ST. MARY'S UNIVERSITY COLLEGE

SCHOOL OF GRADUATE STUDIES

DETERMINANTS OF LOAN REPAYMENT PERFORMANCE OF INDUSTRIAL PROJECTS: THE CASE OF DEVELOPMENT BANK OF ETHIOPIA

BY

HABTAMU ASFAW

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DECLARATION

I, the undersigned, declare that this thesis is my original work, prepared under the guidance of Dr. Nigussie Sime. All sources of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

_____ _____

Name Signature

St. Mary's University College, Addis Ababa **June, 2013**

ENDORSEMENT

This thesis has been submitted to St. Mary's University College, School of Graduate Studies for examination with my approval as a university advisor.

_____ _____

Advisor Signature

St. Mary's University College, Addis Ababa **June, 2013**

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LIST OF ACRONYMS

CRM	Credit Relation Manager
DBE	Development Bank of Ethiopia
LPM	Linear Probability Model
ML	Maximum Likelihood
MOFED	Ministry of Finance and Economic Development
NPL	Non-performing Loan
OLS	Least Square Estimation
SNNP	South Nations and Nationality People
VIF	Variance Inflation Factors

ABSTRACT

Once the loan is extended to establishment of projects, getting back the money is challenging in project financing. To address this problem, various studies have been undertaken on loan repayment performance of agricultural projects at Development Bank of Ethiopia. However, previous studies did not specifically carried out loan repayment performance of industrial projects. To address this research gap, the study outlined general objectives to investigate factors affecting loan repayment performance of industrial projects financed by DBE. From a total of 270 industrial projects, 116 industrial projects were taken as a sample. Linked with objectives, the study employed descriptive analysis to evaluate the statistical association of factors affecting loan repayment performance. On top of this, likelihood maximization logit model as well as heteroscedasticity and multicollinearity test were applied to analyze the relative importance of factors on loan repayment performance. In doing so, twenty one variables were used in the model.

According to the results from the analysis, age of the borrowers, regional distribution of the project location (project location of Oromia and Addis Ababa), and ratio expatriates to local employees, education level of the general manger (Secondary school), work experience of the general manager, and market destination (Both imported and domestic market destinations) and loan scheme, collateral values and loan size are important factors which significantly affect loan repayment performance.

Hence, it is recommended that organizing regular discussion mechanism, recruit expatriates for high-tech projects, comprehensive due diligence assessment on educational level and work experience of existing management staffs , design sound and appropriate marking strategy, improve appraisal planning quality, protect strategic default through reasonable collateral coverage ratio, and properly determine the loan size of the project.

CHAPTER ONE: INTRODUCTION

1.1. Background of the study

Ethiopia, with the vision of a becoming a middle income country and carbon-neutral economy by 2025, has achieved a commendable development results since 2005 (MOFED, 2012). The World Bank report, 2012, reported that the country has registered a remarkable economic growth over the past nine years, which is beyond the growth rate in the sub-Saharan Africa of 5.2%, which is far lower the average real GDP growth rate of Ethiopia. Agriculture and services sectors had a significant contribution for the economic growth of the country with a share of 45.9% and 43.1% of the total GDP followed by industry with a GDP share of 11.5% (NBE, 2013).

In Ethiopia, the number of financial institutions in general and banks in particular increased significantly over the last couple of years. These expansions in financial institutions support significantly the improvement of domestic and foreign investments and played un-substitutable role as source of fund. Currently, there are sixteen private commercial banks and three government owned banks with an increased number of branches from 636 to 681 at the growth rate of 45 percent. All these progress made the institution to be in the position of boosting profitability, enhancing resource mobilization, expanding capital level, increasing loan disbursed amount (NBE, 2011).

During 2009/10, the banking system extended an approved outstanding loan of Birr 62.3 billion at annual growth rate of 20.6%. Out of this outstanding loan, 33.2%, 19.6% and 10.9 % granted to finance trade (Both domestic and international), industry and agriculture, respectively. In terms of investment ownership, Birr 46 billion of loan was extended to private sector at a growth rate of 21.4% over the last reported year. From the total loan outstanding, Birr 28 billion is disbursed, of which Birr 13.94 billion is from public banks and the remaining 14.97 billion is from private banks. From outstanding loan disbursed by public banks, recovery rate was 73% of the total collection plan which is 10 million while private banks fully collected the disbursed amount of the outstanding loan.

This signifies that the loan repayment problem is crucial in the public banks in general and Development Bank of Ethiopia in particular.

According to loan concentration report June 30, 2012, DBE financed Birr 17.92 billion of outstanding loans for 1711 projects, of which Birr 1.12 billion is under NPL. This makes the issue of loan repayment performance questionable and crucial in determining the profitability and sustainability of the bank.

This paper, therefore, will provide an empirical analysis on the characteristics of borrowers, lenders and loan to verify the relative importance of factors affecting loan repayment performance and help the credit analysis and policy makers of the Bank to install proper pre and post credit risk assessment with an appropriate modification and adjustment.

1.2. Statement of the Problem

Development bank of Ethiopia is a policy bank aimed at extending of credits to creditworthy borrowers after appraisal and found to be financially and economically viable and socially desirable. (DBE, 2009)

Unlike to commercial banks, unique characteristic such as nature of projects, the amount of capital extends to these projects and scheme of loans designed by the development banks makes the Bank to involve credit risk. According to the credit policy of DBE (2009), loan schemes of the Bank include long and medium term loan, additional loan, loan rescheduling, expansion loan, working capital loans (permanent), syndicate (co-financing loans), fund and managed loans, loan buy out, loan transfer, leasing finance and special working capital for selected sectors (textile and pharmaceutical factories). However, the largest loan portfolio of the bank lies on long and medium projects. Moreover, short loan schemes are designed to solve liquidity problem and maintain the smooth running of the projects of existing borrowers.

Based on strategic objective of the government, term loan projects financed by the bank has long loan repayment period which extends up to twenty years including maximum five

years of grace period. Moreover, low interest rate than commercial banks, which is 8.5% for priority area projects and 9.5% is for non-priority area projects, and suitable rehabilitation mechanism makes the bank different from other lending institutions. Though the bank has all the above policy privileges, non-performing loan of the bank is much higher than what is internationally agreed, which is named as Basel Agreement.

According to the Basel agreement in 2006, the minimum NPL ratio shall not exceed 15% of the total outstanding loan. During 2009/10, the average loan recovery rate of the bank was about 13% of which Industry has a major share with 63% followed by agriculture, and services sector with 35% and 2%, respectively (DBE, 2012). This shows that the recovery rate of the Bank is higher than the minimum NPL ratio set by the BASEL agreement. Looking at loan repayment performance among the major economic sectors, the problem is significant in industrial projects which has higher NPL ratio.

In order to assess the issues related to loan repayment performance & forward proper mechanism for improvement of recovery rate, various studies were undertaken by different scholars at global level in general and Ethiopia in particular. Up to the knowledge of the researcher, various researchers have made empirical analysis on loan repayment performance in Ethiopia. Almost all the studies focused on loan repayment performance of small scale agricultural related activities financed by micro finance institutions. DBE as research study area, there are studies conducted for agricultural input (fertilizer) loan of small-scale enterprises by Abraham (2002) and loan repayment performance of agricultural projects by Mulugeta (2010). However, these studies do not specifically touch the loan repayment performance for projects on industry and service sectors.

Provided the previous empirical analysis and level of problems, this paper, therefore, narrows the gap of the research through focusing on loan repayment performance of industrial projects financed by DBE.

1.3. Basic Research Questions

The factors are stated in general and guiding way, therefore, identify the determinants factors considering the nature of the borrowers, lending institution and loan itself is potent for the further investigation. Once the factors are identified, testing the relative importance is take place.

Various reasons are attributed to loan repayment performance. The operational and marketing performance of the project depends on the demographic and socio- economic characteristics of the promoter, loan characteristics as well as lending institutions. If there is no sound strategies put in place in enhancing the loan repayment of the borrowers, the profitability and survival of the lending institutions becomes questionable and the economic growth of the country goes down or stagnant. Based this description, the basic research questions are the following:-

i. What are the factors affecting the loan repayment performance of industrial projects at Development Bank of Ethiopia?
ii. To what extent that the determinant factors have relative impact on loan repayment performance of industrial projects at Development Bank of Ethiopia?

1.4. Objectives of the Study

1.4.1. General objective

The general objective of the study is to investigate the factors affecting loan repayment performance of industrial projects at Development Bank of Ethiopia.

1.4.2. Specific objectives

Considering the research question/problems, the following specific objectives are driven. These are:-

- To identify the factors affecting loan repayment performance of industrial projects.

- To measure the effect of factors affecting loan repayment performance of industrial projects.
- To describe the determinant factors of loan repayment performance of industrial projects.

1.5. Significance of the Study

Lending institutions are crucial in the endeavors of economic growth of a given country. Lending money by itself does not realize the role of the lending institutions to the economic growth of a country; rather proper utilization of the money and get back the money after being establish successful project. This study forwarded recommendations to decision makers of bank to install exclusively proper credit policy for industrial projects to tackle the problem at hand. Previously made empirical analyses on the repayment performance of projects at DBE given recommendations separately only for agricultural projects. The study narrowed the knowledge gap on determinants factors affecting loan repayment performance of industrial projects.

The problem of loan repayment performance in project finance is not a onetime challenge for lending institutions. This initiates staffs of the lending institutions and academicians, who are interested in this area, to conduct similar research works focusing on research gap. Thus, this study would shed light for in advance studies in the area. As a result, the prevalence of problem on the subject area would bring down significantly.

Theoretical foundation on the determinant factors of loan repayment performance is so limited to the directives of Basel Committee II. In the directive, dimensions or risk drivers are crucial for the development of internal rating based approach to distinguish the loan repayment performance of project, either being default and non-default. Linked with these drivers, specific factors affecting of loan repayment performance of industrial projects is identified and analyzed. Therefore, the study is simultaneously build a theory as a result of qualitative research and tests the empirical theory using econometric model.

Beyond the accomplishment of these benefits, being a post graduate student, conducting research based on the interest of the researcher and area of specialization is mandatory to be eligible in the given program. Therefore, this study would reward me to be eligible in the postgraduate of masters of business administration.

1.6. The Scope and limitation of the Study

From the projects financed by the Bank, the study considered industrial projects, which are administered both at the head office and braches of the Bank. Generally speaking, the loan schemes of the Bank can be either long term or short term. The categorization of the loan scheme lies on the repayment period, which extends up to seventeen years for long term project where two years for short terms and paid back directly from the sales processing so that the repayment is directly controlled by the Bank. But, there are borrowers and lender's characteristics that determine repayment performance of the long term loan. Thus, the study considers only long and medium term industrial projects. Moreover, under implementation projects are not considered in the study, this is because the bank often plans loan repayment to begin when they commence production, mainly principal payment. Due to the nature of the data, which is objective, the study employed questionnaire which is handed over to the contact officers of each projects to collect the data.

To have theoretical integration of the factors affecting loan repayment, there are no framed theoretical arguments. As a result, the researcher has faced to have various arguments on the issue. Moreover, the data collection process was difficult as there is no organized data base to collect the data. In this case, the researcher confronted challenges in obtaining consistent data. At the same time, the time spend to have the data is more than the plan. This prolongs the overall time in conducting the research work.

1.7. Organization of the Research Report

The research report is organized in five chapters. Chapter one introduces the key issues of the study, which consist of background information, statement of the problem, objectives

of the study, basic research questions, significance of the study, and scope and limitation of the study. In line with the research question, chapter two discussed specific related literatures both theoretical and empirical review. In chapter three, the method of the study which includes the type and design of the research, the subjects/participant of the study, the sources of data, the data collection tools/instruments employed, the procedures of data collection and the methods of data analysis are comprehensively incorporated. Following to this, chapter five discussed the data analysis, interpretation and findings of the study. In chapter five, the study forwarded conclusions and recommendations in line with findings.

CHAPTER TWO: REVIEW OF LITERATURE

2.1. Theoretical Review

2.1.1. Definition of credit

Credit is the reliance which allows lenders to deliver financial (e.g. granting a loan) or non-financial (e.g. consumer credit) resources, including deferred payments, to borrowers which would be repaid at a later date (Martin Chima, 2011).

In light the above definition, involvement of transaction of cash is not necessary in the credit concept. However, the key concept in credit definition is the transfer of resources (either financial or non-financial) from one party, who is commonly lender, to the other party, who is borrower. Looking at the real business environment, almost all transactions are made using monetary term, which is money as medium instrument to transact commodities (goods and services).

2.1.2. Types of credit

The Credit is classified in to eleven categories based on wide range of factors with standard parameters. The loan classification is paramount for the credit analyst or client relationship manager (CRM) to understand various credit products and to view them as part of both the overall client relationship and as part of the credit portfolio of the bank. In this way, the authors use wide range factors to classify the loan types. These include borrowers (corporate, private, etc), term (short term, medium & long), purpose (working capital, mortgage loan), collateral, repayment (amortizing, bullet), transferability and condition. On the bases of these factors, the following types of credit are postulated, which are currently applied in the business environment of the world. (Froweinet *et al.*, 2009)

Term loan:

It is a type loan granted to borrowers on the long term planning securities, which is more than one year for 3 to 10 years. In the researcher view, the repayment period of this type of loan extended to undefined years, which is determined based on the lending. Credit policy

of Development Bank of Ethiopia (DBE), the repayment period for this type of loan extends to 17 years, including grace period, it ranges up to 5 years maximum. This type of loan is designed for financing of fixed asset investment, general working capital needs or company acquisition. Borrowers pay back the amount of loan (both principal and interest rate) in regular installments or alternatively in bullet at maturity. It is profitable types of loan with higher interest rate and high upfront fees resulting due to higher credit and repayment risk. Prevalence of higher credit and repayment risk is due to longer commitment of the lender than other types of loans. As way of mechanism, collateral and covenants are put in place to reduce credit risk resulting from these types of loan.

Overdraft:

An overdraft credit is a loan scheme which allows debtors to borrow money from financial institutions for an agreed maximum loan limit based on overdrawing of a bank account. This kind of scheme is usually applicable in uncollateralized bank credit (Martin Chima, 2011).

The purpose of this type of loan is for financing of any short term financing needs, include private clients for consumer financing and companies for short term bridge financing or seasonal financing. Borrowers get in to commitment to pay back the loan at regular basis-monthly, quarterly, semi-annually or annually. It is also offers financial flexibility and improved liquidity management based on Accounts relationship, because the borrowers draw their credit limit in situation of poor liquidity, at the same time, not fully utilized. As result, the lenders generate low revenue than the term loan resulting from the condition where payment is made only on the utilized amount without commitment charge. Contrary to this, the lender charges higher interest rate and fees for unauthorized overdrawing of the limits. Unlike to term loan, the lender carried full credit risk, because it is not collateralized though it has clean up period and refinancing to imitate the borrower to make the payment timely.

Revolving credit

It has similar nature to that of an over drafting credit with approved credit limit which can be utilized in varying amounts based on the borrowers financial needs. The purpose of this type of loan is for financing general purpose and working capital financing in with the loan contract, not tied to bank loan in over drafting credit, where minimum amount and a maximum number of drawings under the existing client limit. The limit can be canceled at the contractual maturity date or based on a breach of the loan contract by the borrower, like breach of covenants or materials deterioration. With slight variation with that of the overdraft credit, the interest rate is charged on the drawn amount under the revolving credit limit, but the lender charges commitment fee for unutilized part and charge a handling fee and a breakage cost resulting from interest losses due to prepayment of the loan before the maturity date.

Documentary credit

It is an undertaking used for the handling and safeguarding payments in commercial business worldwide. A documentary credit is a type of loan given to clients who fulfilled partial payment and currently in need of the remaining payment upon the presentation of required documents in compliance with terms and conditions of the payment system (Martin Chima, 2011).

