



ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF MANAGEMENT

**LOAN REPAYMENT DETERMINANT: THE CASE OF DEVELOPMENT
BANK OF ETHIOPIA**

BY

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JUNE, 2020

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BANK OF ETHIOPIA**

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BY

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DECLARATION

I the undersigned, declare this thesis is my original work and all sources of materials used for the thesis have been fully acknowledged. Also I confirm that the thesis has not been submitted in full to any other higher learning institutions for the purpose of awarding any degree.

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ACRONYMS

DBE: Development Bank of Ethiopia
NBE: National Bank of Ethiopia
IR: Interest Rate
PR: Principal Repayment
LPT: Loan Processing Time
PIP: Project Implementation Period
PM: Project Management
LAG: Loan Amount
BEB: Business Experience of Borrowers
ELB: Educational Level of Borrowers
LRP: Loan Repayment Period
PF: Project Follow-up
GDP: Gross Domestic Product
NPL: Non-performing loan
DER: Debt-to-Equity Ratio
BSC: Balanced Score Card
SMEs: Small and Medium- Sized Enterprises
AM: Accessibility of Market
TA: Technology Adoption
GP: Grace Period
KBR: Keeping Book of Records
LRD: Loan Repayment Determinants
LR: Loan Repayment
CFO: Chief Financial Officer
NPV: Net Present Value
BOM: Board of Management
PFEA: Public Financial Enterprise Agency
ACSI: Addis Credit and Saving Institution

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ABSTRACT

Development Bank of Ethiopia plays vital role in supporting the national development agenda by providing loan to viable projects. The study assessed Development Bank of Ethiopia borrower's loan repayment determinants in the project financing scheme. The study employed explanatory research design and quantitative research approach. Both primary and secondary data was collected from 131 projects financed from January 2012 G.C to June 2018 G.C. Primary data was collected from respective contact officers through questionnaires while secondary data collected from each individual files and from data base of the bank. The total population was 131, of which 95 (73%) were non-defaulters and 36(27%) were defaulters borrowers. The variables considered in the study were loan amount, number of project follow-up(per year), loan repayment period, educational level of borrowers/general manager, business experience of borrowers/general manager, accessibility of market for product, grace period, technological adoption, keeping of book of records and interest rate. In the study, Logit regression model was employed to assess factors of loan repayment determinants of borrower's. The study exposed that loan amount, borrower's educational level and its business experience, loan repayment period, market accessibility, grace period and number of project follow-up are statistically significant factors of loan repayment determinants of Development Bank of Ethiopia borrower's in the project financing scheme. Thus, it is recommended the bank needs to focus on seriously evaluating loan request of the client and evaluate the purpose of the loan, made serious appraisal study and make sure the loan amount is enough for the project establishment, requites and gives priority for those educated and experienced customer , conduct continues and regular follow up, grant longer repayment period for its borrower to lessen the periodic repayment, provide longer grace period to start production and marketing of its borrower , and study market destination of its borrower's product before signed a loan contract agreement.

Key words: Logit model, Defaulter, Repayment, DBE

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

Financial sectors play a critical role for the growth and development of a country. Bank is a financial institutions plays as an intermediation function by mobilizing money from those who have excess fund and lend it to others who need it for their investment. Banks contribute to the growth of economy by providing credit to borrowers and ensuring money availability in the economy that used for productive and fertile project purpose , and also stimulate the economy as well (Ayele, 2016). To strengthen this idea, banks are the principal sources of credit and facilitators of financial transactions in nations' economies that it pool resources together for projects that are too large for individual shareholders to undertake (Ampratwum, 2015). Moreover, banking industry is a diverse business, fulfilling the finance needs of both consumers and corporations (Walter Bialas, Christian Beaudoin and Geno Coradini, 2017).

Fabio Schiantarelli, Massimiliano Stacchiniy and Philip E. Strahan (2016), claimed that safest borrowers delay loan repayment to weaken the banks because of weak enforcement of creditor and this exposure leads the bank to loss by impair its stability. On the other side, Toni Beutler, Robert Bichsel, Adrian Bruhin and Jayson Danton (2017), stated that banks are exposed to adverse movements as interest rate raises because of the value of assets decreases more than the value of liabilities. Beside this, Rozina Akter and Jewel Kumar Roy (2017), by its study suggested the state that loan causes problems are : (1)lending banks are ambitiously lend large size loans to overpower the competitors, (2) provide loans beyond the repayment capacity of the borrower sanction and loans without adequate collateral, (3)accepting overvalued collaterals in excess of market price, (4) repayment plan are not clear or not stated on the face of the note, (5) failure to receive borrower's financial statement, (6)inadequate professionally capable persons to handle loan cases, and(7) loan to a new business with inexperienced owner and disbursement of funds before documentation finished.

To cover risk of loan default and reduce non performing loans burden, banks needs to establish a proper and effective loan repayment environment (Dr AAJ Fernando & HH Dedunu, 2017). On the other hand, Daru (2016), suggested that banks needs monitoring their standard asset regularly and properly managing of NPLs before turn into non-performing loans. Rozina Akter & Jewel Kumar Roy (2017, also suggested banks should regularly revised its lending policy because it

has crucial influence on non-performing loans and advised to implement effective monitoring and supervision reduce the level of nonperforming loans.

Development bank of Ethiopia was established in 1909 G.C and is one of the financial institutions engaged in providing short, medium and long term development credits in the country. DBE is a specialized institution and distinguished form other banks operating in Ethiopia is due to its feature of project based lending tradition. Project financed by the bank is carefully selected and prepared through appraised, closely supervised and systematically evaluated and, the term of loans is determined based on the specific needs and requirements of projects (DBE, 2015). Currently, bank encompasses the board of directors and the president at the top; five vice presidents, thirty directorates, two offices, twelve district offices and one hundred ten branches. Due to the lending policy of the bank and its approach on project collateral based only, it faced deferent problems through its operational years.

As per the Bank's annual operational budget plan adopted by BOM and PFEA, and annual report for the last the five year performance report shows that the NPL ratio increase from year to year. The actual NPL ratio for the fiscal year 2014/15, 2015/16, 2016/17, 2017/18, 2018/19 was 12.54%, 17.71%, 24.98%, 39.43%, and 33.91% respectively and in 2019/2020 fiscal year (for six) reported NPL ratio was 34%.

Table 1.1. Planned and actual performance of the bank for last five operational years

in Billion

Loan Activities (in Birr)	Fiscal Year												
	2014/15	2015/16			2016/17			2017/18			2018/19		
	Actual	Plan	Actual	Perf. (%)	Plan	Actual	Perf. (%)	Plan	Actual	Perf. (%)	Plan	Actual	Perf. (%)
Approval	9.69	14.82	11.84	80%	18.78	12.08	64%	9.91	13.10	132%	12.76	11.88	93%
Disbursement	6.69	13.54	6.34	47%	14.08	5.38	38%	6.47	7.07	109%	7.80	10.68	137%
Collection	3.9	5.79	3.85	67%	6.00	4.51	75%	5.69	4.84	85%	6.93	4.93	71%
Loan Outstanding	27.36	38.61	31.63	82%	42.64	33.82	80%	40.54	39.16	97%	41.78	47.58	114%
N.P Loans	3.43	3.65	5.60	153.53%	4.14	8.45	203.88%	6.88	15.44	224.41%	6.58	16.14	245.13%
NPL Ratio	12.54%	9.45%	17.71%	53.36%	9.76%	24.98%	39.07%	16.97%	39.43%	43.04%	15.76%	33.91%	46.48%

In contrary, the non performing loan ratio of commercial Bank of Ethiopia is below the national acceptable level and it was 2.5%, 2.8% and 3.4 % in the year 2016, 2017 and 2018 respectively (<https://www.combanketh.et/AboutUs/FactsandFigures.aspx>, 2020) While the average of NPL ratio for private bank in Ethiopia is range from 2-4% (Analytics, May 30,2019). The summarized over all average non performing loans ratio of all banks in Africa was 8.72% ,9.53%, 11.46% , 11.93% and 11.9% for the year 2014, 2015, 2016, 2017 and 2018 respectively (<https://www.theglobaleconomy.com/Ethiopia/Nonperformingloans/>).

The low performance of the DBE was, the increasing trend of NPLs were loan diversion and lack of willingness to repay loans by borrowers, unwillingness of project owners/ general managers to deliver real data while conducting management intervention, increasing trend of loan approval to borrowers without duly analysis/ aggressively lending, controlling staff intervention is not deepened, lack of regular and problem solving follow-up even to those huge and influential projects. Low level of repayment performance of the borrowers and high NPLs leads to reduction of the profitability of the bank. Moreover, it hinders economic growth of the country by weakening the credit supply of lending institutions.

