IMPACT OF RISK-BASED CAPITAL REQUIREMENT

ON THE BEHAVIOR OF NIGERIAN LICENSED BANKS 1986-2004.

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DECLARATION

I declare the work in the project thesis entitled ''Impact of Risk-Based Capital requirement on the behavior of Nigerian licensed Banks, 1986-2004" has been performed by me in the Department of Economics. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this project thesis was previously presented for another degree or diploma at any university.

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CERTIFICATION

This project thesis "IMPACT OF RISK-BASED CAPITAL REQUIREMENT ON THE BEHAVIOR OF NIGERIAN LICENSED BANKS, 1986-2004", by AKU, Emmanuel Maganie meets the regulations governing the award of the degree of Master of science (Economics) of Ahmadu Bello University, and is approved for its contribution to knowledge and literary presentation.

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ABSTRACT

Banking is an international business and its internationalization has created the need for capital standards that can be applied across national borders. It led the Bank of International Settlement (BIS) to form, in 1974, the Basel Committee on Bank Supervision Practices, which introduced risk-based capital requirements for banks. Since its introduction, the risk-based capital requirements has been acknowledged for its contribution to the widespread use of its capital ratios both as measures of the strength of banks and as trigger devices for supervisors' intervention in banks operations.

Banking is undoubtedly one of the most regulated industries in the world, and the rules on bank capital are one of the most prominent aspects of such regulation. This prominence results from the central role that banks play in financial intermediation, the importance of bank capital for bank soundness and the efforts of the international community to adopt common bank capital standards. The immeasurable attention accorded bank regulation can best be understood in its ability to alter social progress.

This study attempts to analyse the impact of risk-based capital requirement on the behavior of Nigerian licensed banks form 1986 to 2004. In the simultaneous equation model, Bank capital and risk were disaggregated into major components to make policy decision and direction very effective. This was also to ensure that any change in them should not have appreciable impact on the parameters of the models except it is a sustained change. Capital was captured by regulatory pressure, returns on assets, bank size, change in risk, and previous capital stock. In the same vain, change in risk was captured by regulatory pressure, loan losses (Bad debts), bank size, change in capital and previous risk. in the other model (simple linear), the change in both deposits and loans were captured by the same variables, that is, previous total capital, change in total capital, bank size, change in loans/deposits, and national income respectively.

The aim of this study therefore is to examine the effect of the risk-based capital requirement on the portfolio behavior of banks in Nigeria and draw inferences about the effectiveness of the Central Bank of Nigeria in bringing banks to compliance. Only secondary data were collected and estimated using both ordinary least square and two stages least square estimation techniques. The data were collected from the individual bank's balance sheets and latter aggregated according to need.

The first and most basic bank behavior concern the question whether regulatory capital requirements induce them to hold higher capital ratio while the second has to do with whether undercapitalized banks increase their capital ratios more rapidly than other banks. The next is on the adjustments to achieve the capital ratios which depending on the ratio concern, affect the numerator and denominator, that is, tier 1 and tier 2 capital respectively.

The study finds that capital requirement has an impact on capital and risk adjustments in several interesting respects. In line with literature, the study find that banks adjust capital faster than risk. with respect to the coordination of capital and risk, it shows that banks with low capital buffers attempt to rebuild an appropriate capital buffer by decreasing risk when capital decrease. In contrast, banks with high capital buffers attempt to maintain their capital buffer by increasing risk when capital increase. However, banks do not adjust capital when risk changes.

The study finds that Nigerian banks close to the minimum regulatory capital requirements tend to increase their ratio of capital to risk-weighted assets. This indicates that regulatory pressure, that is, the expected penalty implied by a breach of the capital requirements has the desired impact on banks' behavior. Regulatory pressure has a positive and insignificant impact on the ratio of capital to total assets, but no significant impact on banks' risk-taking. This indicates that for Nigerian banks, an increase in available capital through retained earnings or equity issues is less costly than a downward adjustment in

the risk of the portfolios. However, the absence of a developed market for asset-backed securities accounts for the rigidity of their portfolios.

The evidence suggests the relevance of a careful phasing in of new capital requirement in order to avoid undesirable macroeconomic side effects. In addition, notwithstanding the general recognition that capital regulation have different effects on different banks, banks capital regulation has not yet addressed the distinct needs of less developed economies which mostly rely on bank credits. The authority should devote particular attention to the process of enforcement of a stricter bank capital discipline. The presence of different bank constraints need not be read as an excuse for the failure for not modernizing capital regulation. It should instead motivate a timely revision of these constraints on the part of the individual banks and the definition of more suitable regulatory options for regulatory authorities on the part of the international standard setters.

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CHAPTER ONE

GENERAL INTRODUCTION.

1.1 Background to the study.

Banking is one of the most regulated industries in the world, and the rules on bank capital are one of the most prominent aspects of banking regulations, (Basel Committee on banks supervision, 1999). Government's interest in bank capital is manifested in government regulatory guidelines on bank capital. According to the NDIC Annual Report, (1989,p.11) bank capital serves as a cushion or insurance to absorb losses that may occur. The other functions of bank capital include serving the psychological role of maintaining the confidence of lenders (depositors) in the bank's ability to meet maturing demand, sustain present and contemplated growth patterns and conforms to industry standards.

Banking is an international business especially now that many domestic financial markets are being internationalized. The internationalization of banking has created the need for capital standards that could be applied across national borders. The necessity led the Bank of International Settlement (BIS) to form, in 1974, the Basle Committee on Banking Regulations and supervisory practices. The committee put in place the International Convergence of Capital Measurements and Capital Standards (ICCMCS) in 1988, which since then has been adopted by many countries including Nigeria. This is known as the risk-based capital requirement and it has a formula that relates bank's capital to their risk assets. Five classes of risk weights of 0,10,20,50 and 100 percent were

adopted for different types of bank assets. The weights reflect riskiness of each asset. The assets with no credit risk, for example, cash, have a risk weight of zero, whereas most loans have a risk weight of 100 percent. In a few cases, the committee allowed for some degree of national discretion in applying the weights, provided this done without compromising the set standards.

A bank's required capital (BRC) according to the committee is related to the bank's total Risk Assets (TRA) and a bank's total risk assets is a weighted average of the bank's assets and their assigned weights. Specifically, it is the bank total risk assets multiply by their assigned weight. Mathematically it is given as:

BRC = $\partial_i TRA_i \geq 10\%$ presently.

Where"

TRA is the different risk assets, e.g. credits, cash, among others and ∂i is the various weights, of the different assets.

$\geq$ is equal or greater than 10% which is the bank's required capital.

The Basle Committee posit that the capital of an internationally active bank should equal 7.25 percent of the bank's total risk assets by 1991, which should be increased to 8 percent at end of 1992 and further increases from time to time. Further, the composition of the capital should be at least 50 percent core capital or first tier capital and the other second tier, that is, loan stocks, debentures and preference shares.

A transitional period was provided for countries to adjust to the new standards. This adjustment period was necessary, according to the Basle Committee, in view of some particular features in the supervisory and accounting systems in individual countries.

On March 29, 1990; Nigeria through Central Bank of Nigeria adopted the ICCMCS via a circular to licensed banks. The Nigeria standard assigned risk weights varying from zero to 100 to 18 types of assets categories.

The weight adopted for banks in Nigeria are very much in line with the ones by the Bank of International Settlement (BIS). In the circular, five assets categories were assigned risk weights of 100 percent, three categories risk weights of 50 percent, three categories risk weights of 20 percents while seven categories have risk weights of zero.

The capital standard for credit risks was amended in 1996 to cover market risks arising from bank's open positions in foreign exchange, traded debt securities, traded equities, commodities and options. In 1999, it was further amended to cover interest rate risk and operational risks.

Since its introduction, the Capital Accord has been acknowledged for its contribution to the widespread use of risk-based capital ratios both as measures of the strength of banks and as trigger devices for supervisors' intervention. The Accord has also been praised for the international convergence of capital standard and for the improvement of these standards in many countries.

In Nigeria, a number of developments that have occurred in the banking sector even after 1990 that suggest that all is not well with the banking industry. Bank distress and bank failures were a recurrent problem prior to the Bank consolidation revolution.

In the financial and banking sector, the number of banks in operation, which picked at 66 in 1993, dropped to 55 in the year 2000. Some of theses banks have been closed due to distress while other have their board of Directors dissolved and their management handled by either NDIC or CBN itself. While Bank consolidation may have brought down the number of banks to 25, the fourteen banks that failed to consolidate or be consolidated have impose significant burden on investors, depositors and their will force.

The pre and post –consolidation bank distress and failures despite the introduction of a risk-based capital raises two types of issues. The first concerns the behavior of licensed banks and the second, the supervisory capacity of the Central Bank of Nigeria. The knowledge of banks' behavior is important for monetary management in the economy. Banks' assets portfolio behavior especially as noted by Andersen and Burger (1969) is an important explanatory factor for the magnitude and change in the magnitude of the aggregate economic activities and money stock as well as bank credit to the local economy. A knowledge of the supervisory capacity of the CBN is even more important to trust and confidence as well as riskiness of the financial industry.

1.2 Statement of the Problems

The role of banks in crucial to the effective implementation of monetary policy in a nation. For the achievement of the desired objectives in the economy, the banks should be properly placed in a position to perform their duty of financial intermediation. The collapse of banks affects both the banks and the nation's economy. In the banks, it affects their cash flow and profitability while in the economy; it leads to loss of businesses, unemployment and law growth rate. All these symptoms have been observed in post 1986 Nigeria as well as 1990. Therefore, this study, which focuses on bank behavior in relation to the CBN circulars of 1990, seeks to answer the following questions:

i. What is the impact of the risk-based capital requirement on the portfolio behavior of Nigerian Banks?

ii. Has the central bank of Nigeria been effective in bringing banks into compliance to the guidelines on risk-based capital requirements?

1.3 Research Objectives.

The main objective of this study is to analyze the impact of the risk-based capital requirement on the portfolio behavior of Nigerian licensed Banks. Specifically, the study would:

(a) Analyze the impact of the Central Bank Nigeria Circular of 29 March 1990 on the portfolio behavior of licensed banks;

b. Draws inferences about the effectiveness of the Central Bank of Nigeria in bringing banks into compliance.

1.4 Justification of the Research.

Estimates of the probability of failure of individual banks are useful both for individual bank supervision and in forming an assessment of the overall stability of the financial system. If a bank fails, depositors in that bank may lose funds, and in particular circumstances, the failure could cause difficulties for other financial institutions or problems in financial markets. As expressed above, the knowledge of the behavior of the banking system is important for monetary management. Most empirical studies on Nigerian banks reveal that both profitability and capital has failed to achieve stability in the banking system (see Uchedu, 1995 and Nyong 1996). However, most of these studies have either focused on profitability alone or capital adequacy or both. Uchendu (1995) and Nyong (1996) finds out among others that the high level of profitability declared by banks in Nigeria in the light of their high level of under-capitalization imply excessive risk-taking which is incompatible with prudent banking.

The problem of excessive risk-taking in the nation's banking system has created enormous problems for the conduct and implementation of monetary policy. The findings from this study will reveal monetary authorities efficiency in their regulatory control hence given insight that may be useful in preventing systemic failure in the post-consolidation era.

1.5 Scope and Limitations of the Research.

Whether a policy aimed at providing a short-run or panacea to the economic ailment of any given society, it adequately must have been informed

by a good historical experience that covers a good time frame and which guides the theoretical underpinnings of the policy decision. So time, as commonly construed by professionals in management field, is vital when it come to thrusting an idea that has empirical flavor. This study covers the period 1990-2004. The choice of the period is informed by two reasons. First, in the science for research, the period is wide enough to permit good deductions that may influence or redirect policy decisions and second, the period covers only the liberalized sort of policy practice, that is, the risk-based capital Accord (1986-2004).

The other major limitation is time and resources to enable us to collect data of all Nigerian commercial banks. This has been taken care of by working with only the three largest banks in the country, that is, those banks that their total assets are over N100 billions. Uchendu (1995) found that whether you use all banks or the three big banks in Nigeria, the result would be the same.

1.6 Outline of Chapters.

The study began with an introduction into the basic characteristics of the Nigerian banking crisis, and how the crisis had generated the money related depression that had to be controlled. The study notes however, that the introduction of risk-based capital requirements has not help matters.

The shift from direct to indirect monetary policy following the introduction of structural adjustment programme in Nigeria in 1986 and the crisis it brought

to the banking sector was also discussed in this section. What follows the remaining introductory items examined include:

- Statement of the problem: Here, attention was drawn on the fact that while some countries or some economies have been able to exercise a substantial degree of control on banking practice using the risk-based capital requirements, the trend in Nigeria seems to have defied its use. However, question still lingering inquiring minds are whether or not the central bank of Nigeria have been effective in making the banks to complied, and if they have, whether or not the right combination of the weights have been chosen with cognizance to the prevailing general economic condition at the given point in time.
- Research objectives: This includes identifying the crucial lapses that have characterized the designs and applications of past capital adequacy ratios aimed at addressing the problem of banks performance especially in the areas of implementation of monetary policy, through a periodic assessment of the banking system. This form the basis of understanding the necessary combination of tools- which will be identified in the course of the analysis, capable of being employed in addressing the problem.
- Justification of the research: Here, an attempt was made to justify the need for a research like this in view of the problem raised.

- Scope and Limitation of the research, which includes stating the time frame covered by the study and the limiting case of the reliability of the study was discussed here.
- Outline of chapters: This includes stating the composition of the research work

In chapter two: we present some literatures and theories on the Bank behaviors. The review covers the classical, Keynesian and the neo-classical analyses of the monetary basis of banks capital concepts and theories of Bank behavior. The Bank portfolio composition and some bank capital models results of study conducted in Nigeria and other developing/developed countries that have near similar economic conditions are discussed here. Specifically, the theories are those of traditional and modern ones, which among others include Risk Management theories, and Portfolio theories that have link to Bank management. The empirical studies along with Bank distress in Nigeria and the impact of the new international banking standard on banks are also discussed in this chapter.

The third chapter engages the methodology of the research along with the models and estimation techniques used in this research.

While chapter four covers the analysis of the results, the study ends with summary, conclusion and recommendations in chapter five.

CHAPTER TWO

2.0 LITERATURE REVIEW

The purpose of this chapter is to review:

(a) Theories of Bank Capital and behavior of banks and

(b) Empirical studies on the relations between change in capital and change in risk and the effect on the macroeconomics.

The review seeks to establish their relevance in explaining the relationships between the relevant variables in the Nigerian Banking industry. In examining these relationships, the theories chosen are those that examine the transmission mechanism from capital to risk. The choice is significant because the study is focused on the nature of the relationship between capital and risk through the mechanism of loan and deposit.

The studies selected and reviews for the empirical literature are those that estimated models links capital, risk, loans, deposits and gross domestic product.

2.1 Theories of Bank Behavior.

The literatures on bank behavior, bank regulations and related issues indicate that the banking firm is unique, (Lewis 1991). There are three reasons for this apparent uniqueness. First of all, banks supply services that are generally vital for the well functioning of a modern society. They are information specialists, which enables them to intermediate between borrowers and lenders, transform and accept risks, they provide liquidity and thereby facilitate all sorts

of transactions, etc, Second, in contemporary financial systems, banks have widespread and substantial positions with each other, known as the inter bank market. As a result, one major bank failure may ruin a whole series of (safe) banks, and hence, disrupt the entire economy. Third, since banks are the foremost transmitters of monetary. Policy, their behavior is crucial for the central bank's ability to influence the real sector of the economy. These argument are not to deny that banks have also a lot in common with ordinary business firms for example, they use labour and physical capital to produce their outputs.

As elaborated by Lewis (1991), the theoretical literature on the banking firm can be roughly divided into two parts. One part takes the existence of banks for granted and focuses on certain aspect of their operations. The other part primarily deals with the reasons why banks exist, or, more abstract, the condition under which intermediation is viable. In the latter category of studies, usually referred to as " financial intermediation theories" transaction costs and problems of imperfect information; market signaling and so forth are of critical importance. Literature such as Benston and Smith (1976) focus on transaction costs, Leland Pyle (1977), Campbell and Kracaw (1980), Diamond (1984) and Fama (1985) focus on asymmetric information and signaling while Diamond and Dybvig (1983) focus on liquidity insurance. Incidentally, the borderline between the two parts of the literature is rather vague, as imperfect information and signaling also play key roles in studies of loan commitments, credit rationing and collateral, which is generally not reckoned among the pure theories of financial intermediation. The

theory can be divided into four groups: (a) Risk management theories, (b) Portfolio theories, (c) imperfect market theories and (d) Real resource theories. To some extent each group of the theories can be associated with a specific view of bank behavior. The theories are discussed bellow:

2.1.1 Risk Management Theories

Risks management theories regard the individual bank as a risk-neutral agent that maximizes expected profits while allowing for a particular type of risk (Marcus, 1983). These theories focus on two particular aspect of banking. They are the credit risk or default risk, which is the risk that a borrower cannot repay his loan and accrued interest and the funding or withdrawal risk, which is the risk that creditors withdraw their deposits.

According to Jaffee, (1989), when a loan is repaid in full, the bank earns the contractual interest rate- the interest rate set in the loan contract. When a borrower defaults, the bank's return depends on how much of the scheduled payment is actually made. The expected rate of return on a loan is thus a function of the contractual interest rate, the livelihood of default, and the probable amount of repayment when there is default. In equation form, it is given by:

(2.1) $r_e = p_c r_c + p_d r_d$

Where,

r_e = the expected rate of return on the loan;

p_c = the probability of repayment in full;

r_c = the contractual loan interest rate;

p_d = the probability of default;

r_d = the bank's lively rate of return when there is default.

The probability p_c and p_d must be sum to unity because it covers the only two probabilities.

The first term in equation (2.1) represents the bank's expected return when the loan is repaid in full (the contractual loan rate r_c times the probability p_c). The second term represents the bank's expected return when borrowers default (the rate of return r_d times the probability of default p_d). The rate of return r_d is computed as $r_d = (D - L)/L$, where D is the amount received by the bank when there is a default and L is the amount of the loan. The rate of return in the case of default is always less than the contractual rate of return r_c and it is often negative (representing the loss of principal as well as interest).

According to Jaffee (1989) banks often use a target rate of return r_c to determine the desired level of the expected rate of return r_e on a loan. A target rate of return depends on the interest the bank pays on deposit; its operative expenses and its desired profits each specified as a percentage of the loan amount (L), which is:

(2.2) $$r_t = I + c + g$$

Where,

r_t = the target interest rate for the loan

I = the interest rate paid on deposits

C = the average operating cost ratios

g = the profit margin

Equation (2.2) assumes that the bank obtains all of its funds from deposits and uses all of its deposits to make loan. Comparable, but more complex, this equation does not apply if the bank has non deposits sources of funds or interests in assets other than loans. Banks have other forms of funds, which include capital and investments other than loans, e.g bonds, treasury bills, among others.

According to Garber, (1992), a bank sets the contractual interest rate r_c on a loan so that the expected return r_e equate the target rate r_t. In this case, because the probability of repayment in full p_c is 1.0, the expected rate of return r_e equals the contractual interest rate r_c. So the bank would just set the contractual rate r_c equal to its target rate r_t, ($r_c = r_t$).

According to Jaffee, for risky borrowers, the contractual rate r_c must be set above the target rate r_t to account for the possibility that the borrower will default. The additional interest charge equals the expected lost due to default, that is, the probability that the borrower will default times the amount of the loss which is the contractual rate r_c minus the return when there is default r_d.

In risk management theories, according to Jaffee, the prime-lending rate plays an important role. Interest rates on riskier loans are determined as a markup, that is, an interest rate premium over the prime rate. In practice, the

markup over the prime rate charged a risky borrower may also depend on the degree of competition in the loan market. When the market is highly competitive, the markup represents only the expected loss due to default. If a bank tried to charge more, competitors would offer a lower interest rate and take away the customer. He continues that with imperfectly competitive markets, banks may be able to charge risky borrowers a markup over the prime rate that is more than the expected loss due to default.

The amount of competition in loan markets is different for prime and risky borrowers. For prime borrowers and for highly collateralized loans, the loan markets tend to be highly competitive. For risky borrowers, banks must determine the degree of risk, so considerations of customers' relationships and information come into play. The result is that banks may be able to charge an interest rate markup that is more than the expected loss due to default.

Another aspect of the risk management of banks is the diversification of loan portfolios. Diversification according to Sheldon (1996), plays a key role in how risk-averse banks deals with risky loans. It requires that the portfolio consists of a large number of relatively small loans and the loans have independent risks, that is, the probability of default on a given loan is uncorrelated with the probability of default on the other loans. Although diversification is useful for reducing the range of possible outcomes, other factors cause banks to specialize in particular categories of loans. Banks that specialize are likely to achieve economies of scale in gathering and evaluating credit risk

information. This creates a trade-off between diversification and specialization and banks will vary in the particular choice they make.

2.1.2 Portfolio Theories.

Portfolio theories deal with the combination of various investments in a set in order to achieve optimum result (Nwankwo, 1991). Bierman and Smidt, (1980) defined portfolio as the collection of marketable stocks and bonds held by an individual investor. It is concerned with that aspect of decision-making on investments where the outcome of future events cannot be predicted with complete certainty. According to Nwankwo, the basic idea of portfolio theory is that rational investors should maximize returns and at the same time be aware of the risk of alternative investment. Thus, the theory focuses on risk and returns. For commercial banks, it considers several aspects: How risky are the assets of these banks? Are the banks earning sufficient returns on assets relative to the risks that they are taking? How can they increase their returns on assets without also increasing their risks?

Risk is a statistical concept that refers to the variability of returns. The risk of an individual investment can be measured by the standard deviation, which indicates the degree of variability of a set of observations from the expected returns of an investment. Modern portfolio theory divides total risk into two parts. Unsystematic risk is that part of total risk that is unique to the investment. For example, a fire at the company's main plant affected earnings of a firm and the subsequent returns to investors adversely. Here,

the fire affected one company and had no impact on other companies making the same products. Therefore diversifying portfolios can eliminate this type of risk. The systematic risk on the other hand cannot be diversified because it is that part of total risk that varies with changes in returns for all investments. In systematic risk all investments are affected by a common factor, for example, economic doom or change in government policy.

The portfolio problem of the bank is the choosing of a collection of investments that when taken together have desirable characteristics with respect to risk and expected returns. Jaffee, (1989: P 79) put forward four factors that should be considered in portfolio selection:

1. Financial and capital assets with higher expected rates of returns should be generally preferred. In terms of financial liabilities, lower rates of interest should be preferred for financing purchases of goods and assets,
2. Assets with lower levels of risk should be generally preferred,
3. Portfolios usually should be diversified, that is, should consist of a relatively large number of individual assets that can substitute another in the long run,
4. Portfolios generally should include some liquid assets that can be rapidly sold at fair prices to raise money.