Unlike to above mentioned types of credits, this type of credit bases on the underlying trade of commodities on short term which is below 360 days on which the actual payment even can be documented. For banks, this type of credit gains fee income for negotiation and handling as well as credit fees depending on the underlying risk. Compare to a clean credit, this type of credit considers a risk mitigating factors in addressing the counterparty risk of borrowers. Moreover, it has a mitigating character, like the liquidity of the underlying goods.

Guarantees

This is a type of loan used “for safeguarding payment and performance obligations in commercial business.” Lenders, being as guarantor, protect their customers, who may be buyers or sellers in the commercial contract, from involving risks. The above mentioned credits, except documentary credit, made transaction within the two parties , lender and borrowers whereas this type of loan involves the third party, who is the primary debtor with the intension of upgrading a transaction using the good name of the bank (Guarantor) backing the guarantee. In the commercial business, this type of loan serves as supplementary product in trade fiancé and presents cross-selling benefits.

Leasing

A lease is an alternative source of fund in which a lesser(owner of an asset) give privileges to use and possess an asset to a lessee(user) in return for regular rental payments for a stipulated period of time (Martin Chima, 2011).

It is an alternative use of buying the capital and offers the possibility of optimizing the allocation of capital and making use of cash flows available.

Syndicate loans

Syndicate loans are loans given by a group of lenders or financial institutions in contrast to bilateral loans with a single lender.

Banking consortium are the players for a single transaction with several tranches, with tranches varying according to credit type, term, or seniority. The purpose of the loan is to arrange a multilateral loan with a borrower mandating a lead bank or several lead banks. This helps the lead bank to increase the number of borrowers in its credit portfolio, thereby reducing concentration risk. Moreover, it is paramount to have comprehensive loan documentation and the disclosure thereof throughout the process. It is an essential financing instrument for medium and large corporations as well as financial institutions. As a result, it generates both interest and fees income for the banks involved in the

transaction, but the lead banks receive upfront fees for the syndication of the loan. This types of loan involves counterparty and syndication risk. However, the counterparty risk is lower than the bilateral loans, as each bank retains a smaller share of the risk and the lead bank retail a larger risk share than intended in the case of major market shifts (Martin Chima, 2011).

Consumer finance

This refers to loans from banks and other financial institutions granted to consumers, which is short to medium ranging from six months to six years based on the credit quality of the borrower and the purpose of the loan, like life time of an asset that is being financed. Consumer loan remain constant over the life time of the loan, include principal and interest payment with limited amount of loan, such as Euro 25,000, with larger amount possible. The purpose of the loan is for financing general purpose. The only income generated from this type of loan is interest rate, it includes additional fees like administration fees, typically not charged separately but included in the interest rate. Not only financial institutions, non-financial institution provide their products to their clients via cooperating financial institutions. It involves also credit risk of private borrower and uses advanced & standardized credit process so as to identify eligible borrowers. Moreover, it is secured by providing collateral, such as pledging of salary or the granting of security interests in the acquired assets. The basket or securitization approaches, have proven more viable for the risk reduction of consumer loan portfolios.

Credit card loans

This is kind of loans emit credit cards, either direly or linked corporation with financial instructions, mainly commercial banks. Credit card enables customers to procure goods, access services or obtain cash at partners cooperating with the credit card issuer up to the approved limited amount. This credit card limit signifies that the maximum loan available to the client. And it can have a chance to be conversed and become a consumer loan. At this time, it is amortized over a longer period. In this case, is has a purpose of both convenience and credit purpose. The issuing financial institution has interest income of a

certain percentage, usually 1 to 5 percent, from the seller of the goods or service, but the client is free of interest rate is the loan is repaid on a monthly basis. If the loan is not repaid on stipulated time and converted to amortizing loan, very high interest rate is charged on the outstanding loan balance. It is also subject to counterparty risk of the private customer. In a situation of liquidity problems, the percentage of drawn under the credit card limits increases.

Mortgage loans

A mortgage is one of the types of credit in which collateral is requested for long term loan financing. It could be residential property, like apartments and houses, for residential mortgage, or commercial properties, such as warehouses or office building, for commercial mortgages with the objective of either to fiancé the acquisition of the property or for other long term investments. These types of loan will have a maturity period of 5 to 30 years without limited absolute amount of loan but it related to the underlying collateral and repayment period amortized over the maturity of the loan or bullet payments at maturity period is a feasible alternative. It offers a long term stable income; the main income component is regular interest payment, including legal or collateralization charges, credit insurance or the cost for the prepayment option. If the borrower chooses prepayment option, the lender experiences contraction risk, a low interest environment. Moreover, the income situation of the borrowers for residential mortgage and the asset quality of the commercial properly are the key determinant aspects for the repayment risk. The asset quality of the properly deteriorates in a situation of downturn in real property markets will result in a lower that the expected value of the property (Martin Chima, 2011)..

Structured finance

Structured finance is applied in a situation where there is challenging market condition and to identify new ways of financing. It offers various types of loan products that are structured best suit the customer needs, who could be internationally oriented corporation as well as financial institutions. This can be described on the basis of trade finance and leverage finance.

Structured trade finance

Structure trade finance consists of pre-finance, inventory finance, trade finance, or hedging business and various type of loan such as term loans, overdrafts, or revolvers. Moreover, other commercial products such as documentary credits or draft discounting and forfeiting are offered as supplementary financing schemes. In this case, lenders provide loan to their customers along with the international supply chain of commercial business-any- where from production to the processing, warehousing, and trading based on existing and future contracts. The repayment of the loan lies on the underlying commercial contract and determined based on the track record and market reputation of the borrower rather than on its financials. Due to the complicated nature of the finance, they are pledged, assigned, guaranteed or, hedged in various forms. As a result, the unique character of this type of finance is goods that are taken as collateral serves as the sources of funds for the repayment of the finance for a certain loan, but market reputation of the parties involved becomes a crucial aspect. In the financing scheme, the role of the bank to built contracts between clients and potential trading partners.

Leverage finance

Leverage finance is customarily applicable in acquisition of property which would be in turn utilized to mobilize equity from the public. In this case, the large portion of the purchase price is debt financed and cash flow is used to repay the debt. Thus, acquisition candidates generate stable cash flows with low business risk and offer some kind of upside to the financial sponsor.

In view of the above mentioned types of credits, the researcher considers merely the term loan, medium or long term loans, including bilateral loans, and syndicated loan which involves multilateral loan. This is because, the lender, Development Bank of Ethiopia, focus on granting of long term loans for the establishment of projects aligned with government priory areas which has the highest share of loan portfolio. After the projects are operational, the Bank designed various loan schemes to consider their short term liquidity problem, such as working capital loan for the existing project in general and

special working capital, exclusively given for the purchasing raw materials of textile and pharmaceutical factories. Moreover, the bank gives guarantee services, being a guarantor, for export oriented project for their short term working capital requirements as a supplementary service (Martin Chima, 2011).

2.1.3. The Nature and Role of Credit Market

Finance is central to establish and operate productive activity. Sufficient finance is a prerequisite for proper organization of production, acquiring of investment assets and/or raw materials and development of marketing outlets etc. Credit is a device for facilitating transfer of purchasing power from one individual or organization to another. As indicated by Oyatoya (1983) credit provides the basis for increased production efficiency through specialization of functions thus bringing together in a more productive union the skilled labor force with small financial resources and those who have substantial resources but lack entrepreneurial ability.

The link between credit and economic development has captured the attention of economists since long (Schumpeter, 1933). With improved financial intermediation, the proportion of financial savings that is diverted by the financial system into non-productive uses fails, and the rate of capital accumulation increases for a given saving rate (Mensah, 1999). He further elaborates the importance of financial intermediation as it enhances saving mobilization by providing a variety of safe financial instruments to savers and ensuring tangible returns on savings. The financial sector contributes to the efficiency of the entire economy by spreading information about expectations and allocation of resources to investors.

In more explicit analysis of the association between finance and economic development Schumpeter (1933) treated the banking system and entrepreneurship as the two key enabling agents of development. Schumpeter argues that the banking system's capacity to supply initiative and entrepreneurship in addition to credit creation enabled it to transfer resources from less productive uses to more economically rewarding uses because those who control existing resource or have claims on current wealth are not necessarily those

best suited to use these resources. The banking system credit creation equipped entrepreneurs with purchasing power with which they were able to express overriding command over real productive resources. Financial theorists argue that if economic units relied completely on self-finance, investment will be constrained by the ability and willingness of each unit to save, as well as by its capacity and readiness to invest (Mensah, 1999). In his contribution to the role of financial institutions, Von Pischke (1991) admitted that even though finance is a catalyst for investment, it is also a catalyst for poor investment, political patronage, corruption and other types of opportunism.

A credit market differs from standard markets (for goods and services) in two important aspects. First standard markets, which are the focus of classical competitive theory, involve a number of agents who are buying and selling a homogeneous commodity. Second in standard markets, the delivery of a commodity by a seller and payment for the commodity by a buyer occur simultaneously. In contrast, credit received today by an individual or firm in exchange for a promise of repayment in the future. But one person's promise is not as good as another. Promises are frequently broken and there may be no objective way to determine the likelihood that promise will be kept (Jaffee and Stiglitz, 1990).

Banks in many developing countries hold a truly alarming volume in non-performing assets. Differences between promised and actual repayments on loans are the result of uncertainty concerning the borrowers' ability or willingness to make the repayments when they are due which creates the risk of borrowers default (Kitchen, 1989; Pischke, 1991; Vigano, 1993). The inapplicability of the standard demand and supply model for credit market give rise to credit rationing phenomena. Credit rationing as defined by Jaffee (1971) is the difference between the quantity of loans demanded and loans supplied at the ruling interest rate. In this case lending institutions make use of their own screening criteria to identify credit worthy borrowers so as to decrease the probability of default.

2.1.4. Determinants of Declining Loan Repayment Performance

According to Von Pischke *et al*, 1998, there are nine factors that determine loan repayment performance. These factors are summarized as follows:

2.1.4.1. Reduced Attention to Borrowers

The willingness to pay a loan relay on the interest of the borrower. However the interest to pay will decline as time goes on. This is due to the fact that the borrower loses his/her commitment through time which simultaneously reduces the attention of the lender.

2.1.4.2. Moving Along the Risk Curve

In project financing, financial institutions prefer to finance low risk development based projects based on risk rating system. However, this system will not remain the same as time passes as lenders gain more experience. These circumstance initiates lenders to engage in additional activities which involve relatively higher risk. The reason is not only gaining experience on project financing, but also low risk financing will become saturated and exhausted as time goes.

2.1.4.3. Increasing Loan Size Increases Risk

Financing higher and higher amounts of loan to clients' increases risk as borrowers become successful in timely repayment. This initiates lenders to lend larger amount of loan to expand the existing or/and establish investment activity. Finally, as the amount of loan increase in proportion to total assets, it might not comply with the principle of creditworthiness. Hence, the situation increases the risk for lenders. The risk is mainly emanated from the fact that larger loan might not be profitable as it was planned. At this point, consumption may surpass production as the preferred use of funds, giving the borrower an incentive to default because new loans are not attractive.

2.1.4.4. Lenders Lack Plans to Deal with Risk

Projects with optimistic assumptions will face higher risk mainly in determining loan size, which is mainly a relatively large debt service burden. When predetermined assumptions are not met as it was proposed due to market problem domestically and internationally, the overall financial projections are failed to achieve and acutely attuned to risk, are now the driving force behind large industrial projects.

2.1.4.5. Borrowers Probe a Credit Operation's Weaknesses

Once loan are given to borrowers, lenders need to have proper follow up program and meeting on regular bases for loan collection. Unfortunately, lenders failed to follow up a

missed payment which led the borrower to take note and withhold payment until lenders contacted borrowers for payment. This will in turn initiates other borrowers to take bad lessons on late payment as other are not suffer no costs.

2.1.4.6. Rent-Seekers Capture the Credit Program

Credit programs attract rent-seeking of all sorts, especially when some subsidy is involved. (In modern economic jargon, rents are transfers that do not result from productive behavior.) Rent seeking takes a number of forms, which include default by borrowers; transaction costs imposed or indulged by lenders, such as bribes and bloated staffing structures; and by the use of credit programs to favor certain politically-targeted groups who in theory should be at least somewhat grateful politically to those providing the money.

2.1.4.7. Lenders and Project Designers Have Low Expectations

In some case, finance is extended to achieve strategies socio-economic objectives. In this case, lenders either financial institutions or donors are interested in repayment of the loan because the objective is almost overwhelmingly to get the money working in order to stimulate development. As a result, loan might not be repaid as it is stipulated.

2.1.4.8. The Lender Is Unwilling To Collect

Loan repayment performance is also affected by the unwillingness to collect of lenders. There are a number of reasons for the unwillingness to collect loan. For example in situations where project financing is highly politicized, unwillingness to collect loans would increase as lenders fear that it would not be politically right and might affect the support they need from the people who are in power.

2.1.4.9. Lack of Good Models

Lack of clear and effective loan collection models increases the risk of default. This situation is mostly observed in a new lender or credit program in different countries mainly due to the lack of local formal sector model. As a result, the lack of trustworthy models is called the High Default Culture Effect.

2.1.5. Credit Management Policies

In the past decades there have been major advances in theoretical understanding of the workings of credit markets. These advances have evolved from a paradigm that emphasis the problems of imperfect information and imperfect enforcement (Hoff and Stieglitz, 1990). Hoff and Stieglitz (1990) pointed out that borrowers and lenders may have differential access to information concerning a projects risk, they may form different appraisal of the risk. What is clearly observed in credit market is asymmetric information where the borrower knows the expected return and risk of his project, whereas the lender knows only the expected return and risk of the average project in the economy.

Lending institutions are faced with four major problems in the course of undertaking credit activity: a) to ascertain what kind of risk the potential borrower is (adverse selection), b) to make sure the borrower will utilize the loan properly once made, so that he will be able to repay it (moral hazard). C) to learn how the project really did in case the borrower declares his inability to repay and d) to find methods to force the borrower to repay the loan if the borrower is reluctant to do so (enforcement) (Ghatak and Guinnane, 1999).

These problems of imperfect information and enforcement lead to inefficiency of credit market which in turn leads to default. Thorough credit assessment that takes into account the borrowers` character, collateral, capacity, capital and condition (what is normally referred to in the banking circles as the 5C`s) should be conducted if they are to minimize credit risk.

Mensah (1999) stressed the importance of credit management as follows: credit management process deserves special emphasis because proper credit management greatly influences the success or failure of financial institutions. An understanding of a bank's credit risk management process provides a leading indicator of the quality of a bank's loan portfolio. The key elements of effective credit management therefore are well developed credit policies and procedures; strong portfolio management; effective credit controls and the most crucial of all a well trained staff that is qualified to implement the system. Financial institutions must maintain basic credit standards if they are to function well and

make credit available to investors. These standards include a thorough knowledge of the borrowers' business by the officer in charge; reasonable debt equity ratio; marketability and viability of the investment project and other technical capabilities. Credit analysis is in general vital for the officer to judge about the credit worthiness of the borrower as well as the project to which the loan is injected.

Credit risk evaluation is a complex process, which implies a careful analysis of information regarding the borrower in order to estimate the probability that the loan will be regularly repaid (Vigano, 1993). The probability of regular repayment depends on objective factors related to the borrower's operating environment, the borrower's personal attitude towards loan obligation, and the bank's ability to evaluate these two aspects through the information it has and to control credit risk specific contractual conditions. Vigano summarized factors affecting credit risk as follows: the customer's ability and willingness to pay, presence of favorable external conditions, quality of information and bank's ability to ensure the customers willingness to pay.

