PREDICTING CORPORATE BANKRUPTCY USING MULTIPLE DISCRIMINANT ANALYSIS

A STUDY OF SELECTED FAILED AND HEALTHY NIGERIAN BANKS

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JULY, 1997

PREDICTING CORPORATE BANKRUPTCY USING MULTIPLE DISCRIMINANT ANALYSIS: A STUDY OF SELECTED FAILED AND HEALTHY NIGERIAN BANKS

BY

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A project Submitted to the Postgraduate School, Ahmadu Bello University, Zaria in partial fulfillment of the requirements for the degree of Master of Business Administration (MBA)

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CERTIFICATION

This project entitled "PREDICTING CORPORATE BANKRUPTCY USING MULTIPLE DISCRIMINANT ANALYSIS: A STUDY OF SELECTED FAILED AND HEALTHY NIGERIAN BANKS" meets the requirements and regulations governing the award of the Degree of Master of Business Administration (MBA) of Ahmadu Bello University, Zaria and is hereby approved for its contribution to knowledge.

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DECLARATION

I hereby declare that this work is a record of my own personal effort. It has not been presented in any previous application for a higher degree. All sources of information are specially acknowledged by means of references.

Ibrahim, Ahmed

DEDICATION

This work is dedicated to my son, Baba Mohammed Ahmed, who was born while I was writing this report.

ACKNOLEDGEMENT

All thanks be to Allah (SWT), the beneficial, the merciful for giving me the health and energy to complete this course.

I wish to express my profound gratitude to my Project Supervisor, Mallam I. F. Okeji of the Department of Business Administration for his understanding, encouragement and supervision of this project. I also wish to thank all the Lecturers who, in the course of the MBA programme, impacted their various knowledge to us, which formed the basis for writing this thesis.

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A B S T R A C T

The pervasive problem of distress in the banking sector in Nigeria in recent years requires the development of a cost effective, reliable and quick technique for predicting potential failures. Although several studies on distress in the banking sector in Nigeria has been carried out, most of them were limited to causes and efficacy of distress rather than predictability.

The objectives of this study were to test the predictability of corporate bankruptcy prior to occurrence by applying Edward I. Altman's Multiple Discriminant Analysis (MDA) and to make recommendation based on the findings.

In carrying out the study, a random sample of 29 banks in Nigeria were selected without bias or stratification. From data obtained in the banks financial statements, Z- scores for the period 1989-94 were calculated using the Microfost Excel Computer Software.

The results showed that Z - scores for the selected banks ranged from 0.0768-0.4020. Comparing these Z- scores with Altman's minimum of 2.99 for non-bankruptcy and below 1.8 for bankruptcy, all the banks in Nigeria could be classified as bankrupt. The discrimination amongst banks may only be in terms of extent of the distress. This finding confirms and justifies the recent directive by the Federal Government for banks to raise their paid-up share capital to at least N500 million by the end of 1998.

The results showed that there are early warning signals that can be detected from readily available data to predict fairly accurately, the prospect of bankruptcy and these signals can lead to timely intervention to avert the prospect of bankruptcy.

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CHAPTER 1

INTRODUCTION

1.1 Background

Corporate bankruptcy became pronounced in Nigeria following the global economic recession of the early 1980s, engendered by the glut in the world oil market and the resultant burst in oil-dependent economies world wide. During that period, Nigeria's foreign exchange earnings declined steeply, foreign reserve fell to less than a month's imports and all forms of balance of payment support for the country were withdrawn by the country's trading partners.

In Nigeria, the reverberating effect of that development was worst felt by the industrial sector due to its structural handicaps and large import dependency. Many firms in the sector went bankrupt. Fortunes of the services sector, including banks were also affected adversely.

In order to forestall a total collapse of the economy, series of holding actions were introduced by various governments between 1981 and 1995. The most far reaching of such actions was the Structural Adjustment Programme (SAP) of 1986. SAP led, amongst other things, to liberalisation / deregulation of the banking industry. As a result, within a short period of five (5) years (1986 -1991), the number of

commercial and merchant banks in the country had risen from 41 to 119, an increase by about 180%. The rapid expansion of the financial system following the liberalisation resulted in a situation where major management decisions had to be taken by relatively inexperienced staff in a number of insitutions. Moreover, the access tof newly licensed banks to the lucrative foreign exchange market did not allow them to cultivate appropriate banking traditions for survival. Supervisory weaknesses were conducive to loose banking practices and made it difficult to arrest an accumulation of non-performing loans at an early stage. Other internal structural weaknesses, such as inadequate capitalisation, poor asset quality, insider abuses and political interference further exacerbated the situation.

Consequently, the initial positive impact of SAP was offset by the general poor state of the financial sector which was characterised by liquidity problem and even outright failure. By the end of 1994, the number of banks had fallen to 166 made up of 65 commercial and 51 merchant banks from 119 at the end of 1991. The decline was due to liquidation of 3 merchant banks in 1994, namely: Alpha Merchant Bank Plc, Kapital Merchant Bank Ltd. and Financial Merchant Bank limited. Similarly, the number of banks adjudged as technically insolvent (distressed) rose from 8 in 1990 to 28 in 1993 and to 45 by the end of 1994. As at June, 1994, the number of such banks had risen to 57.[1]

The severity of the situation was such that the Federal Government had to intervene directly by promulgating Decree 18 of 1994 on Failed Banks (Recovery of Debts) and other Financial Malpractices in order to stem further loss of confidence in the banking industry and its ripples on the economy as a whole.

Between 1990 and 1995, several studies on the causes, efficacy and remedies to distress in the banking industry in Nigeria had been carried out. The most prominent and contemporary of those studies was the joint study by the Central Bank of Nigeria (CBN) and Nigeria Deposit Insurance Corporation (NDIC) in 1995.

The objective of this work is to expand the horizon of such studies by testing with a model, the predictability of potential bankruptcy prior to occurrence. The researcher considers this work important because the pro-active approach would facilitate early intervention and save the high cost of bank failure. The model, if successful, could also be applied to corporate bodies in other sub-sectors of the economy. Development of a reliable early warning model is considered particularly important becuase the phenomenon of bank failure has assumed an international dimension in recent years, as evidenced by recent happenings in Japan, United Kingdom and Unied States of America where cost of liquidation of failed banks runs into billions of dollars of tax-payers money.

1.2. Problem Definition

Due to the important facilitating roles financial institutions play in every economy, they are often referred to as the economic life-wire. By implication, therefore, the development, capacity and health of the economy of any nation can be assessed from the capacity, reliability and health of its financial institutions, particularly banks.

The pervasive problem of distress in the banking industry in Nigeria in recent years requires the development of cost effective, reliable and quick technique for predicting potential failures. Therefore:

(i) Are there early warning signals that can be detected from readily available data?

(ii) Can these signals be used to predict accurately, the prospect of bankruptcy?

(iii) Can the detection of these signals lead to timely intervention to avert the prospect of bankruptcy.

1.3. Significance of the Study

This study, especially its findings, would be useful to a variety of interest groups for various, and sometimes conflicting reasons. However, the major users can be broadly classified into four (4), namely: banks; regulatory authorities; research institutions; and the general public.

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Banks could monitor, assess and control their performances using this method as a feed-forward control measure. Even within banks, various uses can be found. Shareholders could use it to measure management performance; investors, creditors, and depositors could predict their unsystematic risks in the banks with greater confidence; and management could optimise leverage, amongst others.

Regulatory agencies such as the Central bank of Nigeria and Nigeria Deposit Insurance Corporation could minimise the enormous cost usually associated with rescue operations. It would also free their respective executive capacities so as to concentrate on deepening and broadening the services offered by the banking industry by developing new financial instruments.

It would set forth, a window for further research into the enhancement of the model as applicable to the banking industry and extension to all corporate bodies.

The study would also empower the general public through enhanced understanding of the parameters determining bank health and providing means for first hand assessment of such banks.

1.4. Purpose of the study

The major objectives of this study are:-

i) To test the predictability of corporate bankruptcy prior to occurrence by applying multi-variance analysis to selected failed and healthy banks in Nigeria with a view to minimising the enormous financial and economic costs associated with bank failure; and

ii) To make specific recommendations based on findings of the study.

1.5. Scope of the Study

i) The study did not attempt to test predictability of potential bankruptcy in firms spread across all sectors of the economy. Instead, it was limited to a randomly selected sample of twenty nine (29) healthy and failed banks in Nigeria.

ii) Even for the selected banks, the study was limited only to secondary data contained in published statement of Annual Accounts of the selected banks during the period of study and other information gathered through library research. No primary data was, therefore, collected.

1.6. Hypothesis

Studies on predicting corporate failures have confirmed that the closer such studies are to the commencement of bankruptcy or failure of the firm, the more accurate is the prediction. That is to say that the accuracy of prediction diminishes as lead time increases.

According to Altman's Multiple Discriminant Analysis model, all firms having a Z- score of greater than 2.99 clearly fall into the "non-bankrupt" sector while those firms having a Z - score blow 1.81 are all bankrupt. The model further stated that the area between 1.81 and 2.99 represents the "zone of ignorance" or "grey area" because of the susceptibility to error classification.

It is against the backdrop of this hypothesis that this study was set to test the significant truth of the findings in relation to the Nigerian banking institutions.

1.7. Limitations of the Study

The major limitations of this study are the followings:-

i) It is restricted only to the banking industry. There are, therefore, obvious limitations in generalising the findings to firms in other sectors of the economy.

ii) The selected samples comprised both publicly quoted and unquoted banks with different disclosure requirements.

iii) There are general suspicions that some of the banks "window-dress" their accounts. Should such suspicions be applicable to any member of the sample studied, the type II error included in this study would affect the result;

iv) There are wide variances in the ages, classification and nature (commercial / merchant and quoted /unquoted) of the banks in the sample. This heterogenity can affect uniform comparison of results for all the banks during the study period.

v) There were serious difficulties in obtaining the financial statements of unquoted banks, especially the distressed ones. This difficulty forced a reduction in the sample size from the initially intended figure of 50 to 29. Even for the reduced sample size, complete information could not be obtained for all.

1.8 Structure of the Project

The information given in this research work is presented in five chapters. Chapter one illustrates the background to the study in the form of introduction. The problems that informed the choice of the topic, the significance, purpose and scope of the study were also mentioned.

Furthermore, hypothesis that served as springboard for the study was propounded in this chapter along with limitations of the study.

In chapter two, appropriate literature on previous studies on the topic were reviewed. Research works and models built by former researchers on the topic were also enumerated.

Chapter three treats in depth the method of data collection employed and limitations of the methods used.

Chapter four gives the details of data analysis and presentation of the outcome of the study. The chapter also tests the hypothesis earlier propounded in chapter one and concludes the analysis.

The study work was closed in chapter five with the summary of findings, conclusions and recommendations.

FOOT NOTES:

1. **CBN/NJIC (1995)** "Distress in the Nigerian Financial Services Industry", Page Publisher Services Limited, Lagos, Pg 8-16.

CHAPTER TWO

LITERATURE REVIEW

2.1. Corporate Bankruptcy: An Overview

Bankruptcy occurs when a firm's total liabilities exceed the fair value of its total assets. That is, the real net worth of the company is negative. Bankruptcy, which is usually referred to as "gamblers ruin" can be generally defined as business failure.

In the same vein, business failure can be explained through two concepts:-

Economic Failure: Failure in an economic sense usually signifies that a firm's revenue do not cover its costs. It can also mean that the rate of earning on its historical costs of investments is less than the firm's cost of capital. It can even mean that the firm's actual returns have fallen below its expected return. There is no consensus on failure in an economic sense.[1]

Legal Failure: A corporation is a legal failure if the corporation's assets are not sufficient to meet the legally enforceable claims of creditors.[2]

A firm can be considered a failure if it cannot meet its current obligations as they fall due, even though its total assets may exceed its total liabilities. This is defined as technical insolvency. For the purpose of this study, the word failure will connote both technical insolvency and bankruptcy.

2.1.1 Causes of Failure

Numerous efforts have been made to assign the causes of failure to different factors. In his studies, Dewing[3] classified the causes of failure and the percentage of total as: unfavourable industry trend (20%); management incompetence (60%); catastrophes(10%); and miscellaneous (10%).

In their own compilation, Dun and Bradstreet [4] attributed the causes of failure to neglect (2%); fraud (1.5%); disaster (0.9%); management incompetence (93.1%); and unknown (2.5%). They remarked that the usual "causes" given for financial failure such as lack of capital, faulty accounting, poor planning, etc. are more often not causes but rather rationalisation on excuses for the poor performances. The underlying cause of most failures can best be summarised by the term management incompetence. It is the lack of managerial skills which appears to be the fundamental cause of business failure, independent of the size or nature of the business undertaking. Ultimately, business success or failure depends on the quality of human management. According to

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analysts, management should be prepared to operate in environments in which recessions occur and should frame their policies to cope with down turn as well as to benefit from business upswings. Managements also should anticipate unfavourable industry trends.

In his own remark, Van-Horne opined that "many failures are attributable either directly or indirectly to management ... Usually the cause is a series of errors, and the difficulty evolves gradually".[5]

2.1.2 **Remedies to Failure**

The rate of company failure or bankruptcy usually rise during recession periods, when the economy is weakened and credit is tightened. During this period, governments and industries always take some measures to rescue the failed firms and prevent an erosion of confidence, particularly in the case of financial institution.

Some of these remedies are highlighted as follows:-

Extension and Composition: In this approach, the creditors give concessions voluntarily. Extension postpones the date of required payment of past due obligations. In the same vein, composition voluntary reduces the creditors' claims on the debtor. Both are intended to keep the debtor in business and to avoid court costs. Although creditors must absorb a temporary loss, the debtors' recovery is often greater

than if one of the formal procedures had been followed; and the hope is that a stable customer will emerge.

Re-organisation: This involves scaling down of claims, rationalisation of staff, disposal of obsolete stocks and equipment, installation of better equipment, product modification and development of new products where necessary. This remedy entails more legal proceedings than extensions and composition and must be carried out with utmost fairness and feasibility for successful rehabilitation and profitable future operation of the firm. There is also need to improve the production, marketing, advertisement and other functions to enable the firm to compete favourably.

