A DISSERTATION ON

DETERMINANTS OF LOAN REPAYMENT PERFORMANCE:
A CASE STUDY OF NATIONALIZED COMMERCIAL BANKS IN BANGLADESH.

Submitted in Partial Fulfillment of the Requirements for the
Degree of
Doctor of Philosophy
of the
University of Dhaka.

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April 03, 2004

DECLARATION

I hereby declare that the material embodied in this thesis is original. It has neither been copied nor submitted earlier in part or full for any other diploma or degree of the University of Dhaka or any other Universities/Institutions.

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ACKOWLEDGEMENTS

I would like to express my gratitude for the guidance, mentoring, and intellectual support provided to me by my advisor, Prof. Dr. Nurur Rahman. My respect for him has never dwindled over the years and continues to grow. I would like to thank Prof. Dr. Baqui Khalily for his suggestions and encouragement that went beyond the call of duty. My loving appreciation goes to my wife, Mahmuda for her emotional support during my Ph.D. studies. To my affectionate children Mishu and Duiti, I thank you for understanding my busy hours.

This study would not have been possible without the cooperation of the clients of Nationalized Commercial Banks, who sacrificed their time during the harvest time to give their input in a survey. Also, I am grateful to the Credit Information Bureau (CIB), Bangladesh Bank and some of faculty members of the Institute of Business Administration, University of Dhaka for their academic support of my work. Especially, I am grateful to my colleague Ms. Mahjabeen Ahmad, Associate Professor and Dr. Hamid Uddin, Assistant Professor, Institute of Business Administration for providing me the courage to complete the work. I benefited from their expertise and insights.

Finally, I thank my family and friends for their continual support and love that give me the strength to achieve my goals while providing me with the perspective to know what is truly important.

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ABSTRACT

This study focuses on the determinants of loan repayment performance in nationalized commercial banks in Bangladesh. Lending situation in four NCBs over the last ten years (from 1992 to 2002) show that there is a large amount of non-performing loans in NCBs. A number of empirical studies have been conducted in various countries on loan repayment problems. These include studies on loan repayment performance of different types of borrowers in financial institutions and borrowers' repayment behavior. The studies have indicated that a number of factors affect loan repayment performance. However, most of the studies have done in the context of the developed economies. Bangladesh, being an under-developed country has situation different from that of developed countries. Accordingly, a model focussing Bangladesh situation has been developed considering variables to address the country specific situation. The development of this type of model is the first attempt for a comprehensive analysis of the loan repayment performance in Nationalized Commercial Banks in Bangladesh. The suggested model is capable of capturing the situation prevailed in nationalized commercial banks. Factors such as promoters' characteristics, company profile, lenders loan processing and monitoring systems, measures taken for recovery of loan, macro-environmental factors have been explicitly included in the model as the major determinants having significant effect on the loan repayment performance of borrowers.

In order to evaluate the prevalence of positive and negative externalities that affect loan repayment performance, a survey of 125 public limited companies was conducted. The Logit model was used to test the marginal effect of variables involved in repayment performance. The results indicate that a company of good financial performance with good management capability has the good chance of repaying the loan. However, policy changes by the government and measures taken by the bank are also significant factors in loan repayment performance. The results of the empirical model suggests that modifications of lending procedures such as shorter loan processing and disbursement lagging time could enhance loan recovery. The model can be used to predict the loan repayment performance of borrowers of Nationalized Commercial Banks and other financial institutions operating in Bangladesh. This model may also be used to identify significant factors that affect loan repayment performance.

CHAPTER 1

INTRODUCTION

1.1. Statement of the Problem

One of the major problems faced by the NCBs is poor recovery of loan. There are a number of companies that did not repay their loans on time. According to the Credit Information Bureau of Bangladesh Bank (2002), the average number of classified borrowers as of December 2002 is 55.28 percent and the average amount of classified loans in NCBs is 38.33 percent. As of December 2002, the total amount of outstanding loans that had been disbursed by NCBs is Tk. 26.637 billion and total classified amount was Tk. 10.228 billion. The overall loan situation of four nationalized commercial banks from 1992 to 2002 is shown in Appendix A.

The financial sector of Bangladesh, which is dominated by banks, is in distress because of the large amount of non-performing loans, low recovery rates, weak institutional capacity for loan monitoring, and deficient legal framework for recovery of classified loan. The non-performing bank loan ratio increased from 32 percent to 40 percent between 1995 and 2002 (ADB, 2000). Although in recent years some improvement has been made in the legal and regulatory framework, these efforts have not yet proven successful in improving the situation of loan defaulting. The size of the classified loans increased by 10 percent during December 1995 – December 1996, reaching

to Tk. 111 billion which was 31.5 percent of total loans. By the end of the financial year 1997, it further expanded to Tk. 122 billion, which was 33 percent of the total loan portfolio. The nationalized commercial banks as a whole now have a classified loan burden to the extent of 45 per cent of the total loans disbursed by them [World Bank Report, 1998].

1.2. Research Issues

The subject of the present study is to identify the factors affecting loan repayment performance of borrowers in nationalized commercial banks. The banking sector as a whole plays an important role in the economy of a country irrespective of its level of development. The Commercial Banks, particularly Nationalized Commercial Banks (NCBs) have greater responsibilities both in the areas of productivity growth and in the performance of social obligations. Studies during the seventies and eighties have given a mixed picture on the performance of the banking sector. In his study, Cookson (1989) observed differential efficiency level between public and private banking industry where productivity in private banking was found to be higher than what it was in NCBs. He observed a declining trend in efficiency in the public sector and a mild increasing trend in the private sector. Chowdhury (1987) also observed a declining trend in efficiency in the banking sector till the mid eighties. Das (1989) attempted to measure bank-wise profitability and got a mixed picture.

All these studies were done prior to nineties. The realization since 1980's has been that the performance of the banking sector was severely constrained by

the policy and institutional weaknesses and endemic weakness of the management. However, one of the major drawbacks of all such studies is that they did not conduct in-depth analyses of the inefficiency at different lending sub-sectors. And as a result, the recommendations that came up were general in nature and no individual bank benefited from these studies. Thus, the critical question is: Why and under what circumstances would borrowers of nationalized commercial banks repay the loan? Also what factors are responsible for non-repayment of loan and to what extent each factor can explain such a default situation?

The study addresses on the following issues concerning the loan repayment situation in nationalized commercial banks:

1. What is the present loan repayment situation?
2. What institutional arrangement exists for lending activities?
3. What factors affect the borrowers in making repayment of loan?
4. What impact the factors have on repayment performance of borrowers?

Little, if any, published research addressed these issues in nationalized commercial banks in Bangladesh. Choudhury & Raihan (2000) observed that the government frequently extended concessions to some overdue borrowers (particularly in agricultural sector), which created " moral hazard problem" and incentives for other borrowers to be reluctant in the repayment of loan in the expectation that they might be accorded similar concessions. But they did not consider other factors related to the lenders' activities and borrowers' characteristics and their marginal effects on the loan repayment situation in Bangladesh.

1.3. Research Objectives

The research objectives have been built around the listed research issues. The broad objective of the study is to define and understand the mechanisms within the lending system of NCBs that affect repayment. The proposed exploration of loan repayment is intended to meet theoretical, empirical, and methodological objectives. Based on the theoretical foundation, an empirical estimation will be implemented with the purpose of developing a model capable of better isolating and defining the mechanisms influencing loan repayment. The model will incorporate borrower characteristics, company profile, loan sanctioning and monitoring system, and external factors as the predictive variables. Specific objectives are:

1. To examine the credit policy, institutional arrangements and operational technicalities in nationalized commercial banks.

2. To review the existing loan repayment situation in nationalized commercial banks.

3. To find out the mechanism of the credit system and the relevant characteristics of the lender that have necessary influence on loan repayment performance.

4. To identify the determinants that affect the borrowers in repayment of loan.

5. To assess the effects of macro-environmental factors on the repayment situation in nationalized commercial banks.

6. To describe the loan repayment characteristics based on the theoretical foundation and empirical estimation with the purpose of developing an

empirical model capable of isolating the effective factors that have positive and negative effects on loan repayment performance.

This dissertation will attempt to use a statistical technique (i.e. logit model) which is gaining more and more recognition in econometrics to test the model. The logit model allows for calculating the marginal effects of identified variables and estimating the probability of making repayment of loan.

In Bangladesh, little research has been done to find the factors that affect loan performance of the borrowers in nationalized commercial banks. The rate of non-performance of loan is increasing every year. The problem warrants a study to identify the determinants of loan-performance of the borrowers.

1.4. Research Approach

The study follows research processes as stated below:

1. A review of the literature covering the lending situation in financial institutions in Bangladesh and in other countries.

2. A conceptual framework describing the probable factors of loan repayment performance in financial institutions in different countries.

3. A model is developed to find out the effect of each factor on the loan repayment performance of borrowers.

1.5. Scope of the study

1. The study covers four nationalized commercial banks in Bangladesh. It includes Agrani Bank, Janata Bank, Rupali Bank Ltd. and Sonali Bank.

2. The study is limited to the borrowers drawn from public limited companies listed with Dhaka Stock Exchange in Bangladesh.

3. The study covers the borrowers consists of medium and large industries in private sector that have taken term loans from any of the NCBs. As stated earlier, only the companies operating in industries categorized by Dhaka Stock Exchange were considered for this study.

4. The study covers a ten-year period (from 1992 to 2001) during which loans from NCBs were availed by borrowers and repayment of loans were warranted.

5. Both unclassified borrowers and classified borrowers were covered. Unclassified borrowers are those who are not finally identified as defaulters by NCBs up to 2001. Classified borrowers are those who are identified as defaulters by NCBs during the period 1992 to 2001.

1.6. Limitations of Extant Models

Several economic studies (theoretical) have advanced the understanding of corporate loans. The mathematical formulations and proofs contribute to our understanding of basic bank-borrower processes. Most of the literature accepts the conventional wisdom that financial performance positively affects loan repayment. However, more critical studies have questioned the very foundation of the corporate lending performance. Few studies have attempted to dissect the complex process of loan repayment in a systematic and rigorous fashion. Most of the empirical studies are based on interpretive evidences rather than more scientific approaches. Nevertheless, simplifying assumptions limit the ability of these models to replicate the multitude of simultaneous processes occurring within a corporate loan process.

Nonetheless, the specification of the models appears to be ad hoc without a systematic technique for incorporating the empirical and theoretical findings. In this study the loan repayment characteristics are built on the theoretical foundation and empirical estimation with the purpose of developing an empirical model capable of isolating the factors that both have positive and negative effects on loan repayment performance.

1.7. Structure of the Dissertation

Chapter 2 includes the review on existing lending policies in NCBs, default situation in NCBs, institutional arrangements of NCBs for providing loans. This chapter also includes the extant literature findings on determinants of loan repayment performance in different countries and statistical techniques used for analyzing repayment performance of borrowers.

Identified variables that may have effect on loan repayment performance are described in Chapter 3 with relevant hypotheses that are required to test the determinants of loan repayment for lending programs.

Chapter 4 includes the specifications and measurement criteria of variables. Chapter 5 highlights the key features of methodology used to collect data and make analyses. It includes sampling method and the econometric model used in analyzing variables.

Chapter 6 describes analytical frameworks and techniques, summarizes findings, analyzes marginal effects of variables, and develops models to determine the probability of loan repayment performance.

Finally, Chapter 7 draws conclusion on research findings, describes implications of models and points to further research agenda that could provide additional insight into lending problems

CHAPTER 2

LITERATURE REVIEW

This chapter presents a review of the literature covering the lending situation in NCBs, extant literature findings, and statistical techniques used for determining loan repayment performance of borrowers in different countries.

2.1. Lending Situation in NCBs

A bank in the usual and traditional sense is a financial institution offering following two major services to the public:

a. Transaction accounts, which may be used for safekeeping of deposit savings of the savers and make payments for purchase of goods and services, and
b. Direct loans to business, individuals, and other institutions.

Nationalized Commercial Banks (NCBs) are such types of financial institutions which offer the above mentioned two major categories of services. Specially, NCBs offer financial services such as time and saving deposits, lease financing, financial advice and counseling, portfolio management, the safekeeping of valuables, transfer of securities, etc. The principal assets of NCBs are loans and advances made directly to business firms, individuals and families, security dealers and other types of borrowers.

Nationalized Commercial Banks give commercial loans to business houses to assist in financing working capital needs, and other legitimate business purposes. Banks lend large amounts to manufacturing companies, service organizations, farmers, security dealers, and other financial institutions. The loan may provide fund for short-term uses such as temporary working capital needs and construction expenses. In that case the borrower might have obtained a commitment for long term financing from other lender for long-term uses such as purchase of new equipment and for plant expansion.

With a view to augmenting the availability of long term investment fund in the industrial sector, the government has entrusted the Agrani Bank in 1998 with the responsibility of issuing 5-year and 7-year government guaranteed Industrial Development Bonds worth Tk.500 crores. The rate of interest on the 5-year bond, is 10.0 percent and on the 7-year bond 11.0 percent. Till June 2000, Agrani Bank sold bonds worth Tk. 203.45 crores and disbursed loans of Tk. 31.02 crores.

Another initiative to augment the supply of term investment fund in the industrial sector was in process for issuance of US$ 100 million foreign currency denominated bond of 5-year maturity through Sonali Bank for purchase by non-resident Bangladeshis (Bangladesh Bank Annual Report, 2000/2001).

Janata Bank has been financing for establishment of Small, Medium & Large sized Industries and providing Short, Medium & Long-term Loans. Financing

under this programme is being conducted by Janata Bank through its 106 designated branches. The Bank has so far disbursed Tk. 351 crore since inception for establishment of 1,205 number of various types of industries and an amount of Tk. 215.29 crore has already been sanctioned during the last six months.

Although Bangladesh has recently made some reforms in the financial sector, the banking system remains underdeveloped, inefficient, and dominated by state-owned banks. According to the Economist Intelligence Unit, "State-owned banks—the nationalized commercial banks (NCBs)—dominate the financial sector. Since the government is the owner, regulator and customer of the NCBs, there has been ample opportunity for mismanagement and political interference." The U.S. Department of State adds that, "Despite market reforms, such as the liberalization of interest rates, the government continues to encourage its own banks to lend to 'sick' industries in both public and private sectors.

The government formed a committee in 2002 headed by Professor Wahiduddin Maumud with the assignment to look into the problem of defaulted loans. In July 2002, the Bank Reforms Committee found that the percentage of the defaulted loans over the last five years (1996-2001) was the lowest. The fact surfaced when the committee analyzed the trend of the country's default loans over the last three decades (INAM AHMED and SHAHRIAR KARIM, Daily Star 10/7/2002). The committee divided the three decades into three periods — 1971 to 1980, 1981 to 1990 and 1991-1995 and

then calculated how much of the total loans disbursed during the periods were defaulted. As per their latest statistics, total classified loans of the country's banking sector was Tk 23,390 crore. They added that the percentage of default loans during the first 20 years was very high. Till 1990, about 73.22 per cent of the total disbursed loan turned bad and the amount of defaulted loans stood at Tk 10,100 crore. Between 1991, and 1995, there was some improvement. Yet, 51.37 per cent of the total disbursed loans during the period was classified as defaulted loan and the amount stood at Tk 5,911 crore. The significant change in the default bank loan trend took place during 1996-2001 when 36.04 per cent of the total disbursed loans was defaulted in NCBs. The amount of the defaulted loans during the period stood at Tk 7,400 crore. The committee decided to look into the present system of rescheduling the defaulted loans and held that the Bangladesh Bank should not get involved, in any way, in the process of sanctioning loans by different banks. As per the present rule, the commercial banks have to take permission before sanctioning loan if the amount is more than 15 per cent of a bank's paid –up capital. Also, the banks have to take clearance from Bangladesh Bank in rescheduling the defaulted loans.

At a seminar held on 30th April 2001, Former Finance Minister, Shah AMS Kibria observed that reluctance of banks, law officers, and others involved in the process created a backlog of long-pending loan cases in courts. He urged all concerned to be more responsive to the need for restoring discipline in the banking sector. He referred to stay orders and other causes delaying enforcement of law in recovery of default loans. Apart from reforming laws,

the then finance minister has observed, sincere efforts are required from all relevant individuals and organizations to enforce the law properly and quickly to have a more efficient financial sector, which is the key for sustainable economic growth.

Prof. Wahiduddin Mahmud in 2002 has mentioned that a strong political will is more important for removing deep-rooted problems in the banking sector. He has pointed to the inherent problems in the legal process and lack of proper attention that are hampering settlement of loan cases. Prof. Mahmud suggested irregularities in different banks, reported to the central bank, should be made public and there should be no secrecy and hiding of facts.

According to Hossain and Rashid, (1997), many nationalized industries have incurred heavy losses and, under instruction of the Government, the NCBs have provided loans to keep them alive. Loanable funds became scarce after the priority sectors were accommodated and interest rates were negative in real terms. Thus, private sector demand has been rationed among the economically and politically powerful ones. This has contributed to inefficiency in investment and the nonpayment of loans.

The country's aid-based development strategy is alleged to contribute to the bad-debt problem. Business houses do not pay their debts because they know that sooner or later the aid giving agencies will refinance the banking system and past loans will be written off (Hossain and Rashid, 1997).

The newly permitted private banks were expected to create a competitive environment for the banking system, but that is yet to be seen mainly because of the dominance of the nationalized commercial banks in the money market. The loan portfolios of the private banks have a much narrower range than that of the nationalized commercial banks. Being private and profit oriented, these banks are more likely to avoid loans that are risky even if they serve the purpose of development, and avoid small clients and unattractive locations even if they are considered socially desirable. Thus, the nationalized commercial banks are steadily filling these gaps. This action, along with loans to ailing state owned enterprises (SOEs), has burdened the portfolio of the nationalized commercial banks.

Before the financial sector reform program (FSRP) in 1990, loan portfolios had deteriorated as interests payments were waived and certain borrowers had segregated their loans into 'blocked accounts' (not subject to the normal pressures to keep up payments). Some borrowed more money to set-up their own private banks or insurance companies and evidence suggests that defaults were linked to considerable capital flight through the unregulated hundi markets.

Prof. Mahmud in 2002 observed that one of root causes of non-performing loans in Bangladesh may be "managerial and institutional weakness". Project appraisal capabilities are weak, and appraisals are often based upon unreasonable assumptions about the policy environment. Debt recovery is poor, and the lack of adequate management information systems compounds

the problem. Structural Adjustment Participatory (SAP) Review for Financial Sector in Bangladesh was taken up in 2000. The SAP designers argued that particularly, in the NCBs the efforts are continuing to reduce administrative costs, but not intensifying loan collection process (Choudhury & Raihan 2000).

Most of the modern industrial sector of the country is concentrated in 20-25 business groups. Indeed, this is the common phenomenon in Asia. These groups are led by a small family group (the core) which invests over time in a number of companies, each of which effectively operates independently but under the direction of the core. The financing of industry is largely through bank borrowing. Individual groups expand depending on bank credit for leverage. In the high interest rate environment of Bangladesh and considerable business risks this approach is fraught with extreme danger.

Bank lending is structured on providing collateral for loans. The concept of asset based, rather than activity based, lending has dominated commercial banking in Bangladesh. For a limited company it is the practice to demand as collateral guarantees or real estate from directors in addition to the assets of the borrowing company. The belief is that this is additional security in the event of default of the loan as the assets of the defaulting company may be insufficient to cover the debt. The banks are extra cautious and distrust the borrowers because the legal system provides little support to the lenders. Ironically, collateral has no impact as the collected collateral value is about 10% of the loan balance. Moreover, in the meantime, the default loan

balances may become two or three times the original loan due to accumulating interest. Bank lending is generally completed when there is collateral present, even though such collateral has little real value. Along with the problems as mentioned, an inadequate legal and judiciary framework intensified the loan defaulting problems.

2.2. Institutional Arrangements for lending

NCBs provide rural credit, credit to borrowers in agro-based industry, trade credit, credit for export/import, credit to industrial borrowers, and credit to individual. Different levels of management of a bank perform different phases of lending activities for making the lending decision. The authority of a level of management for sanctioning loan depends on the amount of loan requested by the borrowers. Management for making the lending decisions are divided into following three levels:

a. Branch Management
b. Zonal Management
c. Head Office

Branch Management

This level of management gives importance to the experience of the borrowers in the relevant field, transaction records, and state of the security. Branch management physically inspects the state of the collateral and other securities. It appears that the branch is more interested in the security.

Borrowers apply in a prescribed application form along with necessary documents and information to a specific branch of the bank that has the necessary technical know-how and financial analysts to evaluate the industrial credit proposal. The prescribed application form consisting of five sections requires the following information.

a. Project, borrower, proprietorship and management related data,
b. Description of the project,
c. Project expenditures and financial sources,
d. Marketing and selling strategy, and
e. Economic feasibility of the project.

After receiving the application for industrial loan, the branch examines the documents and information for ensuring that the necessary documents and information are included. If any discrepancy or inadequacy of documents or information exists, the bank returns the credit proposal to the borrower to eliminate discrepancies and to include the relevant documents. If the borrower does not fulfil the requirements, the credit proposal is not processed.

If no discrepancy exists or after fulfilling necessary requirements, the concerned branch evaluates the project's technical and financial feasibility. Technical experts and financial analysts of the branch prepare technical & economic feasibility reports on projects. If the project is technically sound and economically viable, the manager of the branch forwards the credit proposal to the principal office with recommendation in line with the feasibility report. If

the project is not technically and economically feasible, the concerned branch does not forward the proposal for credit.

Zonal Management

When the principal office receives the proposal of credit with a recommendation from the concerned branch to evaluate the proposal, it takes necessary steps to verify the adequacy of information and required documents to arrive at a decision about the project. If any discrepancy in information or documents exists, the principal office sends back the credit proposal to the branch office for necessary ratification.

If the principal office finds no discrepancy or the branch sends back the proposal after ratification of information and documentation, the principal office moves ahead to assess the project's technical and economic feasibility. It's technical experts and financial analysts conduct the technical and economic feasibility studies in more detail. Technical experts and financial analysts prepare a report on project's technical and economic soundness. Based on the reports provided by technical group and financial specialists, the principal office decides whether the credit proposal is forwarded to the head office. If the project fails to cross the technical and economical hurdle, the evaluation procedures of the project come to an end.

If the project successfully passes the technical and economical feasibility tests, the principal office sends the proposal with a recommendation to the head office.

The zonal office uses no additional decision criterion. If the zonal office is not satisfied with the securities, officials of the zonal office visit the security to find out its real value.

Head Office

The Industrial Credit Department (ICD) of the head office deals with the activities of industrial credit. It is authorized to verify the proposal's necessary requirements and to evaluate whether or not it is fit for getting loan. When a credit proposal comes to the head office, it takes necessary steps to verify the following:

1. Adequacy of Information provided by the borrower,
2. Verification of project's land by an engineer to ensure the land is suitable for establishing the project,
3. Valuation of the land on which project will be built, and
4. Adequacy of infrastructural facilities for efficient operation of the project.

The engineer of ICD makes a report on the technical feasibility of the project and submits it to the proper authority. He recommends the project if it is technically sound. If any inadequacy of information exists, the proposal is sent back to the borrower through the principal & branch office to fulfill the information gap.

If ICD receives the report from the engineer with a positive recommendation, departmental procedures start for granting the loan. At first, ICD sends letters to other national, private and multinational banks to know about the

borrower's credit status. Also, it collects the credit status information of borrower from Credit Information Bureau of Bangladesh bank. If the borrower is identified as a credit defaulter by any bank, ICD sends a letter to the borrower to regularize the other loan accounts by making repayment of the due installment or rescheduling the earlier loan account. If the borrower responds positively or if ICD receives favorable responses about the borrower's credit status from other bank, ICD moves to the subsequent procedures. If the feasibility report submitted by the engineer is positive, General manager (GM) of the ICD makes a note to the higher authority to approve the project. After the consent of the GM of ICD, the proposal is evaluated in terms of technical feasibility, financial, and market acceptability. The proposal has to cross three hurdles that are described below:

Technical Feasibility

A group of technical experts including a civil engineer and a mechanical engineer and a technical expert from the related area evaluate the project's technical feasibility. For example, if the project is textile-oriented, a textile engineer is included in the expert group. The 'technical group' evaluates soundness of the proposed machinery that should produce the goods or would render the service efficiently, proposed process design, proposed layout of the machinery, and other related technical aspects. After evaluation of the project, the expert group prepares a feasibility note about the project for the consideration of higher authority.

