risk Scoring System

Table 1: Template for Risk Scoring

	Quantitative Analysis		*Qualitative Analysis*	
	Criteria	weight	Criteria	weight
	Revenue	35 %	Management Quality	20%
	Leverage	20 %	Credit History	20%
	Coverage	25%	Industry attractiveness	20%
	Profitability	20%	Competitive position	20%
			Operating Environment	20%
Total Scores		100%		100%
Weight Overall scores		60%	100%	40%

Source: The author

(ii) Risk Rating System

Table 2: Chart Showing How Risk Scores Graduate to Effective Lending Rate

Item	Tier 1	Tier 2	Tier 3	Tier 4	Tier 5	Tier 6	Tier 7	Tier 8	Tier 9	Tier 10
Overall score	> 85	75<85	65<75	50<65	40<50	30<40	25<30	20<25	15<20	<15
Risk rating Explanation	1 (extremely. low risk)	2 (very low risk)	3 (low risk)	4 (acceptable risk)	5 (mod. high risk	6 (high risk)	7 (very high risk)	8 Extremely . high risk)	9 (high default	10 (Same as 9)
Interest rate applicable	PLR*	PLR+1	PLR+2	PLR+3	PLR+4	PLR+5	PLR+6	PLR+7	PLR+7	PLR+7
Typical Bank rating	Superior	Strong	Good	Satisfactory	Acceptable	Bankable with care	Sub standard	Doubtful	Lost	Lost
CBN rating	AAA	AA	A	BBB	BB	B	CCC	CC	C	C

Sources: CBN Risk Rating framework & Author's computations.

* Prime lending rate

Notes: Internal rating systems across banks differ considerably. The number of grades and the risk associated with each grade vary across banks because differences exist in who assigns ratings and how rating assignments are reviewed. The credit rating usually has 6 to 10 different ranks.

APPENDIX B:

The acronym CAMELS stand for the following factors that examiners use to rate bank institutions:

Capital Adequacy

Examiners assess institutions' capital adequacy through capital trend analysis. Examiners also check if institutions comply with regulations pertaining to risk-based net worth requirement. To get a high capital adequacy rating, institutions must also comply with interest and dividend rules and practices. Other factors involved in rating and assessing an institution's capital adequacy are its growth plans, economic environment, ability to control risk, and loan and investment concentrations.

Asset Quality

Asset quality covers an institutional loan's quality which reflects the earnings of the institution. Assessing asset quality involves rating investment risk factors that the company may face and comparing them to the company's capital earnings. This shows the stability of the company when faced with particular risks. Examiners also check how companies are affected by fair market value of investments when mirrored with the company's book value of investments. Lastly, asset quality is reflected by the efficiency of an institution's investment policies and practices.

Management

Management assessment determines whether an institution is able to properly react to financial stress. This component rating is reflected by the management's capability to point out, measure, look after, and control risks of the institution's daily activities. It covers the management's ability to ensure the safe operation of the institution as they comply with the necessary and applicable internal and external regulations.

Earnings

An institution's ability to create appropriate returns to be able to expand, retain competitiveness, and add capital is a key factor in rating its continued viability. Examiners determine this by assessing the company's growth, stability, valuation allowances, net interest margin, net worth level and the quality of the company's existing assets.

Liquidity

To assess a company's liquidity, examiners look at interest rate risk sensitivity, availability of assets which can easily be converted to cash, dependence on short-term volatile financial resources and ALM technical competence.

Sensitivity

Sensitivity covers how particular risk exposures can affect institutions. Examiners assess an institution's sensitivity to market risk by monitoring the management of credit concentrations. In this way, examiners are able to see how lending to specific industries affect an institution. These loans include agricultural lending, medical lending, credit card lending, and energy sector lending. Exposure to foreign exchange, commodities, equities and derivatives are also included in rating the sensitivity of a company to market risk.

APPENDIX C:

Table 3: List of Failed Banks in 2009.

S/N	Failed Banks	Bridge Banks/Taking over Banks
1	Afribank	Mainstreet Bank
2	Bank PHB	Keystone Bank
3	Spring Bank	Enterprise Bank
4	Fin Bank	First City Monument Bank
5	Intercontinental Bank	Access Bank
6	Oceanic Bank	Ecobank

Sources: CBN Annual reports (various issues)

APPENDIX D:

Risk in Banking

The major sources of banking risks are classified into 6 categories: operational risk, credit risk, interest rate risk, foreign exchange risk, liquidity risk and market risk

Operational risk
This is the risk to the bank that errors made in the course of conducting its business will result in losses. The Federal Reserve calls this operational risk and states in its definition that operational risk arises from the potential that inadequate information systems, operational problems, breaches in internal controls, fraud, or unforeseen catastrophes will result in unexpected losses.

Credit risk
The risk to earnings or capital from the potential that a borrower or counterparty will fail to perform on an obligation. Usually, but not always, the obligation in question is a requirement to make interest or principal payments. Sometimes called default risk, the failure to make required payments reduces the value of equity securities, debt securities, and loans. In the extreme, credit defaults eliminate all or almost all of the value in loans or securities. Adverse consequences from credit risk are not restricted to default, the ultimate manifestation of credit risk. In addition, asset owners can suffer from reductions in value resulting from either real or perceived declines in the obligor's financial strength.

Interest rate risk (IRR)
The potential that changes in market rates of interest will reduce earnings and/or capital. The risk that changes in prevailing interest rates will adversely affect assets, liabilities, capital, income, and/or expense at different times or in different amounts. The Federal Reserve calls this type of risk market risk and defines it as the risk to a financial institution's condition resulting from adverse movements in market rates or prices, such as interest rates, foreign exchange rates, or equity prices. Within that definition, the Federal Reserve clearly views interest rate risk as just one component of market risk

Foreign exchange risk
The risk to earnings or capital arising from adverse movement of foreign exchange rates. The Federal Reserve includes this risk in its definition of market risk as mentioned above.

Liquidity risk
(1) In financial institution analysis, liquidity risk is the risk that not enough cash will be generated from either assets or liabilities to meet cash requirements. For a bank, cash requirements are primarily made up of deposit withdrawals or contractual loan findings

(2) For a security, the risk that not enough interested buyers will be available to permit a sale at or near the currently prevailing market price.

Market risk
One of six risks defined by the Federal Reserve. The risk of an increase or decrease in the market value/price of a financial instrument. Market values for debt instruments are affected by actual and anticipated changes in prevailing interest rates. Market values for all financial instruments, except direct obligations of the U.S. Treasury, are affected by either actual or perceived changes in credit quality.