In the forth factor, the maturity of the assets, that is, time for which their invested amount is returned may also matter. Jaffee (1989) continued that the banks portfolio policy should be to invest in market instruments and while doing

this; they should be committed to making the maximum return, while trading same off with risk. In this case, the choice of an appropriate portfolio model becomes important. Keynes, (1936) put up a portfolio model in his liquidity preference theory. According to Keynes (1936), the liquidity of an asset reflects how readily it can be exchanged for money. Most tangible capital assets, such as manufacturing equipment have poor liquidity because they cannot be readily sold. Financial instruments such as stocks and bonds are usually more liquid. Money has the ultimate degree of liquidity since it is a medium of exchange.

For Keynes, an investor with a given total balance must decide what proportion of his balance to hold in cash A_1 and in bonds A_2 where the yield on cash is zero and on bonds is N_r. In the words of Keynes: The three divisions of liquidity-preference - - - may be as depending on (1) the transactions motive, (ii) the precautionary motive, and (iii) the speculative motive. The Keynesian transaction and precautionary motives mainly reflect the classical theories and the speculative motive which is Keynes main contribution concerns fluctuation in interest rate due to demand for money. The speculative motive sees interest earnings from holding money as income.

The liquidity-preference theory received its onesome boost in the work of James Tobin (1947), 'Liquidity Preference as Behavior towards Risk'. The most essential aspect of the theory is the principle of portfolio diversification. Money was related to choice of investment and nothing more.

Following Keynes, Baumol and James Tobin developed a money demand theory. The Baumol-Tobin (1947) cash management theory of money demand analyses the transaction demand for money of people who have the option to invest funds that are not required immediately for payment purposes. In this theory, the key result is that the demand for money is negatively related and the velocity of money is positively related to the opportunity cost of individuals.

In reworking the Keynesian theory of demand for money, Tobin Combine the demand for money and the principle of portfolio diversification to develop his liquidity preference theory. The starting point of Tobin's theory is an investor who is allocating a given amount of wealth among money, debt, securities such as bonds and equity investments such as common stocks. Like Keynes's liquidity preference theory, Tobin's recognizes that a security's interest rate, or expected rate of returns is the major factor determining the demand for security. He focuses on risk as another's fundamental factor that investors should consider when selecting assets. According to Stephanie Stolz (2002), banks portfolio model assume that the banks objective function is to maximize the expectation of a Von Neumann Morgenstern utility function that describes the preferences of the risk-averse owner-manager. Von Neumann–Morgenstern model is the analytical tool for dealing with choice under uncertainty. It begins with a utility function that assigns a numerical measures of satisfaction to each outcome, where outcomes are defined in terms of the final wealth to which they correspond. Henderson and Quandt (1980,p.61) postulate that the utility of a

risk-averse consumer is strictly concave while risk lovers and risk neutrals have strictly convex and linear utility functions respectively.

In banks, portfolio model approach is the vehicle for analyzing risk management problems in a coherent way. As noted by Baltensperger (1980), this coherence is obtained through a somewhat mechanic conception of the banking firm, a collection of financial assets with exogenous but stochastic rate of return, and with liabilities treated as negative assets.

According to Job Swank (1996), most applications of bank portfolio models deal with the efficiency or inefficiency of regulatory requirements. Kwan and Eiserbeis (1996) see inefficiencies as a function of leverage, asset quality, and growth of the bank. According to them, leverage, assets risk, and inefficiencies are simultaneously determined and can be expressed in general terms as inefficiencies being a function of leverage, assets quality and bank growth, then assets quality as a function of inefficiencies, assets composition, and assets growth while Leverage is a function of Inefficiencies, regulatory capital constraints, asset returns. All of these are captured using accounting ratios from the banks' balance sheets whose values are BADLOAN, BVCAPITAL, M-LOAN, M-LOAN2 for inefficiency, INEFF, RE, CI, CS, M-LOAN, M-LOAN2 for assets quality or Bad loans and INEFF, BASLE, ROA for capital.

That imposing a simple capital asset or gearing rate is likely to increase rather than decreases the probability of bank default. He said that the simple capital asset ratio ignores two fundamental insights from portfolio theory: (1) the bank's

balance sheet items do not entail the same risks, that is, the associated rates of return have different variances, and (2) the bank can diversify some risk away owing to non-zero co-variances. Said Keeton (1989), this pitfall can be avoided by relating required amount of capital to the risk-weighted sum of assets, laid down in the Basle agreement on capital adequacy. The key problem is then to determine the appropriate risk weights.

Kim and Santomero (1988) said that the correct weights of capital assets are a function of the regulator's minimum aspiration level of bank solvency and the expectations, variances and co-variances of the assets returns. They said that the bank's risk preferences are irrelevant to the optimal weights and that it is not clear whether the risk-based capital standard affects risky banks more than safe banks. They conclude by claiming that the straightforward nature of the optimal risk weight determination implies that their empirical estimation could be implemented and used to evaluate the regulator's risk weights.

2.2 Empirical Studies of Bank Behavior

2.2.1 Introduction

This section shows the review of the empirical bank studies on the implications for the optimal capital structure, risk-taking, and interaction with regulation and supervision. Although much attention has been accorded to the variables that explain the stability of the banks in the specifications, most models have attempted capturing other variables, which have proved to be essential in

explaining the regulatory behavior in the economies of their application. Among some of these models that have been specified and estimated includes those of developed countries whose banking operations are similar to that of Nigeria. The choice of these models for illustrative purposes in our analysis is informed by the following reasons:

(i) The models would provide us the basis for substantiating the existence of a relationship between capital stock and risk;

(ii) They would also allow an understanding of the direction of the relationship;

(iii) They would permit an insight into the role of other variables in explaining risk behavior; and

(iv) As reflection of general bank models, they would provide a background point of departure for this study.

2.2.2 Empirical Studies Review

Marcus (1983) employs non-parametric tests along with simple correlation analysis to explain the decline in capital to asset ratio in US commercial banks between 1965 and 1977, confirms the peer group theory of regularly pressure. The study focus on the effect of drop in capital common to all banks, for example due to a risk in the interest rate, and found out that it does not induce regulatory authority to review any particular bank and consequently do not require banks to readjust capital. This means that when banks suffer capital losses, the increase in regulatory costs for a particular bank is much smaller than

it would be if that bank alone lowered its capital. Using the same methodology, but when the minimum capital asset ratio requirement replaces the peer group type of capital regulation, Keeley (1988) studies the effect on the capital positions of the 100 largest bank holding companies in United States. He finds that the regulations succeeded in causing banks with low capital ratios to increase their book value capital ratio both absolutely and relatives to banks with initially high capital ratios, and that banks did so primarily by slowing assets growth.

Hart and Jaffee (1974) and Marcus (1983) conducted a research work on the factors that explain the decline in capital to asset ratios in US commercial banks between 1965 and 1997. In their attempt to observe whether the behavior of the general risk level reflects changes in the capital supply, the result thus obtained revealed that changes of risk and capital are the result of exogenous shocks and discretionary behavior. This problem must be dealt with to empirically model the interrelation between bank capital and risk decisions. With respect to capital: 'exogenous' changes can be the result of enforced increases in capital required by regulators, unanticipated changes in earnings caused by fluctuations in operating income or loan values which affect loans losses allowances. With respect to risk, exogenous changes could be the result of unanticipated shocks to the national or local economy, such as changing characteristics of loan demand in the bank's market area, or volatility in the value of loan collateral such as real property.

While Marcus (1983) and Keeley (1988) did not consider risk-taking, Shrieves and Dahl (1992) analyze the relationship between changes in bank capital and changes in portfolio risk for the US banking sector in the mid-eighties. They refine the Marcus' methodology by using two-stage simultaneous equation estimation, thereby taking into account that banks simultaneously determine capital and risk levels.

Shrieves and Dahl (1992) argued that major determinants of the risk of a bank's asset portfolio include the allocation of assets among risk categories and the quality of the assets in the loans component of the portfolio. Thus, they use two risk measures, the composite measure of asset risk adopted by regulators in risk-based capital guidelines and the ratio of non-performing loans to total loans. Support for these measures can be found in Chessen (1987) and Keeton (1989) for the composite measure and in Meeker and Gray (1987), Beaver et al (1989), and Nejezchled and Morgan (1990) for non-performing loans. They found evidence for a positive relationship between bank capital and risk-taking. The fact that this held true even in banks, which were in excess of the minimum regulatory capital requirement, supports the conclusion that the positive association between risk and capital of such banks is not strictly the result of regulatory influence. It rather reflects the view that risk-taking behavior tends to be constrained by bank owners' and/or managers' private incentives. Target capital levels and rates of adjustment of capital were higher for banks presumed to be under regulatory pressure due to low capital levels. This indicates that

capital regulation was at least partially effective for banks with low capital levels. The results suggest that banks will tend to offset regulatory induced capital increases with increase in asset risk unless constrained from doing so by the regulatory apparatus.

By using the same methodology as Shrieves and Dahl, Jacques and Nigro (1997) extend the work of shrieves and Dahl to capture the relationship between changes in bank capital, portfolio-risk, and risk based capital standards. They find that the risk-based capital ratio's led to significant increased in capital ratios and decreases in risk exposure both for risk-based capital constrained and unconstrained banks

Aggarwal and Jacques (1998) investigate the impact of the prompt corrective action (PCA) provisions on bank capital ratios and portfolios risk levels using the same model as in Shrieves and Dahl (1992). The Federal Deposit insurance corporation improvement Act of December 1991 had defined a series of capital thresholds used to determine what supervisory actions bank regulators would take. They find that both adequately capitalized and undercapitalized banks increased their capital ratios and lowered portfolio risk in response to PCA during both the announcement period 1992 and the first year the standards were in effect (1995). The speed with which banks adjusted these variables was higher for 1993 than for 1992. These results suggest that PCA has been effective in getting both undercapitalized and adequately capitalized banks to increase their capital ratios without an offsetting increase in portfolio risk.

Ediz, Michael, and Perraudin (1998), using a similar model used by Shrieves and Dahl to study the U. K banking sector from 1989 to 1995. They analyzed whether pressures by supervisors affect bank capital dynamics when capital ratios approach their regulatory minimum and how banks adjust their capital ratios when subject to regulatory pressure. The authors study the change in capital ratios within a dynamic multivariate panel regression model that is the same with that of Shrieves and Dahl. They find that capital requirement induce banks to increase their capital ratio even after one allows for internally generated capital targets. With this, they conclude that banks do not significantly rely on asset substitution away from high-risk weighted assets to meet their capital requirements as they approach the regulatory minimum. They further said that the regression suggest that the adjustment comes through increases in narrow capital (Tier 1).

Furlong (1988) studies how the default risk of large U. S bank holding companies changed in the pre-Basel period from 1975 to 1986. He finds that asset risk measured actually double in 1981-1986, the part of his sample in which banks faced capital requirements.

Sheldon (1996) performs a similar analysis for 219 G –10 banks over the period 1987 to 1994 in which the Basel regulations came into force. He studies the risk-seeking effects of the implementation of the new-based capital standard. His results suggest that asset volatility in US banks rose irrespective of whether the banks increased their capital. In Japan, asset volatility fell although most

banks raised their capital ratios. Sheldon's results provide little evidence that the implementation of the Basel guidelines increased the probability of bank failure.

Thies and Gerlowski (1989) and Wheelock (1992) find for the US banking sector that risk-taking and probability of failure are increasing with deposit insurance. Similarly, Demirguc-Kunt and Detragiache (2000) find in a sample of 61 countries that over a period from 1980-1997, deposit insurance significantly increased the probability of a banking crisis. They also find that in countries where bank regulation and supervision is of poor quality, moral hazard due to deposit insurance is higher.

The findings by Gropp and Vessala (2001) stand in contrast to these former empirical results. They study the relationship between deposit insurance, debt-holder monitoring, bank charter values, and risk- taking for European banks and find that the introduction of explicit deposit insurance reduces the risk-taking of banks. Gropp and Vessala explain their result by the expectation that in the absence of deposit insurance, public bailout would save banks in time of distress. The establishment of an explicit deposit insurance system then actually limits the scope of the safety net. This result implies that the belief of the depositors in a public bailout is sufficient for moral hazard of banks. They also find that banks with lower charter values reduce risk-taking more after the introduction of explicit deposit insurance that suggests that the introduction of explicit deposit insurance does not alleviate "too-big-to-fail" problems.

Saunders, Strock, and Travlos (1990) provide empirical evidence for the impact of ownership structure and deregulation on bank risk-taking for bank holding companies over the period 1978-1985 using a cross-section time-series regression, they explain risk (using several different capital market risk measures) by the ownership structure, the regulatory environment, and other bank specific variables. Their result suggest an agency problem between managers who also hold capital of the bank (insiders) and outside investors, who only hold capital without being managers. They find that risk-taking differences between stockholder and managerially controlled banks become more transparent in periods of deregulation which suggest that high bank charter values can mitigate moral hazard by stockholders.

Keeley (1989) examines differences in stock price reactions following voluntary capital injections by commercial banks and involuntary re-capitalization required to meet regulatory capital requirements for US in the period 1975 to 1986. He finds significant drop in the share price of capital constrained banks after the re-capitalization announcement while for well-capitalized banks; the stock price did not show a similar behaviour.

Uchendu (1995) examines the effect of monetary polices on the performance of Nigerian commercial banks using a portfolio management theory, the statistical model and production function approach. He developed an ordinary least square simple equation model to identify the impact of some selected monetary policy variables on the performance of Nigeria's commercial

banks in the period 1970 to 1993 and found that whether you use all banks data, six banks or the three big banks' data in Nigeria, the dominant factors influencing banks profitability are interest rate, exchange rates, bank reserves, banking structure and unit labour cost. He therefore concludes that a stable and realistic monetary and banking policies are important for profitable commercial banking in Nigeria.

Nyong (1996) extended Uchendu's work of investigating the performance of Nigeria commercial banks using a simultaneous equation model. He finds that there is a correlation between profit and capital in Nigerian commercial banks. He used data from 1982 to 1990 and hypothesizes the model linking profitability to capital investment in a banking setting. According to him, profit depends on capital investment, which provides the wherewithal for the purchase of equipment and machinery and the adoption of modern technology for improved performances. Said he, increase profits motivate further increases in capital investment, which in turn expand the scope of banking operations for increased profitability.

Hancock and Wilcox (1997) estimate a bank portfolio adjustment model that relates state-wide growth in real estate lending (for single –family and for commercial real estate) to a measure of capital pressures on banks in that state using the average capital shortfall/surplus relatives to an assumed 4.75% leverage ratio standard, indicators of national economic conditions, indicators of state wide-economic conditions, and other variables. Their empirical findings are

consistent with the hypothesis that commercial real estate lending is much more vulnerable to negative capital shocks than is single-family residential lending. They said that vulnerability results from the fact that the residential mortgages market is more liquid than is the commercial mortgages market.

Hancock and Wilcox (1998) use annual state-level banking data for the period 1988-1992 to assess whether any reductions in business loan supply at small banks are off-set by increases in loan supply at large banks, and vice versa. A business loan at large banks shows some tendency to rise when capital falls at small banks.

Peek and Rosengren (1997 a) also examine the commercial real estate sector. They document that leading U. S branches and subsidiaries of Japanes banks over the period 1988-1995 was highly sensitive to the parent's regulatory capital positions.

2.2.3 Tobin's Portfolio Selection model: The Risk-Averse Theory of Liquidity Preference.

This part of the model start with a presumption that an individual asset holder has a portfolio of money and bonds where money neither brings any returns nor imposes any risk on him. But bonds yield interest and also bring income along with risk. It assumes that the expected value of capital gain or loss from holding interest bearing assets is also zero. As Keynes puts it, an investor with a given total balance must decide what proportion of this balance to hold in cash, A_1 and in bonds A_2 where the yield on cash is zero and on bonds is N_r.

However, Tobin (1947) removes two major defects of Keynes; (1936) liquidity preference. These are dependence on the inelastic expectations of future interest rates and that individuals hold either money or bonds. Hence, the remove version as contains in Tobin (1947) became more relevant to this study and is reported in equations 2.3 to 2.6.

The portfolio consists of a proportion of money (M) and bonds (B) where both M and B add up to 1 and do not have negative values. The return on a portfolio is given in equation (2.4) below. According to Tobin, the standard portfolio constraint function of the investor is:

(2.3) $R = \beta(r+g)$ where $0 < \beta < 1$:

(2.4) $\sum(R) = U_R = \beta_r$:

(2.5) $\sigma_R\ \beta\sigma_g$ where $0 < \beta < 1$:

(2.6) $U_R = r/\sigma_\sigma\ \sigma_R$ where $0 < \sigma_R < 1/\sigma_g$.

Equations (2.2) to (2.6) are the basic analytical framework of the standard risk-averse investor whose specification is situated in the context of his risk behavior. It reflects the expected returns equation (2.4) and the reasons of decisions taken by prospective investors equations (2.5) and (2.6).

The framework implies that portfolios selection is based on the yield expected and the risk from the choice of the investment. The risk attached to portfolios is measured by the standard deviation of R, which is a measure of dispersion of positive returns around the mean value of U_R, equation (2.4).

A high standard deviation means high probability of large deviation from the mean, both positive and negative while a low one means low probability of large deviation from mean, (U_R). In the extreme case, a zero standard deviation indicates certainty of receiving the return. Thus a high standard deviation of R portfolio offers investors the chances of large chances of large capital gain at the price of equivalent chances of large capital losses. A low standard deviation of R portfolio protects the investor from capital loss, and likewise gives him little prospect of usual gains.

The standard deviation of R depends on the standard deviation of g, σ_g and on the amount invested in bonds, (equation 2.5) β determines both in expected U_R and his risk σ_R. The returns on which the investor can obtain expense of assuming more risk can be derives from equations (2.5) and (2.6).

2.2.4 Peak and Rogengren's Model of Bank Behavior

The Peak and Rogengren model measures the effect that changes in capital regulation might cause on deposits and loans of banks. In particular, capital shortages in the banks included in our sample was derived from two sources: the first stems from loan losses, forcing banks to write down capital, the second is due to changes in regulation, raising bank's capital ratio.

In order to derive the implications of the two sources of shocks, it is useful to refer to the following simplified version of the banks' balance sheet:

(2.7) $D + (RK + EK) \equiv D + TK = L + B$

Where D = Deposits, RK = Regulatory capital, ER = Excess capital, TK = total capital, L = Loans, ands B = bonds.

Assuming that capital regulation is defined by the leverage ratio:

(2.8) $k = RK/L$

and that supply determined loans can be expressed as

(2.9) $L = RK/k$,

from equations (2.7) and (2.8), the expression for deposits will be:

(2.10) $D = L + B - (RK + EK) = RK/k - RK - ER + B$

Which by total differentiation becomes:

(2.11) $\partial D = ((1/k) - 1)\, \partial RK + (RK)\, \partial\, (1/k) - \partial EK + \partial B$

As a matter of completeness, assuming further that banks do not wish to change their bond holding ($\partial B = 0$). Then, totally differentiating expression (2.10) for loans will have

(2.12) $\partial L = (1/k)\, \partial RK + RK\, \partial(1/k)$

Both expressions (2.11) and (2.12) can be discussed within three distinct situations:

(i) The crisis case, when a negative shock to total capital affects bank lending and liabilities (i.e. $\partial TK<0$);

(ii) The regulatory restriction case, when a change in regulation raises the fixed minimum capital requirement (i.e. $\partial Tk > 0$)

(iii) The case of crisis with regulatory restriction, when the regulatory restriction takes place during a financial crisis and

the previous two impacts need to be considered simultaneously.

The Crisis Case- from (2.11), assuming that if the bank is capital constraints ($\partial EK = 0$ and $\partial TK = RK$), the impact of a decrease in capital and in regulatory capital will cause a reduction in deposits. Alternatively, if the bank is not capital constrained ($\partial RK = -\partial EK$ and $\partial TK = 0$), the impact will be of opposite sign. This is the case considered by Peak and Rosengren that shall be labeledas the "crisis case".

Following Peak and Rosengren:

(2.13) $\partial TK < O \Rightarrow \partial D/\partial TK > O$ if the bank is capital constrained.

(2.14) $\partial TK < O \Rightarrow \partial D/dTK < O$ if the bank is not capital constrained.

(2.15) $\partial TK < O \Rightarrow \partial L/\partial TK > O$ if the bank is capital constrained.

(2.16) $\partial TK < O \Rightarrow \partial L/\partial TK = O$ if the bank is not capital constrained.

A direct implementation of these results is testing whether there is a positive correlation between a change in capital (∂TK) and in deposits (and /or loans).

The Case of Regulatory Change- assuming that capital shortages may derive from an increase in capital ratio (here the leverage ratio k). If effective, this exogenous increase will cause a reduction in deposits of the constrained banks (since $\partial EK = 0$). The impact on the unconstrained bank instead will be

null, since there will only be a substitution of excess capital with regulatory capital $\partial EK = (-RK)\ (\partial K/k)$.

In this second case, assuming that an increase in the capital ratio ($k = K/L$) has a clear-cut impact on deposits and loans whenever the bank is capital constrained:

(2.17) $K < O \Rightarrow \partial D < O$ if the bank is capital constrained.

(2.18) $\partial K > O \Rightarrow \partial D = O$ if the bank is not capital constrained

(2.19) $\partial K > O \Rightarrow \partial L < O$ if the bank is capital constrained.

(2.20) $K > O \Rightarrow \partial L = O$ if the bank is not capital constrained

Assuming that an increase in the capital ratio ($\partial k > 0$) does not imply a predefined variation of total capital (TK), still, where banks are capital constrained and have limited asset alternative to loans, the presence of hypersensitivity of an individual bank negative shock to capital should lead to a positive correlation between changes in capital and deposits (loans). In addition, the correlation becomes stronger with the increase of the leverage ratio (k).

The Case of Crisis with Regulatory Restrictions- In this third case, the assumption is that capital shortage may be derived both from losses and from the introduction of a more restrictive capital regulation. If the bank is capital constrained ($\partial EK = 0$), the result will be a cumulative effect driven by the capital reduction due to losses (lower deposits) and by a higher capital ratio (lower deposits). The impact on deposit of the negative shock on capital would

therefore be reinforcing. If the bank is not capital constrained the cumulative effect should be inducing banks to reduce their lending, especially the ill – advised lending which are induced by bank's exploitation of the public safety net, (i.e. NDIC). In fact the increase in regulatory capital would be absorbed by a compensating reduction in excess capital ($\partial EK = \partial RK$) with no effect on deposits (equation 2.18) while the negative shock to total capital would again be transmitted with a negative sign to deposits (equation 2.14).

Looking at the loan side, the assumption is that the increase in capital ratio (k) (equation 2.19) and the decrease in total capital (TK) (equation 2.15) will have a negative impact for capital constrained banks. The sum of the two effects in the "crisis" plus "regulatory tightening" is likely to have a magnified effect.

(2.21) $\partial TK < 0$ and $\partial k > O \Rightarrow \partial D < 0$ if the bank is capital constrained.

(2.22) $\partial TK < 0$ and $\partial k > O \Rightarrow \partial D < 0$ if the bank is not (enough) capital constrained.

(2.23) $\partial TK < 0$ and $\partial Tk > O \Rightarrow \partial L < 0$ if the bank is capital constrained.