2.2. Empirical Review

2.2.1. Empirical studies in other countries

Major socioeconomic variables that affect credit repayment performance include education, age of house-hold, family size; genders of house-hold head, etc. Family size is expected to affect loan repayment performance positively. This is because farmers with more families may have more labor force for more diversified source of income as stated by Schreiner and Nagarajan (1997) in case study of Gambia.

Koopahi and Bakhshi (2002) used a discriminate analysis to identifying defaulter farmers from non-defaulters of agricultural bank recipients in Iran. Results showed that use of machinery, length of repayment period, bank supervision on the use of loan had significant and positive effect on the agricultural credit repayment performance. In the other hand incidence of natural disasters, higher level of education of the loan recipient and length of

waiting time for loan reception had a significant and negative effect on dependent variable.

Oladeebo (2008) examined socio-economic factors influencing loan repayment among small scale farmers in Ogbomosho agricultural zone of Oyo State of Nigeria. Results of multiple regression analysis showed that amount of loan obtained by farmers; years of farming experience with credit use and level of education were the major factors that positively and significantly influenced loan repayment.

Mansoori (2009) analyzed ten socio-economic and institutional factors affecting loan repayment performance of farmers in Khorason- Razavi Province of Iran using a logit model. The result showed that, farmer's experience, income, loan size and collateral value were had a positive and significant impact on loan repayment status of farmers. Whereas loan interest rate, total application cost and number of installment were negatively and significantly affected the farmer's repayment performance.

Jama and Kulundu (1992) in their study on small-holder farmer's credit repayment performance in Kenya used two stages least squares method to deal with endogenity problem of the loan diversion where the loan repayment was used as an independent variable. Farm income, farmer's attitude toward loan repayment, proper amount of purchased farm input and source of income from farming activity had statistically significant effect on loan repayment performance. They also reported that the proportion of loan funds diverted to non-intended purpose was positively to the proportion of arrears on loans. In addition late loan issuing and inadequate supervision and advice to farmers were positively related to the proportion of loan diverted.

Okovie (1996) in his study on major determinants of agricultural small-holder loan repayment in Nigeria reported that four factors had a tremendous effect on loan repayment performance. These factors include time of loan disbursement, nature of loan disbursement (in cash or in kind), number of supervisory visits made by credit officers after disbursement and profitability of enterprises on which loan funds were invested.

Matin (1997) in his study on the loan repayment performance of borrower in Bangladesh obtained a significant positive relationship between households asset/income position/ and its loan default status. In his analysis, he related this situation to a very strong demonstration effect where borrowers having relatively small loan size behave in the same way as those who have larger loans. The education status of the house-hold was reported to have strong positive effect on non-defaulter status irrespective of the household's income position. The total operated landholding of the household was the other variable, which was negatively associated with default after certain level.

Wenner (1995) stated that formal lenders find it difficult and costly to: accurately ascertain the likely-hood of the defaults and to monitor closely how borrowers use funds and what technologies they choose for project implementation. Thus borrowers may not take actions that make repayment more likely (moral hazard). Weak legal system, lack of secure collateral and pervasive views that government bank loans are patronage, magnify loan enforcement cost for formal lenders.

Hunte (1996) using the logistic model in Guyana showed that certain factors such as activities in fishing, male borrowers in food crop and live-stock credit experience and sugar cane production resulted in low default risk, minimum or low credit rationing (giving nearly the amount the borrower requested or demanded) and high repayment performance. Alternatively, other factors such as extending grace period in loan contracts and long processing times led to high default risk and low repayment. Moreover, the result clearly showed that wealthy borrowers exhibited poor repayment performance.

Farmanfarmian (1962) using the method of OLS on the discussion of the impact of increased loan to total project cost ratio and swifter loan disbursements on investment and loan recovery is also another important study that captures attention in the discussion of loan repayment determinant. He states that if there is a situation where loan constitutes a relatively higher percentage of the total cost of the project, an investor is likely to be attracted to invest as his own contribution becomes smaller. Limiting the loan percentage will have a negative impact on a private investor's tendency to invest. He further notes

that “generous” loan policy and swifter loan disbursement will lead to less delay in project implementation which in turn, will bring about swifter loan repayment. He also argues that if investors can get loan from an industrial bank at an interest rate smaller than market rate of interest, larger loan amount become highly attractive. On the other hand in explaining the effects of limiting the percentage of loans, Fermanfarmian states that part of the essential requirements of an investment project (such as pre- production expenditures, installation costs, etc) may be over looked to meet permitted proportion; and the investor may find it difficult to procure the rest of the money from other sources. Besides, he point out that one of the most error in experienced industrialist is to start project with inadequate funding.

Ajayi (1992) employed a correlation and multiple regression analysis in his study about factors affecting default in residential mortgages of the federal mortgage bank of Nigeria. His result revealed that construction, monthly repayment, loan to value ratio, market value of property, age of borrower and annual income of borrower enhance loan defaults, while expected rental income from property reduces loan default.

Vigano (1993) in his study about the case of development bank of Burkina Faso employed a credit scoring model. He found out that being women, married, aged, more business experience, value of assets, timeliness of loan release small periodical repayments, project diversification and being a preexisting depositor are positively related to loan repayment performance. On the other hand loan in kind, smaller loan than required, long waiting period from application to loan release and availability of other sources of credit where found to have negative relation with loan repayment performance.

Kashuliza (1993) used a linear regression model to analyze determinant of agriculture loan repayment performance in case of southern highland of Tanzania. His study showed that level of education, attitude towards repayment, farm income and off-farm income positively affected loan repayment with farm income being significant, While age, house hold expenditure and house hold size have negative influence on loan repayment performance with house hold expenditure being significant.

Njoku and Odii (1991) studied determinant of loan repayment under the social emergency loan schemes in Nigeria. Their study showed that late release of loans, complicated loan processing procedure loan diversion to non-agricultural enterprise which is low enterprise returns resulting from low adoption rate of improved rate of improved agricultural technology and emphasize on political consideration in loan approvals contributed to poor loan repayment performance of small holders. Loan volume, years of formal education, household size and interest paid on loan were found to positively and significantly affect loan repayment; while years of farming experience, loan period, farm size, farming as a major occupation, farm output and value of assets were found to negatively and significantly affect loan repayment.

Chirwa (1997) used a probit model to estimate the probability of agriculture credit repayment in Malawi. The result indicated that crop sales, income transfers, degree of diversification and quality of information are positively related while size of club negatively related to the probability of repayment. Other factors like amount of loan, sex, household size and club experience were found to be insignificant.

2.2.2. Empirical studies in Ethiopia

Abreham (2002) studied on loan repayment and its determinants in small scale enterprises financed by DBE for agricultural inputs. The researcher used a stratified method of sampling and determined 102 sampling size. Based on this sample size, the study used descriptive and inferential method of analysis, which is Tobit model. To avoid exogenous problem, the study formulated a separate mode for the loan diversion and then incorporate in the main model (loan repayment performance) as one of the independent variable. In this regard, the study found that high value of collateral and those with relatively longer repayment period were favored and higher equity share and extensive experiences in related activity were disfavored. To this end, it concluded that the bank's rationing mechanism didn't much with the repayment behavior of borrower and suggested that bank's rationing technology should be revised in such a way that Small Scale Entrepreneurs who have the managerial and entrepreneurship capacity but don't have sufficient credit access due to stringent collateral requirement.

Abebe (2009) focused on determinants of credit repayment and fertilizer use by cooperative members in ada district, east shoa zone, Oromia region. Considering cooperative Members (smallholder farmers), the study used a two-stage random sampling procedure and selected 130 sample respondents. Descriptive and Topit model and multiple regression models were employed. As result, the study forwarded a recommendation that improving the livestock sector, educating households and their family member, giving attention in promoting non-farm activities in rural areas and promoting saving habit

Fikirte (2011) determinants of loan Repayment Performance financed of micro and small enterprise operators or potential operators and, low income people by Addis Credit and Saving Institution. The sample size of the study was 200 randomly selected clients (100 defaulters and 100 non-defaulters). To measure the determinant factors of loan repayment, the study employed descriptive & a binary Logit model .In this regard, the findings of the study was Age and five business types (baltina & petty market, kiosk & shop, services providing, weaving & tailoring and urban agriculture) were important in influencing loan repayment performance of the borrower. Moreover, Sex and business experience of the respondents were found to be significant determinants of loan repayment rate.

Dayanandan *et al*. (2008) investigated the determinants of Loan Repayment Performance among Small Farmers in Northern Ethiopia. The sample size of the study is 130 and employed t-test and X2test to compare non-defaulter and defaulter groups & Logit model. To this end, it found that the amount of credit is highly significant at less than 1 percent. Educational status, experience in credit utilization, off-farm and non-farm income, follow-up and the repayment period are significant at less than 5 percent. On the top of this, livestock ownership of the household is also another variable which is significant at less than 10 percent level. In line with the finding, it recommended that government, cooperatives and other NGOs are top lay their own role in reducing the price of farm inputs as well as diversification of non-farm and off-farm activities for additional income of the family. As livestock are sources of income and serve as security during crop failure, more attention should be given to the livestock sector in the areas of feed resource improvement and management, genetic resource improvement, control and/or prevention

of animal diseases and parasites, as well as development of marketing facilities for animal and animal products.

Million *et al*. (2012) examined that factors affecting loan repayment performance of smallholder farmers in East Hararghe, financed by Oromiya Saving and Credit Share Company. Out of the farmers community in the area, the study has chosen 140 smallholder farmers from two districts (71.4 percent and 28.6 percent households were partial loan defaulters and complete non-defaulters) using multistage sampling technique. The method of analysis were descriptive & a two limit Tobit regression model. Using this method of analysis, it found that agro ecological zone, off-farm activity and technical assistance from extension agents positively influenced the loan repayment performance of smallholder farmers. Production loss, informal credit, social festival and loan-to-income ratio negatively influenced the loan repayment of smallholder farmers.

Bekele *et al*. (2004) looked at factors influencing repayment of agricultural input loans in Amhara and Oromia reginal states in Ethiopia. From these two regions, 315 households are selected as sample size.

Jemal (2003) microfinance and loan repayment performance: financed by Oromia credit and savings share Company (OCSSCO) in Kuyu. The study used both descriptive statistics and the probit model. As a result, the study found out that education, income, loan supervision, suitability of repayment period, availability of other credit sources and livestock are important and significant factors that enhance the loan repayment performance. Moreover, loan diversion and loan size are found to significantly increase loan default and female borrowers were found better in terms of loan repayment. As a result, it recommended that care and designs a better lending strategy focusing on effective supervision, training and approval of appropriate loan size so as to minimize the loan default problem observed. In addition to this, pay attention to expanding of its services so that more poor women join the program and benefit from it there by contributing to the improvement of the repayment performance. Regarding the loan rationing, borrowers who are literate, loan diverters, support more dependents and earn more income, were

disfavored; while those who are older, male, apply for larger loan amounts, own livestock of higher value, perceive supervision as adequate and the repayment period as suitable were favored.

Micha'el (2006) investigated the micro-finance repayment problems in the informal sector in Addis Ababa. The study considered 225 clients and analyzed using multinomial logit model. At the end, it recommended that better repayment performance is strongly and directly associated with educational level of the borrower. Insufficiency of the loan granted and unplanned engagements in the business activity do also reduce repayment performance.

Mengistu (1997) used binomial model to analyze the repayment performance of the borrowers of micro enterprise in Awasa and Bahirdar towns. And he reported that the number of workers employed has positive relation with full loan repayment for both towns; while loan size and loan diversion were negatively related. Age and weekly repayment period had positive relation with repaying loan in full in Awasa. In case of Bahirdar loan expectation and number of workers employed have positive relationship with full repayment, while loan diversion and availability of other sources of credit have a negative impact.

Berhanu (1999) in his study on the project office for the creation of small-scale business opportunities (POCSSBO) in Addis Ababa, used probit model and found that education, timely loan granting and the proportion of loan funds diverted statistically significant. However loan size, number of dependents within the house hold and consumption expenditure are positively related to loan diversion. He reported that loan diversion and loan size are negatively related to full loan repayment while age is positively related.

Belay (1998) considered in his study twenty eight demographic and socio-economic variables which were hypothesized to influence repayment of fertilizer credit among smallholder farmers in the central highland of Ethiopia, Alemgena district. His result

showed that credit experience and loan diversion variables were found to have statistically significant and potential power to discriminate between defaulter and non defaulter group of the fertilizer borrowers.

Fantahun (2000) hypothesized twenty one socio-economic variables to influence the loan repayment performance of agency for cooperation in research and development's (ACORD) community based organization revolving credit schemes. Accordingly his fitted Tobit model revealed that factors such as the size of loan issued, other income source, loan supervision visit had a positive impact on loan repayment performance.

Belay (2002) examined twelve socio-economic and institutional factors that affect loan repayment performance of rural women in eastern Ethiopia, in case of Drediwa Town using a logit model. The result of the study showed that, location of borrowers from lending institution, loan diversion, annual farm revenue, celebration of social ceremonies, effect of initial group formation and farm size were significantly affect the rural women loan repayment performance.

In view of the mentioned above studies, various studies were conducted on the determinants of loan repayment performance in Ethiopia. Most of these studies were focused on the credit associated with agricultural activities and they identified the socio-economic factors that affect the loan repayment rate of rural household. However, in the empirical analysis nothing was studied about the factor influencing the loan repayment performance of industrial projects. Thus, this research could focus on the loan repayment performance of industrial projects financed by DBE. Moreover, the study draws lessons from the review and select variable to be analyzed in the research.

CHAPTER THREE: DESCRIPTION OF THE STUDY AREA AND RESEARCH METHODOLOGY

3.1. Description of Research Area

Development Bank of Ethiopia is one of government owned financial instructions established to support the national development agenda by financing viable projects from the priority areas of the government. It mobilizes funds from domestic and foreign sources. The organization structure of the bank has been improved in line with the newly organizational structure of the Bank, BPR. In this time, the bank has been organized in five regions: central regions, western region, southern region, northern region and northwestern region. Each regions has main branches and sub branches. (Corporate Balanced Scorecard, 2010-2015)

A central region has three main regions, include Addis Ababa, Adama and Diredawa and sub-branches are Ambo, Fiche, Debrebirhan, Weliso, Harer, Chiro, Asela and Bati. The second region is western region, which has one main branch of Jimma and sub branches include Metu, Mizan teferi, Shambu, Gimbi, Dembidolo and Agaro. The third region is southern region, has one three main branches, which are Hawassa Dila, Welayta Sodo. The sub-branches include Yirgalem, Hosana, Goba and Aletawendo. The forth region is northern region has one main branch of Mekkele and "Endasellasie" is sub-branch. The last but the least is northwestern region which has one main branch of Bahirdar and three sub branches. These include Gondar, Dessie and Debremarkos.

The reasons considered in selecting DBE as study area are the following:-

- The issue of loan repayment is crucial in the Development Bank of Ethiopia, where long term projects are financed with high risk. Be it private or government owned commercial banks, they lend short term loans which would be repaid with one year or less. In fact, they have given a privilege to lend money for maximum loan period of ten year. However, the loan repayment period of projects financed by DBE shall extend to twenty years with some rescheduling work.

- In line with institutional objective, DBE has given a mandate to finance projects and equipped necessary huge amount of money. The capital accumulation of commercial banks is limited to finance only small projects with limited loan amount. Therefore, the loan repayment issue takes great attention in DBE than other commercial banks.

- All the projects financed by DBE are from the scratch, such as establishment of industries, commercial farm and standard service based projects. Beyond commercial banks, these projects played a role in job opportunity, generating of foreign currency, import substitution, create backward and forward linkage, and generate government tax and so on. Thus, the failure in loan repayment would bring a loss of all these socioeconomic benefits. This aggravates the macro economic problems of the country.