APPENDIX E:

Table 4: Differences Between Traditional Framework and Emerging Framework

Features	***Macro-prudential regulation***	***Micro-prudential regulation***
Conception of risk	Views risk as endogenous, a systemic phenomenon. **Dimensions of risk** • **Cross-sectional:** contributions of financial institutions to systemic risk. • **Interdependencies:** institutional, structural and policy (exposures to economic risk. • **Time:** evolution of risk through time	View risk as exogenous; risk triggers are outside the financial system. Dimension of risk • microeconomic
Objectives	• To reinforce and sustain soundness (resilience) of the financial system • To eliminate or mitigate systemic risk systemic risks • To minimize macroeconomic cost of financial distress	• To promote safety and soundness of individual financial institutions. • Limit distress individual financial institutions • Protect banks depositors and investors
Practical application	• To identify, monitor and take actions to minimize systemic risk • Backward looking and forward looking	• Identification, monitoring and taking actions to reduce risk to individual financial institutions • Backward looking

Source:Adapted from Garba (2014)

Emerging framework = Macro policy +Macro-prudential regulations+ Micro-prudential regulations
Traditional framework (old) = Macro policy + Micro-prudential regulations.

APPENDIX F:

Table 5: Theoretical Definition of Terms and Variables in the Model, Equations 3.3-3.6

Variable/factor	Symbol	Proxy/definition of variable	Theoretical expectation/*a priori* expectation
Prime interest rate on domestic short term loans	i_p	Dependent Variable – Interest rate on creditworthy customers.	N/A
Maximum Interest rate on domestic short term loans	I_m	Dependent Variable – Commercial banks max. lending rate is prime or best rate plus risk premium.	N/A
1.Bank-specific factors			
1.1 Direct cost of funds/overhead	CF	Ratio of operating expenses to total assets OR costs/income. Banks that are inefficient will incur higher overhead and will pass them to customers through high interest rate	> 0. Positive relationship. Banks efficiency reduces interest rate on loans and increase that of deposits (Gambacorta 2004)
1.2 Liquidity	L	Cash and securities/total assets OR Ratio of liquid reserves to total assets OR Ratio of liquid assets / assets OR total loans/total deposits.	> 0. Positive relationship. Highly liquid banks are expected to have higher interest to compensate for the opportunity of holding extra liquidity.
1.3 Capital (size)	S	Capital/risk weighted assets OR Tier 1 and 11 capital/risk weighted capital.	< 0 and > 0. Negative and positive relationships. Bank capitalization follows a parallel line of reasoning with that of bank size. First, negative coefficient: banks which maintain high level of capital are less likely to go bankrupt, more creditworthy and enjoy economies of large scale provision of services. The sense of security they provide their customers enables them to source funds at a lower rate relative to their lending rate. (Gambacorta 2004; Tan et at 2012). Based on this, the effective lending rate could be low to reflect 'efficiency'. Secondly, positive coefficient: Capital or size could lead to

			monopoly in the banking industry which could influence pricing in the positive direction.
1.4 Credit risk	CR	Non-performing loans to total loans ratio (NPL/L) is used as an indicator of credit risk or quality of loans	> 0. Positive. An increase in provision for loan losses implies a higher cost of bad debt write offs. Given the risk-averse behaviour, banks facing higher credit risk are likely to pass the risk premium to the borrowers, leading to higher spreads. Hence the higher the risk, the higher the pricing of loans and advances to compensate for the potential loss. This is based on the principle of Risk-based Loan Pricing.
2. Industry –Specific factors			
2.1 Monetary Policy stance. Monetary tightening	MPR	CBN interest rate/ MPR	> 0. Positive. Monetary tightening pushes money market rates up and consequently the lending rate.
2.2 Cash Reserve Requirement	CRR	% or fraction of deposits required to be kept in cash as legal reserve.	> 0 positive. Higher CRR, leads to higher interest rate to compensate for paid deposits that are kept idle.
2.3 Target Return on Equity (ROE)	ROE	This is part of the elements/considerations that banks add up to the pricing of credit to maintain an adequate level of profitability. Ratio of net income to equity.	> 0 positive. In banking sector where there is low degree of competition (oligopolistic competition), banks have the power to demand profitability rates that exceed the normal level by integrating "abnormal" profit in their lending rates (CBN 2011). The higher the shareholders expectation in terms of returns on

			investment, the higher the lending rate the banks would set to accommodate the shareholders interest. (Ariefianto and Soepomo 2011)
3. Macroeconomic Environment (factors)			
3.1 Inflationary expectation/Expected movement in general price level	INF	Rate of inflation. Annual; % change in consumer price index (CPI).	> 0. Positive. (Kaufman 1972; Soludo 2008)
3.2 Real GDP Growth	GDP	Annual % change in real GDP	> 0. Positive. Increased economic activity can heighten demand for loans leading to higher lending rates (Tan 2012; Were and Wambua 2013).Volatilities in GDP increase credit risk and uncertainties and lending rates. Similarly, volatilities in macroeconomic environment which leads to recession can increase '*systemic risk'* which affects liquidity in banks and the money market. This increases the lending rate.

APPENDIX G:

CENTRAL BANK OF NIGERIA ADVERTORIAL, 18/08/2009
List of large ticket loan defaulters

Following the recent regulatory action of the Central Bank of Nigeria on the five (5) banks, it has become necessary to use this medium to request the following defaulting customers of the affected banks to pay without further delay their indebtedness, failing which the banks will take all appropriate legal actions to ensure repayment. These are the largest debtors and the CBN will continue to publish the list of defaulters on an on-going basis.