Mergers and Acquisition: This is another option to salvage the failed firm. More healthy and profitable firms is engaged to absorb the distressed firm for better management and viability.

Liquidation/Bankruptcy: When it is confirmed that the firm is "worth more dead than alive", the liquidation option is adopted. Bankruptcy is a legal procedure, carried out under the jurisdiction of special courts, in which a firm is formally liquidated and creditor's claims are completely discharged. It takes place when the debtor is insolvent and the possibility of restoring profitability is so remote that the enterprise should be dissolved. It should also be noted that bankruptcy through courts involves much time, legal formalities, accounting and legal expenses.

2.2 Distress in the Nigerian Financial Institutions: Nature and Causes

2.2.1. ***Definitions:*** Several writers have defined distress in various ways. Distress has been defined as "unhealthy situation" or a state of inability or weakness which prevents the achievement of set goals and aspirations. (Smith and Wall, 1992; Ologun, 1994). In his own contribution, Benston et al (1986) describe distress as a situation of complete or near complete loss of shareholders funds. Alashi (1993) associates distress with a cessation of independent operation or continuance without the assistance of relevant authorities such as a deposit insurance institution.

A distressed financial institution can, therefore, be described as one with severe financial, operational and managerial weaknesses which have rendered it difficult for it to meet its obligations to its customers, owners and the rest of the economy as and when due.

2.2.2 ***Nigerian Financial Institutions:-***

Financial Institutions in Nigeria can be broadly classified into two:

Banks: This comprises commercial, merchant, community, people and development banks.

Non-Bank Financial Institutions: These are finance houses, insurance companies, pension funds, mortgage institutions and discount houses to mention a few.

For the purpose of this study, emphasis would be on commercial and merchant banks.

Distress in the Nigerian financial sector first came into limelight in 1930, when the first bank failure was reported. More than twenty one bank failures were recorded between 1930 and 1958 when the Central Bank of Nigeria was established. Moreover, the present distress syndrome commenced in 1989, when the government directed the withdrawal of deposits of government and other public sector institutions from commercial / merchant banks. The action exposed the financial condition of most financial institutions in the country. Since then, the number of distressed institutions and the severity of the problem has progressively increased. Hence, the number of banks adjudged as technically insolvent (severely distressed) increased from 8 in 1990 to 28 in 1993 and 45 by the end of 1994. As at June, 1995, the number of such banks had risen to about 57. By the end of 1994, 31 finance houses were also classified as severely distressed while another 118 had defaulted on matured obligations. With regards to community banks, 32 were reported to be in distress as at the end of 1994. As at 30th September, 1995, the community banks certified to be in various stages of distress had risen to 235.[6]

The above mentioned distress phenomenon has severe adverse effects on the financial system in particular and the economy in general. Some of the effects were manifested in the deposit base of the banks, the capitalisation of banks and the level of interest rates in the economy. When it was discovered that most of these distressed banks were having liquidity problem, the depositors embarked on mass withdrawals and they eventually lost their customers without any incentive to attract new deposits. This seriously weakened the deposit base of the affected banks and even other banks, since the distressed banks were not known to members of the public.

Debtor morality was also affected as some debtors who obtained bank loans and who were in a position to pay refused to do so in an era of generalised default. Furthermore, the effects of the distress on the economy included the erosion of public confidence in the banking system and the reduction in the flow of investible resources that could be channelled to the most competitive investment outlets.

In its own submission on the distress in the financial system, the Financial services Regulation Co-ordinating Committee (FSRCC) highlights the following consequences:-

Loss of confidence in the financial system leading to deposit run, disinvestment in the capital market and failure to ensure business and other exposures;

Disintermediation and demonetisation resulting in massive portfolio shift to safer assets such as foreign currency - denominated assets, short term government securities and non-monetary assets or inflation hedges;

Crowding-out of the real sector in the provision of credit in an attempt to reduce risk exposure;

Increase in the cost of supervision and regulation in resolving the problem of distress in the system; and

Increase in unemployment and its attendant social implication.

Having enumerated the severity and effects of distress in the financial sector and the economy, it will be pertinent to discuss the causes and necessary solution to the identified problems.

2.2.3 *Causes of Distress in the Financial Institutions*

In line with the definitions of failure discussed in paragraph 2.1.1, available literature has identified a long list of potential causes of distress in a financial system to include: weak management; inadequate capital base; fraudulent and corrupt practices of owners and managers; poor asset and liability management; macro-economic instability; political instability/interference; and inadequate legal framework and structure.

Others include delayed supervisory action towards insolvent institutions, economic recession and inadequacy of the regulatory framework amongst others. Although, this list is not exhaustive, given the strong association between bad lending policy and fraudulent practices with bad management, one would, therefore, infer that bad management was indeed the most serious cause of distress in the Nigerian financial services industry.

2.2.4 ***Measures Taken to Arrest the Distress Situation***

Several measures have been taken by the appropriate supervisory and regulatory authorities to arrest further deterioration in the financial condition of banks and enhance public confidence.

The Central Bank of Nigeria (CBN) and the Nigeria Deposit Insurance Corporation (NDIC) have adopted some measures to deal with distress in the system. These measures include the following:

Financial Assistance: The CBN in collaboration with the NDIC do from time to time grant liquidity support to illiquid banks to assist them meet their obligations as and when due. This has achieved some measures of success, and public confidence was not endangered in those banks.

Technical Assistance: Technical assistance in the form of advisory services and secondment of staff is provided by the CBN/NDIC as and when the need arises.

Holding Action: Holding actions are measures designed by the CBN/ NDIC and imposed on distressed banks with a view to preventing further deterioration in their financial condition and to enable them undertake self-restructuring measures .

Some of holding actions stipulations include:

- recapitalisation through an immediate injection of fresh capital;
- aggressive debt recovery drive;
- staff and branch rationalisation with a view to reducing cost; and
- embargo on further lending.

Holding actions have been imposed on quite a number of banks and noticeable improvement have been made by some. Critical examination of the holding actions however, reveals that the shareholders and management of distressed banks lack the capacity and ability to implement the requirement of the holding actions.

Assumption of Control and Management: Owing to limited success in the application of Holding Actions, the CBN has had to assume control of management of some distress banks. The intention is to acquire, restructure and subsequently sell them to the public. This action started with some six state-owned banks and the action is recording some measure of success. Recently, the CBN also sought and obtained the approval of the Head of State to assume the control and management of seventeen (17) additional banks for restructuring and subsequent sale in view of their deteriorating financial conditions. Accordingly, the Board of Directors of the affected banks were dissolved and replaced with new Management Boards constituted to superintend over their affairs.

Review of Banking Licenses: In order to sanitise the banking system and instil market discipline, licenses of four banks have so far been revoked while two others were suspended.

However, it goes without saying that the above laudable measures achieved little success so far. Some reasons have been ascribed to the slow pace of curbing distress in the banking system. These involve:

- Lack of political will in dealing with government banks - Usually, bureaucracy and unnecessary delay in some actions have been recorded. A case in point is the delay in judicial processes as evidenced in the case of National Bank of Nigeria, which took CBN almost 18 months to obtain a court order for its acquisition (Ebhodaghe, 1995);

- Inadequacy of executive capacity on the part of the supervisory authorities. With the large number of distressed banks, the skilled executives required to carry effective supervision are not adequate; and

- Piecemeal approach. It has been suggested that a comprehensive and more pragmatic approach would be more effective than the present piecemeal approach. An example of such pragmatic approach, which is yielding positive returns is the promulgation by the Federal Government of Decree 18 of 1994 on failed banks (Recovery of Debts) and other Financial Malpractices in order to deal with the problems of bad loans and of malpractices in banks, particularly insider abuse, in which key officials of most banks granted loans and advances to themselves and other staff without collaterals and little consideration for repayment.

2.3. Previous Studies on Predicting Business Failures

Predicting business failures commenced with the use of financial ratios to analyse financial statements with a view to assessing the performance / achievement of business firms.

Financial ratio relates two pieces of financial data to each other. It can be grouped into four types, namely: liquidity; debts; profitability; and

coverage. The financial analyst uses each type as a tool for further use to the outside creditors, investors, government regulators, management and for a better understanding of what outside suppliers of capital expect in financial condition and performance. Financial ratios are analysed on comparative basis to make them more meaningful. Knowing the effect of failure in a business organisation on the owners, creditors, management and other interested parties.; the importance of searching for techniques to predict such bankruptcy cannot be overemphasised. For instance, for those with equity in the firm, bankruptcy means not only a loss in the earning power of that equity but also total or partial delay in return of the equity itself. Therefore, it is important for the user to be able to anticipate impending bankruptcy with some relaiability.[7]

Furthermore, it has also been affirmed that a failure of a business firm is an event which can produce substantial losses to creditors and stockholders. Therefore, a model which predicts potential business failures as early as possible would serve to reduce such loss by providing ample warning to these interested parties. This was an adequate motivation for the researchers mentioned below to develop models for predicting failure based on the financial reports of firms.

Several studies have been carried out on predicting corporate failure as evidenced by the event of bankruptcy. Prominent among these published contributions are Beaver (1966, 1968a, 1968b); Altman (1968, 1973); Altman and Lorris (1976); Altman and McGough (1974); Altman,

O'Connor (1973, p.342) used correlation analysis to reduce from 33 to 10 the number of variables employed in his model of predicting investor's rate of return and noted that a generally low intercorrelation between the ten indicated potential effectiveness of predictors.

Daniel employed a correlation matrix, selecting one variable of any two that had a correlation of 0.70 or greater, where 1.0 represents perfect correlation. This group of variables was further reduced by selecting variables which had the highest loading indicated by factor analysis. Factors from this kind of analysis are called principal components and are the product of a technique which may have promise for future predictive ability research (Daniel, 1968, p.70).

Fitz Patrick (1931) analysed 3-5 years conditions of twenty firms (that failed between 1920-1929) prior to failure by using thirteen ratios for each of them separately and compared his result with those of nineteen non-failed firms. He then concluded that all ratios are capable of predicting failure to a certain extent. [9]

Smith and Winakor (1935) analysed the trend of twenty-one ratios for ten years prior to failure. They observed that there was deterioration in the average value of failed firms and concluded that long term solvency and working capital to total assets are good indicators of approaching distress; as they declined from the beginning to the end of the period.

Deaking (1972) used fourteen ratios. He studied a pair of thirty-two failed and non-failed firms for the period between 1964-70 in a discriminant function. He discovered that he could predict bankruptcy three years before failure.[10]

Wildcox (1973) used a pair samples of fifty failed and non-failed firms over the period 1949-71. He adjusted both the cash position and cash flow for both samples. He further used the gambler's ruin model in which risk of bankruptcy of all firms in the samples for five years prior to failure were ranked.

2.4. Concepts and Analytical Framework of Multiple Determinant Analysis

Multivariate Analysis is an extention of financial ratio analysis which deals with the prediction of corporate bankruptcy. Various people have made contributions to this model, but the outstanding and worth mentiong among them was Edward I. Altman's Multiple Discriminant Analysis (MDA).

Multiple Discriminant Analysis can be defined as a statistical technique used to classify an observation into one of several groupings dependent upon the observation's individual characteristics. It is used primarily to classify and or make predictions in problems where the dependent variable appears in qualitative form e.g. bankrupt or non-bankrupt.

MDA has been used in various diciplines since its first application in the 1930s. It was initially used mainly in the biological and behavioural sciences. Later, it was successfully applied to financial problems such as consumer credit evaluation and investment classification.
The MDA techniques has the advantage of considering an entire profile of characteristics common to the relevant firms, as well as the interaction of these properties. It also has the advantage of reducing analyst's space dimensioinality.

Considering the above enumerated advantages, the MDA technique was selected as most appropriate for the bankruptcy prediction rather than traditional ratio analysis.

2.4.1 ***Model Building***

In his study on "The Prediction of Corporate Bankruptcy: A Discriminant Analysis", Edward I. Altman sampled sixty-six corporations - thirty three firms in each of the two groups. Group 1 comprised the manufacturers that have been classified as bankrupt. Group 2 consisted of a paired sample of manufacturing firms carefully selected from non-bankrupt firms on a stratified random basis. The data collected are from the same years and derieved from financial statements one reporting period prior to bankruptcy.

Although large number of variables have been found to be significant indicators of corporate problems in past studies, a list of twenty -two potentially helpful variables (ratios) is compiled for evaluation. The variables are classified into five standard ratio categories including liquidity, profitability, leverage, solvency, and activity ratios. Altman selected five variables from the original list of variables and considered them as doing the best overall job together in the prediction of corporate bankruptcy.

The final discriminant is as follows:

$$Z = 0.012X_1+0.014X_2+0.033X_3+0.006X_4+0.999X_5$$

where

X_1 = Working capital /Total assets

X_2 = Retained earnings/Total assets

X_3 = Earnings before interest and taxes/Total assets

X_4 = Market value of equity / Book value of total debt.

X_5 = Sales/Total assets (Gross earnings) / Total assets.

Z = Overall Index

Altman classified all firms with 'Z' value less than 1.81 as bankrupt and all firms with scores more than 2.99 as non-bankrupt while those with scores between the range $1.81 \leq Z \leq 2.99$ as falling within a grey area, where clear classification was not possible.

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The above varribles can be briefly defined as follows:-

X1 - *Working Capital / Total Assets (WC/TA)*

This ratio is a measure of the net liquid assets of the firm relative to the total capitalization. Working capital is defined as the difference between current assets and current liabilities. Liquidity and size characteristics are explicitly considered. Ordinarily, a firm experiencing consistent operating losses will have shrinking current assets in relation to total assets. This ratio proved to be the most valuable out of the three liquidity ratios evaluated.

X2 - Retained Earnig/Total Assets (RE/TA

This ratio implicity considers the age of a firm by measuring its cummulative profitablity over time. For instance, a relatively young firm will probably show a low RE/TA ratio because it has not had time to build up its cummulative profits. Therefore, it may be argued that the young firm is somewhat discriminated against in this analysis, and its chance of being classified as bankrupt is relatively higher than another older firm, other things being equal. In the real world situation, the incidence of failure is much higher in a firm's earlier years.