3.2. Research Methodology

3.2.1. Sample and Sampling Techniques

The participants (subjects) of the study are industrial projects financed by DBE. Based on their project status, project which are under implementation are not part of the study. In sample size determination, projects under implementation and projects operational below six months are excluded from the study. Based on NBE directive, the repayment performance of the project can only be evaluated after six months and above. (NBE directive, 2012)

Projects can also be categorized under long & medium term, and short term loans. The repayment period for the long and medium term loans extends till to seventeen years based on the cash flow whereas two years maximum for the short term loans. Therefore, the types of loan which are included in the study are long and medium term loans. Because repayment of the short term loans, both short term special working capitals, is settled directly from their sales proceeding. For instance, a special working capital loan for textile and pharmaceutical industries is to purchase cottons from the growers and to supply

medicinal items to PEFA based on tripartite agreement (consist of lending bank, borrowers and the purchasers of the medicinal items, i.e., Ethiopia pharmaceutical agency), respectively. (Credit policy, special letter on special working capital for cotton and pharmaceutical, 2012)

In the loan portfolio report of DBE (2012) reported that there are 260 numbers of industrial projects managed in all operational regions of the bank, 226 of them are defaulter and the remaining 34 loans are non-defaulter.

Based on NBE directive of loan classification, non-default loans, which are under pass and special mentions loan classification, are administrated under the credit process operational units while default projects, which are under substandard, doubtful and loss loan classification, are administered under project rehabilitation and recovery process operational unit. Accordingly, the detail loan classification of industrial projects is presented here below table 1.

Stratified random sampling is used to avoid random sampling error and maintain the balanced sampling size. The strata of the sample study is defaulter and non-defaulter industrial projects. Considering the total population of the study, the sample size of the study is determined using mathematical formula. The mathematical formula is used in sample size determination is give here below at 10% precision level. (Israel, 2009).

$$n = \frac{N}{1 + N (e) 2}$$

Table 1 Loan repayment performance category

S.N	Description	Number Population	Sample size
1	**Non-defaulter**		
1.1.	Pass	21	9
1.2.	Special mention	13	6
	Sub-total	34	15
2.	**Defaulter**		
2.1.	Sub-standard	15	7
2.2.	Doubtful	11	5
2.3.	Loss	210	87
	Sub-total	236	99
		270	116

3.2.2. Instruments of Data Collection

The sources of the information are both primary and secondary data. The data on the characteristics of borrowers, lenders and the loan itself is categorized under primary data. Questionnaire is used to collect the primary data. These data were collected under classification three categories: characteristics of borrowers, lenders and the loan itself. Thus, the types of data are collected are the following.

i. Borrower characteristic includes
   - Age, marital status, address of borrower, nationality, level of education, etc for private borrower.
   - Information on credit experience, business experience, and managerial experience of the borrower and the project manager.

ii. Loan characteristics: include
   - History of the loan like amount of loan, length of loan processing time, disbursement installment, etc.
   - Information on the collateral coverage, equity debt ratio,

iii. Lenders characteristics: include
   - number of follow up ,

3.2.3. Procedures of Data Collection

The producers of data collection depend on the types of data and instruments to be used for doing so. During data collection, the study followed the following steps.

i. Development data collection devise (questionnaire) based on the required information
ii. Dispatch the questionnaire to professionals of the subject area for pre -pilot test to ascertain the relevance of the questions and evaluate how much the questions are clear and understandable
iii. After the pre pilot test is accomplished and brainstorming was made to the contact officers of the project, the questionnaire was dispatched to the contact officers of bank or directly to the company for the selected industrial projects.
iv. Once the data was gathered, the data was checked whether the required information is collected or not.
v. Finally, the missed information was amended together with the contact officers of the Bank or with the company looking at some of the questions.

3.2.4. Methods of Data Analysis

3.2.4.1. Descriptive analysis

Simple descriptive analysis is used to identify and describe the determinants of loan repayment performance of industrial projects, such as mean, standard deviation, percentage; t-test is used to test the mean difference of the explanatory variables and dependent variables, chi square test to investigate the association of each explanatory variable with the loan repayment performance, etc.

3.2.4.2. Econometric analysis

Inferential statistics was used employed to test the significance of determinates on loan repayment performance of export oriented projects. In this case, econometric model is a preferred of data analysis model using logistic model.

The dependent variable of the model is loan repayment performance, which is either being default loan or not. The regressand, the dependent variable, or the response variable Y is

qualitative nature (or dummy), or a mixture thereof. This shows that the response variable, or regressand, can take only two values, "0" if the project is categorized under default loan and "1" if the project is categorized under non-default. It is noted that the fundamental difference between a regression model where the regressand Y is quantitative and a model where it is qualitative. In a model where Y is quantitative, it has an objective is to estimate its expected, or, mean, value given the values of the regressors. While in a model where Y is qualitative, it has an objective is to find the probability of something happening, such as being default loans or non-default loans. Hence, qualitative response regression models are often known as probability model. In probability model, there are three approaches to develop for a binary response variable. These include the linear probability model (LPM), the logit model and the probit model. Of these models, this model will employ linear probability model (LPM), because it has an estimation and interpretation problem than logit and probit model. The fundament problem of LPM is that it is not logically very attractive model because it assumes that pi =E (Y=1/X) increases linearly with X, that is, the marginal or incremental effect of X remains constant throughout. This model can't also guarantee that the estimated probabilities will indeed lie between the logical limits 0 and 1. (Gujarati, 2005)

Specification of the logit model

Hosmer and Lemeshew (1989) pointed out that the logistic model could be written in terms of the odds and log of odds, which enables to understand the interpretation of the coefficients. Accordingly the logistic probability model is econometrically specified as follows:

$$p_i = E(Y = 1/X_i) = \frac{1}{1+e^{-(B_1+B_iX_i)}} \quad (1)$$

For easy of exposition, equation (1) can be written as

$$Pi = \frac{1}{1+e^{-Z_i}} = \frac{e^{Z_i}}{1+e^{Z_i}} \quad (2)$$

Where $Z_i = B_1 + B_iX_i$

Equation (ii) represents what is known as the (cumulative) logistic distribution function. It is easy to verify that as Zi ranges from $-\infty$ to $+\infty$, Pi ranges between 0 and 1 and that Pi is

nonlinearly related to Zi (i.e., Xi), thus satisfying the two requirements considered earlier. If Pi, the probability of being non-defaulter, is given by (ii) then (1-Pi), the probability of being defaulter of a loan is

$$1 - P_i = \frac{1}{1 + e^{Z_i}} \tag{3}$$

Therefore, it can be written as

$$\frac{P_i}{1 - P_i} = \frac{1 + e^{z_i}}{1 + e^{-Z_i}} = \text{e zi} \tag{4}$$

By taking the natural log of (IV), an interesting result, namely, the legit model is obtained:

$$L_i = Ln\left(\frac{P_i}{1 - P_i}\right) = Z_i \tag{5}$$

$$= B_1 + B_i X_i \tag{6}$$

Where, L – the log of odd ratio, is not linearly related in Xi

Xi – the independent variable in the working hypothesis

B1& Bi - the parameter in the model

To fit the logistic regression model, the estimation of the values of the unknown parameters ß1 and ßi's are required. In linear regression, the Least Square Estimation (OLS) method is used to estimate the parameters of the model. In this method, those values of ß1 (constant) and ßi (coefficients of explanatory variables), which minimize the sum of squared deviations of the observed values of Zi (dependent variable) from the predicted values are determined. Under the assumptions of linear regression, the method of least squares yields estimators with a number of desirable statistical properties. Unfortunately, when the method of OLS is applied to a model with a dichotomous outcome the estimators no longer have these same properties. (Gujarati, 2005)

Since the method of OLS does not make any assumptions about the probabilistic nature of the disturbance term (uj), in logistic regression, the parameters of the model are estimated using the Maximum Likelihood (ML) method (Gujarati, 2005). Due to the non-linearity of the logistic regression model, an iterative algorithm is necessary for parameter estimation.

Maddala (1989) pointed out that the method of ML is a very general method of estimation that is applicable to a large variety of problems. The ML method of estimation suggests choosing as estimates the values of the parameters that maximize the likelihood function (Maddala, 1989). In many cases it is convenient to maximize the logarithm of the likelihood function rather than likelihood function itself and the same results are obtained (Maddala, 1989). Hosmer and Lemeshow (1989) concluded that in a very general sense, the method of ML yields values for the unknown parameters, which maximize the probability of obtaining the observed set of data. Mostly this method is preferred when large sample size is used.

Definitions and Hypothesis of Working Variables

Based on literature on determinant of loan repayment performance and economic theory, the following functional relationship between loan repayment performance and factors affecting will be hypothesized.

a) Dependent variable

Depend variable is a loan repayment performance of industrial projects financed by the DBE. It is a dummy variable assigned with a value of "0" for defaulters and "1" for non-defaulters. The classification bases on the loan classification directives of NBE. Accordingly, loans are classified into five: Pass, special mention, sub-standard, doubtful and loss. Generally speaking, these are categorized into two: Non-defaulter for pass and special mention loan status and Defaulter are the remaining loan classifications include sub-standard, doubtful and loss. (NBE, 2012)

b) Independent variables

Region: is a dummy variable, which assigned from 1-11 to represent Tigray, Afar, Amhara, Oromia, Somali, Gambela, SNNP, Benshagul Gumuz, Harari, Der Dawa and Addis Ababa. It refers to regional state of the country where the selected projects are found for the production, not necessary for marketing of outputs. On the same way, all regional state of the country don't have land granting and registration system, judiciary

system, corruption level, accessibility of infrastructure and so on. It is supported by the empirical study of Belay (2002).In this way; it is assumed that regions which have better and comfortable regional characteristic would enable projects to have better operational and financial performance.

Age: is continuous variable and measured in years of the life span of the project manager from birth date till the date of the project when approached to the bank for loan request. There are various arguments forwarded regarding to age of the project manage. Some of the arguments support that old project managers have long year of work experience in handling various business ventures with improved educational level. This fact would enable a person to manage the project properly and achieve the objective of the business venture: profitability and sustainability. On the hand, though young managers have fewer years of work experience and educational level, they have relatively better motivation and vision to achieve their objectives. Vigano (1993), Mengistu (1997) and Nagarajan (1997) noted that as the age of the borrower increases, he/she gets more and more wealth from the activity and be able to pay the debt efficiently than the younger borrowers. Therefore, the researcher expects that the results of the study will have positive effect.

Gender: is a dummy variable on which Male is presented by 0 and Female presented by 1. It is verified in the project concept that male is risk taker than female on core business decision of the company and this initiates them to develop a strategic defaulter thinking in meeting their debt commitment. On the hand female is more responsible than male in handling each and every aspects of the business venture of the company and committed enough to serve the debt commitment of the company with minimal decision role. Thus, this researcher supports that the females would have serve their repayment commitment than male.

Marital status of the borrower: is a categorical variable and assigned 0 for non married and 1 for married. Conceptually, it is agreed that married borrowers, who have a spouse, are relatively more responsible than others. On other hand, they are likely to tend to have

more school and living expense than others. Therefore, result of the study would determine solutions for these ambiguous arguments on marital status.

Educational level of project manager: is a categorical variable which takes 1 for elementary school, 2 for secondary school, and 3 for tertiary school. Various empirical studies support that a borrower who has an improved educational level would enhance its awareness and committed enough to meet to debt commitment than a borrower with less educational level. Moreover, Matin (1997), Kashulize (1993), Njioku and Odii (1991), Birhanu (1999), Oladeebo (2008) and Amare (2002), Michael (2006) empirical studies noted that education has a positive impact on the repayment performance through increasing awareness of the customer to utilize the loan efficiently. Therefore, educational level of a borrower would a positive impact on loan repayment performance.

Work experience of the Borrowers: is a continuous variable and measured in years from which a borrower begins its business activities and extends to the year of the loan application, which taken a weighted average of both relevant and irrelevant experience to the business. A long year's work experience a borrowers would a positive impact on the operational and financial performance of the business venture. This enables the borrower to maintain its profitability and can maintain its loan repayment commitment. Therefore, work experience of a borrower would have a positive impact on loan repayment.

Nationality: Nationality of a borrower: is a dummy variable and assigned 0 for Ethiopian borrower, and 1 for foreigner borrower. Practically, it is verified that foreigners' have a better organizational management system, well established market reputation and problem solving than local borrowers. This fact enables them to have better operational performance and strong competitive capacity than local borrowers. On the other hand, in the country where there lose financial control and market and technical awareness, foreigners are exposed to divert their wealth to their own country. This because their improved awareness of in the international market and financial exchange and less sense of nationality than local investor. Therefore, the study would determine these contradictory arguments.

Types of management: it is a discrete variable and measured in number of individual member of shareholders who have decision role in the business venture, either it is administered in board of management or its own management executive. Practically, it is verified that a business venture where it is administered in board of management would be a better decision role than a business venture administrated with its own executive management. In board management, members are not only from the shareholders but also from other the shareholders who have a vast work experience and education level in similar and related business ventures and have their own business venture so that they are influential and play a significant management role. In a business venture where members of the executive management are the shareholders regardless of their work experience and educational level, but only looking at their member. Therefore, this researcher support the business venture organized in a board of director would have better operational and financial performance to meet their debt commitment than a business venture organized in its own executive management.

Types of loan scheme: is a categorical variable which takes 1 for new loan, 2 for expansion loan, 3 for buyout and 4 for other loan scheme. From the project point of view that expansion projects have better operational marketing exposure than new borrowers. In a business venture, it is known that market competition is key for profitability and suitability of a business venture. Early established projects, which are approached the bank for expansion and buyout loan, are better competent enough than new applicants. However, there is different view for buyout projects, which buying of a loan for established projects from other banks. Most of the time, the driving force to buy these projects is to improve their operational and financial problems. Therefore, except projects with expansion loans, new and buy out loans are exposed to operational and financial problems and failed to meet their debt commitment. As a result, the researcher expect that project with expansion loan would have positive impact on loan repayment performance than others loan schemes.

Project ownership: is a dummy variable which takes 0 for government owned projects and 1 for private owned projects. Project management system depends on the ownership

background of the project. Except few project, government owned projects are development oriented than profit oriented like private owned projects. On the top of this, government owned projects have poor management in handling of the operation and financial activities of the business venture. Therefore, the researcher expect that private owned projects have better management system and are profit oriented to serve their debt commitment.

Legal background of the business: is a categorical variable and assigned with 1 for sole proprietorship, 2 for private limited company and 3 for shareholders. With a decision making role in problem solving, PLC and shareholders have better role in decision making than others. In this regard, plc and shareholders would establish a business venture with satisfactory operational and financial capacity. However, they are exposed to strategic defaulter, because they would be disagreement in meeting their debt commitment since they have different attitude and business experience. Therefore, the result study would determine these contradictory views.

Credit history of a borrower: is a dummy variable which takes 0 for Defaulter and 1 for Non-defaulter while they had credit relation with other lending financial institutions. Borrowers who are non-defaulters are relatively committed to meet their debt commitment than defaulters. Therefore, the researcher supports the view that borrowers with non-defaulter loan status would have positive impact on loan repayment performance than defaulters.

Collateral coverage ratio: is a continuous variable and measured in ratio of approved loan to that of insured collateral value. Practically, a borrower with less collateral coverage ratio tends to strategic defaulter than highest one. This is because when the collateral coverage ratio is less, it implies that the more asset of the company is on working capital or liquid, which can be easily diverted to other business establishments. In this case, the borrowers feel a saver one when the project gets bankrupted with minimal or none equity of the borrower. Thus, a borrower with highest collateral coverage is more concerned and careful for the change of project status, being bankrupted. This initiates that borrowers to

handle properly he business venture and resulted in profitability. This is supported by the empirical study of Mansoori (2009). To this end, a borrower with highest collateral coverage would have positive impact on repayment performance.