1 INTERCONTINENTAL BANK PLC

BALANCE AS AT MAY 31, 2009

S/N	ACCOUNT NAME	(N)	DIRECTORS/MAJOR SHAREHOLDERS	STATUS
1	ASCOT OFFSHORE NIGERIA LIMITED	44,670,080,228.83		NON- PERFORMING
2	ROCKSON ENGINEERING LIMITED	36,989,685,692.84		NON- PERFORMING
3	UNITED ALLIANCE COMPANY OF NIG.LTD.	16,247,686,168.18	JOEY CHUMA OBUE, SAMUEL AIKHIONBARE, HENRY IMASE	NON- PERFORMING
4	ACCOUNTANT GENERALS SPECIAL PROJECT	14,528,671,304.81	ENGR. J. I. A. ARUMEMI- IKHIDE AND MRS. MARY E. ARUME	NON-PERFORMING
5	RAHAMANIYYA OIL AND GAS LTD.	12,799,823,561.55	MR. AIG-IMOUKHUEDE AND MR. HERBERT WIGWE	NON- PERFORMING
6	DANSA OIL AND GAS LIMITED	8,836,682,542.69		NON- PERFORMING
7	IORNA GLOBAL RESOURCES LIMITED	7,700,000,000.00	AIL. ADDULRAHAMAN M. BASHIR, ALH. MUSA BASHIR, ALH	NON- PERFORMING
8	FOBY ENGINEEERING LIMITED	6,861,592,031.47	ALHAJI SANI DANGOTE, ALHAJI ALIKO DANGOTE, ALHAJI M	NON- PERFORMING
9	TRANSNATIONAL CORP OF NIG PLC	6,553,985,525.18	NWUCHE NNANNA, DAVIDEGWE	NON- PERFORMING
10	MAVEN ASSET MANAGEMENT LIMITED	5,927,624,574.44	ENGR. EMMANUEL O. EFOBI, DR. (MRS) SARAH EFOBI	NON- PERFORMING
11	LISTER OIL LIMITED	5,000,000,000.00	PRO. NDI OKEREKE-ONYIUKE, TOM ISEGHOHI	NON- PERFORMING
12	SAMMY BETH INTERBIZ LIMITED	4,500,000,000.00	CHIEF EFFONG, TUNDE ADEYEMI, FRANK OBOTT	NON-PERFORMING
13	CINCA NIGERIA LIMITED	3,821,838,736.45	ALH ARISEKOLA ALAO, ISMAILA ALAO, KADIJAT ALAO	NON-PERFORMING
14	NITEL CDMA PROJECT ACCOUNT	3,593,779,589.40	NOSO UJAM, NINA EGWU	NON- PERFORMING
15	TRIQUEST ENERGY LIMITED	2,430,000,000.00	ENGR. H.F. ENUHA	NON- PERFORMING
16	CAMDEN RESOURCES LIMITED	2,400,000,000.00	TRANSNATIONAL CORPORATION	NON-PERFORMING
17	RIVERSIDE LOGISTICS LIMITED	2,400,000,000.00	ALH. DAGAZAU AND CHIJIPKE OKENWA	NON-PERFORMING
18	JUMMAI MAHMUD	2,300,000,000.00		NON-PERFORMING
19	STANZUS INVESTMENT LTD	2,273,401,070.49		NON-PERFORMING
20	INTEGRATED OIL - GAS LIMITED	2,000,000,000.00		NON-PERFORMING
21	RESOURCE INTERMEDIARIES LIMITED	2,000,000,000.00		NON-PERFORMING
22	SPRINGBOARD TRUST AND INVESTMENT NI	2,000,000,000.00		NON-PERFORMING
23	MOBITEL LIMITED	1,380,781,422.64		NON-PERFORMING
24	CASHCRAFT ASSET MGT LTD	1,535,000,000.00		NON-PERFORMING
25	BROOKE INVESTMENT LTD	1,658,486,009.44		NON-PERFORMING
26	SANTRUST SECURITIES LTD	1,585,818,101.57		NON- PERFORMING
27	DSNL OFFSHORE LTD	1,601,019,849.77		NON-PERFORMING
28	NORTHERN TEXTILE MANUFACTURER LTD	1,638,176,888.55		NON-PERFORMING
29	DICETRADE NIGERIA LTD	1,000,000,000.00		NON-PERFORMING
30	OBAT-OIL PETROLEUM LTD	1,000,000,000.00		NON-PERFORMING
31	SINGE-OBI CONSTRUCTION COMPANY LTD	1,175,827,597.23		NON-PERFORMING
32	ENA-BELL LTD	1,293,727,613.35		NON-PERFORMING
33	ONUOHA E. IBE	654,593,289.82		NON-PERFORMING
34	OJEMAI INVESTMENT COMPANY LTD.	736, 850,500.02		NON-PERFROMING
35	BABA HARUNA IBRAHIM	544,880,532.37		NON- PERFORMING
	TOTAL	210,903,162,331.07		

2 AFRIBANK PLC

S/ N	ACCOUNT NAME	BALANCE AS AT MAY 31, 2009 (N)	DIRECTORS/MAJ OR SHAREHOLDERS	STATUS
1	KOLVEY COMPANY LIMITED	16,500,000,000.00	SULIEMAN IBRAHIM, AISHA BA'ABA USMA	NON- PERFORMING
2	REHOBOTH ASSETS LTD	15,000,000,000.00	CHUDI AJAEGBU, CHIAMAKA AJAEGBU, TO	NON- PERFORMING
3	RESOLUTION TRUST AND INVEST CO. LTD	12,000,000,000.00	PATIENCE ORIGHOMESAN, SARAH ORITSE	NON- PERFORMING
4	PETOSAN PROPERTY AND DEV CO. LTD	10,000,000,000.00	PATIENCE ORIGHOMESAN, SARAH ORITSE	NON- PERFORMING
5	LARIX NIG LTD	6,100,000,000.00	ALHAJI IDAH	NON-PERFORMING
6	BRO WORKS (NIG) LTD	5,000,000,000.00	ALHAJI IBRAHIM	NON-PERFORMING
7	SULETICAL NIGERIA LTD	5,000,000,000.00		NON-PERFORMING
8	AQUITANE OIL AND GAS LTD	2,451,429,489.89	DAHIRU WADA, IKECHUKWU OKOLO, VICT	NON- PERFORMING
9	PETRO-LOGISTICS LIMITED	1,753,629,570.19	DR UGOJI EGBUJO, MR SHAKAR OLUWO, A	NON- PERFORMING
10	FIOGRET LIMITED	1,683,796,444.93	CHIEF GREAT OGBORU, MR TURNER OGBO	NON- PERFORMING
11	OMATEK COMPUTERS LTD	1,649,380,634.77	MRS FLORENCE SERIKI, FOLA ADEOLA DR T	NON- PERFORMING
12	DAMNAZ CEMENT COMPANY LTD	1,624,731,764.95	ENGR IBRAHIM A. GOBIR, ALH. ABUBAKAR	NON- PERFORMING
13	STERLING CIVIL ENGINEER	1,588,641,038.00		NON-PERFORMING
14	NICE CORPERATE SERVICES LTD	1,468,012,191.22	LAWAL MOHAMMED AUWAL, AUWAL ASM	NON- PERFORMING
15	PETTERNS NIGERIA LTD	1,121,815,000.00		NON-PERFORMING
16	CONTINENTAL TRANFERT TECH LIMI	696,195,060.96	ALH HASSAN IBETO, MR BENOY BARRY, MF	NON- PERFORMING
17	ORANGE-LINE LTD	661,722,356.08	CHIKE IROEGBUNAM, CHIEDU N. EDOZIE	NON- PERFORMING
18	IMAD OIL AND GAS LIMITED	555,359,418.30	ALH. ABBA DASUKI, BASHIR ADAMU GUSA	NON- PERFORMING
19	IKEJA HOTEL PLC	541,029,826.48		NON- PERFORMING
20	DREDGING ATLATIC COMPANY LTD.	510,252,876.98	JOHANNAS DAVID RASSFELD, HERMAN ST	NON- PERFORMING
21	ALLIANCE AND GEN. INSURANCE CO. LTD	508,868,225.48	ALANI AKINRINADE, OLAFISOYE A.O, A. AI	NON- PERFORMING
22	THE DAILY TIMES OF NIG. PLC	493,472,332.51		NON-PERFORMING
23	BRUNEL ENGR. AND CONSULTING LTD.	6,935,006,115.89		NON-PERFORMING
24	FALCON SECURITIES LIMITED	29,500,000,000.00	PETER OLOLO (MD), SIMBABE JOSEPH, EMI	NON- PERFORMING
25	AFRICAN PETROLEUM	12,804,121,542.49	FEMI OTEDOLA, OSA OSUNDE, TUNDE FAL	NON- PERFORMING
26	MERISTEM SECURUTIES LTD.	2,920,559,831.00	ISHAYA SHEKARI, KELAMB INVEST LTD, OLU	NON- PERFORMING
27	ULO CONSULTANTS LIMITED	2,025,395,139.48	CHIEF UCHE OKPUMO, BARR. SAM NWOSU	NON- PERFORMING
28	HOME TRUST SAVINGS AND LOANS	763,260,162.00	FEMI ADEMOSUN	NON-PERFORMING
	TOTAL	141, 856,679,021.60		