(2.24) $\partial TK < 0$ and $\partial k > O = \partial L < 0$ if the bank is not (enough) capital constrained.

Therefore, when a regulatory restriction is enforced during a financial crisis, the assumption is that there will be a negative correlation between changes in capital and changes in deposits (loans). This would be severe for banks with not or not (enough) capital constrained, either being well capitalized

or undergoing smaller negative capital shocks. In this research, consideration is given to the second and third situation using Nigerian banks data.

In order to test for the effect on deposits and loans of a shock to Capital Adequacy Ratios, the nature of our sample, the method of analysis, which is panel in nature, control variables for year of enforcement and macro-economic effects are taken into account. In this wise, the following two regressions are estimated:

2.2.5 RIME'S MODEL OF BANK BEHAVIOR.

In this model, we combine Tobin, and Aggarwal and Jacques's model of bank behavior. This combination is justified by the need to bring together portfolio selection process and capital adequacy of commercial banks as they affect the efficient implementation of monetary policy in Nigeria. Tobin's model allows us to link risk taking with the yield from investment holding while Aggarwal and Jacques's models allow us to link bank capital requirement with risk taking lending to the availability of credits to the economy.

The synthesis of the two models therefore allow us to analyze the interactive behavior of capital adequacy and the provision of bank services, especially credits within their monetary policy thrust. The model is a simultaneous equation whose specification is aimed at capturing the interdependencies that exist or appear between risk and capital.

To provide the model suitable for the study, we use risk management theories and the portfolio theories, which assumes that risk-taking in banks fully,

reflect available capital. The immediate implication of the model is that successive increase in risk is a function of increase in capital of the bank. Here, observed changes in bank's capital and risk levels consist of two components, a discretionary adjustment and change caused by factors exogenous to the bank.

(2.25) $\Delta CAP_{jt} = \Delta^{\partial} CAP_{jt} + E_{jt}$

(2.26) $\Delta RISK_{jt} = \Delta^{\partial} RISK_{jt} + S_{jt}$

Where ΔCAP_{jt} and $\Delta RISK_{jt}$ are the observed changes in risk levels respectively for bank j in period t.

The discretionary changes in capital and risk, $\Delta^{\partial} CAP_{jt}$ and $\Delta^{\partial} RISK_{jt}$ are modeled using the partial adjustment framework, thereby recognizing that banks may not be able to adjust their desired capital ratio and risk level instantaneously. In this framework, the discretionary changes in capital and risk are proportional to the difference between the target levels and the levels existing in period t-1.

(2.27) $\Delta^{\partial} CAPj_{jt} = \alpha (CAP_{jt}^{*} - CAP_{jt-1})$

(2.28) $\Delta^{\partial} RISK_{jt} = \beta (RISK_{jt}^{*} - RIOSK_{jt-1})$

Where CAP_{jt}^{*} and $RSIK_{jt}^{*}$ are bank js target capital and risk levels respectively.

Substituting equations (2.27) and (2.28) into equations (2.25) and (2.26), the observed changes in capital and risk can be written:

(2.29) $\Delta^{\partial} CAP_{jt} = \alpha (CAP_{jt}^{*} - CAP_{jt-1}) + E_{jt}$

(2.30) $\Delta^{\partial} RISK_{jt} = \beta (RISK_{jt}^{*} - RIOSK_{jt-1}) + S_{jt}$

These observed changes in capital and risk in period t are a function of the target capital and risk levels, the lagged capital and risk levels, and any exogenous factors. Therefore.

(2.31) $CAP_{jt}^* = f\ (REG_{jt-1}, ROA_{jt}, SIZE_{jt}, DRISK_{jt})$

(2.32) $RISK_{jt}^* = g\ (REG_{jt-1}, LOSS_{jt}, SIZE_{jt}, DCAP_{jt})$

The framework for this study is a synthesis of Tobin, Peak and Rosengren and Rime's models of bank behavior. The synthesis can be justified by the need to bring together portfolio selection process and capital adequacy of commercial banks as they affect the efficient implementation of monetary policy in Nigeria. Tobin's model allows us to link risk taking with the yield from investment holding while Peak and Rosengren model allow us to link the banks' capital to loans and deposits. Rime's model allows us to link bank capital requirement with risk taking leading to the availability of credits to the economy.

The synthesis of the three models therefore allows us to analyze the impact of capital adequacy on the bank and their provision of bank services, especially credits. According to Goodhart (1982) the most that can be done in a study of the impact of policies on commercial banks is to examine the determinations of its asset demand function and of its rate-setting functions. In order to show the complete process of portfolio determination, it is necessary to explore the inter play between the commercial bank capital and the regulatory pressure of government within the economy. The model is specified in chapter three.

2.3 Bank Distress in Nigeria.

The bank distress and failures in Nigeria started with the collapse of the African Banking Corporation in 1892. However, it was taken over by the Bank for British West Africa in 1894. The period of this bank failure is divided into two.

The first period is between 1892 and 1952 described as free banking era when no law governing the operations of the banks was in place. Also, this period saw the absence of a regulatory institution –Central Bank of Nigeria and Nigeria Deposit Insurance Corporation.

According to the Central Bank of Nigeria, Banking Supervision Annual Report (2001, p.67), the history of financial distress in the Nigerian banking system dates back to the 1930s when 21 indigenous bank failures were recorded, prior to the establishment of the Central Bank of Nigeria in 1958. The first financial crisis was attributed to a number of reasons including the under capitalization of banks, weak management, inappropriate corporate governance structures, reckless use of depositors' funds, excessive growth and lack of regulation and supervision. This 21 were out of the 25 indigenous banks in operation. This high failure rate attracted public displeasure. Adekanya (1986) said that it was because of the need for appropriate laws and regulations to control the activities of the operations of banks that had led to the setting up of the Paton Commission in 1948 and paved the way to the enactment of the 1952-banking ordinance.

From 1958 when the Central Bank of Nigeria (CBN) was established to 1986 when the Structural Adjustment Programme (SAP) was introduced, the Nigerian banking industry witnessed relative stability. However, following the adoption of SAP, which was based on the principle of free market economy, noticeable cracks were beginning to show in the walls of stability experienced in the industry. The second financial crisis, which started in 1989 with the identification of eight distressed banks, worsened gradually with 31 banks being liquidated by 1998. In 1989, eight (8) banks were adjudged technically insolvent. From the period until very recently, the situation had deteriorated to a frightening level. With the exception of the slight decline from nine in 1990 to eight in 1991, the number of distressed banks was increasing. The incidence reached its peak at the end of 1995 when the total number of distressed banks stood at 60 out of which 31 were not only insolvent but also terminally distressed. As a result of intervention by the regulators the number reduced to 45 in 1997. In 1998, the Central Bank of Nigeria revoked the license of 26 of them while taken over 22.

As at 31st December 1999, the number of distressed banks dropped to 10 from 22 in 1998. This was largely due to the recapitalization efforts of the shareholders of the affected banks and the interest shown by new investors. In furtherance of its distress resolution efforts, the CBN in 2000 sold four of the banks earlier acquired to new investors. While the banks were recapitalized, the CBN management granted partial waivers on the banks' overdrawn accounts with

them and converted the balance to 5-year term loans with moratorium of two years, as a gesture of its support to the restructured banks.

Three other banks were recapitalized, restructured and sold to new investors. Furthermore, the banking licenses of three other banks. The development of commercial banking in Nigeria and the experiences of the bank failures portray a pattern that in the early periods of their development, the banks were mainly private small companies and failed at the least shock. Such banks were forced to increase note-issue in times of difficulties, but eventually burst leading to failures. In the later periods and with extensive amalgamations and withdrawal of note issuing from the banks, they became large corporations and significantly stabilized. With the liberalization in the 1980s, they went back into the crisis situation. Since then, the battle to resuscitate them has being on going.

2.4 The New International Banking Standard.

This refers to the tools and methodologies put in place by the Bank for international settlement (BIS) to adopt a common level standard for Banks operation across borders. Banking is an international business and the internationalization of banking created the need for common standards that could be applied across national borders. The internationalization led the Bank of International Settlements (BIS) to form, in 1974, the Basle Committee on Banking Regulation and Supervisory Practices. The committee which comprises of representatives from central banks and regulatory authorities publishes its

report on the "International Convergence of capital Measurement and Capital Standards" in 1988. Following their recommendations on the need for a common and effective standard of measurement for capital adequacy, a bank's capital is no longer related to total credit but to risk weighted assets. Their report was initiated and adopted by the Group of Ten (G-10) industrialized countries.

This agreement on standards of capital adequacy arose following the failure of saving and thrift institutions in the USA and indeed the proliferation of banking crises in other nations across the world during the 1980s including Germany. The agreement was to integrate the standard of capital adequacy across countries and to supplement the existing leverage requirement by accounting for the risks associated with banks portfolios. The 1988 Basle Accord was adopted in Nigeria in 1990 as a ''standard of best practice," to complement the existing leverage requirement, for banks to maintain prudent capital positions. The Accord defined ''risk buckets'' that group bank assets with presumably similar risk as well as a credit risk-based weighting mechanism to arrive at the banks' risk-adjusted asset value. In 1996, the Basle Committee proposed an amendment to the 1988 Accord to cover risks that arise from market factors. The general objectives according to Bank for international Settlement (BIS) behind the implementation of these risk-based requirements were to:

(1) make regulatory Capital more sensitive to differences in risk profiles among banking organizations;

(2) take off-balance sheet exposures explicitly into account in assessing capital adequacy; and

(3) lower the disincentives to holding liquid, low risk assets.

The Nigerian Credit risk-based standards attach risk weights to broad categories on and off-balance sheet activities. Similar to the Basle committee Agreement, assets are classified into four categories. The Lowest category carries a zero weight and contains those assets with the least risk such as cash, reserves and government securities. The next lowest category has a risk weight of 20 percent and includes inter-bank deposits, claim on banks and securities issues by government agencies. The third category attracts a risk weight of 50 percent and includes residential mortgages. The last risk category has a maximum weight of 100 percent and includes remaining securities such as commercial papers, loans and fixed asset. Off-balance sheet activities were also 20 percent risk weighted. The weights for the items on the balance sheets of Nigerian banks according Central Bank of Nigeria circular of 29 march 1990 are presented in Table 2.1.

TABLE 2.1: BANK ASSETS AND RISK WEIGHTS IN NIGERIA.

Nos.	Types of Assets	Risk Weights %
1.	Cash in Hand	0
2.	Balance Held with:	
	(i) Other banks in Nigeria	0
	(ii) Other banks outside Nigeria (including foreign currencies held)	20

3.	Federal Government Stock	0
4	Treasury Certificates	0
5	Treasury Bills	0
6	Negotiable Certificate of Deposit	0
7.	Non-Negotiable Certificate of Deposit	50
8.	Industrial Investment	50
9.	Loans and Advances:	
	(i) Loans to Federal Government	0
	(ii) Bankers' Acceptance	20
	(iii) Owner Occupier of Residential Mortgage	50
	(iv) Private Sector-Commercial Real Estate	100
	(v) Other loans	100
	(vi) Commercial Papers	100
10.	Fixed Assets	100
11.	Other Assets	100
12.	Contra items (contingent liabilities)	20

Source: Central Bank of Nigeria circular of 29 March 1990.

The emergence of the New Capital Accord and the global initiative to achieve its implementation by the end of 2006 made it compelling for the Central Bank of Nigeria to ensure full compliance with the 1988 Accord. A joint CBN/NDIC Committee recognized this in 1995. Consequently, in August 2003, the Central Bank of Nigeria issued a circular reference BSD/11/2003, which raised the minimum capital adequacy ratio (CAR) from 8 to 10 percent. The risk weights of some asset categories were also reviewed, while off-balance sheet items were broken down into various risk categories as recommended in the 1988 Accord. The highlights of the review are as follows:

(i) A 20 percent risk weight is adopted in Current account balances with other banks in Nigeria without reference to tenure because such balances are meant to facilitate transaction settlement among banks. However, where such funds are held with banks that are confirmed to be illiquid, a 100 percent weight is adopted.

(ii) A 100 percent is adopted for Claims on Banks outside Nigeria.

(iii) The Certificates of Deposits (CDs) which had zero percent and 50 percent weights for Negotiable and non-Negotiable Certificate of Deposits, now attracts higher weights of 50 and 100 percents respectively, because banks no longer have recourse to Central Bank of Nigeria on such issues/products.

(iv) Bankers' Acceptance attracted a 20 percent weight in the past. However, in view of the fact that banks do rediscount acceptances or purchase acceptances issued by other banks, and report such transactions on balance sheet, the transaction represents pure lending and now attracts a 100 percent weight. Bankers' acceptances that are reported off-balance sheet will be treated as such.

(v) Industrial Investment, which previously attracted a 50 percent risk weight, now attracts a 100 percent weight in line with the 1988 Accord.

(vi) Only loans granted directly to the Federal Governments will attract zero percent weight while other subordinated governments (States and

Local Governments) and their agencies are assigned a 100 percent weight in accordance with the 1988 Accord. Also, loans to Federal Government agencies and parastatals now attract 100 percent weight.

(vii) For loans fully secured by mortgage on residential property, a 100 percent weight is applied to reflect the realities of our environment, which had made the perfection of securities problematic and realization almost impossible especially where the owner occupies the property.

(viii) Off-balance sheet engagements are grouped into six risk buckets in accordance with the 1988 Basel Accord. Each category is assigned a credit-conversion factor, which reflects the credit risk characteristics of the transactions as against the 20 percent risk weight, which was applied wholesale to the off-balance sheet figure. The classification and the risk conversion factors are as follows: (1) Bankers Acceptances-100%, (2) Confirmed Documentary Credit-20%, (3) Guarantees and Endorsements-50%, (4) Bills for Collection-100%, (5) Obligations due to Repurchase-100%, (6) Other Commitments and Contingencies-100%.

According to Central Bank of Nigeria monitored capital standards (2003) a bank is expected to meet the risk-based requirement, which is the ratio between its capital base and the aggregate of its on-balance sheet assets, off-balance sheet

items, managed funds and foreign exchange risk exposure at no less than ten percent presently.

The risk-based capital standards adopted by the Central Bank of Nigeria before 1994 were not without their Limitations. One major limitation was the fact that the risk-based standards only account for the credit and foreign exchange risks. This excludes other risks such as interests rate, liquidity and operational risks, which can potentially incur significant capital losses. For example, a bank may choose to simply substitute away from assets with high credit risk towards assets that posses' considerable interest rate risk, since the risk-based measure does not account for interest rate risk, this move will remain unaccounted for by capital. Such examples led to the hypothesis that the risk-based capital requirements affect bank's risk behavior adversely, (Genotte and Pyle 1991 and Koehn and Santomero 1980). There were also the problems with deriving the optimal risk weights to be applied, Avery and Berger (1991) and Kin and Santomero (1988). Another potential problem with risk-based capital standard was that they do not limit the amount of risk in a bank's asset portfolio. That is then simply estimating the amount of capital that must be held concomitant with the credit risk present in the portfolio whatever the level of risk.

Based on these shortcomings, the Basle committee has sought to refine the risk-based requirements with a view to making them even more "risk sensitive'. These revisions are being amended for implementation on or before December 2006. Changes that have been proposed include making the risk

weights dependent on the ratings of borrowers. These ratings could be sourced externally (for example, from some rating agency) or evaluated internally based on the banks own model for risk assessment. With these changes, elements of other types of risk might also be incorporated into the risk might also be incorporated measure.

The Basel Committee does not have legislative authority, but participating countries are implicitly bound to implement its recommendations.

2.5 Impact of the New International Banking Standard on Bank Behavior.

The main thrust of the New International Banking Standard is the adoption of the international convergence of capital measurement and capital standard (the risk-based capital) across borders. Since its introduction, the risk-based capital ratios in developed and developing economies including Nigeria have significant effects on the operation of banks. Although the data are not fully comparable across countries (due to such factors as differing tax regimes, accounting standards, industrial and regulatory factors and cultural differences), it is clear that the introduction of the Basle capital adequacy ratios has effect in the behavior of the banks. The first and most basic behavior concern the question whether regulatory capital requirements induce commercial banks to hold higher capital ratios than would have otherwise been the case.

Literature on the effectiveness of capital requirements does provide evidence that, since the introduction of formal regulatory capital requirements, bank's capital ratios that were below the regulatory minimums increase their capital ratios more rapidly than strongly capitalized banks, (Patricia Jackson, et, al, 1999). According to them, most works employed a partial adjustment specification in which if Y_t is the actual capital ratio of an individual bank and YD_t is the bank's capital target at time t, then Y_t is assumed to follow the process:

(2.9) $Y_t - Y_{t-1} = \alpha(YD_t - Y_{t-1}) + U_t$.

Here, U_t is a random error and α is a positive parameter. When Y_{t-1} exceeds (is less than) YD_t, the sign of α implies that $Y_t - Y_{t-1}$ is on average negative (positive). Hence, in the long-run Y_t will tend to converge towards YD_{t-1} and the magnitude of α reflects the rate at which such convergence occurs. Since the bank's desired capital ratio YD_t is not observable, researchers have employed a proxy, typically replacing YD_{t-1} in the above equation with a weighted sum, $\sum b_i X_{it}$, where the X_i are lagged conditioning variables describing the state of the economy and the bank's financial situation and the β_i are constant parameters to be estimated.

Capital pressure as measured by proximity to minimum capital levels has been introduced into partial adjustment models of this kind (i) by including among the Xi conditioning variables a dummy variable which is unity when capital ratios are below some level and zero otherwise, (ii) by allowing such a dummy to interact with Y_{t-1} (this permits the convergence parameter ∂ to vary

according to whether banks are subject to regulatory pressure (whether such pressure is a result of regulatory or market discipline) or not), or (iii) by estimating entirely different models for banks subject to regulatory pressure and those which are not. Adopting any or the combination of these methods according to Aggarwal and Jacques (1997), Ediz, Michael and Perraudin (1998) and Rime (1998) shows that the studies are effectively investigating whether undercapitalized banks tend to increase their capital ratios more rapidly than other banks.

Of course, the coefficient on a dummy variable may be influenced by any omitted variables that would distinguish undercapitalized banks from better-capitalized banks. For example, suppose that undercapitalized banks are located in areas, which have experienced a more severe downturn than those areas where better-capitalized banks are located. If the researcher does not take the differences in macroeconomic conditions into account, then such dummy variable could pick up the influence of differences in macroeconomic conditions, rather than an effect of capital regulation, per se. In the case of Ediz, Michael and Perraudin, the ratio of total capital to risk adjusted assets increasing by 44 basis points per quarter more for banks in the regulatory pressure zone compared to adequately capitalized banks.

The next is on the adjustments to achieve the capital ratios. Altering either the numerator or the denominator in the ratio may change a capital-asset ratio. Depending on the ratio concerned (leverage ratio, Tier 1 to risk-weighted

assets (RWA) or total capital to RWA), the numerator may be changed by retaining earnings, issuing equity or issuing other quasi-equity securities such as subordinated debt. Similarly, the denominator may be adjusted by cutting back loans or, in the case of ratios to RWA, by shifting into assets that bear a relatively low risk weight such as Federal Government stocks, Treasury Certificates Treasury Bills Loans to Federal Government, residential mortgages, short-term interbank exposures or government securities.

The approach that banks take in adjusting their balance sheet to capital pressure is, of course, likely to vary over time, depending particularly on the stage of the business cycle. During booms, banks will find it easy to raise equity capital and potential earnings retentions will be high. During downturns, with declines in loan demand and increased default risks, banks may prefer to cut back their loan base.

Several researches shed light on how capital deficient banks adjust their balance sheets. For example, Aggarwal and Jacques (1998) find that the impact of FDICIA regulation on banks' long-term targets for the Tier 1 ratio actually exceeds that for total capital and that convergence of the Tier 1 ratios to its long-run average is quicker. Since total capital includes Tier 1, this finding implies that the entire impact of regulation on long-term capital targets operates through Tier 1 capital. Ediz, Michael and Perraudin (1998) in their study of UK bank data conclude that regulation affects a bank's long-term Tier 1 capital targets more than its long-run Tier 2 target. However, they find that when an

individual bank's capital requirement is augmented, initially the bank tends to raise its Tier 2 capital with Tier 1 adjusting subsequently.

On adjustments to the denominator in capital ratios, numerous studies have examined whether capital ratio shortfalls induce banks to change their asset holdings. One may distinguish here between the possibility that banks react to capital requirements by cutting their total assets or alternatively that they react by switching from highly risk-weighted assets to those with a lower risk weighting. Shrieves and Dahl (1992), Nigro and Jacques (1997), Aggarwal and Jacques (1997) and Rime (1998) found that banks change the composition of their assets when they face a binding regulatory capital constraint, substituting away high risk-weighted assets. According to them, some banks substitute towards low risk-weighted asset categories when their capital ratios are low.

The third reaction is whether banks increase the riskiness of their asset portfolios in response to the imposition of regulatory capital requirements. The motivation for investigating this issue is a series of theoretical literatures, which have debated the possible effects on banks' portfolio choices of imposing a uniform capital requirement. Although capital requirements with differentiated weights will quite probably give banks an incentive to shift towards lowly risk-weighted asset categories, for any category of assets which bear the same proportional capital charge, banks may be induced to shift towards the more risky assets in the category. According to Sheldon (1996), banks asset volatility

rise both for banks, which increased their capital ratios, and for those, which did not in reaction to regulators' pressures.

CHAPTER THREE

METHODOLOGY OF RESERCH

In this part of the study, a discussion of the methods and procedure for data analysis that sets the rules of interpretation and the criteria for admissibility of explanation is carried out. The chapter will also discuss the nature and sources of data, data processing and presentation as well as the model specification, method of estimation, analysis and evaluation of result.

Modeling a part or all of a Nigeria banking system can be a little problematic. The problem often revolves around the choice of appropriate theoretical framework, the extent of institutional structural details to be incorporated, difficulty in obtaining micro data and the correct use of micro model. These problems notwithstanding, this study relied on the various international microeconomic models on banking firms used in developed/developing countries. This is to serve as a springboard for providing models that would serve for the analysis of our banking system. The models include those of Peak and Rosengren (1995) and Rime (2001).

3.1 Model Specification.

In studying the bank behavior, researchers attempt to find out whether the relationship between bank capital, Risk-taking and capital regulation is fully revealed in banks performance. Most of these studies applied either the risk management theories, portfolio theories, the imperfect –market theories or the real resources theories.

The risk management theories and the portfolio theories, which are appropriate for this study assumes that risk-taking in banks fully reflect available capital which implies that successive increase in risk is a function of increase in capital of the bank.