Number of disbursement installment: The financial institutions assume that increasing the number of disbursement installment enhances proper utilization of the loan; this in turn has appositive impact on repayment. On the other hand Mansoori (2009) and Farmanfarmian (1962) suggest increasing the number of disbursement installment will lead to delays in the project implementation. So this has a negative impact on repayment performance. Therefore the sign of the variable is expected to be either positive or negative depending on the empirical result.

Loan processing cycle time: is a continuous variable and measured in days from loan application to loan approval. The implementation schedule of the project often starts from the loan processing time till the commencement of production. When the time of loan processing time is stretched beyond the planned time, the scheduled implementation time will be distorted and repayment time becomes first before the commencement of production. In this case, the borrowers failed to meet its debt repayment on the stipulated implementation period of time. This variable hypothesis is supported by the finding of authors Bankhshi and Koopahi (2002), Bekele (2003), Jama and Kulundu (1992), Hunte (1996), Vigano (1993), Njioku and Odii (1991), Birhanu (1999). Therefore, the researcher expects that loan processing cycle time would have a positive impact on loan repayment performance.

Market destination: is a categorical variable which takes 1 for export oriented projects and 0 for domestic based projects and 3 for projects have both market destinations. Most of the time, project for export market are relatively have value added products with better price in the international market provided that stiff completion than domestic based projects. In the presence of stiff competition, business ventures are forced to install better operational and financial management system to be competitive in the international market. This enable the export oriented project to ensure profitability and sustainability,

and meet their debt commitment. On the other hand, domestic project with stable market and accessibility of raw materials can also achieve profitability. Therefore, the result study would determine the statistical significance of the market destination on loan repayment performance.

Source of major raw materials: is a categorical variable which takes 1 for imported raw materials, 2 for domestic raw materials and 3 for project use both sources of raw materials. Accessibility in terms of time and volume is a key in operational performance of a business venture. Timely availability of raw material would enable the business venture to maintain its production capacity utilization, otherwise distorted. Practically, due to delay in transportation and tax related issues from the origin of the raw materials, the imported raw materials arrive at the project site beyond the expected period of time. During the interval time of depletion of initial stock and arrival of the raw materials, the production capacity utilization of the business venture will significant decline or completely stopped. This is because the working capital of the business venture for raw materials and related costs is limited and they forced to keep the stipulated period of time for circulation of raw materials. In this way, the operational and financial performance of the business venture is distorted and failed to have better loan repayment status. Thus, the researcher expects that the projects which are accessible to local raw materials would have better operational and financial performance to meet their debt commitment.

Variation in grace period: is a continuous variable and measured in years from the loan processing time to production commencement. In the situation when the actual grace period of the project is aligned with the planned one, projects would meet their loan repayment schedule, otherwise distorted. Therefore, projects whose grace period aligned with loan repayment would have better loan repayment performance.

Variation in follow-up coverage: is a continuous variable and measured in number of follow-up made for the project from time when the project commences production. In the DBE procedure guideline, operational follow up will be made two times a year. When he lender made follow up aligned with the planned one, the role of lender and borrower can

indentified and the operational and financial problems of the project would get solution and as a result the project can maintain its profitability, otherwise not. Bankhshi and Koopahi (2002), Jama and Kulundu (1992), Okovie (1996) and Fantahun (2000) empirical studies noted that as a number of follow up/ supervision of the project activity after the disbursement of the loan increases, the repayment performance of the borrowers will be enhanced. The same is expected in this analysis.

Other source of income: is a dummy variable which takes 0 for Yes and 1 for No answers on the question of whether they have sources of income or not. A borrowers might have other sources of income or might not, such as other separated business ventures and related business to the project. Occasionally, when production and financial performance of the project gets deteriorated and exposed to bad loan classification, the borrowers can take money from other sources and maintain the loan repayment status of the project. Abraham (2002) on his empirical study argued that, borrowers who have other source of income are more likely better repayment performance. Hence, it is expected to have a positive impact on loan repayment performance of DBE agriculture borrowers

Ratio of expatriate to local employees: is a continuous variable and measured in ratio of number of expatriate to local employees. Most of the time, the expatriates have deliberately recruited to increase the productivity and technical capability of the business venture. They are often recruited from the country where they are known and successful for the sector of the product. In this way, they contributed in training and improving the technical capability of the company though technology and knowledge transfer. As a result, the operational and financial of the company would be improved to maintain their debt commitment .Thus, the researcher expect that the highest ratio of expatriate to local employees would have positive impact on loan repayment performance.

Loan size: Defined as the amount of the loan that the bank disburses to the respective borrowers. It is assumed that if the size of the loan is large, it will increase the interest expense on the production process and affect the repayment performance negatively. On the other hand Bekele (2003) noted that, if the production capacity of the project can

utilize the loan efficiently, it enhances the loan repayment performance. Hence, the actual sign of the variable will be determine in the analysis.

Econometric Tests- Multicollinearity, Hetroscedasticity and Coefficients

Before taking the selected variables into the logit model, it is necessary to check for the existence of multicollinearity among the continuous variables and verify the degree of association among discrete variables. The reason for this is that the existence of multicollinearity will affect seriously the parameter estimates. If multicollinearity turns out to be significant, the simultaneous presence of the two variables will attenuate or reinforce them individual effects of these variables. However, Kothari, (1990) stated that omitting significant interaction terms incorrectly will lead to a specification bias. In a nut shell, the coefficients of the interaction of the variables indicate whether or not one of the two associated variables should be eliminated from model analysis). Accordingly, a Variance Inflation Factors (VIF (Xj)) technique was employed to detect the problem of multicollinearity for continuous variables (Gujarati, 1995). Each selected continuous explanatory variable (Xj) is regressed on all the other continuous explanatory variables, the coefficients of determination (Rj2) being constructed in each case. If an approximate linear relationship exists among the explanatory variables then this should show up as a 'large' value Rj2 for in at least one of the test regressions. A popular measure of multicollinearity associated with the VIF (Xj) is defined as:

$$VIF\ (Xj) = (1\text{-}Rj2)\text{-}1 \qquad (7)$$

Where, Rj2 is the coefficient of multiple determinations when the variable Xj is regressed on the other explanatory variables. A rise in the value of Rj2 that is an increase in the degree of multicollinearity does indeed lead to an increase in the variances and the standard errors of the OLS estimators. A VIF value greater than 10 is used as a signal for the strong multicollinearity (Gujarati, 1995).

Similarly, there may also be interaction between two qualitative variables, which can lead to the problem of high degree of association between two variables. To detect this

problem, contingency coefficients were computed from the survey data. The contingency coefficients are computed as follows:

$$C = \sqrt{\frac{x^2}{N+x^2}}$$

(8)

Where, C= coefficient of contingency, $\chi 2$ = Chi-square random variable and N=total sample size.

Separate tests of the null hypothesis that individual coefficients are zero can be computed using t-test of the multiple linear regression models (Gujarati, 2005). This test can be used to see the statistical significance of each coefficient. An overall test of the null hypothesis that all the parameters associated with the explanatory variables in these models are equal to zero is an F-test based on the OLS estimation procedure.

In logit and other probability models, the most commonly used test is the likelihood ratio statistic, which approximately follows the Chi-square ($\chi 2$) distribution (Liao, 1994). In the ML estimation method, a log likelihood ratio test replaces the usual F-test of OLS regression models to evaluate the significance of all or a sub-set of coefficients (Aldrich and Nelson, 1984; Pindyck and Rubinfeld, 1981). The Chi-square tests the null hypothesis that the coefficients for all terms in the current model except the constant are zero.

With regard to testing the model fitness, the researcher used the log likelihood ratio statistic follows a Chi-square distribution with k degrees of freedom (where k is the number of parameters in the equations less the constant) and is calculated as the difference between -2 times log likelihood for the model with only a constant and -2 times log likelihood for the current model:

$$\chi 2 = -2(\text{Ln } L_O - \text{Ln Lmax}) \qquad (9)$$

Where Lo is the value of the likelihood function for the constant only and L max is the value of the likelihood function when all or a sub-set of independent variables are included in the model (Kementa, 1986; Maddala, 1989; Pindyck and Rubinfeld, 1981).

Interpretation of parameter estimates

In multiple linear regressions, the interpretation of the coefficient is straightforward. It tells the amount of change in the dependent variable for a unit change in the independent variable. The interpretation of logistic regression coefficients (ßi) is considered by using odds ratio $\left(\frac{\text{pi}}{1-\text{pi}}\right)$ and log of the odd ratio $\left[\text{Ln}\left(\frac{\text{pi}}{1-\text{pi}}\right)\right]$ (Liao, 1994). The odds value gives the expected change in the odds ratio of defaulter versus non defaulter per unit change in an explanatory variable, other things being equal. The same interpretation applies to both dummy and continuous variables (Liao, 1994). The logistic regression slope coefficient can be interpreted as the change in the log odds associated with a unit change in the independent variable (Xi),i.e., it tells how the log odds in favor of defaulter changes as Xi changes by one unit. The is the log odds in favor of being defaulter if Xi is zero.

In most applications of binary response models, the primary goal is to explain the effect of the explanatory variable on the response probability P(Y= 1/Xi). And it is complicated to estimate the effect of each explanatory variable on the probability success P(Y= 1/Xi) using the logit model. So in order to measure the effect each significant explanatory variable on the probability of success (i.e. identifying the relative important variable on repayment performance), the researcher was found the partial effect of explanatory variable on the response probability. The researcher relays on calculus to measure the partial effect of each explanatory variable. If Xi is a roughly continues variable, its partial effect on $P(X_i) = P(Y = 1/X_i)$ is obtained from the partial derivative:

$$\frac{\delta P_i}{\delta X_i} = \frac{e^{Z_i B_I}}{(1+e^{Z_{ii}})^2} \tag{10}$$

$$= P_i(1-P_i)B_i \tag{11}$$

Therefore the impact of each significant qualitative explanatory variable on the probability of non-defaulting of a typical borrower was calculated by keeping the continuous variable at their mean values and the dummy variables at their most frequent values (zero and one).

CHAPTER FOUR: RESULT AND DISCUSSION

4.1. Descriptive Statistics Results

Descriptive statistics is used to describe of general characteristics of the database using basic statistics such as mean, mean, percentage, standard deviation and frequency distribution. On the top of these, it is also used a t-test to test whether two groups, defaulter and non-defaulters, have the same mean of a single independent variable and a chi-square goodness of fit test to construct a confidence interval for a single variance or standard deviation test a claim about a single variance or standard deviation of independence and measures of association.

4.1.1. Borrower's demographic and socio-economic characteristics

This refers the characteristics of borrowers which have substantial influence / role on the magnitude of operational and financial performance of the project to meet their debt commitment. This can be sound and applicable when the promoter involves directly in the day to day operation of the business venture and play key role indirectly in decision making of the project. Practically, Project manager of the project has the role of decision making and handling of day today operation of the project, either employed or the borrowers themselves. Therefore, to accommodate the role of decision making and handling of the day to day operation and financial performance of the project, the characteristics of the general manger of the project is considered.

From the overall respondents of the study, the average age of the borrowers and /or general manager is 47 year with standard deviation of 9 years, provided that average age of borrower and/or manager is 48 year and 46 year for non-defaulter and defaulter, respective. Given 5 % significance level, there is no statistical significance difference between the mean of age of the borrowers in the loan repayment performance category, which is categorized as non-defaulter and defaulter.

With regard to work experience, the average years of work experience of the borrowers/general manager is 14 years with standard deviation of 3 years of the study respondents. More specifically, 13 year is the average work experience of non-defaulter and 14 years is the average work experience of defaulters. At the 5% significance level, there is no statistical significance difference between the mean of the work experience in the non-defaulter and defaulter's borrowers/managers.

Table 2 Distribution of Borrowers by their age, education and work experience

Variables	Non defaulters (N= 41)		Defaulters (N= 75)		Total sample (N= 116)		t-value
	Mean	St.dev	Mean	St.dev	Mean	St.dev	
Age	47.9	9.94	46.16	8.74	46.78	9.18	0.98
Work experience	10.22	4.72	9.63	4.78	9.84	4.75	0.64

Across the loan repayment performance category, the age of borrowers/managers ranges from 31 to 65 years for non-defaulters and 31 to 82 for defaulters during the time of loan application. The proportion age of non-defaulter borrowers/managers is a little bit lower than defaulter borrowers/managers' age.

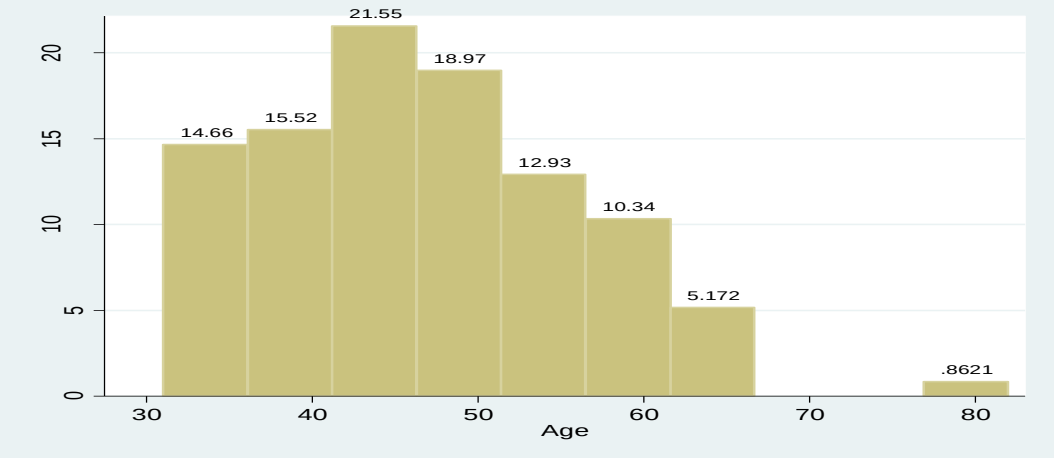

Figure 1 Range of age borrowers

Since the bank finances projects in line with the government policy and strategy so that the projects are established strategically in all regional state of the county. Due to the strategic location of the country, the highest number of non-defaulter projects, which is about 17 projects, is found in Oromia regional state followed by Addis Ababa (13 projects), Tigray (7 projects) and other regions (4 projects), respectively. Similar to non-defaulter, the highest number in defaulter projects, which is 28 projects, are found in Oromia regional state., the number of projects in SNNP (15 projects), Addis Ababa (15 projects), Amhara (11 projects) and other projects (6 projects) are ranked next to this region respectively. Provided 5% significance level, there is statistical significant association between project location and loan repayment performance.

Secondly, the ownership of the project is confined to merely to some of gender category, female or male. In case non defaulters, male borrowers have the highest proportion of project ownership than female borrowers, which accounts of 32 projects belongs to male borrowers and the remaining number projects female borrowers. In the same way, about 78 projects belong to male borrowers and the remaining projects belong to female projects. Unlike to the statistical association between project location and loan repayment performance, the statistical test evidenced that there is no statistical association between gender and loan repayment performance.

Thirdly, the other borrower characteristic is marital status, which is categorized under married and not married. The highest numbers of non-defaulter borrowers are married who own 17 projects and the remaining projects belong to non-married borrowers. Maintaining the marital status of the borrowers, married borrowers owns 50 projects and the remaining projects goes to non-married borrowers. Similar to the result of statistical significance of association gender to loan repayment performance, there is no statistical significance association between marital status and loan repayment performance.

The forth discrete variable of borrower's characteristics is management type. The highest number of management type of non-defaulter borrower is owner of the project, which are 27 numbers of projects and the remaining number of managers are recruited from the labor market. In addition to number of projects in management type of project managers, no difference statistical significance of association result is found compare to that of gender and marital status of the borrowers.