3	UNION BANK PLC				
	S/ N	ACCOUNT NAME	BALANCE AS AT MAY 31, 2009 (N)	DIRECTORS/MAJ ORSHAREHOLDERS	STATUS
	1	TRANSNATIONAL CORP.PLC	30,863,304,173.00	DR. NDI OKEREKE-ONYIUKE	NON-PERFORMING
	2	MTS FIRST WIRELESS LTD	9,849,331,689.00	CHIEF LULU BRIGS	NON-PERFORMING
	3	ZENON	6,251,658,228.00	Olufemi Otedola, Nana Otedola	NON- PERFORMING
	4	IRS AIRLINES LTD	3,331,882,287.00	KHALIFA ISIAKA RABIU,YUSUF RABIU,SHEI	NON- PERFORMING
	5	AVIAN SPEC NIG LTD	1,747,793,566.00		NON-PERFORMING
	6	COMMUNICATION TRENDS L	1,127,361,164.00	ENGR UZO UDEMBA,BARR. ADA-UGOJDE	NON- PERFORMING
	7	OSIGWE FOODS LTD	959,674,031.00	CHIEF A. K. MOHAMMED; SHAANXI FUWA	NON- PERFORMING
	8	STAR PAPER MILL	719,816,365.00	CHIEF ECHEME NNANA KALU	NON-PERFORMING
	9	DJONES	524,929,000.00	Sir J.O Eze, Richard Eze	NON- PERFORMING
	10	MIDLAND GAL. PROD LTD	506,759,793.00	DR. J. C. DUGAD	NON-PERFORMING
	11	CHACHANGI AIRLINES NIG L	423,467,502.00	ALH.AHMADU CHANCHANGI	NON- PERFORMING
	12	AFRICAN TEXTILES MFG	304,479,940.00	MR. SUNAIL AKAR	NON- PERFORMING
	13	IKEJA HOTELS PLC	1,245,953,865.00		NON- PERFORMING
	14	BAO YAO HUAN JIAN	3,136,303,163.00		NON- PERFORMING
	15	ZIKLAGSIS NETWORKS	4,339,343,543.00		NON- PERFORMING
	16	MINAJ HOLDING LTD	1,634,717,063.00		NON- PERFORMING
	17	IBETO INDUSTRIES	2,479,103,704.00		NON- PERFORMING
	18	GMT SECURITIES	1,291,737,218.00		NON- PERFORMING
	19	AVIAN SPEC NIG	1,172,926,239.00		NON- PERFORMING
	20	AFRICAN TEXTILE MAN	592,362,186.00		NON- PERFORMING
	21	AWARTISE NIG LTD	573,192,919.00		NON-PERFORMING
	22	PALM TREE LTD	505,975,575.00		NON-PERFORMING
		TOTAL	73,582,073,213.00		