X3 - Earnings Before Interest and Taxes / Total Assets (EBIT/TA)

This ratio is calculated by dividing the total assets of a firm into its earnings before interest and tax deductions. It is a measure of the time productivity of the firm's assets, abstracting from any tax or leverage factors. Since a firm's ultimate existence is based on the earning power of its assets, this ratio appears to be particularly appropriate for studies dealing with corporate failure. As earlier stated in section 2.1, insolvency in a bankruptcy sense occurs when the total liabilities exceed a fair valuation of the firm's assets with value determined by the earning power of the assets.

*X4 - Market Value of Equity /Book Value of Total Debt (MVE/BVT*A

Equity is measured by combined market value of all shares of stock, preferred and common, while debt include both current and long term. The measure shows how much the firm's assets can decline in value (measured by market or equity plus debts) before the liabilities exceed the assets and the firm becomes insolvent.

X5 - *Sales or Gross Earnings/Total Assets (GE/TA)*

The capital - turnover ratio is a standard financial ratio illustrating the sales generating ability of the firms's assets. It is one measure of management's capability in dealing with competitive conditions.

In the final analysis, the result of the study indicate that it is possible to classify corporations into her potentially bankrupt or potentially non-bankrupt groups. More importantly, the multiple discriminant model exhibits exceptional accuracy as a bankruptcy prediction procedure. This accuracy holds for even as much as two years prior to bankruptcy with the effectiveness of the model substantially diminishing after the second year.

The model correctly classifies 95% of the initial sample at one year prior to bankruptcy. This sample include sixty-six manufacturing companies matched evenly into bankrupt and non-bankrupt groups.

To verify the reliability of the model and a test for any bias, a set of several secondary samples are tested. The model predicts bankruptcy correctly in 96% of the secondary sample of bankrupt firms. This result implies that any potential bias, due to classifying firms in the same sample as the one in which parameters are established, is not significant. The percentage error, therefore, was just 4% in this sample compared to a comparatively small 5% error in the original sample. This error, that of predicting non-bankruptcy when indeed the firm went bankrupt, was referred to as a Type I error. The opposite error, that of predicting bankruptcy when in fact, the company remain healthy, was equivalent to Type II error. The later error was investigated in a secondary sample of admittedly below average firms and the model correctly predicted non-bankruptcy for approximately 80% of these firms.

As earlier stated above, from an original list of twenty two ratios, the suggested model employs five variables. They represent measure of corporate liquidity, profitability, solvency, and capital trurnover. Investigations of these varibales revealed that the most serious deterioration in the majority of the ratios occured between the third and second years prior to bankruptcy. The individual ratio movement, therefore, appear to corroborate the statistical findings of the model.

The bankruptcy - prediction model appears easily applicable in practical decision making situations; and it can also be applied to business credit evaluation, internal and external management considerations, and investment guidelines.

In conclusion, the study proved that despite some analysts' contention that ratio analysis is no longer as important analytical technique in the academic environment, due to the relatively unsophiscated manner in which the it has been presented; ratios, if analysed within a multivariate framework will take a greater statistical significance than the common technique of sequencial ratio comparisons. Also, the study further confirmed that bankruptcy can be accurately predicted up to two years prior to actual failure with the accuracy diminishing rapidly after the second year.

2.5. VALUATION OF SHARE PRICES

There are two principal approvals for valuing the worth of a firm's share. These are the Assets Approach and Earnings Approach.

The value per share under these two approaches are defined as follows:-

2.5.1 *Assets Aprroach*

$$\text{Value per share} = \frac{\text{Net Assets (liabilities)}}{\text{Total no. of shares}}$$

where,

Net Assets = Total assets - current liabilities

Total no of shares = All issued common and preferred shares

2.5.2 *Earnings Approach*

$$\text{Value per share} = \frac{\text{Discounted value of profit before tax (PBT)}}{\text{Total no. of shares}}$$

where,

$$\text{Discounted value of PBT} = \frac{\text{PBT}}{\text{Minimum Rediscount Rate (MRR)}}$$

FOOT NOTES:

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CHAPTER THREE

RESERACH METHODOLOGY

3.1. Introduction

This Chapter deals with the sources and method of data compilation for this study. It describes the population and nature of the sample selected. The design of the analysis are enumerated with the inherent limitations.

3.2. Research Methodology

Research methods are classified according to the three areas of time; viz:

3.2.1 ***The Past:*** Under this category, there is Historical Research method which tries to answer the question of "what has been".

3.2.2 ***The Present:*** This involves the Normative Research methods like Survey Research method and Experimental Research method. It deals primarily with what is occuring now.

3.2.3 ***The Future:*** This comprises Prognostic or Predictive Research method which analysis the probable nature of what will be.

In this research work, both historical and predictive research methods were used. Past information were collected through library research and data on previous performance of the concerned establishments were obtained as well. These data were transplanted into the future through forecasting model.

3.3 Sample Selection

Although Corporate Bankruptcy occurs in all sectors of the economy, samples for this study were mainly selected from the banking sector. This is due to the intensity and spread of distress in the banking sector, especially in the last few years with attendant severe consequences on the economy as a whole. Twenty nine banks (both failed and healthy) were selected as per availability of relative data needed. The size and age of these banks were not taken into consideration during the sampling. Also, there was no discrimination of public quoted from unquoted companies; neither was there any stratification. They were selected at random without much bias.

3.4. Sources and Method of Data Compilation

Relevant information were gathered through the secondary source. Published books, journals and other periodicals were collected from various libraries. In addition, annual financial statements / Audited

Accounts and Central Bank of Nigeria mininmum rediscount rates for the period 1989-1996 were collected from the Nigerian Stocks Exchange in Lagos and Kaduna. Other relevant documents were obtained from banks and private individuals who are stock holders of the concerned establishments. Data collected were analysed and compiled through the use of Multiple Discriminant Analysis Model described in Chapter Two.

In view of the intensity of the calculations involved in the analysis and the need for ensuring absolute accuracry in the evaluations, a Microsoft Excel software was utilised for the calculations using a computer.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

4.1 Introduction

This Chapter enumerates in brief, the historical background of few of the selected banks analysed in the study. The major analysis of the banks are presented in accordance with the stated model. Furthermore, the outcome of the analysis are tested with the hypothesis mentioned in Chapter 1. This is followed by the concluding part of the Chapter.

4.2. Brief History of the Selected Financial Institutions

4.2.1 *NAL Merchant Bank Plc*

NAL Merchant Bank Plc (the bank) was wholly owned subsidiary of John Holt (Liverpool) Limited of United Kingdom. The Bank was incorporated on 25th November, 1960 as Nigerian Acceptances Limited. Initially, its principal activity was acceptance credit. In November, 1969, Nigerian Acceptances Limited became the first financial house to be granted a merchant banking licence under the Banking Act of 1969.

In the course of Government policy of Privatisation and Commercialisation, the Federal Government of Nigeria (FGN) and American Express Bank (AMEX) sold their combined 47% stake in the bank's equity. The major shareholders of the bank are now National Insurance Corporation of Nigeria (30%) John Holt Group (10%) and New Nigeria Development Company Ltd.(10.3%). The shares of the bank are now listed on the Nigerian Stock Exchange and were trading at 333 kobo (per 50k share) as at August 23, 1994. The Bank's Head Office is located at NAL Towers, 20 Marina, Lagos. It also has ofiices in Kano, Kaduna, Owerri and Ibadan.

The Bank's customers are mainly multi-national companies, large and middle sized Nigerian Companies. The bank provides credit, financial advisory, capital market and investment management services to its customers. The Bank has a wholly owned subsidiary called NAL Towers Securities Limited.

4.2.2 *FSB International Bank Plc*

FSB International Bank Plc was incorporated on the 31st of March, 1989. It's Banking Licence was issued on 18th of May, 1991. The bank's authorised share capital is ₦150 million, while the paid up capital is ₦111.3 million as at 1995.

The bank's Head Office is located at 23, Awolowo Road, Ikoyi, Lagos. The bank has seven branches situated at Apapa, Idumota, Ikeja, Port Harcourt, Aba, Kaduna and Onitsha. It's correspondent Bank is Citibank N.A.

4.2.3 ***United Bank for Africa (UBA) Plc.***

UBA Plc was incorporated in 1961. It's Banking Licence was also issued in 1961. The authrised share capital and paid up capital is N300 million. The bank has 199 branches located in various places in Nigeria. It also has three branches abroad.

UBA Plc correspondent banks are its New York branch, Bankers Trust in USA, Banque Nationale in France and United Kingdom.

4.2.4 ***Trans International Bank Plc***

Trans International Bank Plc was incorporated in 1989. The Bank commenced operations on the 30th of March, 1989. It's authorised share capital is ₦200 million, out of which ₦154.5 million was paid-up as at 1995.

The bank's Head Office is located in Ibadan. It has nine branches scattered in the country.

4.2.5 *Afribank Nigeria Plc*

Afribank Nigeria Plc (formerly International Bank for West Africa (IBWA) obtained its Banking Licence in October, 1959. The Bank's Head Office is situated at 55, Broad Street, Lagos. The bank has 116 branches in all parts of the federation as at 1993.

4.2.6 *Allied Bank of Nigeria plc*

Allied Bank of Nigeria Plc was incorporated in 1969. The bank started operations in Lagos in 1962. It has sixty seven branches located in all states in Nigeria as at 1993.

4.2.7 *First Bank of Nigeria Plc*

First Bank of Nigeria Plc was incorporated on the 31st of March, 1894. The bank has 287 branches located in various parts of Nigeria. Its Head Office is situated in Lagos.

4.2.8 *Nigeria International Bank Limited*

Nigeria International Bank Limited (NIB) was incorporated in May, 1984. The bank's Head office is situated at Commerce House, 1, Idowu Taylor Street, Victoria Island, Lagos. Its branches are located at Victoria Island, Apapa, Ikeja, Marina, Kano, Port Harcourt, Warri, Idimu, Lanlate, Egbeda, Ososa and Ifako-Iju (12 branches as at 1994).

Euromoney Magazine, August, 1994 describes NIB as follows: "NIB is consistently the most profitable bank in Nigeria, with non-performing debt less than 1% of loans. NIB is number one foreign exchange bank by volume; it has pioneered foreign exchange forward contracts and the development of the secondary market in government securities..."

4.2.9 ***Trade Bank Plc***

Trade Bank Plc is owned by Kogi and Kwara States and Nigerian citizens in the following shareholding percentages:

Shareholder	**% of Share**
Kogi	8.31
Kwara	31.96
Nigerian Citizens	59.73
TOTAL	**100.00**

The bank has its Head Office situated in Ilorin. It has three Area Offices, fourteen branches and three cash centres in Nigeria as at 1994.

4.2.10 ***Wema Bank Plc***

Wema Bank Plc was incorporated on 1st of May, 1945. The bank was registered as a private limited liability company with share capital of 5,000 pounds.

As at 31st March, 1994, the bank's share with a par value of 50 kobo were trading at 258k. As at 31st March, 1994, the bank employed 1878 staff (1993; 1758)

During the year that ended on 31st March, 1994, the bank also increased the number of its branches from sixty-six to seventy three.

4.2.11 ***New Africa Merchant Bank Limited***

New Africa Merchant Bank Limited was incorporated on the 14th May, 1986 and was licensed in May, 1988. The bank was set up to carry on the business of banking in general with merchant banking business as its speciality. It commenced operations simultaneously at both its Head Office in Kaduna and Lagos Central Office on the 25th October, 1989.

The bank is 35% owned by the New Nigeria Development Company Limited, 16% by Bank of the North Limited, 44% by highly placed private individuals and 5% by the employees of the bank.

The bank has an authorised share capital of ₦100 million of which ₦57.75 million has been issued and fully paid. It's services to both corporate and private individual clients include Treasury and Financial Services, Domestic Operations and International Banking.

4.2.12 *Lion Bank of Nigeria Plc*

Lion Bank of Nigeria Plc was incorporated in 1982. The bank commenced operations on the 19th of January, 1987. The percentage shareholding of the bank is as follows:-

Shareholder	**% of Share**
Plateau State Government	- 29.41
International Merchant Bank Limited	- 12.50
National Provident Fund	- 12.50
Nigerian Citizens and Associates	- 45.59
TOTAL	**100.00**

As at 1994, the total asset base of the bank was ₦1,141,139,000 and its authorised share capital was ₦75million out of which ₦60,266,000 was fully paid up. The bank's staff strength was 410 in 1994. It has eight branches located in Jos, Lagos, Kano, Ikeja, Onitsha, Lafia, Akwanga and Abuja.

4.2.13 *Habib Nigeria Bank Limited*

Habib Nigeria Bank Limited was incorporated as a private limited liability company in November, 1982 and granted Banking Licence on 7th March, 1983. The bank commenced operations on 16th May, 1983.

The shareholding ratio was 40% to Habib Bank Limited, Pakistan with which a Technical Management Agreement was reached and 60% to Nigerians. In 1985 in compliance with Nigerian Enterprises Promotion Act of 1977, the Nigerian partners of the venture reliquished 10% of their shares to the Nigerian employees for acquisition under the Staff Equity Participation Scheme.

By the end of 1995, the bank had thirty-nine branches all over the country. At the same time, its staff strength was 924 Nigerian and 3 Expatriate employees made up of 54 executives, 346 senior staff, 393 clerical and 164 non-clerical.

4.2.14 ***Bank of the North Limited***

Bank of the North Limited was incorporated on 17th September, 1959 with an initial paid-up share capital of £12,500. The bank, which commenced business in January, 1960, is owned by the nineteen Northern State Governments and the Northern Nigeria Investments Limited, a wholly owned subsidiary of the New Nigeria Development Company Limited.

As at December, 1992, the bank operated 102 branches in 23 states of the federation and the Federal Capital Territory, Abuja.; its total assets stood at over ₦3.72 billion with an authorised share capital of ₦100 million, ₦57.93 million fully paid-up. Also the staff strength was over 4,400.

4.3. Model Building and Analysis

In carrying out this project work, 29 banks, comprising 22 commercial and 7 merchant banks were selected. Twenty two of the selected banks are quoted on the Nigerian Stock Exchange while 7 are unquoted, corresponding to 76% and 24% respectively. No preference was given to their asset base and condition in the selection.