The fifth borrower's characteristic is nationality of the borrowers. From the total respondents of non-defaulter borrowers, Ethiopian borrowers own 4 projects, foreigners own 2 projects. Considering the highest total number defaulter borrowers, Ethiopian takes 37 projects and the remaining 73 projects are owned by Foreigners. Moreover, the statistical hypothesis test confirms that there is statistical significance of association between nationality of the borrowers and loan repayment performance.

Before approaching the bank for loan request, the borrowers have credit history with other financial instructions. About 38 of the non-defaulter borrowers have credit history with other financial institutions and few of them have no credit relation with other financial institutions. While as in the case of defaulter borrowers, 45 of them have credit history with other financial instructions and the remaining 30 defaulter borrowers have no credit relation with other financial institutions before approaching the bank. On the top of this, the statistical association between credit history of the borrower and loan repayment performance is significance at 1% significance.

The other sources of the borrowers can also be used in maintaining the loan performance of the project. In this way, majority number non defaulter borrowers, which accounts 36 borrowers, have no other sources and the remaining number borrowers have other sources of projects. Similar to this, 72 defaulter borrowers have no credit history with other financial institutions and the remaining 3 defaulter borrowers have credit history.

At 10% significance level, the having other sources of income is statistical associated with loan repayment performance.

From non-defaulter projects, 7, 4, and 11 borrowers/managers of the projects are with primary education, secondary school and tertiary school, respectively. In the case of defaulters, 9, 19 and 28 borrowers/managers of the projects are with primary education, secondary school and tertiary school, respectively. Based on hypothesis test, there is no statistical association between education level and loan repayment performance.

Table 3 Borrowers characteristics

Discrete Variables	Non Defaulter		Defaulter		Total		Chi-square -value
	Number	Percentage	Number	Percentage	Number	Percentage	
1. Regional distribution of project location							
Tigray	7	17.07	5	6.67	12	10.34	12.0568**
Amhara	3	7.32	11	14.67	14	12.07	
Oromia	17	41.46	28	37.33	45	38.79	
SNNP	1	2.44	15	20	16	13.79	
Addis Ababa	13	31.71	15	20	28	24.14	
Total	41	100	75	100	116	100	
2. Gender							
Female	9	21.95	23	30.67	32	27.59	1.008
Male	32	78.05	52	69.33	84	72.41	
Total	41	100	75	100	116	100	
2. Marital status							
Non-Married	17	40.48	24	32.43	41	35.34	0.7586
Married	25	59.52	50	67.57	75	64.66	
Total	42	100	74	100	116	100	
4. Management type							
Owned	27.00	65.85	43.00	57.33	70.00	60.34	0.8042
Employed	14	34.15	32	42.67	46	39.66	
Total	41.00	100.00	75.00	100.00	116.00	100.00	
5. Nationality							
Ethiopian	4	66.67	37	33.64	41	35.34	2.7163***

Foreigners	2	33.33	73	66.36	75	64.66	
Total	6	100	110	100	116	100	
6. Credit history of the promoter							
Yes	38	92.68	45	60	83	71.55	13.9108*
No	3	7.32	30	40	33	28.45	
Total	41	100	75	100	116	100	
7. Other sources of Income							
Yes	5	12.2	3	4	8	6.9	2.7727***
No	36	87.8	72	96	108	93.1	
8. Educational level							
Primary education	7	63.64	9	32.14	25	32.47	4.2574
Secondary education	4	36.36	19	67.86	52	67.53	
Tertiary education	11	100	28	100	77	100	

***At 10% significance level
**At 5% significance level
*At 1% significance level

4.1.2. Lender's lending strategy characteristics

Loan processing cycle time is the length of time from loan application of the borrower to loan approval. From the total borrowers of the study, the average days of loan processing cycle time is 126 days. Specific to each category of loan repayment performance, 124 days takes to process the loan request of the non-defaulted borrowers and defaulted borrowers' loan request takes 126 days of loan processing cycle time. The statistical hypothesis test signifies that there is no statistical significance between the mean of the loan processing time and loan repayment performance.

The variation in the grace period of planned to actual implementation period contributes to change in loan repayment performance. The overall sample mean in the variable is 0.2 years, which about two months, with standard deviation of 1 and half year and specifically 0.1 year, one month and 0.2 year, two months of actual grace period variation from the planned one. The applied hypothesis test notifies there is no

statistically significance between the mean of the variable under review and the outcome variable.

Once the project is implemented and commences operation, regular follow up report is procedure in the credit policy of DBE to identify the challenges and avail remedies before the projects gets bankrupts. In comparison the actual to planned follow up coverage, the actual follow-up coverage lower by 1.20 than the planned one that is two follow up report per year. The problem of follow up coverage report highly reflected in non-defaulted loans than defaulted loans with a short fall of almost 2 follow report under the planned one. Statistically, the mean between defaulter and non-defaulter is statistically difference with loan repayment performance.

Table 4 Lender's characteristics

Variables	Non-defaulters (N= 41)		Defaulters (N= 75)		Total sample (N= 116)		t-value
	Mean	St.dev	Mean	St.dev	Mean	St.dev	
Loan processing cycle time	124.37	79.89	126.39	52.33	125.67	63.11	-0.16
variation in grace period	0.1190244	2.302119	0.2442667	1.010614	0.2	1.582472	-0.406
Follow up coverage ratio	-1.829268	2.888792	-1.146667	1.204646	-1.387931	1.985914	-1.7865*

*At 5% significant level

Looking at the apparent loan processing cycle time, it ranges from 31 to 365 days and 34 to 256 days from loan application to loan approval for non-defaulter and defaulter loan, respectively. The loan processing cycle time of the majority non defaulted borrowers are less than 100 years. Contrary to this, the loan processing cycle time of the majority defaulted borrowers is between 100 to 200 days, which is more than non-defaulted borrowers' loan processing cycle time.

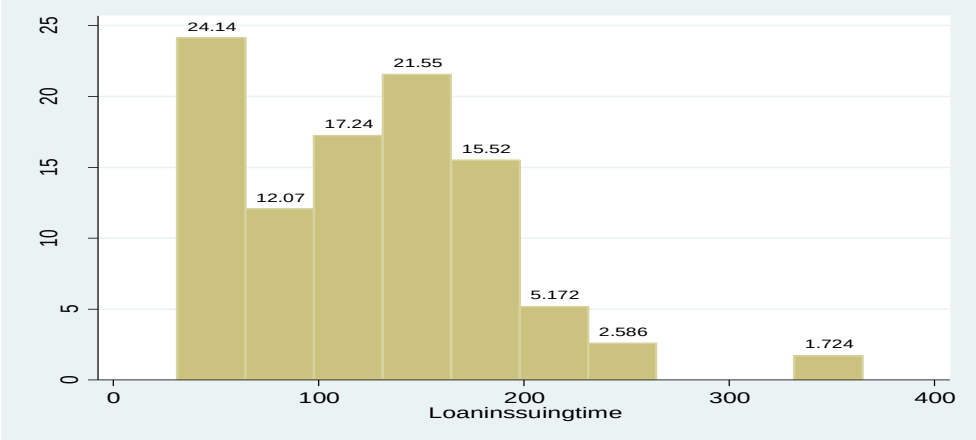

Figure 2 Loan processing time

Variation in the actual grace period from planned one is within and below the zero for non-defaulted borrowers. This implies that the majority non defaulter projects implement their project below the planned grace period in the appraisal period. In the case of defaulter borrowers, the actual grace period is within and above the planned grace period.

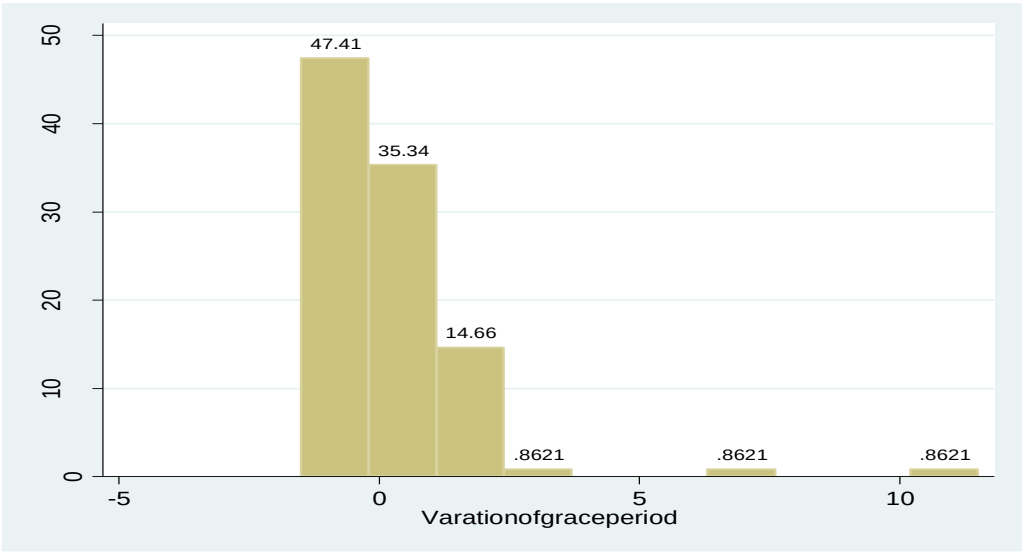

Figure 3 Variation in grace period

The procedure of the bank explicitly states that the follow up coverage for operational project is to be done bi-annum. Taking this into account, the actual follow up coverage is within and below the scheduled follow up for both non defaulter and defaulter borrowers. In attaining the expected follow up coverage, the defaulter projects have better follow up coverage than non-defaulter projects.

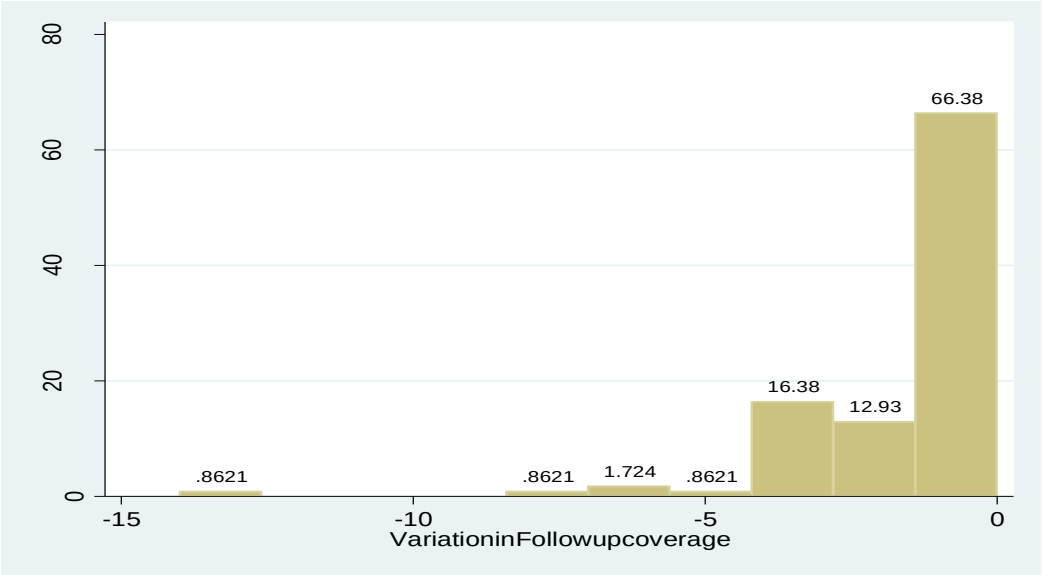

Figure 4 Variation in operational Follow up coverage

1.1.1

4.1.3. Loan characteristics

Collateral coverage ratio is defined as the ratio of collateral value to approved loan of the project. From the selected respondents of the study, the average collateral coverage ratio is 2.67 which signify that the bank is more secured in case of bankruptcy. For non-defaulter borrower, the average collateral coverage ratio is 0.92, which is the collateral value is 0.8 more than the approved loan of the project. In this case, it is safe, but in a very limited way considering the depleted assets and salvage values of the project during foreclose. The collateral coverage of the defaulter is 3.63 which explicitly notify the bank

is strongly secured in the case of default. Statistically, the mean of the non-defaulter project is more than the defaulters at 1% level of significance.

The loan size of the projects depends on the nature and complexity of the project. The over average of loan size of the selected projects in the study is Birr 14,400,000 with standard deviation of 44,660,000. In the total average loan size, the non-defaulter project has an average loan size of Birr 32,000,000 and Birr 4,737,643 is the average loan size of the defaulter projects. Based on the statistical significance test, the mean of the non-defaulter loan size is lower than the defaulter projects.

The number of disbursement is scheduled based on the implementation schedule of the project. Putting the loan disbursement with limited number of disbursement initiates the borrowers to divert the loan and an extended number of disbursements get obstacle the proper implementation schedule of the projects, when the plan is made merely on the size of loan disbursement allotted to each disbursement regardless on the implementation schedule of the project. In this way, the average number of disbursement for the selected projects in the study is almost three disbursement so that the loan is disbursed classifying in three disbursement schedules. Statistically, there is no significant difference between the mean of the number of disbursement and loan repayment performance.

Practically it is verified that in the business venture where there are more expatriate employees would have a technology and knowledge transfer. The average expatriate to local employees ratio is 0.2, where the number one expatriate employees among five local employees. Non defaulter projects have an average one expatriates among ten local employees and one expatriate among five local employees in the defaulter projects under study. Beyond practically, the mean difference of expatriate to local employees' ratio is insignificant statistically.

Table 5 Collateral strength, loan size, number of disbursement and ratio of expatriate to local employees characteristics of loan

Variables	Non-defaulters (N= 41)		Defaulters (N= 75)		Total sample (N= 116)		t-value
	Mean	St.dev	Mean	St.dev	Mean	St.dev	
Collateral coverage ratio	0.92	1.51	3.63	2.68	2.67	2.67	-5.97*
Loan size	32,000,000	70,600,000	4,737,643	11,200,000	14,400,000	44,600,000	3.28*
Number of disbursements	2.83	1.26	3.05	1.32	2.97	1.30	-0.89
Expatriate to local employee ratio	0.1190244	2.302119	0.2442667	1.010614	0.2	1.582472	-0.406

*At 1% level of significance.

In project financing, collateral coverage is considered in the credit risk assessment to assess the collateral strength of the project in the case of default. The coverage ratio varies from 0 to 9.99 and 0.25 to7.65 in the case of non-defaulter and defaulter borrowers, respectively. Relatively, the coverage ratio for non-defaulters inclined to one and scattered for defaulter.

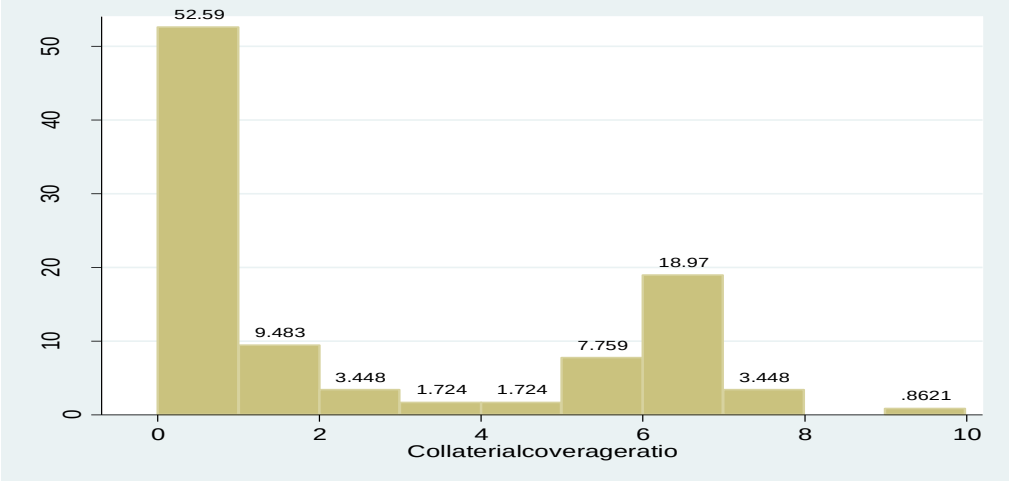

Figure 5 Collateral coverage ratio

In fact, the size of the loan varies with the nature and complexity of the project. Given this fact, the loan size non defaulter projects varies from Birr 7653.32 to Birr 386,000,000, whereas the loan size in defaulter projects varies from Birr 116,842.80 to

Birr 83,800,000. The maximum limit of loan size of defaulter projects is a little bit greater than non-defaulter projects.