4 OCEANIC BANK PLC

BALANCE AS AT MAY 31, 2009

S/N	ACCOUNT NAME	(N)	DIRECTORS/MAJOR SHAREHOLDERS	STATUS
1	NOTORE CHEMICAL INDUSTRIES LTD	32,392,951,000.00	(1) NOTORE CHEMICAL IND. (MARIT	NON- PERFORMING
2	RAHAMANIYYA GLOBAL RESOURCES LTD	28,589,958,000.00	Abdul Rahaman Musa Bashir	NON- PERFORMING
3	LV DEVELOPMENT COMPANY LTD	2,727,256,000.00	MICHAEL ONASANYA, PRISCILLA BE	NON- PERFORMING
4	DANGOTE INDUSTRIES LIMITED	2,526,460,000.00		NON-PERFORMING
5	FALCON SECURITIES NIG. LTD	22,260,476,000.00	MR PETER UKORITSEMOFE OLOLO &	NON- PERFORMING
6	WAVES PROJECT NIGERIA LTD	362,315,000.00	(1) WESTCOM TECHNOLOGY (2) MILL	NON- PERFORMING
7	SPARK-WEST STEEL INDUSTRIES	18,449,629,000.00	MR NIYI OYEDELE, MR SARELI TAUTE	NON- PERFORMING
8	BFCL ASSETS AND SECURITIES LIMITED	4,107,218,000.00	S E OKORO, O V IBRU	NON-PERFORMING
9	MID-WESTERN OIL& GAS COY PLC	23,863,485,000.00	ONAJITE OKOLOKO, ENG. ADAMS OK	NON- PERFORMING
10	OANDO PLC	7,100,574,000.00	GENERAL M. MAGORO	NON-PERFORMING
11	HONEYWELL GROUP	1,606,584,000.00	MR OBA OTUDEKO	NON-PERFORMING
12	GLOBAL FLEET INDUSTRIES LTD	14,782,994,000.00	JIMOH IBRAHIM	NON-PERFORMING
13	CIRCULAR GLOBAL INTERNATIONAL LTD	12,884,748,000.00	NANASHETU ABDULAI	NON- PERFORMING
14	IMAD OIL &GAS LTD	10,389,687,000.00	BASHIR ADAMU / ABBA DASUKI	NON-PERFORMING
15	ZARM POULTRY & FEED MILLS LTD	8,374,879,000.00	ALHAJI MUFTAU GBADAMOSI	NON-PERFORMING
16	CASHCRAFT ASSET MGT LTD	2,209,562,000.00	J. A. O. Ogunfuwa;	NON- PERFORMING
17	DELTA STATE GOVERNMENT	6,455,196,000.00	Deolu Ireyomi	NON-PERFORMING
18	NITEL	7,829,277,000.00		NON-PERFORMING
19	FLOTSOME INVESTMENT LIMITED	7,069,450,000.00	Mrs. Elizabeth Ishola; Mrs Orumen Ja	NON- PERFORMING
20	PRISKYGOLD NIGERIA LIMITED	6,886,324,000.00		NON-PERFORMING
21	PETOSAN PROPERTY & DEVELOPMENT CO	6,396,232,000.00	PETER U. OLOLO	NON- PERFORMING
22	DILIVENT INTERNATIONAL LIMITED	6,258,912,000.00	LEKAN OGUNLEYE	NON-PERFORMING
23	AQUITANE OIL AND GAS LIMITED	6,119,035,000.00	IKECHUKWU OKOLO, NGOZI OKOLO	NON- PERFORMING
24	VALUELINE SECURITIES &INVESTMENTS I	6,165,241,000.00	ELDER SAM ENYINNAYA	NON- PERFORMING
25	ABINOF FOD COMPANY LTD	1,316,131,000.00		NON-PERFORMING
26	JEEDAB FIBRE	4,813,696,000.00	CHIEF ANTHONY GODWILL ADOH	NON- PERFORMING
27	MARRI CROSS INVESTMENT LTD	4,353,402,000.00	MR. NTUK BASSEY AND MRS. INDA I	NON- PERFORMING
28	BERKELEY GROUP PLC	4,300,000,000.00	HENRY EFE IMASHEKA, ANTHONIA C	NON- PERFORMING
29	JAG GLOBAL RESOURCES LTD	4,157,568,000.00	JAMILU ABUBAKAR	NON-PERFORMING
30	ORION TECHNOLOGIES LTD	3,874,837,000.00	MICHEAL ONASANYA, ABIODUN SUL	NON- PERFORMING
31	OBAT OIL AND PETROLEUM LTD	4,474,550,000.00	PRINCE FEDRICK .E. AKINRUTAN	NON-PERFORMING
32	PETOSAN OIL & GAS COMPANY LIMITED	5,105,833,000.00	PETER U. OLOLO	NON- PERFORMING
	TOTAL	278,204,460,000		

5	FINBANK PLC						
S/N	ACCOUNT NAME	BALANCE AS AT MAY 31, 2009 N	DIRECTORS/MAJOR SHAREHOLDERS				STATUS
1	AQUITANE OIL AND GAS LIMITED	3,656,502,137.27	IKE OKOLO, DAHIRU WADA,WALTER WATGBA				NON- PERFORMING
2	FALCON SECURITIES LIMITED	3,049,001,918.10	MR. PETER OLOLO (MD) MR JONATHAN O.A.				NON- PERFORMING
3	SPRINGBOARD TRUST & INV. NIG. L	1,944,938,367.83	SHEHU YAKUBU CONCERN, BLACKTHORN HIL				NON- PERFORMING
4	JEVKON OIL & GAS LIMITED	1,608,912,798.75	DR OKON ONYUNG,ENGR FRANK ASIEGBU,E				NON- PERFORMING
5	RUHANTI NIG. ENTERPRISES	1,073,172,545.37					NON-PERFORMING
6	DE-LORDS SECURITIES LIMITED	942,506,602.57	ENGR. E. O. BANJOKO, MRS B. SHONOWO,				NON- PERFORMING
7	FRAJEND INVSTMENT NIG LTD	941,360,020.26	CHIEF FRANK CHIJIOKE ENENDU, LOLO MONI				NON- PERFORMING
8	INTEGRATED TRUST & INVESTMENT	893,385,078.01	OTUNBA OLADUNNI, DELE LAWORE, ENITAN				NON- PERFORMING
9	YOOJIN ENGINEERING NIG LTD	858,265,908.06	MR LEE JAE KOUNG, MR KIM SANG YOUNG, M				NON- PERFORMING
10	HAJAIG CONSTRUCTION (NIG) LTD--	850,960,727.00	ABDULNASSER HAJAIG,ENGR ABBAS HAJAIG				NON- PERFORMING
11	RELIANCE TELECOMMUNICATIONS	800,896,080.76	ANNIE OKONKWO/CLEMCOS GROUP				NON- PERFORMING
12	ADONAI STOCKBROKERS LTD	747,329,796.37	MR EZE,DR GILBER ADIMORA,ARC OKAM,MR				NON- PERFORMING
13	EBONYI STATE GOVERNMENT	587,143,427.27					NON- PERFORMING
14	AFRICA ENERGY S.A (NIG) LTD.	293,755,537.47					NON-PERFORMING
15	EXCALIBUR INVESTMENT	281,191,501.59					NON-PERFORMING
16	INTERCELLULAR NIG. PLC	157,554,403.51					NON-PERFORMING
17	DDJ SPECIAL PROJECTS LTD	104,903,887.05					NON-PERFORMING
18	MATERNAL MANAGERS LTD	141,174,516.39					NON-PERFORMING
19	GTL GREEN TECHNOLOGIES LTD	508,769,340.33					NON-PERFORMING
20	NEW INDUSTRIES AND PROPERTIES	277,265,746.80					NON- PERFORMING
21	A.S RANO OIL AND GAS	362,847,706.81					NON-PERFORMING
22	MASTERS ENERGY OIL AND GAS	661,253,024,.97					NON-PERFORMING
23	NAKEEM OIL AND GAS	332,646,151.85					NON-PERFORMING
24	JAG GLOBAL RESOURCES LTD	581,182,832.76					NON-PERFORMING
25	REAL OIL MILLS LIMITED	247,819,636.40					NON-PERFORMING
26	IMAD OIL AND GAS	223,403,114.12					NON-PERFORMING
27	PABE OIL AND GAS	538,980,167.00					NON-PERFORMING
28	DAX ENERGY SERVICES	134,494,069.00					NON- PERFORMING
29	ALMUNOR RESOURCES LTD	364,961,526,.46					NON-PERFORMING
30	JEVKON OIL AND GAS LTD	1,608,912,798.75					NON-PERFORMING
31	GLOBAL GAS AND REFINING LTD	309,201,965.53					NON-PERFORMING
33	ONOGBHAGBE ANTHONY ENAHORO	96,677,959.49					NON-PERFORMING
34	M.A.$ USMAN ABBA	266,476,243.41					NON-PERFORMING
35	GHL VENTURE & TRUST LTD	233,284,385.98					NON-PERFORMING
36	COASTAL DREDGING AND CONSTRU	109,816,820.47					NON- PERFORMING
37	KING AND PEARLS INTERNATIONAL	104,804,778.85					NON- PERFORMING
38	GEFESCO ENT. NIG LTD.	875,959,572.50					NON-PERFORMING
39	RUHANTI NIG.ENT.	845,734,477.04					NON-PERFORMING
40	BELPHINS NIGERIA LTD.	687,684,583.46					NON-PERFORMING
41	NATIONAL FERTILIZER COMPANY OF	639,856,160.37					NON-PERFORMING
42	MESAN LIMITED	491,769,753.02					NON-PERFORMING
43	EXCLUSIVE INTERNATIONAL LTD.	452,812,809.33					NON-PERFORMING
44	SAMBAWA FARMS	450,949,339.63					NON-PERFORMING
45	Tijjani Babangida .S/plaza project	450,877,672.67					NON-PERFORMING
46	MATERIAL MANAGERS LTD	440,476,190.50					NON- PERFORMING
47	Obedafe Holdings Nigeria Limited	409,626,011.04					NON- PERFORMING

