AN EVALUATION OF QUANTITATIVE PROCEDURES FOR COMMERCIAL LOANS IN NIGERIA

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DECLARATION

I hereby declare that this thesis has been written by me and that it is a record of my research work. All materials consulted and used in the study have been acknowledged by means of references and bibliography.

A.M. ABU-ABDISSAMAD

CERTIFICATION

This thesis entitled ***An Evaluation of Quantitative Procedures for Commercial Loans in Nigeria*** by Abdullahi Musa Abu-abdissamad meets the regulation governing the award of Doctor of Philosophy degree of Ahmadu Bello University, Zaria and is approved for its contributions to knowledge and literary presentation.

Chairman, Supervisory Committee	25/4/2001 **Date**
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DIGITIZED

DEDICATION

This work is dedicated to all Muslims struggling to liberate humanity from the shackles of devastating interest based banking system that has been impoverishing developing nations.

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ABSTRACT

The problem of bad debt Josses in the Nigerian banking industry compelled the monetary authorities to close down some banks in the 1990s. This trend called for a study that would halt the trend. This study is an attempt to respond to this call. The specific objective of the study was to evaluate and examine the procedures, which commercial banks employ to evaluate commercial loan proposals.

A descriptive/survey research method was adopted for the study. Questionnaire and documentary sources constituted the main instruments used to collect relevant data for the study. The responses to the questionnaire were analyzed. The chi-square statistic and correlation analysis were used to test the hypotheses formulated for the study.

The findings showed that: ratio analysis was about the only quantitative technique Nigerian commercial banks staff employed in evaluating commercial loan proposals; other quantitative techniques such as MDA, logit, or LGP were not used by virtually all bankers; and there was significant relationship between academic qualification of managers/bank officials and their ability to adopt quantitative analysis for classifying commercial loan proposals.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Increasing bad debt losses characterized the Nigerian banking industry within the last two decades. Several hypotheses were put forward to explain the phenomenon. These included political instability occasioned by the annulment of June 12, 1993; implementation of various facets of the International Monetary Fund (IMF) conditionalities such as devaluation of local currency (Naira), trade liberalization, and the withdrawal of petroleum subsidies.

The political instability could be viewed from two-dimensional perspectives: the international and the national levels. The international business communities were hesitant in making substantial investments in Nigeria because of the frequent changes in the country's leadership. For example, the British business community would find it difficult to forget the change of leadership of the country from General Gowon to General Murtala because of the impact of Murtala administration policies upon British businesses such as Shell BP. The Murtala - Obasanjo's regime nationalized the Shell BP because of the company's association with the

apartheid regime in South Africa. At the national level, Adewusi (1994) observed that the Nigerian economy was characterized by very low performance in the productive sectors in 1993 because of the political impasse occasioned by the unsuccessful attempt to enthrone a democratic government in the country. Similarly, Ndiokho (1994) was of the opinion that the year 1994 was difficult politically and economically with series of politically motivated strikes leading to a loss of eight working weeks due to political uncertainties.

Toward the end of the second republic (1979-1983), the Nigerian government was faced with debt - service problem and this forced the Shagari administration to seek some aid from the International Monetary Fund (IMF). The Buhari administration took over the government in January, 1984 before any meaningful agreement with the IMF could be reached. Like Shagari administration, Buhari administration also failed to reach an agreement with the Fund before the take-over of government by Major General Ibrahim Badamasi Babangida in August, 1995.

The main factors that were responsible for the deadlock in the IMF loan negotiation were hinged on the three irreducible minima conditionalities

of the IMF, which included the devaluation of the naira, trade liberalization, and the removal of petroleum subsidies.

The last two decades witnessed rapid changes in the political economy of Nigeria. These changes were characterized by economic and financial reform programmes. The most spectacular of these being the significant movement by government to expand the use of market forces in shaping production and distribution patterns and the reduction of direct government ownership and control of the productive system.

One of the leading authorities in the financial sector of the economy and the former Governor of the CBN, Ahmed (1984) was of the opinion that the operation of the regulated economy prior to the decade under study caused the distortions in the nation's economy whose effect came to limelight in the wake of the glut in the world oil market in 1981.

Before the oil boom of the 1970s, earnings from farm produce such as groundnut, cotton, cocoa and rubber met the country's foreign exchange needs. But the arrival of the oil boom blindfolded the government to the extent that even self-sufficiency in food production was no longer considered

as something important enough to attract serious attention from the government. The government began to import food and agro-based raw materials to supplement the dwindling local production instead of redirecting her attention to the development of agricultural sector. Thus, Nigeria became so heavily import-dependent in her production and consumption patterns that she found it extremely difficult to adjust to her reduced foreign exchange earnings occasioned by the slump in the oil market.

In facing the challenge posed by the dwindling earnings from crude oil, the Shagari administration adopted stringent trade and other economic control measures to manage the external shocks caused by oil glut and perceived internal distortions. These control measures were embedded in the Economic Stabilization Act of April 1982 popularly referred to as "Austerity Measure". Despite all these control measures, total import bill increased from an average of ₦6.3 billion in 1975-79 to ₦8.5 billion in 1980-85 and the external debt outstanding increased from a paltry sum of $3.4 billion in 1980 to a staggering sum of $17.3 billion in 1985. During Buhari regime, two major strategies were adopted for the purpose of addressing the internal distortions in the Nigerian economy. The two

strategies were the counter-trade and the commitment of over 40 percent of the nation's foreign exchange earnings to debt repayment.

The counter-trade was a strategy of trade finance used by the Buhari administration to pay for the importation of raw materials, machinery, spare parts and consumer goods with the shipment of equivalent value of crude oil. The Buhari administration decided to use 44 kobo for every ₦1.00 earned to service and repay the debt.

On seizing power from Buhari in 1985, Babangida terminated the two-year old IMF loan negotiation which started toward the end of the second republic (1979-1983), and embarked on a number of structural changes in the political economy of the country particularly in the financial sector. These changes included the permission for the operation of domiciliary foreign currency account scheme (1986), establishment of foreign exchange market (1987), introduction of bureaux de change (1989), licensing of primary mortgage institutions (1989), withdrawal of public sectors funds from commercial and merchant banks (1989), privatization of 12 banks in which the Federal Government was the largest shareholder (1989), establishment of People's Bank (1989), and Community Bank

(1990), issuance of prudential guidelines (1990), promulgation of the Central Bank of Nigeria Decree No.24 of 1991 and Banks and other Financial Institutions Decree (BOFID) No.25 of 1991, suspension of licensing of new banks (1991), the re-introduction of interest rate control which pegged interest rate on loans and advances to a maximum of 21 per cent (1991), the raising of the minimum capital base of commercial and merchant banks to ₦ 50 million and ₦ 40 million in the BOFID (1991) respectively, and deregulation of the foreign exchange market by merging the official with the parallel exchange rate of the naira to the US dollar (1992), among others.

1.2 Statement of the Problem

The survival of every commercial bank depends on its ability to manage its loans and advances portfolio. However, the commercial banks had been disclosing higher classified accounts and bad debt losses within the last two decades (see table 1.1 p.17). This problem of bad debt losses had led to the closure of a number of banks beginning with the National Bank of Nigeria Limited. Furthermore, several other commercial banks were classified as "distressed banks" by the monetary authorities. All of these failed and failing commercial banks had bad debt losses as their central problem.

While numerous bank customers rushed to their banks to withdraw their deposits in the wake of circulating lists of distressed banks, others just decided not to deposit their money in the banks. In other words, some bank customers decided to keep their money at home rather than in the banks. These customers' decisions drastically reduced the ability of the banks to grant credit facilities in the quantum demanded by the investing business enterprises. Consequently, the business organizations were forced to cut down their production levels and retrench some of their valued staff. The ripple effect of this capacity under-utilization was the increasing rate of unemployment with its attendant social problems manifested in increased wave of armed robbery and political thuggery (e.g. "Lagos Area Boys").

1.3 Research Questions

Having identified bad debt losses as a major problem that confronted commercial banks during the period covered by this study, could these high bad debt losses be attributed to the objectives of lending, or/and poor evaluation of commercial loan applications? This question is pertinent to this study because there was intense competition among the banks in the areas of deposit mobilization and project financing. This competition appeared to be geared toward growth in size and "profit". This objective could easily influence credit standards of banks pursuing it. High bad debt

losses could also be associated with the tools used to evaluate commercial loan applications.

In order to investigate the influence of lending objective and the tools used to evaluate loan proposals upon high bad debt losses, the following research questions were raised:

a) Why do commercial banks evaluate commercial loan proposals?

b) What quantitative techniques do commercial banks use in evaluating commercial loan proposals?

c) Do academic qualifications of commercial bank staff influence their ability to adopt quantitative techniques in classifying commercial loan proposals?

d) To what extent does the predictive ability of the quantitative techniques influence the classification of the commercial loan proposals into accepted and unaccepted categories?

e) What qualitative (non- quantitative) techniques do commercial banks use in evaluating commercial loan proposals?

1.4 Purpose of the Study

The overall purpose of this study was to investigate the relationship between bad debt losses and the techniques used to evaluate commercial loan proposals in Nigeria. The specific objectives were:

(a) to ascertain the reasons that inform commercial banks' evaluation of commercial loan proposals.

(b) to identify quantitative techniques commercial banks use in the evaluation of commercial loan proposals.

(c) to investigate the relationship between academic qualifications of commercial bank staff and their ability to adopt quantitative techniques in classifying commercial loan proposals.

(d) to investigate the relationship between the predictive ability of the quantitative techniques and their influence in the classification of commercial loan proposals.

(e) To identify qualitative(non-quantitative) techniques commercial banks use in evaluating commercial loan proposals.

1.5 Hypotheses

We developed five hypotheses to empirically determine the relationship between bad debt losses and the quantitative techniques adopted to evaluate the loan proposals.

Hypothesis 1: There is no significant relationship between the academic qualification of the commercial banks staff and their ability to adopt ratio analysis in classifying commercial loan proposals.

Hypothesis 2: There is no significant relationship between the academic qualification of commercial banks staff and their ability to adopt MDA in classifying commercial loan proposals.

Hypothesis 3: There is no significant relationship between the academic qualification of commercial banks staff and their ability to adopt Logit Model in classifying commercial loan proposals.

Hypothesis 4: There is no significant relationship between the academic qualification of commercial banks staff and their ability to adopt linear goal programming (LGP) in classifying commercial loan proposals.

Hypothesis 5: There is no significant correlation between quantitative techniques adopted by commercial banks and their classification of commercial loans.

1.6 Significance of the Study

The liquidity crises that became the hallmark of nearly all banks in Nigeria and the incidence of distressed and failed banks necessitated a study of this nature in order to restore customers' confidence in the banking industry. Therefore, the findings of this study would be of immense benefits to the customers.

The banking industry could benefit significantly from the findings of this investigation, because of the negative impact of bad debt losses upon banks. Virtually all banks declared as "distressed banks" or "failed banks" had bad debt losses as their central problem. Thus, a research work

designed to study the procedures for evaluating commercial loan proposals could identify weaknesses inherent in the existing procedures and recommend methods for overcoming them. Additionally, credit officers desiring to improve upon their ability to analyze commercial loan proposals would benefit from the credit screening models discussed in this study.

The findings of this study could also be useful to monetary authorities. Some of the recommendations could be incorporated into the CBN credit guidelines to plug some of the existing loopholes some banks and their customers currently exploit.