Marketing Feasibility

A marketing specialist (internal) evaluates market acceptability of the product(s) or services of the project. Authorized personnel collects relevant secondary information to verify the current market condition and future demand projection, and other relevant marketing aspects. He then prepares a report on marketing acceptability of the products or services that would be produced and sends it to the higher authority for decision making. If relevant secondary data are not adequate for decision making, the marketing specialist attempts to conduct a survey to determine the market acceptability of the project.

Financial Feasibility

A financial analyst evaluates the project's financial acceptability. He/she attempts to determine the following:

1. Total fixed cost of the project,
2. Estimated financial statement for next two/three years; the statements include projected Profit and Loss statement, and Balance Sheet,
3. A clear picture of the project's financial acceptability, he/she uses various capital budgeting techniques such as **IRR** (Internal rate of return) **NPV** (Net present value), **PI** (Profitability index), and
4. Loan limit and equity participation; for all types of industry except software industry, the debt-equity ratio is 50:50. The ratio for software industry is 80: 20.

Approval of Loan

Based on the findings of technical, marketing, and financial feasibility reports, higher authority decides whether credit proposal should be granted. The

ultimate decision-maker for credit approval depends on the amount of credit applied for as indicated in Figure 2.1.

Position	Amount of Credit
GM of ICD	Allow the loan up to Tk. 75 Lac
DMD	Allow the loan up to Tk. 1 Crore
MD	Allow the loan up to Tk. 1.5 Crore
Credit Approval Committee	Allow the loan from Tk. 1.5 Crore to Tk. 10 crore

Figure 2.1: Authority for approval of Loan Amount

Source: Bangladesh Bank

Credit Approval Committee consists of the following six members.

i. Chairman of the Bank,
ii. One member from chamber of commerce,
iii. One member from the political parties,
iv. One member from Bangladesh Bank, and
v. One member from Ministry of Finance.

Generally, Credit Approval Committee takes decision about credit proposal up to Tk. 10 crore. It also has the authority to decide about loan amounting more than Tk. 10 crore; but it depends on the consensus decision of the committee. If the committee is not interested in allowing a loan more than Tk. 10 crore, a consortium comprising of representatives from several national, private, and multinational banks specified by the Central Bank takes the decision.

Evaluation of the Loan Proposal

Risk is the factor that the bank wants to minimize in case of lending. The level of risk varies with the amount of loan to be taken by the borrower. Thus, banks make Lending Risk Analysis (LRA) to evaluate the overall risk of the business by segmenting the risk factors from different aspects. This is done for Industrial credit because the amount of loan for which LRA is done fall under this category only. Banks take extra precaution in case of industrial credit where huge sum of money is at stake. The human judgement of the assigned bank officer plays the major role in deciding the risk factor of that individual borrower. A detail on Lending Risk Analysis is shown in Appendix B.

2.3. Lending Policies

NCBs have a set of objectives clearly specified for the term loan scheme. The direction and overall framework of NCBs term loan scheme are dictated by these objectives. The loanable funds of NCBs are targeted towards the industrial development of the country. It is the policy of NCBs to ensure that loans granted to an organization are channeled only to the purpose for which the loan is granted.

Term loans are usually given to industrial undertakings for setting up new units/facilities or for BMRE (Balancing, Modernization, Replacement, and Expansion) projects. They are usually long-term in nature with a high risk

factor. Consequently, term loans require more scrutiny and evaluation from bank's point of view. Term loan is provided against a particular project and the disbursed money cannot be used on any heads other than that project. Sanctioned credit amount is disbursed usually in three equal phases:

1. After disbursement of first phase, the bank regularly monitors the activities of the project to ensure that the entrepreneur also invests his/her own equity,

2. Within two month of first credit disbursement the entrepreneur must invest a matching amount of equity for the construction of building, and

3. If the entrepreneur does not invest his/her own equity, the second phase of credit will not be disbursed. In that case, bank also has the authority to collect the disbursed credit amount and interest, as well.

Where after the project goes with operation, the bank monitors the activities of the project. Entrepreneur is usually allowed for one year to start the production of the project after receiving the first installment of the credit.

Sometimes, problems arise in project development stage when the cost of project goes up and the project requires more money. This is called "cost over run" effect. In this case, entrepreneur has to apply to the bank for more money to meet the additional cost describing reasons for increased cost. If the bank authority considers the reason of excess cost is valid, it approves more money. Otherwise, the excess cost has to be financed by the entrepreneur from his/her own funds.

Two types of schedules are determined for payment of principal amount of credit and interest. In the first schedule, bank calculates the interest on the principal amount for the first 18 months from the first disbursement of loan. Calculated interest amount on principal is divided into five-equal parts. The date for five one-yearly installment payments is then determined.

Under the second type of schedule, entrepreneur has to pay quarterly installment according to the schedule of the bank. Installment payment starts after 18 months of the first credit disbursement. The first disbursement will become due in the 21st month. Sometime organization has to face 'Time Over Run' effect. This means, due to some unavoidable reasons the production of project is delayed. In that case, entrepreneur has to apply to the bank for restructuring the credit payment schedules. If the branch office finds it logical they recommend it to the higher authority for further action. If the authority finds the ground logical, payment schedule is restructured in supersession of the first installment schedule.

As prescribed by Bangladesh Bank, loan repayment status are classified into three categories such as Sub Standard (SS), Doubtful (DF) and Bad & Loss (BL). According to Bangladesh Bank, criteria for determining the preliminary classification status for term loans up to 5 years are shown in Figure 2.2 and the criteria for term loans over 5 years are shown in Figure 2.3.

Period of Arrears	Classification Status
Less than 6 months	Unclassified (UC)
6 months to less than 12 months	Substandard (SS)
12 months to less than 18 months	Doubtful (DF)
18 months or more	Bad Loan (BL)

Figure 2.2: Status of borrower for term loans up to 5 years

Source: Bangladesh Bank

Period of Arrears	Classification Status
Less than 12 months	Unclassified (UC)
12 months to less than 18 months	Substandard (SS)
18 months to less than 24 months	Doubtful (DF)
24 months or more	Bad Loan (BL)

Figure 2.3: Status of borrower for term loans over 5 years

Source: Bangladesh Bank

In case, if any account is classified as SS, DF or BL the bank pursues the borrower for regularization of account by repayment of over dues.

If Borrower is not able to make repayment of over dues for regularizing the account, he is advised to reschedule the liability for regularization of Loan account.

To reschedule the Loan liability the borrower has to take the following two measures:

1. The borrower shall have to deposit 10% of overdue as down payment, and
2. Adequate collateral security is to be offered to cover the rescheduled Liability.

If the borrower fails to reschedule or by other means to regularize the account, a final notice is given to the borrower for repayment and regularizing the account with the stipulation that if he fails to do so, action against the borrower is taken up.

The following procedures are followed to collect the amount lent to the entrepreneur along with interest on the principal account:

1. The bank communicates with the entrepreneur to remind the entrepreneur to pay the first installment within due date,

2. If the installment is not paid in due date, bank gives a persuasive letter to the entrepreneur to pay the first installment.

3. If the amount has yet to be paid, another letter is sent to the debtor to request him/her for the payment within a specified date. If the entrepreneur does not respond, the bank sends two more reminder letters. In the meantime, authorized personnel of the bank could meet the debtor physically to persuade for payment of the installment,

4. After completion of the procedure (3) and if the installment has yet to be paid, bank sends another letter with warning of legal action to be taken against the debtors. Procedures (2), (3) & (4) require a period of three-month. After completion of the procedures as stated above, the second installment becomes due. Then, bank gives a letter to the debtor by identifying him/her as a credit defaulter and delivers the information to the other bank and the central bank,

5. A legal notice is then given to the debtor by indicating specified time to pay the overdue amount failing which he will be sued by the bank after the specified time period, and

6. If the debtor does not pay the amount, a legal case is filed against the borrower to recover the entire dues.

2.4 Default Situation in NCBs

Defaulting amount in nationalized commercial banks (NCBs) in 1990 stood at $ 1.1 billion, when the World Bank stepped into the banking sector with its Financial Sector Reform Program (FSRP). FSRP set out to liberalize interest rates, improve banking supervision, improve loan recovery, adopt international standards of loan classification and realize adequate capital reserves, improve the operation of money and capital markets, and Institute management reforms across the sector. Inspite of all these measures, the total of 'bad debt' had grown to $ 4.3 billion by the end of the 1990s.

Nationalized commercial banks are now bearing a heavy burden of default loans amounting to about Tk 9,430 crores. Major portion of the amount is rated as bad loan. Despite mobilization of high efforts for collection of bad loans and to prevent default loan culture during the last one decade, the amount of default loans stood at 34 per cent of the total loans disbursed so far. The default loan declined to 32 percent at the end of 1996 but in the next year it again rose to 37 percent of the total loans disbursed. It clearly indicates that absolute amount of default loans remarkably increased over the years in spite of building awareness against default loan culture. The loan situation including total outstanding loans, classified loans and default rates in NCBs are shown in Appendix A.

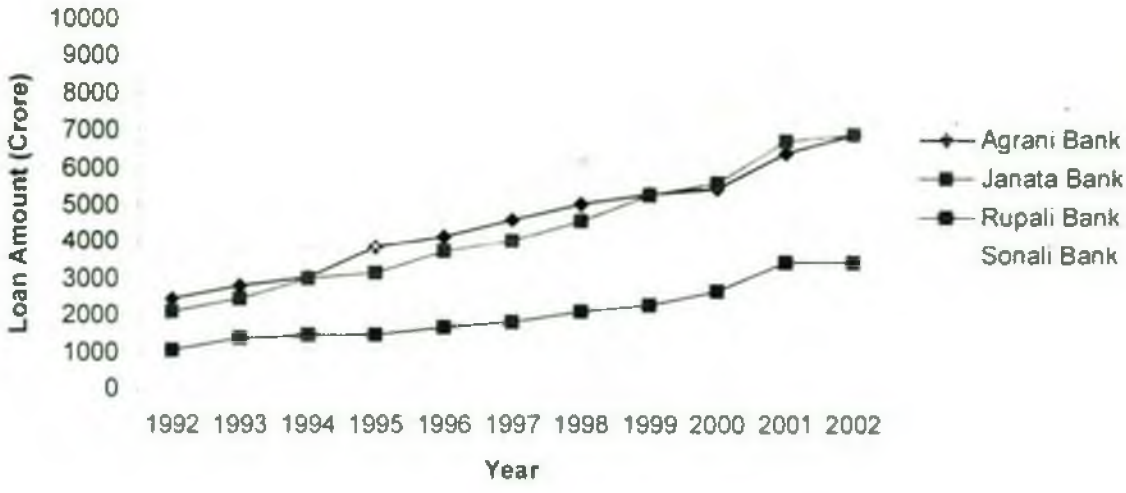


Figure 2.4: Trend in Outstanding Loan Amount in NCBs

The trends of outstanding loans in 4 (four) nationalized commercial banks in different years are shown in Figure 2.4. The amount of outstanding loan provided by nationalized commercial banks stood at Tk. 26,639 crores in 2002 which was 5.32 percent higher than that in year 2001. The growth of total outstanding loan amount in all NCBs varied between 5 percent and 17.7 percent in different years. The growth was highest in 2001, the year of national election of the country and was lowest in 2002.

The trends of classified loan amount from 1992 to 2002 are shown in Figure 2.5. The total classified loan in 1992 was Tk. 2,307.70 crores and increased to Tk. 3,503.54 crores in 1993 which was 51.82% higher than that was in the previous year. The amount decreased by 7% in 1994 and 4% in 1995. From 1996, it gradually increased and the amount of total classified loan in 2002

stood at Tk.10,208 crores which was 38.32% of the total outstanding loan in NCBs.

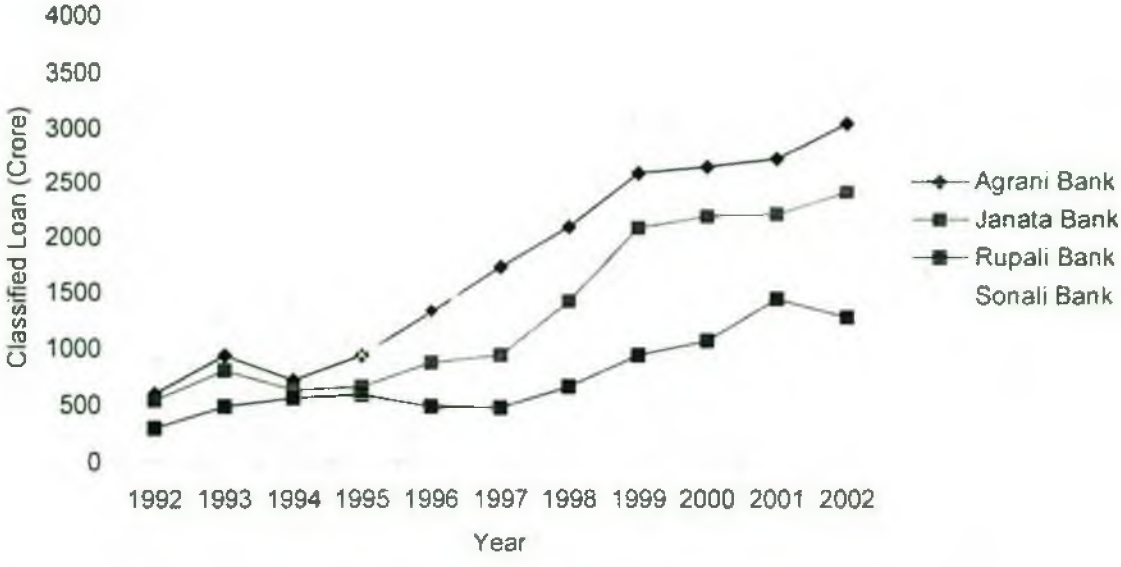


Figure 2.5: Bank-wise Trend in Classified Loan Amount in NCBs

Figure 2.6 shows the trends of default rate in nationalized commercial banks in different years. The default rate in 4 (four) NCBs varied between 20.65% and 48.73% in different years from 1994 to 2002. The lowest default rate was 20.65% in Janata Bank and the highest was 48.73% in Agrani Bank. Default rates in Agrani and Janata Banks increased every year from 1994 to 1999. From 2000, the default rate had a decreasing trend but in 2002, it increased further in these two banks.

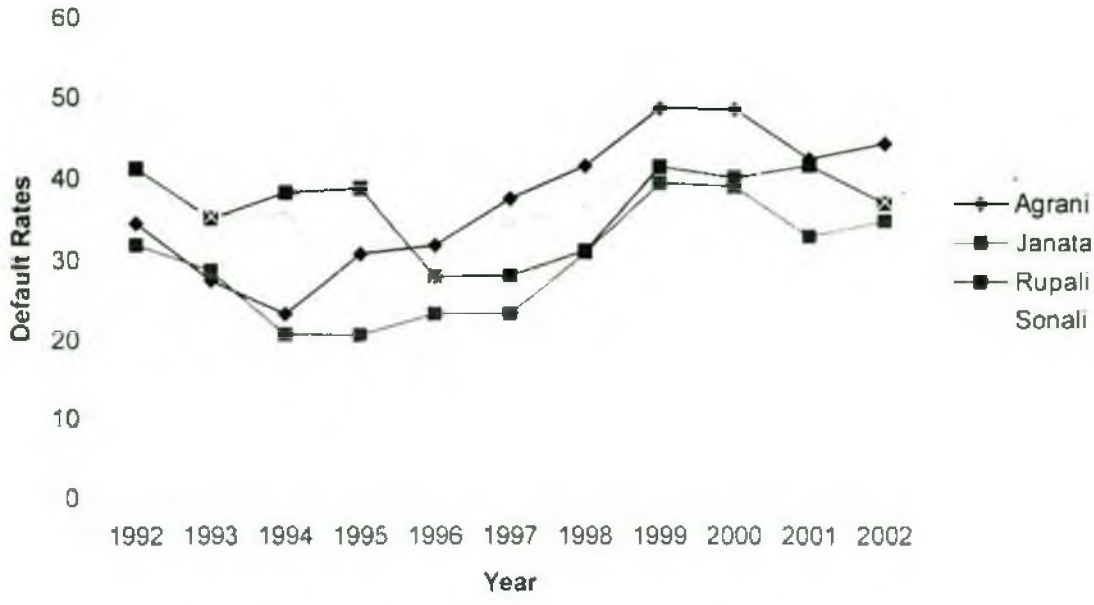


Figure 2.6: Bank-wise Trend in Default Rates in NCBs

In Rupali Bank, the rate decreased sharply from 38.75% to 27.97% in 1996 but from 1997 the rate increased gradually and reached to 41.43% in 1999. The rate was almost same in following two years and decreased to 36.97% in 2002. In Sonali Bank, the rate decreased sharply from 35.68% to 25.83% in 1995 and kept on increasing and reached to 44.90% in 1999. It then decreased to 35.21% in 2001 and again increased in 2002. The mean default rate is better in Janata Bank and the situation is worst in Agrani Bank among four NCBs.

2.5 Extant Literature Findings

This research was motivated by the poor loan performance in NCBs and by a few studies on determinants of repayment performance considered in various countries. A number of empirical studies have been conducted in various countries on loan repayment problems. These include studies on repayment

performance in financial institutions and borrowers' repayment behavior. The studies have indicated that there are a number of factors affecting loan repayment performance. Factors such as income from business, productivity, business experience, input and output prices, loan utilization, lenders loan processing and monitoring systems, interest rate charged by bank, etc. have been identified to having influence on loan repayment performance (Ogunronbi, 1974; Singh et. al., 1986; Arene and Nwagbo, 19'32, Osuntogu et. al., 1992 Idress and Ibrahim, 1993). In addition, there are studies which reveal that poor repayments seem to depend more on the attitude of the borrowers rather than their economic conditions (Penny, 1968; Rusli, 1960; Jama and Kulundu, 1992).

In Latin America, many external crises over the last twenty years have been attended by difficulties in the financial sector. The situation in Chile during 1982, in Mexico during the so-called "tequila effect", etc. are two clear instances. Sometimes, these external crises lead to a local currency devaluation (it happened in case of Chile and Mexico) that magnifies the crisis and evidences a weak financial system, in which debtors are unable to pay their obligations. In this case, the economy faces a generalized crisis, which causes more unpaid loans than what has been usual.

The persistence of the banking problem is attributed to a lack of political will to deal with the root causes. The banks may be deterred by the perceived strength of the major defaulters, and the fear of possible bank runs if weak banks are closed (Wade et al., 1998). Usually, nationalized commercial banks

suffer from weak corporate governance, and the concentration of non-performing loans to some borrowers is indicative of an imprudent credit policy. The private banks are reported to be hampered by insider lending, fraud, and negligence (Wade et al., 1998).

According to De la Cuadra and Valdés (1992) if banks are not prepared in terms of technology, human capital and managerial ability to handle the new situation of a free financial market, they tend to have riskier portfolios, higher interest rates and spreads owing to a poor risk evaluation. The same is true if the Superintendency of Banks and Financial Institutions lack the know-how required to monitor and control risk, primarily on account of the absence of a prudential regulation (De la Cuadra and Valdés, 1992).

A borrower-bank relationship can affect the loan performance because close and continued interaction between a firm and a bank may provide the later with sufficient information about the firm (Petersen and Rajan 1995).

There is a problem of asymmetric information in the credit market, that translates into moral hazard and adverse selection problems, as creditors are able to partially observe the behavior of the debtor. On the other hand, there are risks to the debtor's project; for instance, an economic shock, that may entail problems for the debtor as regards paying the debt (Besley, 1995).

Creditworthiness of the borrower in terms of his personal characteristics, repayment ability, management capability, and existence of collateral offered

are important determinants of loan performance. From a survey, it has been found that there is no integrated model to evaluate the overall creditworthiness of the borrower taking into account the relevant variables in the commercial banking system (Alam & Rahman, 2001).

J. Rodrigo Fuentes & Carlos P. Maquieira (1998) investigated to see what were the determinants to repay a loan in the Chilean financial market. The specific goal is to identify the institutional arrangements whereby creditors ensure that borrowers will repay the debt and to analyze the effects of these arrangements on borrowers' behavior. A satisfactory performance of the Chilean credit market, in terms of loan repayments, hinges on a good information sharing system, an advanced collection technology, macroeconomic performance, and major changes in financial market regulation. Dilatory credit evaluation system, delayed disbursement of loan, allocation of inappropriate fund by the lender may hamper the maximum utilization of loan by the borrower, which may cause bad debt.

Ade S. Olomola (1999) made a research on the determinants of smallholders loan repayment performance in Nigerian micro-finance system. The objective was to examine the design of micro-credit and the operational features to ascertain the nature of loan repayment problems and to analyze the factors affecting repayment performance under micro-finance program. Olomola found that education, experience, savings had significant effect on loan repayment performance. There are also many extraneous factors that are responsible for the inability of borrowers to fulfill their repayment obligations.

These include the general economic conditions such as instability of product prices and natural constraints such as inclement weather.

Julia Anne Paxton (1996) made a research on the determinants of successful group loan repayment in Burkina Faso. The variables included are: client location, the history of working in groups, and leadership and training. She showed that group lending repayment rates could surpass individual rates if the positive externalities of group lending could outweigh those negative externalities such as the domino effect[1]. In the case of Burkina Faso, negative influences on repayment were witnessed, including the domino effect and the matching problem. However, these negative externalities may be counteracted by reducing sectoral liability, increasing training and contingency plans, and targeting groups with sufficient economic diversification and experience working with groups.

Abu, Shaari, and Azhar (2000) made a study on the loan repayment behavior among the rubber farmers in nucleus estate projects in Malaysia. The study

indicates that the repayment behavior of a farmer is positively related to his or her educational attainment, farming experience, productivity, other sources of income, attitude towards loan repayment, knowledge about the rubber production technology and satisfaction with the project activities and services, but is negatively related to age, family size. In addition, factors such as income from other sources, productivity, farm size, farming experience, input price, output price have been identified to have affected the loan repayment

[1] Domino Effect is the consequence of one event triggering a series of similar events.

performance (Ogunronbi, 1974: Singh et. al., 1986; Arene and Nwagbo, 1992, Osuntogu et. al., 1992 Idress and Ibrahim, 1993).

2.6 Conceptual Framework

Based on the findings of the existing study, the variables which may influence loan repayment performance can be broadly classified into four factors: Promoters' Profile, Company Profile, Lender Related Causes and Macro-Environmental Factors. A conceptual model of loan repayment performance has then been derived and presented in Figure 2.7.

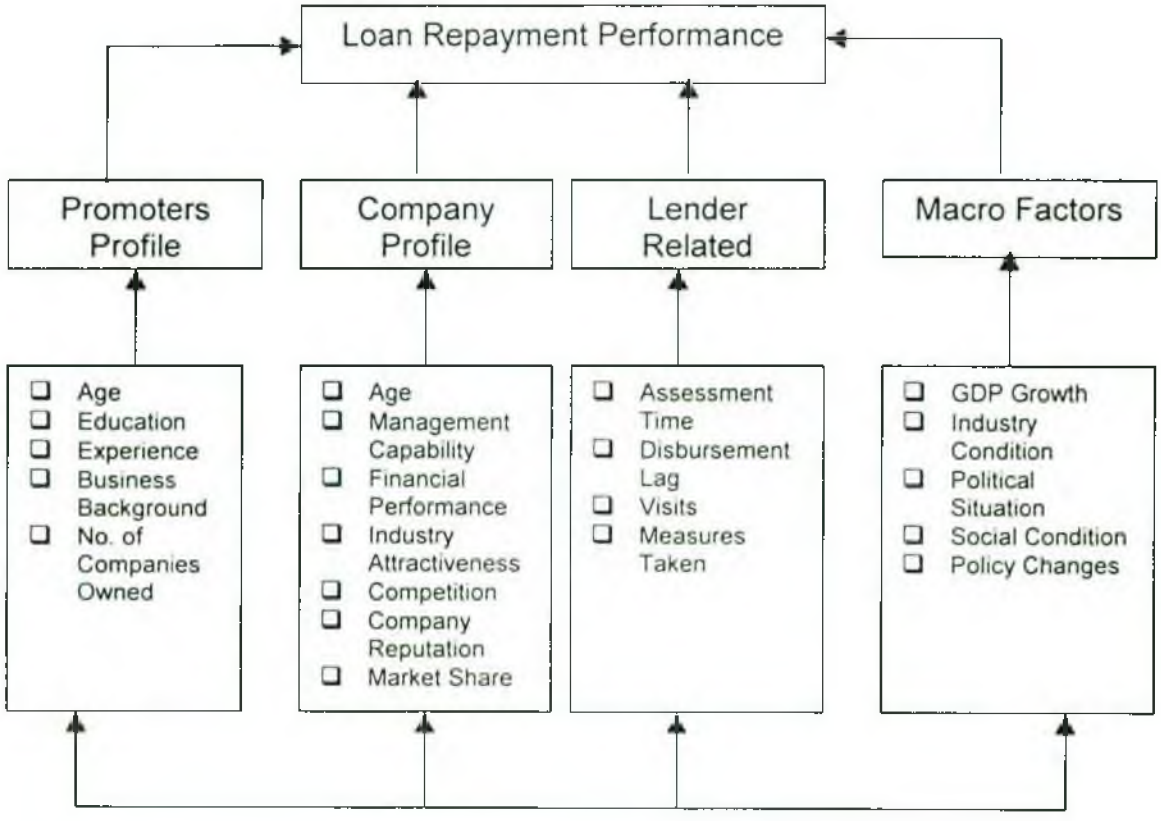


Figure 2.4: Conceptual Model of Loan Repayment Performance

The model is a comprehensive one and should be capable of capturing the relevant variables underlying the problem in Bangladesh. A number of variables has been included to measure each factor.