46	MATERIAL MANAGERS LTD	440,476,190.50					NON- PERFORMING
47	Obedafe Holdings Nigeria Limited	409,626,011.04					NON- PERFORMING
48	LINLAND NIGERIA LIMITED	368,440,090.08					NON- PERFORMING
49	SINTAX LIMITED	362,259,870.14					NON- PERFORMING
50	THE JUDICIARY BAUCHI STATE	351,840,934.89					NON-PERFORMING
51	DRAGNETANOSE CONSTRUCTION	317,320,395.12					NON-PERFORMING
52	RAHMAN BROTHERS LTD	314,384,637.17					NON- PERFORMING
53	VISTA INTERNATIONAL LIMITED	311,811,463.77					NON- PERFORMING
54	GLOBAL GAS AND REFINING LTD	309,201,965.53					NON- PERFORMING
55	MAIJAMA'A INTERNATIONAL LTD	290,283,920.89					NON- PERFORMING
56	ACI-COJA A/C	276,238,789.93					NON- PERFORMING
57	ROUDO NIGERIA LIMITED	275,974,440.70					NON-PERFORMING
58	OCEANIC EXPRESS OFFSHORE OPERA	274,255,592.06					NON- PERFORMING
59	UWA INDUSTRIES NIG. LTD.	274,244,498.24					NON-PERFORMING
60	YOOJIN ENGINEERING CO. NIG LTD-	264,523,867.83					NON-PERFORMING
61	LANDA LTD	257,912,683.83					NON- PERFORMING
62	RISMAN NIG LTD 11	256,650,546.89					NON- PERFORMING
63	Sanusi Sule Garo	256,463,773.58					NON- PERFORMING
64	ENERGY VENTURES LTD	255,531,677.97					NON- PERFORMING
65	EMWAI CO.LTD (REALTY DEPT.)	251,289,133.54					NON-PERFORMING
66	MINISTRY OF FINANCE & ECONOMI	250,110,407.07					NON-PERFORMING
67	CHUBAD AB	248,710,301.82					NON- PERFORMING
68	DYNAMIC PORTFOLIOS LTD.	238,046,082.93					NON- PERFORMING
69	STANDARD UNION SECURITY LTD A/	233,958,431.89					NON- PERFORMING
70	BAZAMRI P.V.C.TILES LTD.	230,512,835.94					NON- PERFORMING
71	RUHANTI NIGERIA ENTERPRISES	227,438,068.33					NON-PERFORMING
72	PRAKLA GEOMECHANIK ENT. LTD	225,648,735.01					NON-PERFORMING
73	UNIVERSAL NAT.BEVERAGES LIMITE	221,270,825.58					NON- PERFORMING
74	CEM-CON [NIG] LTD	220,286,175.59					NON-PERFORMING
75	Sterling Plantations & Processing C	208,142,478.63					NON- PERFORMING
76	UNIVERSAL NAT.BEVERAGES LIMITE	191,582,820.48					NON- PERFORMING
77	DR. PETER ODILI	189,123,711.95					NON- PERFORMING
78	TRANSKY AIRLINES LTD	186,684,460.72					NON- PERFORMING
79	REEJ INT`L LTD.	183,790,582.46					NON- PERFORMING
80	INDEPENDENT PETROLEUM MARKET	177,855,220.87					NON- PERFORMING
81	YUSUNAB (NIG) LTD	174,506,279.08					NON- PERFORMING
82	ULTIMATE CONSTRUCTION LIMITED	172,648,066.44					NON- PERFORMING
83	E.& L.OIL MILLS LTD.	163,572,472.81					NON- PERFORMING
84	ARARAUME GODWIN FEANYI	158,642,391.00					NON-PERFORMING
85	CAPERNAUM VENTURES LIMITED	151,836,223.40					NON- PERFORMING
86	NURUDEEN INT	151,129,618.94					NON- PERFORMING
87	BROADBAND TECHNOLOGIES LTD .	150,838,298.17					NON- PERFORMING
88	HYDROWORKS LIMITED	149,221,204.54					NON-PERFORMING
89	TRITEL NETWORK	143,222,404.33					NON-PERFORMING
90	SACATOMIO INTERNATIONAL LIMIT	140,000,000.00					NON- PERFORMING
91	NADINA INDUSTRIES LIMITED	137,676,902.70					NON- PERFORMING
92	SIGMA ENGINEERING AND CONSTR	136,106,776.04					NON- PERFORMING
93	ALH. MUSA HARUNA	131,603,920.89					NON- PERFORMING
94	ABU TU INV	127,740,258.91					NON- PERFORMING
95	ADVANCED INTERNATIONAL LTD	125,138,279.79					NON- PERFORMING
96	SAM-DAVID INT'L LTD	118,782,317.17					NON-PERFORMING
97	ALI MUHAMMAD	117,112,722.88					NON-PERFORMING
98	ABBEY TRAVELS	116,812,618.83					NON- PERFORMING
99	GRAINS PROCESSING NIG LTD	114,999,046.11					NON- PERFORMING
100	TRANS SAHARAN 3	113,187,721.25					NON- PERFORMING
1001	GJMSER COMMODIT	111,570,224.85					NON- PERFORMING
1002	FIRST VENTURES (NIG) LIMITED	109,384,961.03					NON-PERFORMING
1003	AFRICAN INITIATIVE DEVEPMENT CO	109,358,764.96					NON- PERFORMING
1004	OBAFEMI OLANREWAJU K. ADEBOYE	102,889,576.42					NON- PERFORMING
1005	BROADFIELDS INTERMEDIARIES LTD	100,171,387.62					NON- PERFORMING
	TOTAL 42,445,227,400.33						