To the academia, the study might not only contribute to the existing knowledge on the subject area but also open a new frontier for in-depth research into establishing relationships between some other quantitative methods and banking operations. The findings of these future studies might increase objectivity in the accept-reject decisions in respect of commercial loan proposals.

1.7 Scope the Study

The boundaries of this study were defined in terms of three variables. These variables include the period of investigation, the environment in which the research data were collected and the type of banks investigated.

The time frame of the study spanned over a period of two decades (1979 - 1998). This period was chosen because it witnessed significant revolutions in the Nigerian banking industry. The period was characterized by regulated, deregulated and a reverse to regulated banking policies. The period also witnessed the greatest expansion of banking industry not only in terms of number of banks but also the branch network of commercial banks.

Thirty banks located in 14 towns were included in the sample. These towns were chosen in different parts of the country to give the study a good geographical spread.

The investigation was restricted to commercial banks because they dominated commercial loan activities during the period covered by this study. Other banks such as development banks, merchant banks and community banks were not covered by this study.

1.8 Limitations of the Study

The major limitations of this research work included inadequate financial resources at the disposal of the researcher and the time constraint. Another limiting factor was the unwillingness on the part of the respondents to supply certain data which could have improved the findings of the study.

1.9 Definition of Terms

Below are the operational definitions of the key terms used in this study.

Failed Firm: is the one in which any of the following events has occurred: bankruptcy, bond default, overdrawn bank account, or non-payment of preferred stock divided.

Univariate Analysis: is the method of applying financial ratio analysis to evaluate the credit worthiness of prospective customers on a "one-at-a-time" basis.

First Year Before Failure: is that year included in the most recent financial statement prior to the date that the firm failed. For example,

if a firm failed in 1993, and its most recent financial statement was prepared on December 31, 1992, the first year before failure would include the 1992 statements and the third year before failure would include 1990 statements.

Profile Analysis: is the comparison of the mean of the ratios of the failed firms with those of the non-failed firms in each of the years before failure.

Illiquidity: is the inability of a business to obtain additional funds from its traditional borrowing sources without prohibitive interest rates.

Industry-Relative Ratio: is a firm's financial ratio relative to the mean value for that ratio in the firm's industry at a point in time.

Multiple Discriminant Analysis: is a statistical technique used to determine the variables that distinguish several *a priori* groups and to classify observations into one of these groups.

Distressed Banks: these are banks with problems relating to liquidity, poor earnings and non-performing assets. The climax of it could be a condition of insolvency which implies inability to pay debts or meet maturing obligations as they become due.

1.10 Abbreviations

IMF	International Monetary Fund
CBN	Central Bank of Nigeria
BOFID	Banks and Other Financial Institutions Decree
SBA	Small Business Administration
RMA	Robert Morris Associates
MDA	Multiple Discriminant Analysis
LGP	Linear Goal Programming
CAM	Credit Analysis Model
NCUA	National Credit Union Administration
LDA	Linear Discriminant Analysis
C.O.T	Commission on Turnover

Table 1.1 Trend of Bad Debt Losses in Nigerian Commercial Banks: The case of the "Big Three"

First Bank of Nigeria Plc					
	1989	1990	1991	1992	1993
	N 000	N 000	N 000	N 000	N 000
Share Capital (SC)	80,699	80,699	80,699	80,699	107,599
Bad & Doubtful Debt (B&D)	268,926	201,334	394,450	522,733	329,169
Ratio of B&D: CS	3.3324	2.4949	4.8879	6.4776	3.0592
United Bank for Africa Plc					
Share Capital (SC)	75,000	75,000	100,000	100,000	100,000
Bad & Doubtful Debt (B&D)	35,655	69,500	390,524	455,123	741,424
Ratio of B&D: CS	0.4754	0.9267	3.9053	4.5512	7.4142
Union Bank of Nigeria Plc					
Share Capital (SC)	63,504	63,504	79,380	79,380	79,380
Bad & Doubtful Debt (B&D)	99,062	152,710	252,369	432,027	212,232
Ratio of B&D: CS	1.5599	2.4047	3.1792	5.4425	2.6736

Sources: Various Annual Reports and Accounts of First Bank of Nigeria Plc, United Bank for Africa Plc, and Union Bank of Nigeria Plc

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Ndiokho, B.U. (1994). United African Company (UAC) Plc. 1994 *Annual Reports and Accounts*.

First Bank of Nigeria (FBN) Plc, *Annual Reports and Accounts* for 1989-1993.

United Bank for Africa (UBA) Plc. *Annual Reports and Accounts* for 1989-1993.

Union Bank of Nigeria (UBN) Plc, *Annual Reports and Accounts* for 1989-1993.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The studies reviewed in this chapter dealt with different techniques lending institutions normally employed to evaluate commercial loan proposals for the purpose of minimizing possible bad debt losses. Sections 2.2 through 2.5 discussed the concept and functions of commercial banks, and their intermediary roles between the surplus and the deficit sides of the economy. Sections 2.6 through 2.12 reviewed various studies which used financial data to predict an enterprise becoming financially distressed. Specifically, the review focused on the empirical studies that examined the utility of accounting information in predicting corporate bankruptcy. The criticisms and the limitations of the various corporate failure predictive techniques were discussed in section 2.13. Section 2.14 was the summary of the chapter.

2.2 Concept of Commercial Banks

Banks hold a unique position in capitalist economies. They are major intermediaries between savers and investors and between producers and consumers. Most importantly, they are the principal instruments through

which governments effectuate monetary policy. According to Lissakers (1984) lending by banks creates most of the money supply.

The modern financial system includes a variety of institutions in which individuals and groups can place funds. Many of these institutions go under the general term "banks" - thus we speak of commercial banks, mortgage banks, development banks, industrial banks, peoples banks, community banks, and so on.

Although the commercial bank has many features in common with other financial institutions, it is the only institution that accepts demand deposits subject to withdrawal by the owner or transfer to a third party by a means of a cheque. Deposits at other financial institutions do not circulate as money, as do those at commercial banks.

There are various definitions of the term "commercial bank" in the literature. For instance, Shapiro, Solomon, and White (1968) assert that the term "commercial bank" is used to describe all banks that offer demand deposits. In the same vein Kent (1956) opines that a "commercial bank" is distinguished by the fact that it receives deposits from the general public that

are repayable on demand upon the written orders of the individual depositors. Section 61 of Decree No.25 of 1991 defines a "commercial bank" as any bank in Nigeria whose business includes the acceptance of deposits withdrawable by cheques. In line with Decree No.25 of 1991, Hill and Sartoris (1992) assert that a commercial bank is defined by law as a depository institution that takes deposits and makes business loans.

From these definitions, one unique characteristic of a "commercial bank" is its acceptance of deposits withdrawable by cheques. Other financial institutions may be accepting deposits, but the depositors cannot withdraw them on demand through issuance of cheques.

2.3 Functions of a Commercial Bank

Shapiro, Solomon, and White (1968) broadly categorized the functions of commercial banks into two: the money-creating functions and the service-rendering functions. The money-creating functions include buying and selling of evidence of debt (e.g. loans), while their service-rendering functions include collecting cheques and drafts for their customers; and providing facilities for domestic and foreign remittances.

Commercial banks provide facilities for the pooling of savings through the acceptance of deposits from the public and then making these

funds available for economically and socially desirable purposes. A commercial bank accepts three major kinds of deposits from its customers. These include savings deposits, current account deposits, and fixed deposits. Savings deposits are those on which the bank pays small interest to the depositors who are usually small savers. Mostly corporate bodies, businessmen, and salary earners maintain current accounts deposits. They can withdraw any amount standing to their credit by cheques without notice. Savers who do not need money for a stipulated period maintain fixed deposits; say from 6 months to longer periods. The bank pays a higher rate of interest on such deposits. These pooled funds are thus, made available to investing publics who may use them for the expansion of their productive capacity and to consumers for such items as housing, vehicles and other consumer goods.

Another important function of a commercial bank is the provision of a payments mechanism or the transfer of funds. But this function is yet to assume its rightful position in the Nigerian economy because of the poor banking habits of an average Nigerian, coupled with the fraudulent tendencies among Nigerians (Ekezie, 1997).

Extension of credit to worthy customers or borrowers is one of the primary functions of a commercial bank. A commercial bank lends a certain percentage of the cash lying in deposits on a high interest rate than it pays on such deposits.

Commercial banks provide international banking services to facilitate foreign trade and travels. For instance, a Nigerian importer may encounter a situation where his foreign business partners are unwilling to ship the goods without adequate arrangement for payments. The proper arrangement could be obtained from the foreign exchange section of a commercial bank. This section can issue a commercial letter of credit - which is a written statement on the part of the commercial bank to an individual or firm guaranteeing that the bank will accept and pay a draft up to a specified sum, if presented to the bank in accordance with the terms of the letter of credit (Ekezie, 1997).

Finally, the most important function of commercial banks is the creation of credit or money (Shapiro, Solomon, and White, 1968). It is this function that distinguishes commercial banks from other financial institutions. The creation of credit is accomplished by the lending and

investing activities of commercial banks in cooperation with the CBN. When a bank advances a loan, it opens an account in the name of the borrower and does not pay him in cash but allows him to draw the money by cheque according to his needs. By granting this loan, the bank creates credit or money. The CBN uses various monetary control mechanisms to check the money creation ability of Nigerian commercial banks. Such mechanisms include reserve requirements, cash ratio, liquidity ratio, and stabilization securities.

2.4 Commercial Bank Lending

The loans of commercial banks may be classified on the basis of what borrowers intend to do with the money they obtain. Campbell and Campbell (1972), and Kent (1972) suggest six major classes and they include: business loans, farm loans, loans for the purchasing and carrying of securities, consumer loans, home mortgage loans, and a miscellaneous class including inter bank loans, direct loans to governmental bodies, and loans granted by banks to their own officers and employees.

The survival and ability of commercial banks to compete depend on their ability to profitably manage credit risk. Lending is based on the two

fundamental products of banking: money and information. Banks obtain these products from customers themselves by offering customers valuable services. They package money and information about their borrowers together with valuable banking services to create loan agreements and then sell the loan agreements back to their customers.

2.4.1 Credit Philosophy and Culture

Managing credit risk requires a clear credit philosophy in order to set management priorities with respect to the marketplace. The credit philosophies of banks may range from an emphasis on consistent performance of the highest quality loan portfolio based on highly conservative underwriting standards to an emphasis on aggressive loan growth and market share with highly flexible underwriting standards (Hampel and Simonson, 1999).

The credit philosophy and loan policy of banks must be supported and communicated with an appropriate credit culture. An effective credit culture exists when the actual behaviour of every individual in the loan organization is closely aligned with management's priorities.

2.4.2 Credit Risk Management Strategy

The risk connected with lending to business depends on several factors. For any particular type of business the risk of failure is affected by the state of the economy, trends in the demand for the product or service provided, competition and technological changes. According to Henderson (1988), the risk of business failure increases if:

a) financial resources are too limited;

b) suitable labour and equipment are not available;

c) raw materials or other supplies are difficult to obtain; and

d) technical, marketing, or managerial skills are lacking.

Thus, in commercial lending the commercial banks need to take a view about the kind of business the customer is involved in and need to judge whether the customer has enough of all the necessary skills and resources to make the risk acceptably low.