The factor promoters' profile consists of five variables namely, age of promoters of a borrowing company, educational qualification of promoters, their total and related business experience, family business background of promoters and number of companies owned by them.

Company profile includes seven variables such as age of the company, capability of management people of the company, overall financial performance of the company, industry attractiveness, competition prevails in the industry, reputation of the company, and market share enjoyed by the company.

Four lender related variables namely, assessment time of loan application, loan amount disbursement lagging time, visit of the borrowing company by bank officials, and measures taken for recovering loan amount may affect the loan repayment performance.

Macro-environmental factors may also affect the loan repayment performance. Factors include GDP growth of the country, overall industry conditions, political situation (hortals called by political parties), social condition (number of crimes) and changes of government regulations.

Each variable in these four major categories may have marginal effect on the loan repayment performance of a borrower. Using statistical method, the probability of loan repayment performance of a borrower can be found out by

considering marginal effects of all variables. Variables in these four major categories and their specifications have been discussed in Chapter 4 and 5.

A variety of multivariate statistical techniques has been used to predict a binary dependent variable from a set of independent variables. A Multiple Linear regression model and discriminant analysis are found to have wide application in loan repayment studies (George et. al., 1996, Jama and Kulundu 1992, Abdul Aziz et al., 1995). However, these techniques pose difficulties when the dependent variable can have only two values, an event occurring and not occurring. When the dependent variable can have only two values, the necessary assumptions for hypothesis testing in regression analysis are not flausible.

The use of Logit model is a possibility. The model has been widely used for predicting whether an event will or will not occur, as well as identifying the variables that are useful in making predictions. Abu, Shaari, and Azhar (2000) used the logit model to find out the loan repayment capability of the rubber farmers in nucleus estate projects in Malaysia. Olomola (1999) used this model to determine the marginal effect of the variables and the probability of repayment capability of a smallholder in Nigerian Micro-finance system. Ralf and Gerald (1998) made the logit analysis to identify significant factors that are able to explain the loan repayment performance.

In this study, it is required to assess a borrower whether he/she will perform a loan or not. A logit model is preferable because it can be used to determine the probability that a borrower will be defaulter or not. Therefore, a logit model

may be used in this study to predict the probability that a borrower will become a non-defaulter.

CHAPTER 3

VARIABLES & HYPOTHESES

3.1. Variables Considered

Variables that may influence the loan repayment performance of borrowers were considered based on the literature survey and opinions of researchers and experts in banking sector. The variables are classified into four major categories: promoters' profile, company profile, lender-related causes and macro-environmental factors.

3.1.1. PROMOTERS' PROFILE

Promoter means the person or persons who are in control of the company directly or indirectly, whether as a shareholder, director or otherwise. He beneficially owns, either alone or together with spouse financial assets having an aggregate realizable value.

Age of Promoters

It is generally regarded that older people tend to be more reluctant to change their attitudes, and traditional ways and beliefs, and thus, they become less dynamic and more reluctant to adopt new approaches and technology in business (Abu, Shaari & Azhar, 2000).

According to Viganò (1993), the older people have larger and more stable incomes and therefore they are more reliable in performing the loan repayment. Generally, a senior person from the directors of a public limited company is chosen as the chairman or chief executive officer of the company. They have positive attitude toward the development of the society and the nation and so they may be more responsible in making repayment of loan. So, it may be hypothesized that promoters' age may influence loan repayment behavior.

Business Experience of Promoters

Business experience refers to the duration of time in which a borrower has been involved or participated in the activities related to some business. All that the borrower has learned in the business can now become the foundation for his own growth that will guide him forward. The more business experience a borrower has, the greater the capability of using intuition and judgement in forecasting future business environment that could make him able to use the loan in a profitable way. Business experience in the area of the project as well as total business experience of the borrower may be considered as measuring criteria. It may be hypothesized that the longer the business experience, the greater the promoter's capacity to repay loan.

Formal Education of Promoters

Education is often identified as the key to a desirable future. For Hubner, formal education means "the formation of abilities, the methodological development of habits or forms in which intellectual work takes place with

growing independence; the creation of a system of mental functions enabling a person to master new situations in life". William Cronon says, "More than anything else, being an educated person means being able to see connections that allow one to make sense of the world and act within it in creative ways." The level of educational attainment is expected to affect the manner in which an individual gathers and adjusts himself or herself to the environment. Formally educated people think broadly and understand systems, connections, patterns, and root causes of a situation that are very much helpful in improving the performance in the business (David Orr, 1991). Thus, the hypothesis may be: the level of education is positively related to the loan repayment performance.

Promoters' Business Background

Borrower from a family having business background has the opportunity to acquire knowledge about business and its environment from his family business. Furthermore, he may have strong financial support from his family business. This knowledge may help the borrower run his business effectively.

Business background of borrower's family may be measured in terms of following factors:

1. The number of years his various generations are in business, and
2. The nature of business that his family did in the past or other types of business such as:
    a. Continuing the family business,
    b. Doing a business similar to that of his family

c. Doing a different business

It may be, in this case hypothesize that the business background is positively related to the loan repayment performance.

No. of Companies owned

The income level usually refers to the annual income of the borrower derived from the business in which borrowing money has been invested. The borrower may also have income from other companies or projects that can provide additional income. The probability that a borrower will become a non-defaulter is positively related to his income level. Theoretically, level of income may have close association with repayment capacity that suggests that the greater the income, the greater would be the capacity to repay loan. The additional income from other business could have enhanced loan repayment capacity. So, it may be hypothesized that income obtainable from other companies will enhance promoters' loan repayment capacity.

3.1.2. COMPANY PROFILE

Company is an institution created to conduct a business. It is an association of a number of individuals for the purpose of carrying on some legitimate business. In this case, company is considered as an entity for which the loan has been taken from the bank. The loan amount is invested in the company that is required to finance different activities of the company. The efficient utilization of loan amount depends on management capability of employees and other attributes related to the company such as attractiveness of the

industry in which the company operates, age of the company, market share of the company, reputation of the company, and its financial performance.

Industry Attractiveness

All industries do not have equal opportunity to do well in a particular business environment. Operating elements of the business environment may be more favorable to a sector that could help a company in this sector in making better performance. Performance of any business organization depends greatly on the industry in which it operates. Organizations, with same resources, operating in different industry essentially do not perform equally well.

General Electric introduced a comprehensive portfolio-planning tool called a Strategic Business-Planning Grid (BCG). It uses a matrix with two dimensions - one representing industry attractiveness and one representing company strength in the industry. The best businesses are those located in highly attractive industries where the company has higher business strength.

The GE approach considers many factors besides market growth rate as part of industry attractiveness. It uses industry attractiveness made up of market size, market growth rate, and industry profit margin. Combined effect of all of these factors is calculated to determine the attractiveness of an industry. Thus, it is hypothesized that the company operating in a more attractive industry has the higher ability to repay the loan.

Age of the Company

With poor performance a company cannot survive longer. As time passes on, a firm faces various economic conditions, political situations, and competitors to earn a reasonable market share in order to survive in the industry. With the passage of time, it earns experience and gains knowledge to face different types of challenges. A Company doing a business for long period indicates that it has good management capability and better financial performance. Thus, it is hypothesized that the longer the age of the company, the greater the ability to repay the loan.

Management Capability

The quality of management in a company is an important contributor to its success and financial strength. Management ability can be assessed according to the experience, expertise and stability of the senior management team. The depth of experience of a company's management is not a guarantee in itself against bad debts, but it does provide some indication that management knows its business.

Management capability refers to the management's expertise in maintaining operations so the firm can pay its debt obligations (Kotch & Macdonald, 2000). Particular attention should be focused on management character and quality. The background of the chief executive, operating and financial officers should be examined in terms of key individual's experience in the business, service with the company and apparent line of succession. Management capability of the owners of the company and the percent of professionally

trained management personnel out of its total employees working may be considered as the management capability of the company. Thus, the hypothesis may be stated as the better qualified and experienced people, the higher the ability to repay loan.

Financial performance

Firms with more equity capital try to structure a deal so that management has a strong incentive to work hard to survive and generate profit [Breely & Myers 1998]. Equity capital builds confidence in creditors. Increasing equity financing reduces the likelihood of bankruptcy [Gardner, Mills & Cooperman 2000]. Equity capital provides long-term funds for investment and asset growth as well. The contribution of the equity can be measured in terms of return on shareholders' equity. It indicates how well the firm has used the resources of the owners. The value of return on equity can be compared with the industry average. If it is greater than the industry average, the company performs well.

Debt includes the loan taken for the project from different financial institutes and the amount applied for loan. Modigliani and Miller's proposition II says that the rate of return shareholders can expect to receive on their shares increases as the firm's debt-equity ratio increases. This works out through financial leverage.

Modigliani and Miller's theory states that the value of the firm is determined by real assets of the firm. Real assets include tangible assets and intangible

assets used to carry on business. It repays the debt in full only if its assets are worth more than the debt obligations. The lender could consider that borrowers need to repay their debt in full only if the assets of the company are worth than a certain amount. The company's real assets need to produce enough cash to satisfy bank's claim to repayment of the loan [Breely & Myers 1998]. Real assets are directly concerned with the sales activities of the firm and generation of sales. The firm must manage its real assets efficiently and should generate maximum sales through their proper utilization. Utilization of real assets can be measured in total sales turnover.

The financial performance of the company may be measured by the Zeta Analysis which is the most popular classification models for commercial loans designed by Edward Altman (1968 & 1981). This model, uses a multiple discriminant analysis technique to identify important financial ratios used, classifies firms likely to fall from those that are not likely to fall. Given statistically determined weights for each of the ratios, a Zeta or Z-score can be calculated by plugging in a firm's ratios, as follows:

$$Z = 1.2\,WC + 1.4\,RE + 3.3\,ROA + 6\,ED + 1.0\,AT$$

Where,

WC = Working Capital to Total assets

RE = Retained Earnings to Total assets

ROA = Return on Asset based on operational earnings

ED = Market value of Equity to Book value of Debt

AT = Asset Turnover

If the score is greater or equal to cutoff score of about 2.675, the firm is more likely to be in the non-failed group, and the loan is less likely to be defaulted. Thus, the hypothesis may be stated as the better the financial performance, the greater the company's ability to repay loan.

Competition in the Industry

Competition refers to the force in the environment in which the company operates. It includes all the actual and potential rival offering similar products and substitutes that a customer might consider (Kotler 2002). Number of companies offering similar type of products or services refers to the intensity of competition in an industry. An industry with a larger number of companies was considered more competitive than the industry with fewer numbers of companies. Industries with a low standard deviation in annual sales and having larger number of companies are considered more competitive. The hypothesis may be: the more competition in the industry, the lesser the ability of the borrower to repay the loan (functional).

Company Market Share

Market share of a company is measured by the company sales as the percentage of total industry sales over a specified period of time. Performance of any business organization depends on the market share it has. Performance also depends on the growth of the industry in which the organization is included. It can be measured as strong, average or weak. According to GE's strategic business planning grid, a company with at least

80 percent market share in a good-sized and highly attractive industry has strong business strength. A Company with below 20 percent market share in highly attractive industry has not much business strength. If a company that has 50 percent market share in an industry, but the industry is not very attractive, it has average business strength. Thus, it may be hypothesized that the greater market share the company enjoys, the greater the ability to repay the loan.

Company Reputation

"What others say about your brand is so much more powerful than what the management can say about the company" (Al Ries, 1998). Reputation is more than an identity or image. It is the result of what the company does, how the company does, what it says, and what others say about the company or its brand. A Company could enjoy tremendous goodwill stemming from the high quality and reliability of its products coupled with rapid and friendly technical support. The company's reputation reflects the performance of its employees. The Company's reputation depends on the conduct of its employees. Every employee and outside agents who are associated with the company must play a part in maintaining company's reputation for the highest ethical standards.

Reputation is the most important commercial mechanism for conveying information to consumers. The companies that last are those that manage their key relationships well and focus on their reputations. (John Kay, 1993). Company has good reputations from its customers if it deals with customers

straightforwardly and honestly. They will know they can depend not only on company's products and services, but also on word and character.

The Company depends on how its employees act at all times with the highest degree of integrity. A well-reputed company treats all individuals with whom it comes in contact - clients, agents, and vendors - in a fair and respectful manner.

Company reputation can also be seen from suppliers' and employees' viewpoint. If the company pays bills to the suppliers' satisfaction, the bank may consider the company as good payer of bills. If the company pays salaries, bonuses and other obligations to its employees timely, the company will be considered to be meeting its obligations meticulously.

Thus, company reputation is a function of its honesty, quality of goods and services, relationship with its vendors and employees, and customer dealings. It is hypothesized that the company with more reputation has greater ability to repay the loan.

3.1.3. LENDER RELATED CAUSES

The lender is a financial institution that provides the credit to businesses and individuals. The bank, which provides loan to companies, is the lender in this case. Before sanctioning loan to a borrower, it evaluates the loan proposal of the borrower. In the process of evaluation, the lender visits the borrower to see the borrower's existing performance. Lender's various actions from the

assessment of loan application to the collection of loan may affect the loan repayment performance of the borrower. Related variables considered here are assessment time of loan proposal, disbursement lag time of loan, number of visits by the lender, and measures taken against the non-repayment of loan.

Assessment Time of Loan Application

Assessment time of loan application defined as the time interval between the submission of loan application and sanction of loan. Borrowers apply for loan considering various aspects including industry conditions, economic environment, government regulations, tax rate present market situation, etc. These variables are subject to change due to changes in other macroeconomic variables. If it is delayed to assess the loan application of a borrower, there may be a chance of assessing the borrower with conditions different from those considered by the borrower at the time of application. So, delayed assessment may result in an inappropriate analysis by the lender. The borrower may also loose the better opportunities due to the delayed assessment by the lender. So, it may be hypothesized that more time used in processing loan proposal, the lower to effort to repay the loan.

Disbursement Lag of Loan

Loan disbursement time defined as the time interval between the sanction of loan and the collection of last installment of loan (days). According to Olomola (1999) loan disbursement lag significantly increase-borrowing transaction cost and can also adversely affect repayment performance. Timely disbursement

of loan may help the company to use it properly in its business development. When loan delivery misses the critical period of use due to excessive delay in loan processing stage, there may be the tendency that such a loan when it finally arrives may be diverted to relatively less productive or utterly non-productive activities. Such a diversion makes loan recovery difficult and expensive. Total no. of delayed disbursement days in various installments will be calculated. It may be hypothesized that more delay in disbursing loan, the lower the effort to repay the loan.

Number of Visits by Lender

We assume that repayments are closely related to control of moral hazard risks and to the extent of post-origination monitoring activity required of lenders (Smith and Warner (1979). Loan official should make periodic visit to the project for which loan is sanctioned and is considered to be sanctioned. Frequent visit to the project would give the loan official substantial knowledge about the project and its courses of actions. This type of frequent visit may force the borrower to give sincere effort to run the activities of the project. Number of visits by loan officials may be considered as the criteria. The bank which has a separate monitoring cell to oversee the project in a better position to monitor the project properly. Casual assignment of an officer for monitoring a project may not provide a good output. Thus, it is hypothesized that more frequent visit by loan officials will enhance the repayment of loan.

Measures Taken for Recovering Loan

Legal framework is another important determinant of loan performance. The main characteristic of this legal structure is that laws are based on general principles of morality and justice, regulating the behavior of the participants in the financial market. Judicial system may be inefficient due to the high cost and low likelihood of obtaining an effective result. If the rules of enforcement are inefficient, the cost of not paying a debt could be lower than the benefit, and therefore defaults would increase. Among the inefficiencies a slow legal system and costly judicial proceedings can be mentioned. However, not only the law matter, but also law enforcement is very important to force the borrower to repay the loan.

Nationalized Commercial Banks takes following measures for recovering loan from their borrowers.

a. Remind Borrower: If the installment is not paid in due date, the bank gives a persuasive letter to the entrepreneur to pay the installment.

b. Meet Borrower Personally: If the borrower does not respond the bank sends authorized personnel of the bank to meet the borrower personally to persuade for payment of the installment.

c. Make Credit Defaulter: While completing the above stated procedures, the next installment becomes due. Bank gives a letter to the debtor by

identifying him/her as a credit defaulter and delivers the information to the other banks and the central bank.

d. Legal Notice: A legal notice is then given to the debtor by indicating specified time to pay the overdue amount or failing which he will be sued by the bank after the stipulated time period.

e. Legal Action: If the debtor fails to pay the amount after serving legal notice, the bank sues him and court decides matters thereafter.

It may be hypothesized that more legal action taken by the lender increases the loan repayment performance

3.1.4. MACRO ENVIRONMENTAL FACTORS

Macro-environmental factors that are considered in this study include the following:

a. Industry conditions such sales growth and profit margin of industries,
b. Economic condition such as GDP growth of the country,
c. Political situation such as 'hortals' called by political parties,
d. Social condition such as number of crimes reported in the country in different years, and
e. Policy changes by the government that may affect the performance of the borrower.

GDP Growth

Macroeconomic instability could be the reason for a high level of non-performing loans. It has been found from various studies that the economy of a country with a high growth rate of GDP experienced a low level of non-performing loans. According to Myers (1975), increase in GDP in the country increases the capability of the borrower to repay the loan.

Political Environment

Business decisions are strongly affected by the political environment. Political stability means optimum conditions for stable capital growth and debt collection. Hungary's Prime Minister Viktor Orbán said on 07.06.2001 at the American Chamber of Commerce's (AmCham) business lunch that behind the success of the Hungarian economic model one of the most important reasons is obviously political stability. So prudent policy is something other than a novelty. Political stability means decisions that are able to create economic stability for the long term.

Without political stability there will be no investments, no employment, and no production of wealth. Political stability depends upon a sound democratic system in a country. But democracy is based on more fundamental values, truth, transparency, knowledge, freedom and human rights - and these are only guaranteed by a moral conscience (President and Bishops of IMBISA Harare, 2001).

The ultimate risk of private business is also political risks, in their various shapes and forms. No matter what the quality of policies, there is no enabling environment for investment without political stability (Mieko Nishimizu, World Bank Report 2001).

The firm's operations may be disrupted due to 'hortals' called by political parties, strikes by labor unions, number of crimes held etc. Number of disruptions in a year due to 'hortals', strikes due to political or labor unrest can be considered as measurement criteria. Thus, political stability in a year may be considered as a function of and number of hortal calls/strike days and number of crimes in the year.

Govt. Regulations

Advocates of free-market economies agree that the system works best with at least some regulations. Well-conceived regulations can encourage competition and ensure fair markets for goods and services. Thus government develops public policy to guide commerce - sets of laws and regulations that limit the business for the good of society, as a whole.

Legislation affecting business around the world has increased steadily over the years. USA has many laws covering issues such as import, export, tax, competition, fair trade practices, environmental protection, product safety, truth in advertising, packaging and labeling, pricing, etc. In India, food companies must obtain special approval to launch brands that duplicate those already existing on the market (Kotler 2002). It may be hypothesized that

more favorable changes in policy will enhance the loan repayment performance of borrowers.

Following changes in policies have been considered which may have effect on repayment capability.

a. Changes in import policy (import ban on some items),
b. Changes in export policy (export ban on some items),
c. Changes in tax laws,
d. Ban on production and marketing some items etc.,
e. Major changes in financial market regulation,
f. Changes in interest rate, and
g. Waiver of interests payments.

Hypotheses as formulated in this section along with their expected effect on the loan repayment performance in nationalized commercial banks are summarized in Table 3.1.

Table 3.1: Summary of Variables and Their Stated Hypotheses

Variables	Variable Name	Stated Hypothesis	Expected Effect
PRMAGE	Promoters' average age	The higher the promoters' age the higher the effort to repay loan (Viganò, 1993)	+
PRMBUSEXP	Business experiences	The longer the businesses experience the greater the promoter's capacity to repay loan (Isa, Hamid, & Ghani 2000).	+
PRMEDU	Years of formal education	The level of education is positively related to the loan repayment performance. (David Orr, 1991)	+
PRMBUSGRD	Business Background	The longer period the family is in business, the higher the ability to repay loan (functional).	+
NOCOMPANIES	No. of Companies	Income obtainable from other companies will enhance promoters' loan repayment capacity (functional).	+

Variables	Variable Name	Stated Hypothesis	Expected Effect
INDATTRACT	Industry Attractiveness	The company in a more attractive industry has the higher ability to repay the loan (functional).	+
COMPAGE	Age of the Company	The longer the age of the company, the greater the ability to repay the loan (Olomola, 1999).	+
MCAPABILITY	Management Capability	The better qualified and experienced people the higher the ability to repay loan (Kotch & Macdonald, 2000).	+
FINPERF	Financial Performance	The better the financial performance, the greater the company's ability to repay loan [Breely & Myers 1998]	+
COMPETITION	Competition in the Industry	The more competition in the industry, the lesser the ability of the borrower to repay the loan (functional).	-

Variables	Variable Name	Stated Hypothesis	Expected Effect
MRKTSHARE	Market Share	The greater market share the company enjoys, the greater the ability to repay the loan (functional).	+
REPUTATION	Company Reputation	The company with more reputation has greater ability to repay the loan (John Kay, 1993)	+
PRCSTIME	Loan Processing Time	More time used in processing loan proposal, the lower to effort to repay the loan (Fuentes & Maquieira 1998).	-
DISLAG	Disbursement Time	More delay in disbursing loan, the lower the effort to repay the loan (Olomola, 1999).	-
NOVISITS	Monitoring Loan Utilization	More frequent visit by loan officials will enhance the repayment of loan (Smith and Warner, 1979).	+

Variables	Variable Name	Stated Hypothesis	Expected Effect
MEASURES	Measures taken	More legal action taken by the lender increases the loan repayment performance (Fuentes & Maquieira 1998).	+
NOCRIMES	No. of Crimes	More crimes will reduce the repayment performance (functional).	-
HORTALS	No. of Hortals Days	More hortals reduces company's loan repayment performance (functional).	-
POLICY	Policy Changes	More favorable changes in policy will enhance the loan repayment performance of borrower (functional).	+
GDP	Country's GDP Growth	More GDP growth of the country will increase the loan repayment performance (Myers, 1975).	+

CHAPTER 4

SPECIFICATION AND MEASUREMENTS OF VARIABLES

To obtain the information for this study, a survey was conducted on 125 randomly selected companies by using a structured questionnaire. The questionnaire is divided into mainly five sections. These are:

- Promoters' Profile
- Company Profile
- Lender Related Causes
- Macro-Environmental Factors.

A separate section is included in the questionnaire to find the opinion of borrowers about the probable causes of their non-repayment status.

4.1. Promoters' Profile

Promoters' profile includes age of promoters, their formal education, total and related experience in business, number of companies owned by them, and their business background.

Age of all the promoters of a company have been included in this study. Open questions were used to ask the age of promoters of each company. Average age of all promoters of the company were computed and considered as the

measurement criteria. From collected data, it shows that the average age of promoters of the sample companies varies between 37 and 67.33 years. Five-point measurement scale was used for purposes of analyses. In the five-point scale, a company with higher average age of promoters was given more point than the company with having lower average age as shown in Table 4.1.

Table 4.1: Measurement Criteria for Age of Promoters

Average Age	Point
37 to 42 years	1
43 to 49 years	2
50 to 56 years	3
57 to 63 years	4
64 years or more	5

Business experience of a promoter was separated into total business experience and related experience in the company related business. Total business experience was calculated as the total number of years a promoter is in business with this company and with other companies. Similarly, related experience was computed as the number of years the promoter was in this company and with other companies of similar in type.