1.2. Statement of the Problem

Development Bank of Ethiopia is a specialized financial institution established to promote the national development agenda through development finance and close technical support to viable projects for the priority area sectors given by the government by mobilizing fund from domestic and foreign sources. DBE's main area of focus is provision of working capital, medium and long-term loans for priority areas investment projects and currently machinery lease (Lease Financing) for small and medium enterprises. The Bank's vision is "100% success for all financed projects by 2020." However, the annual performance report for the last five operational years shows that projects financed by the bank with huge loan portfolio faces different challenges and have direct impact on the operational performance as well the attainment of the vision of the Bank.

These different challenges of the projects hinder the bank not to collect the amount of loan from its customers /borrowers as per the schedule and create uncertainty for the achievement of its vision by 2020. Thus, these challenges contribute a lot to fail in collection, un-attainment of its vision, and corrective measures are required to be before hinders the banks sustainability. NBE's directives No.SBB/43/2008 clearly indicated that the acceptable level of NPL is below 5% for all banks operating in the country. However, the bank(i.e; DBE) actually reported NPL ratio for the last five years was 12.5%, 17.71%, 24.98%, 39.43% and 33.91% for 2014/15,2015/16,2016/17,2017/18 and 2018/19 operational years respectively and 34% for the first six months of 2019/2020 fiscal year. In addition, the bank registered a loss of birr 763 million birr in the fiscal year 2018/19.

The above fact indicated that the bank faced problem of collecting its loan as per the loan contract agreement entered with its borrowers, clearly shown that there are factors that holds projects or borrowers unable to meet its debit obligation on time and, cause for dalliance of repayment and borrowers incurring unnecessary penalty interest rate.

Therefore, the question is that:

- What are the reasons that the bank unable or weaken to collect the due loan as per the predetermined contract agreement? and
- What are the reasons or causes for the continuous increment of NPLs in the Bank?

The above mentioned evidences motivated the researcher to identify and analyzed the major factors that determine loan repayment of Development Bank of Ethiopia borrowers, and

suggested a mechanisms how to reduce NPL and achieve better financial performance in the bank.

1.3. Research Objective

1.3.1. General Objective

The main objective of the study is to analyze and identify the major determinants/factors of loan repayment of Development Bank of Ethiopia financed projects or borrowers.

1.3.2. Specific Objectives

The specific objectives of the study:

- To identify the major determinants that holds borrowers from timely repayment obligations.
- To analyze the financing institution (lender) side factors that affect loan repayment of borrowers.
- To identify the projects factors that influences the loan repayment of borrowers.
- To identify borrowers factor that affects the its loan repayment performance
- To suggest mechanisms how to reduce NPLs and achieve better financial performance

1.4. Significance of the Study

Development bank of Ethiopia is a specialized government owned bank. Due to its project base lending practice the bank faced different risks and challenges throughout its operation years. Currently, different experts see DBE's mounting non-performing loans (NPLs) could be behind the bank's caution in its lending drive and judging by the decline in income and earned interest. According to the bank's annual report for the fiscal year 2018/19, the loan outstanding balance was 47.58 billion birr and the non performing loans was 16.14 billion birr and the NPL ratio was 33.91% which shows the bank face difficulty in loan management and collection due to its borrower didn't repay their debit obligation on time. Thus, affects the bank's profitability, supporting the national development of the country and more importantly put in question of its sustainability. So, analyzing the factors and demonstrate proper solutions for the problem are urgent for sustaining the bank and for the country as well. Accordingly, form this research finding;

- The top management of the bank didn't approved a loan unless properly checking of the due diligence assessment report, appraisal study/finding, technical evaluation of the Performa invoices and other collateral items budget allotted.

- It helps to managers or credit officers to know the problems of low performance of the bank's loan collection rate and it also reminds to increase the frequency of project follow-up at every stage of the project implementation.
- Policy makers can use a sources of inputs while formulating or revising the current credit policy and loan manual of the bank
- Helps other researchers to obtain new knowledge , provides new ways of thinking and stimulate them to study further
- At the end, the study findings might be used by the bank's staff as a sources document for further activities in reduction of the current NPLs by scaling up their best practices and achieving better financial results.

1.5. Scope of the Study

The study has been focused or encircled on Development Bank of Ethiopia borrowers from January 2012 G.C to June 2018 G.C and those borrowers granted a loan of birr 30 million and above on factors that affects loan repayment. The main aim of research scope bounded by time and the amount of loan granted is due to accessibility of relevant and, well organized and recorded data at the institution. The researcher also bound the time is that the NPL ratio of the bank aggressively increases for the last five to seven years according to bank's report. On the other hand, the loan amount i.e 30 million and above bound is due to the increasing of project loan portfolio and those borrowers took the lion share (90%) of the total loan portfolio of the bank (DBE, 2018). Thus, the scope of the study has restricted to borrowers of Development Bank of Ethiopia whose approved loan is 30 million birr and above in all economic sectors.

1.6. Limitation of the Study

The study was limited to specific factor related to bank, borrower and project related factors which affects determinants of loan repayment of borrowers. The study doesn't included/considered factors like political factor, socio-economic factors and environmental factors which tangibly affect loan repayment of borrowers due to budget constraints. The study also excluded machinery lease (lease financing) since they were introduced after 2016 G.C, and has no sufficient data. Hence, the study covered the repayment determinant aspect of Development Bank of Ethiopia borrowers' granted or borrowed 30 million and above from January 2012 to June 2018 focused on explanatory variable/ independent variables like loan amount, number of project follow-up, loan repayment period, business experience of borrowers, accessibility of market for output , grace period, technological adoption, keeping of book of records , educational level of borrowers and interest rate associated with loan repayment.

1.7. Organization of the Study

The paper was organized into five chapters. The first chapter discusses about the background of the study, statement of the problems, objectives, hypothesis, scope, limitation, significance and organization of the study. Chapter two deals with review of the related literature and chapter three concern with the methodology utilized in the study. Chapter four deals with results and discussion is presented. Finally, chapter five constitute the summary, conclusion and recommendation of the study.

1.8. Definition of Terms

A bank loan is a form of credit extended for a specified period of time with fixed interest and with principal loan installment repaid either in regular basis or in full on the appointed redemption date (Dr AAJ Fernando & HH Dedunu ,2017). On the other hand, NBE Proclamation No. 592/2008 and Directive No.SBB/43/2008; stated that loans and advances are a financial assets of a bank arising from a direct or indirect advance (i.e. participation in a loan syndication, the purchase of loan from another lender etc) or commitment to advance funds by a bank to a person that are conditioned on the obligation of the person to repay the funds, either on a specified date or on demand, usually with interest. The proclamation further underlines the term must includes a contractual obligation of a bank to advance funds to or on behalf of a person, claim evidenced by a lease of financing transaction in which the bank is a lesser, and an over draft facility to be funded by the bank on behalf of a person. However, the term does not include accrued but uncollected interest or discounted interest. More over, loan and advances constitute the primary source of income for banks and the amount of money someone borrow from a financial institution for business establishment seeks to maximize its profits through loans since it entail profitability tendencies than any other assets (Ampratwum ,2015).

The Development Bank of Ethiopia (DBE) is a specialized financial institution established to promote the national development agenda through development finance and close technical support to viable projects for the priority areas sectors by mobilizing fund from domestic and foreign sources. The Bank earnestly believes that these highly valued objectives can best be served through continuous capacity building, customer focus and concern to the wider environment (www.dbe.com.et). It provides medium and long term, managed fund, co-financing or syndicating financing ,guarantee service and lease financing for Ethiopian and foreign nationals since 1909 G.C.

Interest rate (IR) is the amount that the borrower must pay to the lender and expressed as the percentage of the total amount of the funds borrowed and it is a measure of the cost for the borrowing. According to Benard (2011), bank interest rates are rewards expected by the lenders (bank) for the period the borrower spends using the borrowed funds and it is the time value of money for the funds granted to borrowers in a specific period of time. Higher interest margin on a risky loan reflect the increased risk of non-payment while a higher discount rate offset the higher interest margin on the loan cash flows in guiding the bank's lending decision (Fikadu Gutu, Wondaferahu Mulugeta & Belay Birlie, 2017). On the other hand, the higher lending rates of interest is the larger burden placed on the borrower to service his or her loans and lower interest rates contribute to enhancing the capacities of borrowers to service their loans out of their business revenue and thereby help to alleviate credit risk (Tumusiime-Mutebile, 2017).