If a bank advances credit to only the strongest customers, it will experience only small amounts of bad debt losses. On the other hand, it will probably lose some profitable lending opportunities, and the profit it foregoes on these lost lending opportunities may be greater than the costs it

avoids. To determine the optimal credit standard, the bank may relate the marginal costs of credit to the marginal profits on the increased advances to customers (Hempel and Simonson, 1999). Marginal costs include default or bad debt losses; higher investigation and collection costs; etc. Since credit costs and credit quality are correlated, it is important to be able to judge the quality of a customer in terms of the probability of default. Probability estimates are usually subjective, but an experienced credit manager can make reasonably accurate judgments of the probability of default by different classes of customers.

2.4.3 Analysis of Credit Selection Risk

Credit selection is the process of assessing the risk of lending to a customer. This section evaluates risk against benefits the bank expects to derive from making the loan. The direct benefits are the interest and fees earned on the loan; and the deposit balances required as a condition for the loan. Indirect benefits may include the initiation or maintenance of a relationship with the borrower that may provide the bank with increased deposits and demand for a variety of bank services.

Selection risk has both qualitative and quantitative dimensions; the quantitative dimensions are generally more difficult to assess. Qualitative risk assessment consists a number of steps which include gathering information on the borrower's record of financial responsibility, determining the borrower's true purpose for borrowing funds, identifying the risks confronting the borrower's business under future industry and economic conditions, and estimating the degree of commitment the borrower is expected to have regarding repayment. The quantitative dimension of credit risk assessment consists of the analysis of historical financial data and the projection of future financial results to evaluate the borrower's capacity for timely repayment of the loan and the borrower's ability to survive possible industry and economic reversals (Hempel, and Simonson, 1999). The essence of credit selection analysis can be captured in four basic credit factors or line of inquiry.

2.4.3.1 Borrower's Character

Character has to do with the probability that a customer will try to honour his obligations. Will the customer make an honest effort to pay the debts, or is he likely to try to get away with something? Experienced credit managers frequently insist that character is the most important issue in credit evaluation (Weston and Copeland, 1988). In other words, the paramount factor for a successful loan is the honesty and goodwill of the borrower.

Dishonest borrowers do not feel morally committed to repay their debts. A determined, skilled, and dishonest borrower can get credit through misrepresentation since loan officers do not have enough time to evaluate and uncover elaborate schemes to defraud the bank.

It is important to note that default is not always a function of dishonesty. There are other important factors that can influence non-repayment of loans. These factors include intelligence, managerial skills and instincts.

The greatest problem credit officers face in the course of their duty is how to discover the true quality of a borrower's business or project. Even competent and essentially honest borrowers are motivated to represent their plans and prospects in the best possible light when they are applying for funding. Thus, the credit officer tends to receive only part of the information needed to make a balanced credit decision. More than any other factors, it is this asymmetry in credit information volunteered by borrowers that compels credit officers to analyze other more objective information.

The bank must protect itself from dishonest and incompetent borrowers by thoroughly investigating the borrower's credit background. The borrower's previous relationships can be evaluated from the records of the bank or past banking relationships with other banks (Desmond and Fitzgerald 1986). If the borrower has built a record of prompt payment of interest and principal, it is likely that future loans will be similarly serviced. If the borrower has been habitually late in paying past debts, then the reasons for such behaviour should be identified. If references from previous creditors indicate that the customer has been defaulting, then the credit officer should almost automatically reject the application.

2.4.3.2 Purpose of the Loan Funds

In many commercial loans, the purpose for which the loan funds will be used is frequently not very clear to the credit officer. A banker should never accept vague generalizations such as: we need the loan for normal trade requirements (Desmond and Fitzgerald, 1986). In fact, determining the true need and use for funds requires good analytical skills in accounting and financial management. An understanding of the loan's intended use helps the analyst to understand whether the loan request is reasonable and acceptable.

As a rule of thumb, most commercial loans are made for current asset additions to working capital. But the specific purpose for the loan may be substantially different. For instance, the loan proceeds may actually provide emergency funds to pay overdue accounts to suppliers, or may replace working capital that was depleted through operating losses. The credit officer should also determine whether working capital needs are seasonal or permanent. Assets financed by term commercial loans should meet the legitimate needs of the customer's business. An asset purchased in hope of profiting from its resale is speculative. Banks do not advance loans for such a purchase because it does not contribute to the economic needs of the business.

2.4.3.3 Main Source of Repayment

The analyst's accounting and financial management skills are crucial in determining the borrower's ability to repay a loan from cash flow. For seasonal working capital loans, cash flows are generated by means of orderly liquidation of the seasonal buildup in inventories and receivables. In term loans, cash flows are generated from earnings and non-cash expenses charged against earnings (e.g. depreciation). The credit officer must

ascertain the timing and sufficiency of these cash flows and evaluate the risk that cash flows may fall short. Sources of repayment other than cash flows from operations should be viewed with caution. The borrower may plan on a future injection of investor capital to repay the loan. This is feasible only if the business is able to produce attractive profits, otherwise the investors will withhold future investment in the firm.

2.4.3.4 Other Sources of Repayment

Generally, cash flows from business operations are the most dependable source of loan repayment. However, if sufficient cash flows fail to materialize, the bank can prevent a loss if it has secured a secondary source of repayment.

Collateral should always be viewed as a secondary, not the main, source of repayment. Banks always try to avoid foreclosing on collateral because foreclosure entails much time and expense. Collateral value should cover the principal and interest due, the legal costs of foreclosure and interest during foreclosure proceedings. Collateral is about the best secondary source of repayment.

Another secondary source of repayment is guarantor. However, collection from guarantor often requires expensive litigation and results in considerable ill will between the bank, customer, and guarantor.

2.4.4 Sources of Credit Information

The objective of credit investigation is to acquire enough information to determine the commercial loan applicant's willingness and capacity to service the proposed loan. The investigation should assist the analyst to understand the nature of the borrower in terms of the four basic credit factors: the borrower's character, purpose of the loan funds, main source of repayment, and other sources of repayment. There are three main sources of information. These include customers, internal sources, and external sources available through institutions outside the bank.

2.4.4.1 Customer Interview

In spite of the possible dishonesty, the loan customer still provides the most important information needed in a credit investigation. The borrower must indicate the purpose, type, and amount of loan requested, designate the proposed source and plan of repayment, provide proforma financial data, identify the collateral or guarantors, name other previous and current

creditors, list primary customers and trade suppliers, identify the firm's accountant, indicate the principal officers and shareholders, and give personal and business histories. The borrower also should provide documents needed to establish the lending relationship, including such items as the latest three or more years of business financial statements, personal financial statements, personal income tax returns, borrowing authorities, evidence of insurance, and continuing guarantees (Hempel and Simonson, 1999).

Lenders can gather a lot of information using well-planned questions such as:

What are the characteristics of the borrower's market?

What is the production process?

Does the firm have any labour relations problems?

How important is price, quality, or service in selling the product?

Who are the principal owners and executives, and what are their experience and educational background?

These and related questions can serve to build the credit officer's comprehensive grasp of the strengths and weaknesses of a loan applicant.

2.4.4.2 Internal Bank Sources of Information

If a loan customer has existing relationships with the bank, then a great deal of information may be internally available to the bank about the customer's willingness and capacity to service the proposed loan. The credit officer should study the credit files on any current or previous borrowings, examine the borrower's current account operations, and review other deposits previously or currently held. These sources will indicate the degree of the bank's satisfaction with past payment performance, and they may reveal any tendency to overdraw deposit accounts.

2.5 Types of Commercial Loans

Bank loans are highly flexible and diverse but they can still be fairly classified according to their maturity, type of collateral, and other special features. In general, four different types of bank loans can be identified. They include short-term loans, bridge loans, revolving credit loans, and term loans.

2.5.1 Short-Term Loans

Any business loan having an original maturity of one year or less is a short-term loan (Kent, 1972) and commercial banks occupy second position

in the supply of short-term loans to business firms (Schall and Haley, 1986). According to Hempel and Simonson (1999), well over half of bank commercial loans are made for a short term, and most of these loans are for financing increases in inventory for seasonal borrowers. The loan is repaid when the borrower's inventory is sold and its receivables are collected.

Retailers and manufacturers are regular users of seasonal working capital lines of credit. Martin, Petty, Keown and Scott, Jr. (1979) and Weston and Brigham (1981) define a line of credit as an informal agreement or understanding between the borrower and the bank as to the maximum amount of credit which the bank will provide the borrower at any one time. Through a line of credit, a bank indicates its intention to provide credit up to the amount of the line. The credit officer analyzes borrower-prepared projected monthly balance sheets and income statements. The projections should show the need for loan to finance seasonal bulges in working capital as inventory, sales, and receivables expand in sequence. This sequence is referred to as the working capital cycle. The projections should also reveal the expected peak loan need, the link between bank and supplier credit, and the time of the bank's maximum reliance on inventory support of its loan.

2.5.1.1. Facility

A loan facility is defined as the structure and terms established in a loan agreement. In the case of lines of credit, the facility is very flexible and overcomes the need to extend a series of short-term loans. The borrower takes down only part of the line as the need arises and this saves the borrower from borrowing redundant funds.

A letter of agreement may be used to specify the line amount; define how the proceeds against a line are to be used; restrict the use of funds for other purposes, such as the purchase of fixed assets; and spell out the expiration date. If the borrower's soundness deteriorates, lines of credit are subject to reduction or even cancellation.

Line-of-credit borrowings are often secured with inventory, accounts receivable, or fixed assets. The use of a formula for advancing funds against a borrowing base is not normal for seasonal borrowing. However, the bank must be concerned with the quality of receivables as the inventory is sold. This concern requires an understanding of the customer's credit policy, including how the customer checks on the credit of its own

customers, how it sets customers' credit limits, and its collection procedures.

2.5.2 Bridge Loans

Another type of short-term loan is the bridge loan. Such loans can be thought of as project-type loans that bridge a period of time up to a specific event that generates sufficient funds for repayment of the loan. Another type of bridge loan is one that provides temporary financing until an issue of long-term debt or equity can be completed (Brealey and Myers, 1984). On completion of the issue, the proceeds are used to retire the bridge loan.

The credit officer must determine the probability that the bridge event will occur as projected. The lender must also analyze the borrower's ability to repay the loan if the projected event does not occur. Bridge loan maturities are tailored to the timing of the payoff event. If repayment is not completed at the time of the event, the bank must conclude that a failure has occurred.

When a bridge loan is used to finance the acquisition of an asset for immediate resale, the acquired asset is usually taken as collateral. However,

the bank must determine if the borrower can repay from other sources if the sale does not succeed.

2.5.3 Revolving Credit Loans

Revolving credit loans may be used to finance the expansion of current assets or to retire the current liabilities. This type of credit is often referred to as asset-based lending because the amounts borrowed are tied to a borrowing base formula that limits the outstanding amount to a margin percentage on the borrower's receivables, or inventory.

During the life of the revolving credit loan, repayment is derived from collections from the borrower's customers. With revolving credit, however, further advances can be made when the borrowing firm periodically increases its inventories. Thus, repayment is indefinite and often remains so until the loan is converted to a term loan with a definite repayment schedule. The risk of non-repayment is greater for revolving credit than for other types of loans because of the borrower's unresolved earnings power and the duration of the borrower's need. The bank must therefore determine how the borrower can demonstrate long-term earnings power capable of repaying the current loan.

Revolving credit loans are made on a revocable basis. A loan agreement specifies the credit limit available and the conditions under which funds are advanced and repaid. Advances are made against evidence of adequate working collateral, with reports on the status of the collateral submitted frequently. Experienced credit officers determine the quality of inventories and receivables and the margins to be applied in a borrowing base advance formula. As a general rule, raw material inventories attract a higher advance rate than a finished product because raw materials can be sold to manufacturers who need similar raw materials. By contrast, goods-in-process inventories may not be accepted as collateral because the bank is likely to find it difficult to supervise the finishing of production ina failed firm. Of the two, receivables constitute better collateral than inventories (Hempel and Simonson, 1999).