Total business experiences of promoters in a company vary on a wide range. In order to get the overall experience of all promoters in business, average year of total experience of promoters in business was considered as

measurement criterion. Similarly, average related experience of promoters in the same type of business of the company was taken as measurement criterion. The average total business experience varies between 12 and 36 years and related experience varies between 7 and 34 years. In the five-point scale, a company with promoters having more average business experience has been given more points than the company with promoters with fewer average business experience as shown in Table 4.2.

Table 4.2: Measurement Criteria for Experience in Business

Total Experience in Business	Experience in Related Business	Point
12 to 16 years	7 to 12 years	1
17 to 21 years	13 to 18 years	2
22 to 26 years	19 to 24 years	3
27 to 31 years	25 to 30 years	4
32 years or more	31 years or more	5

In measuring the level of education of promoters, number of years required to obtain the highest degree by a promoter was considered. Sixteen years have been considered for obtaining Masters degree or higher, 14 years for bachelor degree, 13 years for diploma, 12 years for HSC level, 10 years for SSC level and zero for below SSC as shown in the Table 4.3:

Table 4.3: Number of years considered for Education Level

Education Level	Number of years
Masters Degree / Engineering / Medical or More	16
Bachelor Degree	14
H.S.C	12
S.S.C	10
Below S.S.C	0

Total number of years required to obtain the highest educational qualification by all promoters of a company was computed. Educational qualifications of promoters in companies were found to vary between Ph.D. and below SSC level. Average number of years of qualifications of all promoters in a company was considered as the measurement criterion. Average year of education of promoters varies from 10.11 to 16 and is divided into five mutually exclusive classes as shown in Table 4.4.

Table 4.4: Measurement Criteria for Formal Education

Average Number of years	Point
up to 10 years	1
10 up to 12 years	2
12 up to 14 years	3
14 up to 16 years	4
16 years or more	5

Family business background of a promoter is defined as whether or not the promoter has come from a business family i.e. promoter's family was in business. This variable was measured in terms of the number of years the promoter's family was in business. Average number of years the families of all promoters were considered for measuring the overall family business background of promoters in the company. It is shown that the number of years the promoters' family is in business varies between 13 and 60 years. This duration is divided into five categories as shown in Table 4.5. A Company with promoters having highest number of years in business has been assigned 5 (highest point) and lowest number of years in business has been assigned 1 (lowest point).

Table 4.5: Measurement Criteria for Business Background

No. of years in business	Point
11 to 20 years	1
21 to 30 years	2
31 to 40 years	3
41 to 50 years	4
51 to 60 years	5

Whether a promoter of a company is involved in the same nature of business as that of his family or not was classified into two categories such as same business as that of the family he is continuing, and other type of business. One point has been assigned to a promoter, who is continuing his family business, and zero point has been assigned to a promoter who is doing a different type of business. Among 125 companies, promoters of 51 companies do not continue their family business. They started their business on their own. One or more promoters of 74 companies continue family business. Total points were computed for all promoters of a company and considered as the measurement criterion. Total points of all promoters of companies vary between 0 and 11. The zero point means all promoters in a company are engaged in a business other than the family business. These points are divided into five classes as shown in Table 4.6.

Table 4.6: Measurement Criteria for Nature of Family Business

No. of years in business	Point
0 up to 2	1
2 up to 4	2
4 up to 6	3
6 up to 8	4
8 or more	5

A promoter of a company may own a number of other businesses. Total number of companies owned by all promoters in a company was counted. It is found that some of the promoters do not own any other company. Total number of companies owned by promoters varies between 1 and 21. It is more logical that promoters owning larger number of companies should have more capability to repay the loan. Data set has been divided into five classes as shown in Table 4.7. Highest point has been assigned to companies with promoters owning higher number of companies and vice versa.

Table 4.7: Measurement Criteria for Number of Companies Owned

Number of Companies	Point
Below 5	1
6 to 10	2
11 to 15	3
16 to 20	4
21 or more	5

4.2. Company Profile

The study questionnaire also attempted to measure company profile that may have effect on the performance of loan repayment. The company profile includes company age, industry attractiveness, management capability of managers other than promoters, financial performance, intensity of competition, and market share of the company.

Age of a company has been defined as the total number of years the company is in business. Age has been measured as the difference between the inception year of the company and the year 2002. Age of different companies varies between 7 and 27 years. It has been hypothesized that age of a company is directly related to the loan repayment performance. A relatively longer age of a company indicates that it had the capability to

survive and passed through various situations and gained experience to survive longer. Companies with longer ages are assigned more points than companies with shorter ages as in Table 4.8.

Table 4.8: Measurement Criteria for Age of a Company

Age of a Company	Point
6 up to 10	1
10 up to 14	2
14 up to 18	3
18 up to 22	4
22 or more	5

Industry attractiveness may be considered as the overall performance level of companies operating in the industry. It is generally measured in terms of market size (total sales volume), average profit margin, and sales growth in the industry. The values for different constructs were calculated as follows:

Sales Growth (%) = (Current Year Sales – Previous Year Sales) / Previous Year Sales

Profit Margin = Net Profit / Current Year Sales

Larger market size, higher sales growth, and higher profit margin of an industry indicate that the industry is more attractive. Hypothesis regarding the attractiveness of an industry is formulated as the company belongs to an attractive industry performs better in making loan repayment. The performances of different industries are shown in the Table 4.9.

Table 4.9: Industry Performance

Industry	Sales Growth (%)	Profit Margin (%)	Sales Volume (in crore)
Engineering	9.796	4.53	4681.37
Food & Allied	8.675	3.73	8705.79
Fuel & Power	9.322	1.00	17127.98
Jute	-2.436	-0.82	862.25
Textile	29.661	3.70	10609.74
Pharma & Chemicals	19.045	7.92	7789.99
Paper & Printing	1.801	-10.82	355.41
Services & Real Estate	41.733	7.00	2221.46
Cement	33.775	6.16	2388.00
Ceramic	15.835	8.64	680.79
Leather	10.944	3.10	4263.83

Average sales growth in various industries varies between –2.4 and 41.7 percent. The highest average sales growth has been found in real estate industry and the lowest has been found in jute industry. Profit margins in some companies were found negative and some companies' profit margins were found positive. Industry average profit margin varies between –10.82 and 8.64 percent. Highest profit margin has been found in ceramic industry and the lowest has been found in paper and packaging industry. Market size of various industries varies between Tk. 355.41 crore and Tk. 17,127.98 crore. These three factors (sales growth, profit margin and market size) have been rated on a five-point scale (1 to 5) and average value of these three factors were to indicate the level of attractiveness of an industry. The class with higher average value has been assigned more point than the class of lower average value as shown in Table 4.10 (a, b & c).

Table 4.10a: Measurement Criteria of Sales Growth

Sales Growth (%)	Point
up to 10	1
10 up to 20	2
20 up to 30	3
30 up to 40	4
40 or more	5

Table 4.10b: Measurement Criteria for Profit Margin

Profit Margin (%)	Point
Negative Profit	0
0 up to 2	1
2 up to 4	2
4 up to 6	3
6 or more	4

Table 4.10c: Measurement Criteria of Sales Volume (crore)

Sales Volume	Point
<=3500	1
3501 to <=7000	2
7001 to <=10500	3
10501 to <=14000	4
14001 to <=17000	5

Industries were rated using average of these three criteria as mentioned in Table 4.10 to find the overall industry attractiveness.

Company performance somewhat depends on the management capability of the employees. Management capability has been measured in terms of their relevant educational qualification, professional training received, and experience with the company (i.e. number of years they are working with the company). Employees in management positions were taken for this purpose. Educational qualification of promoters has not been included in computing the total number of years required to obtain the highest degree by management people. In measuring relevant educational qualification, only formal educational qualifications of all managers were considered. Data show that average number of years required to obtain the professional qualification by the management people varies between 10 and 16 years.

Similarly, total duration of professional training received by all management people and total numbers of years they are working with the company were computed. Total duration of professional training received by managers varies between 0.47 and 21 months. Total years of experience of all managers with the company and worked in other companies were computed. Average number of years has been considered and it varies between 6 and 27 years.

Duration of educational qualification, working experience and professional training is divided into five classes and companies with higher length have been assigned more points as shown in Table 4.11a, 4.11b and 4.11c. The average points on qualification, experience, and training of all managers in a company have been taken as the overall management capability of the company.

Table 4.11a: Measurement Criteria for Educational Qualification

Number of years	Point
up to 10 years	1
10 up to 12 years	2
12 up to 14 years	3
14 up to 16 years	4
16 years or more	5

Table 4.11b: Measurement Criteria for Training Received

Training Duration (Man month)	Point
Up to 4 months	1
4 up to 8 months	2
8 up to 12 months	3
12 up to 16 months	4
16 months or more	5

Table 4.11c: Measurement Criteria for Professional Experience

Years of Experience	Point
5 to 9 years	1
10 to 14 years	2
15 to 19 years	3
20 to 24 years	4
24 years or more	5

Financial performance of a company has been transformed in a Zeta Score as formulated by Altman. Financial statements of various years from 1992 to 2002 of a company were used for calculating Zeta Score. Financial data were collected from the annual reports of different years available in Dhaka Stock Exchange. Average Zeta Score of each company has been calculated and used for measuring its financial performance. Average Zeta Score of all companies varies between -0.46 and 6. Higher Zeta Score of a company means that the company is in a better financial position. The company with higher Zeta Score has been assigned higher point as shown in Table 4.12.

Table 4.12: Measurement Criteria for Financial performance

Zeta Score	Point
Zero or less	1
1 up to 2	2
2 up to 3	3
3 up to 4	4
4 or more	5

Market share of a company is the percentage of company sales in the industry. To compute the market share of a company in various years, company sales as well as the industry sales in each year were collected from annual report of the company, monthly and special bulletins of Dhaka and Chittagong Stock Exchanges. The market share of the companies varies between 0.50 and 58.39 percent. Companies with higher market share were given more weight as shown in Table 4.13.

Table 4.13: Measurement Criteria for Average Market Share

Average Market Share	Point
0 up to 10	1
10 up to 20	2
20 up to 30	3
30 up to 40	4
40 or more	5

Competitive status in an industry has been measured in terms of number of companies operating in the industry and intensity of competition among companies. Intensity of competition was measured in standard deviation of market share of all companies in the industry. Standard deviations of market shares vary between 1.09 and 29.61. Total number of companies in each industry listed with Dhaka Stock Exchange and the Bangladesh Chamber of Commerce and Industries has been counted. It varies between 12 and 83 numbers. Ceramic industry consists of lowest number and food industry consists of highest number of companies. An industry with a larger number of companies was considered more competitive than the industry with fewer numbers of companies. Industries with a low standard deviation in annual sales and having larger number of companies are considered more competitive.

Table 4.14: Measurement Criteria for Competition in the industry

Number of Companies	Point
10 up to 25	5
25 up to 40	4
40 up to 55	3
55 up to 70	2
70 or more	1

Opinions from customers, vendors who in someway or other involved with the company business and employees who are working with the company were considered for measuring the company reputation. Ordinal level scale, from very good to very poor, was used to collect opinions of these stakeholders. Five-point has been assigned to very good, 4 to good, 3 to average, 2 to poor and 1 point was assigned to very poor. Total points on opinion from these three stakeholders about a company were considered as the overall reputation about the company. Total point for reputation of companies varies between 3 and 15.

Table 4.15: Measurement Criteria for Company Reputation

Company Reputation	Point
Up to 3	1
3 up to 6	2
6 up to 9	3
9 up to 12	4
12 or more	5

4.3. Lender Related Causes

Lender related causes include loan proposal assessment time taken by the bank, total disbursement delayed by the bank, number of visits made to the borrowing company by loan officials, and measures taken by the bank to monitor the loan recovery.

Loan assessment time is the time between the date of submission of application and the date of final sanction of loan. Time taken by banks to assess loan request of borrowers varies between 1 month and 15 months. The longer time taken by the bank to assess loan application of a company was given less weight and least time taken by the bank was given more weight as shown in Table 4.16.

Table 4.16: Measurement Criteria for Loan Assessment Time

Loan Assessment Time	Point
Up to 3 months	5
3 up to 6 months	4
6 up to 9 months	3
9 up to 12 months	2
12 months or more	1

Total disbursement time of loan amount has been measured as the difference between the due date of first installment and the date of receiving payment of the last installment. It was found that there were some lags between due date of installments payment by the bank and the actual date of payment. The total lagging time varies between 1 month and 19 months. This duration was divided into five classes as shown in Table 4.17. More points have been assigned to companies with low disbursement lag and least point is assigned to companies faced a situation of highest lagging time.

Table 4.17: Measurement Criteria for Disbursement Lag

Disbursement Lag	Point
Up to 4 months	5
4 up to 8 months	4
8 up to 12 months	3
12 up to 16 months	2
16 months or more	1

Bank officials' visits the borrowing company prior to sanctioning of loan and after sanctioning of loan have been separately taken. Thus, visits by loan officials were categorized into two classes. Prior visits are made to assess the feasibility of the loan request and post visits are made to monitor the loan utilization. Total number of visits to a company by loan officials has been collected from lending bank and the borrowing company. Number of visits prior to loan sanctioning varies between 0 and 12. Number of visits by bank officials during loan utilization also varies between 0 and 12. Frequently visited companies visited have been assigned more points.

Table 4.18: Measurement Criteria for Visits by Loan Officials

Number of Visits	Point
0 to 2	1
3 to 5	2
6 to 8	3
9 to 11	4
11 or more	5

Banks usually take some measures against the nonpayment of loan by the borrower. These include reminding the borrower and visiting the borrower when the borrower is irregular in repayment of loan installments before they are being identified as defaulters. These two actions of the bank monitor the borrower to make regular repayment before being identified as a defaulter. Finally, legal actions are taken after a borrower has been identified as defaulter. In this study, the action taken by the bank for forcing the borrower to make repayment of loan was collected. One point to remind the borrower, 2 points to meet the borrower personally, 3 points to identify a defaulter, 4 points to the issue of legal notice and 5 points to initiate legal action were assigned. Total points for all companies vary between 1 and 6. Measurement criteria for this variable are shown in Table 4.19.

Table 4.19: Measurement Criteria for Measures taken

Measuring Point	Point
1	1
2	2
3	3
4	4
5 or more	5

4.4. Macro-environmental Factors

Economic, and political situations were considered to measure the effect of macro-environmental factors on loan repayment status of companies. Macro-environmental factors include GDP growth of the country, hortals called by political parties, number of crimes occurred in the country and impact of government policies affecting the business.

Nominal GDP growth rate of the country of last ten years varies between 4.53 and 12.09 percent (source: Bangladesh Bank). To assess the political situation of the country, total number of 'hortal' hours and number of crimes held in various years were collected. Number of 'hortal' hours varies between 87 and 894 hours and number of crimes varies between 14,526 and 41,324 (source: Bangladesh Police). These data were used to see their effects on year-wise default situation in NCBs.

Policies changed by the Govt. and the Bangladesh Bank may have effect on company's operations. Policies considered include the import policy, export policy, tax policy, interest rate of banks, imposition of ban on marketing or production of some items, waiver of interest by banks. The effects of these policies were measured in three categories, namely favorable, unfavorable and no effect. Policy change that was favorable to the company was assigned positive one point and negative one point was to the policy that was unfavorable to the company. Policy change, which did not affect the company performance, was assigned zero point. Total points from all changes that affect a company were calculated. It ranges between –3 and 8 points. It is divided into five scale classes as shown in Table 4.20.

Table 4.20: Measurement Criteria for Policy Changes

Point for Policy Changes	Point
Less than or equal to zero	1
1 to 2	2
3 to 4	3
5 to 6	4
7 or more	5

A separate section was introduced in the questionnaire in order to find the opinion of borrowers about the probable causes of loan defaulting. Probable causes have been classified into four categories. These are promoter-related causes, company-related causes, lender-related causes and macro-environmental causes. Promoter related causes include promoters being relatively young, inadequate business experience, low level of education, lack

of family business background, unwilling to repay, and having no other significant sources of income.

Company-related causes include the non-attractive industry in which the company belongs, strong competition faced by the company, the company with the shorter age, poor management capability of employees, poor financial performance of the company throughout the years, insufficient cash flow, and low market share enjoyed by the company.

Lender-related causes include delayed assessment of loan proposal of the borrower, delayed disbursement of loan, lack of proper monitoring of the project in which loan has been utilized and lack of proper measures taken by the bank for the recovery of loan.

Macro-environmental causes are low GDP growth of the country, increasing crimes in the country, unstable political situation in the country, and policy changes by the Govt.

The survey shows that multiple causes were responsible for a company to become loan defaulter.

Table 4.21: Causes of Loan Repayment Problems

Causes		(%) of Respondents
Promoter's Related	Promoter being relatively young	9
	Inadequate Business Experience	38
	Low Level of Education	26
	Lack of Business Background	21
	Unwilling to Repay	11
	No other significant sources	19
Company Related	Non Attractive Industry	56
	Strong Competition	39
	Shorter Age	18
	Poor Management Capability	42
	Poor Financial Performance	73
	Poor Cash Flow	26
	Low Market Share	51
Lender's Related	Delayed Assessment of Loan	9
	Late Disbursement of Loan	17
	Lack of Proper Monitoring	13
	Lack of Proper Action Taken	21
Macro-Environmental	Low GDP Growth	4
	Increasing Crimes	86
	Unstable political situation	39
	Policy Changes by the Govt.	16

Source: Author's Analysis

As shown in Table 4.21, 86 percent of the borrowers claimed that political situation including hortals called by political parties and crimes in the country affected their ability to fulfill their repayment obligations. About 61 percent claimed that changes in some government's policies affected business performance. Particularly, changes in import or export policies affected loan performance of the companies that are largely dependent on import and export business.

Business experiences of promoters are more important than their educational qualifications. Financial performance of the company is another major cause identified by 73 percent borrowers that are supported by non-attractive industry, poor management capability of the company, low market share in the industry. Fifty six percent argued that it is very much difficult to make a good profit for a company operating in a non-attractive industry. According to 51 percent of the borrowers, a company operating in an attractive industry with low market share might have problem for making repayment of loan. This situation may arise due to the strong competition in the industry or poor management capability of the company. Thirty nine percent identified strong competition and 42 percent identified poor management capability for poor performance. Eleven percent argued that companies having reasonably good financial performance and market share are not willing to repay the loan with the expectation of taking benefits of loan rescheduling and waiver of interest amount in the future.

CHAPTER 5

RESEARCH METHODOLOGY

For analytical purposes, the borrowing companies were classified into two categories based on their repayment status as of December 31, 2002. The classification was made for term loans. The categories are:

a. Unclassified borrowing companies: These are borrowing companies who repaid as and when due or within one year from the date on which it became due. For this study, it is termed as performing companies.

b. Classified borrowing companies: These are borrowing companies who did not make full payment six months into the expiry of deadline and have been considered as defaulters by the lending bank. For this study, it is termed as non-performing companies.

5.1 Area of Study

This study has been conducted on the borrowing companies of four nationalized commercial banks in Bangladesh namely, Sonali Bank, Janata Bank, Agrani Bank and Rupali Bank. The DSE listed companies that took loans from each of these banks were the population of this study. The number of such companies is 256. The population was so delineated because these companies published their annual reports on financial performance and they were required to submit reports to the DSE and the Bangladesh Bank.

Information required for the study are available in the annual reports of these selected 256 companies.

5.2 Sampling Frame

The study covers companies listed with Dhaka Stock Exchange that took loan from any of four NCBs in Bangladesh because reliable information about these companies are available in DSE.

A list of beneficiaries of NCBs in 1992 was obtained from Central Information Bureau (CIB) of Bangladesh Bank. From the list of CIB, only the DSE listed companies were selected. The selected companies were distributed across the identified categories. A random sample of 125 companies out of the set of a total of 256 companies were chosen. The loan year 1992 is selected to ensure the completion of at least one cycle to ascertain the repayment status of the loan at the end of 2002. The selection of time frame was done on the expectation that records of the loans with completed maturity would be available in 2002; ten-year duration is usual for term loans.

5.3 Sampling Plan

As stated earlier, the public limited companies that are enlisted with Dhaka Stock Exchange and have taken term loan from NCBs were considered as the population of the study. A total of 265 public limited companies other than financial institutions have been enlisted with Dhaka Stock Exchange. These companies are categorized into different industries. The number of companies in each industry group is shown in Table 5.1.

Table 5.1: Number of Borrowing Companies of NCBs.

Name of the Industry	Number of Companies
Bank	27
Investment	12
Engineering	22
Food & Allied	42
Fuel & Power	5
Jute	5
Textile	46
Pharma & Chemical	28
Paper & Packaging	9
Service & Real Estate	5
Miscellaneous	44
Insurance	20

Source: Bangladesh Bank

Miscellaneous group includes cement, leather and ceramic companies. To maintain the commonality of borrowing companies, financial institutions such as banks, leasing, investment and insurance companies were excluded from the list. Table 5.2 shows the number of companies taken loan from each of NCBs. Stratified sampling procedure was followed in selecting companies as sample for this study. The selected companies were divided into four groups. Each group consists of borrowing companies taken loan from each NCB as shown in the table 5.2.

Table 5.2: Number of Borrowing Companies of NCBs.

	Agrani Bank	Janata Bank	Rupali Bank	Sonali Bank	Total
Number of Borrowers	59	45	30	71	205
No. of Performing Companies	39	32	21	60	152
No. of Non-performing Companies	20	13	9	21	53

Source: CIB, Bangladesh Bank

Out of 205 borrowing companies of NCBs, 53 companies fall with defaulter group and 152 companies are good performers.

A stratified random sampling method has been used in selecting a sample of 125 borrowing companies. Out of these 125 companies, proportionate number of performing and non-performing companies were chosen in the sample in which 93 are performing companies and 32 are non-performing companies. The sample consists of a total of 39 borrowing companies from Agrani Bank, 32 from Janata Bank, 21 from Rupali Bank and 60 from Sonali Bank.

In the sample, there are 24 performing and 11 non-performing borrowing companies in Agrani Bank, 19 performing and 8 non-performing in Janata Bank, 13 performing and 6 non-performing in Rupali Bank and 37 performing

and 7 non-performing companies in Sonali Bank. The sampling plan is summarized in table 5.3:

Table 5.3: The sampling plan.

	Agrani Bank	Janata Bank	Rupali Bank	Sonali Bank	Total
No. of Companies in the sample	36	27	19	43	125
No. of Performing Companies	24	19	13	37	93
No. of Non-performing Companies	11	8	6	7	32

5.4 Sources of Data

Data were collected on relevant variables from primary and secondary sources through questionnaire survey. Primary sources include both promoters of the selected companies and lending banks. Secondary sources are CIB of Bangladesh Bank, Security and Exchange Commission, Dhaka Stock Exchange, Bangladesh Police, Newspapers, and Magazines. Collected data have been summarized and processed by using statistical methods in line with the analytical design.

5.5 Collection of Data

Primary data were obtained through questionnaire from borrowing companies and lending banks. The data cover information about the promoters of selected companies, companies for which the loans were taken. Also, data

cover the lending related information such as time taken in processing loan and in monitoring repayment situation by the lending bank. Data on promoters include their average age, formal education, business background, business experience, number of companies they owned. Company related data include management capability of the persons working in the company, financial performance, age of the company, market share enjoyed by the company and effect of policy changes (govt. regulations) on business performance. Data on loan processing and monitoring include proposal assessment time taken by the bank, total lagging time in loan disbursement and number of visits to the borrowing company by loan officials and measures taken for the recovery of loan.

Secondary data were collected from various sources, such as Bangladesh Bank, Lending Banks, Borrowing Companies, Dhaka Stock Exchange (DSE), Bangladesh Chamber of Commerce and Industries (BCCI), Bangladesh Police, Newspapers, and Magazines. The data include financial data of companies, default rates of four NCBs in different years from 1992 to 2002, year-to-year GDP growth rates, number of companies in different industries, profit margin of each industry, number of crimes held and hortals called by political parties. Financial data were collected from annual reports of companies submitted to the Dhaka Stock Exchange. Default rates were collected from Bangladesh Bank, GDP growth from Bangladesh Bank, number of competitors and profit margin of each industry from BCCI, number of crimes from Bangladesh Police and number of 'hortals' from Newspapers and Magazines. Data collected from different sources are shown in table 6.4:

Table 5.4: Sources of Data

Source	Information
Bangladesh Bank	Default Rates in NCBs and GDP Growth Rates.
Bangladesh Chamber of Commerce & Industries	Industry Conditions
Dhaka Stock Exchange	List of enlisted companies
Lending Banks	List of performing and non-performing borrowers
Borrowing Companies	Promoters' and Company information
Bangladesh Police	Number of Crimes
Newspapers & Magazines	Duration of hortals

The questionnaire included some questions to measure the respondents' attitudes toward loan repayment. Also, included some questions on loan default culture in order to assess the probable factors involved in Bangladesh context.