Parameters necessary for the evaluation of the Altman factor (Z), current assets (CA), current liabilities (CL), fixed assets (FA), retained earnings (RE), earnings before interest and taxes (EBIT), number of stocks (common and preference) and long term loans (L.T. LOAN) were extracted for the selected banks for the period 1989-1994 from the financial statements of the banks. Other parameters also extracted are gross earnings (GE) and profit before taxes (PBT). For quoted banks, market values per share (MV/SHARE) were obtained from the Nigerian Stock Exchange (NSE), being the market values at the end of the respective calender years. For unquoted banks and some quoted banks whose market values at the end of the year were not available in the NSE summaries, both the Earnings Approach and Assets Approach were employed using the equations in section 2.5 and the most reasonable values were selected.

The values of minimum rediscount rates used for this purpose are as given in Table 4.1.

TABLE 4.1: MINIMUM REDISCOUNT RATES (MRR) AS AT 31ST DECEMBER, 1989-94

S/N	YEAR	MRR
1	1989	18.50%
2	1990	18.50%
3	1991	15.50%
4	1992	17.50%
5	1993	23.50%
6	1994	13.50%

Source: *Nigerian Stock Exchange Annual Summaries*

Market values of equity were computed from market values per share and number of shares. Book values of total debts (BVTD) were obtained from the summation of current liabilities and long term loans.

Finally, the 'Z' values were determined for each of the 29 banks for the years 1989-94. Results of these cumputations are as given in Tables 4.2-4.7

TABLE 4.2: DETERMINATION OF ALTMAN'S FACTOR FOR SELECTED NIGERIAN BANKS FOR 1989

S/N	NAME OF BANK	CA (N'000)	CL (N'000)	FA (N'000)	RE (N'000)	EBIT (N'000)	NO. OF STOCK (NO.)	L.T.LOAN (N'000)	MV/SHARE (K)	MVE (N'000)	GE (N'000)	PBT (N'000)				
														PPS (AA)	PPS (EA)	
1	LION BANK OF NIG. PLC	324 874	317 594	6 727	2 004	15 300	20 863 214	0			24 885	7 190		97	186	127
2	MERCANT. BANK OF NIG PLC	744 473	748 820	24 775		30 504	13 466 000	6 000	10	1 347	92 370	-4 685		152	-188	-18
3	INT'L MERCH. BANK PLC	1 911 449	1 841 339	42 537	18 153	198 798	34 500 000	0			333 746	50 769		327	795	561
4	NAL MERC. BANK PLC													#DIV/0!	#DIV/0!	#DIV/0!
5	ORIENT BANK OF NIG. PLC													#DIV/0!	#DIV/0!	#DIV/0!
6	OWENA BANK NIG. PLC	457 993	437 850	14 286	1 519	34 891	41 250 000	0	75	30 938	80 239	13 084		83	171	127
7	PROGRESS BANK PLC	790 302	773 240	19 991	1 882	43 405	50 000 000	0	81	40 500	84 433	11 970		74	126	100
8	TRANS INT'L BANK PLC	157 817	147 379	11 919	1 457	7 082	40 000 000	0			14 943	4 338		56	59	57
9	UNION BANK OF NIG. PLC	7 815 624	7 428 156	170 444	62 587	532 009	254 016 000	24 000	85	215 914	1 059 418	152 409		220	324	272
10	WEMA BANK PLC	863 099	831 187	35 219	763	63 366	20 000 000	0			116 963	21 930		336	593	464
11	TRADE BANK PLC	199 698	186 428	10 991	1 211	17 729	18 882 325	0			28 270	8 944		128	256	192
12	SAVANNAH BANK OF NIG PLC	1 955 443	1 933 923	126 969	8 881	150 520	69 843 750	40 000	143	998 756	299 322	28 219		213	218	215
13	AFRI BANK PLC	2 196 789	2 083 251	183 135	2 449	273 793	100 000 000	0			481 400	122 568		377	563	470
14	ALPHA MERCH. BANK PLC			1 943	989		15 000 000	0			79 394	13 773		13	496	255
15	ALLIED BANK OF NIG. PLC	954 737	946 528	85 174	1 192	75 382	20 000 000	30 000			186 033	3 707		367	100	234
16	AFRICAN CONT'L BANK PLC													#DIV/0!	#DIV/0!	#DIV/0!
17	FIRST BANK OF NIG. PLC	9,198,494	7,858,090	293,868	88,466	333,041	181 386 322		176	328 061	1 151 061	163 044		331	546	439
18	INLAND BANK (NIG.) PLC	129 642	118 730	2 618	80	6 478	20 000 000				10 714	1 867		68	50	59
19	HIGHLAND BANK OF NIG PLC	78 975	66 389	7 472	919	6 013	16 000 000				10 425	3 765		113	127	120
20	FSB INT'L BANK PLC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		#VALUE!	#VALUE!	#VALUE!
21	UNITED BANK FOR AFRICA PLC	9 026 965	8 788 675	178 465	14	451 445	75 000 000				819 637	101 234		556	730	643
22	HABIB NIG. BANK LTD	615 929	593 894	20 987	1 584	74 824	21 000 000				105 302	45 037		205	1 159	682
23	BANK OF THE NORTH LTD													#DIV/0!	#DIV/0!	#DIV/0!
24	GAMJI BANK OF NIG. PLC													#DIV/0!	#DIV/0!	#DIV/0!
25	NIGERIA-ARAB BANK LTD	554 757	564 945	43 092	1 184	50 852	20 000 000				105 354	4 892		165	132	148
26	CMB NIG. LTD	1 931 358	1 861 186	59 653	20 443	300 070	16 530 000	6 000			393 583	53 972		785	1 765	1 275
27	NIGERIA MERCH. BANK LTD	1 534 562	1 443 213	6 244	18 356	163 178	15 000 000				200 279	50 051		651	1 804	1 227
28	NIGERIA INT'L BANK LTD															
29	NEW AFRICA MERCH. BANK LTD															

KEY:

N/A = Not Available
#DIV/0! = The denominator is zero
#VALUE! = Cell width too narrow to accommodate entry

TABLE 4.3: DETERMINATION OF ALTMAN'S FACTOR FOR SELECTED NIGERIAN BANKS FOR 1990

S/N	NAME OF BANK	CA (N'000)	CL (N'000)	FA (N'000)	RE (N'000)	EBIT (N'000)	NO. OF COMMON STOCK (NO.)	L.T.LOAN (N'000)	V/SHAR (K)	MVE (N'000)	GE (N'000)	PBT (N'000)			
1	LION BANK OF NIG. PLC	318 397	307 962	10 266	1 255	38 165	32 340 000		80	25 872	53 588	12 524	64	209	137
2	MERCANT. BANK OF NIG PLC	418 571	893 109	27 998	-299 928	-174 993	13 466 000	4 867	10	1 347	87 737	-229 814	-1 831	-9 225	-5 528
3	INT'L MERCH. BANK PLC	2 161 228	2 072 853	38 685	11 428	271 002	34 500 000				473 841	33 387	368	523	446
4	NAL MERC. BANK PLC	1 391 715	1 208 122	64 735	18 160	184 239	31 500 000	4 858			229 311	50 813	788	872	830
5	ORIENT BANK OF NIG. PLC												#DIV/0!	#DIV/0!	#DIV/0!
6	OWENA BANK NIG. PLC	604 906	588 554	20 959	2 176	34 681	41 250 000		84	34 650	95 704	2 179	90	29	60
7	PROGRESS BANK PLC	1 064 755	1 043 179	27 216	2 856	74 174	50 000 000		106	53 000	128 772	16 880	98	182	140
8	TRANS. INT'L BANK PLC	366 189	353 776	16 732	28	34 988	40 000 000				53 842	11 862	73	160	117
9	UNION BANK OF NIG. PLC	8 802 404	8 572 791	439 155	85 166	839 834	254 016 000	18 000	64	162 570	1 420 778	127 249	283	271	287
10	WEMA BANK PLC	856 264	927 948	49 986	639	82 941	20 000 000				133 526	28 219	392	763	577
11	TRADE BANK PLC	254 490	250 083	20 790	191	24 300	20 140 247				45 039	5 587	125	150	138
12	SAVANNAH BANK OF NIG PLC	1 906 640	1 885 431	142 340	10 744	163 993	89 843 750	40 000	136	94 988	345 166	19 185	234	148	191
13	AFRI BANK PLC	3 142 600	3 098 827	244 581	3 588	288 887	27 917 000				856 044	86 265	1 033	1 283	1 158
14	ALPHA MERCH. BANK PLC	701 415	668 391	9 454	1 325	87 528	20 000 000				122 241	25 600	212	892	453
15	ALLIED BANK OF NIG. PLC	1 246 847	1 350 217	135 282	-35 471	79 954	25 000 000	24 000			224 072	-35 944	128	-777	-325
16	AFRICAN CONT'L BANK PLC	1 831 568	2 283 124	63 482	N/A	-12 806	119 874 184	45 283			338 485	-196 374	-324	-885	-805
17	FIRST BANK OF NIG. PLC	8 106 314	8 181 342	376 286	211 713	384 854	188 398 322		144	288,414	1,433,440	205,428	161	-596	-217
18	INLAND BANK (NIG.) PLC	365 480	342 707	5 035	277	24 196	40 000 000				38 021	7 331	70	99	84
19	HIGHLAND BANK OF NIG PLC	116 904	100 421	9 331	2 878	8 669	20 000 000				15 590	5 636	129	152	141
20	FSB INT'L BANK PLC												#DIV/0!	#DIV/0!	#DIV/0!
21	UNITED BANK FOR AFRICA PLC	11 070 690	10 878 776	280 183	374	584 023	75 000 000				1 145 831	116 445	829	839	734
22	HABIB NIG. BANK LTD	938 116	926 412	43 185	136	87 972	28 000 000				146 790	33 847	196	653	425
23	BANK OF THE NORTH LTD												#DIV/0!	#DIV/0!	#DIV/0!
24	GAMJI BANK OF NIG. PLC	297 850	277 490	7 975		29 934	20 892 500				52 267	2 420	136	63	99
25	NIGERIA-ARAB BANK LTD	729 699	742 602	60 979	871	65 423	20 000 000	20 000			126 446	1 262	240	34	137
26	CMB NIG. LTD	2 312 807	2 247 606	84 962	19 050	420 225	19 836 000	4 000			584 017	35 078	757	956	856
27	NIGERIA MERCH. BANK LTD	1 540 011	1 420 521	26 832	27 400	265 835	30 000 000				325 594	60 178	488	1 084	786
28	NIGERIA INT'L BANK LTD														
29	NEW AFRICA MERCH. BANK LTD														

KEY:

N/A = Not Available
#DIV/0! = The denominator is zero
#VALUE = Cell width too narrow to accommodate entry

TABLE 4.4: DETERMINATION OF ALTMAN'S FACTOR FOR SELECTED NIGERIAN BANKS FOR 1991

S/N	NAME OF BANK	CA (N'000)	CL (N'000)	FA (N'000)	RE (N'000)	EBIT (N'000)	NO. OF COMMON STOCK (NO.)	L.T.LOAN (N'000)	MV/SHARE (K)	MVE (N'000)	GE (N'000)	PBT (N'000)			
1	LION BANK OF NIG. PLC	378 541	363 372	14 564	3 431	37 099	40 426 000		75	30 320	59 731	3 772	74	80	67
2	MERCANT. BANK OF NIG PLC	852 986	931 852	38 411	1 859	81 360	21 040 000	3 334	10	2 104	104 016	2 790	-1 143	88	-529
3	INT'L MERCH. BANK PLC	1 928 948	1 820 727	41 493	7 678	247 811	333 000 000				521 924	30 477	44	59	52
4	NAL MERC. BANK PLC	1 577 188	1 326 956	88 426	16 643	174 797	31 500 000				286 215	35 421	1 012	723	869
5	ORIENT BANK OF NIG. PLC	508 104	510 683	15 929	800	444 428	40 000 000				78 966	3 400	33	55	44
6	OWENA BANK NIG. PLC	808 257	799 494	30 611	14 444	39 410	41 250 000		70	28 875	131 420	2 882	95	48	70
7	PROGRESS BANK PLC	1 120 566	1 127 301	48 787	-4 189	85 978	50 000 000		89	44 500	178 425	-3 767	84	48	18
8	TRANS INT'L BANK PLC	524 498	524 693	32 803	879	52 180	50 000 000				85 786	12 922	88	163	114
9	UNION BANK OF NIG. PLC	12 602 709	12 498 061	563 728		655 518	317 520 000		44	139 709	1 924 117	14 434	210	29	120
10	WEMA BANK PLC	1 330 985	1 296 656	71 181	3 507	118 548			96		218 272	37 570	#DIV/0!	#DIV/0	#DIV/0!
11	TRADE BANK PLC	376 819	388 970	20 388	1 518	44 979	40 282 294				86 171	7 023	70	11	91
12	SAVANNAH BANK OF NIG PLC	2 900 325	2 898 022	3 549 871		562 678	69 843 750	40 000	84	58 669	567 916	5 240	4 387	46	5 518
13	AFRI BANK PLC												#DIV/0!	#DIV/0	#DIV/0!
14	ALPHA MERCH. BANK PLC	1 170 776	1 108 128	14 818	6 741	129 474	100 000 000				204 896	31 078	77	201	139
15	ALLIED BANK OF NIG. PLC	1 757 269	1 948 150	230 411	-39 034	84 443	50 000 000	29 167			261 364	-39 034	77	-504	-213
16	AFRICAN CONT'L BANK PLC	2 861 602	3 691 169	66 082		-115 336	186 874 184	36 450	81	73 123	401 028	-367 980	-409	-1 270	-840
17	FIRST BANK OF NIG. PLC	10 757 566	10 862 583	561 530	-31 295	529,898	25,000,000		80	177 078	1 574 711	-31 295	1 626	-808	-509
18	INLAND BANK NIG I PLC	225 421	199 837	8 364	358	37 163	46 000 000				59 830	6 976	74	98	88
19	HIGHLAND BANK OF NIG PLC	244 691	226 687	11 105	2 307	14 348	24 000 000				27 206	3 675	121	99	110
20	FSB INT'L BANK PLC												#DIV/0!	#DIV/0	#DIV/0!
21	UNITED BANK FOR AFRICA PLC												#DIV/0!	#DIV/0!	#DIV/0!
22	HABIB NIG. BANK LTD	1 076 890	1 056 535	66 588	5 477	103 081	52 500 000				183 096	44 893	166	552	359
23	BANK OF THE NORTH LTD	2 814 112	2 778 138	136 571	3 374	184 853	57 431 000	*5 000			433 533	7 974	300	90	195
24	GAMJI BANK OF NIG. PLC	412 293	400 537	12 883	-7 536	26 278	27 342 500				60 376	-6 561	89	-155	-33
25	NIGERIA-ARAB BANK LTD												#DIV/0!	#DIV/0!	#DIV/0!
26	CMB NIG. LTD												#DIV/0!	#DIV/0!	#DIV/0!
27	NIGERIA MERCH. BANK LTD	2 042 807	1 956 863	72 689	2 625	300 460	35 000 000				394 704	12 011	452	221	337
28	NIGERIA INT'L BANK LTD														
29	NEW AFRICA MERCH. BANK LTD														