Loan Disbursement: is the payment of money from a fund or account. Disbursement is actual transfer of funds or actual act of giving money (DBE, 2018).

Loan collected: is the process of pursuing payments of debts owed by individuals or businesses (DBE, 2018).

Project Follow-up: is a general process for controlling and monitoring status of project work to ensure that the project is performed on schedule, within budget and as per requirements. It uses feedback on costs, schedules, requirements, employee performance, and other critical factors to determine project success (DBE, 2018).

Principal Repayment (PR): is part of money goes to paying off the principal repayment. It is also the act of taking back the money one has borrowed from a financial institution.

Delinquency: delinquency occurs 1 day after a scheduled payment on a loan is not fully paid.

Grace Period: A grace period is a time in a project's life when a borrower may not be required to make principal loan repayment. The bank sets grace period for principal loan repayment based on the time required for project implementation, commencement of operation and generation of cash. Such grace period, however, shall not exceed a maximum six for tree fruits and five years for all others (DBE, 2018).

Outstanding Balance: is the outstanding balance can consist of principal, interest, or both owed by the borrower. The principal diminishes over time, as does the total outstanding balance, if sufficient payments are made to also cover interest due. If insufficient or no payments are made, interest can increase the total outstanding balance over time (DBE, 2018).

Loan classification: As per NBE Directives: No 52/2012 project loan are classified as:

- Pass Loan: Any loan pas due less than 180 days
- Special Mention Loan: Any loan pas due between 180 days but less than 365 days
- Substandard Loan: any loan pas due between 365 days but less than 545 days.
- Doubtful Loans: any loan pas due between 545 days but less than 1095 days:
- Loss: any loan pas due above 1095 days:

Basing NBE Directives: No 52/2012, Development Bank of Ethiopia classified its loan into two as stated in the 2018 revised credit policy of the bank;

Performing loans:

- Pass Loan: Any loan pass due less than 180 days
- Special Mention Loan: Any loan pass due between 180 days but less than 365 days
- Substandard Loan: any loan passes due between 365 days but less than 545 days.

Default Loans:

- Doubtful Loans: any loan pass due between 545 days but less than 1095 days:
- Loss: any loan pass due above 1095 days:

Project: is a temporary endeavor designed to produce a unique product, service or result with a defined beginning and end (usually time-constrained, and often constrained by funding or staffing) undertaken to meet unique goals and objectives, typically to bring about beneficial change or added value. The temporary nature of projects stands in contrast with business as usual (or operations), which are repetitive, permanent, or semi-permanent functional activities to produce products or services (DBE, 2018).

Repayment Period (RP): is the act of paying back money previously borrowed from a lender or the return of funds happens through periodic payments which include both principal and interest (DBE, 2018).

Product: A product is the item offered for sale. A product can be a service or an item. It can be physical or in virtual or cyber form. Every product is made at a cost and each is sold at a price. The price that can be charged depends on the market, the quality, the marketing and the segment that is targeted (<https://economictimes.indiatimes.com>).

Accessibility: is the practice of making your websites usable by as many people as possible. The practice of making sites accessible also benefits other groups such as those using mobile devices, or those with slow network connections.

CHAPTER TWO

LITERATURE REVIEW

2.1. Loan Repayment Determinant

Loan repayment is determined by characteristics of the borrowers, businesses characteristics and characteristics of the lending institutions.

Determinant of loan repayment of borrower are:

(i)Loan Amount (LA): loan amount is the borrower granted has positive impact on the borrower's repayment capacity. The higher the total loan received by the borrowers, the higher probability of borrowers to pay their loan on time, and it is because the borrowers have enough funds to finance their business makes them get more profit and increase their business (Osman Yibrie and Prof. R. Ramakrishna, 2017).

(ii)Interest rate: interest rate has a great influence on the loan repayment performance. An increase in interest rates on credit facilities advanced to the borrowers is likely to deter them from servicing their loans according to the agreed terms and conditions (M.W. Kariuki and S. Ngahu, 2016). Higher interest rate has an impact on loan repayment and has negative relationship between interest rate charged on loan and loan repayment (Ali Othman Abbas, 2017).

(iii)Business Experience of Borrowers (BEB): A business run by an experienced person has an effect on the loan repayment performance. The risk of failure is less, when the business operated by experienced person than those who have just started and the more the number of years in a business; the better would be the loan repayment performance of borrower (Osman Yibrie and Prof. R. Ramakrishna, 2017).

(iv)Educational Level of Borrowers (ELB): borrower perception determines loan repayment performance. Non defaulter's benefits freedom of penalty, building of good relationship with the loan provider while defaulters reasoning low supervision of loan officers of the institution and personal problems of the borrowers for default (O.Ombongi, 2015). Educational level is an important element that has a positive impact on a small-scale entrepreneur's demand for credit. Micro and small enterprise operators with higher education level, accounting knowledge, better business management skills, and capability of absorption and adoption of technology give added advantage when it comes to credit borrowing (Neema Mori, Thadei Nyantori and Donath Olomi, 2016).

(v) Loan Repayment Period (LRP): determines of loan repayment of the clients/borrowers/. The longer repayment period can be disadvantageous to borrowers which mean that a borrower might be tempted to spend higher net income in the early months of the loan (Osman Yibrie and Prof. R. Ramakrishna, 2017).

(vi) Project Follow-up (PF): effective ways of monitoring borrower's loan portfolios helps borrows to reduce the high loan delinquency and default rates (Neema Mori, Thadei Nyantori and Donath Olomi, 2016).

(vii) Accessibility of Market (AM): accessibility of market for output products has highly influenced on successful loan repayment performances of borrowers (Ayele Shirga, 2016). In addition to this, Garomsa (2017), indicated market demand decreases, defaulters were increasing, which implies on the other way creditworthy borrowers were increasing as market demand for the product increases.

(viii) Technology Adoption (TA): Adopting technology while running the business enables borrowers to get successful business which in turn could enhance borrower's repayment performances (Sisay, 2018). In addition to these he also claimed enterprises and individual entrepreneurs who have employed a modern technology while running their respective businesses could have high possibility of success which in turn enables them to repay the loan timely. On the contrary, borrowers who have not employed the best technology could earn less profit as compared to others (Garomsa, 2017).

(ix) Keeping a Book of Records (KBR): borrowers who kept a book of records for their financial transactions were non-defaulters while the others who were not kept a book of records were defaulter (Sisay, 2018). Likewise, borrower's trends of recording the financial transaction to book of records to monitor and evaluate the profitability and financial position of their respective businesses and, thus borrowers who manage their expenses and revenues as well as cash flows could probably better monitor their loan repayment status than none (Garomsa, 2017).

(x) Grace Period (GP): Grace period is the period given by the financial institution to the borrower before the first installment is due. In other words, it is considered to be the time between when the loan was disbursed to the loan applicant and when the first installment is paid. Businesses get enough grace period and have never experienced problem of default or borrowers who get enough grace period are non defaulters (Makorere, 2014).

2.2. Effect of Interest Rates on Bank Lending

Interest rate increase affects the volume of loans offered by the banking system. One element in this process is the deterioration in borrower's balance sheets. Bundesbank(2017), stated on his research that the rising of interest rates and falling asset prices have a negative impact on businesses cash flow by reducing the demand for goods. Additionally he claimed, declining collateral valuations and a valuation related decline in bank capital worsens their refinancing conditions and has a direct effect on credit supply. On the other hand, Neema Mori, Thadei Nyantori and Donath Olomi (2016) and Claessens, Stijn, Nicholas Coleman, and Michael Donnelly(2017), on their respective researches arrived on higher interest rates have a counterproductive effect on the lender's profits because of the adverse and moral effects on the borrower's incentives and interest rate increase reduce risk appetite of bank and low interest rate reduces banks profitability.

2.3. Effect of Interest Rates on Loan Repayment

According to Edakasi S Apunyo Benard (2011), the level of interest rates has a direct effect on a consumer's ability to repay a loan. He also arrived a conclusion that, when interest rates are low people are willing to borrow because they find it relatively easy to repay their debt. In the other side he alsostated that when interest rates are high people are reluctant to borrow because repayments on loans cost more, and when interest rates rise sharply and stay high for a long period borrowers will default on their loans. Neema Mori, Thadei Nyantori and Donath Olomi (2016), strengthen the finding of Edakasi S ApunyoBenard (2011) that an increase in interest rates affects the behavior of borrowers negatively by reducing their incentive to take actions conducive to repaying their loans.