To measure the level of borrowers' satisfaction with the NCBs lending activities and services, a number of questions related to this were used. These questions were about the quality of the activities performed and services rendered by the NCB loan officials. It includes the loan assessment time taken by loan officials and services provided during disbursement of loan

installments. A scale ranging from 1 to 5 was used to capture the satisfaction status. A score of 5 was given if the respondent was most satisfied with the activities and services and a score of I was given if the respondent was least satisfied. Finally, a summated score was computed to reflect the level of the borrower's satisfaction with the NCBs lending activities and services.

5.6 Nature of Analyses

To find effects of relevant determinants on loan repayment performance, analyses were made from two perspectives:

1. The effect of some variables on the repayment status of individual borrowing companies, and

2. The effect of macro-environmental factors on overall repayment situation in NCBs.

Functionally, repayment status of the borrower was considered as dependent variable. Independent variables include promoters' age, experience in business, academic qualification, business background, number of companies owned, age of the company for which loan was taken, industry attractiveness, management capability of the company, financial performance of the company, average market share of the company, assessment time taken by the bank, lagging time for disbursement of loan, number of visits by bank officials prior to sanctioning loan & after disbursing loan, action taken by the bank against irregularity of payments, policy changes by the government and the Bangladesh Bank.

The objective is to analyze the marginal effect of these variables on the repayment status of a borrower. The proposed model has been formulated to calculate the combined marginal effects of all variables on the repayment status.

Effect of macro-environmental factors on situations from 1992 to 2002 in each of nationalized commercial banks were analyzed with yearly GDP growth rate, political situation in each year in terms of total duration of hortals and number of crimes held in each year. These data reflect on the overall situation of the country in different years. The data affect all borrowers across the board without having any exclusive effect on any particular borrowing company.

5.7 Study Assumptions

The explanatory variables used to explain the repayment of performance were grouped into four categories. First category is the set of promoter's profile such as PRMAGE, PRMBUSEXP, PRMEDU, PRMBUSGRD, and NOCOMPANIES.

Second category is the set of company profile such as MCAPABILITY, INDATTRACT, COMPAGE, FINPERF, and MRKTSHARE.

Third is the set of lender's processing behavior such as PRCSTIME, DISLAG, NOVISITS, and MEASURES.

Fourth is the set of macro-environmental factors such as GDP, NOCRIMES, HORTALS, and POLICY.

It is hypothesized that all these identified variables have significant effect on the repayment status of the borrowing company.

The effect of promoters' characteristics is expected to be positive on loan repayment performance. Most of the variables relating to the company profile have positive effect. Industry conditions may have both positive and negative effect. If the company operates in an attractive industry, the loan performance may be better. But if there are too many companies in the industry that prevails severe competition in the industry, the performance may be poor.

Effects of variables relating to the lending banks can be positive or negative. If the lending bank takes longer time to process a loan application, the better opportunities of loan utilization by the borrower may be hampered, which may in turn cause poor performance. Effects of NOVISITS and DISLAG may be positive or negative. If an increase in the number of visits is translated into effective monitoring including proper targeting of visiting time, it may have positive impact on loan repayment performance, otherwise borrower may be in an unfavorable repayment status despite increasing visits. If there are enforcement problems such as borrowers' unwillingness to repay, the repayment performance may also be low notwithstanding the frequency of visits. The time lag for disbursement may be long while loan processing is haphazardly conducted. In this circumstance, the relationship between

repayment performance and disbursement lag will be inverse. As stated earlier, Olomola (1996) observed that loan disbursement lag could significantly increase borrowing transaction cost and might also adversely affect repayment performance. When loan delivery date extends the critical period of use due to excessive delays at the loan processing stage, there is the tendency that such a loan, when it finally became available, may be diverted to relatively less productive or utterly unproductive activities. Such a diversion makes loan recovery exceedingly difficult and expensive.

Sustaining GDP growth may have positive impact on loan recovery. If the company operates in a stable political situation, the repayment performance may be expected to be positive. It it works in an unstable situation, overall performance of the business are hampered which may, in turn, lower the loan repayment performance. Policy changes may affect the business positively or negatively. Changes may be favorable to one type of business but may be unfavorable to another type of business. The effect of changes may be positive or negative depending on the circumstances and type of business.

5.8 Statistical Method Used

Statistical methods and financial techniques were used in analyzing the data. Analyses were performed in order to assess the importance of each determinant affecting the loan repayment performance in Bangladesh. Statistical techniques, specifically logit model and linear regression model, were used to assess the effect of determinants on loan repayment performance. Linear regression model was used to analyze the effect of

macro-environmental factors on overall default situation in NCBs and to find the nature of relationships between default rate and independent variables such as GDP growth, number of crimes, 'hortals', industry sales growth, and profit margins.

Logit model was used to analyze the repayment performance of borrowing companies of NCBs. The model has been employed because it is more robust to test the marginal effect of multiple independent variables on the dependent variable. This technique allows for an error term for latent variables with multiple indicators and therefore gives a much more accurate estimation and a more appropriate treatment of variables measured with error (Nerlove, M., and Press, S. J (1973)..

When it is assumed that the qualitative dependent variable has two possible outcomes (1 and 0) and if it is denoted that probability of $(Y_i=1)=\pi_i$, the logit model can be specified as

$$\pi_i = F(\alpha + \beta X_i) = \frac{\exp(\alpha + \beta X_i)}{1 + \exp(\alpha + \beta X_i)}$$
$$1 - \pi_i = 1 - \frac{\exp(\alpha + \beta X_i)}{1 + \exp(\alpha + \beta X_i)} = \frac{1}{1 + \exp(\alpha + \beta X_i)} \qquad (5.1)$$

Here X_i are explanatory variables. From these two equations it can be shown that in the logit model the log odds ratio (ratio of probability of an event to occur and probability of the event not to occur) can be expressed as a linear function of explanatory variables.

$$\ln\left(\frac{\pi_i}{1-\pi_i}\right) = \alpha + \beta X_i \qquad (5.2)$$

According to Maddala (1990) and Babock (1995), the probabilities for two alternatives (0 for defaulter and 1 for non defaulter) can be written as follows:

$$P_j = \text{Prob}(Y_j = j) = \frac{e^{\beta x_{j\,i}}}{1 + \sum_{j=1}^{i} e^{-(\beta + \beta_j x_j)}} \quad j = 0 \text{ or } 1 \qquad (5.3)$$

where β_i is a vector of parameters that relates to the explanatory variables, x_i, to the probability that $Y_j = j$. Because the two probabilities (defaulter or non defaulter) must sum to one, a convenient normalization rule is to set one of the parameter vectors, say β_0, equal to zero. So, $e^{\beta_0 x_i} = 1$. The probabilities for the two alternatives can then be expressed as follows.

$$P_0 = \text{Prob}(Y_i = j) = \frac{1}{1 + \sum_{j=1}^{i} e^{-(\beta + \beta_j x_j)}} \qquad (5.4)$$

For ease of exposition, we can write as

$$P_0 = \frac{1}{1 + e^{-z_j}} \qquad (5.5)$$

Where $Z_j = \beta + \beta_j x_j$

If P_0 represents the probability of being in UC category, then $(1 - P_0)$, the probability of not being in UC category is

$$1 - P_0 = \frac{1}{1 + e^{Z_j}} \qquad (5.6)$$

Therefore, we can write

$$\frac{P_0}{1 - P_0} = \frac{1 + e^{Z_j}}{1 + e^{-Z_j}} = e^{Z_j} \qquad (5.7)$$

Now this is the odds ratio in favor of being in unclassified category. The ratio is the probability that a borrower will be in unclassified category to the probability that it will not be in the classified category (Gujarati, 1995). Thus, if $P_0 = 0.80$, it means that odds are 4 to 1 in favor of being in the unclassified category. If $P_0 = 0.50$, there are equal chances of being in each category. Now taking the natural log, we obtain a form of linear equation:

$$L_0 = \ln (P_0 / 1 - P_0) = Z_i = \beta + \beta_j x_j \qquad (5.8)$$

Where, L_0 is the log of odds ratio, is linear in explanatory variables. L is called the logit and hence the name is logit model like (5.8). Here X_j are explanatory variables, which have been described in Table 3.2. The logit model tells how

the log odds in favor of being a non-defaulter change as one variable, say financial performance, changes by one unit.

Equation (5.8) is the form of a linear regression equation. The slope coefficients of Xs suggest that for a unit change in explanatory variables, there will be change in the loan repayment performance. For example, the value of log of odds ratio, L_0, has been found 0.0787. Taking the anti-log of 0.0787 gives approximately 1.0818. This is the value of the expression $[P_0/(1 - P_0)]$, from which the value P_0 (probability of being non-defaulter) can be calculated. In this case the value P_0 is 0.5196, which means that there is a probability of 51.96% that the borrower will be non-defaulter.

The Logit technique is employed in estimating the model. The model has been widely used in several disciplines including Biology, Psychology, Economics and Transports. It is used for predicting whether an event will or will not occur, as well as identifying the variables that are useful in making such prediction. A logit model is preferable because probability must be between zero and one, and in logit model probability is obviously always between zero and one. Therefore, a logit model was used in this study to predict the probability that a project participant will become a non-defaulter. In this model, the dependent variable is the logarithm of the odds that a project participant will become a non-defaulter. Given the polychotomous[2] description of loan repayment performance, the logit specification gives rise to a system of two probabilities (probability of a borrower to be unclassified or classified),

[2] Polychotomous is a categorical data that can have more than two values

sum of which must equal one. As mentioned earlier, the conceptual model of loan repayment performance is based on economic and non-economic variables. In this study, the two groups of variables are combined into one model. The logit model used for this study is as presented below:

LN(Pi/(1 - Pi)) = B+ B1*PRMAGE + B2*PRMEDU + B3*PRMBUSEXP + B4*PRMBUSGRD + B5*NOCOMPANY + B6*INDATTRACT + B7*COMPAGE + B8*FINPERF + B9*MCAPABILITY +B10*MRKTSHARE +B11* PRCSTIME +B12*DISLAG + B13*NOVISITS +B14*MEASURES + B15*POLICY) + ERROR TERM

Where,

P_i = the probability that the borrower will become a loan non-defaulter.

(1- Pi) = the probability that the borrower will become a loan defaulter.

Finally, the interpretation of the variables requires the estimation of marginal effects. Insight into the effect that the explanatory variables have on repayment performance can be captured by examining the derivative of the probabilities with explanatory variables. Marginal effects of continuous variables have been calculated using the equation 5.9.

$$\frac{dP_i}{dX_i} = \beta \times P_i(1 - P_i) \qquad (5.9)$$

This shows the change in probability of P_i=1 i.e. change in the probability of attachment in category j due to 1 unit changes in X_i.

Detail procedures of the logit model for calculating various effects of explanatory variables on the dependent variable are described in Appendix D.

Numerous computer programs such as SAS, SHAZAM, SPSS, etc. have been developed for the estimation of logit models. These packages analyze complex microeconomic data and can handle numerous dependent variables.

Linear multiple regression model was used to find the effect of macro-environmental factors on overall default situation in NCBs. This model was used to examine the influence of two or more independent variables on the dependent variable. The general multiple regression with n numbers of independent variables is expresses as follows:

$$Y' = a + B_1X_1 + B_2X_2 + B_3X_3 + \text{-------} + B_nX_n \qquad (5.10)$$

Here,

Y' = The expected value of the dependent variable

a = Y intercept

Bs = regression coefficients.

In this analysis, an attempt has been made to develop a multiple regression equation to see the strength of the relationship between the independent variable such as default rates in NCBs and the dependent variables such as

yearly GDP growth, number of crimes, duration of hortals, industry profit margins. The regression model used for this study is as presented below:

Default Rate = a + B1 * GDP + B2 * CRIMES + B3 * HORTALS + B4 * PROFITMARGIN + B5 * SALESGROWTH. (5.11)

CHAPTER 6

FINDINGS OF THE ANALYSIS

6.1 Analytical Framework

As stated earlier, borrowing companies have been divided into two groups, namely performing and non-performing. Non-performing loans are those that are either overdue, have been refinanced or modified, or have been defaulted. Performing loans are either current or have been repaid

It may be summarized that factors influencing loan repayment should point out some of the causes affecting business development. Better loan performance suggests that the borrowers were able to identify a good opportunity, or entered into the good market, or had excess resources necessary to carry out the venture. Successful repayment of a loan requires that all requirements are fulfilled; failure in one area can lead to the failure of the project and inability to repay the loan.

There are several factors that can influence loan repayments, ranging from the generic factors such as economic development and political situation of the country to the more specific factors such as financial performance and management capability. Commonly referred factors include lack of experience (both managerial and professional), policy changes and usually short

business experience of the promoters. Use of appropriate statistical model will indicate significant issues concerning loan repayment.

A number of multivariate statistical techniques can be used to predict a binary dependent variable from a set of independent variables. When a dependent variable can have only two values, the use of regression analysis is not meaningful. Another difficulty with the multiple regression analysis is that predicted values cannot be interpreted as probabilities. These are not constrained to fall in the interval between zero and one (Gujarati, 1995).

The logit model has been widely used in several disciplines including economics and finance. It is used for predicting whether an event will or will not occur, as well as identifying the variables that are useful in making prediction. A logit model is preferable where the probability of dependent variable must be between zero and one. Therefore, a logit model has been used in this study to predict the probability that a borrower will become a non-defaulter. In this model, the dependent variable is the logarithm of the odds that a borrower should become a non-defaulter. As mentioned earlier, the conceptual model of loan repayment performance is based on economic and non-economic variables. In this study, the two groups of variables are incorporated into one model.

Logit model was used to examine marginal effects of independent variables on loan performance. The general form of the logit model (derived in Chapter 6) is given below:

$$\ln [Pi/(1 - Pi)] = B + B1Z1 + B2Z2 + B3Z3 + \ldots\ldots\ldots + BnZn + ERR$$

Where,

Zs represent factors that influence loan performance.

Pi = the probability that the ith company will become a loan non-defaulter.

(1- Pi) = the probability that the ith company will become a loan defaulter.

ERR = error terms.

B = constant

B1, B2, B3 .... Bn = coefficients of independent variables

Z1, Z2, Z3 .....Zn = independent variables

As the observations were individual company and not group, the logit model has been used with a nonlinear maximum-likelihood procedure.

6.2 Determinants of Loan Repayment Performance

Eighteen variables are hypothesized to be key in determining the repayment status of the borrower. As noted earlier, five of these variables are promoter's characteristics, six are company characteristics, four are lender related and remaining three are macro-environmental.

Descriptive analyses of collected data were done to find maximum, minimum, mean and standard deviation of the distribution. The analyses on unclassified borrowers are shown in Table 6.2.1 and on classified borrowers are shown in Table 6.2.2.

Table 6.2.1: Descriptive Analyses (Unclassified Borrowers)

Variables	Mean	Maximum	Minimum	Standard Deviation
FINPERF	1.54	6.00	0.59	0.85
PRMEDU	14.76	16	10.78	1.30
COMPAGE	13.84	27.00	3	6.03
PRMAGE	52.16	64	42.2	3.80
TOTEXP	28.64	36	22	4.29
RELEXP	26.45	34	20	3.91
YRSFAMILYBUS	37.30	60	13	7.78
NOCOMPANY	3.67	21.00	1.00	3.51
MGTEDU	15.00	16.00	12.25	0.89
MGTTRAIN	8.31	21.00	0.48	3.55
MGTEXP	19.17	27.33	8.50	3.88
ASSESSTIME	2.77	6.00	1.00	1.30
DISLAG	3.47	13.00	1.00	2.14
PRIORVISIT	4.64	12.00	1.00	1.77
DURINGVISIT	8.26	12.00	1.00	2.76
MEASURES	4.59	6.00	3.00	1.14
PMARGIN	-2.71	69.26	-177.40	27.58
MRKTSHARE	7.91	58.39	0.00	11.11
REPUTATION	3.77	5.00	2.00	1.09

Table 6.2.2: Descriptive Analyses (Classified Borrowers)

Variables	Mean	Maximum	Minimum	Standard Deviation
FINPERF	0.61	1.81	-0.46	0.59
PRMEDU	11.34	12.67	10.11	0.62
COMPAGE	12.62	27.00	3.00	5.97
PRMAGE	51.81	67.33	37.00	4.84
TOTEXP	16.89	34.00	12.00	3.66
RELEXP	11.38	16.00	7.00	2.64
YRSFAMILYBUS	22.30	43.00	13.00	5.95
NOCOMPANY	9.65	15.00	3.00	2.77
MGTEDU	12.35	15.23	10.00	1.68
MGTTRAIN	3.10	5.00	1.00	1.40
MGTEXP	10.52	20.00	6.00	2.85
ASSESSTIME	9.59	15.00	5.00	2.90
DISLAG	11.78	19.00	2.00	5.03
PRIORVISIT	1.54	7.00	0.00	1.45
DURINGVISIT	2.70	5.00	0.00	1.27
MEASURES	2.00	3.00	1.00	0.82
PMARGIN	-8.75	23.82	-118.26	29.21
MRKTSHARE	2.68	11.00	0.01	3.01
REPUTATION	2.22	3.00	1.00	0.85

It is shown from Table 6.2.1 and Table 6.2.2 that mean value of the financial performance of unclassified borrowers is higher than that of classified borrowers. The average value of other variables namely, education of promoters, age of promoters, company age, business experience, family business background, employees' management capabilities, overall industry attractiveness, number of visits by bank officials, measures taken to monitor the repayment status, and company reputation are higher of the unclassified

group than that of the classified group. It indicates that all these variables have the positive effect on loan performance.

The mean value of the number of companies owned by the borrowers of the classified group is higher than that of the companies of the unclassified group. The promoters owning greater number of companies are in the classified group. It is possible that such promoters are involved more in meeting obligations of other companies owned by them. The average value of the assessment time and disbursement time are higher for the companies in the classified group. These two values indicate that the longer loan processing and disbursement time may hamper in making the proper utilization of the loan amount.

The logit model is used to ascertain the variables that significantly indicate the likelihood of a borrower belonging to a particular repayment category. In this model, the dependent variable is the logarithm of the odds that a borrower will become a non-defaulter. Table 6.2.3 presents the parameter estimates and asymptotic t-statistics resulting from the logit model. The estimated coefficients of the variables as well as the t-ratios have also been shown in Table 6.2.3.

As noted earlier, parameters are normalized using the unclassified category (loans without repayment problem) as a base. Hence the estimated coefficients reflect the effect of variables on the likelihood of being in a given repayment category relative to the unclassified category. With regard to the

unclassified category, twelve of the explanatory variables have positive coefficients while remaining eight variables have negative coefficients. A positive coefficient indicates that the variable is associated with a higher probability of being in the unclassified category. On the other hand, a negative coefficient indicates that the variable is associated with a probability of being in the classified category.

Table 6.2.3: Estimated Result from Logit Analyses.

Variables	t-ratios	Coefficient	Standard Error
PRMAGE	1.472	0.0309	0.0235
PRMEDU	3.725	0.1932	0.1180
PRMTOTEXP	2.441	0.0078	0.0040
PRMRELEXP	4.844	0.0874	0.0725
BUSBKGRND	3.067	0.0413	0.0290
NOCOMPANY	-2.102	-0.0604	0.0045
COMPAGE	-1.682	-0.0374	0.0106
FINPERF	2.854	0.2164	0.0500
INDATTRACT	2.695	0.0006	0.0002
MRKTSHARE	2.092	0.0180	0.0085
REPUTATIION	1.093	0.1573	0.0625
COMPETITION	3.628	-0.0378	0.0145
MGTCAPABILITY	2.139	0.0541	0.0245
ASSESSTIME	-2.237	-0.0082	0.0060
DISLAG	-2.771	-0.0064	0.0055
PRIOR VISIT	2.596	0.0180	0.0110
DURING VISIT	3.851	0.0308	0.0278
MEASURES	2.272	0.0701	0.0550
POLICY	-0.068	-0.1014	0.0560
GDPGROWTH	0.081	0.0099	0.0075
HORTALS	0.207	-0.0499	0.0283
CRIMES	0.539	-0.0673	0.0435
Constant	-12.57		

Source: Author Calculation

Confidence Level	95%
Chi-square	59.351
% of correct predictions	78
Number of observations	125

6.2.1. Marginal Effect of Promoters' Characteristics

The results in Table 6.2.3 show that the marginal effect of age of promoters and family business background of promoters is not very significant. Both variables have positive effect on loan repayment performance. Good family business background of promoters increases the probability of repayment by 4 percent. In the case of higher ages of the promoters, the probability of repayment is increased by 3 percent.

The probability of loan repayment performance of a borrower also increases by 0.7 percent with marginal increase in total experience in business of promoters. Experience of promoters related to the nature of the company business has significant positive effect on loan repayment performance. Marginal increase in related experience of promoters increases the probability of repayment capability by 8 percent. Educational qualification of promoters has significant positive effect on loan repayment performance. It increases the probability of loan repayment performance by 19 percent.

The other characteristic of borrowers, which has a significant effect on repayment performance, is the number of companies owned by the borrower. It has no positive effect on repayment performance and reduces the repayment probability by 6 percent. It is found that many borrowers having ownership on other companies have good tracks in repayment performance. But some borrowers do not perform well in making repayment of loan. It is possible that to meet obligations of other companies, borrowers may require

transferring financial resources during a particular loan cycle despite that their previous repayment records were somewhat satisfactory with the bank.

6.2.2. Marginal Effect of Company Related Causes

Company related variables have a significant effect on repayment performance. Variables such as management capability of the company, its financial performance, market share enjoyed by the company in the industry, and overall attractiveness of the industry in which it operates have positive effect on loan repayment performance. Financial performance of a company is a major determinant in repayment of loan. Financial performance increases the probability of repayment by 21 percent.

Two variables, namely management capability and market share of the company have also positive effect on repayment performance. As stated earlier, management capability increases the probability of repayment performance by 5 percent. Management capability of people working in a company were measured in terms of total number of years of relevant education and professional training they received and number of years they are working with the company. Competition among the companies in an industry has the negative effect on loan repayment performance. It decreases the probability of repayment capability by 3.7 percent.

Market share of the company in the industry increases the probability of repayment performance by 1.8 percent. Company with well reputation for its

products and services has reasonable effect on repayment performance. It increases probability of repayment performance by 15.7 percent.

6.2.3. Marginal Effect of Lender Related Causes

Lenders' effort in facilitating improved repayment performance are captured by four variables, namely loan processing time, loan disbursement lags, number of visits for monitoring the use of loan by loan officials, and measures taken against the non-repayn.ent of loan. The effect of loan processing time is found negative on repayment performance. Longer loan processing time reduces the repayment capability by 0.8 percent. Loan disbursement lag reduces the probability of being unclassified by 0.6 percent. The findings in respect of loan processing time and disbursement lag implies that they have a role to play on determining whether or not repayment performance will be favorable. These two variables have been used to capture the effect of activities between the period of submission of loan application and the period of disbursement of the loan. The result shows that these activities are partially successful in reducing default probability.

The effect of visit on loan repayment performance is not very much significant. Visits by loan officials prior to loan sanction increases repayment capability by 1.8 percent. Visits during the utilization of loan increase the repayment capability by 3 percent. The non-significance of visits by loan officials with regard to default is a reflection of the weak effect of loan monitoring. The existing monitoring arrangements are not well construed and the implementation process is bedeviled with infrastructural and logistical

problems such as lack of transportation facilities for loan officials to move effectively, lack of monitoring incentives for them to be committed to the effective execution of monitoring plans. However, measures taken by the bank have been found positive and it increases the probability of being unclassified by 7 percent.

6.2.4. Marginal Effect of Macro-Environmental Causes

Macro-environmental factors that have been considered in this study include policy changes, GDP growth of the country, 'hortals' called by political parties, and number of crimes held in the country in different years. Table 6.2.3 shows that GDP growth rate of the country has no significant effect on the loan repayment performance. GDP growth rate increases the probability of being unclassified by 0.9 percent. 'Hortals' and crimes have negative effect on the loan repayment performance, but not significantly. 'Hortals' reduce the probability of being unclassified by 4 percent and crimes reduce the repayment capability by 6 percent. Policies changed by the Government have significant negative effect on the repayment capability of the borrowers. Survey data show that some policies are favorable to some companies while others are unfavorable. Overall effect of policies changed has negative effect on repayment capability and it reduces the probability of being unclassified by 10 percent.