KEY:

N/A = Not Available
#DIV/0! = The denominator is zero
#VALUE! = Cell width too narrow to accommodate entry

TABLE 4.5: DETERMINATION OF ALTMAN'S FACTOR FOR SELECTED NIGERIAN BANKS FOR 1992

S/N	NAME OF BANK	CA (N'000)	CL (N'000)	FA (N'000)	RE (N'000)	EBIT (N'000)	NO. OF COMMON STOCK (NO.)	L.T.LOAN (N'000)	V/SHAR (K)	MVE (N'000)	GE (N'000)	PBT (N'000)				
1	LION BANK OF NIG. PLC	528 481	514 024	19 896	924	51 524	50 531 250		101	35 372	91 606	15 942		88	180	124
2	MERCANT. BANK OF NIG PLC								15					#DIV/0!	#DIV/0!	#DIV/0!
3	INT'L MERCH. BANK PLC	2 119 727	19 955 766	49 364	12 136	344 944	33 000 000		0		627 664	55 559		-53899	962	-28468
4	NAL MERC. BANK PLC	2 398 127	1 994 484	62 843		244 778	126 000 000		368		356 318	110 108		368	499	434
5	ORIENT BANK OF NIG. PLC	517 859	482 797	21 095		31 177	57 000 000		30		83 932	-3 928		99	-39	30
6	OWENA BANK NIG. PLC	963 129	945 436	4 359		94 296	120 000 000		54	53 800	220 476	16 559		54	79	67
7	PROGRESS BANK PLC	1 525 832	1 533 913	80 457	1 744	179 120	50 000 000		97	285 500	323 785	-4 015		144	46	49
8	TRANS INT'L BANK PLC	838 936	822 309	57 188	3 345	122 113	100 000 000		74		184 164	40 387		74	231	152
9	UNION BANK OF NIG. PLC	22 473 148	22 651 981	1 396 478	51 155	983 723	317 520 000		79	250 841	2 699 987	109 807		383	198	291
10	WEMA BANK PLC	1 598 781	1 581 909	105 831	2 984	154 191			104		267 413	43 634		#DIV/0!	#DIV/0!	#DIV/0!
11	TRADE BANK PLC	786 777	765 985	38 288	2 472	112 308	100 282 294		102	102 288	192 885	21 964		88	125	97
12	SAVANNAH BANK OF NIG PLC	3 822 384	3 824 543	4 065 805		601 308	104 765 825	40 000	14	77 527	611 548	10 240		3879	56	1967
13	AFRI BANK PLC													#DIV/0!	#DIV/0!	#DIV/0!
14	ALPHA MERCH. BANK PLC	1 871 192	1 525 759	35 122	1 939	324 301	200 000 000		110	220 000	519 080	45 389		90	130	110
15	ALLIED BANK OF NIG. PLC	2 737 795	2 674 469	276 892	4 172	243 506	150 000 000	60 000	33		565 893	8 770		93	33	63
16	AFRICAN CONT'L BANK PLC								87					#DIV/0!	#DIV/0!	#DIV/0!
17	FIRST BANK OF NIG. PLC	16 315 500	16 030 787	670 805	213 927	1 058 197	186 398 322		96	178 942	2 689 324	365 963		513	1122	817
18	INLAND BANK (NIG.) PLC	484 175	434 848	24 998		48 759	100 000 000		74		95 340	17 767		74	102	98
19	HIGHLAND BANK OF NIG PLC	279 088	237 536	11 552	5 596	28 287	24 000 000		263		52 694	12 823		263	301	282
20	FSB INT'L BANK PLC													#DIV/0!	#DIV/0!	#DIV/0!
21	UNITED BANK FOR AFRICA PLC													#DIV/0!	#DIV/0!	#DIV/0!
22	HABIB NIG. BANK LTD	1 941 783	1 926 512	133 507	27 518	247 389	52 500 000		283		382 574	184 431		283	1790	1037
23	BANK OF THE NORTH LTD	3 434 461	3 420 810	289 104	12 131	279 533	57 434 000	15 000	110		559 282	11 048		527	110	319
24	GAMJI BANK OF NIG. PLC	1 145 894	1 111 812	47 397	16 602	160 771	58 091 000		140		216 318	42 494		140	418	279
25	NIGERIA-ARAB BANK LTD															
26	CMB NIG. LTD															
27	NIGERIA MERCH. BANK LTD															
28	NIGERIA INT'L BANK LTD															
29	NEW AFRICA MERCH. BANK LTD															

KEY:

N/A = Not Available
#DIV/0! = The denominator is zero
#VALUE! = Cell width too narrow to accommodate entry

TABLE 4.6: DETERMINATION OF ALTMAN'S FACTOR FOR SELECTED NIGERIAN BANKS FOR 1993

S/N	NAME OF BANK	CA (N'000)	CL (N'000)	FA (N'000)	RE (N'000)	EBIT (N'000)	NO. OF COMMON STOCK (NO.)	L.T.LOAN (N'000)	V/SHAR (K)	MVE (N'000)	GE (N'000)	PBT (N'000)			
1	LION BANK OF NIG. PLC	923,335	868,040	31,579	4,345	68,592	120,531,250		84	77,140	130,241	21,399	#DIV/0!	#DIV/0!	#DIV/0!
2	MERCANT. BANK OF NIG PLC								12				111	111	142
3	INT'L MERCH. BANK PLC	2,130,795	1,961,958	48,893	24,185	62,162	195,500,000		105	205,275	852,914	77,311	478	441	460
4	NAL MERC. BANK PLC	2,796,756	2,271,544	77,666	195,008	368,970	126,000,000		330	415,800	518,219	127,929	52	284	-106
5	ORIENT BANK OF NIG. PLC	802,785	603,197	26,163		78,735	50,000,000		70	35,000	201,782	30,348	127	823	348
6	OWENA BANK NIG. PLC	754,794	959,906	52,379		135,396	120,000,000		58	89,600	246,335	227,092	153	61	108
7	PROGRESS BANK PLC	2,092,596	2,183,774	147,781	2,948	258,805	50,000,000		70	35,000	479,186	7,211	98	310	204
8	TRANS INT'L BANK PLC	1,359,006	1,312,449	60,759	18,501	323,407	110,000,000				345,527	78,341	528	842	685
9	UNION BANK OF NIG. PLC	30,533,182	30,330,744	1,484,914	336,884	1,839,565	317,620,000		72	228,614	3,937,714	614,759	235	515	375
10	WEMA BANK PLC	2,915,527	2,864,530	230,469	32,467	314,665	120,000,000		72	86,400	526,917	142,255	83	142	112
11	TRADE BANK PLC	1,330,766	1,013,138	65,378	5,535	228,937	100,282,294		117	117,330	395,475	32,764	4,666	148	2,407
12	SAVANNAH BANK OF NIG PLC	4,575,468		312,582	574		104,765,625		84	67,050	1,079,879	35,616	137	308	223
13	AFRI BANK PLC	10,540,556	10,488,580	585,024	53,931	911,604	450,000,000	60,800	160	720,000	2,145,716	318,711	#DIV/0!	#DIV/0!	#DIV/0!
14	ALPHA MERCH. BANK PLC												168	368	268
15	ALLIED BANK OF NIG. PLC	3,842,973	3,900,962	309,473	70,093	617,351	150,000,000	80,000	82	93,000	1,118,551	126,954	#DIV/0!	#DIV/0!	#DIV/0!
16	AFRICAN CONT'L BANK PLC								65				694	1,883	1,288
17	FIRST BANK OF NIG. PLC	22,700,911	22,058,537	851,337	346,188	1,745,588	215,198,000		471	1,013,483	4,308,535	931,832	88	221	105
18	INLAND BANK (NIG.) PLC	927,857	924,478	84,567			100,000,000		150	100,000	247,851	27,930	80	-394	-167
19	HIGHLAND BANK OF NIG PLC	284,588	284,651	14,848		16,616	24,000,000				97,733	21,738	65	79	72
20	FSB INT'L BANK PLC	1,099,146	962,304	7,823	9,928	152,661	222,616,468		77	171,415	216,997	40,388	361	761	561
21	UNITED BANK FOR AFRICA PLC	21,832,202	22,227,015	1,117,393	769	1,139,518	200,000,000				2,808,394	349,985	356	1,811	1,084
22	HABIB NIG. BANK LTD	3,232,958	3,213,523	292,105	87,697	566,778	87,500,000				846,548	364,478	#DIV/0!	#DIV/0!	#DIV/0!
23	BANK OF THE NORTH LTD												137	149	143
24	GAMJI BANK OF NIG. PLC	1,050,313	983,587	59,970	3,403	197,125	100,000,000				347,917	34,255	#DIV/0!	#DIV/0!	#DIV/0!
25	NIGERIA ARAB BANK LTD												#DIV/0!	#DIV/0!	#DIV/0!
26	CMB NIG. LTD												#DIV/0!	#DIV/0!	#DIV/0!
27	NIGERIA MERCH. BANK LTD	10,612,861	10,324,296	93,224	192,396	1,557,297	100,000,000				1,985,021	1,333,703	382	5,799	3,390
28	NIGERIA INT'L BANK LTD														
29	NEW AFRICA MERCH. BANK LTD														

KEY:

N/A = Not Available
#DIV/0! = The denominator is zero
#VALUE! = Cell width too narow to accommodate entry

TABLE 4.7: DETERMINATION OF ALTMAN'S FACTOR FOR SELECTED NIGERIAN BANKS FOR 1994

S/N	NAME OF BANK	CA (N'000)	CL (N'000)	FA (N'000)	RE (N'000)	EBIT (N'000)	NO. OF COMMON STOCK (NO.)	L.T.LOAN (N'000)	V/SHAR (K)	MVE (N'000)	GE (N'000)	PBT (N'000)			
1	LION BANK OF NIG. PLC	1.092.331	1.035.799	48.808	4.894	105.610	120.531.250		54	65.087	199.990	28.577	87	183	125
2	MERCANT. BANK OF NIG PLC								12				#DIV/0!	#DIV/0!	#DIV/0!
3	INT'L MERCH. BANK PLC								103				#DIV/0!	#DIV/0!	#DIV/0!
4	NAL MERC. BANK PLC	3.172.324	2.661.014	91.330	7.125	504.399	189.000.000		302	570.780	728.444	100.195	319	393	356
5	ORIENT BANK OF NIG. PLC	824.542	656.208	31.117		16.788	50.000.000		66	32.500	114.278	-26.090	-1	-387	-194
6	OWENA BANK NIG. PLC	1.056.989	1.233.204	69.710	46.228	95.229	120.000.000		57	68.400	292.427	48.895	-89	302	107
7	PROGRESS BANK PLC	1.477.991	2.428.539	187.452	-734.090	-535.256	50.000.000		70	35.000	304.587	-733.590	-1.526	-10.988	-6.197
8	TRANS INT'L BANK PLC	1.765.448	1.749.672	97.352	417	148.186	154.500.000		123	190.035	320.121	27.039	73	130	101
9	UNION BANK OF NIG. PLC	41.802.525	41.491.784	1.912.208	261.913	2.100.484	635.040.000		321	2.038.478	5.794.505	606.309	319	707	513
10	WEMA BANK PLC	5.709.626	5.531.617	374.188	10.395	618.871	230.000.000		371	853.300	1.003.699	375.110	240	1.208	724
11	TRADE BANK PLC	1.556.106	1.518.730	60.144	6.021	185.278	110.310.524		98	108.104	397.690	35.089	88	236	162
12	SAVANNAH BANK OF NIG PLC	5.256.675	5.684.727	351.667	-334.886	151.208	104.765.625	40.000	64	67.050	1.385.963	-328.564	-73	-2.323	-1.198
13	AFRI BANK PLC	13.423.838	134.173.178	705.490	81.575	913.433	582.500.000	60.800	116	652.500	2.564.513	254.468	-21.341	335	-10.503
14	ALPHA MERCH. BANK PLC								111				#DIV/0!	#DIV/0!	#DIV/0!
15	ALLIED BANK OF NIG. PLC								80				#DIV/0!	#DIV/0!	#DIV/0!
16	AFRICAN CONT'L BANK PLC								50				#DIV/0!	#DIV/0!	#DIV/0!
17	FIRST BANK OF NIG. PLC	32.847.658	32.124.175	1.106.902	255.300	2.080.295	430.396.000		375	1.613.985	5.354.996	873.527	425	1.503	984
18	INLAND BANK (NIG.) PLC	974.485	904.343	78.642	3.044	70.426	150.000.000	20.000	94	141.000	193.368	1.512	99	7	53
19	HIGHLAND BANK OF NIG PLC	248.279	332.319	14.773		-92.770	50.000.000		120	60.000	38.707	-109.579	-139	-1.623	-881
20	FSB INT'L BANK PLC	1.369.266	1.222.614	34.833	15.274	293.280	222.616.468		108	240.426	446.744	107.359	82	357	219
21	UNITED BANK FOR AFRICA PLC	22.699.311	22.681.286	1.545.446	1.000	1.025.963	200.000.000				3.629.066	212.507	782	787	784
22	HABIB NIG. BANK LTD	3.799.821	3.762.139	294.379	1.240	277.663	175.000.000				600.812	103.075	190	436	313
23	BANK OF THE NORTH LTD	5.432.160	5.876.408	490.517		167.700	77.818.000				989.195	-167.518	59	-1.595	-768
24	GAMJI BANK OF NIG. PLC												#DIV/0!	#DIV/0!	#DIV/0!
25	NIGERIA-ARAB BANK LTD												#DIV/0!	#DIV/0!	#DIV/0!
26	CMB NIG. LTD												#DIV/0!	#DIV/0!	#DIV/0!
27	NIGERIA MERCH. BANK LTD												#DIV/0!	#DIV/0!	#DIV/0!
28	NIGERIA INT'L BANK LTD	7.764.841	7.253.138	167.022	104.540	1.319.210	100.000.000				1.855.931	1.137.001	679	8.422	4.550
29	NEW AFRICA MERCH. BANK LTD	789.333	873.879	171.530	4.144	166.084	55.000.000				256.500	21.206	158	286	222

KEY:

N/A = Not Available
#DIV/0! = The denominator is zero
#VALUE! = Cell width too narow to accommodate entry

4.4 Presentation of the Results

The result of the study as values of X_1, X_2, X_3, X_4, X_5 and Z for the selected banks for the period of the study were as presented below:

4.4.1 *X_1 Values*

Table 4.8 presents the values of X_1 for the period 1989-94 in respect of the 29 banks that were selected.