Summary :	NPLs in N
Oceanic Bank:	278,204,460,000.00
Intercontinental:	219,903,162,331.07
Afribank:	141,856,679,021.06
Union Bank:	73,582,073,213.00
Fin Bank:	42,445,227,400.33
Total	755,991,601,965.46

***Notes**:*

- The aboveN0.76 trillion NPLs are just for 5 banks. Other banks, *healthy banks,* were also having large ticket loan defaulters.
- All the account names are large ticket obligors that enjoyed prime lending rate at the time the loans/overdrafts were approved

APPENDIX H:

Diagnostics: assuming a balanced panel with 9 cross-sectional units
observed over 14 periods

Fixed effects estimator
allows for differing intercepts by cross-sectional unit
slope standard errors in parentheses, p-values in brackets

const:	16.277	(0.29332)	[0.00000]
d_cost_of_funds:	0.50917	(1.4793)	[0.73137]
d_size_b:	-3.4376e-006	(6.2322e-007)	[0.00000]
d_liquidity_b_:	0.36036	(0.66143)	[0.58700]
d_credit_risk:	-0.0083421	(0.0042708)	[0.05337]
d_c_rr:	0.012108	(0.0057492)	[0.03752]
d_m_pr:	-0.27221	(0.050695)	[0.00000]
r_oe:	0.0020396	(0.0020279)	[0.31676]
i_fl:	0.11858	(0.026025)	[0.00001]
d_real_gdp:	-0.058093	(0.064771)	[0.37177]

9 group means were subtracted from the data

Residual variance: 95.4799/(126 - 18) = 0.884073
Joint significance of differing group means:
F(8, 108) = 1.48448 with p-value 0.171194
(A low p-value counts against the null hypothesis that the pooled OLS model
is adequate, in favor of the fixed effects alternative.)

Means of pooled OLS residuals for cross-sectional units:
unit 1: 0.41697
unit 2: 0.37473
unit 3: 0.061684
unit 4: -0.1745
unit 5: -0.11626
unit 6: -0.058502
unit 7: -0.21313
unit 8: -0.15333
unit 9: -0.13765

Breusch-Pagan test statistic:
LM = 0.126469 with p-value = prob(chi-square(1) > 0.126469) = 0.722121

(A low p-value counts against the null hypothesis that the pooled OLS model is adequate, in favor of the random effects alternative.)

APPENDIX I:

(a)PAY*Direct* Bank collection of Federal Inland Revenue Tax from 2002 -2016*

Year	*Amount Collected by Banks (N' billion) for FIRS*
2005	1,741.80
2006	1,866.20
2007	1,846.90
2008	2,972.20
2009	2,197.60
2010	2,839.30
2011	4,628.50
2012	5,007.70
2013	4,805.60
2014	4,714.60
2015	3,741.80
2016	1,200.00
Total	39,894.00

Source: FIRS Tax Revenue Statistics @ http://www.firs.gov.ng/tax.management/pages/tax.revenue.statistics
**DMBs also enjoy T + 2 collection (free Deposits) float*
***Worked out by the author*

(b) **Analysis of DMBs Interest and Non-Interest Income (Commission and Fees) from 2002 - 2015**

Year	*Growth rate 2002-2004*	*Growth rate 2005-2006*	*Growth rate 2012-2013*
Net Interest Income (N' billion)	2.80%	5.70%	17%
Non- Interest Income (N' billion)	55.90%	7.50%	51.70%

Sources: CBN Banking Supervision Annual Report (2005)
NDIC Annual Report and Statement of Accounts (2010; 2014)
NDIC Quarterly Report 2015 March
NDIC Quarterly Report 2015 Sept

Year	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Net Interest Income (N' billion)	218	195	224	193	204	616	979	962	825	na	1,108	1,299	1,297	1,991.7
Non-Interest Income (N' billion)	118	161	184	159	171	577	700	597	463	na	576	745	873	814.9

APPENDIX J:

Prudential Guidelines Classification of Licensed Banks: 1/7/2010

Loan Loss Provisioning

12.1 Credit portfolio classification system for facilities other than "Specialized loans"

(a) Licensed banks should review their credit portfolio continuously (at least once in a quarter) with a view to recognizing any deterioration in credit quality. Such reviews should systematically and realistically classify banks 'credit exposures based on the perceived risks of default. In order to facilitate comparability of banks' classification of their credit portfolios, the assessment of risk of default should be based on criteria which should include, but are not limited to, repayment performance, borrower's repayment capacity on the basis of current financial condition and net realizable value of collateral.

(b) Credit facilities (which include loans, advances, overdrafts, commercial papers, bankers acceptances, bills discounted, leases, guarantees, and other loss contingencies connected with a bank's credit risks) should be classified as either "performing" or "non-performing" as defined below:

(1) a credit facility is deemed to be performing if payments of both principal and interest are up-to-date in accordance with the agreed terms;

(2) a credit facility should be deemed as non-performing when any of the following conditions exists:

(i) interest or principal is due and unpaid for 90 days or more; (ii) interest payments equal to 90 days interest or more have been capitalized rescheduled or rolled over into a new loan(except where facilities have been reclassified as specified in12.1(d) below).