As mentioned earlier, the conceptual model of loan repayment performance is based on four categories of variables. In this study, the four groups of variables are combined into one model. The logit model of loan repayment

performance used for this study that best predicts successful loan performance is as presented below:

$$\begin{aligned}\ln(P_i / (1 - P_i) = {} & -12.57 + 0.0309*PRMAGE + 0.1932*PRMEDU + \\ & 0.0078*PRMTOTEXP + 0.0874*PRMRELEXP + \\ & 0.0413*PRMBUSGRD - 0.0604*NOCOMPANY + \\ & 0.008*INDATTRACT - 0.0374*COMPAGE + \\ & 0.2164*FINPERF - 0.0378*COMPETITION + \\ & 0.0541*MGTCAPABILITY + 0.0180*MRKTSHARE + \\ & 0.1573*REPUTATION - 0.0082*PRCSTIME - \\ & 0.0064*DISLAG + 0.0180*PRIOR\_VISIT + \\ & 0.0308*DURING\_VISITS + 0.0701*MEASURES + \\ & 0.0099*GDP - 0.0673*NOCRIMES - \\ & 0.0499*HORTALS - 0.1014*POLICY + ERROR\end{aligned}$$

The chi-square value is 59.351, which is significant at the 5% percent level, and the model provides 78 percent correct prediction of the dichotomous (0, 1) dependent variable. This appears to indicate the model provides a reasonably good fit.

The above model has been deduced to a Parsimonious one by excluding less significant variables. A model may not give a completely accurate description of reality (Guzarati 1995). To describe reality one may have to develop such a complex model that it will be of little practical use. Some amount of abstraction or simplification is inevitable in any model building. The principle of parsimony states that a model be kept as simple as possible (Friedman

1953). According to him "A hypothetical model is important if it explains much by few key variables that capture the essence of phenomenon under study and relegate all minor and random influences to the error term.

Only significant variables have been retained in the parsimonious model. An estimation of variables used in the parsimonious model has been made and the findings have been shown in Table 6.2.4.1.

Table 6.2.4.1: The Parsimonious Model

Variables	t-ratios	Coefficient	Standard Error
PRMEDU	5.293	0.2550	0.098
PRMRELEXP	6.869	0.2179	0.1925
PRMTOTEXP	2.648	0.0168	0.0042
BUSBKGRND	3.067	0.0413	0.0250
NOCOMPANIES	-2.838	-0.0102	0.0022
FINPERF	3.035	0.2631	0.050
COMPETITION	2.136	0.0378	0.0143
MGTCAPABILITY	2.591	0.0518	0.0204
ASSESSTIME	-3.033	-0.0816	0.0610
DISLAG	-2.963	-0.0097	0.0055
PRIOR_VISIT	2.864	0.0206	0.0116
DURING_VISIT	3.789	0.0386	0.0285
MEASURES	2.272	0.0701	0.0685
INDATTRACT	2.365	0.0020	0.0016
MRKTSHARE	2.365	0.048	0.0355
Constant	-10.93		

Fourteen variables, which have been found statistically significant, are: FINPERF, PRMEDU, PRMTOTEXP, PRMRELEXP, BUSBKGRND, NOCOMPANY, COMPETITON, MGTCAPABILITY, ASSESSTIME, DISLAG, PRIOR_VISIT, DURING_VISIT, MEASURES, INDATTRACT and MRKTSHARE.

The marginal effect of the variables in the parsimonious model has been changed when analysis was made using only significant variables. The effect of the most of the variables in the parsimonious model has been increased. The econometric model based on parsimonious variables for successful loan repayment performance is presented below:

$$\begin{aligned}\ln(P_i / (1 - P_i)) = {} & -10.93 + 0.2550*PRMEDU + 0.0168*PRMTOTEXP + \\ & 0.2179*PRMRELEXP + 0.0413*PRMBUSGRD - \\ & 0.0102*NOCOMPANY + 0.0020*INDATTRACT + \\ & 0.2631*FINPERF - 0.0378*COMPETITION + \\ & 0.0518*MGTCAPABILITY + 0.048*MRKTSHARE - \\ & 0.0816*ASSESSTIME - 0.0097*DISLAG + \\ & 0.0206*PRIOR\_VISIT + 0.0386*DURING\_VISITS + \\ & 0.0701*MEASURES + ERROR\end{aligned}$$

The above parsimonious model shows that out of fourteen significant variables, eleven variables have positive effect on the loan repayment performance and the remaining three variables have negative effect and these three increase the probability of loan defaulting.

Among positive variables, education of promoters increases the probability of repayment capability by 26.3 percent. Related business experience has more positive effect than the total business experience of promoters. Total and related experience of promoters increases the probability of being unclassified by 1.6 percent and 21.79 percent respectively. Family business background of promoters increases the probability of repayment capability by 4.13 percent.

Among company related causes, better financial performance of a borrowing company has most positive effect of loan repayment capability. It increases the probability of being unclassified by 26.31 percent. Management capability, market share, and an attractive industry in which the company operates increase the repayment probability by 5.18, 4.8 and 0.2 percent respectively. Competition in the industry decreases the repayment capability by 3.7 percent.

Visits by loan officials prior to loan sanctioning and during loan utilization have positive effect on loan repayment performance. Prior to and during visits increase the repayment performance by 2 percent and 3.8 percent respectively.

Number of companies owned by promoters reduces the probability of being unclassified and increases the probability of loan default. It reduces the repayment probability by 1.02 percent.

Longer time taken for loan assessment reduces the loan repayment probability by 8.16 percent. Loan disbursement lag also has the negative effect on repayment performance and decreases the repayment probability by 0.9 percent.

The model has been used to calculate the probability that a borrower would be a good performer or not. Based on sample data, the calculated probability

divides the borrowing companies into two groups. Companies with probabilities 41.37% or abcve are good performers and companies with probabilities below 41.37% are defaulters. Thus, banks may use the following decision criterion for choosing a borrower.

Table 6.2.4.2: Decision Criterion for Lending

Decision Criterion (Probability)	Lending Decision	Standard Error
41.37% or more	Approve the loan	0.0751
Below 41.37%	Reject the loan proposal	

If the model shows that the probability of a borrower of becoming non-performer is 41.37% or above, the bank may approve the loan proposal. However, If the probability is below 41.37%, the bank may not accept the loan proposal.

6.3 Effect of Macro-environmental Factors on NCBs' Default Situation

To analyze the effect of macro-environmental factors on the overall default situation of nationalized commercial banks, the following variables were considered:

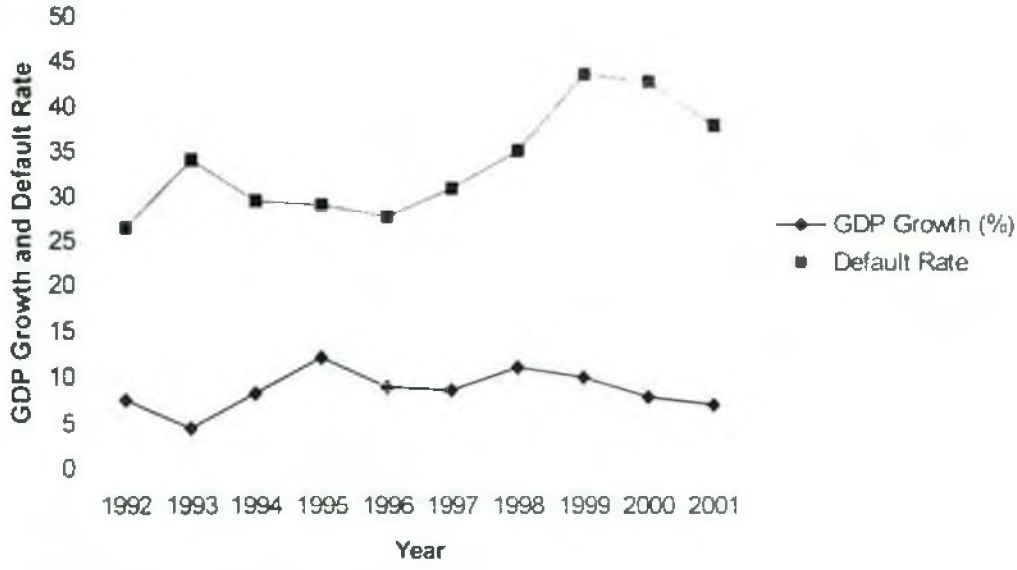
1. Industry conditions such as industry sales growths and profit margins in different years,
2. Economic condition such as GDP growth of the country,

3. Political situation such as hortals called by political parties, and
4. Social condition such as number of crimes held in the country in different years.

Table 6.3.1 shows the GDP growth rates and default rates (the default rate is the percentage of the loan amount which has not been repaid by borrower) in four nationalized commercial banks from 1992 to 2002. GDP growth rate in the country throughout the years from 1992 to 2002 does not follow a different trend.

Table 6.3.1: Default Rate in NCBs and GDP Growth Rate

Year	GDP Growth (%)	Increasing / Decreasing	Default Rate (%)	Increasing / Decreasing
1992	7.57		26.47	
1993	4.53	Decreasing	34.12	Increasing
1994	8.21	Increasing	29.53	Decreasing
1995	12.09	Increasing	29.01	Decreasing
1996	9.01	Decreasing	27.74	Decreasing
1997	8.58	Decreasing	30.95	Increasing
1998	11.11	Increasing	35.12	Increasing
1999	10.04	Decreasing	43.64	Increasing
2000	7.95	Decreasing	42.77	Decreasing
2001	7.10	Decreasing	38.03	Decreasing



Source: CIB, Bangladesh Bank

Figure 6.3.1: Trend of GDP Growth and Default Rate in NCBs

GDP growth rate decreased in 1993 but increased in next two years and reached to the highest 12.09 percent. But average default rate in NCBs in 1993 decreased. It seems that GDP growth rate has positive effect on default rate. Except in 1998, the GDP growth rate was in negative trend from 1996 to 2002 but the default situation in 1998 deteriorated. In 1999, the GDP growth rate was relatively good but default rate was increased in this year. From 1999 the GDP growth was in negative trend but default rate decreased. Thus, no definite relationship is discernible between GDP growth and default rate.

Table 6.3.2 shows average sales growth of all industries from 1992 to 2001 and corresponding default rates in NCBs.

Table 6.3.2: Trend of Sales Growth & Default Rate

Year	Sales Growth (%)		Default Rate (%)	Effect
1992	19.44		26.47	
1993	14.44	Decreasing	34.12	Increasing
1994	30.80	Increasing	29.53	Decreasing
1995	32.11	Increasing	29.01	Decreasing
1996	33.84	Increasing	27.74	Decreasing
1997	28.17	Decreasing	30.95	Increasing
1998	11.26	Decreasing	35.12	Increasing
1999	0.38	Decreasing	43.64	Increasing
2000	25.75	Increasing	42.77	Decreasing
2001	-9.22	Decreasing	38.03	Decreasing

Source: SEC and CIB, Bangladesh Bank

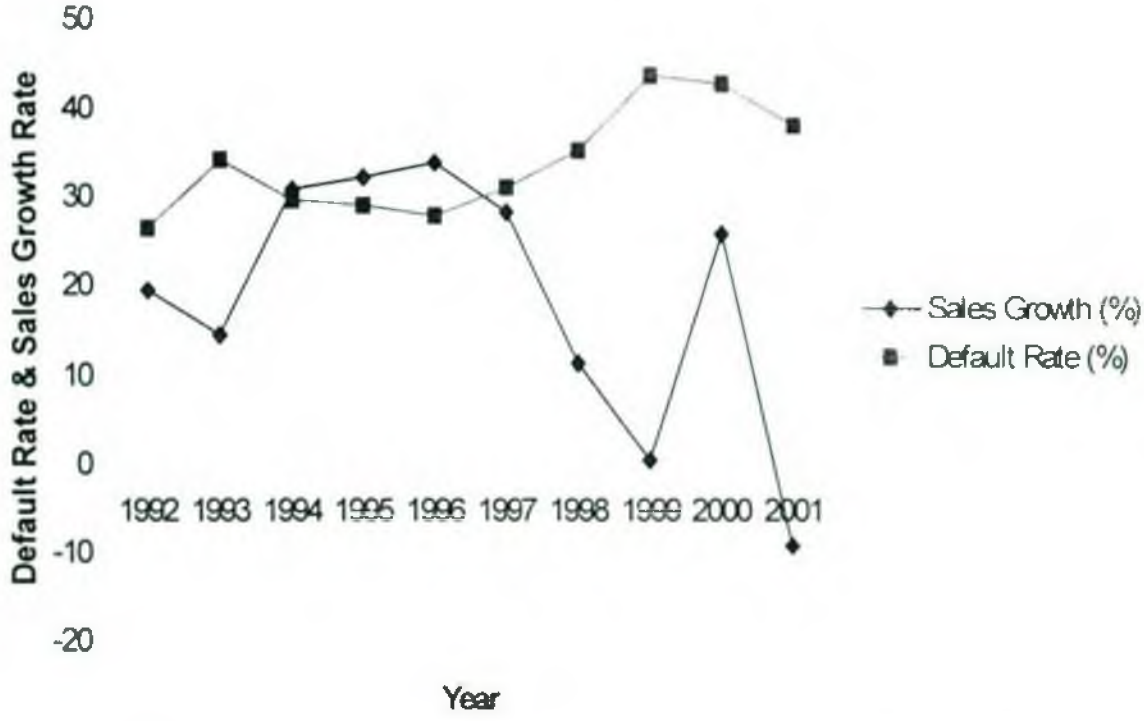


Figure 6.3.2: Trends in Default Rate & Industry Sales Growth Rate

It may be logically hypothesized that default rate decreases as the sales growth increases. Data show that industry sales growth rate has negative effect on overall default situation in NCBs in all the years except in 2001. In this year, sales growth had the reversed effect on default rate. Sales growth was negative in this year but the default rate decreased. From 1994 to 1996, sales growth rates were in increasing trend from 30.80 in 1994 to 33.84 in 1996, but default rates were in decreasing trend in these years. From 1997 to 1999 sales growths were in decreasing trend but default rates were in increasing trend. In 2000, sales growths increased and default rate decreased. In these four years from 1997 to 2000, there was negative

relationship between industry sales growths and default rates in NCBs. To find the overall relationship effect of sales growths on default rates from 1992 to 2001, statistical technique such as correlation analysis was used. The correlation analysis shows that there is strong negative relationship between sales growths and default rates in NCBs (Table 6.3.2).

Table 6.3.3 shows that profit margins in different years from 1992 to 2001 are not on a particular trend. Industry profit margin in 1993 decreased, but default rates in NCBs increased. In 1994, default rate decreased with an increase in profit margin. Again, in 1995 both profit margin and default rate decreased. From 1996 to 2001, a definite relationship between profit margins and default rates was found except in 1997. In these years, either default rate decreased with an increase in average industry profit margin or default rate increased with a decrease in industry profit margin.

Table 6.3.3: Trend of Profit Margins & Default Rate

Year	Profit Margin (%)		Default Rate (%)	Effect
1992	2.79		26.47	
1993	1.96	Decreasing	34.12	Increasing
1994	6.24	Increasing	29.53	Decreasing
1995	3.68	Decreasing	29.01	Decreasing
1996	4.84	Increasing	27.74	Decreasing
1997	6.91	Increasing	30.95	Increasing
1998	3.24	Decreasing	35.12	Increasing
1999	3.07	Decreasing	43.64	Increasing
2000	3.87	Increasing	42.77	Decreasing
2001	4.11	Increasing	38.03	Decreasing

Source: Bangladesh Bank

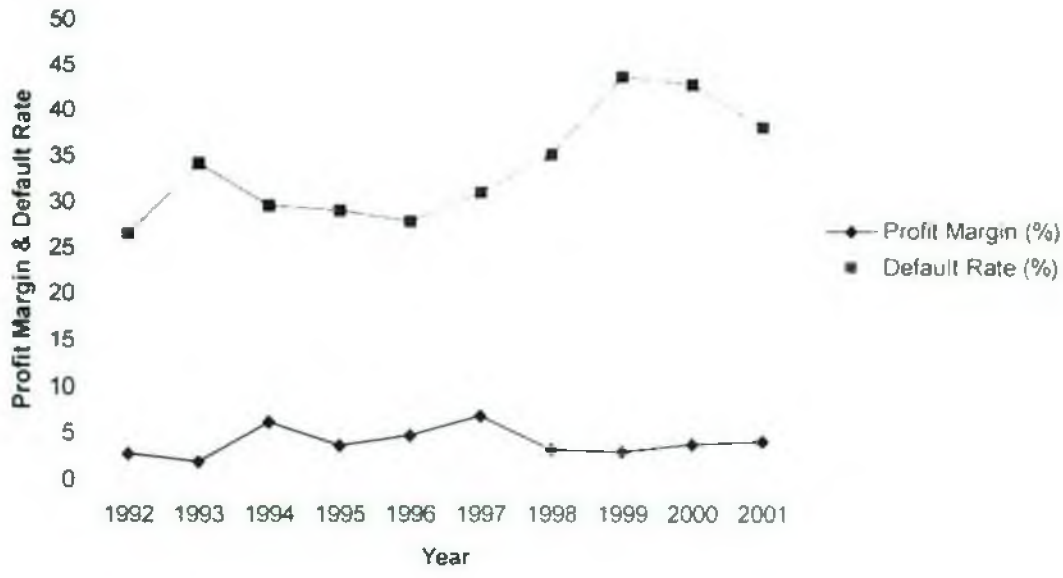


Figure 6.3.3: Trends in Industry Profit Margin & Default Rate

In 1998, average profit margin decreased from 6.91 to 3.24 but the default rate increased in this year. From 1999 to 2001, average profit margin gradually increased from 3.07 to 4.11 but default rate decreased from 43.64 to 38.03.

Political and social environment in the country had effect on repayment performance of borrowers in NCBs. Hortals called by political parties affect business performance of the companies. From 1992 to 2001, there were 3,068 hours of hortals in the country. In 1993, hortal hours were increased to 229 hours from 163 hours in the previous year. Default rate also increased from the previous year. In 1994 and 1995, total duration of hortals were increased and default rates also decreased.

Table 6.3.4: Hortals Called & Default Rate

Year	Hortal Hours	Effect	Default Rate	Effect
1992	163		26.47	
1993	229	Increasing	34.12	Increasing
1994	404	Increasing	29.53	Decreasing
1995	598	Increasing	29.01	Decreasing
1996	411	Decreasing	27.74	Decreasing
1997	87	Decreasing	30.95	Increasing
1998	104	Increasing	35.12	Increasing
1999	529	Increasing	43.64	Increasing
2000	188	Decreasing	42.77	Decreasing
2001	355	Increasing	38.03	Negative

Source: Bangladesh Police

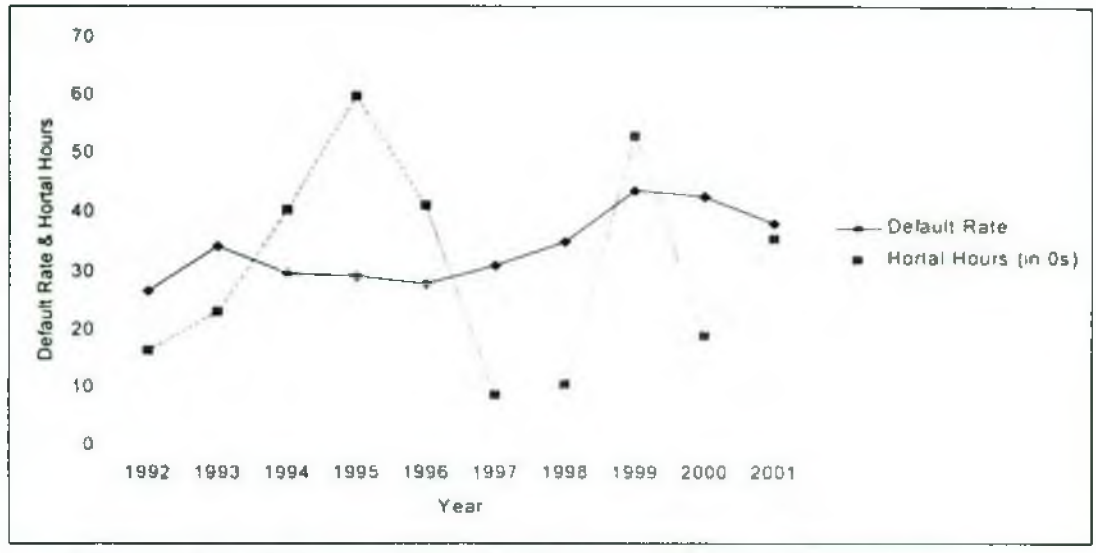


Figure 6.3.4: Trend in Hortals Calls and Default Rates

From 1996 to 2000, 'hortal' had positive effect on default rates in NCBs except in 1997. In majority of cases, default rate decreased when duration of 'hortals' also decreased and default rate was increased with increased 'hortal' duration.

Table 6.3.5 shows that number of crimes in the country had positive effect on default rates in NCBs in most of the years. In 1993, number of crimes increased from the previous year and default rate also increased. In the next year, default rate decreased with a decrease in the number of crimes.

Table 6.3.5: Number of Crimes & Default Rate

Year	No. of Crimes		Default Rate	Effect
1992	10365		26.47	
1993	14281	Increasing	34.12	Increasing
1994	10526	Decreasing	29.53	Decreasing
1995	29295	Increasing	29.01	Decreasing
1996	24844	Decreasing	27.74	Decreasing
1997	30338	Increasing	30.95	Increasing
1998	38375	Increasing	35.12	Increasing
1999	36902	Decreasing	43.64	Increasing
2000	31903	Decreasing	42.77	Decreasing
2001	36847	Increasing	38.03	Decreasing

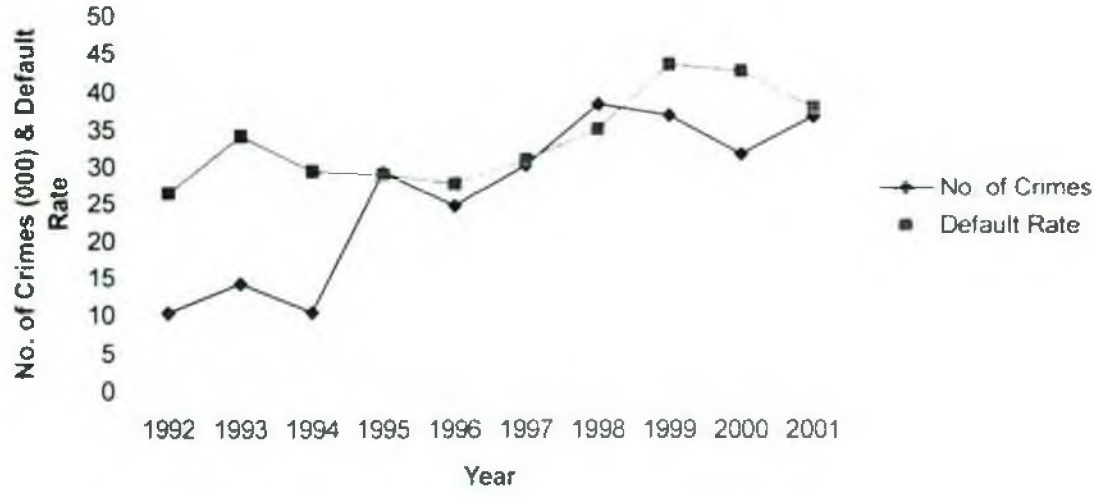


Figure 6.3.5: Trend in Crimes & Default Rate

From 1996 to 2000, default rates increased with an increase in number of crimes in the country and decreased with a decrease in crimes. Exceptional

years were 1995 and 2001 during which number of crimes increased but default rates decreased from the previous year.

To measure the overall effect of macro-environmental factors on default rates in NCBs in different years, correlation coefficients of various factors were calculated.

Linear correlation and regression models have been used to determine effect of five macro-environmental variables on default situation in NCBs and find out the nature and strength of relationships between dependent and independent variables. The estimates from linear regression analysis are presented in Table 6.3.6.