Generally, the result in Table 4.8 show two importantfeatures. One, the values of X_1 which varies from -8.2229 to 0.1254 were very low. Secondly the values were negative in respect of certain banks in some years.

Since X_1 is a measure of the net liquid assets of the firm relative to its total capitalisation, a firm experiencing consistent operating losses will have shrinking current assets in relation to total assets. Therefore, a low or declining value of X_1 is the first signal of insolvency, leading to defaults in meeting customers obligation as and when due, run on deposits and further deterioration in the financial health of the bank.

A close study of the results in Table 4.8 indicate that:

i) Merchant Bank of Nig. Plc , International Merchant Bank Plc, Orient Bank of Nig. Plc, Owena Bank of Nig. Plc, Progress Bank Plc, Trans International Bank Plc, Union Bank of Nig. Plc,

TABLE 4.8: SUMMARY OF 'X'_1 VALUES FOR THE SELECTED BANKS FOR THE PERIOD 1989-94

S/N	NAME OF BANK			X_1			
		1989	1990	1991	1992	1993	1994
1	LION BANK OF NIG. PLC	0.022	0.0318	0.0386	0.0264	0.0579	0.0495
2	MERCANT. BANK OF NIG PLC	-0.0057	-0.6148	-0.4033			
3	INT'L MERCH. BANK PLC	0.0359	0.0402	0.054	-8.2229	0.0775	
4	NAL MERC. BANK PLC		0.1261	0.152	0.163	0.1827	0.1567
5	ORIENT BANK OF NIG. PLC			-0.00449	0.0651	-0.0007	-0.0483
6	OWENA BANK NIG. PLC	0.0427	0.0261	0.0104	0.0175	-0.2541	-0.1564
7	PROGRESS BANK PLC	0.0211	0.0198	-0.0058	-0.0049	-0.0318	-0.5707
8	TRANS INT'L BANK PLC	0.0615	0.0324	-0.0003	0.0186	0.0328	0.0085
9	UNION BANK OF NIG. PLC	0.0485	0.0248	0.0079	-0.0075	0.006	0.0025
10	WEMA BANK PLC	0.0355	0.0281	0.0245	0.0216	0.0162	0.00293
11	TRADE BANK PLC	0.063	0.016	0.0198	0.0362	0.0161	0.0231
12	SAVANNAH BANK OF NIG PLC	0.0103	0.0104	0.0007	-0.0003	0.9361	-0.0763
13	AFRI BANK PLC	0.0481	0.0129			0.0047	-8.546
14	ALPHA MERCH. BANK PLC	0	0.0465	0.0528	0.0852		
15	ALLIED BANK OF NIG. PLC	0.008	-0.0748	-0.0965	-0.0453	-0.014	
16	AFRICAN CONT'L BANK PLC		-0.2383	-0.2834			
17	FIRST BANK OF NIG. PLC	0.0283	-0.009	-0.0093	0.0168	0.0273	0.0213
18	INLAND BANK (NIG.) PLC	0.0825	0.0615	0.1104	0.0969	0.0034	0.0666
19	HIGHLAND BANK OF NIG PLC	0.1254	0.1306	0.0704	0.1774	-0.0002	-0.3195
20	FSB INT'L BANK PLC					0.1236	0.1044
21	UNITED BANK FOR AFRICA PLC	0.0259	0.0169			-0.0172	0.0007
22	HABIB NIG. BANK LTD	0.0346	0.0119	0.0178	0.0073	0.0055	0.0092
23	BANK OF THE NORTH LTD			0.0122	0.0037		-0.075
24	GAMJI BANK OF NIG. PLC		0.0666	0.0277	0.0286	0.0596	
25	NIGERIA-ARAB BANK LTD	-0.017	-0.0163				
26	CMB NIG. LTD	0.0352	0.0272				
27	NIGERIA MERCH. BANK LTD	0.0593	0.0763	0.0405			
28	NIGERIA INT'L BANK LTD						
29	NEW AFRICA MERCH. BANK LTD						

Afri Bank Plc, Allied Bank of Nig. Plc, African Continental Bank Plc, First Bank of Nig. Plc, Highland Bank of Nig. Plc, United Bank for Africa Plc, Bank of the North Ltd. and Nigeria Arab Bank Plc recorded serious deterioration in their liquidity positions at one time or the other during the period under study;

ii Most of the banks listed in 4.4.1 (i) above that witnessed deterioration in their liquidity positions are now classified as distressed and some of them are currently out of operation; and

iii For the selected banks, the regime of illiquidity started mainly in 1990 and deteriorated steeply between 1991-94. The commencement of illiquidity in the banking sector coincides with the introduction of the Prudential Guidelines by the Central Bank of Nigeria in 1990, which requires banks to make provision for bad and doubtful debts, a factor which was responsible for the insolvency of some banks.

Based on the strong correlation between the above results and the reality, it can be concluded that X_1 is indeed a reliable and important measure of distress in a firm.

4.4.2 *X_2 Values*

Summary of the values of X_2 for the banks between 1989-94 was given in Table 4.9. The results show that on the average, the values of X_2 were higher for the older banks.

TABLE 4.9: SUMMARY OF 'X'$_2$ VALUES FOR THE SELECTED BANKS FOR THE PERIOD 1989-94

S/N	NAME OF BANK			X2			
		1989	1990	1991	1992	1993	1994
1	LION BANK OF NIG. PLC	0.006	0.0038	0.0087	0.0017	0.0046	0.0043
2	MERCANT. BANK OF NIG PLC	0	-0.6716	0.0027			
3	INT'L MERCH. BANK PLC	0.0093	0.0052	0.0039	0.0056	0.0111	
4	NAL MERC. BANK PLC		0.0125	0.0101	0	0.0678	0.0022
5	ORIENT BANK OF NIG. PLC			0.0011	0	0	0
6	OWENA BANK NIG. PLC	0.0032	0.0035	0.0172	0	0	0.041
7	PROGRESS BANK PLC	0.0023	0.0024	-0.0036	0.001	0.0013	-0.4408
8	TRANS INT'L BANK PLC	0.0086	0.0001	0.0016	0.0037	0.013	0.0002
9	UNION BANK OF NIG. PLC	0.0078	0.0071	0	0.0021	0.0105	0.006
10	WEMA BANK PLC	0.0008	0.0006	0.0025	0.0018	0.0103	0.0017
11	TRADE BANK PLC	0.0057	0.0007	0.0038	0.003	0.005	0.0037
12	SAVANNAH BANK OF NIG PLC	0.0043	0.0052	0	0	0.0001	-0.0597
13	AFRI BANK PLC	0.001	0.0011			0.0049	0.0058
14	ALPHA MERCH. BANK PLC	0.509	0.0019	0.0057	0.0011		
15	ALLIED BANK OF NIG. PLC	0.0012	-0.0257	-0.0196	0.0014	0.0169	
16	AFRICAN CONT'L BANK PLC		0	0			
17	FIRST BANK OF NIG. PLC	0.0078	-0.025	-0.0028	0.0126	0.0147	0.0075
18	INLAND BANK (NIG.) PLC	0.0006	0.0007	0.0015	0	0	0.0029
19	HIGHLAND BANK OF NIG PLC	0.0109	0.0228	0.009	0.0193	0	0
20	FSB INT'L BANK PLC					0.009	0.0109
21	UNITED BANK FOR AFRICA PLC		0			0	0
22	HABIB NIG. BANK LTD	0.0025	0.0001	0.0048	0.0133	0.0249	0.0003
23	BANK OF THE NORTH LTD			0.0011	0.0033		0
24	GAMJI BANK OF NIG. PLC		0	-0.0177	0.0139	0.003	
25	NIGERIA-ARAB BANK LTD	0.002	0.0011				
26	CMB NIG. LTD	0.0103	0.0079				
27	NIGERIA MERCH. BANK LTD	0.119	0.0175	0.0012			
28	NIGERIA INT'L BANK LTD						
29	NEW AFRICA MERCH. BANK LTD						

Since X_2 is a measure of cumulative profitability over time in relation to total capitalisation, it is obvious that a relatively younger firm would ahow a low value. It implies that a young firm is discriminanted against and may be classified as distressed compared to an older firm, *ceteris paribus*.

But the above condition is quite true in the case of Nigerian banks. The preponderance of distress in the new generation banks was much higher than the older banks because the later had time to build up profits, which enables them absorb certain policy shocks better.

However, the generally low values of X_2 indicate that the retained earnings of all the banks are insignificant compared to their total liabilities. Hence, their abilities to withstand prolonged adversity are low.

4.4.3 *X_3 Values*

Table 4.10 presents the values of X_3 for the selected banks during the period 1989-94.

X_3 is a measure of the true productivity of the firm's assets, abstracting from any tax or leverage factors. Since a firm's ultimate existence is based on the earnings power of its assets, this ratio is particularly important in studies dealing with corporate failure. Furthermore, insolvency in a bankruptcy sense occurs when the total liabilities exceed

TABLE 4.10: SUMMARY OF 'X'$_3$ VALUES FOR THE SELECTED BANKS FOR THE PERIOD 1989-94

S/N	NAME OF BANK	X3					
		1989	1990	1991	1992	1993	1994
1	LION BANK OF NIG. PLC	0.0461	0.1161	0.0944	0.0940	0.0718	0.0925
2	MERCANT. BANK OF NIG PLC	0.0397	-0.3919	0.0887	#DIV/0!	#DIV/0!	#DIV/0!
3	INT'L MERCH. BANK PLC	0.1017	0.1232	0.1258	0.1590	0.2850	#DIV/0!
4	NAL MERC. BANK PLC	#DIV/0!	0.1265	0.1062	0.0996	0.1249	0.1546
5	ORIENT BANK OF NIG. PLC	#DIV/0!	#DIV/0!	0.8481	0.0578	0.1220	0.0256
6	OWENA BANK NIG. PLC	0.0735	0.0554	0.0470	0.0933	-0.1677	0.0845
7	PROGRESS BANK PLC	0.0536	0.0679	0.0735	0.1050	0.1146	-0.3214
8	TRANS INT'L BANK PLC	0.0417	0.0914	0.0936	0.1363	0.1574	0.0796
9	UNION BANK OF NIG. PLC	0.0666	0.0692	0.0498	0.0412	0.0575	0.0483
10	WEMA BANK PLC	0.0705	0.0824	0.0845	0.0905	0.1000	0.1017
11	TRADE BANK PLC	0.0841	0.0883	0.1132	0.1363	0.2089	0.1146
12	SAVANNAH BANK OF NIG PLC	0.0723	0.0800	0.0944	0.0762	0.0000	0.0270
13	AFRI BANK PLC	0.1160	0.0852	#DIV/0!	#DIV/0!	0.0821	0.0646
14	ALPHA MERCH. BANK PLC	0.0000	0.1231	0.1092	0.1901	#DIV/0!	#DIV/0!
15	ALLIED BANK OF NIG. PLC	0.0739	0.0578	0.0425	0.0808	0.1487	#DIV/0!
16	AFRICAN CONT'L BANK PLC	#DIV/0!	-0.0068	-0.0394	#DIV/0!	#DIV/0!	#DIV/0!
17	FIRST BANK OF NIG. PLC	0.0630	0.0454	0.0468	0.0623	0.0741	0.0613
18	INLAND BANK (NIG.) PLC	0.0490	0.0653	0.1591	0.0958	0.0000	0.0669
19	HIGHLAND BANK OF NIG PLC	0.0712	0.0687	0.0561	0.0973	0.0555	-0.3527
20	FSB INT'L BANK PLC	#VALUE!	#DIV/0!	#DIV/0!	#DIV/0!	0.1379	0.2089
21	UNITED BANK FOR AFRICA PLC		0.0515	#DIV/0!	#DIV/0!	0.0497	0.0423
22	HABIB NIG. BANK LTD	0.0490	0.0897	0.0901	0.1192	0.1608	0.0679
23	BANK OF THE NORTH LTD	0.1172	#DIV/0!	0.0626	0.0751	#DIV/0!	0.0283
24	GAMJI BANK OF NIG. PLC	#DIV/0!	0.0979	0.0618	0.1348	0.1760	#DIV/0!
25	NIGERIA-ARAB BANK LTD	#DIV/0!	0.0827	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
26	CMB NIG. LTD	0.0851	0.1753	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
27	NIGERIA MERCH. BANK LTD	0.1507	0.1697	0.1420	#DIV/0!	#DIV/0!	#DIV/0!
28	NIGERIA INT'L BANK LTD	0.1059					
29	NEW AFRICA MERCH. BANK LTD						

a fair valuation of the firm's assets with value determined by the earning power of the assets.