2.5.4 Term Loans

Term loans are loans with maturities over one year (Kent, 1972). They are often used to purchase fixed assets, expand production capacity, finance an acquisition, or take out a revolving loan.

The repayment source for term loans must consist of stable, long-term sources of cash flow. For loans made to finance fixed assets, repayment should be scheduled before the end of the useful life of the asset.

The analysis of term loan borrowers focuses on what might be called the long-term income statement. The bank must understand the firm's long-term earnings potential. This implies a broad-based analysis of the firm's products and management, its industry, and its competitive strength within the industry. In lending on specific fixed assets, it is necessary to determine whether the assets will produce sufficient profitability to warrant their purchase.

Term loans are usually outstanding for a specified period of time and are amortized with payments of interest and principal on a quarterly, or monthly basis. Monthly payments provide the bank with more frequent confirmation that the borrower's ability to repay the debt has not deteriorated. In reality, term loans provide intermediate term credit with maturities limited to 10 years. The borrower's fixed assets normally secure the term bank loan.

2.6 Risk Rating and Monitoring

Generally, banks use risk rating systems to measure the risk of their loans. Risk rating forces the credit officers to quantify the risk perceived in their loans. The risk is always assessed and the rating assigned at the time the loan is made and then revised during the life of the loan if its credit quality changes materially. The degree of monitoring required for a loan is proportional to its rated risk level.

Risk rating systems contain both objective and subjective elements (Osayameh, 1986). Objective aspects are based on financial statements and apply weights to ascertain financial ratios that reflect liquidity, leverage, and earnings. Despite the requirement that risk be quantified, risk rating systems always have a subjective dimension that attempts to capture intangibles such as the quality of management, the borrower's status within the industry, and the quality of financial reporting. These subjective items inevitably result in inconsistencies. Still, any system is better than simply omitting the measurement of loan risk (Hempel and Simonson, 1999).

Morsman (1983) suggests a five-class risk-rating system. These classes include highest quality, good quality, satisfactory quality, below-average quality, and poor quality. For details, see Table 2.1

Table 2.1: A Loan Risk-Rating System

Class I (highest quality)
Business with high liquidity, excellent financial conditions, history of stable and predictable earnings, available sources of alternative funding, strong management, favourable industry trends. Loans adequately secured with certificates of deposit, government securities, cash value of life insurance, etc. Individuals have substantial net worth concentrated in high liquid assets with well-defined primary and secondary sources of repayment.

Class II (good quality)
Businesses with most of the characteristics described in class I. However, certain characteristics are not quite as strong, such as more cyclical earnings and less availability of alternative funding in periods of economic distress. Individuals have substantial net worth, which may be concentrated in less liquid assets such as real estate or stock in closely held but strong companies. Present and future earnings potential is strong, and the secondary source of repayment is readily apparent with an adequate secondary source available.

Class III (Satisfactory quality)
Companies with fair liquidity and a reasonable financial condition which falls within acceptable tolerances of similar companies in the RMA *Annual Statement Studies*. Earnings may be erratic, and satisfactory payment expected but not assured under all conditions. Loans are frequently secured by collateral such as receivables and inventory where conversion to cash is difficult and uncertain. Alternative funding sources are normally restricted to competitor banks. Individuals have marginal liquidity and net worth but reasonable earnings with a reliable primary source of repayment. Secondary sources of repayment are less obvious and are restricted to such possibilities as mortgage refinancing.

Class IV (below-average quality)
Businesses with poor liquidity, high leverage, and erratic earnings or losses. The primary source of repayment is no longer realistic, and asset or collateral liquidation may be the only source of repayment. Loans are marginal and require continuing and close supervision by the responsible loan officer. Asset-based revolving credits supplying working capital for an indefinite period. Close monitoring of collateral by personnel with sufficient expertise is required. Individuals have no liquidity, marginal net worths and a speculative primary source of repayment with no secondary source identified. Loans classified "other loans especially mentioned" by examiners. Loans where the information in the credit file is insufficient to draw any conclusion as to quality.

Class V (poor quality)
Collateral, net worth, and cash flow are insufficient to support the level of borrowing, and sources of repayment are not readily identifiable. Without constant and intense supervision, the real possibility of partial or full loss exists. Individuals have insufficient net worth or earnings to support the loan. Additional collateral must be obtained, and there is a distinct possibility of loss. Loans classified "substandard," "doubtful," and "loss" by examiners.

Source: Morsman, E.M. (1983). *Effective Loan Management*, Robert Morris Associates, Philadelphia.

2.6.1 Watch List

Loans that are rated in the lower categories of the risk rating system constitute the "watch list." The watch-listed credits bear special attention to prevent their becoming losses. The watch list is a vital aid for understanding the total loss exposure. The bank's future performance is tied up intimately in the watch list. Banks must "watch-list" problem loans before they become bad debts. This requires the credit officers to monitor closely not only past-due loans but also current loans that are known to be potential past-dues because of deterioration in the credit.

2.6.2 Loan Review

There is a popular saying that banks never make bad loans; at least, they are not bad at the time they are made. However, banks find that invariably a small portion of their loans become delinquent and eventually must be written off. This basic risk of the lending function is not entirely bad. When a bank does not experience at least a few loan losses, this may indicate that it is passing up profitable opportunities. Nevertheless, well-managed banks should do all they can to minimize loan losses.

The loan review is an important part of the lending process. In fact, loan review is the second major aspect of systems and procedures for business loans. According to Baugh and Walker (1966) long experience has indicated that loan losses tend to be related to lack of attention, as much as to inadequate credit standards or inadequate analysis at the outset.

Most banks conduct loan reviews to reduce losses and monitor loan quality. Loan reviews consist of a periodic audit of the ongoing performance of some or all of the active loans in the bank's loan portfolio. To fulfill its basic objective of reducing loan losses, the following points should be emphasized in loan review:

- To detect actual or potential problem loans as early as possible
- To provide an incentive for loan officers to monitor loans and to report deterioration in their own loans.
- To enforce uniform documentation.
- To ensure that loan policies, banking laws, and regulations are followed.
- To inform management and the board about the overall condition of the loan portfolio.
- To aid in establishing loan loss reserves.

The actual purpose of loan review is a source of controversy. Most bankers would cite an "early warning" purpose wherein loan review provides the basic defence against deteriorating credit quality. They claim that loan review provides the basic defence against deteriorating credit quality. They also claim that loan review can detect the changes in credit quality that can occur quickly in loan agreements.

However, Udell (1987) argues that review is to reinforce a "credit culture" with the lending organization. The credit culture relies on loan officers as the basic defence against deteriorating credit quality. The rationale for depending on the credit culture is that loan officers are privy to crucial information about borrowers' financial conditions, and they are the first persons in the bank to know about changes in credit quality. The procedures for loan review must be formalized in written form in the loan policy. All the materials needed for loan review should be in the credit files set up for each loan advanced.

Most banks are unable to review every loan on their books on a regular basis. Some banks review all loans in excess of a certain cutoff

value and review only a random sample of loans below the cutoff. The frequency of review of individual loans is determined by the size and quality of the loan; large, poor-quality loans are reviewed most frequently.

Although loan review personnel are important in the early detection of problem loans, credit officers frequently have special ongoing knowledge to contribute. Loan officers attempt to maintain good rapport with their borrowers. If the borrower's business deteriorates, the loan officer will, often find that this rapport deteriorates as well. Any unexplained change in the borrower's attitude toward the loan officer or the bank may be a clue to the borrower's financial difficulties. Other clues include declines in deposit balances, occurrence of overdrafts, late payments of interest and principals, and abnormal delays in submitting periodic financial statements as required in the loan agreement.

When a problem loan is detected, the credit officer must take corrective measure to prevent further deterioration and to minimize potential loss. The preferred solution to a problem loan is to negotiate a plan of action with the borrower to try to protect both the bank and the borrower from possible loss. The bank should set forth a new repayment schedule,

provide covenants limiting the borrower's activities, establish requirements for the borrower to report operating and financial activities for the bank to monitor, and specify the extent of the bank's authority to concur in management decisions (Hempel and Simonson, 1999). In fact, corrective measure calls for a fresh renegotiation of the loan terms.

Problems with secured loans may arise when the collateral is inadequate. The market value of certain types of collateral may fall below the loan value. A problem loan can be remedied through the addition of guarantees.

2.7 Reasons for Loan Losses

Well-managed banks regularly conduct what might be called an "autopsy" on loans that resulted in losses for the bank. This step is the strongest feedback available on the effectiveness of loan policies, documentation, loan officers and the loan review functions. While a thorough review of bad debt losses is painful, it probably teaches credit officers about the importance of controls on the lending function better than any theoretical knowledge could do. Table 2.2 Lists common causes for loan failures that were uncovered in loan autopsies.

Tabe 2.2 Twenty Common Reasons for Loan Losses.

1.	Collateral overvalued, improperly margined; failure to get appraisal.
2.	Dispersal of funds before documentation finished.
3.	Officer making "good ole boy" loans, bypassing the loan committee, personal friendship of loan officer with borrower.
4.	Loan to a new business with an inexperienced owner-manager.
5.	Renewing a loan for increasing amounts, with no additional collateral taken.
6.	Repeatedly rewriting loan to cover delinquent interest due.
7.	Not analyzing borrower's cash flows and repayment capacity.
8.	Failure of officer to review loan's status frequently enough.
9.	Funds not applied as represented; diverted to borrower's personal use (no attempt to verify to what purpose money was applied).
10.	Funds used out of the bank's market area; poor communications with borrower.
11.	Repayment plan not clear or not stated on the face of the note.
12.	Failure to receive or infrequent receipt of borrower's financial statements.
13.	Failure to realize on collateral because borrower raised nuisance legal defenses.
14.	Bank's failure to follow its own written policies and procedures.
15.	Bank president too dominant in pushing through loan approvals.
16.	Ignoring overdraft situation as a tip-off to borrower's major financial problems.
17.	Failure to inspect borrower's business premises.
18.	Lending against fictitious book net worth of business, with no audit or verification of borrower's financial statement.
19.	Failure to get or ignoring negative credit bureau reports or other credit references.
20.	Failure to call loan or to move against collateral quickly when deterioration becomes obviously hopeless.

Source: Hempel, G.H. and D.G. Simonson (1999) op. cit. p. 410

In addition to the 20 common reasons for loan losses Offor (2000) added the dependence of state governments upon banks to finance some of their projects and workers salaries. Most of these loans are advanced with little or no collateral.

2.8 Financial Distress Prediction

Although financial difficulties of enterprises can be attributed to several factors, many corporate failures are directly or indirectly associated with management. Several non-financial problems (e.g government policies, boardroom politics, etc.) can lead to substantial losses, which, in turn, lead to financial difficulty and eventual failure.

The possibility that a firm runs into financial difficulty could be evident before the actual failure and a creditor might be able to take corrective measures before failure act occurs. A lending officer in a bank could use financial distress prediction models as a guide to lending decision. Specifically, the lending officer would want models that categorize the commercial loan proposals into those that are likely to fail and those that are not.