(c) The practice whereby some licensed banks merely renew, reschedule or roll-over non-performing credit facilities without taking into consideration the repayment capacity of the borrower is objectionable and unacceptable. Consequently, before a credit facility already classified as "un-performing" can be reclassified as "performing" the borrower must effect cash payment such that outstanding unpaid interest does not exceed 90 days.

(d) When a loan rescheduling is agreed with a customer, the rescheduling should be treated as a new facility but provisioning should continue until it is clear that rescheduling is working at a minimum, for a period of 90 days. Reversal of interest previously suspended and provision against principal previously made should be recognized on a cash basis

.

(e) Non-performing credit facilities should be classified into three categories namely, sub-standard, doubtful or lost on the basis of criteria below:

Sub-Standard
The following objective and subjective criteria should be used to identify sub-standard credit facilities:

(i) Objective Criteria: facilities as defined in 12.1(b) on which unpaid principal and/or interest remain outstanding for more than 90 days but less than 180 days.
(ii) Subjective Criteria: credit facilities which display well defined weaknesses which could affect the ability of borrowers to repay such as inadequate cash flow to service debt, undercapitalization or insufficient working capital, absence of adequate financial information or collateral documentation, irregular payment of principal and/or interest, and inactive accounts where withdrawals exceed repayments or where repayments can hardly cover interest charges.

Doubtful
The following objective and subjective criteria should be used to identify doubtful credit facilities:
(i) Objective Criteria: facilities on which unpaid principal and/or interest remain outstanding for at lest180 days but less than360 days and are not secured by legal title to leased assets or perfected realizable collateral in the process of collection or realization.
(ii) Subjective Criteria: facilities which, in addition to the weaknesses associated with sub-standard credit facilities reflect that full repayment of the debt is not certain or that realizable collateral values will be insufficient to cover bank's exposure.

Lost Credit Facilities
The following objective and subjective criteria should be used to identify lost credit facilities:
(i) Objective Criteria: facilities on which unpaid principal and/or interest remain outstanding for 360 days or more and are not secured by legal title to leased assets or perfected realizable collateral in the course of collection or realization.
(ii) Subjective Criteria: facilities which in addition to the weaknesses associated with doubtful credit facilities, are considered uncollectible and are of such little value that continuation as a bankable asset is unrealistic such as facilities that have been abandoned, facilities secured with unmarketable and unrealizable securities and facilities extended to judgment debtors with no means or foreclosable collateral to settle debts.

(f) Banks are required to adopt the criteria specified in paragraphs 12.1(a) to12.1 (e) to classify their credit portfolios in order to reflect the true accounting values of their credit facilities. Licensed banks should note that the Central Bank of Nigeria reserves the right to object to the classification of any credit facility and to prescribe the classification it considers appropriate for such credit facility.

12.2 Provision for non-performing facilities other than "Specialized loans" as Defined by the guidelines

(a) Licensed banks are required to make adequate provisions for perceived losses based on the credit portfolio classification system prescribed in paragraph 12.1 in order to reflect their true financial condition. Two types of provisions (that is specific and general) are considered adequate to achieve this objective. Specific provisions are made on the basis of perceived risk of default on specific credit facilities while general provisions are made in recognition of the fact that even performing credit facilityharbours some risk of loss no matter how small. Consequently, all licensed banks shall be required to make specific provisions for non-performing credits as specified below:

(1) For facilities classified as Sub-Standard, Doubtful, or Lost:
(i) interest overdue by more than 90 days should be suspended and recognized on cash basis only.

(ii) principal repayments that are overdue by more than 90 days should be fully provided for and recognized on cash basis only.

(2) For principal repayments not yet due on non-performing credit facilities, provision should be made as follows:

(i) Sub-Standard Credit Facilities: 10% of the outstanding balance;

(ii) Doubtful Credit Facilities: 50% of the outstanding balance;

(iii) Lost Credit Facilities: 100% of the outstanding balance.

(b) For prudential purpose, provisioning as prescribed in 12.2(a) should only take cognizance of realizable tangible security (with perfected legal title)in the course of collection or realization. Consequently, collateral values should be recognized on the following basis:(1) For credit exposure where the principal repayment is in arrears by more than six months, the outstanding un provided principal should not exceed 50% of the estimated net realizable value of the collateral security.

(2) For credit exposure where the principal repayment is in arrears by more than one year, there should be no outstanding unprovidedportion of the credit facility irrespective of the estimated net realizable value of the security held.

APPENDIX K:

Results of the estimated fixed effect (WG) model.

Fixed-effects, using 126 observations
Included 9 cross-sectional units
Time-series length = 14
Dependent variable: prime_rate
Robust (HAC) standard errors

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	16.2544	0.109619	148.2811	<0.00001	***
d_size_b	−3.43379e-6	4.53898e-07	-7.5651	<0.00001	***
d_credit_risk	−0.00790086	0.00361265	-2.1870	0.03086	**
d_c_rr	0.0121288	0.00262921	4.6131	0.00001	***
d_m_pr	−0.27148	0.0186325	-14.5702	<0.00001	***
r_oe	0.00193073	0.000963444	2.0040	0.04753	**
i_fl	0.119751	0.00692501	17.2926	<0.00001	***
d_real_gdp	−0.0577735	0.013629	-4.2390	0.00005	***

Mean dependent var	17.39714	S.D. dependent var	1.378034
Sum squared resid	95.89265	S.E. of regression	0.933676
LSDV R-squared	0.596024	Within R-squared	0.596024
LSDV F(15, 110)	10.81956	P-value(F)	1.41e-15
Log-likelihood	−161.5839	Akaike criterion	355.1679
Schwarz criterion	400.5484	Hannan-Quinn	373.6046
rho	0.018297	Durbin-Watson	1.849258

Joint test on named regressors -
Test statistic: F(7, 110) = 23.1848
with p-value = P(F(7, 110) > 23.1848) = 4.6148e-019

Test for differing group intercepts -
Null hypothesis: The groups have a common intercept

Test statistic: F(8, 110) = 1.50541
with p-value = P(F(8, 110) > 1.50541) = 0.163417

Comments: **The above result of Fixed Effect (WG) is similar to the estimated fixed effect LSDV model in table 4.6.**