A careful study of Table 4.10 reveals that:

i) The highest value of X_3 was 0.2089 for FSB International Bank Plc in 1994. This represents a 20.89% earning power of the bank's assets in relation to its liabilities. On aggregate basis, it can be concluded that the earning power of the banks assets are low. This again implies higher vulnerability to policy shocks. The value of 0.8481 for Orient Bank in 1991 was considered anomalous due to the unsustainability as shown by the sharp decline to 0.0578, 0.1220 and 0.0256 in 1992,1993 and 1994 respectively;

ii) The values of X_3 shows evidence of discrimination between healthy and unhealthy banks. For instance, for most banks which are today considered healthy, such as: NAL Merchant Bank, Union Bank, Wema Bank, FSB International Bank, United Bank for Africa and Habib Nigeria Bank, the values were either increasing steadily or fluctuate within a narrow band. Similarly, banks such as: Orient, Progress, Owena, Trans-International, Savannah, Alpha, Allied and African Continental Bank exhibit steep declines or violent flunctuations in their X_3 values. Interestingly, most of the banks in the later group are currently out of operation.

It can, therefore, can be concluded that the ratio X_3 is a very apt indicator of the health of a firm.

4.4.4 *X_4 Values*

The values of X_4, which is the ratio of the market value of equity to book value of total debts was presented in Table 11.

X_4 shows how much the firm's assets can decline before the liabilities exceed the assets and the firm becomes insolvent. A firm with a value of equity higher than its total debt could withstand a much higher drop in its equity before it becomes insolvent compared to a firm with lower market value of equity. The ratio adds a market value dimension.

However, as can be seen in Table 4.12, some of the banks selected for this study are unquoted. It is, therefore, impossible to obtain market value of the equities of those banks. Even amongst the quoted banks in the sample, only 7 out of 22 were quoted as far as back as 1989. The others were quoted between 1990 and 1994.

In place of the market value of equity for the unquoted banks and banks that were unquoted as at 1989, values per share were calculated using the two (2) approaches defined in Section 2.5, namely: Assets Approach; and Earnings Approach. The values that appear closer to

TABLE 4.11: SUMMARY OF 'X'$_4$ VALUES FOR THE SELECTED BANKS FOR PERIOD 1989-94

S/N	NAME OF BANK	X4					
		1989	1990	1991	1992	1993	1994
1	LION BANK OF NIG. PLC	0.0000	0.0840	0.0834	0.0688	0.0889	0.0628
2	MERCANT. BANK OF NIG PLC	0.0018	0.0019	0.0022	#DIV/0!	#DIV/0!	#DIV/0!
3	INT'L MERCH. BANK PLC	0.0000	0.0000	0.0000	0.0000	0.1046	#DIV/0!
4	NAL MERC. BANK PLC	#DIV/0!	0.0000	0.0000	0.0000	0.1830	0.2145
5	ORIENT BANK OF NIG. PLC	#DIV/0!	#DIV/0!	0.0000	0.0000	0.0580	0.0495
6	OWENA BANK NIG. PLC	0.0707	0.0589	0.0361	0.0673	0.0725	0.0555
7	PROGRESS BANK PLC	0.0524	0.0508	0.0395	0.0174	0.0162	0.0144
8	TRANS INT'L BANK PLC	0.0000	0.0000	0.0000	0.0000	0.0000	0.1086
9	UNION BANK OF NIG. PLC	0.0290	0.0189	0.0112	0.0111	0.0075	0.0491
10	WEMA BANK PLC	0.0000	0.0000	0.0000	0.0000	0.0302	0.1543
11	TRADE BANK PLC	0.0000	0.0000	0.0000	0.1353	0.1158	0.0712
12	SAVANNAH BANK OF NIG PLC	0.5060	0.0493	0.0200	0.0201	#DIV/0!	0.0117
13	AFRI BANK PLC	0.0000	0.0000	#DIV/0!	#DIV/0!	0.0683	0.0049
14	ALPHA MERCH. BANK PLC	#DIV/0!	0.0000	0.0000	0.1442	#DIV/0!	#DIV/0!
15	ALLIED BANK OF NIG. PLC	0.0000	0.0000	0.0000	0.0000	0.0235	#DIV/0!
16	AFRICAN CONT'L BANK PLC	#DIV/0!	0.0000	0.0196	#DIV/0!	#DIV/0!	#DIV/0!
17	FIRST BANK OF NIG. PLC	0.0412	0.0328	0.0163	0.0112	0.0459	0.0502
18	INLAND BANK (NIG.) PLC	0.0000	0.0000	0.0000	0.0000	0.1082	0.1525
19	HIGHLAND BANK OF NIG PLC	0.0000	0.0000	0.0000	0.0000	0.0000	0.1805
20	FSB INT'L BANK PLC	#VALUE!	#DIV/0!	#DIV/0!	#DIV/0!	0.1781	0.1966
21	UNITED BANK FOR AFRICA PLC		0.0000	#DIV/0!	#DIV/0!	0.0000	0.0000
22	HABIB NIG. BANK LTD	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
23	BANK OF THE NORTH LTD	0.0000	#DIV/0!	0.0000	0.0000	#DIV/0!	0.0000
24	GAMJI BANK OF NIG. PLC	#DIV/0!	0.0000	0.0000	0.0000	0.0000	#DIV/0!
25	NIGERIA-ARAB BANK LTD	#DIV/0!	0.0000	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
26	CMB NIG. LTD	0.0000	0.0000	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
27	NIGERIA MERCH. BANK LTD	0.0000	0.0000	0.0000	#DIV/0!	#DIV/0!	#DIV/0!
28	NIGERIA INT'L BANK LTD	0.0000					
29	NEW AFRICA MERCH. BANK LTD						

TABLE 4.12: MARKET VALUES OF EQUITY FOR THE SELECTED BANKS FOR THE PERIOD 1989-94

S/NO	BANK	PER VALUE (K)	QUOTATION (K)					
			1989	1990	1991	1992	1993	1994
1	Afribank	50					160	116
2.	ACB	50			61-	67-	65-	50-
3.	Allied	50					62	80-
4.	Alpha Merchant	50				110+	110-	111
5.	First Bank	50	176+	144-	95+	96	471+	375-
6.	FSB Int'l Bank	50					77+	108-
7.	Highland	100						120-
8.	Inland	50					100	94-
9.	IMB	50					105+	103
10.	Lion	50		80-	75-	70	64	54-
11.	Merchantile Bank	50	10+	10+	10+	15-	12-	12-
12.	NAL Merch. Bank	50					330-	302-
13.	Orient Bank	50					70-	65-
14.	Owena Bank	50	75+	84-	70	53+	58+	57-
15.	Progress Bank	50	81+	106-	89-	57-	70-	70
16.	Savannah Bank	50	143+	136-	84-	74	64	64
17.	Trade Bank	50				102+	117+	98+
18.	Trans Int'l Bank	50						123+
19.	U.B.A	50	282+	207+	105+	74	54	194+
20.	U.B.N.	25	85	64+	44+	79	72	321-
21.	Wema Bank	50			96+	104-	72	371-

Source: Nigerian Stock Exchange, Lagos

\+ Values are as the end of the respective calender years.

the market values were taken as the 'market value per share'. Market values of equity for those banks were then obtained by multiplying the respective market values per share with the total capitalisation.

In practice, the actual market value of an equity could be much higher or much lower than the calculated value based on either the assets or earnings approach. This is due to the other extrinsic factors, such as information effect, labour unrest, technology effect, future of the firm, etc. which usually determines the market valuation. In fact, this was manifested in the significant differences between the market values of the equities for certain years and calculated values for other years. e.g. the calculated values per 50k shall for Allied bank for 1989, 1990, 1991 and 1992 were 367k, 128k, 77k and 33k respectively as shown in Tables 4.2,4.3, and 4.5. However, the actual market values for 1993 and 1994 were 62k and 80k as given in Table 4.12.

The wide differences between the calculated and market values per share introduces an unavoidable error in the determination of X_4 for unquoted banks and banks quoted after 1989.

Despite the above, it is observed generally that the values of X_4 for all the banks were extremely low. This is mainly due to low capitalisation and dis-proportionately high level of short term debts. Slight drops in their assets value could lead to insolvency. In fact, technically, all the banks could be classified as insolvent as at 1994.

The above finding aptly justifies the January, 1997 directive of the Federal Government to all banks in Nigeria to beef up their share capital to at least ₦500 million by the end of 1998. Presently, paid capital of some of the banks are as low as ₦50 million.

4.4.5 *X5 Values*

Table 4.13 presents the values of X_5 for the selected banks during the period 1989-94.

The capital - turnover ratio (X_5) illustrates the sales generating ability of a firm's assets. It is one measure of management's capability in dealing with competitive conditions.

A study of the results in Table 4.13 indicate that:

i) Like the other ratios, values of X_5 were also generally low. The highest value of this ratio was 0.3182 obtained for FSB International Bank Plc in 1994, indicating a far less than par contribution of assets to sales. The value of 40.866 for Alpha Merchant Bank in 1989 was ignored because it was due to the low total assets value employed in the calculation of X_5. Due to dearth of adequate data, only the fixed assets was used as the denominator as against total assets (see Table 4.2);

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TABLE 4.13: SUMMARY OF 'X_5' VALUES FOR THE SELECTED BANKS FOR PERIOD 1989-94

S/N	NAME OF BANK	X5					
		1989	1990	1991	1992	1993	1994
1	LION BANK OF NIG. PLC	0.0750	0.1630	0.1519	0.1671	0.1364	0.1753
2	MERCANT. BANK OF NIG PLC	0.1073	0.1965	0.1504	#DIV/0!	#DIV/0!	#DIV/0!
3	INT'L MERCH. BANK PLC	0.1708	0.2154	0.2651	0.2894	0.3913	#DIV/0!
4	NAL MERC. BANK PLC	#DIV/0!	0.1574	0.1751	0.1450	0.1803	0.2226
5	ORIENT BANK OF NIG. PLC	#DIV/0!	#DIV/0!	0.1507	0.1557	0.3208	0.1743
6	OWENA BANK NIG. PLC	0.1699	0.1529	0.1567	0.2182	0.3052	0.2595
7	PROGRESS BANK PLC	0.1042	0.1179	0.1526	0.1898	0.2139	0.1829
8	TRANS INT'L BANK PLC	0.0880	0.1406	0.1539	0.2055	0.2434	0.1718
9	UNION BANK OF NIG. PLC	0.1327	0.1537	0.1385	0.1131	0.1230	0.1332
10	WEMA BANK PLC	0.1302	0.1327	0.1557	0.1569	0.1675	0.1650
11	TRADE BANK PLC	0.1342	0.1636	0.2170	0.2338	0.3608	0.2461
12	SAVANNAH BANK OF NIG PLC	0.1437	0.1685	0.0953	0.0775	0.2209	0.2471
13	AFRI BANK PLC	0.2040	0.1937	#DIV/0!	#DIV/0!	0.1932	0.1815
14	ALPHA MERCH. BANK PLC	40.8616	0.1720	0.1727	0.3036	#DIV/0!	#DIV/0!
15	ALLIED BANK OF NIG. PLC	0.1824	0.1621	0.1315	0.1877	0.2694	#DIV/0!
16	AFRICAN CONT'L BANK PLC	#DIV/0!	0.1786	0.1370	#DIV/0!	#DIV/0!	#DIV/0!
17	FIRST BANK OF NIG. PLC	0.1356	0.1690	0.1391	0.1583	0.1829	0.1577
18	INLAND BANK (NIG.) PLC	0.0810	0.1026	0.2554	0.1872	0.2448	0.1836
19	HIGHLAND BANK OF NIG PLC	0.1235	0.1235	0.1064	0.1813	0.3267	0.1471
20	FSB INT'L BANK PLC	#VALUE!	#DIV/0!	#DIV/0!	#DIV/0!	0.1960	0.3182
21	UNITED BANK FOR AFRICA PLC		0.1009	#DIV/0!	#DIV/0!	0.1267	0.1497
22	HABIB NIG. BANK LTD	0.0890	0.1496	0.1601	0.1843	0.2402	0.1467
23	BANK OF THE NORTH LTD	0.1653	#DIV/0!	0.1469	0.1502	#DIV/0!	0.1670
24	GAMJI BANK OF NIG. PLC	#DIV/0!	0.1709	0.1421	0.1813	0.3106	#DIV/0!
25	NIGERIA-ARAB BANK LTD	#DIV/0!	0.1599	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
26	CMB NIG. LTD	0.1762	0.2436	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
27	NIGERIA MERCH. BANK LTD	0.1977	0.2078	0.1866	#DIV/0!	#DIV/0!	#DIV/0!
28	NIGERIA INT'L BANK LTD	0.1300					
29	NEW AFRICA MERCH. BANK LTD						

ii) Values of X_5 were on the average higher than those of X_1 to X_4 followed by X_3. This implies that the largest discriminant functions are X_5 and X_3 respectively.

On the surface, this order is the reverse of the findings of E.I. Altman's study of bankrupt and non-bankrupt firms, in which the scaled vectors indicated that the largest contributors are X_3, X_5 and X_4 respectively.

A further scrutiny of the results indicate that the reverse order is due to high cost of sales in the banks, since X_5 is X_3 plus a ratio of cost-of-sales to total assets.

In practise, this is a true reflection of what obtained in Nigerian banks during the period 1989-94, when banks introduced and sustained a regime of staggering salaries and fringe benefits for staff. Thus, setting the stage for subsequent failures.