2.4. Repayment Performance of Clients

According to Osman Yibrieand Prof. R. Ramakrishna (2017), repayment level or performance of clients classified into three categories: (1) paid on time for the clients who repaid loan before the due date (2) delinquency for clients who repaid late from the due date or repaid less than the appropriate amount of their most recent loan and (3) default for the clients who did not pay after three months of the due date, thus the main problem of the poor performance of financial institutions in many developing countries is high rate of non-repayment of loan.

2.5. Effect of Nonperforming Loan on GDP

Francis Ampratwum(2015), claimed that nonperforming loans involve loans with uncertain cash flow streams which is unrecognized by banks until the receipt of cash and has lower interest rate, and it arise from the loans and advances which are given by banks to different projects. According to Wesley Manono Abugah, Dr. Nyagol Michael and Dr. Fredrick Odoyo (2017), GDP growth is inversely related to NPLs that an improvement in the real economy translates into lower NPLs.

2.6. Theory

2.6.1. Theory of Project Management

The project management books states that projects are composed of project management process and product oriented process. The theory of project is provided by the transformation view on operations. In the transformation view, a project is conceptualized as a transformation of project inputs to products or consumable outputs. This project management principles suggested decomposing the total transformation hierarchically into smaller transformation, task and minimizing the cost of each task independently. According to Koskela and Howell (2002), that management at the operations level is consists of the creation, revision and implementation of plans and has strong causal connection between the actions of management and outcomes of the organization. The theory further stated that the management role is to integrate resources and tasks to achieve goals and objectives of an organization. Theory of project management views a strong causal connection between the actions of management and outcomes of the organization. It also stated a practical skill of the field is a hallmark of professionals. This means as the management of the organization is well performed, the yield of the organization will be better.

2.6.2. Project Finance

In a project financing, the sponsoring entity sets up a project as a distinct legal entity and raises funds through the project. The investors look to the project's cash flow for their return. Project financing is a capital structure decision because the firm could fund the project using its own credit. Project finance is that firms with weak credit ratings can finance a project more cheaply with project finance than on their own account. Project finance can overcome the under investment problem i.e the possibility of the firm will not invest in positive NPV projects which required an outside contribution of capital because a portion of the capital investment might go to pay the claims of existing debt holders. Because the project is funded as a separate entity,

none of the project's cash flow can be siphoned off to pay the firm's general creditors. Thus, any positive NPV project can be funded with project finance. Most project financings call for the periodic payment to the equity holders of all cash flows above those necessary to pay the project's creditors and to continue maintaining the project's assets. Project finance can create value when there are informational asymmetries and it requires a firm managers have often more information about a business than outside investors.

2.6.3. Theories of Bank Loan Commitmentseory

The theory stated that, borrowers are more risk averse than banks that are willing to pay the bank a premium for taking the interest rate risk on their behalf. With a fixed rate of commitment, the bank bears the risk of changes in the rate as well as changes in the borrower credit risk premium. A theory also emphasised that a bank bears the latter risk when there is a variable rate of commitment. In addition, loan commitments address over investment, underinvestment, and sub optimal liquidation problems. According to Maksimovic (1990), shows that the structure of the borrower's industry determines the terms of loan commitments. The theory further articulates, in industries with imperfect competition the option to acquire financing at predetermined interest rates enhances the borrower's strategic position and creates value for the borrower. Accordingly, a firm that has access to resources at a lower marginal cost than its competitors has a strategic advantage that it can exploit to gain a larger market share and higher profits.

2.7. Empirical Literature/Evidence

Various research works have been conducted on credit repayment around the world to know loan repayment determinants of borrowers by utilizing different models and analysis methodologies by several authors. Some of the studies reviewed as below.

2.7.1. Empirical Evidence in the World

Ono Arito and Yasuda Yukihiro (2017), on its research work investigated the determinants and effects of different debt forbearance policies toward small and medium-sized enterprises (SMEs) in Japan using a unique firm survey dataset with which they were able to identify firms that received financing and firms that received debt forgiveness after the implementation of the SME financing facilitation act. The researchers found that using of banks choose debt forgiveness firm had more creditworthy and more profitable and banks choose public credit guarantees for financing firm loans. In addition they found firms that received debt forgiveness had better

access to new loans and saw a greater improvement in their performance than firms that received financing.

G. Dorfleitner, S. Just-Marxa, C. Priberny (2017), conducted a research to analyze the drivers of the probability of default and the loss given default of a unique dataset consisting of individual agricultural micro loans granted by a Nicaraguan microfinance institution which does not charge interest rates from borrowers according to their creditworthiness. The researchers found higher income or greater wealth as well as a variety of assets owned by a borrower decreases the default probability significantly, negative relationship between the borrower's age and probability of default, loans used for irrigation purposes are related to a lower probability of default and water is an important factor of production.

Aziz (2017), investigated the risk and performance of Bank of Tokyo-Mitsubishi UFJ Bank by using the annual report of Bank of Tokyo-Mitsubishi UFJ from 2011 to 2015 and found high liquidity makes the company have the capacity to meet its short term financial obligations and liquidity is positively significant to the return on asset.

Norhaziah Nawai and Mohd Noor Mohd Shariff (2012), on the other hand studied factors affecting repayment performance in microfinance programs in Malaysia and on their study they attempted to determine different factors of repayment performance of borrowers by using multinomial logit regression model. Multistage random sampling was utilized and 309 respondents in Peninsular Malaysia province from November 2010 to February 2011. The researchers were adopted mixed methods i.e; includes questionnaire surveys among participants, structured interview and observation for selected participants and found that age, gender, business experience, religious education, total household income, total sales, distance to the lender office, the formality of business, period of loan approval and loan monitoring were affects the repayment performance of the borrowers. In addition they recommended that providing training to the borrowers such as how to market their products, financial management and accounting course will help them improve their business and increase their profits. Along these they also recommend giving a refund to the good borrowers to encourage them to repay their loan on schedule without delay.

Suraya Hanim Mokhtar, Gilbert Nartea and Christopher Gan (2012), studied the determinants of microcredit loans repayment problem among microfinance borrowers in Malaysia. They adopted logistic regression model to analyzed loans repayment problem among microfinance borrowers by collecting primary data through survey interviews using a structured questionnaire. They

found out that, borrower's characteristics (age and gender), business characteristics (business type) and loan characteristics (repayment period, repayment mode and repayment amount) were significantly influencing on time loan repayment of borrowers.

E. Pishbahar, M. Ghahremanzadeh, M. Ainollahi, and R. Ferdowsi (2015), on the other hand conducted a reaserch to investegated factors influencing agricultural credits repayment performance among farmers in East Azarbaijan Province of Iran. The researchers were obtained data from a sample of 779 individual farmers who had previously received loans from Agricultural Bank during the period 2004-2008. Nested Logit Model was applied for analyzing the data and for this purpose STATA software was used in the study. The analyses of the data showed that having an activity besides farming, extension of the repayment period of the loan, and large volume of received loans had significantly negative impacts on loan repayment. On the other hand high interest rates of loans, collateral of guarantor, services received from the banks and long term maturity period for the loans increase the probability of timely loan repayment significantly.

Mohammad Reza Kohansal and Hooman Mansoori (2009), examined by adopting logit model the factors influencing on loan repayment performance of farmers in Khorasan- Razavi Province of Iran. They were collected data from 175 farmers in rural regions of Khorasan-Razavi province of Iran through a survey and filling questionnaires. The result reveled that, farmer's experience, income of borrower, received loan size and collateral value have positive effect while loan interest rate, total application costs and number of installment implies a negative effect on repayment performance of borrowers.

Uma Murthy & Paul Anthony Mariadas (2017), had explored an exploratory study on the factors contributing loan repayment default among the loan borrowers in Micro Finance Institutions in Shah Alam, Selangor. They were used questionnaire to collect data for the study and distributed to 120 loan borrowers of micro finance institution in Shah Alam, Selangor. The study suggested that there was a positive relationship between nature of business operation and negative relationship between age of borrowers, diversion of funds by borrowers as well as repayment schedule to loan defaults.