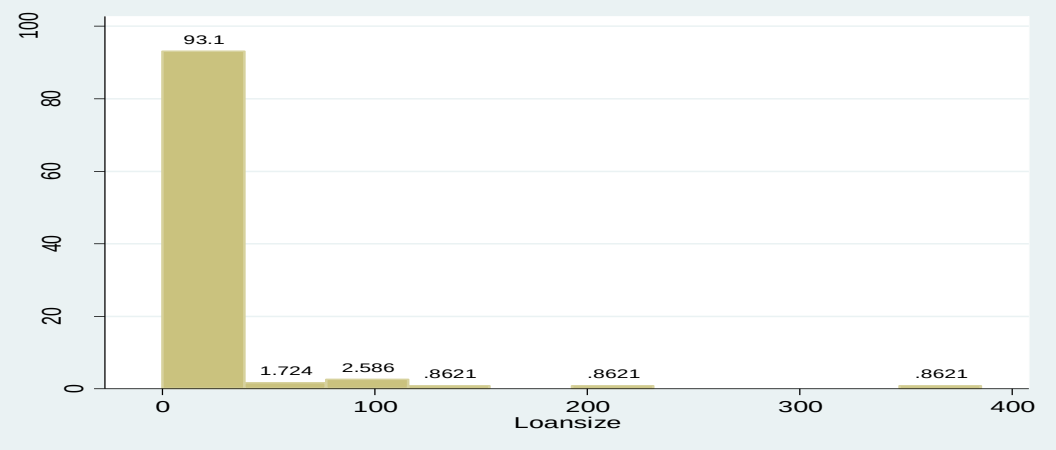

Figure 6 Loan size of the Project

Conceptually, disbursement schedule in project financing bases on the project implementation schedule. Similarly, the number of disbursement schedule varies from one to six numbers of schedules for non-defaulter and defaulter projects.

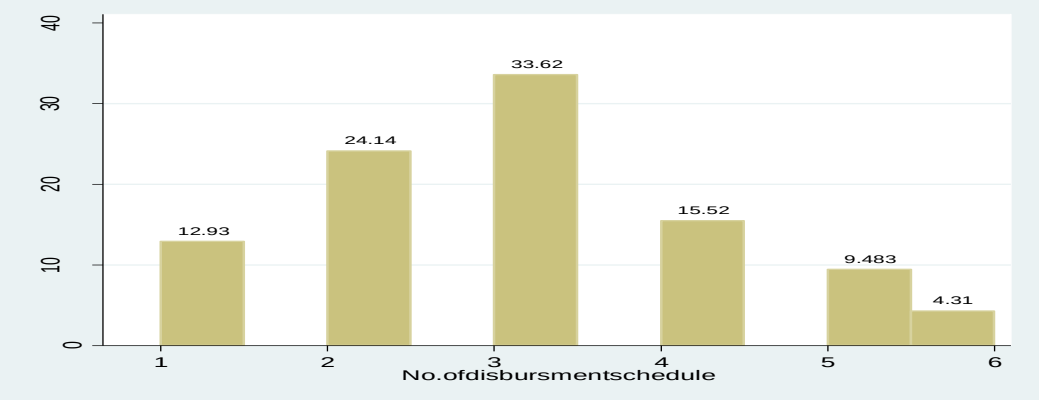

Figure 7 Number of disbursement

The credit policy of DBE stated that there are various loan schemes which are designed to entertain the loan request of the borrowers with various project natures of establishments. In the non-defaulter projects, financing of new loan scheme takes upper hand in project financing of the bank followed by loan buy out and expansion loan, respectively. Unlike to non-defaulter projects, the expansion loan scheme takes the upper hand next to new loan scheme. Provided hypothesis test, the statistical association between various loan schemes and loan repayment performance is insignificance.

Business ventures have various legal backgrounds during formulation: sole proprietorship, private limited company and shareholders. In both loan repayment categories, private limited company has the highest proportion than other legal background, which 26 non defaulted projects and 44 defaulted projects followed by sole proprietorship. This is because PLC has limited liability in the case of default. The statistical association between legal background and loan repayment performance is insignificance.

From the market competition stand of point, projects have their own market strategies and segmentation in terms of market destination. Domestic based projects have highest proportion than other market destination category. Regarding to each classification of market destination, 35 non defaulted projects and 45 defaulted projects avail their product to domestic market and the remaining project offer to other market oriented projects. Moreover, there is statistical association between market destination and loan repayment performance at 1%.

Table 6 Loans characteristics

Discrete Variables	Non defaulter		Defaulter		Total		Chi-square value
	Number	Percentage	Number	Percentage	Number	Percentage	
1. Types of loan							
New Loan	24	58.54	49	65.33	73	62.93	5.1532
Expansion Loan	4	9.76	14	18.67	18	15.52	
Buyout Loan	8	19.51	9	12	17	14.66	
Other Loans	5	12.2	3	4	8	6.9	
Total	41	100	75	100	116	100	
2. Legal Background							
Sole proprietorship	11	26.83	29	38.67	40	34.48	3.721
Private Limited company	26	63.41	44	58.67	70	60.34	
Shareholder	4	9.76	2	2.67	6	5.17	
Total	41	100	75	100	116	100	
3. Market destination							
Export Oriented	1	2.44	13	17.33	14	12.07	8.8784*
Domestic Based	35	85.37	45	60	80	68.97	
Both	5	12.2	17	22.67	22	18.97	
Total	41	100	75	100	116	100	
4. Source of raw materials							
Imported	17	41.46	21	28	38	32.76	2.289
Domestic Based	13	31.71	27	36	40	34348	
Both	11	26.83	27	36	38	32.76	
Total	41	100	75	100	116	34413.52	

*At 1% significance level.

4.2. Econometrics result

4.2.1. Econometric tests

4.2.1.1. The Goodness fit of the Model

Pseudo R2 measures the goodness of logistic model, which lies between zero and one. This statistic will equal zero if all coefficients are zero. It will come close to 1 if the model is very good. In this way, the Pseudo R2 is 0.68. The result shows that the goodness fit of the logistic model is within the acceptable range, which is close to one. Therefore, the loan repayment is correctly explained by the logistic model.

The other ways of assessing "Goodness of Fit" is to assess whether or not the model fits the data is logistic model for loan repayment based on classification table. The logistic model need to correctly predict the each group of loan repayment performance at the probabilities $\geq .50$ as being non-default, otherwise is predicted as probability of defaulters. To this end, the loan repayment performance is correctly predicted at 88.79% by the logistic model.

Provided Pseudo R2 and classification table, the loan repayment performance is well explained by the logistic model, or logistic model is fitted to loan repayment performance.

4.2.1.2. Hetroscedastictiy

Hetroscedastictiy refers to when the variance of the residuals is non-constant. In the existence of hetroscedasticity, the result of the model estimation is distorted. For doing so, the Breusch-Pagan /Cook-Weisberg test for heteroskedasticity is used to explore the existence of the problem considering OLS model assumption in the formulated model. At 1% significance level, there is a statistical significant heteroscedasticity in the variance of the reseals. As correcting mechanism, a robust variance estimates is used to produce

estimators for ordinary data (each observation independent). Once the existence of the problem is checked, robust command is used in stata to correct model.

4.2.1.3. Multicollinearity

When there is a perfect linear relationship among the predictors, the estimates for a regression model cannot be uniquely computed. The term collinearity implies that two variables are near perfect linear combinations of one another. When more than two variables are involved it is often called multicollinearity, although the two terms are often used interchangeably. The primary concern is that as the degree of multicollinearity increases, the regression model estimates of the coefficients become unstable and the standard errors for the coefficients can get wildly inflated.

Variance inflation factor is used after the regression to check for multicollinearity. As a rule of thumb, a variable whose VIF values are greater than 10 may merit further investigation. Tolerance, defined as 1/VIF, is used to check on the degree of collinearity. A tolerance value is lower than 0.1 is comparable to a VIF of 10. It means that the variable could be considered as a linear combination of other independent variables. The computed VIF value of the model is 3.89, which is within the tolerance value range. Likewise, the results of the computation of contingency coefficients reveal that there was no a serious problem of association among discrete variables. For this reason, all of the explanatory variables were included in the final analysis. More specifically, eleven continuous and eleven discrete explanatory variables were used to estimate the logit model. The VIF values for continuous variables and contingency value for discrete variable depicted in Annex II and III, respectively.

4.2.2. Findings and Discussions

Logit fits a logit model for a binary response by maximum likelihood and estimates coefficients of the explanatory variables. Logistic displays estimates as odds ratios. Both

models have the same results as they use the maximum-likelihood estimator. In the model estimation, twenty two explanatory variables are used, of which 11 variables are discrete variable and remaining 11 variables are continuous variables. Based on individual significant test, ten of explanatory variables are statistically significant, remain other variables are constant. From the statistical significant variables, age of the borrowers, regional distribution of the project location (project location of Oromia and Addis Ababa), and ratio expatriates to local employees are statistically significant at 5% significant level. Moreover, education level of the general manger (Secondary school), work experience of the general manager, market destination (Both imported and domestic market destinations) and variation in follow up coverage are the variable statistically significant at 10% significant level. At the end, the remaining variables include loan scheme, collateral values and loan size are statistically significant at 1%. The remaining explanatory variables include ownership background of the general manager, gender of the promoter/general manager, marital status of the promoter/general manager, management type of the general manager, nationality of the promoter/general manager, legal background of the project, credit history of the promoter with other financial institutions, loan processing cycle time, number of disbursement schedule, sources of raw materials and other sources of income are statistically insignificant to the loan repayment performance.

Age of the borrowers is statistical significant and negatively related to loan repayment performance at 5% significance level. The ratio of the probability being defaulter to the probability of being non defaulter is 1.3 to 1 when the age of the borrowers increases by 1 year. Moreover, the partial effect of the age of the borrowers notifies that the probability of being defaulter decreases by 15% when the age of the borrowers increases by 1 year. Vigano (1993), Mengistu (1997), Nagarajan (1997) and Fikirte (2011) agree with this result. It is obvious that when the managers of the project becomes old enough, the responsibility and commitment increases and improves the proper decision making and

problem solving capacity. This directly influences the productivity and production efficiency of the organization and thereby the borrowers enable to serve their debt commitment.

The other borrower's characteristic is the regional distribution of the project location. At 5% significance level, this explanatory variable is statistically significant and has negative relation to the loan repayment performance. Taking one of the regions of the project location, Tigray, the ratio of the probability of being the project location in Oromia and Addis Ababa to the probability of the being the project location is Tigray is 1.01 to 1 and .0007 to 1, respectively. Furthermore, the probability of being defaulter decreases by 0.1% as a result of establishing projects in Addis Ababa city administration and Oromia regional state. It is supported by the empirical study of Belay (2002).

Education level of the general manager is statistical significant and positively related with loan repayment performance at 10% level of significance. Considering primary education as base level variable, the probability of being defaulter to the probability of being non defaulter is 0.48 to 1 when the project is managed by secondary school general manager. Moreover, the probability of being defaulter increases by 64% and 23% resulted from an shift from elementary school of education level to secondary and tertiary level of education, respectively. This result is different from the findings of Abebe (2009), Jemal (2003), Micha'el (2006), Matin (1997), Kashulize (1993), Njioku and Odii (1991), Birhanu (1999), Oladeebo (2008) and Amare (2002), Michael (2006) which noted that education has a positive impact on the repayment performance through increasing awareness of the customer to utilize the loan efficiently In the case of this study, improvement in educational level of the general manger cannot improve the loan repayment performance of the borrowers. The result lies on the nature of the study, the authors considered agricultural loans to small scale farmers, but this study considered industrial project with complicated nature of operation. In the case of the authors, as the magnitude of the projects confined to the individual based activities and takes as work for

life like involve in small farming activities, small scale activities and etc, the repayment of their debt can early improved as the awareness of the borrowers increases. On the contrary, handling of mega projects requires scientific management knowledge linked with relevant experience and management competence.

Work experience of the general manager is statistically significant and positively related with loan repayment performance at 10% significance level. In this way, the ratio of the probability of being defaulter to the probability of non-defaulter is .006 to 1 resulting from an increase in one year work experience. Furthermore, the marginal effect of the variable shows that the probability of being defaulter increases by 98% when a work experience of the general manager increases by one year.

Market destination is a loan related variable affect loan repayment performance. The market destination can be categorized under three: domestic market, export oriented and both market destinations. Market destination, mainly project with domestic market is positively related and statistically insignificant. The other types of market destination is project offer their products to both domestic and export market. In this case, these projects have statistically significant and positively related with loan repayment performance at 10% significance level. Moreover, the probability of defaulter to the probability of non-defaulter is 0.28 to 1 resulting from a project have a marketing strategy of both domestic and export markets relative to totally confined to export market.

Variation in grace period is manipulated by considering actual grace of the project from the grace period determined in the appraisal report. It is statistically significant and negatively related with loan repayment performance at 10% significance level. From odd ratio stand point of view, the probability of being defaulter to the probability of being non defaulter is 0.72 to 1 when actual grace period increase by one year from the grace period stipulated in the appraisal period. Moreover, the marginal effect of the variable shows that the probability of being defaulter increases by 6.4 resulting from an increase in one

year of actual grace period from the grace period scheduled in the appraisal report of the project.

The bank has various loan schemes financing to entertain the different nature of the project. At 1% significance level, Loan scheme of the bank is statistical significant and have inverse relation with loan repayment performance. In the view of odd ratio, the probability of being defaulter to the probability of non-defaulter is 0.00024 to 1 when the bank finances loan buyout relatively to financing of new loan. Moreover, the probability of being defaulter decreases by 0.000054% when the bank finances loan buyout projects relative to new projects.

Collateral coverage ratio is decisive factors in the credit risk assessment in the case of bankruptcy. It is statistically significant and positively related to loan repayment performance at 1% significance level. Similarly, the ratio of the probability of defaulter to the probability of non-defaulter is 9.2 to 1 when there is an increase the share of loan against the collateral value. On the top of this, the probability of being defaulter increases by 2.46 when the share of loan increases over the collateral value. This agrees with the result of Abreham (2002) and Mansoori (2009). The researcher focus on loan repayment performance of DBE's loan to small scale farmers shows that high collateral value leads the borrowers to be non-defaulter. This seems to be ambiguous to integrate with the result of this study, because it considers only the collateral value regardless of the share of loan against it. When the author conducted this study, personal property and asset of the project considered as collateral value which is fixed collateral coverage ratio of 125%. However, this study considers the collateral value of the project limited only to the assets of the project its self without considering the personal property. Accordingly, the collateral coverage varies with the nature and size of the project.

Loan size of the project is the approved loan which includes the investment cost and working capital requirements of the project. It is statistically significant and negatively

related with loan repayment performance at 1% significance level. The ratio of the probability of being defaulter to the probability of non-defaulter is 0.12 to 1 when the approved loan increases by Birr 1. In line with this, the probability of being defaulter decreases by -0.00000059 when the loan amount of the project increases by Birr 0.000000001. This result is inconsistent with the findings of Jemal (2003) and Bekele (2003). If the production capacity of the project can utilize the loan efficiently, it enhances the loan repayment performance. The inconsistency lies on the types and nature of projects. The author considers small holder farmers borrowed for purchasing of agricultural inputs with small loan size. Because, the loan size is determined apparently in line with the market price of the agricultural inputs.