Table 6.3.6: Estimate Results from Linear Regression Analysis

	Coefficients	t ratio
Constant	35.2410	4.1210
GDP Growth (%)	-1.4450	-1.0680
Sales Growth (%)	-0.0215	-0.1080
Profit Margin (%)	-0.6860	-0.4980
Hortal Hours	0.0051	0.4430
No. of Crimes	0.0005	1.7340

Dependent Variable: Default Rate

Confidence Interval: 95%

Table 6.3.6 shows that the probability of default situation increases with number of crimes in the country but has no significant effect on hortals. The probability of default situation increases with decrease in the profit margin in industries and also with decrease in the sales growth in industries.

The expected overall default rate in NCBs can be calculated from the following regression equation:

Y' = 35.251 – 1.445 * GDP Growth - 0.686 * Profit Margin - .0215 * Sales Growth + 0.005099 * Hortals + 0.000477 * Crimes

Here, Y' is the expected default rate in NCBs.

The correlation coefficients of various factors are presented in Table 6.3.7.

Table 6.3.7: Correlation Coefficients of Default Rates and Macro-Environmental Factors.

	Default Rate	GDP Growth	Sales Growth	Profit Margin	Hortal Hours	Number of Crimes
Default Rate	1.000	-.050	-.611	-.283	.028	.629
GDP Growth	-.050	1.000	.204	.152	-.030	-.110
Sales Growth	-.611	.204	1.000	.447	-.002	-.446
Profit Margin	-.283	.152	.447	1.000	-.051	-.004
Hortal Hours	.028	-.030	-.002	-.051	1.000	.073
Number of Crimes	.629	-.110	-.446	-.004	.073	1.000

In table 6.3.7, it is found that average rate of profit margin in industries have negative relationships with the average default rate in NCBs. That means, as profit margin in industries increases default rate decreases.

Industry sales growth has negative relationship with default rates. Default rates in NCBs decreased as sales growth in industries increased. There is a strong positive relationship between sales growths and rate of profit margins in industries. Both these factors have negative relationship with default rates.

Number of crimes and 'hortal' hours called by political parties have positive relationship. Crimes have the significant positive relationship with the default rates in NCBs. That is, default rates increased with an increase in number of crimes. 'Hortals' called by political parties have insignificant positive relationships with default rates.

CHAPTER 7

DISCUSSION AND CONCLUSION

A number of empirical studies have been conducted in various countries on loan repayment performance of borrowers. These studies have indicated that there are a number of factors affecting loan repayment performance. Factors such as promoters' characteristics, income from business, business experience of promoters and management capability, lenders loan processing and monitoring systems, measures taken for recovery of loan, etc. are the major factors that influence the loan repayment performance.

Generally, it is expected that Bangladesh context presents a similar scenario in respect of loan repayment problem. However, a formal study is needed before an equivocal conclusion may be aimed at. In order to evaluate the prevalence of positive and negative externalities that affect loan repayment performance, a survey of 125 public limited companies, listed with DSE and who took loan from NCBs, was accomplished.

Five promoters related variables, namely promoters age, their education, related and total business experience and number of companies owned by promoters were taken into consideration. It has been hypothesized that age, education, experiences have positive effect on the loan repayment performance and number of companies has a negative effect. Six company related variables, namely company age, industry attractiveness, financial

performance, market share, management capability, and company reputation have been considered as the determinants of the loan repayment performance. All these variables were hypothesized to have positive effect on the loan repayment performance. Among the lender-related causes, loan processing time and disbursement lagging time were considered as the negative determinants of the loan repayment performance. Number of visits and measures taken for recovery were considered as the negative determinants. Four macro-environmental variables were considered as the relevant factors. It has been hypothesized that GDP growth of the country should have positive effect, and favorable policy changes should also have the positive effect. Crimes and hortals were considered as the negative factors adversely affecting the loan repayment performance.

Data analyses were carried out using both statistical and financial techniques. Analyses were performed in order to assess the significance of each variable affecting the loan repayment performance in Bangladesh. Statistical techniques, specifically logit model and linear regression model, were used to assess the effect of determinants on loan repayment performance. Linear regression model was also used to analyze the effect of macro-environmental factors on overall default situation in NCBs and to find the type of relationships between default rate and independent variables such as GDP growth, number of crimes, hortals, industry sales growth, and profit margins.

Logit model was used to analyze the repayment performance of borrowing companies in NCBs because it is more robust to test the marginal effect of

multiple independent variables on the dependent variable. This technique allows for an error term for latent variables with multiple indicators and therefore gives a much more accurate estimation and a more appropriate treatment of variables measured with error.

The logit model indicates that the probability that a company will become a non-defaulter is positively related to promoter and company related causes. Prominent promoter related causes are promoters' education, their company related business experience, and family business background. Significant company related positive causes are management capability and formal education of employees, their professional training, financial performance of the company. However, the following variables were found to have significant effect - company reputation, industry attractiveness, competition, management capability, market share, and financial performance. Significant lender related causes are visits of borrower made by loan officials and measures taken against nonpayment of loan by the borrower. The analysis shows that macro-environmental causes do not have significant effect on loan repayment performance.

The study reveals that promoters' profile is as important as the financial performance of the company. It is revealed from the analysis that most of the promoter related causes have significant effect on the loan repayment performance. According to David Orr (1991), formally educated people think broadly and understand systems, connections, patterns, and root causes of a situation that are much helpful in improving the performance in the business.

Borrowers from a family having business background have the opportunity to acquire knowledge about business and its environment from their family environment. Usually, they have positive attitudes toward the business and are more willing to repay the loan. It is also revealed from this study that companies with promoters having better formal education and longer business experience have better repayment performance. Thus, promoters' characteristics are vital determinants and may be incorporated in banks' lending policy in analyzing lending proposals.

'Management capability' also has the positive effect on the loan repayment performance. The managerial personnel of the company are responsible for business operations. Promoters of the company were not included in the managerial personnel. Well-educated business managers with relevant training and working experience can make a company profitable. In addition to financial performance of the company, capability of operating managers should be included in the process of evaluating the loan proposal.

Industry attractiveness is another positive determinants of loan repayment performance. Company operating in an attractive industry has a better opportunity to perform well in terms of its financial performance. Banks should consider industry performance in evaluating loan proposal.

It is more logical that promoters owning a number of companies should have more capability to repay the loan. But, promoters who own many companies have much responsibilities and accountability to manage all other companies

owned by themselves. There is every possibility that earning from one company may have to be shifted to other companies. Consequently, repayment of loan may be ignored. The analysis revealed that the variable NOCOMPANY (number of companies owned) has negative effect on repayment performance. Thus, this factor should be considered in the lending policy of banks.

Loan assessment time and disbursement have negative effect on loan repayment performance. Findings in respect of these two variables imply that loan processing has a role to play in determining whether repayment performance will be favorable or not. Loan processing needs to be conducted in a timely fashion and it is necessary to have proper interactions between the lender and borrowers so that both parties will be convinced of benefits associated with the use of loan. Loan processing system should be made to the borrower friendly through simplification of administrative processes and avoidance of unnecessary bottlenecks that can escalate the rigor and cost of borrowing.

The significance of the effect of visits on repayment of loan is a reflection of the positive impact of loan monitoring. For loan monitoring to be effective, there should be a sustained system of incentives to motivate the staff involved. A reward system should be worked out for the staff such that monitoring and recovery activities are linked with actual repayment achieved. Specifically, logistics problems hampering access to borrowers should be

solved and appropriate incentives should be provided to motivate staff towards increased efforts in monitoring of the use of loan.

7.1 Policy Implications of Findings

The findings of this study show directions to strengthen the lending system in nationalized commercial banks in Bangladesh. The findings also have implications for the articulation of effective lending policy and better performance of financial institutions.

Some measures can be considered in overcoming the shortcomings of the loan repayment performance. The measures have merits not only from technical point of view, they are meaningful from the socio-cultural perspectives.

Furthermore, the fact that the free-flow of information from the borrower for assessing loan application is not coming forth. This can be done by proper visits to the borrower by bank officials prior to sanctioning of loan. The lenders are required to put effective monitoring and recovery machinery to ensure that the desired results are achieved. Whenever repayment problem arises, in the form of default, the borrower alone cannot be held responsible. Whenever problems arise it is important to examine the extent to which both the borrowers and lenders comply with the loan agreement. Also, it is needed to assess responsibilities and obligations of both parties rather than blame each other.

Appropriate action on the part of both the lender and borrower is essential because the regulatory environment and loan management system in addition to the behavior of borrower have significant role to play in determining the outcome of a loan agreement. Thus, to improve the loan repayment performance, NCBs should strengthen the loan monitoring strategies to further reduce default problems.

The extraneous factors that are responsible for the inability of borrowers to fulfill their repayment obligations need to be examined. These factors include general economic condition such as low GDP growth, instability of political situation, and social conditions (such as increasing crimes). All these constraints should be overcome through appropriate actions that may be taken by relevant government organizations or agencies in the country.

7.2 Strength of the Study

Industry-wide survey on borrowers has been conducted to obtain data. As such, the findings of the study should be free from particular industry characteristics or biases. Random selection of borrowing companies might have minimized the selection bias and might have as well made the sample representative. Consequently, the findings have become more generalized.

The study is designed within the framework of the lending procedures followed in different developed and under-developed countries, and as such has a sound theoretical foundation. The critical pattern of relationships that the factors examined in this study is not theoretical. Thus, a substantive

interpretation of the findings is possible within the frameworks of extant literature.

This study covers multiple aspects of loan situation in NCBs. It made a comprehensive analysis of the variables that are likely to have effect on the loan repayment performance of borrowers. The variables included in the analysis are: stakeholders such as the company, its promoters, and the lenders. Macro-environmental variables have also been included in the analysis to find their effect on the loan repayment performance.

Methodological rigor is maintained in conducting the study. The borrower survey, the sample size, survey design, and the statistical requirements for reliability together contributed to the quality of the research.

7.3 Limitations of the Study

The promoter, company, and related data were obtained through questionnaire survey. Financial and macro-environmental data were collected from published annual reports and other secondary sources. Measures were taken to ensure the objectivity of the study. Although the study was designed carefully, it might not have been absolutely free from possible 'key informant' bias. However, a large sample should have minimized bias. The industry-wide survey and random selection of borrowers should have minimized particular industry characteristics and selection bias.

Although cross-checking of responses is done by obtaining information from NCBs, the study was done from the borrowers' perspective. The information includes financial statements of borrowers and lender related causes. Responses of a limited number of borrowers were cross-checked with the banks' information. Consequently, interpretation of the findings should be done with appropriate caution, though the cross-checking did not reveal inconsistency in the pattern of borrowers and lenders' practices.

In this study, the same data set was used to develop the model and to test the loan repayment performance of borrowers. Use of two independent samples, one for developing model, and the other for testing the performance would have been the best route for developing statistical inference. Validation of the results is not considered a viable option in this study because the number of observations in not large enough to use a holdout sample for the purpose. It may be noted that the findings of this study are strong and consistent with the literature.

7.4 Contribution of the Study

Most of the models in the extant literature have been formulated in the context of the developed economies. Bangladesh, being a under-developed country has situation different from developed countries. Accordingly, a model suitable to Bangladesh situation has been developed considering variables to address the country specific situation. The development of this type of model is the first attempt for analyzing the loan repayment performance in Nationalized Commercial Banks in Bangladesh. Thus, this specific model is an addition to

the literature. This model can be used in other countries having situation similar to that of Bangladesh.

The suggested model is based on the situation prevailed in nationalized commercial banks. The model has taken into consideration the factors that may also be applicable in other types of financial institutions, such as private commercial banks, development financing institutions, micro credit institutions etc. to analyze the loan repayment performance of borrowers.

The LRA model practiced by the banks uses only the borrower's business related factors and gives equal weight to each factor. This model makes subjective analysis using qualitative aspects of the variables. In the LRA model, human judgement of the analyst plays a major role in deciding the risk factor of the individual borrower. The suggested model makes the quantitative analysis of the variables allowing separate marginal effect of each variable and provides probability estimates for each borrower for loan repayment performance.

The LRA model does not take into consideration the personal characteristics of the borrower, the attributes of the lender activities, and some other economic, social, political environmental variables. The suggested model takes into account all these types of variables for making comprehensive analysis to find the capacity of the loan repayment performance of each borrower. The model uses variables that represent almost all aspects of stakeholders of the lending situation in NCBs.

7.5 Agenda of Future Research

The present study focuses on the issues concerning the situations prevailed in NCBs and identifies factors that are relevant to the lending procedure in NCBs. Further study may be attempted to measure the impact of the following macro factors on the loan repayment performance:

i. monetary policy of Bangladesh,
ii. international political situation,
iii. trade policies of other countries,
iv. monetary policies of other countries, and
v. such other relevant variables depending on the specific problems.

As an extension of the present research, the identified variables and the conceptual framework in this study may be used in doing research in other financial institutions such as development financing institutions, private commercial banks, micro credit institutions, etc. of the country.

Further insights into the dynamics of inter-organizational relationships between the bank and the borrowing companies may be obtained by conducting a more focused study. Such a study would reveal how the relationship between bank and borrower over a period of time affects the loan repayment performance.

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Appendix A

Lending Situation in NCBs

Number of Classified Borrowers in NCBs (as of Dec. 2002)

Bank	Number of Borrowers	No. of Defaulters	Percent of Classified
Agrani Bank	22004	10780	48.99%
Janata Bank	19624	8879	45.25%
Rupali Bank	12204	7079	58.01%
Sonali Bank	20630	14207	68.87%

Source: CIB

Total Outstanding Loan Amount in NCBs

(Taka in Crore)

Year	Agrani Bank	Janata Bank	Rupali Bank	Sonali Bank
1992	2451.36	2087.26	1051.28	3185.41
1993	2785.17	2432.44	1369.74	3652.77
1994	3035.88	3000.79	1447.17	3821.48
1995	3841.19	3145.26	1462.81	3856.58
1996	4118.41	3708.17	1658.83	4543.85
1997	4586.09	3998.82	1808.85	5290.78
1998	5021.52	4559.36	2079.82	6145.77
1999	5280.00	5259.00	2257.00	6957.00
2000	5436.00	5573.00	2638.00	7838.00
2001	6399.00	6704.00	3439.00	8751.00
2002	6899.00	6900.00	3422.00	9418.00

Source: CIB, Bangladesh Bank

Total Classified Loan Amount in NCBs

(Taka in Crore)

Year	Agrani Bank	Janata Bank	Rupali Bank	Sonali Bank
1992	599.85	539.97	296.99	870.89
1993	934.70	797.35	481.33	1290.16
1994	709.86	622.24	554.72	1362.65
1995	935.37	649.43	586.53	944.64
1996	1316.54	867.83	483.46	1259.91
1997	1724.69	933.29	472.98	1835.45
1998	2086.43	1413.30	649.32	2256.97
1999	2573.00	2076.00	935.00	3124.00
2000	2638.00	2179.00	1058.00	3397.00
2001	2714.00	2204.00	1431.00	3081.00
2002	3038.00	2405.00	1265.00	3500.00

Source: CIB, Bangladesh Bank

Default Rate in Nationalized Commercial Banks

Year	Default Rate (%)			
	Agrani	Janata	Rupali	Sonali
1992	34.47	31.87	41.25	39.14
1993	27.56	28.78	35.14	35.42
1994	23.38	20.74	38.33	35.68
1995	30.81	20.65	38.75	25.83
1996	31.87	23.40	27.97	27.73
1997	37.61	23.34	28.15	34.68
1998	41.55	31.00	31.22	36.72
1999	48.73	39.48	41.43	44.90
2000	48.54	39.10	40.09	43.33
2001	42.41	32.88	41.61	35.21
2002	44.33	34.86	36.97	37.17
Mean	**38.80**	**29.49**	**36.06**	**35.69**

Source: CIB, Bangladesh Bank

Appendix B

Lending Risk Analysis

For making Lending Risk Analysis, NCBs require following general information about the borrower. The information includes:

- The condition of the industry in which the company is currently operating or will be doing its business. This helps the bank to get some primary idea about the company's competitors as well as the position of the industry in which it will perform, to see whether the company will be able to generate profit to repay the loan.

- The nature of loan whether the company is a new one applying for new loan or whether it is an existing borrower of the bank applying to increase the existing loan amount. Depending on the nature of the loan and the amount sought, the bank analyzes the risk involved in the operation.

There are three-risk categories such as business, security and overall. This gives a basic idea in making the decision. Bank identifies the risk level associated with the borrower and its different operations and assigns scores according to a rating scale. The levels of risks and corresponding points are given below:

INDUSTRY RISK

Supplier Risk & Sales Risk

Risk Level	Score
Low	1.5
Average	3.0
High	4.5
Excessive	12

COMPANY POSITION RISK

Performance Risk & Resilience Risk

Risk Level	Score
Low	2
Average	4
High	6
Excessive	10

MANAGEMENT RISK

Management Competence & Integrity Risks

Risk Level	Score
Low	3
Average	6
High	9
Excessive	24

SECURITY RISK

Security Control & Cover Risk

Risk Level	Score
Low	-5
Average	-10
High	+5
Excessive	+10

The risk is divided into two main segments: total business risk and total security risk. The rating of a particular risk is assigned A, B, C, or D for security risk and assigned 1, 2, 3 or 4 for business risk. . A risk scoring 1 or A is the good score i.e. less risky. For business risk, a total score from 13 to 19 indicated that the company is in a good risk, the score of acceptable risk varies from 20 to 26 and the poor risk's score exceeds 34. On the other hand for security risk the score –20 to –15 represents good risk, while a poor risk's score exceeds +10. By adding the individual score the bank gets the total score and from that score they put the company in a four by four matrix to rate them.

1	2	3	4
A	A	A	A
B	B	B	B
C	C	C	C
D	D	D	D
Good	Acceptable	Marginal	Poor

Decision Criteria

Good = 1A, 1B, 1C, and 1D.

Acceptable = 2A, 2B, and 2C

Marginal = 2D, 3A, and 3B

Poor = 3C, 3D, 4A, 4B, 4C, and 4D.

From the total score the bank gets an idea about the overall risk to be guessed about the company requesting for loan. From this the bank can understand the security cover strength of the borrowing company.

Considering risk levels involved, the assigned official makes the final lending risk score which is a mix of quantitative and qualitative data. It should be worth mentioning that the judgement and the decision are mainly done from human intellect, theoretical knowledge and relevant experience of the officials assigned. They from their experience and subjective analysis can figure out whether a project is feasible or not.

APPENDIX C

Industry Condition

Sales Growth Rate of Industries (in crore)

Industry	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Engineering	7.52	21.04	26.11	28.30	-6.23	4.96	5.00	-6.27	17.12	0.41
Food & Allied	14.93	-3.10	8.11	13.22	28.79	19.03	5.32	-4.80	3.73	1.52
Fuel & Power	10.89	4.12	9.78	9.66	2.22	20.74	10.26	4.12	12.93	8.50
Jute	8.07	1.37	16.59	2.45	-2.90	-3.33	-11.74	-10.25	-18.63	-5.99
Textile	55.56	17.34	34.34	63.63	46.58	22.27	23.24	6.77	34.27	-7.39
Pharma & Chemicals	20.95	22.66	42.15	46.75	10.98	10.73	7.25	7.37	15.92	5.69
Paper & Printing	-19.48	-17.87	-0.03	71.73	-19.23	-18.95	-21.57	16.39	116.74	-89.72
Services & Real Estate	17.04	36.03	254.78	87.18	51.04	11.32	-11.66	-6.82	-3.22	-18.36
Cement	33.27	-9.96	22.82	25.65	80.36	43.04	15.20	15.82	99.42	12.13
Ceramic	47.22	25.05	18.72	1.95	43.51	47.61	-4.73	-5.32	1.72	-17.38
Leather	17.93	18.14	15.39	13.56	27.10	20.47	-2.76	-12.83	3.26	9.18

Average Profit Margin of Industry (in crore)

Industry	1993	1994	1995	1996	1997	1998	1999	2000	2001	Average
Engineering	2.59	6.06	6.3	7	6	7	5	6	5	4.53
Food & Allied	4.98	5.22	6.15	5	6	4	-1	3	8	3.73
Fuel & Power	1	1	1	1	1	1	1	1	1	1.00
Jute	-3	-6	-5	-7	-6	1	-5	-5	-5	-0.82
Textile	1.74	4.43	5.26	7	7	3	3	7	5	3.70
Pharma & Chemicals	4.33	9.33	10.6	9	10	11	10	10	11	7.92
Paper & Printing	-18	-11	1	-10	-16	-25	-17	-7	1	-10.82
Services & Real Estate	14	6	7	12	13	10	6	5	5	7.00
Cement	6	9.5	10.33	9.00	7.40	11.20	9.86	13	9	6.16
Ceramic	12	14	10	5.5	7.5	6	3	4	2	8.64
Leather	5	5	5	2.00	4.17	2.86	-1.17	1.20	4.00	3.10

Appendix D

Logit Model

When economists work with qualitative dependent variables, they try to fit a sigmoid or S-shaped curve bounded in the interval (0,1). One such curve is the logistic curve, which corresponds to what is known as logit model. If it is assumed that the qualitative dependent variable has two possible outcomes (1 and 0) and if it is denoted that probability of (Y_i=1)=π_i then the logit model can be specified as

$$\pi_i = F(\alpha + \beta X_i) = \frac{\exp(\alpha + \beta X_i)}{1 + \exp(\alpha + \beta X_i)}$$

$$1 - \pi_i = 1 - \frac{\exp(\alpha + \beta X_i)}{1 + \exp(\alpha + \beta X_i)} = \frac{1}{1 + \exp(\alpha + \beta X_i)}$$

Here X is the explanatory variable. From these two equations it can be shown that in the logit model the log odds ratio (ratio of probability of an event to occur and probability of the event not to occur) can be expressed as a linear function of explanatory variables.

$$\ln\left(\frac{\pi_i}{1 - \pi_i}\right) = \alpha + \beta X_i$$

The estimation of the parameters of the logit model depends on whether the observations on Y_i for each different X_i have been replicated or not. When there is no replicated observation, most commonly, parameters are estimated using **maximum likelihood method**. Since Y_i is a binomial variable with probability of 1 to be π_i and p.obability of 0 to be 1-π_i the likelihood function for n independent observation of the logit model will be

$$V = \Pi_{i=1}^{n}\left[\frac{\exp(\alpha+\beta X_i)}{1+\exp(\alpha+\beta X_i)}\right]^{Y_i}\left[\frac{1}{1+\exp(\alpha+\beta X_i)}\right]^{1-Y_i}$$

$$\Rightarrow V = \Pi_{i=1}^{n}[\pi_i]^{Y_i}[1-\pi_i]^{1-Y_i}$$

Here Π is the product operator. Taking natural log we obtain the log likelihood function

$$L = \sum_{i=1}^{n}[Y_i \ln \pi_i + (1-Y_i)\ln(1-\pi_i)]$$

The main reason for log transformation is to simplify the likelihood function. As this is a monotonic transformation any value of the parameters that optimizes the value of V also maximizes the value of L. Now taking the partial derivatives with respect to the parameters namely α and β, and setting equal to zero, the equations are solved for the parameters.

Both the equations $\frac{\delta L}{\delta \alpha}$ and $\frac{\delta L}{\delta \beta}$ are highly nonlinear in their parameters and need to be solved by iterative methods. One such method is the **Newton-Raphson Iterative Method**. By this method, one starts the iteration by obtaining an initial estimate for say β which may be obtained by using OLS. Let it be called β_0 and with this the first iteration begins

$$\beta_1 = \beta_0 + \frac{\delta L}{\delta \beta_0}\left[-E\left(\frac{\delta^2 L}{\delta \beta_0^2}\right)\right]^{-1}$$

Then using β_1 second iteration starts off

$$\beta_2 = \beta_1 + \frac{\delta L}{\delta \beta_1}\left[-E\left(\frac{\delta^2 L}{\delta \beta_1^2}\right)\right]^{-1}$$

If the slope of the log likelihood function $\frac{\delta L}{\delta \beta_i}$ is positive, the relevant β value will be increasing and conversely if the slope is negative β will be decreasing. This procedure continues until convergence occurs at $\frac{\delta L}{\delta \beta_i} = 0$.

Multinomial Logit Model is used where the dependent value is no more dichotomous and can have more than two values. Let the dependent variable can have three possible values without any particular ordering such that

$Y_{ij} = 1$ if for the i-th observation the outcome is j where j=1,2,3

$Y_{ij} = 0$ if otherwise

Let us describe the probabilities as $prob[Y_{ij} = 1] = \pi_{ij}$. It is also clear in this model that $\pi_{i1} + \pi_{i2} + \pi_{i3} = 1$.

In general $\pi_{ij} = \frac{\exp(\alpha_j + \beta_j X_i)}{\sum_j^k \exp(\alpha_j + \beta_j X_i)}$ where k is the number of outcomes being modeled and in this case k=3. This expresses the probability that an individual with X_i characteristics will fall into j the category.