Akpa (1984) observed that an approach that attempted to discriminate firms into such dichotomies was crude since a firm's state of financial health/distress is a continuous scale. And that because financial distress was a phenomenon that could not be observed, the researchers preferred to examine events such as legal bankruptcy, loan default, and omission of preferred dividend as a surrogate for measuring financial distress. This permits different shades of meanings to investigators. A broad definition of failure was employed by Beaver (1967) to refer to the inability of a firm to meet its financial obligations as they mature. He submitted that a firm is said to have failed when any of the following events has occurred: bankruptcy, bond default, an overdrawn bank account, or non-payment of a preferred stock dividend. However, other authors have tended to restrict failure to legal bankruptcy. For example, Altman (1968) draws his sample of bankrupt firms from manufacturers that filed a bankruptcy petition under Chapter X of the National Bankruptcy Act of U.S.A.

2.9 Traditional Approach To Credit Evaluation

The Traditional method of applying financial ratio analysis to evaluate the credit worthiness of prospective customers was based on a "one-at-a-

time" basis, that is, a univariate analysis. This system is a starting point which normally leads to a loan decision. Most analysts use the method to discriminate between those customers whose applications are to be rejected outrightly and those that require further or rigorous analysis. But this method of analysis is effective only where industry averages exist for comparative purposes.

Ratio analysis is frequently used to evaluate the financial condition and performance of a firm. The analyst can compare a present ratio with past and expected future ratios for the same firm. He can also compare the ratios of one company with those of similar companies or with industry averages at the same point in time. This latter comparison gives insight into the relative financial condition and performance of the firm. However, this comparison may not necessarily portray a firm's true financial status since accounting data such as depreciation, provision for bad and doubtful debts, and other reserves, are just estimates and may not reflect economic depreciation, bad debts, or other expenses. A number of empirical studies (e.g. Altman, 1983) have tested the predictive power of financial ratios. In many of these studies, financial ratios are used to predict corporate failure. According to Van Horne (1989) the best ratios for

predictive purposes are debt-to-net worth, the net operating profit margin, debt coverage and its stability, return on investment, size, and earnings stability. These studies clearly indicate that a handful of ratios can be used to predict the long-term credit standing of an enterprise.

Altman, et al (1974) investigated the characteristics of 41 ratios grouped into five categories: liquidity, leverage, activity, value added and profitability ratios (See Appendix 3). Liquidity ratios exhibited similarity and overlap between good and bad firms and this diluted the financial import of these ratios. The leverage ratios showed moderate discriminating potential

while only two ratios $\left[\frac{\text{Receivables \& Disc note}}{\text{sales after taxes}}\right.$ and $\left.\frac{\text{Receivables}}{\text{sales}}\right]$

of 11 activity ratios indicated a definite direction i.e. both showed that in the textile industry longer collection period tolerance was a sign of strength. Out of the eight operating ratios, only one $\left[\frac{\text{wages + salary}}{\text{value added}}\right]$ showed any significant level of discrimination.

Altman, et al then concluded that of all the measures, not surprisingly the profitability and cash flows ratios showed the most promise.

Ratios 33 $\left[\frac{\text{Gross profit}}{\text{Equity}}\right]$ and 34 $\left[\frac{\text{Net Profit}}{\text{equity}}\right]$ showed marked differences in the groups.

The study carried out by Beaver (1967) demonstrated that financial ratios of firms that eventually failed diverged rapidly from those of the non-failed ones as the date of failure approached. From Moody's industrial manual, and a list of failed firms provided by Dun and Bradstreet, Beaver (1967) matched 79 failed firms on which financial statement data could be obtained for the first year before failure with 79 non-failed firms on the basis of industry, asset size, and year in each of the five years prior to failure. Beaver defined the "first year before failure" as that year included in the most recent financial statement prior to the date that the firm failed; and the financial statements could not be more than six months old at the date of failure. Beaver then grouped the financial-statement data according to year before failure. For example, if a firm failed in 1964, and its most recent financial statement was prepared on December 31, 1963, the first year before failure would include the 1963 statements, and the fifth year before failure would include the 1959 statements. Similarly the financial statement data of the non-failed firms were stratified into years before failure corresponding to the years that were assigned to their failed mates.

Beaver selected 30 ratios (See appendix 4) on the basis of their popularity in literature, superior performance in the previous studies, or the ratio was defined in terms of a "cash-flow" concept. He computed the mean of the ratios for the failed firms and for the non-failed firms in each of the years before failure. He referred to the comparison of mean values as a profile analysis which merely revealed the general relationships between the failed and non-failed firms rather than predictive test.

Beaver compared his findings with Patrick (1932), Winakor and Smith (1935), and Merwin (1942) and concluded that three studies also supported the profile analysis. Patrick (1932) matched nineteen failed firms with nineteen non-failed firms and discovered that there were persistent differences in the ratios for at least three years before failure. In a study carried out by Winakor and Smith (1935), on the mean ratios of failed firms for ten years prior to failure, they found a significant deterioration in the mean values with the rate of deterioration increasing as failure approached. Merwin (1942) compared the mean ratios of continuing firms with those of discontinuous for the period 1926 to 1936. The evidence indicated marked difference in means as much as six years prior to discontinuity while the difference increased as the year of discontinuity approached.

Beaver employed a dichotomous classification test to predict the failure status of a firm. He used the group means for each of the 30 financial ratios computed for each firm to conduct a univariate profile analysis over the five-year period to failure. To decide upon the optimal cut-off point, the data are arrayed (i.e. each ratio is arranged in ascending order) and the optimal cut-off point (a point that minimizes total misclassification percentage) is found by inspection. If a firm's ratio is below (or above in the case of the total debt to total-assets ratio) the cut-off point, the firm is classified as failed. If a firm's ratio is above (or below for the total debt to total-assets ratio) the critical value, the firm is classified as non-failed.

The dichotomous classification test is useful in a decision-making situation. For example, a bank's lending decision can be viewed as dichotomous choice of accepting or rejecting a loan application. Thus the essence of the ratio analysis is to classify firms as acceptable or not acceptable to the analyst.

In his analysis of evidence Beaver found out that the cash-flow to total debt ratio had the highest discriminatory power of all the ratios he used. For example, in the fifth year before failure this single ratio could correctly classify/predict 78 per cent of the firms in the validation sample. It is interesting to note that the liquidity ratios which are so popular in the Nigerian banking lending analysis performed poorly in the test.

In an attempt to explain why liquidity ratios could not perform as well as measures of long-term survival, Beaver conducted a component analysis on the ratios he used in his 1966 study in 1968 and concluded that the non-liquid measures were more likely to represent permanent aspects of a firm than the liquid measures which reflected only the short-term position.

Another researcher that used profile analysis was Lev (1971). He tested the stability of various items usually found in the financial statements. He came to the conclusions that failed firms experienced more volatile changes in their assets and liabilities than the non-failed firms in each of the five years prior to failure.

2.10 Use of Multiple Discriminant Analysis (MDA) in Predicting Loan Default Risk.

The general problem of classification normally comes up when an analyst has certain characteristics of an observation and wishes to classify the observation into predetermined categories on the basis of the characteristics. For instance a bank credit officer may have on hand various financial ratios of a business enterprise that has applied for a commercial loan and he wishes to use these ratios to classify the firm as either a bankrupt firm or a non-bankrupt firm. Discriminant analysis is about the best statistical technique that can be used for such classification. According to Weston and Copeland (1988), discriminant analysis consists of three basic steps:

a) Establish mutually exclusive group classification. Each group is distinguished by a problem distinction of the characteristics.

b) Collect data for observations in the groups.

c) Derive linear combinations of these characteristics that "best" discriminate between the groups. (By "best", we mean the ones that minimize the probability of mis-classification).

Altman (1968) adopted linear discriminant analysis (LDA) to estimate a discriminant function which is used in differentiating between failed and non-failed firm. The discriminant function transforms indirect variable

values to a single discriminant score or Z value which is then used to classify the object.

To estimate the discriminant function, Altman (1968) matched 33 manufacturing firms that filed a bankruptcy petition under Chapter X of the National Bankruptcy Act during the period 1946 - 1965 with 33 non-bankrupt firms on the basis of industry, asset size, and the year of event. A number of variables (ratios), based on their popularity in the literature and potential relevancy to the study, were selected for analyzing each firm in the two groups. These variables were classified into the following five standard ratio categories: liquidity, profitability, leverage, solvency and activity ratios. He then used a best fit technique to test the individual discriminating ability of the variables for the purpose of selecting one ratio from each category for inclusion in the discriminant function. The mean values of these five ratios resulted in an estimated function:

$$Z = 0.012x_1 + 0.014x_2 + 0.033x_3 + 0.006x_4 + 0.999x_5$$

where

x_1 = Working capital/Total assets

x_2 = Retained earnings/Total assets

x_3 = EBIT/Total assets

x_4 = Market value equity/Book value of Total debt

x_5 = Sales/Total assets

Z = Overall index

Testing the power of the discriminant function, the model was accurate in classifying 98 percent of the total sample correctly. Furthermore, the Z score correctly classified 94 and 97 percent of the failed and non-failed firms respectively. In other words, the type I error was only 6 per cent while type II error was even better at 3 per cent. The accuracy of the function tested two years prior to bankruptcy decreased to 72 per cent with type II error slightly larger (6 per cent versus 3 per cent) in this test but was still very accurate, that is, the function could predict non-failed firms more accurately two years prior to failure than failed firms.

The discriminant function was further subjected to prediction tests. The first test was a prediction of 25 bankrupt firms whose asset size range was the same as that of the initial bankrupt group. Using the parameters of the discriminant model, 24 of the 25 firms, were correctly predicted, that is, the prediction accuracy increased from 94 per cent to 96 per cent. The second test was performed on a sample of 66 non-bankrupt firms which

suffered temporary profitability difficulties. In fact, the only two criteria used to select these firms were manufacturing firms which suffered losses in the year 1958 or 1961. Of the 66 non-bankrupt firms, 52 were correctly predicted. Therefore, the discriminant model correctly classified 79 percent of the sample firms.

Deakin (1972) used the linear combination of the 14 ratios (see Appendix 5) used by Beaver to develop a rule to validate a cross-sectional sample of firms. In replicating Beaver (1966) study, Deakin used 32 failed firms out of a population which experienced failure between 1964 and 1970Deakin excluded firms which defaulted on loan obligations or missed preferred dividend payments from his sample. Thus, the term failure was defined by Deankin to include only those firms which experienced bankruptcy, insolvency, or were otherwise liquidated for the benefit of creditors. He matched each failed firm with a non-failed firm on the basis of industry, year of the financial information and asset size.

The results of the tests of significance indicated that misclassification errors averaged 3%, 4 1/2%, and 4 1/2% for the first, second and third years, respectively. By these results, the conclusion was that statistical techniques, especially discriminant analysis, could be used to predict

business failure from accounting data as far as three years in advance with a fairly high accuracy.

Edmister (1972) tested the usefulness of financial ratio analysis in predicting small business failure which previous studies had ignored because of the difficulty of obtaining data. Edmister examined 19 ratios (See Appendix 6) and five techniques of analysis. He used MDA to select a set of ratios and techniques which best discriminated between loss and non-loss borrowers. He formulated and tested the following four hypotheses:

H_1: A ratio's level is a predictor of small business failure.

H_2: The three year trend of each ratio is a predictor of small business failure.

H_3: The three-year average of a ratio is a predictor of small business failure.

H_4: The combination of the industry relative trend and the industry relative level for each ratio is a predictor of small business failure.

The data used to test the hypotheses were obtained from Small Business Administration (SBA) and Robert Morris Associates (RMA). The

SBA data were drawn from the financial Growth Data Bank containing 192,000 statements submitted by SBA borrowers during the period 1954 - 1969. Edmister then estimated a seven variable function on tri-annual sample as follows:

$Z = 0.951 - 0.423x_1 - 0.293x_2 - 0.482x_3 + 0.277x_4 - 0.452x_5 - 0.352x_6 - 0.924x_7$.