Table 7 Maximum Likelihood Estimate of Logit model for Loan repayment performance

Loan repayment performance	Coefficient & Robust Std. Err.	Odds Ratio	Marginal effects (dy/dx)	[95% Conf.	Interval]
Ownership	.2349212 (3.568756)	1.264809	-.1481314	.0050153	318.9743
Age	-.1320874** (.0514269)	.8762644	-.003865	.7810506	.9830852
Gender	-1.478239 (.3266623)	.228039	-.0664418	.0137618	3.778696
maritalstatus1	.5352702 (2.394177)	1.70791	.0379274	.1094551	26.64978
Management type	.524488 (2.107189)	1.689594	.0969703	.1466223	19.46994
Region (default variable: Tigray)			.0013854		
Amhara	.0479793 (2.060507)	1.049149		.0223406	49.26969
Oromia	-7.185647** (.0022136)	.0007574		2.46e-06	.232859
SNNP	2.580085 (40.39672)	13.19826		.0327486	5319.132
Addis Ababa	-7.192897** (.0020904)	.0007519		3.23e-06	.1748255
Education level (Defaulted variable: primary school)			.0479449		
Edc_secondary school	2.758219*** (25.74177)	15.77173		.6435678	386.5135

Edc_Tertairy school	1.85909 (11.05182)	6.417896		.219582	187.5809
Work experience	.1678826*** (.111311)	1.182798	.0061469	.9835703	1.42238
Nationality	-2.553643 (.1473066)	.0777978	.1003419	.0019022	3.18185
Types of loan (Defaulter variable: New Loan)			-.0132546		
Expansion loan	.3835756 (1.86397)	1.467522		.1217399	17.69035
Loan buyout	-8.336406* (.0007443)	.0002396		5.44e-07	.1055079
Other loans	1.661079 (10.10553)	5.264989		.1223534	226.5578
Legal back ground	2.01889 (9.775076)	7.529961	.0281299	.5912878	95.89292
Credit history of the promoter	-.6724109 (.7854765)	.5104764	.0068182	.0250162	10.41671
Collateral coverage ratio	2.218819* (6.193233)	9.196467	.1243129	2.456921	34.42317
loan size	-1.00e-07* (2.18e-08)	.9999999	-5.94e-09	.9999999	.9999999
Loan processing cycle time	-.0058233 (.0065297)	.9941936	-.0000197	.9814777	1.007074

Loan repayment performance	Coefficient & Robust Std. Err.	Odds Ratio	Marginal effects (dy/dx)	[95% Conf. Interval]	
Number of disbursements	.2278777 (.7916075)	1.255932	-.015178	.3651387	4.319904
Market destination (Default variable: Export oriented)			.1310948		
Domestic based	.2352002 (3.121208)	1.265162		.0100507	159.2561
Both	6.799003*** (3690.939)	896.9522		.2818991	2853940
Source of raw materials (Default variable: Imported)			.0869776		
Domestic based	.6620124 (1.825498)	1.93869		.3061998	12.27472
Both	1.96921 (14.85198)	7.165016		.1232558	416.5116
Variation of grace period	-1.348083*** (.18 47637)	.2597376	.0277914	.0644221	1.047213
Variation in follow up coverage	.1645383 (.2992277)	1.178849	.0218458	.7167988	1.938737
Other sources income	-.0151392 (1.765212)	.9849748	.0195982	.0293734	33.0291

Ratio expatriates to local employees	-18.35195** (7.66e-08)	1.07e-08	-.3395171	8.79e-15	.0130468
_cons	6.371688 (3268.32)	585.0446		.0102801	3.33e+07

Number of obs = 116
Wald chi2(30) = 74.05
Prob > chi2 = 0.0000
Log pseudo likelihood = -24.151841
Pseudo R2 = 0.6795

Note that: *At 1% level of significant
**At 5% level of significant
***At 10% level of significant.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATION

5.1. Conclusion

Based on the research question, this study intends to investigate the determinant factors affecting the loan repayment performance of industrial projects financed by DBE. In line with this objective, the study comes up with statistical significant and functional relations. The model considers 22 explanatory variables, of which 11 variables are statistical, significant and the remaining 11 variables are insignificant. Among the variables, the age of the borrowers, regional distribution of the project locations, ratio of expatriates to local employees, education level of the general manager, work experience of the general manager, both markets destinations (domestic& export), variation in grace period, collateral coverage ratio and loan size of the project were statistically significant and found to be the major determinants of loan repayment performance.

Among the borrower's characteristics, the age of the borrowers is statistically significant and has negative relation with loan repayment performance. This implies that the longer the age of the borrowers, the better the commitment and responsibility, being alter to risks, confined to their work and better work exposure of the old borrowers than young borrowers. Hence, more experienced managers reduce the probability of the project being defaulter. The other borrower's characteristic is the regional distribution of the project locations, mainly Oromia regional state and Addis Ababa city administration relative to Tigray, are statistically significant and positively related to the loan repayment performance. This is mainly due to low production cost resulting from well-established infrastructure and low transportation cost as the locations are found in international market outlets.

The ratio of expatriates to local employees is statistically significant and increase loan repayment performance of the promoters. This is due to the fact that expatriates

contribute significantly for maintaining better operational and financial performance of the business ventures through technology and knowledge transfer. In addition, education level of the general manager is statistical significant and positively related with loan repayment performance. This suggests that general managers with better level of education contribute positively to loan repayment performance. In line with this, work experience of the general manager is statistically significant. This implies that managers need to have related work experience and management capability to make proper decision and solve problem.

Among market destination, projects with both markets destinations (domestic& export) are statistically significant and has positive relation with loan repayment performance. The real phenomenon of the market interaction assures that the markets cannot be distinguished based on their geographical location as the world becomes one village due to globalization. Variation in grace period is also statistically significant and contributed to the positive loan repayment performance. This shows that bank's appraisal report in determination of grace period of the projects should consider practical activities and challenges of the project.

Collateral coverage ratio is statistically significant and positively related to loan repayment performance. In this case, the share of the promoters, which is owner's equity, in the total collateral value, gets diminished and the major share of the asset of the project lies on the hand of the bank. Similarly, loan size of the project is statistically significant and reduces projects from being defaulters. Whenever projects are financed with requirement of the investment, the implementation activities don't get delayed and commence production with uncompleted investment works due to shortage of finance.

Hence, the Development Bank of Ethiopia should focus on the above mentioned determining factors which have significant effect on loan repayment performance in order to enhance its loan collection and reduce the rate of default.

5.2. Recommendation

The following recommendations are given in line with the above concluding remarks which are established based on the objective and findings of the study.

- Business organizations need to have competent management staff, mainly general manager, which has proper decision making capacity on key issues of the organization; install problem solving and risk avert mechanisms to realize better operational and financial performance. In order to maintain management competency as recommended, the bank should also have continuous assessment on management staffs regularly. Moreover, expatriates are also needed for new and projects with sophisticated technology to have better technological competency and knowledge to bring about knowledge transfer and realize cost efficiency and productivity
- In project financing, market competition and technical suitability has played a paramount role in improved operational and financial performance. In this regard, the marketing and technical assessment mechanism or guidelines amend and improve regularly in line with the real challenges of the existing projects. In line with this, need based assessment capacity building programs in improving the credit assessment and enhance the management quality of the staff has to be designed and review regularly.
- The marketing destination of the project bases on the market segmentation of the product. Most of the time, projects offer their products to domestic and export oriented projects with various marketing share if the products are consumed both at domestic and other countries. Once they confirm that their products are consumed at both marketing destination, the bank needs to play its role in leading the borrowers to specialize and exploit optimally the marketing share in one of the

market destination, either the domestic or export market through correcting during appraisal viability checking.

- In the appraisal report of the bank, the length of grace period of the projects depends on the time allocation and magnitude of activities set for each implementation activities of the project. Therefore, the bank needs to improve its planning quality based on the implementation schedule of the similar project so far implemented and apply recommended software in proper allocation of time for each implementation activities.
- The existing projects relatively have better production efficiency and marketing strategy. On the other hand, newly established projects get difficult to compete and penetrate the market. In the way, the banks needs to have a proper market viability checking mechanism giving more focus based on qualitative market assessment beyond focusing on value based market assessment mechanism.
- The more the share of the loan in the collateral value, the more the confidence of the promoter to be strategic defaulter is. Therefore, the bank needs to have a control mechanism of collateral coverage ratio and protect the strategic defaulters.
- Proper loan size determination without under and above project investment requirements makes the project implementation more successful at the stipulated period of time. With regarding to improving its loan determination quality, the bank needs to update the parameters and unit price and collateral manual regularly considering the prevailing cost installation.

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ANNEX

Annex I

Questionnaire

1. BORROWER'S CHARACTERISTICS

1.1. **Address**

- Region _____ Zone _____
- Woreda _____ Town _____
- Kebele _____
- Age _____Years

1.2. Sex (Female or Male) _____

1.3. Marital Status

a. Single
b. Married
c. Divorced
d. Widowed

1.4. Education level (E.g. 8th grade, 10th grade, Bachelor Degree, Masters degree & so on): ____

1.5. How many years of experience does he/she have?

a. Related years of experience _____
b. Non-related years of experience _____

1.6. Nationality of the borrower

a. Ethiopian
b. Foreigner

1.7. Number of shareholders (if the project is PLC & share company) _____

2. LOAN UTILIZATION

2.1. What is the Type of loan?

a. New
b. Expansion
c. Buyout
d. Special working capital
e. Others _____

2.2. What is ownership background of the project?

a. Government owned
b. Private owned

2.3. State the Loan classification & amount of money in arrears as at December 31, 2012?

2 Loan classification Amount of money in arrears (Birr)

3 Principal Interest

a. Pass _____ _____

b. Special Mention _____ _____

c. Substandard _____ _____

d. Doubtful _____ _____

e. Loss _____ _____

2.4. State forms of business type?

a. Sole proprietorship
b. Private limited company
c. Share Company
d. Others _____

2.5. Does it have credit relation with other bank? 1. Yes____ 0. No_____

2.6. If the answer "yes", what was the loan status of the borrower (shareholders) in other bank:

a. Defaulter_____
b. Non-defaulter _____

2.7. Could you please figure out the amount of loan collection as at December 31, 2012?

a. Amount of principal (Birr) _____
b. Amount of interest payment (Birr) _____

2.8. Collateral value: Birr _____

2.9. Amount of equity contribution: Birr _____

2.10. Was the owners' equity contributed in cash or in kind?

a. In cash
b. In kind
c. Both

2.11. What is the amount of loan requested? Birr _____

2.12. State the approved amount of money? Birr _____

2.13. How many numbers of days did it take from loan application to loan approval?

a. Date of loan application _____
b. Date of loan approval _____

2.14. The total number of repayment installments starting from principal payment up to the end? _____

2.15. Amount of principal amount of payment at each repayment installments (if the similar repayment amount is determined at each installment): Birr _____

2.16. At what bases of repayment installment are scheduled?

a. Quarterly (Every three months)
b. Every four months
c. Every six months (bi-annum)
d. Others _____

2.17. How many number of disbursement schedules does the project had?

b. 1 disbursement schedule
c. 2 disbursements schedules
d. 3 disbursement schedules
e. 4 disbursement schedules
f. 5 disbursement schedules

2.18. Could please state the amount of disbursement in each disbursement schedule? (Refer loan contract)

4	Disbursement schedules	Amount of disbursement	
		Equity	Bank loan
a.	1st disbursement	_____	_____
b.	2nd disbursement	_____	_____
c.	3rd disbursement	_____	_____
d.	4th disbursement	_____	_____
e.	5th disbursement	_____	_____

2.19. How long grace period is given for the project? _____

S.N	Sources	Income
1		
2		

2.20. How many Number of operational follow-up been carried by the bank? ____

2.21. **Does the project/owner/ has other source of income? 1. Yes_____ 0. No_____**

5

2.22. If you answer is yes,

2.23. Specify the source and amount of income per annum

2.24. How much amount of money the borrower paid from this source of income? _____

2.25. State the disbursed loan amount of money as at December 31, 2012? Birr _____

3. MARKET AND TECHNICAL ASPECTS

3.1. Where does the project would it sale its products and market share?

6 Market type Market Ratio (%)

a. Export market _____

b. Domestic market _____

c. Both

3.2. Could you please state the installed and actual production capacity of the project?

S.N	Product category	Installed production capacity	Actual production capacity
1			
2			
3			
4			

3.3. State purchasing sources of raw materials? (It is only for major raw materials)

a. Imported
b. Domestic
c. Both

3.4. How long on average time it takes the raw materials to arrive at the project site from the date of purchase order (In month)?

c. Domestic raw materials _____
d. Imported raw materials _____

4. MANAGEMENT AND EMPLOYEE ASPECTS

4.1. Who is the general manager of the project?

7 a. Employed

8 b. Owner

4.2. What is the educational level of the general manager? (E.g. 8th grade, 10th grade, Bachelor Degree, Masters Degree & so on): _____

4.3. How many years of experience does he/she have?

a. Related years of experience _____

b. Non-related years of experience _____

4.4. Categorize the employees of the project such as expatriate and local employees?

a. Number of expatriates _____

c. Number of local employee's _____

Annex II

VIF values for continues variable

Variable	VIF	1/VIF
Age of the Borrower	11.31	0.088387
Number of disbursements	5.83	0.171669
work experience	5.48	0.182512
Loan processing cycle time	4.94	0.202345
collateral coverage ratio	2.18	0.459131
variation in grace period	1.56	0.640819
variation in follow-up coverage	1.3	0.768607
loan size	1.29	0.77311
Ratio expatriates to local employees	1.12	0.890478
Mean VIF	**3.89**	

Annex III

Contingence coefficient for discrete variables

Variables	Region	Ownership	Marital status	Management type	Education	Legal background	credit history of the promoter	Nationality	Market destination	Source of raw materials	Other sources of Income
Gender	0.1405	0.0126	-0.1038	-0.17	0.0353	0.0911	0.0044	-0.1441	-0.0277	0.0246	0.0919
Region		-0.0192	-0.0733	-0.1253	0.0218	-0.0161	0.0273	-0.1268	0.1512	0.0975	0.1478
Ownership			-0.0543	0.1174	0.042	0.1683	0.134	-0.2122	-0.0131	0.0831	-0.0285
Marital status				-0.1593	0.0516	-0.134	0.1172	0.067	-0.0034	0.0008	-0.2197
Management type					-0.0313	0.0087	-0.0815	0.0302	-0.0055	0.1623	-0.0815
Education						0.0581	0.0934	-0.0936	0.0579	0.0451	-0.0801
Legal background							0.0034	-0.1098	-0.0901	-0.0175	0.012
credit history of the promoter								0.1473	0.025	0.1638	-0.1716
Nationality									-0.0413	-0.114	-0.09
Market destination										-0.0744	0.1507
Source of raw materials											-0.1157

Annex IV

Logistic model for loan repayment performance

Classified	D (True)	~D (True)	Total
+	68	6	74
-	7	35	42
Total	75	41	116

Classified + if predicted Pr (D) >= .5

True D defined as loan repayment performance! = 0

Sensitivity	Pr (+| D)	90.67%
Specificity	Pr (-|~D)	85.37%
Positive predictive value	Pr (D| +)	91.89%
Negative predictive value	Pr (~D| -)	83.33%
False + rate for true ~D	Pr (+|~D)	14.63%
False - rate for true D	Pr (-| D)	9.33%
False + rate for classified +	Pr (~D| +)	8.11%
False - rate for classified -	Pr (D| -)	16.67%
Correctly classified		88.79%