4.4.6 ***Z Values***

Summary of 'Z' values for the selected banks during the period 1989-94 were presented in Table 4.14. The table indicate that Values of 'Z' ranged from a floor of 0.0768 for Lion Bank Plc in 1989 to a ceiling of 0.4020 for International Merchnat Bank Plc in 1993. It should be noted though that due to paucity of data, values of 'Z' for some of the banks could not be computed for certain years. But the results indicate that

TABLE 4.14: SUMMARY OF 'Z' VALUES FOR THE SELECTED BANKS FOR PERIOD 1989-94

S/N	NAME OF BANK	z					
		1989	1990	1991	1992	1993	1994
1	LION BANK OF NIG. PLC	0.0768	0.1676	0.1560	0.1708	0.1399	0.1792
2	MERCANT. BANK OF NIG PLC	0.1085	0.1666	0.1484	#DIV/0!	#DIV/0!	#DIV/0!
3	INT'L MERCH. BANK PLC	0.1745	0.2198	0.2697	0.1957	0.4020	#DIV/0!
4	NAL MERC. BANK PLC	#DIV/0!	0.1631	0.1804	0.1501	0.1885	0.2307
5	ORIENT BANK OF NIG. PLC	#DIV/0!	#DIV/0!	0.1785	0.1583	0.3249	0.1747
6	OWENA BANK NIG. PLC	0.1731	0.1553	0.1586	0.2217	0.2967	0.2611
7	PROGRESS BANK PLC	0.1085	0.1206	0.1550	0.1931	0.2172	0.1592
8	TRANS INT'L BANK PLC	0.0902	0.1439	0.1569	0.2101	0.2489	0.1751
9	UNION BANK OF NIG. PLC	0.1356	0.1564	0.1402	0.1144	0.1251	0.1350
10	WEMA BANK PLC	0.1329	0.1356	0.1586	0.1600	0.1711	0.1695
11	TRADE BANK PLC	0.1377	0.1666	0.2208	0.2394	0.3683	0.2504
12	SAVANNAH BANK OF NIG PLC	0.1492	0.1714	0.0984	0.0801	#DIV/0!	0.2461
13	AFRI BANK PLC	0.2082	0.1965	#DIV/0!	#DIV/0!	0.1963	0.0810
14	ALPHA MERCH. BANK PLC	#DIV/0!	0.1764	0.1768	0.3115	#DIV/0!	#DIV/0!
15	ALLIED BANK OF NIG. PLC	0.1848	0.1626	0.1313	0.1897	0.2742	#DIV/0!
16	AFRICAN CONT'L BANK PLC	#DIV/0!	0.1754	0.1323	#DIV/0!	#DIV/0!	#DIV/0!
17	FIRST BANK OF NIG. PLC	0.1382	0.1701	0.1405	0.1607	0.1860	0.1602
18	INLAND BANK (NIG.) PLC	0.0835	0.1054	0.2617	0.1914	0.2452	0.1874
19	HIGHLAND BANK OF NIG PLC	0.1273	0.1275	0.1091	0.1867	0.3282	0.1326
20	FSB INT'L BANK PLC	#VALUE!	#DIV/0!	#DIV/0!	#DIV/0!	0.2031	0.3273
21	UNITED BANK FOR AFRICA PLC		0.1027	#DIV/0!	#DIV/0!	0.1280	0.1509
22	HABIB NIG. BANK LTD	0.0909	0.1525	0.1632	0.1884	0.2456	0.1490
23	BANK OF THE NORTH LTD	0.1695	#DIV/0!	0.1490	0.1526	#DIV/0!	0.1669
24	GAMJI BANK OF NIG. PLC	#DIV/0!	0.1748	0.1441	0.1861	0.3168	#DIV/0!
25	NIGERIA-ARAB BANK LTD	#DIV/0!	0.1623	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
26	CMB NIG. LTD	0.1787	0.2495	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
27	NIGERIA MERCH. BANK LTD	0.2030	0.2144	0.1916	#DIV/0!	#DIV/0!	#DIV/0!
28	NIGERIA INT'L BANK LTD	0.1342					
29	NEW AFRICA MERCH. BANK LTD						

the values of 'Z' for those years were not likely to differ significantly from those obtained.

In the contemporary history of the banking industry in Nigeria, the years 1990 and 1993 were quite significant. While 1990 heralded the Prudential Guidelines, drastic socio-political and macro-economic factors adversely affected the banking industry in 1993. It is, therefore, significant to observe the changes in 'Z' values during the periods 1990-991 and 1993-94.

The results showed that in 1991, 'Z' values for 10 out of 20 banks fell from the levels in 1990. The affected banks were Lion; Mercantile; Union; Savannah; Allied; African Continental; First; Highland; Gamji; and Nigeria Merchant. Four out of these 10 banks, namely: Mercantile; Allied; African Continental; and Nigeria Merchant Bank are presently either terminally distressed or liquidated. Union, Savannah and First Banks posted huge losses in 1991.

Similarly, in 1994, values of 'Z' for 11 out of 16 banks declined from the levels in 1993. The affected banks were: Lion, Orient; Owena; Progress; Trans Interrnational; Wema; Trade; Afribank; first; inland;Highland and United. This result is a mixed grille. Some of the affected banks, namely First, United, and Afribank represent three of the four major banks in the country. This means that the turmoil of 1993 affected all category of banks.

Obviously, the above observed values of 'Z' are blurred. This may not be unconnected with the fact that whereas market values per share were used in the determination of market values of equity for some banks, calculated value per share had to be used for some banks and even the same banks in some years. In some cases, the variance between actual market value per share and calculated value were substantial. The resultant distortion, therefore, significantly affected the 'Z' scores. Another factor which affect a broader comparison is paucity of data limiting comparison of 'Z' values per share for 1990 and 1992 to only 16 out of 29 banks.

4.4.7. ***Test of Hypothesis***

According to the hypothesis for this study stated in section 1.6 of this report: 1) studies on predicting corporate failures have confirmed that the closer such studies are to the commencement of bankruptcy or failure of the firm, the more accurate is the prediction; and 2) according to Altman's Multiple Discriminant Analysis, firms having a 'Z' score of greater than 2.99 clearly fall into the "non-bankrupt" sector while those firms having a 'Z' below 1.81 are all bankrupt. That the area between 1.81 and 2.99 will be defined as the "zone of ignorance" or "grey area" because of the susceptibility to error classification.

In Nigeria, the present distress syndrome commenced in 1989 with the withdrawal of deposits of government and public sector from

commercial / merchant banks. The number of distressed banks also rose from 8 in 1990 to 28, 45 and 57 by the end of 1993, 1994 and 1995 respectively (section 2.2.2). Since this study was limited to the period 1989 to 1994, the criterion for validity of Altman's Model was satisfied. Therefore, the results could be regarded as accurately predictive of the health of the banks.

Also, Table 4.14 indicate that scores varies from 0.0768 to 0.4020 for the selected banks during the period 1989 to 1994. Testing these values with Altman's cut-off points of 'Z' greater than 2.99 for non-bankruptcy and 'Z' less than 1.81 for bankruptcy, all the selected banks would be classified as bankrupt.

Although this generalisation may appear too sweeping, the finding aptly captures the weakness of the banking sector in Nigeria characterised by poor working capital and poor capitalisation, low retained earnings and low assets turnover and high cost of sales. As a result, they are highly vulnerable to policy shocks and susceptible to vagaries of the operating environment as evidenced by changes in 'Z' values between 1989-1990, 1990-1991 and 1993-94. The finding also confirmed the concern of the Federal Government over poor capitalisation of the banking sector and its directive in early 1997 to all banks to raise their paid up capital to at least ₦500 million by the end of 1998 or have their licenses revoked. Adequate capitalisation would enhance working capital, earning power and reserves build-up.

Nonethelss, the wide variance between the range of 'Z' scores obtained in this study (0.0768 - 0.4020) and Altman's minimum for health (2.99) point to the possibility of other factor(s) for the low of ' scores for the banks. Firstly, it could be due to the fact that whereas Altman's study was focussed on manufacturing firms, this study was on banks. Differences in operating conditions in manufacturing and services sector could affect the range classification . Secondly, time could affect the range classification.

In conclusion, it can be stated that the hypothesis is applicable to the Nigerian banking sector to some extent by showing clearly, the indicators of distress and the level of their vulnerability.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

Cases of distress in the banking sector in Nigeria assumed an alarming dimension in the last eight years. The number of commercial and merchant banks adjudged distressed rose from 8 in 1989 to 28, 45 and 57 by the end of 1993, 1994 and 1995 respectively. The effect of the distress in the banking sector was so severe that by 1994, the nation's economy as a whole was threatened. As a result, Government had to intervene directly with the promulgation of the Failed Banks and Financial Malpractises Decree No. 18 of 1994 in order to stem the tide of spread of the effects.

The objective of this study titled, "Predicting Corporate Bankruptcy Using Multiple Discriminant Analysis: A Case Study of Selected Nigerian Banks" was undertaken to test the possibility of predicting accurately, failure potential prior to occurrence. The study was considered important because if the model proves successful, it could be applied not only to banks but also firms in other sectors of the economy for detecting failure potentials and acting appropriately to prevent such failures. This way, the high financial cost and psychological pains of corporate failure could be averted.

In carring out this study, a random sample of 29 banks were considered. The selected banks comprised commercial and merchant banks; quoted and private; and old and new. There was no stratification or bias in the selection. From the Audited Accounts of the selected banks during the period 1989-94 and information obtained from the Central Bank of Nigeria and the Nigerian Stock Exchange, values of 'Z' scores were computed for each of the banks for the period 1989-94. The 'Z' score was as profounded in E. I. Altman's Model for Multiple Discriminant Analysis, while Microsoft Excel computer software was employed in the computations.

Results of the study indicated that:

5.1.1. Values of X_1, a measure of the net liquid assets of the firm to total capitalisation were generally low (-8.2229 to 0.1254). Most of the banks that recorded serious deterioration in liquidity during the period are now out of operation e.g. Merchant Bank of Nig. Plc, Progress Bank of Nigeria Plc, Allied Bank plc, etc;

5.1.2 Values of X_2, a measure of cumulative profitability over time in relation to total capitalisation were on the averge higher for older banks which confirms the fact that the chances of failure are higher for new firms due to low reserves compared to older firms *ceteris paribus*. The low values of X_2 for all selected banks (-0.6716-0.509) is indicative of the vulnerability of the sector;

5.1.3 The highest value of X_3- a ratio of earnings before interest and taxes - being 0.2089 for FSB International Bank Plc in 1994 indicates low earnings power of assets in the banking sector. Also, healthy banks such as NAL, FSB, UBA, etc show rising or fairly steady values of X_3 over the years compared to the declining trend or violent fluctuation exhibited by ailing banks such as Alpha, Allied, Progress Bank, etc.

5.1.4 All the banks in Nigeria are poorly capitalised (paid-up capital of some Nigerian banks are as low as ₦50 million) as evidenced by the low values of X_4, which is a ratio of market value of equity to book value of total debts. This justifies the early 1997 directive of the Federal Government to all banks to raise their paid capital to at least ₦500 million by the end of 1998;

5.1.5 The capital turnover ratio (X_5) which ranged from 0.0750 for Lion Bank in 1989 to 0.3182 for FSB in 1994 represents far less than par contribution of assets to sales;

5.1.6 The 'Z' scores for the selected banks, which ranged from 0.0768 for Lion Bank in 1989 to 0.4020 for International Merchant Bank in 1993 are far from the mark of 'Z' value greater than 2.99 for non-bankruptcy and less than or equal to 1.81 for bankruptcy set by the Altman Model;

5.1.7 Due to paucity of data, values of 'Z' could not be computed for the entire study period for all the selected banks.

5.2 **Conclusions**

Based on the findings of this study, the following conclusions can be drawn, viz:

5.2.1 There are early warning signals for potential failure of a firm that can be detected from readily available data such as the Annual Accounts of the firm.

In the case of the E. I. Altman's Model of Multiple Discriminant Analysis employed for this study, the signals are the absolute values and trend in the values of such variables as X_1, X_2, X_3, X_4, X_5 (ratios of working capital to total assets, retained earnings to total assets, earnings before interest and taxes to total assets, market values of shares to book value of total debts and sales to total assets) and 'Z' - scores.

5.2.2 These signals can be used to predict fairly accurately, the prospect of bankruptcy in a firm. Results of this study indicate that most of the banks that recorded serious deterioration in their liquidity during the period under study (1989-94), namely Merchant Bank of Nig. Plc, International Merchant Bank Plc, Orient Bank of Nig. Plc, Owena Bank Nig. Plc, Progress Bank Plc, Trans International Bank Plc, Union Bank of Nigeria Plc, Afrbank Plc, Allied Bank of Nig. Plc, African Continental Bank Plc, First Bank of Nig. Plc, Highland Bank Plc, United Bank for

Africa Plc and Nigeria Arab Bank plc are currently either calssified as distressed to varying degree or have/or undergoing one form of re-engineering or other to enable them survive.

Furthermore, the extremely low range of 'Z' scores for the banks (0.0768 - 4020) compared to Altman's minimum of 2.99 for non-bankruptcy indicate poor health for all the banks.

The above important finding confirms and justifies Government's concern about the health of the banking sector and its recent directive to all banks to raise their paid-up capital to at least ₦500 million by the end of 1998, from the present low levels of aboutg ₦50 million for some banks; and

5.2.3 The detection of the early warning signals can lead to timely intervention by both owners and regulatory authorities to avert the prospect of bankruptcy.

The directive on enhancement of paid-up capital is one such interventionist measures open to the regulatory authorities and Government. Adequate capitalisation would enhance working capital, earnings power and reserves build-up capacity.

Similarly, the on-going internally initiated re-engineering in some of the banks are also logical responses to the threats of extinction facing the affected banks.

5.3. Recommendation

5.3.1 Regulatory Authorities should enforce the recent directive on minimum bank capitalisation of ₦500 million, which approximates the US$6.0 million minimum capitalisation required internationally. This requirement should also be indexed to the exchange rate of the Naira;

5.3.2 Government should exercise considerable fiscal discipline and monetary policy coherence so as to achieve sustained stability in exchange rates and other macro-economic parameters in order to minimise the contribution of exogenous factors associated with firm's bankruptcy;

5.3.3 Regulatory Authorities should deepen and broaden the controls and disclosure requirements to include higher ratios of working capital and reserves to total assets and lower ratios of book value of total debts to market value of equity;

5.3.4 Banks should strive to enhance the earning power of their assets by improving true productivity, minimising non-productive assets and controlling costs of sales. They should also strive to improve the sales generating ability of their assets. This can be attained through diversification, synergies and continously listening to the voice of their customers to enhance quality and delivery of services. Bureaucracy, indolence and complacence must give way to continous improvements

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in existing processes, methods and procedures. Banks should also embrace technology, especially advances in telecommunications and computers and adapt them to their operations optimally; and

5.3.5 In order to consolidate the findings of this work, other researchers and the Regulatory Agencies should expand the horizon of this study by covering the entire banks in the country and extending the study period to 1989-96.

It is particularly recommended that the Central Bank of Nigeria and Nigeria Deposit Insurance Corporation should undertake this study. This is informed by;

i) the unhindered access of these organisations to information regarding banks in Nigeria; and

ii) the potential contribution of the wider picture expected to emerge in the expanded study in setting, monitoring and enforcing the standards and disclosure requirements recommended in 5.3.3.

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