A normalization is now required because without normalization different set of coefficients can produce same probability which makes the model undetermined. This normalization is called **Theil normalization**. To show that without normalization the model will be undetermined let us assume a new set of coefficients from the current set of β coefficients. Given the same

characteristics, a different set of coefficients should generate a different set of probabilities, i.e. if

$\beta_1' = q + \beta_1, \beta_2' = q + \beta_2, \beta_3' = q + \beta_3$, we will have

$$\pi_{i1}' = \frac{\exp[\alpha_1 + (q+\beta_1)X_i]}{\exp[\alpha_1 + (q+\beta_1)X_i] + \exp[\alpha_2 + (q+\beta_2)X_i] + \exp[\alpha_{31} + (q+\beta_3)X_i]}$$
$$= \frac{\exp(\alpha_1 + \beta_1 X_i) \times \exp(qX_i)}{\exp(\alpha_1 + \beta_1 X_i) \times \exp(qX_i) + \exp(\alpha_2 + \beta_2 X_i) \times \exp(qX_i) + \exp(\alpha_{31} + \beta_3 X_i) \times \exp(qX_i)}$$
$$= \frac{\exp(\alpha_1 + \beta_1 X_i)}{\exp(\alpha_1 + \beta_1 X_i) + \exp(\alpha_2 + \beta_2 X_i) + \exp(\alpha_{31} + \beta_3 X_i)}$$
$$= \pi_{i1}$$

Thus without normalization of some kind, different parameterization can generate identical possibilities which lead to indeterminacy. In the three outcome model the normalized probabilities with first outcome to be the benchmark of comparison (which results α_1 and β_1 to be zero) will be:

$$\pi_{i1} = \frac{1}{1 + \exp(\alpha_2 + \beta_2 X_i) + \exp(\alpha_3 + \beta_3 X_i)}$$
$$\pi_{i2} = \frac{\exp(\alpha_2 + \beta_2 X_i)}{1 + \exp(\alpha_2 + \beta_2 X_i) + \exp(\alpha_3 + \beta_3 X_i)}$$
$$\pi_{i3} = \frac{\exp(\alpha_3 + \beta_3 X_i)}{1 + \exp(\alpha_2 + \beta_2 X_i) + \exp(\alpha_3 + \beta_3 X_i)}$$

Now various permutation of the log odds ratio can be found. These log odds ratio can bee expressed relative to any of the three categories under consideration. But here only the log odds ratio relative to outcome-1 (i.e. the normalized category) will be considered

$$\ln\left[\frac{\pi_{i2}}{\pi_{i1}}\right] = \alpha_2 + \beta_2 X_i$$

$$\ln\left[\frac{\pi_{i3}}{\pi_{i1}}\right] = \alpha_3 + \beta_3 X_i$$

$$\pi_{i1} = 1 - \pi_{i2} - \pi_{i3}$$

The log odds ratio are associated with the coefficients in the estimated equations. The log odds interpretations are not in terms of probability and as well as not very clear. The log likelihood function for the multinomial logit model will be

$$L = \sum_{i}^{n} (Y_{i1} \ln \pi_{i1} + Y_{i2} \ln \pi_{i2} + Y_{i3} \ln \pi_{i3})$$

And then like logit model we try to obtain the values of the α_j and β_j that maximizes the log likelihood function. In this purpose firstly the partial derivatives of L with respect to α_j and β_j are obtained and set equal to zero. Then these obtained equations are solved with Newton-Raphson Iterative Method.

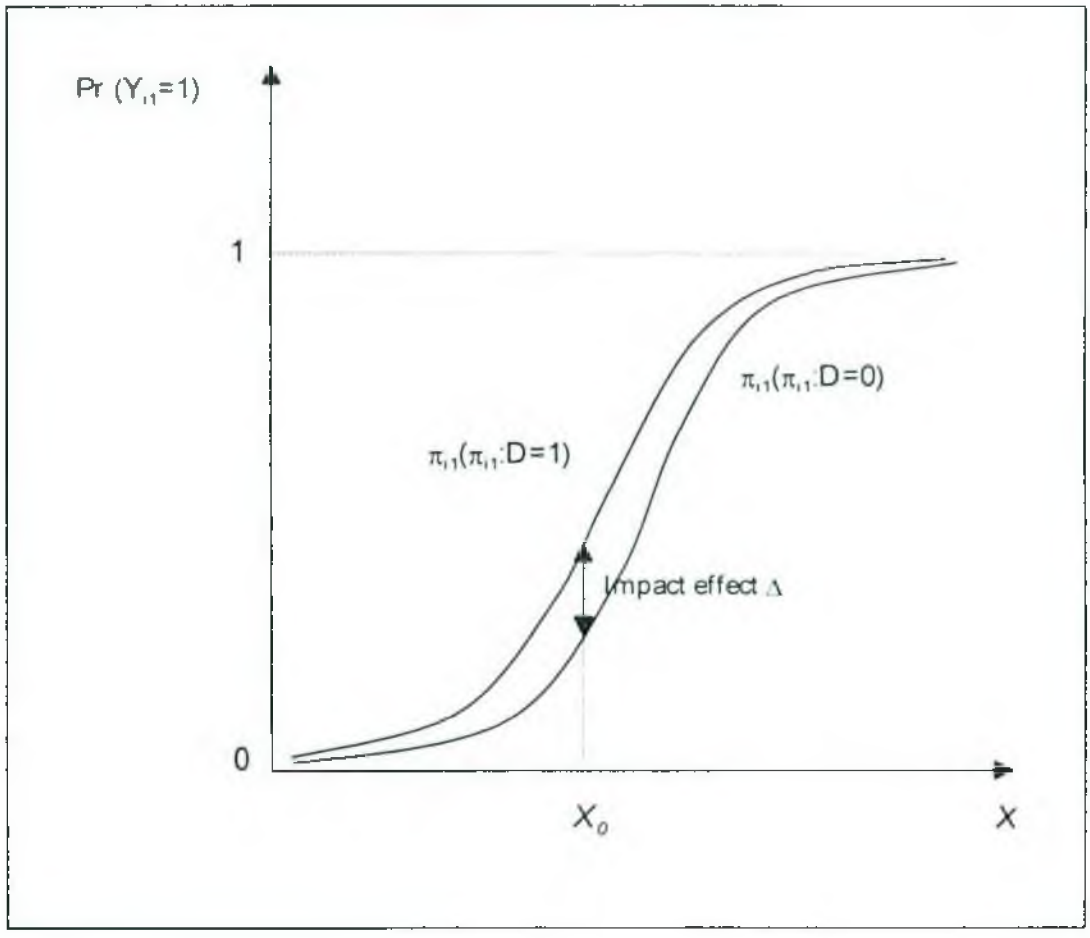
Marginal effects: By differentiating π_{ij} with respect to X_i and using the equation that $\pi_{i1} + \pi_{i2} + \pi_{i3} = 1$ it can be shown that:

$$\frac{\delta \pi_{ij}}{\delta X_i} = \pi_{ij}\left(\beta_j - \sum_{j=1}^{3} \beta_j \pi_{ij}\right)$$

This shows the change in probability of Y_{ij}=1 i.e. change in the probability of attachment in category-j due to 1 unit chances in X_i. Thus we calculate the marginal effect of the continuous variables.

Impact effects: To show the impact let us consider a dummy variable D in the model where D=1 means female student and D=0 means male. Given the coefficients of the dummy variable are δ_j for j=1,2,3 for three categories, the normalized logistic cumulative distribution function will be (δ_1=0 due to Theil normalization):

Figure-1



$$\pi_{i1} = \frac{1}{1+\exp(\alpha_2+\beta_2 X_i+\delta_2 D)+\exp(\alpha_3+\beta_3 X_i+\delta_3 D)}$$

$$\pi_{i2} = \frac{\exp(\alpha_2+\beta_2 X_i+\delta_2 D)}{1+\exp(\alpha_2+\beta_2 X_i+\delta_2 D)+\exp(\alpha_3+\beta_3 X_i+\delta_3 D)}$$

$$\pi_{i3} = \frac{\exp(\alpha_3+\beta_3 X_i+\delta_3 D)}{1+\exp(\alpha_2+\beta_2 X_i+\delta_2 D)+\exp(\alpha_3+\beta_3 X_i+\delta_3 D)}$$

Now it can be said that at $X=X_0$, probability of female students to be in category-1 is:

$$\pi_{i1}(D=1)=\frac{1}{1+\exp(\alpha_2+\beta_2 X_0+\delta_2 D)+\exp(\alpha_3+\beta_3 X_0+\delta_3 D)}$$

And thus at $X=X_0$, probability of male students to be in category-1 is:

$$\pi_{i1}(D=0)=\frac{1}{1+\exp(\alpha_2+\beta_2 X_0)+\exp(\alpha_3+\beta_3 X_0)}$$

Then the impact effect can be described as a female with average characteristics X_0 is Δ*100 percentage point more/less (depends on the value of Δ) likely to be in category 1 than male with characteristics X_0 where,

$$\Delta=\frac{1}{1+\exp(\alpha_2+\beta_2 X_0+\delta_2 D)+\exp(\alpha_3+\beta_3 X_0+\delta_3 D)}-\frac{1}{1+\exp(\alpha_2+\beta_2 X_0)+\exp(\alpha_3+\beta_3 X_0)}$$

The impact effect of dummy variable D on category-1is also shown in figure-1. It shows that females are more likely to be in category-1 than by males given the value of X to be X_0. In the same way we can also calculate the impact effects of the rest two categories.

Measure of goodness of fit:

McFadden's Likelihood ratio index: An analog to the R^2 in a conventional regression is McFadden's likelihood ratio index, which can be computed by the following formula:

$$LRI=1-\frac{\ln L}{\ln L_0}$$

Here $\ln L$ =the maximized value of the log-likelihood function and $\ln L_0$ =the log-likelihood computed only with a constant term and all slope coefficients are equal to zero. This measure is has an intuitive appeal in that it is bounded by 0 and 1. If all the slope coefficients are equal to zero then $\ln L_0 = \ln L$ and *LRI* will be equal to zero. *LRI* increase as the fit of the model improves but there is no way to make it equal to 1.

Test of Significance:

Likelihood ratio test: Let β be the vector of parameters to be estimated and the null hypothesis be some sort of restriction on the parameters. Let $\hat{\beta}_u$ be maximum likelihood estimate of β without any restriction and let $\hat{\beta}_r$ be the constrained maximum likelihood estimator (in case of significance testing the restriction will be the selected parameter or a set of parameters are equal to zero). If $\hat{L}_u$ and $\hat{L}_r$ are the likelihood functions evaluated at these two estimates then the likelihood ratio is $\lambda = \frac{\hat{L}_r}{\hat{L}_u}$. This function must be between 0 and 1 because both likelihoods are positive and $\hat{L}_u$ can not be lower than $\hat{L}_r$. Then it can be said that under regularity, the large sample distribution of $-2\ln\lambda$ is chi-squared, with degrees of freedom equal to the number of restrictions imposed.

The Wald Test: Let $\hat{\beta}$ be the vector of estimated parameters without any restriction and we hypothesize a set of restrictions:

$$H_0 : c(\beta) = q$$

Then the Wald statistic is

$$W = \left[c(\hat{\beta}) - q\right]' \left(Var\left[c(\hat{\beta}) - q\right]\right)^{-1} \left[c(\hat{\beta}) - q\right]$$

and under H_0, in a large sample, W has a chi-squared distribution with degree of freedom equal to number of restrictions. In the significance test of a single parameter the restriction is $H_0 : \beta_i = 0$. In this case, the Wald statistic will be

$$W = \left[\hat{\beta} - 0\right]\left[Var\left[\hat{\beta} - 0\right]\right]^{-1}\left[\hat{\beta} - 0\right]$$
$$= \frac{\hat{\beta}^2}{Var(\hat{\beta})}$$

Here W has a chi-squared distribution with one degree of freedom, which is in fact distribution of the square of the standard normal test of significance.

Tests of Significance of the Parameters

t-test: If a model is $Y_i = \beta_1 + \beta_2 X_{2i} + \beta_3 X_{3i} + ... + \beta_k X_{ki} + u_i$, then t-statistic for any β is computed as $t = \frac{\hat{\beta} - \beta}{se(\beta)}$ which follows t-distribution with degree of freedom (n-k), Where n is the sample size and k is the number of variables in the model. While testing the statistical significance of β, the null hypothesis is set that population parameter β is zero.

Test of overall significance: In this case we actually test the null hypothesis that $\beta_2 = \beta_3 = ... = \beta_k = 0$ with the alternative hypothesis that not all the slope coefficients are simultaneously equal to zero. In this case F statistic is computed as $F = \frac{ESS_{k-1}}{RSS_{n-k}}$ which follows $F_{(k-1,\ n-k)}$ distribution. At some given level of significance if computed F is greater than critical F, the null hypothesis will be rejected.

Variable deletion test: This is simply an F test with null hypothesis that some specified parameters are equal to zero. In this case, firstly the original model is run: $Y_i = \beta_1 + \beta_2 X_{2i} + \beta_3 X_{3i} + ... + \beta_k X_{ki} + u_i$ and *RSS* is obtained and let this *RSS* be called RSS_U. Then let a restriction be imposed on the model that $\beta_2 = \beta_3 = 0$ and omitting the variables X_2 and X_3 the model is run. Now the obtained *RSS* is called RSS_R. Then the F statistic is calculated:

$$F = \frac{(RSS_R - RSS_U)}{\frac{RSS_U}{n-k}} \frac{m}{} \sim F_{m,(n-k)}$$

Here *m* is the number of linear restriction, which is equal to 2 in this example. Now if the calculated F is lower than the critical F, then the null hypothesis will be accepted and deletion of these two variables will cause no harm to the model except sacrificing some R^2.

Diagnostic Tests

Normality Test: One of the major assumptions of the OLS estimation is that the error term is normally distributed with mean zero. If this assumption is violated then inference about the parameters will just be meaningless. So to test the normality of $\hat{u}$ Jarque Bera statistic is computed with the formula that $JB = n\left[\frac{S^2}{6} + \frac{(K-3)^2}{24}\right]$ where S is the skewness and K is the kurtosis of $\hat{u}$. Under null hypothesis that the residuals $\hat{u}$ are normally distributed, asymptotically JB statistic follows chi-square distribution with degree of freedom equal to 2. So if computed JB is lower than critical JB, which is equal to 5.99 with 95% level of significance, we will accept the null hypothesis.

Test for serial correlation: In an estimated model the problem of serial correlation problem exists if there is correlation between the residuals i.e. if $E(u_i u_j) \neq 0$ where $i \neq j$. This causes usual inferences like t and F tests to be invalid. To test the serial auto correlation, Lagrange multiplier test has been used. In this test, firstly, the original model

$Y_t = \beta_1 + \beta_2 X_{2t} + \beta_3 X_{3t} + ... + \beta_k X_{kt} + u_t$ is run and residuals are obtained. Then the following model is estimated.

$$\hat{u}_t = \beta_1 + \beta_2 X_{2t} + \beta_3 X_{3t} + ... + \beta_k X_{kt} + \rho \hat{u}_{t-1} + v_t$$

If ρ is statistically significant then the null of no serial correlation is rejected. In this purpose, the following statistic is computed: $\frac{\rho^2}{\text{var}(\rho)}$ which follows $\chi^2(1)$ distribution. So if the computed statistic is lower than critical value, which is equal to 3.84 at 95% level of significance, then the null hypothesis of no serial correlation will be accepted.

Test for Heteroscedastisity: Problem of heteroscedastisity arises when variance of $\hat{u}$ is not constant i.e. when $E(u_t^2) = \sigma_t^2$. In the presence of heteroscedastisity usual inference will be misleading. In this paper a very simple test for heteroscedastisity has been used which is described as follows. Firstly the original model is run

$$Y_t = \beta_1 + \beta_2 X_{2t} + ... + \beta_k X_{kt} + u$$

$\hat{u}$ and $\hat{Y}_t$ are obtained from this regression and then regression of squared residuals on squared fitted values is run

$$u_t^2 = \alpha_1 + \alpha_2 \hat{Y}_t^2$$

If α_2 is statistically significant then the null of homoscedastisity is rejected. In this purpose the following statistic has been computed: $\frac{\alpha_2^2}{\text{var}(\alpha_2)}$ which follows $\chi^2(1)$ distribution. So if the computed statistic is lower than critical value, which is equal to 3.84 with 95% level of significance, then the null hypothesis that there is no heteroscedastisity will be accepted.

Test of Functional Form: In case of imperfect functional form, the estimated parameters are biased. To test the validity of the functional form, Ramsey RESET test has been conducted. The test procedure is as follows: firstly the

original equation $Y_i = \beta_1 + \beta_2 X_{2i} + ... + \beta_k X_{ki} + u_i$ is run and from the estimated equation fitted values of Y i.e. $\hat{Y}_i$ is obtained. And then the following regression is run:

$$Y_i = \alpha_1 + \alpha_2 X_{2i} + ... + \alpha_k X_{ki} + \theta \hat{Y}^2$$

Now if θ is statistically insignificant then it can be concluded that there is no problem with functional form.

APPENDIX E

Questionnaire

SECTION A

PROMOTERS' PROFILE

Data Source: Company

Name of the Company _____

Name of the industry _____

Number of Promoters _____

Established in _____

1. Age of Promoters

a. 1st Promoter_____ years.
b. 2nd Promoter _____ years
c. 3rd Promoter_____ years
d. 4th Promoter_____ years
e. 5th Promoter_____ years
f. 6th Promoter _____ years
g. 7th Promoter _____ years
h. 8th Promoter _____ years
i. 9th Promoter _____ years
j. 10th Promoter _____ years

2. Total experience in business

a. 1st Promoter_____ years.
b. 2nd Promoter _____ years
c. 3rd Promoter_____ years
d. 4th Promoter_____ years
e. 5th Promoter_____ years
f. 6th Promoter _____ years
g. 7th Promoter _____ years
h. 8th Promoter _____ years
i. 9th Promoter _____ years
j. 10th Promoter _____ years

3. Experience in related business

a. 1st Promoter_____ years.
b. 2nd Promoter_____ years
c. 3rd Promoter_____ years
d. 4th Promoter_____ years
e. 5th Promoter_____ years
f. 6th Promoter _____ years
g. 7th Promoter _____ years
h. 8th Promoter _____ years
i. 9th Promoter _____ years
j. 10th Promoter _____ years

4. Formal Education

a. Having master degree or more _____ Nos.
b. Having bachelor degree _____ Nos.
c. Having H.S.C or Diploma _____ Nos.
d. Having S.S.C _____ Nos.
e. Having below S.S.C _____ Nos.

5. No. of years the family is in business

a. 1st Promoter _____ years.
b. 2nd Promoter _____ years
c. 3rd Promoter _____ years
d. 4th Promoter _____ years
e. 5th Promoter _____ years
f. 6th Promoter _____ years
g. 7th Promoter _____ years
h. 8th Promoter _____ years
i. 9th Promoter _____ years
j. 10th Promoter _____ years

6. Nature of business

a. Continuing the family business _____ Nos.
b. Doing same type of business same as of the family _____ Nos.
c. Doing separate business _____ Nos.

7. No. of Companies owned by Promoters

a.	1st Promoter _____ Nos.	f.	6th Promoter _____ Nos.
b.	2nd Promoter _____ Nos.	g.	7th Promoter _____ Nos.
c.	3rd Promoter _____ Nos.	h.	8th Promoter _____ Nos.
d.	4th Promoter _____ Nos.	i.	9th Promoter _____ Nos.
e.	5th Promoter _____ Nos.	j.	10th Promoter _____ Nos.

SECTION B

COMPANY PROFILE

1. **Payment Status of the Company** (Please Tick)

   a. Unclassified

   b. Classified (Defaulter)

   Data source: Lending Bank

2. **Management Capability**

   a. Total no. of employees _____ nos.

   b. Total no. of management people _____ nos.

   c. Total duration of having relevant academic qualification of all management people

Master Degree/Engineering/MBA	_____ Nos
Bachelor Degree	_____ Nos
Diploma	_____ Nos
H.S.C	_____ Nos
S.S.C	_____ Nos
Below S.S.C	_____ Nos

   d. Total duration of having professional training of all management people

_____Nos.	_____ months each
_____Nos.	_____ months each
_____Nos.	_____ months each
_____Nos.	_____ months each
_____Nos.	_____ months each
_____Nos.	_____ months each

e. Total experience of all management people working in this company

_____Nos.	_____ years each
_____Nos.	_____ years each
_____Nos.	_____ years each
_____Nos.	_____ years each
_____Nos.	_____ years each
_____Nos.	_____ years each

3. **Impact of Policy Changes in Business**

   i. **Changes in import policy (Please Tick)**

      a. Favorable

      b. No Effect

      c. Unfavorable

   ii. **Changes in export policy (Please Tick)**

      a. Favorable

      b. No Effect

      c. Unfavorable

   iii. **Changes in tax laws**

      a. Favorable

      b. No Effect

      c. Unfavorable

   iv. **Ban on production and marketing some items etc.**

      a. Favorable

      b. No Effect

      c. Unfavorable

v. **Major changes in financial market regulation.**

a. Favorable

b. No Effect

c. Unfavorable

vi. **Changes in interest rate.**

a. Favorable

b. No Effect

c. Unfavorable

vii. **Waiver of interests payments**

a. Favorable

b. No Effect

c. Unfavorable

viii. **Other changes affect the borrower (if any),** Mention

_____

a. Favorable

b. No Effect

c. Unfavorable

SECTION C

LENDER RELATED CAUSES

4. **Assessment Time of Loan Application** _____ **months**

5. **Delay in Loan Disbursement** _____ **months**

6. **Borrower's satisfaction with Lending Activities of the Bank**

Very Good	Good	Average	Poor	Very Poor
5	4	3	2	1

7. **No. of visits by bank officials**

   a. Prior to loan sanction _____ Nos.

   b. During loan utilization _____ Nos.

2. **Measures for Loan Recovering** (Please Tick)

   a. Remind Borrower

   b. Meet Borrower Personally

   c. Identify Defaulter

   d. Legal Notice

   e. Initiate Legal Action

Data source: Lending Bank

SECTION D

INDUSTRY CONDITIONS

1. Industry Sales (in crore)

Industry	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Engineering										
Food & Allied										
Paper & Packaging										
Pharma & Chem										
Jute										
Textile										
Leather										
Ceramic										
Cement										
Fuel & Power										
Service										

2. No. of Companies in the industry

Industry	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Engineering										
Food & Allied										
Paper & Packaging										
Pharma & Chem										
Jute										
Textile										
Leather										
Ceramic										
Cement										
Fuel & Power										
Service										

3. Profit Margin (in crore)

Industry	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Engineering										
Food & Allied										
Paper & Packaging										
Pharma & Chem										
Jute										
Textile										
Leather										
Ceramic										
Cement										
Fuel & Power										
Service										

4. Financial Performance (In Crore)

Year	Total Assets	Working Capital	Retained Earnings	Net Profit	Cash Flow
1991					
1992					
1993					
1994					
1995					
1996					
1997					
1998					
1999					
2000					
2001					
2002					

SECTION E

EXTERNAL FACTORS

1. GDP Growth Rate

Year	GDP Growth
1991-92	
1992-93	
1993-94	
1994-95	
1995-96	
1996-97	
1997-98	
1998-99	
1999-00	
2000-01	
2001-02	

Data Source: Bangladesh Bank

2. Political Situation

Year	No. of Hortal Days	Hortal Hours	No. of Crimes
1994			
1995			
1996			
1997			
1998			
1999			
2000			
2001			
2002			

Source: Bangladesh Police

SECTION F

Probable Causes of Loan Repayment Problems

(to be identified by the borrower)

Categories	Causes	Please Tick	Rank
Promoter's Related	Younger Age		
	Lack of Business Experience		
	Lack of Education		
	Lack of Business Background		
	Not Willing to Repay		
	Lack of Supporting Sources		
Company Related	Non Attractive Industry		
	Strong Competition		
	Shorter Age		
	Poor Management Capability		
	Poor Financial Performance		
	Poor Cash Flow		
	Low Market Share		
Lender's Related	Delayed Assessment of Loan Proposal		
	Late Disbursement of Loan		
	Lack of Proper Monitoring		
	Lack of Proper Action Taken		

Categories	Causes	Please Tick	Rank
Macro-Environmental Factors	Low GDP Growth		
	Increasing Crimes		
	Hortals by political parties		
	Policy Changes by the Govt.		