2.7.2. Empirical Evidence in Africa

Solomon Enimu, Emmanuel O. Eyo and Eucharia A. Ajah (2017), examined the determinants of loan repayment among microcredit finance group members in Delta State, Nigeria. The

researchers found:(1) gender play a significant role in the loan repayment rate, i.e. females repay their loans more than their male counterparts,(2) disbursement lag has negatively relates to loan repayment i.e, the shorter the disbursement lag, the higher the loan repayment,(3) loan supervision/follow up has a positive impact on the loan repayment (4) higher income has significant impact and positively related to loan repayment (5) the amount of loan has positively relate to loan repayment (6) education level of borrowers has positively relate to loan repayment and (7) age of borrowers has positively relate to loan repayment.

Wafula Nathan Wamalwa (2016), tired to investigate determinants of loan repayment by borrowers from Micro-Financial Institutions in Nakuru County Kenya and found that education levels are negatively related to loan repayment. On the other hand age of borrowers has positively related to loan repayment performance of borrower.

Olatomide Waheed Olowa and Omowumi Ayodele Olowa (2018), had attempted to loan repayment performance of Lift above poverty Organization Micro-Credit Agency in Nigeria by using Tobit Analysis model. Secondary data on lift above poverty organization microcredit from different sources from 1990 to 2014 were analyzed using simple descriptive statistics such as percentages, mean, t-tests and regression techniques. The results of the analyses showed at 0.92 repayment rates and 0.08 default rates, lift above poverty organization enjoys high level of repayment and a low default rate. The results showed the borrower experience, volume of loans borrowed, number of borrowers, number of credit agency staff had positive effects on repayment performance of borrowers. They also indicated/recommended the lender to adopt incentive-driven system and further administrative reengineering towards enhancing repayment performance of borrowers.

Nwafor Grace O, Agu Aguiyi Fortune, Anigbogu Thersa and Umebali E.E.(2018), on their study of loan repayment behavior among member of farmers Multipurpose Cooperative Societies Anambra State, investigated the socioeconomic factors affecting the farmers' credit repayment ability and ascertained major problems affecting the farmers in loan repayment using t-test statistics and a multiple econometric model of the Ordinary Least Square (OLS). The finding revealed that educational qualification, farm size, loan application cost, and collateral value are significantly affecting loan repayment behavior among member of farmer's multipurpose cooperative societies. While age of member's, membership duration and income of the farmers were not significant but they show a positive relationship with loan repayment ability of

cooperative societies. They recommended cooperative societies should endeavor to educate the farmers on financial discipline and management because it has proven to significantly influence loan repayment. Lending institutions should ensure that whoever they lend to meets a minimum threshold in asset value before loans are accessed and thus helps to reduce defaulters.

Munene, H. Nguta and Guyo, and S. Huka (2013), on the other hand tried to investigate factors influencing loan repayment default in micro-finance institutions: the Experience of Imenti North District, Kenya. The study adopted a descriptive survey design to analyze the individual microfinance loan beneficiaries and microfinance institution officials, and representative random sample of 400 respondents was selected from the study population using census and cluster sampling procedures for micro finance institutions officers and loan beneficiaries data also collected using both structured and unstructured questionnaires were analyzed using descriptive and inferential statistics. The study revealed that there was significant relationship between the type of business a borrower engaged, age of the business, number of employees', business profits and loan repayment default. The study showed a strong link between technical training for loan beneficiaries and the performance of entrepreneurial businesses among the remote communities. Finally, the researchers recommended the stakeholders in the microfinance sector should ensure the borrowers have access to adequate relevant technical training in entrepreneurial microfinance businesses.

Jefferson K. Kasango & James N. Kung'u (2018), had been conducted a study on evaluation of factors influencing loan default among group borrowers of deposit taking microfinance Banks in Kenya. They utilized a descriptive research design with a sample of 94 respondents who comprised of groups relationship managers of microfinance banks. The respondents were identified by a stratified random sampling technique of which a sample of 76 respondents was picked using convenience sampling technique. Along these a closed ended questionnaire was used to collect data from the respondents. Of the distributed questionnaires Sixty four questionnaires were returned and this represented 84.2% response rate. Inferential data analysis method was used to analyze the data. The research finding showed that loan size has significant relationship with loan default i.e the higher the loan size the higher likelihood of loan default while group life cycle, group borrower's education levels, loan cycle had no significant relationship with loan default. They recommend microfinance and banks should put in place solid measures on enhancement of default management.

Nancy Gathoni Kiliswa and Mohamed Sayeed Bayat (2014), attempted to investigate the determinants of loan repayment in Small Scale Enterprises in Developing Countries. The researchers adopted descriptive research design to examine the determinants of loan repayment in small scale enterprises in Kenya's Kariobangi Division, Nairobi County. The population of the study comprised 126 small scale enterprises based in Nairobi's Kariobangi Light Industries. They also used simple random sampling technique and primary data through questionnaires both closed and open ended questions. The result of the research showed that higher education level and large family size, personal characteristics, large amount of loan applied, longer duration of business and loan characteristics resulted in increased loan repayment. However an increase in age, interest rate and change in gender leads to more loan default.

Finally, Wachilonga (2018), had been studied the effect of finance determinants on loan repayment among youth enterprise development fund board beneficiaries in Trans Nzoia County, Kenya. The researcher utilized a descriptive survey research design and the target population comprised of 1,077 individual loan beneficiaries of which a total of 438 respondents participated in the study. A semi-structured questionnaire was used to collect data. He also used descriptive statistics such as frequencies, means and percentages to summarize the data. To determine the relationships between dependent and independent variables he used cross tabulation, chi-Square and ANOVA, and further applied a multinomial logistic regression model. The result of the study clearly showed that an increase in portfolio characteristics the relative risk for a borrower being a delinquent than a re-payer, an increase in cost of funds is likely to result in delinquency and loan default, and the borrowers risk tolerance increases the probability of being a re-payer is greater than probability of being a delinquent. While portfolio diversification, finance literacy, debt management has no significant effect on loan repayment.

2.7.3. Empirical Evidence in Ethiopia

Fikadu Gutu, Wondaferahu Mulugeta & Belay Birlie (2017), in their study on determinant factors affecting loan repayment performance of women borrowers from micro finance institutions in Southwest Ethiopia were found out that age was negatively influencing loan repayment performance and sufficiency of loan to start business/for intended purpose increases the borrowers' loan repayment performance. Similarly, Osman Yibrie and Prof. R. Ramakrishna (2017); had examined age, education level, loan size, interest rate, loan tenure, training and monthly sale, and found statistically significant factors affecting loan repayment performance of

delinquent borrowers while sex, loan size, interest rate, loan tenure and training insignificantly affecting loan repayment of defaulter.

Gudata Abara, Biniam Mengesha, and Dr. P.A.K. Reddy (2017), examined determinants of credit default risk of microfinance institutions in Assosa zone with the aim of identifying the determinants of credit default. The study resulted that gender and loan size are negatively related to loan repayment performance of borrower. In contrary, income from activities financed by the loan and suitability of repayment period are positively related to loan repayment performance of borrowers. Ayele Shirga (2016), on his study assessing determinant of successful loan repayment performance in project financing of Development Bank of Ethiopia, arrived at managerial experience, educational level of borrowers, frequent project follow-up/supervision, higher equity to debt ratio and extended project implementation period all have positively affect loan repayment performance while loan processing time of delay and own management have negatively affect loan repayment performance of borrower. Simeon Gudeta (2018), on his study determinants of non-performing loans the case of Development Bank of Ethiopia arrived at project follow up attributes, policy induced attributes and credit evaluation criteria have positively affect loan repayment performance while source of equity contribution and commodity nature attributes have no effect on loan repayment performance of borrowers.

Dire (2018), had been examined determinants of loan repayment of micro and small enterprises in Jimma Town, Ethiopia. The study adopted descriptive research design and primary data was collected through self administered questionnaire and it was collected from random samples of 341 Micro and Small Enterprises (MSEs) by stratifying into five group. The researcher find out that individual characteristics, loan characteristics and firm characteristics influenced loan repayment of enterprises in the study area. In addition sex of respondents and experience positively and significantly affect loan repayment. On the contrary, the inconvenience of loan payback period, lack of financial skill and planning negatively and significantly affected loan repayment of enterprises while lack of marketing skills, follow up and supervision positively and significantly influenced loan repayment of micro and small enterprises.