The model specification is derived from the theoretical framework, and that of Peak and Rogengren (1995), and Rime (2001a). Peak and Rogengren is a single equation model while Rime is a simultaneous equation. The complete model is given in equation (2.7 to 2.35)

(3.1) $\partial D_{it} = \alpha_0 + \alpha_1 TK_{it-1} + \alpha_2 \partial TK_{it} + \alpha_3 \log (A_{it})$

$+ \alpha_i \partial L_{it} + \alpha_i D_{y\tau} + \alpha_j Y_t + E_{id}$

With $\tau = (t+2)$

(3.2) $\partial L_{it} = \beta_0 + \beta_1 TK_{it-1} + \beta_2 \partial TK_{it} + \beta_3 \log (A_{it})$

$+ \beta_i \partial D_{it} + \beta_i D_{y\tau} + \beta_j Y_t + E_{iL}$

With $\tau = (t+2)$

(3.3) $\Delta CAPjt = \alpha_0 + \alpha_1 REG_{jt-1} + \alpha_2 ROA_{jt} + \alpha_3 SIZE_{jt}$

$+ \alpha_4 \Delta RISK_{jt} - \alpha_5 CAP_{jt-1} + \alpha i Dy_{\tau} + E_{jt}$

With $\tau = (t+2)$

(3.4) $\Delta RISK_{jt} = \alpha_0 + \alpha_1 REG_{jt-1} + \alpha_2 LOSS_{jt} + \alpha_3 SIZE_{jt}$

$+ \alpha_4 \Delta CAP_{jt-1} - \alpha_5 RISK_{jt-1} + \alpha_i D_{y\tau} + V_{jt}$

With $\tau = (t+2)$

Equations 3.3 and 3.4 are simultaneous equations whose specification is aimed at capturing the interdependencies that exist or appear between risk and

capital while equations 3.1 and 3.2 are single equations meant to capture the change in deposits and loans respectively. These specifications are more appropriate for the problems at hand because of the nature of our economy. They formally explain the interdependencies among the variables as a two-way causation is assumed. As noted by Gujarati (1995), the single equation model does not allow for the feed back relationship between the dependent and independent variables but a simultaneous equation does.

Equations (3.3) and (3.4) are the change in capital and risk equations respectively. For this study, these two equations shall be estimated in addition to equations (3.1) and (3.2) above.

In particular, data on bank's assets and their liabilities are obtained because of their centrality to this study at hand. Specifically, data on capital and risk values are used. For capital, two definitions of bank capital are used: the ratio of capital to total assets (RCTA), which was used by Nyong (1996) and the ratio of capital to risk weighted assets (RCWA). The second definition is used because of the introduction of risk-weighted capital standards and has been used by many researchers including Jacques and Nigro (1997), Aggarawal and Jacques (1998), Ediz, Michael and Perrandin (1998) and Rime (2001a). More so, it is the Bank of International Settlement (BIS) standard and is adopted in Nigeria.

Measurement and definition of bank's risk is quite complex and problematic and the literature suggests a number of alternatives, all of which are

subject to some criticisms. In this study, the ratio of risk weighted assets to total assets (RWA) as imposed by BIS and used by Shrieves and Dahl (1992) and used subsequently by Jacques and Nigro (1997) and Aggarawal and Jacques (1998) and Rime (2001a) shall be used. The rationale for using the measure is that portfolio risk is primarily determined by the allocation of assets across the different risk categories. A clear advantage of RWA is that it reflects bank's decisions on risk-taking with appropriate time lines. The reliance on this indicator however, supposes that the risk-weightings currently reflect the economic risk of the different assets categories.

The size variable reflects the deposit insurance and the modern financial intermediation theories. In all cases, a positive sign is expected. Size may influence target risk and capital levels due to its relationship with risk diversification, investment opportunities and access to equity capital. The natural log of total assets (size) is included in the capital and in the risk equation to capture size effect. This was used by Rime (2001a).

Current profits may have a positive effect in the bank's capital if it prefers to increase capital through retained earnings than through equity issues. The latter may convey negative information to the market about the bank's value in presence of asymmetric information. The bank's return on assets, (ROA), which in our case is profit before tax was used by Rime (2001a) is included in the capital equation with an expected positive effect on capital.

A bank's current loan losses affect the ratio of risk-weighted assets to total assets as they lead to a decrease in the nominal amount of the risk-weighted assets. These losses (LLOSS), approximated with the ratio of new provisions to total assets are therefore included in the risk equation with expected negative effect on risk. it was used by Rime (2001a).

The buffer theory predicts that a bank approaching the regulatory minimum capital ratio may have an incentive to boost capital and reduce risk in order to avoid the regulatory costs triggered by a breach of the capital requirements. However, poorly capitalized banks may also be tempted to take more risk in the hope that higher expected returns will help them to increase their capital, Calem and Rob (1996). Regulatory pressure is expected to have a substantial impact on Nigerian bank's behavior, given the nature of our economy. The deposit insurance guarantee scheme, which is compulsory in Nigeria, should exert regulatory pressure on banks.

The evaluation of regulatory pressure, is complex and in several ways. Ediz et al (1998) adopted a relatively refined approach of regulatory pressure that reflects the impact of the capital ratio's volatility on the probability of failing to meet the legal requirements. For Nigeria, this probabilistic approach is quite appealing, given the positive relationship between excess capital and its volatility. Aggarwal and Jacques (1998) measure regulatory pressure using the prompt corrective action (PCA) classification between adequately capitalized and under-capitalized banks. This approach is not of interest for our study since

Nigeria does not have (PCA) law. Nyong (1996) measure regulatory pressure by simple adopting the ratio of regulator's desired capital to actual capital held by banks where it is calculated as risk asset ratio. This method is adopted in this study because it enable us to see if the discrepancies between adequate and the actual capital held by banks do affect the flow of new capital investment into the bank. The coefficient of this variable is expected to be positive. A positive and statistically significant will indicate regulatory effectiveness while non-significance indicates regulatory ineffectiveness. A negative sign will indicate that regulation is not only ineffective, today but has been consistently ineffective in the past. This explains why a negative sign is a stronger confirmation of regulatory ineffectiveness than zero coefficients would have been.

The theoretical models mentioned above suggest that bank's capital and risk choice are interdependent, which requires the inclusion of both variables in the right part of the model. In the period of risk-weighted capital requirements, the assumption is that banks restricted by the regulatory capital requirements will compensate an increase (decrease) in risk-weighted assets (RWA) with an increase (decrease) in the ratio of risk capital and total assets (RCTA) to keep their (RCWA) ratio of risk capital and weighted assets constant. A positive relationship between changes in RWA and RCTA would also be compatible with the assumption that banks not restricted by the capital requirements adjust risk and capital in the same direction to maintain the default probability at an acceptable level, thereby protecting their franchise value. For these reasons, a

positive relationship between changes in RWA and change in RCTA is expected; as a result, the relationship between changes in RWA and RCWA may be rather weak, or even not significant at all.

Changes in the capital regime may directly affect capital and risk measure; macroeconomic shocks such as a change in the volume or in the structure of loans demand can also affect bank's capital ratio and risk capital adjustments in any given year. Dummy variables are added to the specifications for each year of the reference period.

According to Peak and Rogengren (1995), the effect of a change in total capital on change in deposit is captured by the estimates of α_1 parameter in equations 3.1 and 3.2. As shown in selection 3.3, such an impact should decrease with the level of banks initial leverage ratio (capital over total assets). The effect of change in both deposits and loans will be identified by α_2 parameter, provided that potential demand side shocks according to them are controlled by the logarithm of total assets log (A) while the time varying effects are captured by the macro-economic variables Y. Y is real GDP growth. The D_{yt} is the dummies, which takes one and zero value at the period as Capital Adequacy Requirements enforcement and non-enforcement respectively. The ∂L_{it} and ∂D_{it} are changes in loans and deposits respectively, which are included in the two equations to capture the assumption that banks also make loans from deposits receives from the public while recovery of loans forms part of the deposits of the banks. In both equations, negative signs are expected.

This methodology according to Peak and Rogengren (1995) can be applied straightforwardly to banks in developing countries or crisis countries including Nigeria. In Nigeria, banks normally suffer macro negative shocks to their capital. The expectation is that ∂D will be positively related to the change in banks capital endowment. The dynamic of bank deposit and bank capital is crucial for detecting signs of capital crunch in this approach. When this result is obtained, it will be claimed that the capital constraints associated with the enforcement of the Capital Adequacy Ratios did shrink bank intermediation, thus further reducing the supply of credit. Such a result should be reinforced where the negative impact of the crisis on bank capital has been strengthened by a more severe enforcement discipline. Typically, the effect of the change in capital will be smaller for banks, which have higher initial leverage ratios. Correspondingly, the estimates of α_2 coefficient should be negative, proving that the effect of the change in capital decreases when the ratio of capital over total assets increases.

Similar, regression for bank loans equation (3.2) to provide a richer understanding of bank loans around the period of regulatory change will be run. The empirical estimation of capital crunches cannot be based on the behavior of the loan equation alone due to a serious statistical shortcoming related to the treatment of loan write-offs that cannot be captured in the equations. Infect, the experience of banking crisis in Nigeria has shown that often, simultaneous changes of bank loans and capital do not represent a change of banks' lending

policies but reflects the impact on both variables of loans write-offs due to the surfacing of hidden losses as a result of banking crisis.

Equations (3.1) and (3.2) are obtained from the systems exposed in sections 3.3 and 3.2 respectively, where the impact on deposits and loans of a change in Capital Adequacy Ratio regulations is indirectly estimated only through the effect of the change in total capital.

3.2 Estimation Techniques.

There are four principal equations, (3.1, 3.2, 3.3 and 3.4), each targeted at explaining or achieving the set objectives in this study. The first two of these equations are in a single form while the other two are in simultaneous form. The method of ordinary least square (OLS) is applied to the first two equations and the two-stage least square (2SLS) is used to estimate the simultaneous ones.

The method of OLS is to choose estimators of parameters, so that the sum of squared residuals is minimized. Empirical evidence suggests that this method gives best unbiased estimators of the parameters provided that the standard assumptions about the error terms are valid namely zero mean, constant variance, zero covariance and the error term independent of all explanation variables included in the regression equation with 20 – k degree of freedom. The standard statistics is used to evaluate the reliability of our estimates.

As the model, that is, equations 3.3 and 3.4 are over-identified, the two-stage least square procedure is used for their estimation. This allows us to take

account of the simultaneity of banks adjustments in capital and risk to get estimates that are asymptotically efficient. It gives estimates of all the parameters simultaneously. This is in line with our assumption of simultaneous change in capital and risk in banks. It involves the application of the method of least squares in two successive stages and takes into account of the entire structure of the model with all the restrictions that the structure imposed on the values of the parameters.

The estimation period is 1986 – 2004. This whole period (from 1986 – 2004) is the period when the banking industry was liberalized and the risk – weighted assets was in place. The estimated parameters are used to simulate the complete model. The objective here is to demonstrate some policy implications of relationship that exists between change in capital and change in risk structure in Nigerian Commercial Banks.

3.3 key Variables and Sources of Data

this variables are derived from the combination of Tobin's, Peak and Rogengren's and Rime's model of bank behavior. The combination is justified by the need to bring together portfolio selection process and capital adequacy of licensed banks as they affect the efficiency of their operations. Tobin's model allow us to link risk-taking with the yield from investment holding. Rime's model allows us to link bank capital requirement with risk-taking leading to the availability of credits to the economy while Peak and Rogengren's model analysis the impact of bank capital requirement on the economy. The synthesis of the

three models allow us to analyze the interactive behavior of capital adequacy and the provision of the bank services, especially credits within their monetary policy thrust. However, the size of the data along with the period that the study covered differs. The key variables includes:

REG_{jt-1} : represents regulatory pressure defined using the ratio of regulators desired capital to actual capital held by banks where it is calculated as risk asset ratio.

$SIZE_{jt}$.: Represents the jth bank size in period t measured by logarithm of total assets;

ROA_{jt} : profitability of bank j in period t measured by return on assets;

$\partial RISK_{jt}$: change in risk of bank j in period t measured by increase in loans and advances.

CAP_{jt-1} : lagged capital for bank j

∂CAP_{jt} : changed in capital for bank j in period t.

$RISK_{jt-1}$: lagged risk for bank j

$LLOSS_{jt}$: loan losses of bank j in period t measured by the Provision for bad debt,

TK_{jt-1}: lagged capital for bank j

∂TK_{jt}: change in total capital for bank j

Y_t: real GDP growth

∂D_{jt}: change in deposits for bank j

∂L_{jt} : change in loans for bank j and

E_{jt} and V_{jt} are the error term, which must be "white noise".

Information covering the study was sourced from official publication (which are secondary in nature), mainly from articles published in journals and magazines like the international monetary fund (IMF) staff papers, The World Bank Observers and Economic Review, American Economic Review, Journals of Applied Economies, The Bullion, Economic and Financial Reviews of the central bank of Nigeria, the individual bank balance sheets, among others as well as conference papers and text books. With regard to the method of the data collection, the data used in this study was collected from official publication of the federal office of statistic (FOS), annual Report and statements of central bank of Nigeria. Also in use was made of the individual banks annual balance sheets and central bank statistical balance sheet. However, the backward – looking nature of accounting measures means that these figures are unlikely to correspond to the relevant economic concepts (i.e. discounted future flows of economic earnings). In principle, one way of overcoming this problem is to use market values (Gizyeki et at 1991). Unfortunately, this solution is not available because most banks assets and liabilities in Nigeria were not regularly traded and therefore lacked an observable market price. However, for all Nigerian banks, policy based information was available and readily used by regulators to assess banks operations. These include various returns. Here, data from the annual

returns submitted to the regulators along with the annual balance sheets of the individual banks were used.

The reliance of this work on secondary information was premised on the nature of the study whose information or data can hardly be sourced anywhere outside official quarters.

CHAPTER FOUR

ANALYSIS OF THE RESULTS.

The result come from the empirical regression estimates for equations 5.1 to 5.16 are presented in the appendix. The R^2 and R^2 adjusted in all cases measure the explanatory power of the multiple regressions while the t-statistics and f-statistics as well as the Durbin-Watson statistics are reported for testing the significance of each individual coefficient and the existence of serial correlation respectively. The former are in parenthesis under the relevant coefficients. The results are obtained by means of time series and panel analysis controlling, for bank fixed effects and trends in both the financial and the real sector.

The analysis of the results has been structured based on the objectives and hypotheses of the study. In this regards, we present our analysis based on the following subsections:

4.1 The impact of risk-based capital requirements on bank behavior.

4.2 The inferences about effectiveness of Central Bank of Nigeria in bringing licensed banks to compliance with the risk-based capital.

4.3 Summary of findings.

4.1 The impact of risk-based capital requirements on bank behavior.

This study sets out to examine the impact of risk-based requirement on the behavior of licensed banks and the efficiency of regulators, which is assumed to shift away credit to other less risky assets in line with prudential regulations.

The results are obtained by means of panel analysis, controlling for bank fixed effects and trends in both the financial and the real sectors. The effects of changes in capital on both the change in deposits and the change in loans are strong and consistent with the theory. For changes in capital on both change in deposits and change in loans, concentration is on the evidence supplied by the deposit equation because it is not affected by the presence of relevant loans write-offs.

(4.1) $\partial D_{1t} = 2206.92 + 0.57\ TK_{1t-1} + 4.79\ \partial TK_{1t} + 0.03LogA_{1t} - 24.60Y_t$

(0.11) (1.34) (3.47) (0.69) (-0.10)

$R^2 = 0.8946$; Adj-$R^2 = 0.8541$; D-W = 2.47; F = 22.07.

(4.2) $\partial L_{1t} = 556.00 + 1.37TK_{1t-1} + 3.38\partial TK_{1t} - 0.02LogA_{1t} + 0.05Y_t$

(-0.05) (0.77) (0.56) (-0.14) (0.01)

$R^2 = 0.3296$; Adj-$R^2 = -0.718$; D-W = 2.25; F= 1.28.

(4.3) $\partial CAP_{1t} = -3142.91 + 52.33REG_{1t-1} + 0.65ROA_{1t} - 0.06SIZE_{1t} + 136.47\partial RISK_{1t-1} + 0.70CAP_{1t-1}$.

(-1.88) (2.16) (2.82) (-6.10) (3.00) (8.68)

$R^2 = 0.9594$; Adj-R^2 = 9392s; D-W = 1.90; F = 47.33.

(4.4) $\partial RISK_{1t} = 31.32 - 0.20REG_{1t-1} + 1.01LLOSS_{1t} - 3.04E\text{-}05LogSIZE_{1t} - 0.001\partial CAP_{1t} - 0.51RISK_{1t-1}$.

(2.96) (-1.55) (0.84) (-1.26) (2.44) (-2.01)

$R^2 = 0.5004$; Adj-$R^2 = 0.2506$; D-W = 1.92: F = 2.00.

Equations 4.1 and 4.2 are the approximation of the variables that determine dD_t and dL_t in bank one. These variables are TK_{t-1}, TKt, LogAt and Y_t. The coefficients of the variables are rightly signed which indicates that they move in their respective directions except for Y_t. Also the LogA in the loan

equation move in a different direction. Autonomous dD_t and dL_t are 2206.92 and –556.00 respectively, which implies that dD_t and dL_t relies on their own changes by 2206.92 and –556.00 units respectively. The result also show that a unit increase in TKt-1 will lead to a 0.57 and1.37 unit increase in dD_t and dL_t respectively. The dTK_t coefficients in both deposit and loans equations show that a increase in dTK_t could lead to 4.79 and 3.38 unit increase in dD_t and dL_t respectively. Similarly LogA has an increase of 0.03 per a unit increase in dD_t and a decrease of 0.02 in dL_t. The results also indicate that a unit increases in dD_t and dL_t would lead to a decrease of 24.60 and increase of 0.03 in Y_t. The t-ratios of dTK_t show that it is at least a 95 percent likely the value of the coefficient of dTK_t is non-zero except for the coefficients of TK_{t-1}, $LogA_t$ and Y_t TK_{t-1} $LogA_t$, Y_t and the autonomous dDt are small in magnitude which indicates that part of the deposits of the bank is used to meet capital requirement demanded by regulators. Similarly, in the change in loan's equation, all the variables are both 5 and 10 percent level indicating that their coefficient are non-zero. The reverse is for dTK_t, $LogA_t$, Y_t and the autonomous dL_t. For Y_t and autonomous dL_t. their magnitudes are very small which show that the bank loans have a significant effect on its capital, size and national income (dTK_t, $LogA_t$ and Y_t). The results also show that the value of the decrease in national income is quite large, which justified epileptic contribution of the bank to the growth of Nigerian economy.

The adjusted R^2, which is a good measure of the coefficient of determination that R^2 is 0.8541 (R^2 = 89.46) which implies that 85.41 percent of

what happens to dD_t is explained by the explanatory variables and 14.59% other variables not captured by the variables in the equation. The F-statistics of 22.04 also shows that all the variables combined are significant in explaining what happens to dD_t and the D-W of 2.47 shows that there is no autocorrelation in bank one. In equation 4.2, which explains the variations in loans using the same variables in line with theory, the adjusted R^2 along with R^2 shows that only 32.96% and 7.18% is explained by the variables in the equation. It shows that 67.04% and 92.82% of what happens to dLt in bank one is explained by other variables not captured here. The F-statistics of 1.28 and D-W of 2.25 not help matter. This is not consistent with buffer theory.

For equations 4.3 and 4.4 above, their explanations are given bellow. For autonomous ∂CAP, the value is –3142.91, which implies that without the contribution from other variables, capital could assume a positive value. This is evidence in the case of bank one since Credits depends on capital. The change in risk coefficient confirm this result and shows that as a result of a unit increase in capital, ∂RISK would also increase by136.47 units. This coefficient is unduly large and it is possible in years where there were credit crunch. The coefficient of regulatory pressure (REG) is 52.33 and -0.20 for ∂CAP and ∂RISK respectively which implies that regulatory pressure is only effective for capital. The coefficients of ROA_t and $SIZE_t$ in the ∂CAP_t equation are 0.65 and 0.06, which implies that a unit increase in them would lead to a 0.65 unit increase and decrease 0.06 in ∂CAP_t. This also implies that returns on assets and bank size are

not important in determining capital requirement in bank one. However, lagged capital, which is significant and carries a negative sign, has a decreasing effect on ∂CAP_t. Loan losses ($LLOSS_t$) and lagged credits ($RISK_{T-1}$) have positive and negative effect on $\partial RISK_t$ though $LLOSS_{sst}$ is insignificant while $Risk_{t-1}$ is significant only at 10% level.

The t-statistics of ∂CAP_t are above 2, which imply that they are likely that the coefficients of the variables are non-zero (Hansen, 1994). The coefficient of determination are 0.9594 and 0.5004 for ∂CAP_t and $\partial RISK_t$ respectively which implies that9594% and 50.04% of what happen to change in capital and risk are explained by the variables in the equations. The F-statistics of 47.33 and 2.00 for capital and risk shows that all variables are significant in explaining what happens to ∂CAP_t and not $\partial RISK_t$ respectively. The D-W of 1.92 show that the autocorrelation in $dRISK_t$ is in conclusive while 1.90 for the dCAPt equation reveals the same result.

(4.5) $\partial D_{2t} = -49.49 - 0.10TK_{2t-1} - 3.05\partial TK_{2t} + 0.07LogA_{2t} - 0.04Yt$

(-0.03) (-0.19) (-1.98) (2.01) (-0.06)

$R^2 = 0.6001$; Adj-$R^2 = 04464$; D-W = 1.85; F = 3.90.

(4.6) $\partial L_{2t} = -439.25 - 1.63TK_{2t-1} - 3.25\partial TK_{2t} + 0.07LogA_{2t} + 0.04Yt$

(0.08) (1.00) (-0.66) (0.64) (0.02)

$R^2 = 0.5530$; Adj-$R^2 = 0.3811$; D-W = 2.70; F = 3.22.

(4.7) $\partial CAP_{2t} = 85.77 - 0.86REG2t_{-1} + 0.36ROA_{2t} + 0.01SIZE_{2t} - 20.03\partial RISK_{2t} - 0.23CAP_{2t-1}$

(0.16) (-0.14) (1.64) (2.21) (-0.94) (-2.47)

R^2 = 0.6926; Adj-R^2 = 0.5390; D-W = 1.62: F = 4.51.

(4.8) $\partial RISK_{2t}$ = -2.44 - 0.02REG_{2t-1} + 0.92$LLOSS_{2t}$ + 4.14E.05$LogSIZE_{2t}$ - 0.004∂CAP_{2t} + 0.000377$RISK_{2t-1}$

(-0.40) (-0.24) (0.67) (1.23) (-1.81) (1.97)

R^2 = 0.09; Adj-R^2 = -0.40; D-W = 2.92: F = 0.19.