Where $Z = 1$ for a successful (non-loss) business and $Z = 0$ for a failed (loss) business.

$X_1 = 1$ if the annual funds flow/current liabilities ratio is less than 0.05; otherwise $X_1 = 0$

$X_2 = 1$ if the equity/sales ratio is less than 0.07; otherwise $X_2 = 0$.

$X_3 = 1$ if the net working capital/sales ratio divided by its respective RMA ratio is less than -0.02; otherwise $X_3 = 0$.

$X_4 = 1$ if current liabilities/equity divided by the respective SBA ratio averages less than 0.48; otherwise $X_4 = 0$.

X_5 = 1 if the inventory/sales ratio divided by the respective RMA ratio has shown an up-trend and is still less than 0.4; otherwise X_5 = 0.

X_6 = 1 if the quick ratio/RMA trend is down and its level just prior to the loan is less than 0.34; otherwise X_6 = 0.

X_7 = 1 if the borrower's quick ratio divided by the RMA quick ratio shows an up-trend; otherwise X_7 = 0.

The seven-variable function correctly discriminates 93 percent when the decision rule is to predict failure if $Z < 0.520$ and non-failure if $Z > 0.520$. Varying the decision rule resulted in the following predictive accuracy (See Table 2.3).

Table 2.3 Predictive Accuracy of Z - Scores

Z - Score	Failure	Non-failure
Up to 0.469	80%	100%

0.470 to 0.519	85%	95%
0.520 to 0.529	90%	95%
0.530 and above	100%	86%

Source: R.O. Edmister, "An Empirical Test of Financial Ratio Analysis for Small Business Failure Prediction," *Journal of Financial and Quantitative Analysis*, March, 1972, p.1488.

Edmister suggested "black-gray-white" method of determining the Z-score cut-off point. Given a large number of loan applicants, calculated Z-score frequencies may form two normal curves with area of overlap between the two sample populations. The overlapping area lied between 0.47 and 0.53 which constituted the upper bound and lower bound of the loss and non-loss borrowers, respectively. The loss loans area he called "black" and the good loans area he called "white". The credit analysts should reject all loan applicants whose Z - score were less than 0.47 and accept loan applicants with Z - score above 0.53. Loan applicants whose Z - scores lie between 0.47 and 0.53 should require greatest efforts of the analysts; and non-financial statement information regarding management, markets, plant and equipment should be scrutinized in order to classify the applicants as loss or non-loss borrowers. This model can also be used by bankers to analyze existing accounts.

2.11 Evaluation of Commercial Loans Proposals:

Altman, et al (1974) analyzed the repayment performance of a sample of 35 problem firms and 99 good firms in the cotton and wool textile sector of France in the 1968-71 period. They matched the sample of good textile company with the bad sample on the basis of size and year. The study analyzed the indirect and combined characteristics of 41 financial ratios for the sample of 135 firms. These ratios were grouped into liquidity, indebtedness, profitability, turnover coverage, and value added.

Like Altman (1968) and Deakin (1972), the 41 ratio model proved to be effective predictor one-year prior to problems, and the ability to predict impending problems accurately diminished significantly as the time before the manifestation of the problem increased.

Working with smaller groups of ratios, Altman, et al concluded that the most effective discriminators between good and bad credit risks in the textile industry were derived from leverage, profitability, and value added ratios. The bad firms tended to have higher leverage, lower profitability and lower contributions to the firms value added productivity.

The importance of liquidity in credit decisions has been stressed by Backer & Gosman (1980). They assert that firms that are able to avoid illiquidity (financial distress) remain flexible in the movement of their resources. They define illiquidity as the inability of a business to obtain additional funds from its traditional borrowing sources without competitively prohibitive interest rates.

Their three-year study identified some key ratios that were highly considered by creditors in advancing loans. They reported these ratios as follows:

Table 2.4: Financial Ratios Considered Most Significant by Creditors

Financial Ratios	Short-term Bank Loans Seasonal	Short-term Trade Credit	Intermediate Term Bank Loans	Long-Term Bonds
Accounts Receivable Turnover	x			
Cash Flow to Total Debt			x	x
Current Liabilities to Tangible Net Worth		x		
Current Ratio	x	x		
Fixed Charge Coverage				x
Inventory to Working Capital		x		
Inventory Turnover	x			
Long-Term Debt to Working Capital		x		
Quick Ratio	x	x		
Return on Sales			x	
Total debt to tangible net worth	x	x	x	x
Working Capital to Sales			x	

Source: Backer M., and M.L. Gosman, *Financial Management*, Vol.9, No.1, 1980, p.55.

Meyer and Pifer (1970) used the linear probability model which involved substantial computational burden. They introduced financial data from more than one period prior to failure by regressing each financial ratio on time and determining the time trend, coefficient of variation, and shifted away from the trend in the period prior to failure. These data were then entered as independent variables of the type used by Altman. For example

if one has a sample of 200 institutions and wishes to include just 5 financial ratios as independent variables, 1000 individual regressions must be performed to generate the independent variables. The question that remained unresolved was whether such a formidable computational burden would provide enough improvement in predictive ability.

Collins (1980) asserts that Meyer and Pifer method has appeal, that is, bankruptcy is a financial decay process occurring over time. Using the data collected for the period 1956-1976 from National Credit Union Administration (NCUA), Collins compared the predictive ability of Altman discriminant analysis with the linear probability model of Meyer and Pifer (1970). Collins matched 162 failed credit unions with a randomly-selected sample of 162 non-failed credit unions making a total sample of 324.

For each credit union in the sample, sets of data corresponding to Altman, and to Meyer and Pifer were collected and the following independent variables were included in each model:

X_1 = cash + Securities divided by total assets as a measure of liquidity;

X_2 = net income divided by total assets as a measure of profitability;

X_3 = delinquent loans divided by total loans as a measure of the likelihood of future asset losses;

X_4 = new loans divided by total loans as a measure of activity;

X_5 = reserves divided by risk assets as a measure of the ability to withstand asset losses;

X_6 = dividend rate;

X_7 = number of potential members;

X_8 = number of actual members; and

X_9 = TL assets (measured in thousand).

In the Meyer and Pifer - type file, these ratios from period t-1 were included along with their trends, coefficients of variation and residuals. Testing the models on the holdout sample to see which model could do the best job of separating unhealthy institutions from sound institutions, Collins discovered that the predictive ability of both models is good. Furthermore, the simpler Altman-type model performs slightly better than Meyer and Pifer sophisticated model. For instance, the best Altman model is the six-variable model which has an overall correct classification rate of 94.4% as against the best Meyer and Pifer result of 93.2% for the same number of variables. In other words, when both Altman and Meyer and Pifer methods of bankruptcy prediction are used on the same data set, the simpler Altman

method performs just as well or better than the more theoretically appealing Meyer and Pifer.

Gupta et al (1990) proposed application of linear goal programming (LGP) as an alternative to multivariate discriminant analysis (MDA) in classifying *a priori* groups. The basis of their argument was that MDA assumptions were usually violated in practice, and that the LGP approach was not characterized by the restrictive assumptions of the linear MDA. The two main assumptions of linear MDA are that the independent variables are multivariate normally distributed and that the dispersion matrices across groups are equal.

The authors matched 60 pairs of bankrupt and non-bankrupt firms covering the period 1971 to 1986; and used the same variables of Altman (1968) model. They split the sample of 60 into estimation sample of 50 firms and a validation sample of 10 firms. The classification ability of the LGP model was tested using the corresponding validation samples, and the model correctly classified nine out of ten bankrupt firms or 90 per cent for the first year before bankruptcy. The predictive accuracy for the remaining four years were 80 per cent, 80 percent, 70 per cent and 80 per cent for

second, third, fourth and fifth year before bankruptcy respectively. In the case of non-bankrupt firm the corresponding figures were 80, 80, 80, 90 and 70 per cent for the first, second, third, fourth, and fifth year respectively. The authors concluded that LGP formulation was a viable alternative to MDA especially when violations to the MDA restrictive assumptions exist.

Platt and Platt (1990) developed corporate failure model using Industry-Relative financial ratios on the basis of Lev (1969) findings in which he reported that firms often adjusted their financial ratios to conform to their industry's average. They asserted that the classification results of their model were superior to those models that used unadjusted financial ratios.

Because of the instability of financial data over time which were noted by Pinches, Mingo and Caruthers (1973), Scott & Martin (1975), and Platt (1989), Dambolena and Khoury (1980), and Betts and Behoul (1987) used the variation in financial ratios to measure the stability of the ratios.

The industry-relative ratio essentially measures the relative position of an individual company within the distribution of all companies in its industry. An industry-relative ratio is defined as the ratio of a firm's

financial ratio relative to the mean value for that ratio in the firm's industry at a point in time, thus:

$$\text{Industry-Relative Ratio} = \frac{\text{Firm k's Ratio}}{(\text{Mean Ratio in Industry j,t}) \times 100} \qquad (2.3)$$

Where:

Firm k is a member of industry j, and 100 is used to adjust percentage ratios to scalar values that are greater than 1.0. For a given industry within any time period then, the mean industry-relative ratio for that industry is 0.01 (for details see Platt & Platt p.35).

Assembling the results of several studies, Platt and Platt observed that failure models generally produced lower classification levels with out-of-sample data than within-sample data as shown in Table 2.5

TABLE 2.5 Classification Accuracy One Year Before Failure

			Percent Correctly Classified						
			Within Sample				Out of Sample		
Model	Statistical Method	Random Matched Sample	Failed	Non Failed	All	ValidationTest	Failed	Non-Failed	
A	MDA	**M**	94%	97%	95%	N2	**96%**	79%	8
D	MDA	**R**	97%	97%	97%	N1	**82%**	77%	7
A & L	MDA	**R**	90%	90%	90%	L	**83%**	88%	8
K et al	Regression	NA	93%	87%	NA	N2	**94%**	75%	N
A,H,&N	MDA	M	96%	90%	93%	L	**93%**	90%	9
D & K	MDA	**M**	91%	100%	96%	L	**NA**	**NA**	
Z	WESML Probit Even Weight	R	52%	100%	76%	H	54%	99.8%	
	20: 1 Weight	R	42%	100%	97%	H	44%	100%	9
A & I	MDA	**M**	94%	90%	92%	L	94%	90%	9
B et al	Logit	NA	86%	87%	87%	N2	85%	78%	8
F,A&K	RPA	**R**	**84%**	99%	94%	L	NA	NA	8
P & P1	MDA	**M**	93%	97%	95%	N2	86%	96%	
P & P2	Logit	**M**	93%	78%	83%	N2	82%	77%	
B & B	MDA	**R**	98%	92%	96%	L	82%	81%	8

A: Altman, E., (1968)
D: Deakin, E., (1972)
A & L: Altman, E. and B. Loris (1976)
A, H & N Alman, E., R. Haldeman and P. Narayanan (1977)
D & K: Dambolena, I and S. Khoury (1980)
Z: Zmijewski (1984)
A & I: Altman, E. and h. Izan (1984)
Be et al (1985) Barth, J.R., R.D. Brumbaugh, Jr., D. Sauerhaft and G.H.K. Wang
F, A, & K: Frydman H., E. Altman and D. Kao (1985)
P & P1: Pantalone, C. and M. Platt (1987a)
B & B: Bets, J. and D. Belhoul (1987)
H: Within Sample Period Holdout Test
L: Within Sample Period Lachenbruch Test
N1: Out-of-Sample Period ex ante test.