Lastly, Amino (2018), had tried to examine bank specific and macro-economic determinants of non-performing loans (NPLs) of commercial banks in Ethiopia on his research named determinants of non-performing loans in Ethiopian Commercial Banks. He employed an explanatory research design and a quantitative research approach. The study showed that trade

openness has positively and significantly affects non-performing loans whereas exchange rate, unemployment and loan growth affects NPLs negatively and significantly. It also showed real lending rate, capital adequacy ratio and ownership structure of banks' had an insignificant relationship with NPLs of Ethiopian commercial Banks.

2.8. Research Hypothesis

To achieve the objective of the study, the following hypothesis has been tested:

Hypothesis 1: the amount loan has positive and significant relation with timely loan repayment of borrowers

Hypothesis 2: accessibility of market has positive and significant relation with timely borrower's loan repayment.

Hypothesis 3: interest rate has negative and significant relation with timely borrower's loan repayment.

Hypothesis 4: business experience of borrowers has positive and significant relation with timely borrower's loan repayment.

Hypothesis 5: educational level of borrowers has positive and significant relation with timely borrower's loan repayment.

Hypothesis 6: loan repayment period has positive and significant relation with timely borrower's loan repayment.

Hypothesis 7: project follow-up has positive and significant relation with timely borrower's loan repayment.

Hypothesis 8: Grace period has positive and significant relation with timely borrower's loan repayment.

Hypothesis 9: technology adoption has positive and significant relation with timely borrower's loan repayment.

Hypothesis 10 keeping book of record has positive and significant relation with timely borrower's loan repayment.

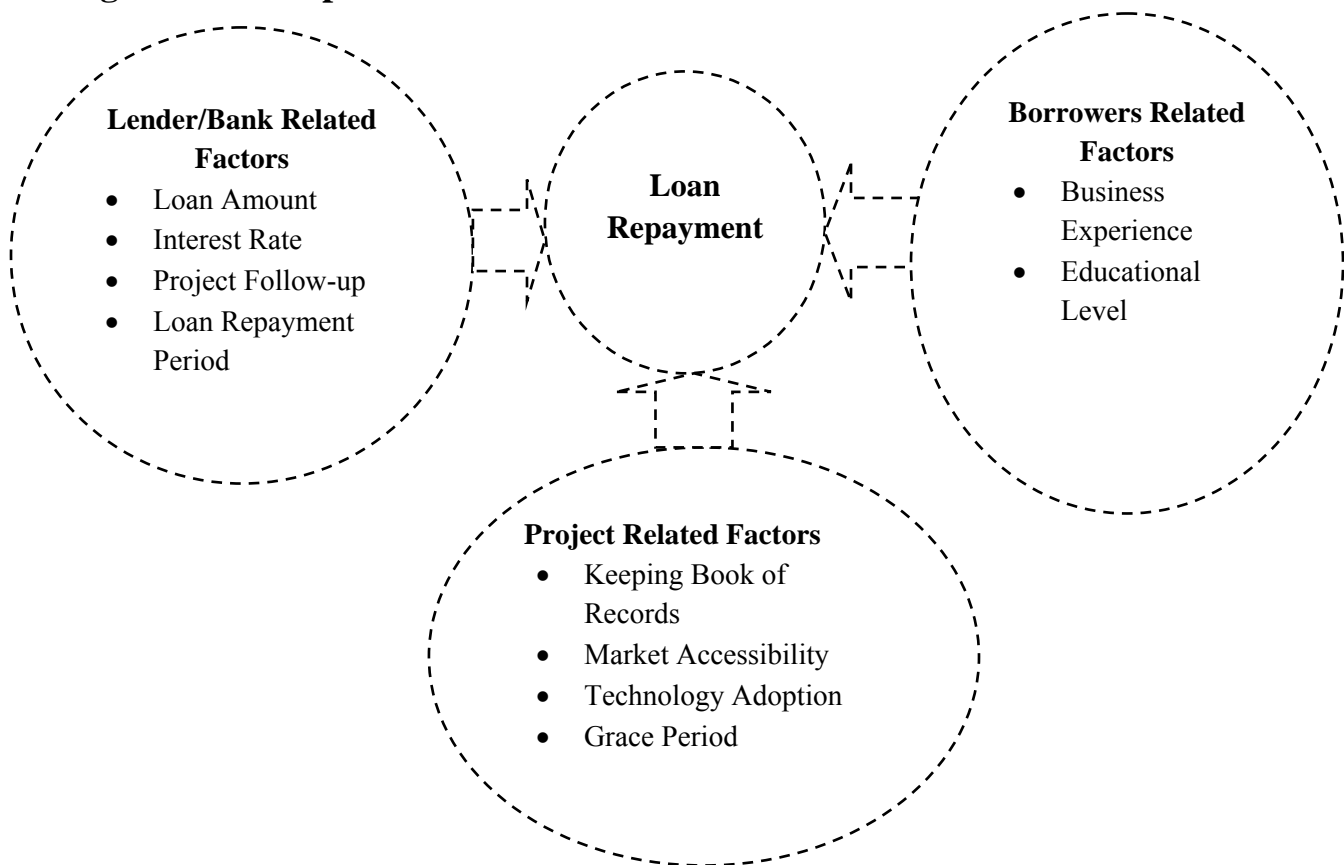
2.9. Conceptual Framework

Loan repayment is determined by characteristics of the borrowers, businesses characteristics and characteristics of the lending institutions. Fikadu Gutu, Wondaferahu Mulugeta & Belay Birlie (2017), claimed that borrower characteristics of loan repayment depend on the willingness and

ability to repay while borrowers loan repayment capacity depending on the domestic business and economic environment.

To categorize and study the determinants of loan repayment in DBE, the conceptual model is drawn based on the literatures reviewed, commodity study (conducted by the Bank business and research department), due diligence assessment manual, follow up report manual, loan procedure manual appraisal documents, credit policy and loan contract agreement. The determinants of loan repayment categorized as borrowers' related factors, bank /lender related factor and project related factors.

Figure: 1 Conceptual Framework



Source: Theoretical and empirical literatures', revised credit policy of the Bank (2018) and own researcher extraction (2020)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Introduction

The study aims to examine the determinants of loan repayment in Development Bank of Ethiopia borrowers'. Accordingly, this chapter discussed the research design, population and sampling technique, methods of data analysis, model selection, descriptions of variables and types and method of data collection.

3.2. Research Design

The research design employed was descriptive research design and explanatory research design with quantitative data. The methodology of the research selected is based on objective of the research and data availability. To address the objectives, the paper is primarily based on quantitative research along with econometric model to identify and measure the determinants of loan repayment in project financing scheme of bank's borrowers. Due to the nature of the dependent variable i.e loan repayment, is binary and taking the value 0 and 1 for defaulter and non-defaulter loan/credit worthy, logit regression analysis model is adopted to measure the effect of determinants on loan repayment of DBE borrowers' or financed projects. It also further employed to verify the associative relationships between variables in terms of the relative importance of the independent variables and predicted values of the dependent variables.

3.3. Population of the study

The target populations in this study are borrowers of Development Bank of Ethiopia loan borrowed or granted 30 million birr and above in which the bank financed from January 2012 G.C to June 2018 G.C. According to the Credit Information system of NBE and data base of DBE, the bank has been financed 131 projects or borrowers in between January 1, 2012 G.C to June 30, 2018 G.C and all projects were started loan repayment on December, 2018 and before. From the total financed projects in the period, 95 of them were non-defaulters; whereas the remaining 36 projects were listed in the loan position of the bank as defaulters on September 30, 2019 G.C (i.e: their loan status are doubt fall and loss which pass due is more than 545 days and above). The study included all borrowers having every level of educational and business experiences. Due to the size of the population and nature and status of under study, i included all of the identified projects under the study. Thus, the total populations of the study were 131 financed projects.

3.4. Types and Method of Data Collection

To address the research objectives, the study applied mainly secondary data collected from DBE data base, DBE Credit information Center, Monthly, quarterly and yearly borrower's loan position, and individual borrowers' files and bank's T-24 system. In addition to secondary data, primary data also collected from DBE credit staff that works on credit line through structured questionnaire for each projects.

3.5. Methods of Data Analysis

After data have been collected, data are analyzed by using descriptive statistics and econometrics analysis to identify the determinants of loan repayment using software called STATA version 12. In addition to the secondary data (i.e: fully quantitative), primary data collected through questionnaires also quantitatively and qualitatively analyzed after categorizing it.

3.6. Model Selection

According to different literatures, most of the studies conducted in modeling the determinants of loan repayment used dichotomous discrete choice models (Logit and Probit) where the dependent variable is a dummy that takes a value of zero or one depending on whether or not a borrower has defaulted or not defaulted/creditworthy/.