Equations 4.5 and 4.6 explain the happenings in bank two. The results are almost the same except that in this bank, the loan behavior is well explained by these variables as against bank one. In equation 4.5, the autonomous ∂D_{2t} is – 49.49, which implies that ∂D_{2t} relies on its own changes by 49.49 units in this bank. The result also show that a unit increase in ∂TK_{2t}, $dTk_{2t,}$ and Y_t will lead to a decrease of 0.10,3.05 and 0.04 respectively in ∂D_{2t}. The $LogA_{2t}$ coefficient shows that its unit increase will lead to 0.07 unit increase in dD_2t.the the t-ratios of $LogA_{2t}$ shows that it is at least a 90% likely that the value of the coefficient of $LogA_{2t}$ is non-zero except for the coefficients of TK_{2t}, dDk_{2t-1} and Y_t. The coefficients of determination as well as the adjusted coefficient of determination of 60.01% and 44.64% respectively are not for the explanation of the movement of the variables in this bank. It shows that more variables that influence deposit creation in this bank lays outside the one captured here. For the change in the loan equation, which is 4.6, the coefficients show that autonomous ∂L_t is 439.25, which implies that without the influence of any other variables, ∂L_t relying on its own changes would be positive. This is possible since;

$\partial L_t = TK_{t-1} + \partial TK_t + A_t + \partial D_t$ (buffers theory). However, ∂TK_{2t}, Y_t and ∂D_{2t} show decreasing units of 1.63 and 3.25 respectively for their one unit increase

on ∂L_{2t}. The $LogA_{2t}$ coefficients show that units increase in $LogA_{2t}$ could lead to a 0.7 unit increase in ∂L_{2t}. The result also indicates that a unit increase in Yt would lead to a 0.03 unit increase in ∂L_{2t}. The t-ratios of ∂TK_{2t} and $LogA_{2t}$ show that it is not at least a 95 per cent likely that the values of their coefficients are non-zero. Except for the coefficients of TK_{2t-1} and Y_t $LogA_{2t}$ coefficients are small in magnitude, which indicates that part of the earnings from assets might be used to defray loan losses. Also if their values are compared with other variables in the equation, it will be realized that their values are relatively small in magnitude. This also implies that the transmission mechanism from earnings to increase in size of the bank, taking allowance of loan losses is justified and is consistent with Nigerian data. The adjusted R^2 which is a good measure of the coefficient of determination than R^2 is 0.3811 which implies that 38.11 per cent of what happens to ∂L_{2t} is explained by this equation and 61.89% by other variables not captured by the variables in the equation. The F-statistics of3.22 also shows that all the variables combined significant in explaining what happens to ∂L_{2t} and the D-W of 2.7S0 shows that there is no autocorrelation.

Equations 4.9 and 4.10 are also the approximation of what happens in bank three. The coefficients show that the autonomous ∂D_t is –2592.28 and ∂L_t is –304.26, which implies that change in both deposits and loans relies on its own changes by this much respectively. In equation 4.9, the result also shows that the unit increase in $LogA_{3t}$ will lead to the same increase in ∂D_{3t} of this bank. The TK_{3t-1}, $\partial TK_{3t,}$ and Y_t coefficients also show that a unit increase in their values

could lead to 6.04, 4.3 decrease while 0.14 increase respectively in ∂D_{3t}. Their t-ratios show that they are at least a 95 per cent likely that the values of their coefficients are non-zero except for the coefficients of the autonomous deposit and Y_t.

The adjusted R^2, which is a good measure of the coefficient of determination than R^2 is 0.7486 which implies that 74.86 per cent of what happens to ∂D_{3t} is explained by this equation and only 25.14% by other variables not captured by the variables in the equation. The F-statistics of 11.72 also shows that all the variables combined are significant in explaining what happens to ∂D_{3t} and the D-W value of 2.48 shows that there is no autocorrelation.

Also in equation 4.10, the TK_{3t-1}, ∂TK_{3t}, and Y_t coefficients show that a unit increase in their values will leads to a decrease of 0.89 and increase of 0.40, 0.06 and 0.10 respectively in ∂L_{3t}. $_t$. The $LogA_{3t}$ coefficient is small in magnitude, which shows that part of the earnings of this bank also might have, be used to offset some loan losses of the bank. The adjusted R^2 is 0.6406 which implies that 64.06 per cent of what happens to ∂L_{3t} is explained by this equation and only 35.94% by other variables not captured by the variables in the equation. The F-statistics of 7.42 also shows that all the variables combined are significant in explaining what happens to ∂L_{3t} and D-W of 2.00 shows that the autocorrelation is absent.

Equation 4.7 and 4.8 are the approximation of what happens to change in capital and risks in bank two. Autonomous ∂CAP_t is minus 85.77, which implies

that ∂CAP_t relies on its own changes by 85.77 units in this bank. The results also show that a unit increase in ROA will lead to a 0.36 unit increase in ∂CAP_t. The size ($SIZE_t$) coefficient also shows that a unit increase in $SIZE_t$ could lead to 0.01 units increase in ∂CAP_t. The result also indicates that a unit increase in $\partial RISK_t$ would lead to a 0.004 unit decrease in ∂CAP_t and a unit increase in last year capital would lead to a decrease in dCAPt of 0.004 unit in this year's. The autonomous $\partial RISK_t$ is –2.44, which implies that $\partial RISK_t$ relies on itself by 2.44 units. The lagged risk ($RISK_{t-1}$) coefficient is 0.000377 and change in capital (∂CAP_t) coefficient is –0.004 in which implies their decreasing effect on $\partial RISK_t$ respectively. The loan loss ($LLOSS_t$) effect of 0.92 though small do not confirms our assumption. The size of this bank has no significant effect on its behavior. The regulatory pressure (REG_{t-1}) in both equations seems ineffective, though it has a positive relationship with the dRISKt.

The adjusted R^2, which is a good measure of the coefficient of determination than R^2 is 0.5390 for ∂CAP_t while it is a 0.1600 for $\partial RISK_t$, showing that the variables explain what happens to change in capital and change in risk can not be captured using these variables. The F-statistics of 2.44 also shows that all the variables combined are not significant in explaining what happens to ∂CAP_t and the D-W of 1.62 shows an inconclusive autocorrelation. For the $\partial RISK_t$ variables, the t-ratios along with the F-statistics reveals that the coefficients are insignificant while a D-W of 1.94 shows that the autocorrelation is inconclusive.

In all, this bank is worst in implementing monetary policy and this account for its continuing crisis during this period.

(4.9) $\partial D_t = -2592.28 - 6.04TK_{3t-1} - 4.320\partial TK_{3t} + 0.74LogA_t + 0.14Y_t$

(-0.63) (-4.87) (-3.44) (5.50) (0.09)

$R^2 = 0.8185$; Adj-$R^2 = 0.7486$; D-W = 2.48; F = 11.72.

(4.10) $\partial L_{3t} = -304.26 - 0.89TK_{3t-1} - 0.40\partial TK_{3t} + 0.10LogA_t - 0.06\partial D_{3t}$

(-0.36) (-3.52) (-1.57) (3.61) (0.18)

$R^2 = 0.7404$; Adj-$R^2 = 0.6406$; D-W = 2.00; F = 7.42.

(4.11) $\partial CAP_{2t} = -1568.96 + 31.53REG2t_{-1} + 0.33ROA_{2t} + 0.005LogSIZE_{2t} + 3.21\partial RISK_{2t} - 0.06CAP_{2t-1}$

(-1.16) (1.26) (1.60) (15.10) (0.34) (-1.15)

$R^2 = 0.9781$; Adj-$R^2 = 0.9671$; D-W = 2.19: F = 89.20.

(4.12) $\partial RISK_{2t} = 5.27 + 0.20REG_{2t-1} + 8.00LLOSS_{2t} - 1.24E.05LogSIZE_{2t} + 0.002\partial CAP_{2t} - 0.95RISK_{2t-1}$

(0.14) (0.49) (1.71) (-0.31) (6.34) (-1.28)

$R^2 = 0.3454$; Adj-$R^2 = -0.0181$; D-W = 2.47: F = 1.06.

Also in equation 4.9, the coefficients of TK_{t-1}, ∂TK_t and Y_t show that a unit increases in ∂D_t is due to a 6.04, 4.32 units decrease in them respectively. This implies that capital and national income are important in determining what happens to deposits in bank three. Overall, the estimates are highly significant in determining what happens in this bank. This leads credence to the situation in bank three which is adjudged the best-managed bank in Nigeria.

Both the TK_{t-1}, ∂TK_t and Y_t coefficients are very high and all carry negatives signs as expected. This implies that ∂D_{3t} decreases when there is an increase in deposits of the bank. A unit decrease in ∂D_t results from a decrease

of 6.04 units of TK_{t-1}, 4.32 units of ∂TK_t and the overall effect is a 10.14 units increase in national income (Y_t). However, a unit increase in ∂D_t will have a similar effect in the bank total assets. The loans equation is similar to that of deposit in behavior except that the positive change in total assets is only 0.89 units. The R^2 and Adjusted R^2 of 0.8185 and 0.7486 for deposits speak well for this bank deposit behavior. The D-W statistics of 2.48 and F-statistics of 11.72 confirm our results. For equation 4.10 the D-W of 2.00 shows that autocorrelation is absent.

Equations 4.11 and 4.12 are the approximation of what happen in bank three i.e. its ∂CAP_t, REG_{t-1}, ROA_t, $SIZE_t$, $\partial RISK_t$, CAP_{t-1}, and $\partial RISK_t$, $LLOSS_t$ and $RISK_{t-1}$. The coefficients show that for autonomous dCAPt without the contribution from other variables ∂CAP_t would be as low as –1568.966 if it relies on its own changes.

The coefficient of $SIZE_t$ shows that a unit increases in $SIZE_t$ would lead to a 0.005 units increase in ∂CAP_t. The implies that $SIZE_t$ is important in determining what happens to a ∂CAP_t in bank three. This leads credence to the situations in this bank, because it pace itself as the biggest single bank in Nigerian. In terms of change in capital, returns on assets ($ROA_{t,}$), change in credits ($dRISK_T$) and previous capital (CAP_{t-1}) have decreasing effect. ROA_t and CAP_{t-1} are significant but carry negative values while the $dRISK_t$ is insignificant. This bank seems to be well managed in terms of capital though heavy reliance is on its size and current capital stock.

The best goodness of fit test, R^2 and adjusted R^2 explained what happen to the dependent variable. The t-ratios are only significant size and previous capital while insignificant for the rest in the ∂CAP_t equation. The F-statistics of 89.02 confirm these results while the D-W figure of 2.19 shows that there is no autocorrelation.

For the risk ($\partial RISK_t$) equation, all the estimates are statistically insignificant with the presence of autocorrelation. This is as reveal in the poor test statistics results obtain. However, the regulatory pressure is compiled here.

Equations 4.15 and 4.16 are the approximation of what happens in the whole three banks. The coefficients show that the autonomous ∂CAP_t and $\partial RISK_t$ are –2741.81 and 158.53 respectively which implies that without the influence of any other variables, ∂CAP_t and $\partial RISK_t$ relying on their own changes would be negative.

(4.13) $\partial D_{At} = -2513.45 - 025TK_{At} + 0.46\partial\ TK_{At} + 0.06LogA_{At} - 0.19Yt$

(0.21) (0.32) (0.17) (1.09) (-0.04)

$R^2 = 0.5452$; Adj-$R^2 = 0.3702$; D-W = 2.15: F = 3.12.

(4.14) $\partial L_{3t} = -817.90 - 0.61TK_{At-1} + 0.53\partial TK_{At} + 0.08LogA_t + 0.04Y_t$

(-0.07) (-0.83) (0.21) (1.68) (0.01)

$R^2 = 0.9380$; Adj-$R^2 = 0.9070$; D-W = 2.21; F =1.90.

(4.15) $\partial CAP_{2t} = -2741.81 + 15.07REG_{At-1} - 2.15ROA_{At} + 0.003LogSIZE_{At} - 0.06\partial RISK_{At} + 1.2806CAP_{A1}$

(-0.72) (0.61) (-3.52) (0.23) (-0.0008) (8.01)

$R^2 = 0.9380$; Adj-$R^2 = 0.9070$; D-W = 1.39: F = 30.26.

(4.16) $\partial RISK_{At} = 158.53 - 0.19REG_{At-1} - 1.94LLOSS_{At} - 2.29E.05LogSIZE_{At} + 0.00151\partial CAP_{At} - 0.96RISK_{At-1}$

(3.71) (-1.69) (-0.97) (-1.26) (0.42) (3.55)

$R^2 = 0.5860$; Adj-$R^2 = 0.3790$; D-W = 1.94: F = 2.83.

Equations 4.13 and 4.14 are the approximation of the behavior of all the banks in terms of deposits and loans when there is demand for increase capital by regulators. For equation 4.13, the autonomous ∂D_t is 2513.45, which shows itself increase/change. The coefficients of TK_{t-1}, ∂TK_t and Y_t for ∂D_t are –0.25, 0.46, -0.19 shows that a unit increase in these coefficients will lead to their decreases in accordance with their weights respectively. The $LogA_{4t,}$ coefficient also indicates that a unit increases in $LogA_t$, would lead to a 0.06 units increase in ∂D_t. This also implies that deposits is inversely proportional to bank capital and national incomes in the banking industry. However, the size of coefficient of 0.06for dD_t implies a direct relationship. The t-ratios for all the variables in the equation is not significant at 5% and 10% level.

The F-statistics of 3.12 for deposits implies that all these variables combined are significant in explaining what happens to ∂D_t while the D-W values of 2.15 confirms that autocorrelation is inconclusive.

For equation 4.14, the result is similar. By implication, the autonomous ∂L_t is –817.90, which shows itself decrease/change. The coefficients of $TK_{t-1,}$ dTK_t and Y_t for ∂L_t are-0.16, 0.53, and 0.04 respectively show that units increase in these coefficients results from them decreases in TK_{jt-1} as the increase accordance with their respective weights. However, the size coefficient ($LogA_t$) of 0.08 for dL_t, which implies a direct relationship, shows that a unit increase in

$LogA_t$ will increase ∂L_t by 0.08 units. The result also implies that loans is inversely proportional to bank capital and national income in the banking industry.

The t-statistics for all the variables in the loan equation are not significant at 5% and 10% level. The F-statistics of 1.90 for loans implies that all these variables combined are insignificant in explaining what happens to them. While the D-W values of 2.21 for deposits shows that autocorrelation is not a serious problem, there is a problem of serial correlation in equation 2.14 because D-W is 1.60.

The results show that the change in risk ($\partial RISK_{jt}$) is statistically insignificant and positive effect on capital. Hence, commercial banks in seem to rely heavily on lagged credits in other to increase capital. The coefficient shows that a unit increases in $\partial RISK_{jt}$ would lead to a 0.05 unit decrease in ∂CAP_{jt}. This means that $\partial RISK_{jt}$ is important in determining what happens to change in capital in Nigerian Licensed banks. However, change in capital (∂CAP_{jt}) show the expected positive effect on risk but insignificant with meagre value. It shows a change of only 0.000151 units for one unit change in $\partial RISK_{jt}$. Bank size ($SIZE_{jt}$) has a statistically insignificant and negative effect on risk, but it seems to have an effect on capital. The coefficient shows a change of 0.05 units for one unit change in capital. The negative effect on bank size for risk means that larger banks have lower target risk levels than smaller banks.

The CAP_{jt-1} coefficient has a magnitude of 1.28 units. This implies that a unit increase in CAP_{jt-1} would lead to a 1.28 unit increase in ∂CAP_{jt}. The ROA_{jt}

coefficient is –2.15, which implies that an increase in ROA_{jt} would lead to a2.15 unit decrease in ∂CAP_{jt}. This reveals that Nigerian commercial banks do not seem to rely on returns on assets to improve their capital adequacy position. The coefficient of loan loss ($LLOSS_{jt}$), as expected, has a statistically high insignificant and positive effect on risk. Their coefficients of-0.96 and 1.94 respectively assert to this. The goodness of fit test (R^2 = 0.9380; Adj-R^2 = 0.9070) implies that 93.80% and 90.70% of what happen to change in capital is explained by these variables. While the F-statistics of 30.26 confirm this, the D-W figure of 1.39 reveals that autocorrelation is inconclusive. The same test statistics are reveal for the risk ($\partial RISK_{jt}$) results, except that other variables not included here effect risk in Nigerian commercial banks as the coefficient of determination along with the goodness of fit test (Ad_j-R^2) of 0.5860 and 37.90 are very low.

From a cursory look at the results in appendix 18,19,and 22 to 25, some of the selected variables have significant regression coefficients. The effects of capital on deposits and loans are strong and consistent with theories but preferences is given to the evidences supplied by the deposit equation, which is not affected by the presence of relevant loan write-offs. As predicted by the theoretical analysis of the crisis case with regulatory enforcement, changes in deposits and in loans are positively affected by changes in capital. The three parameters that is ($LogA_{jt}$) in the deposit and loan regression is positive and strongly significant only for bank three and significant at 10% level for bank two while insignificant for bank one and all the banks put together. Both deposits

and loans grow at a lower pace for banks one two and all the banks put together (the positive / negative and insignificant effect of logA). This is consistent with the **Too Big To Fail** hypothesis, according to which, conscious that the risk of closure during crisis period is lower for larger institutions as depositors move their deposits to larger banks. In both regressions the time dummies having as reference category two years after the enforcement are negative for dL_t bank one and change in deposits for bank three. All the banks are insignificant while three only for change in loans is significant for change in deposits. This result suggests that the negative impact of the regulatory change is most serious at first and then decays in Nigeria. However. To the extent that its impacts continues (and the cross–section result equations 5.7 and 5.8 above support this), it spans also to five years following the enforcement and it seems to have a systemic nature. As regards our economic fundamental controls, the growth in GDP shows insignificant negative effects in both the deposit and loan equation. Estimates have been tested also for autocorrelation using Durbin-Watson test for fixed effects provide enough evidence in support of the null hypothesis of zero serial correlation in the disturbances. In principles, the estimate of all the equations assumers that the individual banks specific effects was randomly drawn.

In the deposit equation, the effect of the slow down in capital accumulation due to the joint effect of the crisis and the rise in Capital Adequacy Ratio is not significant for the entire bank put together at the 5 percents level. In

the loan regression, instead, the coefficient of the change in capital is positive but insignificant in bank three suggesting the presence of a credit crunch immediately upon the regulatory enforcement. As regards bank one, two and three, the deposits and loans generally grow bellow average and the difference is insignificant at the 5% level. Thus, some evidence of capital crunch for the banks was detected.

4.2 Inferences about effectiveness of Central Bank of Nigeria in bringing banks to comply with the risk-based capital requirements

The results in appendix 22 to 23 provide also some interesting insights into the impact of capital regulation on the coordination of capital and risk adjustments. As stated by Volker Kleff (2004), the simplest way to model a regulatory impact is to include a regulatory dummy variable, thereby allowing banks with low capital buffers to differ in their capital and risk adjustments by a certain amount from banks with high capital buffers. However, the coefficients of the regulatory pressure is insignificant both in capital and risk it has signs opposite to what is expected in risk, (Banks: one =-52.33,two = -0.86, three= 31.53 and for all the banks put together = 15.07 for capital and one = -0.20, two = -0.02, three = 0.02 and all the simple banks together = -0.19 for risk).

In the change in capital and change in risk equations, the results suggest that even though banks' risk and their levels of capitalization are positively corrected, there does not seem to be a significant relationship between changes

in the capital ratio and the default probability of banks. These results indicated that simple leverage restrictions might not be a sufficient regulatory instrument to ensure the stability and soundness of banks.

The system base on the probabilistic measure of regulatory pressure gives the following results (Appendix 20 and 21). In the capital equation, current earnings (ROA) have a significant and positive impact or capital in bank one and negative impact for all the banks put together indicating that banks do not improve their capitalization through retained earnings. SIZE has negative and significant impact on capital in Bank one, and positive / significant for banks two and three while insignificant for all the banks put together without reference to size. Indicating that banks increased their ratio of capital to risk – weighted assets. A possible explanation is that all Nigerian banks compete on international markets with institutions that are, in general less capitalized. Regulatory pressure (REG) has a positive and significant impact on the change in capital for bank one negative and insignificant for bank two and positive but insignificant for the rest. Ceteris Paribus, banks one increase it capital by 52.33 percentage points more than other banks. In the risk equation, the regulatory pressure variable has no significant impact on banks' risk in all the banks, which indicates that banks approaching the minimum capital requirements neither increased nor decreased the share of risk-weighted assets in their portfolio. Reflecting big banks' engagement in mortgage lending (preferential risk-weight of 50%) and their decreased focus on corporate finance (100% risk-weight) during the period

under study. In both equations, no significant relationship emerged between changes in capital and changes in risk.

The negative and insignificant impact of both regulatory pressure variable on all the banks put together indicates that Nigerian Banks approaching the minimum legal requirements don't improve their capital adequacy in order to avoid the penalties implied by a breach of the guidelines. Regulatory pressure appears not stronger for Nigerian banks, as indicated by the differences in the amplitude of the capital adjustment. Interestingly, the impact of regulatory pressure on change in risk is not larger in amplitude for Nigerian banks (0.02% for REG on an annual basis) than for us banks (5.6% for PCAU) on an annual basis in Aggarwal and Jacques, (1998). This result may reflect Nigerian banks' difficulties to adjust their capita in a relatively illiquid market for small banks' stocks. In any case it confirm with the traditional view that Nigerian regulators have careless attitude towards undercapitalized or weakly capitalized banks, Nyon (1996).

The positive and insignificant impact of regulatory pressure on change in capital and its absence of influence on change in risk indicates that Nigerian banks improve their capital adequacy by using retained earnings and equity issues and also by decreasing their risk-taking.

In appendix 23, the result shows that the coefficients of ∂CAP_{jt} that is, α_4 for many banks one, three are greater than zero while that of bank tw0o and all the banks l put together are less than zero. In addition the coefficients for

$\partial RISK_{jt}$ that is B_4 for banks three and all the banks put together are greater than zero. This suggests the adjustments in capital and risk are positively related for banks one and three and negative related for bank two and all the bank put together. However, in all the banks the variables are not significant in both the change in capital and change in risk even at 10% level except for bank one $\partial CAP_{jt..}$ Although, Nigeria commercial banks try to maintain their capital buffers by adjusting capital and risk simultaneously, this is done without regulatory pressure. These results suggest that the regulation / supervision of banks by the monetary authorities may not have been effective during this period. It would appears that while capital continue to increase with large magnitude, that for the risk was almost negligible in all the banks and even are negative balances,
(See appendix 25).

Surprisingly, regulatory / supervision is effective only for bank one and all banks put together whose adjustments in capital and risk when they try to rebuild their capital buffer is negatively related. However, it is with a cost to the banks as the decrease in credit is highly negligible and negative compare to capital, which are large and positive. For all the banks put together, capital was a positive balance and risk was negative. Their relationship is ambiguous. These results, taken together with the one on growth in deposit, indicates that although Nigerian Licensed banks have the potential of increasing their capital investment in line with expansion in their deposits as required by the regulatory/supervisory agency, the banks are unable to maintain adequate capital within the period

under review or to bring about changes in their capital as their standards of capital adequacy could not support their risk exposure.

The result indicates a greater preponderance of banks whose ratio of actual capital to desired capital of regulators (REG_{jt-1}) for the period to be less than one, which suggest under capitalization (see appendix 25). Standing alone, this will indicate regulatory in effectiveness. However, they could have been produced by portfolio changes, and even with effective regulation one would not expect immediate elimination of any discrepancy between regulators' desired capital and actual capital. The crucial test is whether the capital stock is responding to regulatory pressure. Our regression results provide this crucial test of regulatory ineffectiveness. The fact that the sign on the regulatory variable is negative for risk and positive for capital implies that banks regulatory measures may not have been sufficiently effective.