Source: Platt, H.D and M.B. Platt (1990), Journal of Business Finance and Accounting, 17(1) Spring 1990, p.33

Platt and Platt matched 57 pairs of failed and non-failed firms covering the period 1972 through the first quarter of 1986. Each bankrupt firm was matched with a non-failed company of nearly equal asset size, and data for the same time period. Mean total assets one year prior to failure were approximately equal for failed and surviving portfolios in each industry.

In addition to financial condition of a firm, industry characteristics can also contribute to the corporate failure. Platt (1989) has shown that relatively healthy firms in weak industries may fail while equally healthy firms in stronger industries survive. His results also suggest that relatively weak firms may survive because they are in healthy industries.

Platt and Platt (1990) concluded that industry-relative ratios offer several advantages over unadjusted ratios when used to predict corporate failure. The empirical results indicated that models built with industry-relative ratios correctly classified a greater percentage of the sample, both overall and within subgroups as shown in Table 2.6

TABLE 2.6 Comparison of Classification Results Between Industry-Relative Ratios Adjusted and Unadjusted Ratios

	Percentage Correctly Classified	
	Industry-Relative Ratios	Unadjusted Ratios
Overall	90	78
Failures	93	89
Survivors	86	67

Source: Platt, H.D. and M.B. Platt (1990). *Journal of Business Finance and Accounting*, 17(1) Spring 1990, p.45.

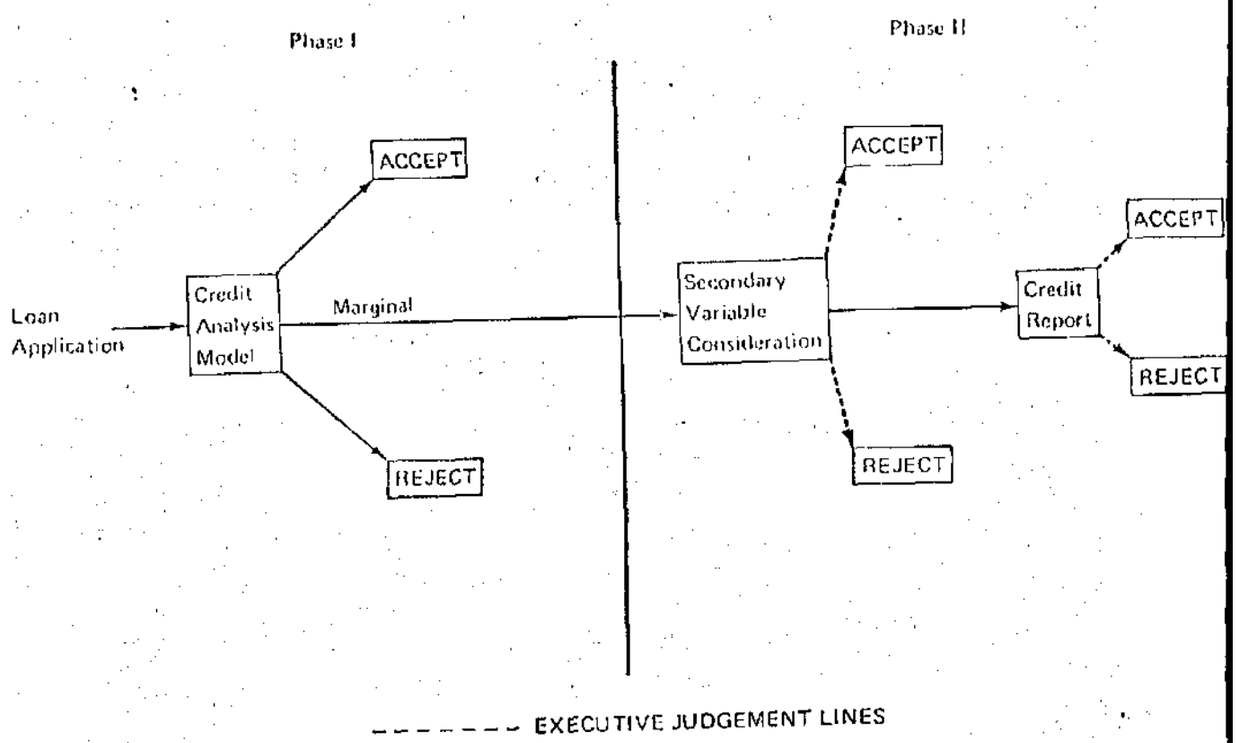
The Results also suggested that industry effects on corporate failure were significant and industry growth appeared to impact the effects of two key financial variables contained in the model. Both the effects of cash-flow to sales and total debt to total assets were found to be conditioned upon the growth (or decline) of a company's industry.

2.12 Credit Scoring Model for Commercial Loans

All credit evaluation decisions involve the use of a model. The traditional model uses a variety of "rules of thumb". The analyst usually collects data on the loan applicant, and subjectively appraise each of the attributes and then recommends acceptance, rejection, or more information on the basis of his experience.

In contrast to this subjective model, the objective scoring system collects data on the loan applicant, combines these data in accordance with statistically determined weights, and then recommends acceptance, rejection, or a closer look by an experienced credit analyst. This does not mean that the credit scoring model is a substitute for common sense and experience. Hottenhouse and Wentworth (1971) conceived and built the Credit Analysis Model (CAM) with full attention to the failures of earlier researchers.

Credit Analysis Model (CAM)



Source: *Hothenhouse & Wentworth, (1970) Money, Credit, and Banking.*

The CAM as shown in the figure combines objectivity and subjectivity, statistics and judgment. In the first state the scorer assigns points to the application in accordance with statistically determined weights. Applications involving very low risk (high scores) or very high risk (low scores) are accepted or rejected automatically. Those requiring additional consideration are forwarded to the experienced credit analyst. He then applies judgment in reaching a conclusion. If after the two-stage process the analyst is unable to reach a conclusion, he may request additional information in the form of a credit report. The accept-reject decision at the third stage will be based on the examination of the credit report. (Hettenhouse and Wentworth, 1971).

Srinivasan and Kim (1987) observed that academic research on credit granting can be grouped into two categories: (i) attempts to apply classification procedures to customer attribute data and develop classification models to assign group membership in the future; and (ii) attempts to explicitly recognize the need to integrate such risk assessment with potential return as well as allow for differing degrees of credit investigation depending on the costs of such investigation.

In the same vein Abate (1969) asserts that there are two basic motives in developing a scientifically designed scoring system for commercial loans. First, a control of losses is essential to any commercial lending operation, and secondly, the time required to initially discuss the loan, evaluate the financial statements, and myriad of work preparation to the approval or rejection of the loan, can run into many hours per loan. He then suggests the following eleven characteristics that can be assigned some weights on the basis of their ages or industries: age of business, years of present management, successive years of increased profits, number of days inventory, number of days receivables, quick ratio, working capital ratio, debt to net worth, trade reports and type of industry.

Orgler (1970) developed a general credit scoring model for evaluating existing commercial loans. The essence of the model was to provide a useful tool for loan review and examination. Orgler used multivariate regression analysis to derive the discriminating function for evaluating existing commercial loans. He performed a regression analysis on a sample of good and bad loans where independent variables represent various characteristics of each borrower, and the dependent variable (Y_i) which are

obtained by applying regression equation to new observations, are compared to two cut-off points C_1 and C_2 where $0 < C_1 < C_2 < 1$. When $Y_i \geq C_2$, loan i is expected to result in a loss; and thus requires a thorough examination. All observations for which $Y_i < C_1$, are considered good loans and are eliminated from review and examination. The remaining cases ($C_1 < Y_i < C_2$) are marginal loans which are reviewed briefly and segregated into potentially bad loans and good loans that are either thoroughly examined or eliminated from examination.

2.13 Critique of Extant Literature on Financial Distress Prediction

The field of financial distress received a lot of attention within the last three decades. This led to the rapid growth of literature in the field. However, the studies carried out on financial distress suffered from one limitation or the other.

The greatest weakness of financial distress research is lack of economic theory of financial distress. The essence of a theory is the specification of variables to be included in each model. Without a theory, any procedure adopted for selecting variables is limited in its ability to

provide generalizable results as to what financial variables can consistently predict financial distress.

Another drawback of corporate failure prediction models lies in its characteristics of autopsy analysis. This post mortem approach consists of collecting sample data for firms that are known to have failed and matching them with non-failed data. Parameters are estimated for some type of a statistical classification technique such as discriminant function, and the estimated model is then used to classify the same estimation sample. This approach is very good for classification of failed and non-failed firms' ratios but not quite good for general corporate failure prediction.

Studies that used the matched pair sampling technique normally assume that the populations of failed and non-failed firms are equal. Under this design, firms are paired on the basis of some selection criteria such as size, asset base, industry, etc. Since the number of failed firms is not equal to the number of non-failed firm, bias is already introduced into the usefulness of the model as a generalized tool. This weakness can be minimized substantially by selecting each sample proportionately to its population size.

The choice of the accounting method adopted can introduce errors in the research variables. Such measurement errors inherent in accounting data can jeopardize the power of an empirical model based on them in separating from non-failed firms. Restricting the model to firms using the same accounting methods can eliminate this error.

Reliance on past performances of customers is also fraught with some danger. A customer who intends to defraud a bank can maintain a very impressive account for a long period of time without defaulting. But when his credit worthiness reaches a level he desires, he can then take a term loan of a large sum of money and then default.

The dependence on collateral is also not risk proof. The value of the assets pledged can fall. In fact, during Buhari – Idiagbon regime of 1984 – 1985, many landlords who were arrested in connection with unexecuted contracts sold their landed properties below their market values just to repay the contract money they collected and secure their freedom.

Despite the weaknesses associated with each credit risk evaluation techniques, it is still better to employ both qualitative and quantitative techniques to guide accept-reject decisions than to rely purely on intuition or experience.

2.14 Summary

In the last three decades, several works were concentrated on financial ratios and the prediction of financial difficulties. Beaver (1967) examined the univariate predictive ability of ratios, Altman (1968) extended the analysis to a multivariate discriminant framework, and Deakin (1972) utilized beaver's data and Altman's technique to further assess the ability of ratio analysis to predict impending problems. Utilizing the MDA, Edmister (1972) confined his analysis to small firms.

Meyer and Pifer (1970) used regression analysis to predict bank failures, and Orgler (1970 also used regression analysis to derive the discriminating function for evaluating existing commercial loans. Gupta et al (1990) used LGP to predict corporate failure while Platt and Platt (1990) developed corporate failure model using industry-relative financial ratios.

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CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter deals with the methodology adopted for undertaking this research. The areas covered in the chapter included research design, population, sampling techniques, sample size, instrumentation, and procedures for data analysis.

The choice of the methodology was guided by the objectives and the nature of the data required for the study. The study was not intended to replicate any of the corporate failure prediction models reviewed in chapter two. The essence of the review was to demonstrate the levels of accuracy of these corporate failure prediction models so that Nigerian commercial banks credit officers might be motivated to use them in their credit analysis. In other words, the central objective of the review was to encourage credit officers to blend quantitative and qualitative techniques together in evaluation of commercial loan proposals.

3.2 Research Design

Research design is the plan for a research project. It may vary on the basis of the nature of the problem under investigation. According to Nwana (1981), design is a term used to describe a number of decisions, which need to be taken regarding the collection of data before ever the data are collected. The investigator needs to find satisfactory answers to such questions as who, or what, constitutes the population to be studied? Will every member of the population be studied, or will a sample of the members be studied? For studies in which it is intended to find the relationship between two variables, will the subjects be studied in their natural setting or will they be studied under experimental conditions?