Logit model: Due to the nature of the dependent variable, loan repayment is a dummy variable (Performing/no-defaulter and defaulter/non-performing), to use either logit or probit model to address the required result. In addition econometric books declare that, logit model can able to overcome the limitation of the LPM (linear probability model) that it can produce estimated probabilities that are negative or greater than one and can by using a function that effectively transforms the regression model so that the fitted values are bounded within the (0,1) interval. Accordingly, the researcher preferred to use Logit to carry out the research.

$$P(\text{performing Loan/non-defaulter}=1)=\beta_0+\beta_1(\text{LA})+\beta_2(\text{PF})+\beta_3(\text{LRP})+\beta_4(\text{ELB})+\beta_5(\text{BEB})+\beta_6(\text{AM})+\beta_7(\text{GP})+\beta_8(\text{IR})+\beta_9(\text{TA})+\beta_{10}(\text{KBR})$$

$$P(\text{Defaulter}= 0)$$

Where:

LA: Loan Amount (in Birr)

PF: Project Follow-up (in number per year)

LRP: Loan Repayment Period (in Years)

ELB: Educational Level of Borrower

BEB: Business Experience of Borrower (in Years)

AM: Accessibility of Market

GP: Grace Period (in Years)

IR: Interest Rate

TA: Technology Adoption

KBR: Keeping Book of Records

β_0 = an intercept of the model

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9, \beta_{10}$, slope of each independent variable and they measure by what extent affect the dependent variable, i.e loan repayment. The Model is:

$$LR = \beta_0 + \beta_1(LA) + \beta_2(PF) + \beta_3(LRP) + \beta_4(ELB) + \beta_5(BEB) + \beta_6(AM) + \beta_7(GP) + \beta_8(IR) + \beta_9(TA) + \beta_{10}(KBR)$$

3.7. Descriptions of Variables

Selection of variables was based on empirical literature on the factors determining loan repayment. The determinants of loan repayment categorized as borrowers' related factors, bank /lender related factor and project related factors.

3.7.1. Dependent Variable

Loan Repayment; the dependent variable can be explained through the independent variables which are specified from the empirical literature. It is determined by willingness, ability and other characteristics of the borrowers, businesses characteristics and characteristics of the lending institutions. Borrower characteristics of loan repayment depend on the willingness and ability of the borrowers to repay. Fikadu Gutu, Wondaferahu Mulugeta & Belay Birlie (2017), stated that borrower's loan repayment capacity depending on the domestic business and economic environment. It is dummy variable and takes 1 for no-defaulter /performing loan and 0 for defaulter.

3.7.2. Independent Variables

3.7.2.1. Borrowers Related Factors

Hypothesis 1: Educational Level of Borrowers (ELB):-The educated borrowers are expected to have a positive impact in loan repayment, because higher level of education enhances borrowers to accept new way of thinking/ knowledge to understand credit terms, problem solving skill and make the right business decision and thus, borrower perception determines loan repayment performance or ability. Non defaulter's benefits freedom of penalty, building of good relationship with the loan provider while defaulters reasoning low supervision of loan officers of

the institution and personal problems of the borrowers for default (O.Ombongi, 2015). Educational level is an important element that has a positive impact on a small-scale entrepreneur's demand for credit, and micro and small enterprise operators with higher education level, accounting knowledge, better business management skills, and capability of absorption and adoption of technology give added advantage when it comes to credit borrowing (Neema Mori, Thadei Nyantori and Donath Olomi, 2016). It is expected to have positive impact and for the analysis purpose it is a categorical variable.

Hypothesis 2: Business Experience of Borrowers (BEB):-A business run by an experienced person has an effect on the loan repayment performance. The risk of failure is less, when the business operated by experienced person than those who have just started, and the more the number of years in a business; the better would be the loan repayment performance of borrower (Osman Yibrie and Prof. R. Ramakrishna, 2017). It is expected to have positive impact and has actual numeric value in years or continues variable in the study.

3.7.2.2. Bank /Lender Related Factor

Hypothesis 3: Loan Amount (LA):-the loan amount the borrower granted expected to have positive impact on the borrower's repayment capacity. The higher the total loan received by the borrower's the higher probability of borrower being non-defaulter; it means a pays their loan on time. This is because the borrowers have enough funds to finance their business makes them get more profit and increase their business (Osman Yibrie and Prof. R. Ramakrishna, 2017). On the contrary, having or receiving large amount of loan has significantly affects loan repayment performance of borrowers (E. Pishbahar, M. Ghahremanzadeh, M. Ainollahi, and R. Ferdowsi, 2015).

Hypothesis 4: Interest Rate (IR):-interest rate has a great influence on the loan repayment performance of borrower's. An increase in interest rates on credit facilities to the borrowers is likely to deter them from servicing their loans according to the agreed terms and conditions (M.W. Kariuki and S. Ngahu, 2016). Higher interest rate has an impact on loan repayment and has negative relationship between interest rate charged on loan and loan repayment (Ali Othman Abbas, 2017).

Hypothesis 5: Project Follow-up (PF):- effective ways of monitoring borrower's loan portfolios helps borrows to reduce the high loan delinquency and default rates (Neema Mori, Thadei Nyantori and Donath Olomi, 2016).

Hypothesis 6: Loan Repayment Period (LRP):- Loan repayment period has positively affected the loan repayment performance of borrowers because it gives enough periods to accumulate profit (Abebe, 2012). In addition, Solomon (2014) also suggested medium repayment period has positively affects loan repayment performance of borrowers.

3.7.2.3. Project Related Factors

Hypothesis 7: Keeping Book of Records (KBR):- borrowers who kept a book of records for their financial transactions were non-defaulters while the others who were not kept a book of records were defaulter (Sisay, 2018). Likewise, borrower's trends of recording the financial transaction to book of records to monitor and evaluate the profitability and financial position of their respective businesses and, thus borrowers who manage their expenses and revenues as well as cash flows could probably better monitor their loan repayment status than none (Garomsa, 2017).

Hypothesis 8: Grace Period (GP):- it is considered to be the time between when the loan was disbursed to the loan applicant and when the first installment is paid. Businesses get enough grace period have never experienced problem of default as or borrowers who get enough grace period are non defaulters (Makorere, 2014).

Hypothesis 9: Technology Adoption (TA):- Adopting technology while running the business enables borrowers to get successful business which in turn could enhance borrower's repayment performances (Sisay, 2018). In addition to these, Garomsa (2017) also stated that enterprises and individual entrepreneurs who have employed a modern technology while running their respective businesses could have high possibility of success which in turn enables them to repay the loan timely. On the contrary, borrowers who have not employed the best technology could earn less profit as compared to others.

Hypothesis 10: Accessibility of Market (AM):-accessibility of market for output products has highly influenced on successful loan repayment performances of borrowers (Ayele Shirga, 2016). In addition to this, Garomsa, (2017) also indicated market demand decreases defaulters were increase which implies on the other way creditworthiness of borrower's increasing as market demand for their product increases.

CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter talks about analysis of the result and discussion to achieve research objectives and lay down a base for conclusion. The first section of this chapter discusses the result of descriptive statistics of explanatory variables. Besides, the second section discusses the econometrics result of binary logistic, the analysis of significant & insignificant variables, correlation analysis, and multi-collinearity test, measures of goodness of fit and marginal effect of the significant variables.

Through descriptive statistics, the researcher used mean, percentage, standard deviation, range, minimum and maximum. In addition, Chi-square test statistics was employed to compare defaulter and non-defaulter group in terms of each explanatory variable. Econometric analysis was carried out to identify the most important factors that affect loan repayment of borrowers and measure the relative importance of statistical significant explanatory variables on loan repayment.