Following the recent reforms in the sector, it will be appropriate for the regulatory pressure to be effective if theater match consolidation is to be achieved. A situation where banks behave without recourse to authority will affect the much needed sound, stable and safe banking system of our dream.

4.3 Summary of Findings

In this chapter the impact of risk-based capital requirement on Nigerian licensed banks' risk behavior during the period (1986-2004) has been examined by estimating a modified version of the model developed by Rime (2001a). Findings are that Nigerian licensed banks close to the minimum regulatory capital

requirements tend to increase their capital which reducing risk (see > for capital and < for risk for all banks in appendix 23). This indicates that regulatory pressure, i.e. The expected penalty implied by a breach of the capital requirements does not have the desired impact on banks' portfolio behavior.

Moreover, regulatory pressure has a positive and insignificant impact on the change in capital and negative units insignificant impact on banks' risk-taking. This indicates that for Nigerian licensed banks' an increase in available capital through retained earning or equity issues is more costly than a downward adjustment in the risk of the portfolio. The absence of a developed market for assets-backed securities in Nigerian Constitutes the explanation for the relative rigidity of Nigerian banks' portfolio in comparison to what was observed in studies on US banks.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION.

5.1 Summary and Conclusion.

This study sets out to examine the impact of the risk-based capital requirement on the behavior of Nigerian licensed banks as it affects the implementation of monetary policies in Nigeria. Basically, it sets out to examine the relationship between change in capital and change in risk, change in deposits, and change in loans in Nigerian licensed banks and their effect on their portfolio choice. The study starts by examining the crisis of licensed banks and their implication for their portfolio selection in Nigeria in the light of the followings:

- what is the impact of the risk-based capital requirement of the risk-based capital requirement on the portfolio behavior of Nigerian licensed banks: This was used to determined whether banks increase the riskness of their assets portfolio in response to the imposition of regulatory capital requirement.
- has the central bank of Nigerian be effective in bring banks to compliance with the risk- based capital standard.
- Suggestions on how banks problems could be solved: This could encourage the government to adopt or approve some of these suggestions.

Capital requirement can have an ambiguous impact on banks' portfolio and may even increase risk (Koehn and Santamero 1980) but where assets are appropriately risk-weighted, however, risk may be expected to decrease (Kim

and Santamero 1988, 1992). Similarly, liquidity risk is reduced by the more stringent liquidity requirement of the risk-based capital accord. This reduction in both capital and liquidity risk, together with increased portfolio diversification through the inclusion of a greater range of assets should reduce risk across the portfolio. It might therefore be expected that the introduction of the risk-based capital would increase stability by reducing risk and therefore the probability of failure in licensed banks. If this is the case then prudential regulation under the risk-based capital has been successful in achieving the desired objective of stability. In addition, the portfolio choice of banks would have been efficient.

Prior to the introduction of the risk-based capital accord, licensed banks often had quite different risk-return profiles. Even within them, considerable variation in risk existed. The ability of regulation to reduce search costs by providing 'labeled' risk information with regard to institution has implication for both efficiency and depositors protection.

In order to examine the theoretical relationship between these variables the study examines theories and models of bank capital and behavior. This was in an attempt to find out the theory and model that is relevant for Nigeria for further empirical analysis. The results of the analysis could be used to fashion out policies and reforms that can improve the banking industry in Nigeria. The traditional and modern theories of banks capital and behavior are those theories discussed by Adams Smith, Bagehot, Keynes, James Tobin, Modigliani and Miller among others. The traditional and modern theories support the view that capital

influences the intermediation behavior of licensed banks. While the traditional theories of bank behavior stress the need for banks to lend on short-term, self-liquidating, commercial paper, that of bank capital sees if as a buffer for intermediation. They are complete theories of bank capital and behavior in that they are able to explain the causes, volume, and composition of bank credits.

The modern theories, on the other hand, are generally not complete theories of bank capital and behavior. These theories seem to have been advanced to take care of particular loopholes in the traditional theories. Some of these theories have attempted to review and analyze a more realistic explanation of intermediation between borrowers and lenders, more specifically investment in banks. More important of the modern theories is the risk management theory, which stress the rational behavior of banks regarding investment of their resources. In addition to risk management theories are theories of portfolio selection, portfolio selection, imperfect-market, real resource, and Modigliani-Miller theorem, which sees capital as loans buffer. The study upholds the modern school of thought that banks are the foremost transmitters of monetary policy and can influence the real sectors of the economy and it is important for the central bank to know their behavior. Specifically, the effect of banks on the economy depends on some factors, which tend to act as transmission mechanisms. Such factors include the liquidity, solvency, profitability, and the soundness of the banking system and the existence of appropriate bank policies.

After reviewing and analyzing the theories and models of bank behavior, the study upholds that, at the theoretical level, no theory so far reviewed can adequately explain the relationship between bank capital requirement and the licensed bank behavior in Nigeria. This study therefore, suggest that, for an underdeveloped banking system like Nigeria, this relationship should be theoretically formulated taking into consideration the role of the capital market and the level of economic development. Accordingly, a model has been formulated which do not only show these variables but their major components. Thus, the bank balance sheet was broken down into deposits plus total capital equals to loans plus bonds where capital regulation and the supply of loans are defined by the bank's leverages. In the same vain, capital requirement was also broken down into excess capital and target or regulators' capital while risk assets was divided into present and past risk along with their future expected value respectively.

As regards the theories and models, this study discovered that no theory or model could adequately explain the pattern in Nigeria. Although most of the theories are relevant in the countries of their geo-political origin, however, few of them are relevant in explaining bank behavior to an extent in Nigeria. For example, the risk management and portfolio selection theories of bank behavior are relevant and consistent in explaining banking business in Nigeria based on the level of our economic development. However, the theories fail to mention the fact that, in developing countries banks are risk-averse and their portfolios

consist mostly of bank credits. It also fails to show that banks are the major provider of credits to the economy. This suggests that a country's socio-economic and political characteristics could determine its theoretical model and explains why most of the theories advanced are not applicable to Nigeria. This also indicates that, Nigeria should regard the theories of bank behavior with cushion. Thus, the study has adequately formulated the theoretical model of bank behavior for Nigeria to include their assets choice and capital requirement and economic growth. The components of the economic growth is necessary so that any shock in the banks should not affect all the parameters of the model except it is a sustained shock.

At the empirical level, this study has critically reviewed four categories of empirical literature. The rationale for this categorization is to examine how variables such as change in capital and risk assets affect the relationship between deposit and national income and thus, policy decision and direction. This category is shown below:

(a) Time series and Cross sectional studies involving variables such as ∂CAP_{jt} and REG_{jt-1}, ROA_{jt}, $SIZE_{jt}$, $\partial RISK_{jt}$ and CAP_{jt-1};

(b) Time series and Cross sectional studies involving variables such as $\partial RISK_{jt}$ and REG_{jt-1}, $LLOSS_{jt}$, $SIZE_{jt}$, ∂CAP_{jt} $RISK_{jt-1}$;

(c) Time series studies involving variables such as ∂D_t and Tk_{it-1} ∂TK_{it}, $LogA_{it}$ ∂L_{it} and Y_t;

(d) Time series studies involving variables such as dL_t and Tk_{it-1}, dTKit, $LogA_{it,}$ Y_t and ∂D_{it}

The variables, time series and cross sectional characteristics of the data and the technique of analysis vary from study to study. Marcus (1983) examined the relationship between changes in risk and capital via exogenous shock and discretionary behavior in U.S.A. commercial banks using the techniques of non-parametric test along with simple correlation analysis after examining the time series properties of the data. He found out that, correlation exist between risk and capital but the drop common to all the banks does not induce regulatory authority to review any particular bank and does not require any bank to re-adjust capital. Shrieves and Dahl (1992) examined the same U.S. commercial banks in the mid 80s using the techniques of two stage simultaneous equations estimation and found that there is positive relationship between bank capital and risk-taking in banks that were in excess of the minimum regulatory capital requirement and that the positive association between risk and capital is not strictly the result of regulatory influence. They find out that risk-taking behavior is constrained by the bank owner's and/or manager's private incentives. Jacques and Nigro (1998), using the same techniques as Shrieves and Dahl found out that the risk-based capital leads to significant increase in capital ratios and decreases in risk exposure both for risk-based capital constrained and unconstrained banks in the United States of America. The results for Aggarwal and Jacques (1998) using the same 2SLS to examine the impact of the prompt

corrective action (PCA) provisions on US bank capital ratios and portfolio risk levels shows that both adequately capitalized and under capitalized banks increased their capital ratios and lowered portfolio risk in response to PCA.

Ediz, Michael and Perraudin (1998) study the U.K. banking sector from 1989 to 1995. They investigate how pressure by supervisors affect bank capital dynamics when capital ratios approach their regulatory minimum and how banks adjust their capital ratios when subject to regulatory pressure and found that capital requirements induce banks to increase their capital ratios even after they allows for internally generated capital targets and conclude that banks do not significantly rely on asset substitution away from high-risk-weighted assets to meet their capital requirements as they approach the regulatory minimum. The regressions suggest that the adjustment comes through increases in narrow capital (tier1) and the adjustment to higher capital requirements that occurs when banks are close to their triggers is more evenly spread across the two categories of capital.

By applying the Shrieves and Dahl methodology, Rime (2001a) analyzes adjustments in capital and risk of Swiss banks when they approach the minimum regulatory capital level and found the same empirical evidence for Switzerland as Ediz, Michael and Perraudin for the U.K. This is that regulatory pressure induced Swiss banks to increase their capital, but did not affect the level of risk. Sheldon (1996) performs a similar analysis for 219 G-10 banks over the period 1987 to 1994 in which the Basel regulation came into force. He studies the risk-seeking

effects of the implementation of the new risk-based capital standard and the results suggest that asset volatility in U.S. banks rose irrespective of whether the banks increased their capital. In Japan, asset volatility fell although most banks raised their capital ratios. Sheldon's results provide little evidence that the implementation of the Basel guidelines increased the probability of bank failure.

Uchendu (1995) examines the effect of monetary policy on the performance of commercial banks in Nigeria between 1970 and 1993 using OLS simple equation estimation procedure and finds out that whether you use all the banks data, six banks, or the three large banks data, the dominant factors influencing bank profitability are interest rate, exchange rate, bank reserves, banking structure and unit labor cost, particularly when returns on capital is used as a measure of profitability. Nyong (1996) uses a 2SLS simultaneous equation technique to investigate the same effect as Uchendu between 1982 and 1990 and finds that banks size exerts a positive and statistically significant effect on the bank profit performance.

Maria Concetta Chiuri, Giovanni Ferri and Giovanni Majnoni (2001) test for emerging economies, the hypothesis that the enforcement of bank capital asset requirements (Capital Adequacy Ratios) curtails the supply of credit using both OLS and the reduced form equations and found three results. First Capital Adequacy Ratio, enforcement significantly trimmed credit supply, particularly at less-well capitalized banks. Second, the negative impact was larger for countries enforcing Capital Adequacy Ratios in the aftermath of a currency/financial crisis.

Third, the adverse impact of Capital Adequacy Ratios was somewhat smaller for foreign-owned banks, suggesting that opening up to foreign investors have partly shielded the domestic banking sector from negative shocks. Also, the results show that, overall, Capital Adequacy Ratio enforcement induce banks to reduce their lending have both beneficial and detrimental effects. As a benefit, it reduces ill-advised lending, possibly induced by banks' exploitation of the public safety net. For the detrimental effect, Capital Adequacy Ratio enforcement induces an aggregate credit slowdown or contraction in the examined emerging countries, thus causing liquidity constraints and negative effect on real activities.

This study upholds that, no study has adequately captured the influence of capital and the behavior of commercial banks in Nigeria. This has been considered in the model estimation and the results have been interpreted and analyzed to conform to the prevailing situation in Nigeria. It suggests that previous studies particularly for Nigeria may be spurious and might have led to misguided policy decision and direction, which explain why most of the banking policies have not yielded any appreciable impact as their crisis remain with us.

Concerning the policies on deposits the study found out that most of the policies regarding deposits have not been effective due to commercial banks behavior. The supply of deposits by the depositing public appears to be crucially dependent on the size of bank and on the level of deposits already reached in the last period. This is an important conclusion in the context of the general acceptance of bank size as an important variable in Nigeria. Most people and

bankers in Nigeria often think that the best bank to save money and way to mobilize more deposits is by using the big ones and by administrative fiat, more branch offices, more deposit mobilizers, better training facilities among others respectively.

The demand and supply for loans and advances do not depends on the state of business and the level of national income. This is revealed in the banks requirement that customers should open and operate their accounts for at least a minimum of three months and a maximum of two years before any credit facility is extended to them. The national income variable (GDP) did not behave according to the assumption. The national income variable have a negative impact in both deposits and loans equations.

Estimating a capital and risk model for an underdeveloped financial system like Nigeria without considering the role of the regulatory authorities along with the level of the economy could lead to spurious result and thus, misguided policy decisions. This called for the need to include regulatory pressure in examining the nature of the relationship between capital and risk in Nigeria. Two Stage Least Square and Ordinary Least Square techniques were used in the estimation of the models. The results indicate that there is no two-way causality between capital and risk in all the three banks and even when consider together, the result is ambiguous. The size of a bank confers potential advantages such as economies of scale, ease of adoption of modern technology, and ability to attract and employ high quality staff. However, the small value of

the coefficient in banks one and two reflects behavior towards greater risk taking.

Managerial efficiency captured by the coefficient of loan losses was found to be consistently insignificant and negative when all the banks are put together but positive and insignificant for banks one and two during this period. In bank three, it is positive and highly significant at 5% level. It confirms the theory that weak management performs poorly on credit delivery in banks compared to strong management. The magnitude of the estimated coefficient shows that poor management was very serious during this period. This result is important in the sense that it recognized the crucial role of management in proper loan appraisal as well as in the monitoring of the loan repayment profile. According to the Nigeria Deposit Insurance Corporation (NDIC) Annual Report (1994, Pg 17), poor bank management had, in the past, resulted in excessive operating expense, inadequate administration of loan portfolio, an overly aggressive growth policy to attract deposits, interest speculation coupled with other instances of poor judgment that resulted in stress for the banks. Our findings suggest that in Nigerian banking, high quality management should never be compromised as revealed by the coefficients of loan losses (LLOSS), size (SIZE) and change in capital (∂CAP).

A return on assets (ROA_{jt}) which was expected to have apriori behavior in line with theory to conform to the above findings was found to be positive and not significant for banks two and negative and not significant for bank one but

significant and positive for bank three. When the whole banks were considered together, the coefficient was significant but carry a negative sign. This is surprising. The implication of this is that most of the banks do not rely on returns on assets as a source of additional finance for change in capital.

Perhaps one of the most interesting findings of this study is the conspicuous absence of any relationship between change in risk and regulatory pressure with respect to risk asset. Even the relationship between change in capital and regulatory pressure was ambiguous as it was insignificant for the banks individually but significant when considered in whole. This means that the regulation/supervision of banks by the monetary authorities may not have been effective.

Appendix 22 to 25 highlights the position of banks with respect to capital adequacy for a cross section of three big banks in the period. The result indicates a greater importance of banks whose ratio of actual capital to desired capital of regulators $\partial^{\partial}CAP_{jt} = \alpha(CAP^*_{jt}-CAP_{jt-1})$; $\partial RISK_{jt} = \beta(RISK^*_{jt} - RISK_{jt-1})$ in the period is less than one for risk and more than one for capital changes which suggests undercapitalization. Standing alone, this indicates regulatory ineffectiveness in the risk assets regulation.

5.2 Recommendations of the Study.

From the policy perspective, the review of the monetary policy trend in the country over the years and results of the empirical investigation thus obtained have shown the concern of the banking industry in portfolio choice and

the effectiveness of regulatory agencies in bringing them to comply with risk-based capital requirement. To compliment the effort, the following are recommended:

From our results, since the demand and supply of loans by the banks is affected by the change in total capital, a great deal is to be gained by simultaneously reducing deposit rates and advances rates if banking assets and the lending capacity of the banks is to increase markedly. Here, the gap between lending and deposit rates should be narrowed to avoid the abnormal earnings by the banks. Since the lag capital and change in capital variables (TK_{t-1} and $\partial TK_{t)}$ exerts negative and significant impact on both change in deposits and change in loans, appropriate increase in gross domestic product (Y_t) policies must involve stimulating lending. Here a cut-down in excess interest rate charges for loans to reduce increase loan demand need to be reviewed. Similarly, since the size effect component as variable captured in the specification, has also proved to be significant and has a positive effect on both change in loans and deposits, an in-house policy of the banks must take into account the expected holding period of returns in line with the pure expectation theory of the term structure of interest rates.

Also as the national income variable exert a negative and insignificant impact on both the change in deposits and change in loans, appropriate GDP growth policies must involve the reduction of advances rate to attract more credit to the economy.

Of the three banks, only bank three did well in both raising deposits and grant/management of loans and advances. All the variables that explained the dependent variables were highly significant with size exerting a large impact on both deposits, loans, capital and risk. This implies that concern must be shown on the possible internal control measures of the banks especially the area of insider abuses. The Central Bank of Nigeria should step up her banking examination strategies to capture all the banks activities.

Also from the effects of a stricter enforcement of minimum capital discipline on bank intermediation in Nigerian financial systems, the banking operations of commercial banks must be made to be in alignment with banking policy targets. Specifically, Licensed Banks should work out a private sector borrowing requirement that is consistent with the economic programme of Government with the aim of achieving the policy targets on macroeconomic goals and objectives.

As the regulatory pressure is ineffective, it is necessary that the regulatory activity of the Central Bank monetary authority as well as the Nigeria Deposit Insurance Corporation be brought under stringent measures that can give effective regulations especially the composition of risk assets to achieve the desire consolidation.

With respect to risk assets, since the loan loss growth is found to exert strong dampening effect on loans and advances of the commercial banks, the banking policy action should include the effective implementation of prudential

guidelines as well as standard accounting practice that would control real credit growth and reveal proper reporting of banks activities. It is important that banks should adhere to the guidelines of their regulatory bodies.

In respect of the capital adequacy, banks should use either preference shares or debenture, to raise capital instead of this ordinary share thing that mop up almost all the free fund in the market. There is the need for us to pursue the capital adequacy ratio that would not be detrimental to our fragile economy.

The incessant increase in capital value for banks via public announcement by Central Bank should be discouraged. Banks should be encouraged to recapitalized at their own pace while restricting them from certain bank business as that goes with large capitals. How are we sure that banks with large capital will do better than those with small capital since our results give conflicting views. Naturally, all banks cannot grow to become big overnight. The regulators should ensure that the growth in the banking industry is transformed to the real sector of the economy.

Finally, since the lag in effect of certain variables is also significant in line with recent monetary policies shift, this should be sustained to complete their impact on the target variable(s).

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APPENDICES.

Appendix 1: Summary of Empirical Studies.

S/NO	Name of Author	Country/ Period	Problems	Methodology Theory Econometric Model Estimation Techniques	Results
1.	Marcus A J. (1983).	U. S. A. Commercial Banks (1965-1977.	Changes in risk and Capital are a result of exogenous shocks and discretionary behavior.	Risk Management approach and peer group theory of regulatory pressure to bank behavior; contingent-Claim model; non-parametric test along with simple correlation analysis.	The drop in capital common to all banks does not induce regulatory authority to review any particular bank and does not require any bank to re-adjust capital. This means that when banks suffer capital losses, the increase in regulatory cost for a particular bank is much smaller than it would be if that bank alone lowered it's capital.
2.	Keeley, M C. (1988)	U.S.A. 100 largest Banks holding Companies.	Changes in risk and capital are a result of exogenous shocks and discretionary behavior.	Risk Management and peer group theories of bank behavior; Simple correlation and quantitative effect analysis.	Regulations succeed in causing banks with low capital ratios to increase their book value capital ratios both absolutely and relative to banks with initially high capital ratios and that banks do so primarily by slowing assets growth.
3.	Shrieves, R. and Dahl, D (1992).	U. S. A. Commercial Banks (mid 1980s).	The relationship between changes in bank capital and changes in their portfolio risks.	Risk management approach to bank behavior; Simultaneous equation model; Two-stage least square estimation technique.	There is a positive relationship between Bank capital and risk-taking in banks that were in excess of the minimum regulatory capital requirement and this means that the positive association between risk and capital is not strictly the result of regulatory influence. They find out that risk-taking behavior is constrained by bank owner's and/or manager's private incentives.
4.	Jacques, K. and Nigro, P. (1998).	U. S. A. Commercial Banks (1991-1997).	The relationship between bank capital, portfolio risk and risk-based capital standard.	Risk management and Portfolio theory approach. Simultaneous equation model; Two-stage least square estimation technique.	The risk-based capital leads to significant increases in capital ratios and decreases in risk exposure both for risk-based capital constrained and unconstrained banks.

5.	Aggarwal, R. and Jacques (1998)	U. S. A. Commercial Banks. (1991-1993)	The impact of the prompt corrective action (PCA) provisions on bank capital ratios and portfolio risk levels.	Risk management and portfolio theory approach of bank behavior; Simultaneous equations model and two-stage least square estimation techniques.	Aggarwal and Jacques find that both adequately capitalized and under capitalized banks increase their capital ratios and lowered portfolio risk in response to PCA.
6.	Ediz, T. Michael, L. and Perraudin, W. (1998).	U. K. Commercial Banks (1989-1995).	Whether pressure by supervisors affect bank capital dynamics when capital ratios approach their regulatory minimum and how banks adjust their ratios when subject to regulatory pressure.	Risk management and portfolio theory approach; Multivariate panel regression model; Single and Simultaneous equations were used; Both OLS and 2SLS estimation techniques were used.	Capital requirements in the banks to increase their capital ratios even after or on allows for internally generated capital targets.
7.	Rime, B. (2000a)	Switzerland Commercial Banks (1990-1995).	There is a simultaneous adjustment in capital and risk of Swiss commercial Banks when they approach the minimum regulatory capital level.	Risk management and portfolio theory approach; Simultaneous equation model; Two-stage least square estimation techniques.	The result indicate that regulatory pressure induce banks to increase their capital, but does not affect the level of risk. This, according to them is due to the relative rigidity of Swiss banks' portfolio holdings as a result of lower liquidity of banks' assets. They said that the low develop market for small banks stocks and the absence of a asset-backed securities is also a contributory factor.
8.	Furlong, R. (1988)	U.S.A. Commercial Banks (1975-1986).	How the default risk of large U.S banks holding companies changed in the pre-Basle Accord period.	Option pricing theory approach; Black and Scholes call option-pricing formula.	Asset risk doubled in the period which banks faced capital requirements compare to the earlier period.
9.	Sheldon, G. (1996).	G-10 Countries Commercial Banks. (1987-1994).	How default risks of 219 G-10 countries banks holding companies changed in the pre-Basel period from 1987-1994 in which the Basel regulations came into force. He studies the risk sealing effects of the implementation of the new risk-based capitalstandard.	Option pricing theory; Portfolio and risk management theories. Simple Correlation model; OLS estimation techniques.	The results suggest that the assets volatility in U.S. banks rose irrespective of whether the banks increased their capital. In Japan, asset volatility fell although most banks raised their capital ratios. Sheldon results provide little evidence that the implementation of the Basel guidelines increased the probability of bank failure.