The research method adopted for this study was the descriptive/survey type. As a descriptive study, the research design made use of survey instruments to assess the use of quantitative techniques in classifying the commercial loan proposals. The descriptive/survey method of research was used because of its appropriateness of enabling the researcher to find out the conditions or relationships that existed by collecting and analyzing data from only a few people or items considered to be representative of the entire group (Akuezuiolo, 1993).

The data collected through the research instruments were analyzed to answer the research questions and to establish the validity of the five hypotheses formulated for the study. Four of the hypotheses tested the relationship between educational qualification and the ability of the commercial banks staff to adopt quantitative techniques to classify commercial loans proposals into accepted or unaccepted categories. The fifth hypothesis tested the impact of application of quantitative techniques upon classification of commercial loan proposals into accepted and unaccepted categories.

3.3 Population of the Study

The population of interest to this study was the commercial banks that operated in Nigeria between 1979 and 1998. This segment of the banking industry was specifically selected for this study for two main reasons.

First, commercial banks dominated the banking industry in terms of number, branch network, and geographical spread. There were 64 commercial banks as against 51 merchant banks, in 1997 (CBN Statistical Bulletin, 1998). Second, the commercial banks had greater capacity to

advance commercial loan than the other banks and this made them more relevant to this study than the other banks. The total assets of the commercial banks as at 1997 averaged =N=545,286.6m as against =N=106,656.6m for merchant banks (CBN Statistical Bulletin, 1998).

3.4 Sampling Technique

Stratified random sampling technique was adopted for this study. The population was segmented into two groups. The first group consisted of banks with asset base above =N=10 billion while the second group comprised banks with asset base of =N=10 billion or less. The sample size of thirty banks was then selected using stratified random numbers. The sample size of 30 banks was considered adequate because of the assertion of Walpole (1974) that the normal approximation would be good if $n \geq 30$ regardless of the shape of the population.

The data for this study were collected from Abuja, Aba, Bauchi, Gusau, Jos, Kaduna, Kano, Katsina, Keffi, Lagos, Maiduguri, Sokoto, Uyo and Zaria. These towns constituted large, medium, and small industrial and commercial centers where commercial loans were demanded and supplied.

Lagos, Kano and Aba were the greatest industrial and commercial centres of the Southern, Northern and Eastern states respectively.

3.5 Sample Size

The number of commercial banks within the period of this study rose from 20 in 1979 to 66 in 1993 but dropped to 54 in 1998. This large number of commercial banks made it impossible to include all of them in a single study of this nature. Therefore, stratified random sampling technique was used to generate a sample size of thirty banks.

Most of the banks included in the sample had national branch network, and these branches always executed policies formulated in their head offices and handed over to them for implementation. Therefore, the findings of this study could be generalized to the whole country because of the branch network of the commercial banks sampled.

The sample of individual respondents consisted of 220 bankers from the 30 commercial banks sampled. Out of these 220 bankers, 135 respondents (or 61.4%) returned their filled questionnaire before the statistical analysis. Nineteen copies of the filled questionnaire were returned

from Jos, Sokoto, and Kaduna after the statistical analysis had been completed and therefore could not be included in the analysis.

3.6 The Research Instruments

The instruments used for the collection of data for this study were questionnaire, consultation of documentary sources, and observation. These instruments were used because of the advantages associated with them as presented by Osuala (1982), and Ijeoma (1992). For instance, the questionnaire was used because of the economy it offered in terms of time and effort and its ability to demand for data in a uniform manner from all the respondents. The questionnaire also made it possible to reach some bankers who could have turned down interview requests because of their tight schedules. The consultation of the documentary materials, especially the Central bank of Nigeria publications, was meant to supplement the data collected through the questionnaire. Questionnaire also made it possible to generate data that could reveal the credit philosophy of Nigerian Commercial banks. Observation was used to obtain additional information not covered by the questionnaire and the documentary sources. The researcher visited two Training Centers and libraries of two commercial

banks. This provided the researcher the opportunity to observe the equipment and syllabi of these training centers.

3.7 Administration of Questionnaire

In administering the questionnaire to the bankers, the researcher made use of 19 research assistants. Each research assistant administered the questionnaire on the staff of the sampled banks of the town assigned to him.

3.8 The Pilot Study

The plot study was carried out in July, 1998 using the questionnaire. The questionnaire was pre-tested to determine its adequacy and effectiveness as an instrument for generating data for this study.

For the purpose of the pilot study, 18 copies of the questionnaire were administered on three commercial banks located in Kaduna and Bauchi. These banks were United Bank for Africa (UBA) Plc, Habib Nigeria Bank Limited and Inland Bank of Nigeria Plc.

The 18 copies were restricted to branch managers, branch accountants and branch credit officers. These categories of staff were selected because

of their direct link with commercial loan proposals analysis. Their responses to questions 4 and 11 revealed that every staff working in the operations could as well fill the questionnaire. This is because most credit officers were posted to the section/department within a period of two years. In fact, four of the six credit officers were posted to the unit within a period of less than one year.

Going through the responses to question 11, it was discovered that the managers and the accountants were credit officers before they assumed their present positions. These findings informed our decisions not to confine the filling of the final questionnaire to specific officers of the banks.

3.9 Data Analysis

Data analysis involves searching for trends and patterns of associations and relationships among data (Asika, 1991). The data from section A were analyzed descriptively because of the difficulty of applying statistical methods to analyze open-ended questions. The data obtained from Section B were analyzed using the Statistical Package for the Social Sciences (SPSS) of Norman et al (1975). The statistical method used to test the five hypotheses were the chi-square test of independence and correlation.

These two statistical methods were adopted because of the nonparametric nature of our variables and the assertion of Best and Kahn (1989) that chi-square test of independence and correlation are quite appropriate for testing hypotheses whose variables are expressed in nominal form.

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CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.1 Introduction

This chapter deals with the analysis of the data generated from the questionnaire administered on the commercial banks staff. The first part of the questionnaire (see section A of Appendix 2) was designed to gather personal data of the individual respondents. These data were meant to guide the researcher in drawing appropriate conclusions. The areas covered by this section included academic qualifications and experiences of the respondents. The second part of the questionnaire (section B of Appendix 2) addressed the research questions that generated the five research hypotheses. The areas included were reasons for evaluating commercial loan proposals, techniques used in evaluating commercial loan proposals, factors responsible for increasing bad debt losses, and the effect of bad debt losses upon commercial banks.

The analysis of the data is organized into two parts. The first part is made up of sections 4.2 through 4.8 and the data presented under these sections were analyzed qualitatively. The second part made up of section 4.9 was devoted to statistical analysis and hypotheses testing.

4.2 Banks Involved in the Study and Their Locations

Thirty banks located in 14 towns and cities of Nigeria were involved in this study. These banks included Afribank Nigeria Plc, African International Bank Plc, Allstates Trust Bank, Bank of the North Ltd, Chartered Bank Plc, Citizens Bank, Continental Trust bank Ltd, Diamond Bank Ltd, Ecobank Nigeria Plc, Equity bank of Nigeria Ltd, First bank of Nigeria Plc, FSB International Bank Plc, Gateway Bank Plc, Guarantee Trust Bank Plc, Gulf Bank of Nigeria Plc, Habib Nigiera Bank Ltd, Hallmark Bank Plc, Inland Bank Plc, Intercity Bank Plc, International Trust Bank Plc, Lion Bank of Nigeria Plc, Manny Bank Nigeria Plc, Savannah Bank of Nigeria Plc, Standard Trust Bank Ltd, Tropical Commercial Bank Plc, Union Bank of Nigeria Plc, United Bank for Africa Plc, Universal Trust Bank and Wema Bank Plc. The thirtieth bank, Trade Bank, did not return a single copy of the questionnaire and it was therefore excluded from the analysis.

The 14 towns and cities where the branches of these banks were located included Abuja, Aba, Bauchi, Gusau, Jos, Kaduna, Kano, Katsina, Keffi, Lagos, Maiduguri, Sokoto, Uyo and Zaria.

Table 4.1 Distribution of Respondents by Organizations

	Name of Bank	Copies of Questionnaire returned	Percentage (%)
1	Afribank Nigeria Plc	20	14.8
2	African International Bank Plc	7	5.2
3	Allstates Trust Bank	1	0.7
4	Bank of the North Ltd	8	5.9
5	Chartered Bank Plc	5	3.7
6	Citizens Bank	1	0.7
7	Continental Trust bank Ltd	1	0.7
8	Diamond Bank Ltd	2	0.7
9	Ecobank Nigeria Plc	4	3.0
10	Equity bank of Nigeria Ltd	1	0.7
11	First bank of Nigeria Plc	3	2.2
12	FSB International Bank	2	1.5
13	Gateway Bank Plc	1	0.7
14	Guarantee Trust Bank Plc	2	1.5
15	Gulf Bank of Nigeria Plc	1	0.7
16	Habib Nigiera Bank Ltd	18	13.3
17	Hallmark Bank Plc	2	1.5
18	Inland Bank Plc	1	0.7
19	Intercity Bank Plc	9	6.7
20	International Trust Bank Plc	2	1.5
21	Lion Bank of Nigeria Plc	6	4.4
22	Manny Bank Nigeria Plc	1	0.7
23	Savannah Bank of Nigeria Plc	10	7.4
24	Standard Trust Bank Ltd	5	3.7
25	Trade Bank Plc	0	0.0
26	Tropical Commercial Bank Plc	2	1.5
27	Union Bank of Nigeria Plc	4	3.0
28	United Bank for Africa	12	8.9
29	Universal Trust Bank	2	1.5
30	Wema Bank Plc	2	1.5
	Total	**135**	**100.0**

4.3 Personal Data

The data obtained in section A of the questionnaire revealed that commercial banks rarely kept their staff in a single Department or Unit for more than two years. For example, 71 out of 135 or 53% were posted to their current Departments or Units between 1999 and 2000, and 93 out of 135 or about 69% were posted to their present Department within the period 1997 to 2000. The bulk of the bankers that retained their posting from 1996 and earlier were either from head offices or zonal offices. The essence of these frequent changes could be to forestall the tendency of irreplaceable officer in a particular position. Other reasons may include making every staff conversant with all aspects of banking operations; assisting the bank in checking whatever excesses that staff could commit; and preparation of each officer for branch management. This finding support our result of the pilot study.

Majority (23%) of the respondents were from credit Department followed by operations, Admin/Control and consumers (13%) each while about 11% were from Funds Transfer Department. About 10% of the

respondents did not respond to the question requesting them to indicate their department or unit.

Looking at the distribution of the respondents one may be tempted to question the rationale for including officers outside the credit Department or Administration into a study that was designed to evaluate the procedures for granting commercial loans. The decision to include bankers from other Departments and units was borne from the responses obtained to the pilot study carried out in 1998. In the study, the following four categories of bankers were requested to fill the questionnaire: branch managers, deputy/assistant managers, branch accountants and credit officers. The rationale then was that these four categories of officers had direct link with processing of commercial loan proposals. However, the data obtained from the questionnaire revealed that the banks frequently transferred their staff across departments. Therefore, the staff you neglect because of his current posting to a particular department may have more relevant experience in credit analysis than the staff occupying the credit department at the moment. This finding has been confirmed by the current data where over 50% of the respondents were transferred to their current departments within the last one-year.