10.	Thies, C. and Gerlowski, D. (1989). Wheelock, D. (1992).	U.S.A Commercial Banks (New evidence from the 1920s).	Deposit Insurance and Bank failures.	Risk management approach; Simple Correlation and Quantitative effect analysis.	Risk-taking and the probability of bank failure are increasing during deposit insurance.
11.	Demirguc-Kunt, A. and Detragiache, E. (2000).	U.S.A. 61 Commercial Banks (1980-1997).	Does deposit insurance increase banking system stability?	Risk management approach; Simple Correlation and Quantitative effect analysis.	Deposit insurance significantly increased the probability of a banking crisis. The adverse impact of deposit insurance on bank stability was stronger where bank interest rates were deregulated. The result shows that in Countries where bank regulation and supervision is of poor quality, moral hazard due to deposit insurance is higher.
12.	Gropp, R. and Vesala, J. (2001).	European Banks.	The relationship between deposit insurance, debt-holder monitoring, bank charter values and Risk-taking.	Risk management theory; Real resource model; Imperfect-market model and Portfolio theory. Simple Correlation model; OLS estimation techniques.	The introduction of explicit deposit insurance reduces the risk-taking of banks. They also find that banks with lower charter values reduce risk-taking more after the introduction of explicit deposit insurance.
13.	Sauders, A. Stck, E. and Travos, N. G. (1990).	U.S.A. Commercial Banks. (1978-1985).	Impact of ownership structure and deregulation on bank risk-taking for bank holding Companies.	Risk management theory; Real resource and portfolio theories; Simple Correlation model; A cross-section time series regression; OLS estimation techniques.	The results suggest an agency problem between managers who hold capital of the banks (insiders) and outside investors who only hold capital without being managers. The result also show that risk-taking differences between stockholders and managerially controlled banks become more transparent in period of deregulation which suggest that high bank charter values can mitigate moral hazard by stockholders.
14.	Keeley, M. C. (1986).	U.S.A. (1975-1986).	Differences in stock price reactions following voluntary capital injections by Commercial Banks and involuntary recapitalizations required meeting regulatory requirements.	Risk management theory; Portfolio theory; Simple Correlation model.	He finds a significant drop in the share price of capital-constrained banks after the recapitalization announcement while for the well-capitalized banks, the stock price did not show a similar behavior.

15.	Uchendu, Okorie. (1995).	Nigeria (1970-1993).	The effect of monetary policy on the performance of Commercial Banks in Nigeria.	Portfolio management approach; the production function approach; OLS single equation estimation techniques.	He finds out that whether you use all banks data, six banks data or the three large banks data, the dominant factors influencing bank profitability are interest rate, exchange rate, bank reserves, banking structure and unit labor costs, particularly when returns on capital is used as a measure of profitability.
16.	Nyong, Michael (1996).	Nigeria (1982-1990).	The effect of monetary policy on the performance of Commercial Banks in Nigeria.	Portfolio theory approach; Simultaneous equation model; 2SLS estimation techniques; Granger Causality test.	He finds that banks size exerts a positive and statistically significant effect on the bank profit performance.
17.	James, C. (1987).	U.S.A.	Some evidence of the uniqueness of bank loans.	Credit Rationing theory; Simple Correlation model; Quantitative analysis.	The announcement of new credits results in significant positive abnormal returns on firms' equity and results. Corresponding announcement of bonds issues do not result in such responses.
18.	Maria Concetta Chiuri, Giovanni Ferri and Giovanni Majnoni. (2001).	Emerging Economies : 16 Countries the World Over including Nigeria in Africa.	That the enforcement of bank capital asset requirements (CARS) curtails the supply of credits.	Portfolio theory and liquidity preference model approach; The statistical model from bank balance sheet identity and profit maximization function approach; OLS multiple equations estimation procedure.	The Econometric analysis on individual bank data suggests three main results: first, CAR enforcement significantly trimmed credit supply, particularly at less-well capitalized banks. Second, the negative impact has been larger for countries enforcing CAR in the aftermath of a currency/financial crisis. Third, the adverse impact of CAR has been somewhat smaller for foreign-owned banks, suggesting that opening up to foreign investors may have partly shielded the domestic banking sector from negative shocks. They find out that the overall effect of CAR enforcement in terms of lending is ambiguous.

Appendix 2: Data For The Variables of Bank One (Raw)

Year	Tier 1 Capital	Tier 2 Capital	Capital Base	RISK ASSETS						
				Cash in head	Cash with Bank in Nigeria	Cash with Banks inside Nigeria	Returns of Assets	Treasury Bills	Non-negotiable certificate	Industrial investments
1986	311		311	84	64	206	146	1177		119
1987	373		373	87	129	320	106	2095	14	131
1988	435		435	90	195	590	124	2038	26	89
1989	534		534	117	788	1830	163	928	25	84
1990	300		285	159	755	1208	-205	2112	26	86
1991	261	195	443	236	764	1564	-31	2532	21	83
1992	634	331	930	300	1146	4246	366	2138	30	93
1993	1046	448	1461	450	317	3519	932	4191	834	91
1994	1382	448	1783	556	3633	875	874	9674	1120	115
1995	3396	2283	5679	765	2673	18938	1007	3078	5226	153
1996	4015	2379	6261	1161	1524	20588	1155	10013	4087	178
1997	4015	2379	6261	1161	1524	20588	1155	10013	4087	178
1998	6855	2379	8830	1141	9544	25240	2323	3246	4030	432
1999	8928	2379	10883	1561	18877	30314	3711	6241	5115	445
2000	12140	2379	14046	2022	11261	51352	5112	40580	9338	491
2001	14714	2379	16806	2710	36373	49001	6201	28467	8825	501
2002	15368	2379	17450	3226	33993	83357	5087	36164	18361	780
2003	22660	2379	20014	4267	18745	97827	13393	80097	14276	7343
2004	36242		36242	3854	26488	53906	14106	67341	25839	16825

RISK ASSETS CONTINUE							
Years	New provision for loan loss	Real Estate loan	Other loan	Returns on Assets	Fixed Assets	Other Assets	Cont/Liabilities
1986	49	489	1697	146	142	1220	1002
1987	61	676	1811	106	167	1184	605
1988	67	705	2110	124	205	1238	814
1989	73	788	2395	163	294	1757	1343
1990	201	671	2803	-205	376	1818	762
1991	394	831	3237	-13	562	1926	885
1992	523	852	4336	366	671	2527	289
1993	239	1254	5411	932	851	2588	275
1994	141	1628	8304	874	1107	4225	1851
1995	79	3545	13132	1007	3519	6085	1452
1996	140	3632	18282	1155	4066	5059	5598
1997	140	3632	18282	1155	4066	5059	5598
1998	698	9795	22312	2323	4706	12606	6999
1999	1563	3841	31676	3711	6081	19549	10099
2000	3460	16238	33309	5112	7447	10933	35040
2001	3952	20280	37419	6201	7308	12855	25797
2002	16396	23544	67683	5087	7826	8664	76883
2003	29002	21879	71056	13393	8620	17428	50423
2004	30236	22195	94928	14106	9564	11596	48829

Source: Compiled from the Banks annual Balance Sheet in 2006.

Bank one: First Bank of Nigeria PLC.

APPENDIX 3: DATA FOR THE VARIABLES OF BANK TWO (RAW)

Year	Tier 1 Capital	Tier 2 Capital	Capital Base	RISK ASSETS					
				Cash in head	Cash with Bank in Nigeria	Cash with Banks inside Nigeria	Treasury Certificate	Treasury Bills	Negotiable certificate
1986	283		283	35	118	241		1003	
1987	316		316	53	159	241		1303	
1988	328		328	45	195	211	117	1330	19
1989	417		417	68	389	544	45	710	32
1990	472		472	79	835	1272	25	888	
1991	484		484	77	213	10941	25	1436	
1992	484		484	268	1039	10491		1364	
1993	723		723	288	1309	1145	937	62	162
1994	1563		1563	588	2740	447	25	1922	
1995	3596		3596	410	30	5959	25	3611	400
1996	4287		4287	413	3567	2022		5991	1452
1997	5290		5290	600	4110	696		9435	
1998	5036		5036	1170	7216	688		9842	
1999	5011		5011	1781	12583	7482		13347	
2000	6782		6782	2077	12475	7530		34499	
2001	8427		8427	2406	23775	22912	9	39323	
2002	9782		9782	1753	1608	39590	1	29267	
2003	13767		13767	3074	4671	22275		30490	
2004	16377		16377	2908	4551	25666		35497	

Source: Compiled from the Banks annual Balance Sheet in 2006.

Bank Two: United Bank for Africa PLC.

Appendix 4: Data for the Variables of Bank Three (Raw)

Year	Tier 1 Capital	Tier 2 Capital	Capital Base	RISK ASSETS						
				Cash in head	Cash with Bank in Nigeria	Cash with Banks outside Nigeria	Treasury Bills	Non-negotiable certificate of deposit	Industrial investments	Size (total assets)
1986	300	40	340	46	457	165	1405	12	5	5299
1987	349	40	389	35	557	634	1181	11	6	5747
1988	413	32	445	42	560	755	1378	14	6	6335
1989	534	24	558	49	1122	1204	995	17	8	7986
1990	653	16	669	50	1713	1176	1286	24	18	9243
1991	668	8	676	93	2801	1936	1548	23	40	13180
1992	989	229	1218	114	446	3275	61	50	63	23870
1993	14	229	1678	315	430	3131	1211	26	78	32000
1994	18	229	2014	222	6501	9484	6669	57	78	43270
1995	3387	229	3554	291	8967	36253	2979	79	39	76560
1996	3851	228	4002	459	7909	27239	4877	45	134	77670
1997	4631	1493	5816	890	9726	24183	3255	22	157	83320
1998	7259	1493	8350	920	5991	36086	3606	36	402	102400
1999	9139	1493	10063	800	6652	34883	8380	60	569	126200
2000	9139	1493	10063							
2001	12293	1493	13005	2437	2098	85588	37019	143	781	215400
2002	28809	1493	30302	3506	6982	115693	32500	3377	994	275200
2003	31237	1493	32730	4003	9300	136008	65840	2185	1054	353200
2004	34492	1493	35985	2141	5324	158650	39282	572	1205	398271

RISK ASSETS CONTINUE								
Year	(ROA) profit before tax	Contingent liabilities	Bankers acceptances	New provision for loan loss	Real Estate loan	Other loan	Fixed Assets	Other assets
1986	104	435		64	786	1357	73	275
1987	84	512		75	886	14	101	457
1988	112	927		127	1059	1791	125	523
1989	152	1111		139	1091	2158	170	243
1990	127	1222		420	1241	2361	439	627
1991	14	1562		14	1347	3031	564	1657
1992	110	2871		467	1792	4496	1396	1305
1993	615	2941		316	1483	6227	1485	2075
1994	606	4046	3728	541	2168	10038	1912	2336
1995	839	8651	1468	1023	3294	15601	2863	4767
1996	1134	8033	4842	985	5543	19740	3627	4084
1997	1511	12298	3128	792	8038	24513	6019	4174
1998	2083	12408	770	1622	8197	25536	7456	4986
1999	3860	28121	378	3033	8873	32539	8011	5228
2000								
2001	7058	34683	3377	2843	10225	35610	9296	7198
2002	7490	33992	6906	2267	12467	49495	10350	10984
2003	10154	21874	3388	16399	14090	56869	11212	11861
2004	10210	27316	10533	19305	20779	76864	12401	13070

Source: Compiled from the Banks annual Balance Sheet in 2006.
Bank Three: Union Bank of Nigeria PLC.

Appendix5: Data For Change in Deposit Variables For Commercial Bank One.

YEARS	∂D_{1t}	TK_{1t-1}	∂TK_{1t}	$LogA_{1t}$	Y_t	Dummy
1986	270	307	4	5996	68.92	0
1987	597	311	62	6777	71.08	0
1988	636	373	62	7072	70.74	0
1989	139	435	99	8492	77.75	0
1990	849	534	(249)	8482	83.50	0
1991	1653	285	158	11319	90.34	0
1992	3678	443	487	16986	94.61	1
1993	4474	930	536	23552	97.43	1
1994	6836	1460	317	33955	100.01	1
1995	18366	1783	3896	59821	101.35	1
1996	13857	5679	582	72819	103.53	1
1997	0000	6261	0000	72819	107.02	1
1998	10704	6261	2569	95221	110.13	1
1999	18329	8830	2053	129503	112.95	1
2000	42699	10883	3163	180553	116.13	1
2001	21049	14046	2760	212901	120.59	1
2002	19896	16806	644	266356	125.35	1
2003	25780	17450	2564	320578	129.83	1
2004	58197	38621	6051	312490	143.38	1

Source: Compiled from the Banks annual Balance Sheet in 2006.
Bank one: First Bank of Nigeria PLC.

Appendix 6: Data For Change in Loan Variables For Commercial Bank One.

Years	∂L_{1t}	TK_{1t-1}	∂TK_{1t}	$LogA_{1t}$	Y_t	Dummy
1986	180	307	4	5996	68.92	0
1987	178	32	62	6777	71.08	0
1988	636	373	62	7072	70.74	0
1989	139	435	99	8492	77.75	0
1990	(752)	534	(249)	8482	83.50	0
1991	(16)	285	158	11319	90.34	0
1992	744	443	487	16986	94.61	1
1993	694	930	536	23552	97.43	1
1994	2868	1460	317	33955	100.01	1
1995	5800	1783	3896	59821	101.35	1
1996	4403	5679	582	72819	103.53	1
1997	0000	6261	0000	72819	107.02	1
1998	9904	6261	2569	95221	110.13	1
1999	5620	8830	2053	129503	112.95	1
2000	3313	10883	3163	180553	116.13	1
2001	111130	14046	2760	212901	120.39	1
2002	15807	16806	644	266356	125.35	1
2003	(5872)	17450	2564	320578	129.83	1
2004	58197	38621	6051	312490	143.38	1

Source: Compiled from the Banks annual Balance Sheet in 2006.

Bank one: First Bank of Nigeria PLC.

Appendix 7: Data For Change in Deposit Variables For Commercial Bank Two.

Years	∂D_{2t}	TK_{2t-1}	∂TK_{2t}	$LogA_{2t}$	Y_t	Dummy
1986	337	209	30	4617	68.92	0
1987	873	239	47	5657	71.08	0
1988	1515	286	42	7061	70.74	0
1989	2286	328	89	9205	77.75	0
1990	1535	417	55	11351	83.50	0
1991	2200	472	112	12684	90.34	0
1992	2455	584	26	18650	94.61	1
1993	4279	610	48	22950	97.43	1
1994	(274)	658	854	24245	100.01	1
1995	14808	1512	2006	44132	101.35	1
1996	3857	3518	639	47945	103.53	1
1997	2502	4157	1066	54399	107.02	1
1998	9337	5223	(310)	68110	110.13	1
1999	24349	4913	(79)	99978	112.95	1
2000	9311	4834	1641	119987	116.13	1
2001	50617	6495	1535	187248	120.59	1
2002	1269	8010	1154	198680	125.35	1
2003	10561	9164	2954	200995	129.83	1
2004	11474	18059	357	208802	143.38	1

Source: Compiled from the Banks annual Balance Sheet in 2006.
Bank Two: United Bank for Africa PLC.

Appendix 8: Data For Change in Loan Variables For Commercial Bank Two.

Years	∂L_{2t}	TK_{2t-1}	∂TK_{2t}	$LogA_{2t}$	Y_t	Dummy
1986	108	209	30	4617	68.92	0
1987	81	239	47	5657	71.08	0
1988	30	286	42	7061	70.74	0
1989	1036	328	89	9205	77.75	0
1990	(539)	417	55	11351	83.5	0
1991	(70)	472	112	12684	90.34	0
1992	2157	584	26	18650	94.61	1
1993	837	610	48	22950	97.43	1
1994	(1111)	658	854	24245	100.01	1
1995	1902	1512	2006	44132	101.35	1
1996	2767	3518	639	47945	103.53	1
1997	1774	4157	1066	54399	107.02	1
1998	6035	5223	(310)	68110	110.13	1
1999	7818	4913	(79)	99978	112.95	1
2000	(7289)	4834	1641	119987	116.13	1
2001	5781	6495	1535	187248	120.59	1
2002	17029	8010	1154	198680	125.35	1
2003	5941	9164	2954	200995	129.83	1
2004	11474	18059	357	208806	143.38	1

Source: Compiled from the Banks annual Balance Sheet in 2006.
Bank Two: United Bank for Africa PLC.

Appendix 9: Data For Change in Deposit Variables For Commercial Bank Three.

Years	∂D_{3t}	TK_{3t-1}	∂TK_{3t}	$LogA_t$	Y_t	Dummy
1986	277	207	133	5299	68.92	0
1987	350	340	49	5748	71.08	0
1988	527	389	56	6336	70.74	0
1989	906	455	133	7986	77.75	0
1990	597	558	111	9242	83.5	0
1991	3360	669	7	13166	90.34	0
1992	5973	676	542	23870	94.61	1
1993	4402	1218	460	32008	97.43	1
1994	4799	1678	336	43274	100.01	1
1995	26693	2014	1540	76550	101.35	1
1996	5307	3554	448	77675	103.53	1
1997	6740	4002	1814	83324	107.02	1
1998	13585	5816	2534	102431	110.13	1
1999	15796	8350	1713	126234	112.95	1
2000	0000	10063	0000	126234	116.13	1
2001	77942	10063	2942	214885	120.59	1
2002	33370	13005	16303	275194	125.35	1
2003	20000	29308	2368	329583	129.83	1
2004	41074	35985	3144	367798	143.38	1

Source: Compiled from the Banks annual Balance Sheet in 2006.
Bank Three: Union Bank of Nigeria PLC.

Appendix 10: Data For Change in Loan Variables For Commercial Bank Three.

Years	∂L_{3t}	TK_{3t-1}	∂TK_{3t}	$LogA_{3t}$	Y_t	Dummy
1986	162	207	133	5299	68.92	0
1987	26	340	49	5748	71.08	0
1988	357	388	56	6336	70.74	0
1989	151	445	113	7986	77.75	0
1990	(59)	558	111	9242	83.5	0
1991	(584)	669	7	13166	90.34	0
1992	2036	676	542	23870	94.61	1
1993	446	1218	460	32008	97.43	1
1994	2887	1678	336	43274	100.01	1
1995	4149	2014	1540	76550	101.35	1
1996	5449	3554	448	77675	103.53	1
1997	6660	4002	1814	83324	107.02	1
1998	1714	5816	2534	102431	110.13	1
1999	2796	8350	1713	126234	112.95	1
2000	0000	10063	0000	126234	116.13	1
2001	9051	10063	2942	214885	120.59	1
2002	8561	13005	16303	275194	125.35	1
2003	9074	29308	2368	329583	129.83	1
2004	346	35985	3144	367798	143.38	1

Source: Compiled from the Banks annual Balance Sheet in 2006.
Bank Three: Union Bank of Nigeria PLC.

Appendix 12: Data For Change in Deposit Variables For the three Commercial Banks.

Years	∂D_{At}	TK_{At-1}	∂TK_{At}	$LogA_{At}$	Y_t	Dummy
1986	884	723	167	15912	68.92	0
1987	1820	890	158	18182	71.08	0
1988	2678	1048	160	20468	70.74	0
1989	3331	1208	301	25683	77.75	0
1990	1863	1509	(83)	29075	83.50	0
1991	5485	1426	277	37169	90.34	0
1992	10235	1703	1055	59506	94.61	1
1993	9486	2758	1044	78510	97.43	1
1994	12293	3796	1507	101474	100.01	1
1995	46571	5309	7442	180503	101.35	1
1996	22682	12751	1669	198439	103.53	1
1997	10897	14420	2880	210542	107.02	1
1998	29512	17300	5413	265762	110.13	1
1999	39038	22093	3845	355715	112.95	1
2000	47533	25780	4804	426774	116.13	1
2001	105486	30604	7237	615034	120.59	1
2002	61276	37821	18101	740230	125.35	1
2003	54944	55922	7886	851156	129.83	1
2004	54944	7886	7886	851156	143.38	1

Source: Compiled from the three Banks Annual Balance Sheets in 2006.
All Banks: First Bank Nigeria PLC, United of Bank for Africa PLC, Union Bank of Nigeria PLC.

Appendix12: Data For Change in Loan Variables For the three Commercial Banks.

Years	∂L_{At}	TK_{At-1}	∂TK_{At}	$LogA_{At}$	Y_t	Dummy
1986	450	723	167	15912	68.92	0
1987	285	890	158	18182	71.08	0
1988	593	1048	116	20469	70.74	0
1989	1337	1208	301	25683	77.75	0
1990	(1350)	1509	(83)	29075	83.50	0
1991	(670)	1426	277	37169	90.34	0
1992	4937	1703	1055	59506	94.61	1
1993	1977	2758	1044	78510	97.43	1
1994	6866	3796	1507	101474	100.01	1
1995	11851	5309	7442	180503	101.35	1
1996	12619	12751	1669	198439	103.53	1
1997	8434	14420	2880	210542	107.02	1
1998	17653	17300	5413	265762	110.13	1
1999	16234	22093	3845	355715	112.95	1
2000	10602	25780	4804	426774	116.13	1
2001	125962	30604	7237	615034	120.59	1
2002	41397	37821	18101	740230	125.35	1
2003	9143	55922	7886	851156	129.83	1
2004	55922	7886	7886	851156	143.38	1

Source: Compiled from the three Banks Annual Balance Sheets in 2006.
All Banks: First Bank Nigeria PLC, United of Bank for Africa PLC, Union Bank of Nigeria PLC.

Appendix 13: Data For Change in Capital Variables For Commercial Bank One.

Years	∂CAP_{1t}	REG_{1t-1}	ROA_{1t}	$SIZE_{1t}$	$\partial RISK_{1t}$	CAP_{1t-1}	Dummy
1986	4	58.96	146	5996	(1.58)	307	0
1987	62	58.52	106	6777	(0.24)	311	0
1988	62	55.50	124	7072	3.1	373	0
1989	99	53.79	163	8492	(2.32)	435	0
1990	(249)	49.63	(205)	8482	10.94	534	0
1991	158	108.07	(31)	11319	(8.96)	285	0
1992	487	75.62	366	16986	(1.46)	443	1
1993	536	55.48	922	23552	(7.24)	930	1
1994	317	39.56	874	33955	3.09	1460	1
1995	3896	51.54	1007	59821	16.71	1783	1
1996	582	42.61	1155	72819	(4.92)	5679	1
1997	0000	42.45	1155	72819	0000	6261	1
1998	2569	42.45	2323	95221	9.51	6261	1
1999	2053	47.58	3711	129503	(6.49)	8830	1
2000	3163	46.32	5112	180553	(8.17)	10883	1
2001	2760	41.63	6201	212901	(0.87)	14046	1
2002	644	40.15	5087	266356	2.80	16806	1
2003	2564	51.80	13393	320578	(4.96)	17450	1
2004	21171	61.08	14106	312490	3.69	38621	1

Source: Compiled from the Banks annual Balance Sheet in 2006.
Bank one: First Bank of Nigeria PLC.

Appendix 14: Data For Change in Risk Assets Variables For Commercial Bank One.

Years	$\partial RISK_{1t}$	REG_{1t-1}	$LLOSS_{1t}$	$SIZE_{1t}$	∂CAP_{1t}	$RISK_{1t-1}$	Dummy
1986	(1.58)	58.96	0.82	5996	4	38.04	0
1987	(0.24)	58.52	0.90	6777	62	36.46	0
1988	3.1	55.50	0.95	7072	62	36.70	0
1989	(2.32)	53.79	0.86	8492	99	39.80	0
1990	10.94	49.63	2.37	8482	(249)	37.48	0
1991	(8.96)	108.07	3.48	11319	158	48.42	0
1992	(1.46)	75.62	3.08	16986	487	39.46	1
1993	(7.24)	55.48	1.01	23552	536	38.00	1
1994	3.09	39.56	0.42	33955	317	30.76	1
1995	16.71	51.54	0.20	59821	3896	33.85	1
1996	(4.92)	42.61	0.19	72819	582	50.56	1
1997	00.00	42.45	0.19	72819	00.00	45.64	1
1998	9.51	42.45	0.73	95221	2569	45.64	1
1999	(6.49)	47.58	1.21	129503	2053	55.15	1
2000	(8.17)	46.32	1.92	180553	3163	48.66	1
2001	(0.87)	41.63	1.86	212901	2760	40.49	1
2002	2.80	40.15	6.16	266356	644	39.62	1
2003	(4.96)	51.80	0.73	320578	2564	42.42	1
2004	3.69	61.08	1.37	312490	21171	54.24	1

Source: Compiled from the Banks annual Balance Sheet in 2006.
Bank one: First Bank of Nigeria PLC.

Appendix 15: Data For Change in Capital Variables For Commercial Bank Two.

Years	∂CAP_{2t}	REG_{2t-1}	ROA_{2t}	$SIZE_{2t}$	$\partial RISK_{2t}$	CAP_{2t-1}	Dummy
1986	30	89.00	82	6417	3.86	209	0
1987	47	81.17	106	5657	(8.72)	239	0
1988	42	68.53	84	7061	(5.73)	286	0
1989	89	64.33	101	9205	3.71	328	0
1990	55	72.90	116	11351	12.91	417	0
1991	112	94.70	117	12684	(1.42)	472	0
1992	26	83.22	20	18650	(11.06)	584	1
1993	48	97.87	350	22950	12.40	610	1
1994	854	146.35	213	24245	(4.01)	658	1
1995	2006	62.10	488	44132	(11.93)	1512	1
1996	639	36.64	1246	47945	1.09	3518	1
1997	1066	34.78	903	54399	0.76	4157	1
1998	(310)	32.03	225	68110	8.62	5223	1
1999	(79)	52.21	1766	99978	(2.17)	4913	1
2000	1641	74.29	3804	119987	(14.00)	4834	1
2001	1535	45.81	1585	187248	2.10	6495	1
2002	1154	61.72	2239	198680	7.96	8010	1
2003	2954	71.05	4816	200995	3.16	9164	1
2004	357	52.16	5608	208806	6.79	18059	1

Source: Compiled from the Banks annual Balance Sheet in 2006.
Bank Two: United Bank for Africa PLC.

Appendix 16: Data For Change in Risk Assets Variables For Commercial Bank Two.

Years	$\partial RISK_{2t}$	REG_{2t-1}	$LLOSS_{2t}$	$SIZE_{2t}$	∂CAP_{2t}	$RISK_{2t-1}$	Dummy
1986	3.86	89	1.15	4617	30	46.49	0
1987	(8.72)	81.17	1.20	5657	47	50.35	0
1988	(5.73)	68.53	1.05	7061	42	41.63	0
1989	3.71	64.33	1.14	9205	89	35.90	0
1990	12.91	72.90	1.96	11351	55	39.61	0
1991	1.42	94.70	6.11	12684	112	52.52	0
1992	(4.01)	83.22	4.20	18650	26	51.10	1
1993	12.40	97.87	3.23	22950	48.00	40.04	1
1994	(4.01)	146.35	1.84	24245	854	52.44	1
1995	(11.93)	62.10	0.51	44132	2006	48.43	1
1996	1.09	36.64	0.00	47945	639	36.50	1
1997	0.76	34.78	0.00	54399	1066	37.69	1
1998	8.62	32.03	0.31	68110	(310)	38.45	1
1999	(2.17)	52.21	0.62	99978	(79)	47.07	1
2000	(14.00)	74.29	0.72	119987	1641	44.90	1
2001	2.10	45.81	0.15	187248	1535	30.90	1
2002	7.96	61.72	0.34	198680	1154	33.00	1
2003	3.16	71.05	1.19	200995	2954	40.96	1
2004	6.79	52.16	2.91	208806	357	46.09	1

Source: Compiled from the Banks annual Balance Sheet in 2006.
Bank Two: United Bank for Africa PLC.

Appendix 17: Data For Change in Capital Variables For Commercial Bank Three.

Years	∂CAP_{3t}	REG_{3t-1}	ROA_{3t}	$SIZE_{3t}$	$\partial RISK_{3t}$	CAP_{3t-1}	Dummy
1986	133	67.63	104	5299	2.09	207	0
1987	49	52.65	84	5748	(0.65)	340	0
1988	56	49.10	122	6336	5.19	393	0
1989	133	53.26	152	7986	(4.30)	445	0
1990	111	48.57	127	9242	16.94	558	0
1991	7	59.64	14	13166	(28.10)	669	0
1992	542	43.05	110	23870	9.55	676	1
1993	460	61.25	615	32008	(6.25)	1218	1
1994	336	50.06	606	43274	5.14	1678	1
1995	1540	65.24	839	76550	(2.79)	2014	1
1996	448	60.61	1134	77675	5.37	3554	1
1997	1814	62.94	1511	83324	5.20	4002	1
1998	2534	52.42	2083	102431	(1.24)	5816	1
1999	1713	43.68	3860	126234	(5.87)	8350	1
2000	0000	38.77	3860	126234	0.00	10063	1
2001	2942	38.77	7058	214885	(5.69)	10063	1
2002	16303	43.54	7490	275194	0.68	13005	1
2003	2368	25.26	10154	329583	(1.79)	29308	1
2004	3144	34.45	10210	367798	1.97	35985	1

Source: Compiled from the Banks annual Balance Sheet in 2006.
Bank Three: Union Bank of Nigeria PLC.

Appendix 18: Data For Change in Risk Assets Variables For Commercial Bank Three.

Years	$\partial RISK_{3t}$	REG_{3t-1}	$LLOSS_{3t}$	$SIZE_{3t}$	∂CAP_{3t}	$RISK_{3t-1}$	Dummy
1986	2.09	67.63	1.21	5299	133	38.35	0
1987	(0.65)	52.65	1.30	5748	49	40.44	**0**
1988	5.19	49.10	2.00	6336	56	39.79	**0**
1989	(4.30)	53.26	1.74	7986	133	44.98	**0**
1990	16.94	48.57	4.54	9242	111	40.68	**0**
1991	(28.10)	59.64	0.11	13166	7	57.62	**0**
1992	9.55	43.05	1.96	23870	542	29.52	**1**
1993	(6.25)	61.25	0.99	32008	460	39.07	**1**
1994	5.14	50.06	1.25	43274	336	32.82	**1**
1995	(2.79)	65.24	1.34	76550	1540	37.96	**1**
1996	5.37	60.61	1.01	77675	448	35.17	**1**
1997	5.20	62.94	0.95	83324	1814	40.54	**1**
1998	(1.24)	52.42	1.58	102431	2534	45.74	**1**
1999	(5.87)	43.68	2.40	126234	1713	44.50	**1**
2000	0.00	38.77	2.40	126234	0000	38.63	**1**
2001	(5.69)	38.77	1.32	214885	2942	38.63	**1**
2002	0.68	43.54	0.82	275194	16303	32.94	**1**
2003	(1.79)	25.26	0.58	329583	2368	33.62	**1**
2004	1.97	34.45	0.85	367798	35985	36.32	**1**

Source: Compiled from the Banks annual Balance Sheet in 2006.
Bank Three: Union Bank of Nigeria PLC.

Appendix 19: Data For Change in Capital Variables For the three Commercial Banks.

Years	∂CAP_{At}	REG_{At-1}	ROA_{At}	$SIZE_{At}$	$\partial RISK_{At}$	CAP_{At-1}	Dummy
1986	167	215.59	332	15912	4.13	723	0
1987	158	192.34	296	18182	(9.61)	890	**0**
1988	160	173.13	320	20469	2.56	1048	**0**
1989	301	171.38	416	25683	(2.91)	1208	**0**
1990	(83)	55.67	38	29075	40.79	1509	**0**
1991	277	80.93	100	37169	(38.48)	1426	**0**
1992	1055	65.30	496	59506	(2.97)	1703	**1**
1993	1044	67.40	1887	78510	(1.09)	2758	**1**
1994	1507	62.68	1693	101474	4.22	3796	**1**
1995	7442	59.75	2334	180503	1.99	5309	**1**
1996	1669	45.98	3535	198439	1.64	12751	**1**
1997	2880	45.93	3569	210542	5.96	14420	**1**
1998	4798	42.66	4631	265762	16.89	17300	**1**
1999	3687	47.13	9337	355715	(14.53)	22093	**1**
2000	4804	48.62	12776	426774	(22.17)	25780	**1**
2001	7237	41.57	14844	615034	(4.46)	30604	**1**
2002	18101	45.88	14815	740230	11.44	37821	**1**
2003	7886	40.33	28363	851156	(3.59)	55922	**1**
2004	24672	38.69	29924	889094	12.45	92665	**1**

Source: Compiled from the three Banks Annual Balance Sheets in 2006.
All Banks: First Bank Nigeria PLC, United of Bank for Africa PLC, Union Bank of Nigeria PLC.

Appendix 20: Data For Change in Risk Assets Variables For the three Commercial Banks.

Years	$\partial RISK_{At}$	REG_{At-1}	$LLOSS_{At}$	$SIZE_{At}$	∂CAP_{At}	$RISK_{At-1}$	Dummy
1986	4.37	215.59	3.18	15912	167	122.88	0
1987	(9.61)	192.34	3.40	18182	158	127.25	**0**
1988	2.56	173.13	4.00	20469	160	118.12	**0**
1989	(2.91)	171.38	3.74	25683	301	120.68	**0**
1990	40.79	55.67	8.87	29075	415	117.77	**0**
1991	(38.48)	80.93	9.70	37169	277	158.56	**0**
1992	(2.97)	65.30	9.24	59506	1055	120.08	**1**
1993	(1.09)	67.40	5.23	78510	1044	117.11	**1**
1994	4.22	62.68	3.51	101474	1507	116.02	**1**
1995	1.99	59.75	2.05	180503	7442	120.24	**1**
1996	1.64	45.98	1.20	198439	1669	122.23	**1**
1997	5.96	45.93	1.14	210542	2880	123.87	**1**
1998	16.89	42.66	2.62	265762	5413	129.83	**1**
1999	(14.53)	47.13	4.23	355715	3845	146.72	**1**
2000	(22.17)	48.62	5.04	426774	4804	132.19	**1**
2001	(4.46)	41.57	3.33	615034	7237	110.02	**1**
2002	11.44	45.88	7.32	740230	18101	105.56	**1**
2003	(3.59)	40.33	2.50	851156	7886	117.00	**1**
2004	12.45	38.69	5.13	889094	57513	100.33	**1**

Source: Compiled from the three Banks Annual Balance Sheets in 2006.
All Banks: First Bank Nigeria PLC, United of Bank for Africa PLC, Union Bank of Nigeria PLC.

Appendix 21: Results from change in Deposits Data

Equation	Intercept	Tk_{it-1}	∂TK_{it}	$LogA_{it}$	Y_t	Dummy	R^2	R^2 Adj	D-W	F
4.1 ()1	2206.92 (0.11)	0.57 (1.34)	4.75* (3.47)	0.03 (0.69)	-24.60 (-0.10)	896.39 (0.15)	0.8946	0.82	2.47	22.07
4.5 (2)	-49.49 (-0.03)	-0.10 (-0.19)	-3.05* (-1.98)	0.07** (2.01)	-0.04 (-0.06)	482.48 (0.19)	0.6001	0.26	1.85	3.90
4.9 (3)	-2592.28 (-0.63)	-6.04 (-4.87)	-4.32* (-3.44)	0.74* (5.50)	0.14 (0.09)	-16508.43* (-2.24)	0.8185	0.74	2.48	11.72
4.13(9)	2513.45 (0.21)	-0.25 (0.32)	0.46 (0.17)	0.06 (1.09)	-0.19 (-0.04)	553.70 (0.80)	0.5452	0.3702	2.15	3.12

( ) : are the t-ratios.
*: are significant at 5% level.
**: are significant at 10% level.
Source: Regression analysis results

Appendix 22: Results from change in Loans Data

Equation	Intercept	Tk_{it-1}	∂TK_{it}	$LogA_{it}$	Y_t	Dummy	R^2	R^2 Adj	D-W	F
4.2 (1)	-556.00 (-05)	1.37 (0.77)	3.38 (0.56)	-0.02 (-0.14)	0.03 (0.01)	-402.36 (-0.02)	0.3292	0.0718	2.25	1.28
4.6 (2)	439.25 (0.08)	-1.63 (1.00)	-3.25 (-0.66)	0.07 (0.64)	0.03 (0.02)	1171.75 (0.14)	0.5530	0.3811	2.70	3.22
4.10 (3)	-304.26 (-0.36)	-0.89* (-3.52)	0.40* (-1.57)	0.10* (3.61)	0.06 (0.18)	-409.07 (-0.27)	0.7404	0.6406	2.00	7.42
4.14(a)	-817.90 (-0.07)	-0.61 (-0.83)	053 (0.27)	0.08 (1.68)	0.04 (0.01)	3759.65 (0.21)	0.4220	0.1997	2.21	1.90

( ) : are the t-ratios.
*: are significant at 5% level.
**: are significant at 10% level.
Source: Regression analysis results.

Appendix 23: Results from change in capital Data

EQT	INT-CPT	REG_{it-1}	ROA_{it}	$SIZE_{it}$	$\partial RISK_{it}$	CAP_{it-1}	Dummy	R^2	R^2 Adj	D-W	F
4.3(1)	-3142.91** (-1.88)	52.33* (2.16)	0.65* (2.82)	-0.06* (-6.10)	136.47* (3.00)	0.07* (8.68)	1921.34* (2.19)	0.9594	0.9392	1.90	47.33
4.7(2)	85.77 (0.16)	-0.86 (-0.14)	0.36 (1.64)	0.01* (2.21)	-0.23* (-2.47)	-0.23* (-2.47)	479.28 (1.29)	0.6926	0.5390	1.62	4.51
4.11(3)	-1568.96 (-1.16)	31.53 (11.26)	0.33 (1.60)	0.005* (15.10)	-0.06 (-1.15)	-0.06 (-1.15)	221.60 (0.49)	0.9781	0.9671	2.19	89.20
4.15 (a)	-2741.81 (-0.72)	15.07 (0.61)	-2.15* (-3.52)	0.003 (0.23)	1.28 (8.01)	1.28* (8.01)	-971.20 (-0.31)	0.9380	0.9070	1.39	30.26

( ) : are the t-ratios
*: are significant at 5% level.
**: are significant at 10% level.
Source: Regression analysis results.

Appendix 24: Results from change in risk assets Data

Equation	Intercept	REG_{jt-1}	$LLOSS_{jt}$	$SIZE_{jt}$	∂CAP_{jt}	$RISK_{jt-1}$	Dummy	R^2	R^2 Adj	D-W	F
4.4(1)	31.32* (2.96)	-0.20 (-1.55)	1.01 (0.84)	-3.04E.05 (-1.26)	-0.001* (2.44)	-0.51** (-2.01)	0.13 (0.03)	0.5004	0.2506	1.92	1.85
4.8 (2)	-2.44 (-0.40)	-0.02 (-0.24)	0.92 (0.67)	4.14E.05 (1.23)	-0.004** (-1.81)	0.000377** (1.97)	3.82 (0.79)	0.4400	0.1600	1.94	3.01
4.12 (3)	5.27 (0.14)	0.20 (0.49)	8.00 (1.71)	-1.24E.05 (-0.31)	0.002 (0.34)	-0.95 (-1.28)	8.76 (0.84)	0.3454	0.0181	2.47	9.51
4.16 (a)	158.53* (3.71)	-0.19 (-1.69)	-1.94 (-0.97)	-2.29E.05 (-1.26)	0.000151 (0.42)	-0.96* (-3.55)	-18.62 (-1.14)	0.5860	0.3790	1.94	7.13

( ) : are the t-ratios.
*: are significant at 5% level.
**: are significant at 10% level.
Source: Regression analysis results.

Appendix 25: The relationship between adjustment in Capital and Risk.

Banks	Values of the coefficients.	Increase (>) or Decrease (<)
One		
α_4	136.47	>
β_4	-0.001	<
$\alpha_1 + \alpha_4$	188.80	>
$\beta_1 + \beta_4$	-0.201	<
Two		
α_4	-20.03	<
β_4	-0.004	<
$\alpha_1 + \alpha_4$	-20.89	<
$\beta_1 + \beta_4$	-0.024	<
Three		
A_1	3.21	>
β_4	0.002	>
$\alpha_1 + \alpha_4$	34.74	>
$\beta_1 + \beta_4$	0.202	>
All Banks		
α_4	-0.05	<
$\beta 4$	0.000151	>
$\alpha_1 + \alpha_4$	15.02	>
$\beta_1 + \beta_4$	-0.189849	<

Source: Computed from the regressed Result.

Appendix 26: The change in Deposits, loans, risk assets and capital for Bank one.

Years	∂D_{1t}	∂L_{1t}	∂CAP_{1t}	$\partial RISK_{1t}$
1990	2599.63	27.19	-10302159.56	-23886.54
1991	2942.56	1666.58	-13752766.91	-31904.40
1992	3930.62	2182.10	-20644964.43	-47873.59
1993	4133.26	2350.83	-28631656.43	-66385.33
1994	3086.45	-1322.85	-41282055.59	-95715.10
1995	22728.42	18481.11	-72736049.07	-168658.30
1996	8222,28	-59.59	-88354310.93	-205322.01
1997	4965.41	11650.53	-88543498.02	-205320.03
1998	18097.85	22605.73	-115786260.00	-268491.17
1999	18370.81	14280.77	-157478646.30	-365172.56
2000	27404.39	730.23	-219561815.40	-509128.76
2001	117230.59	28710.82	-258898863.50	-600345.39
2002	19924.15	18536.19	-323905298.20	-751087.90
2003	32743.39	32507.62	-389848197.20	-903998.36
2004	58539.56	45443.49	-379997366.20	-881181.32

Source: Computed using the regressed equations. The values are strictly comparable.
Bank One: First Bank of Nigeria PLC.

Appendix 27: The Change in Deposits, loans, Risk Assets and Capital for Bank Two.

Years	∂D_{2t}	∂L_{2t}	∂CAP_{2t}	$\partial RISK_{2t}$
1990	4482.13	1955.43	7931292.43	12482.45
1991	3460.87	1090.72	8863657.58	13941.71
1992	2537.85	1419.07	13035797.07	20502.36
1993	4078.89	1266.17	16042825.58	25244.87
1994	1538.22	-925.20	16948644.89	26653.43
1995	-3357.84	-3877.69	30855823.09	48520.52
1996	7455.28	1949.91	33522039.94	52731.25
1997	7854.81	1158.44	38036039.25	59827.45
1998	15077.47	5916.89	47622971.75	74914.27
1999	15783.39	6324.12	69909745.12	105560.25
2000	22918.84	3885.71	83903451.90	131967.88
2001	23375.87	6539.97	130938940.90	205968.59
2002	19107.28	13537.38	138933502.00	218544.39
2003	21585.00	6845.07	140553308.60	221076.67
2004	47291.95	12726.70	146014075.30	229674.03

Source: Computed using the regressed equations. The values are strictly comparable.
Bank Two: United Bank for Africa PLC.

Appendix 28: The change in Deposits, Loans, Risk Assets and Capital for Bank Three.

Years	∂D_{3t}	∂L_{3t}	∂CAP_{3t}	$\partial RISK_{3t}$
1990	3503.49	1235.40	-8392401.25	4445.94
1991	1196.74	30.88	-11960948.19	6288.07
1992	-3764.21	392.64	-21691415.19	11462.93
1993	3627.79	776.83	-29088317.36	15357.38
1994	1885.97	32097.64	-39330895.73	20770.74
1995	24811.62	4372.16	-69577792.65	36741.64
1996	12072.99	4930.97	-70602358.84	37281.65
1997	-1356.02	3190.96	-75738227.17	39987.64
1998	14726.38	2266.04	-93112299.55	49154.85
1999	18308.51	3141.90	-114753598.60	60584.47
2000	19308.32	2981.03	-114759786.60	60589.62
2001	68654.74	9197.63	-195354636.60	103135.79
2002	36381.76	8703.85	-250177992.60	132088.25
2003	30426.15	7937.79	-299639398.30	158188.84
2004	27531.46	-295.86	-334379265.40	176532.74

Source: Computed using the regressed equations.
Bank Three: Union bank of Nigeria PLC.

Appendix 29: The change in Deposits, Loans, Risk Assets and Capital for all the three Banks.

Years	∂D_{at}	∂L_{at}	∂CAP_{at}	$\partial RISK_{at}$
1990	3897.74	662.55	144106451.90	-462349.06
1991	11996.45	-459.94	184234063.50	-591165.21
1992	22704.45	1728.14	294993937.60	-946511.19
1993	26275.38	828.04	389224645.10	-1248861.79
1994	31326.07	-1742.91	503091905.70	-1614215.84
1995	33506.60	41026.02	894955285.40	-2871567.48
1996	23306.25	3323.85	983891488.50	-3156841.48
1997	12194.31	-10841.70	1043905050.00	-3349486.94
1998	15998.85	7719.01	1317713535.00	-4228040.72
1999	37027.84	27314.50	1763739230.00	-5659208.51
2000	37275.32	21792.03	2116082116.00	-6789746.38
2001	139300.48	105860.48	3049567210.00	-9784942.05
2002	66249.10	30518.46	3670353882.00	-11776807.05
2003	44743.99	17988.39	4220373422.00	-13541647.62
2004	71371.86	57081.16	4408502952.00	-14145215.89

Source: Computed using the regressed equations. The values are strictly comparable.

All Banks : First Bank of Nigeria PLC, United Bank for Nigeria PLC, and Union Bank of Nigeria PLC.