4.1. Descriptive Statics Results

4.1.1. Educational Level of Borrowers

Educational level of borrowers is one of the independent variable that is classified under borrower's related factors that determined loan repayment of the borrowers. Hence, from the total borrowers/projects 50%, 34% & 15 % of them had degree & above, Diploma & Certificate, and completed grade 12th and below respectively. Among project owners/borrowers who had degree and above 8% were defaulter and 66% were non-defaulter/creditworthy or repay their loan as per the loan contract agreement. On the other hand, project owners/borrowers who had certificate and college diploma 44% were defaulter and 31% were non-defaulter or repay its loan on time. In contrast, borrowers who had completed grade 12th or below were 47% defaulter and 3% non-defaulters. This implies that, borrowers having higher educational level have more probability of being non-defaulter or repay their loan as per the loan contact agreement. On the other hand, borrowers or project owners having lower educational status were defaulters. This is because of the borrower didn't understand the credit term well. The result supported by O.Ombongi (2015), that educated borrowers can easily accept new knowledge to understand credit terms, problem solving skill and make the right business decision, and thus makes non-defaulter or repay its loan on time. In addition, Neema Mori, Thadei Nyantori and Donath Olomi(2016) also

support this agreement that, higher education helps borrowers to accept accounting knowledge, better business management skills and capability of absorption new idea give added advantage when it comes to credit borrowing. The P Value of the result is 0.000 which is less than the minimum P value=0.05. Thus, educational levels of borrowers and loan repayment have strong relationship. It means as the borrower educated more and more, the probability of being non-defaulter or credit worthiness increases. Moreover, the project management theory also supported the finding in that the management role is to integrate resources and tasks to achieve goals and objectives of an organization.

Table -4.1 Relation of Educational level of borrower's

Variables	Category	Non-defaulters		Defaulters		Total	
		N	%	N	%	N	%
Educational level of borrower	Grade 12 and below	3	3%	17	47%	20	15%
	Certificate and College Diploma	29	31%	16	44%	45	34%
	Degree and Above	63	66%	3	8%	66	50%
Total		95		36			100%

Source: Owen computation, 2020. N= number of respondents

Pearson chi2 (2) = 52.0958 Pr = 0.000

4.1.2. Keeping Book of Records

Table- 4.2: Relation of keeping book of records

Variables	Category	Non-defaulters		Defaulters		Total	
		N	%	N	%	N	%
Keeping Book of Records	Borrowers keep a book of records	89	78.07%	25	21.93%	114	87%
	Borrowers didn't book of records	6	35.29%	11	64.71%	17	13%
Total		95		36		131	

Source: Owen Computation, 2020

Pearson chi2 (1) = 13.5831 P = 0.000

Table 4.2. Above revealed that, 87 % of the borrowers adopt keep a book of records for their transaction (financial, daily stock balance, production and the like) where as 13 % did not. Among of the borrowers/project owners that adopt or experienced keep a book of records, 78.07 % were non-defaulter, and the remaining 21.93% were defaulters. On the contrary, among borrowers/project owners that didn't adopt or experienced keep a book of records, 35.29% of them were non-defaulter and the remaining 64.71% were defaulter.

The P Value of the result is 0.000 which is less than the minimum standard for P value=0.05. Thus relationship between the keeping book of records and loan repayment has strong relationship. This implies that probability of loan repayment of the financed project increases when borrowers/project owners are adopting/practicing a keep book of records for its transaction and vis versa. The result is similar to Sisay (2018).

4.1.3. Technology Adoption

Table 4.3.Revealed that, 79 % of the population (i.e; borrowers or project owner) adopted latest technology (i.e; 0-5 years old technology) while running the business for enhancing their production where as 21 % of borrowers adopted technology above five years old. Among of the borrowers/project owners that adopt latest technology (i.e; 0-5 years old technology), 89 % were non-defaulter, and the remaining 11% were defaulters. On the other side, among borrowers/project owners that adopted technology above five years,7% were non-defaulter and the remaining 93%were defaulter.

Table- 4.3: Relation of technology adoption

Variables	Category	Non-defaulters		Defaulters		Total	
		N	%	N	%	N	%
Technology Adoption	Adopt 0-5 years old technology	93	89%	11	11%	104	79%
	Adopt above 5 years old technology	2	7%	25	93%	27	21%
Total		95		36		131	100%

Source: Owen Computation, 2020

Pearson chi2(1) = 72.3496 Pr = 0.000

The P Value of the result is 0.000 which is less than the minimum standard for P value=0.05. Thus relationship between adoption of latest technology (i.e; Adopt 0-5 years old technology) and loan repayment has strong relationship. This implies that probability of loan repayment of the financed project increases when borrowers/project owners are adopting/ latest technology (i.e; Adopt 0-5 years old technology) while running its business which enhance production and vis versa. The result is supported by Garomsa (2017).

4.1.4. Accessibility of Market

Table4.4.Revealed that, 73 % of the population (i.e; borrowers or project owner)has large market access for its product/out pout while 27 % of borrowers/project owners has face to get market access for its product. Among of the borrowers/project owners that have access market

for their product 94% were non-defaulter and the remaining 6% were defaulters. However, among borrowers/project owners that has not access enough market for its product 28% were non-defaulter and the remaining 72% were defaulter. These because project owner or borrowers having large market for its product can easily sale its product, and can generate cash and get profit. Thus, it can repay its loan or debit timely.

Table- 4.4: Relation of accessibility of market

Variables	Category	Non-defaulters		Defaulters		Total	
		N	%	N	%	N	%
Accessibility of Market	Large market/market access	89	94%	6	6%	95	73%
	No market access	10	28%	26	72%	36	27%
Total		99		32		131	

Source: Owen Computation, 2020

Pearson $\chi^2(1) = 61.4282$ Pr = 0.000

The P Value of the result is 0.000 which is less than the minimum standard for P value=0.05.

Thus it has strong relationship between market access for product and loan repayment of borrowers. The result is supported by Ayele (2018) & Sisay (2017).

4.1.5. Loan Amount

It is defined as the amount of the loan that the bank has approved / disburses/granted to the respective borrowers or project owners. Accordingly, the result shows on average the bank has granted or disbursed a minimum and a maximum amount of birr 43,114,124 and birr 1,720,412,800 for the defaulter /non-performing projects or borrowers while birr 32,328,722 and birr 1,875,000,064 for the non-defaulter/performing projects or borrowers. The mean of loan amount disbursed by the bank were Birr 299,425,182 and birr 272,396,223 for the defaulter and non-defaulter owners or projects. When the amount of loan increases, the probability of being default is increase. These is the fact that when borrower received large amount of loan the probability of loan diversion increase, recklessly utilized for other trade purpose or it may used the loan apart from the project priority aim or purpose. They may purchase things which may not directly important to the project. These result contradicted with Osman Yibrie and Prof. R. Ramakrishna (2017), that borrowers have enough funds to finance their business makes them get more profit and increase their business, and thus they become non-defaulter. On the contrary, the result is similar or supported to Ghahremanzadeh, M. Ainollahi, and R. Ferdowsi (2015) , that

the volume of loans borrowed or receiving become large, the borrowers becomes more defaulters.

Table- 4.5: Mean of loan amount (in Birr)

Loan status	Mean	p50	sdrange	min	max	
NPL (defaulter)	299,425,182	173,619,400	384,159,784	1,677,298,676	43,114,124	1,720,412,800
Performing Loan(non-Defaulter)	272,396,223	129,558,912	351,441,453	1,842,671,342	32,328,722	1,875,000,064
Total	279,824,028	132,809,256	359,426,590	1,842,671,342	32,328,722	1,875,000,064

NB: NP L means Defaulter

Performing Loan Means non defaulter or repay its loan successfully or on time

Borrowers are projects or owners of the project

4.1.6. Grace Period (in years)

Grace period is the period given by the financial institution to the borrower before the first installment is due. Grace period is an important factor that affects the loan repayment performance of borrowers. So, it has a significant impact on project implementation, commissioning, testing, production, marketing of good and sales generation schedule of the borrowers. As shown in table 4.6, the result indicated that on average years of grace period given for an individual projector borrowers by the bank were 0.6years for defaulter projects /borrowers and 0.9 years for the successful projects or borrowers during the time of financing. The result is same as Makorere (2014), that businesses get enough grace period and have never experienced problem of default or borrowers who get enough grace period are non defaulters.

Table- 4.6: Mean of grace period (in Years)

Loan status	Mean	p50	sd	range	min	max
NPL (defaulter)	0.6	0.56	0.29	1.8	0.24	2.1
Performing Loan(non-Defaulter)	0.9	0.75	0.5	1.7	0.41	2.1
Total	0.82	0.65	0.47	1.9	0.24	2.1

4.1.7. Business Experience of Borrowers (in years)

Business experience of borrowers is an important factor that affects the loan repayment performance of borrowers. As shown in table 4.7, the result indicated that on average years of business experience of borrowers were 6.4 years for defaulter projects /borrowers and 9 years for the successful projects or borrowers. This means, as business experience of borrower's increases, the probability of being non-default increase. These are because borrowers acquired more and more business experience and problem solving skill, it enable them to cope up with even the difficult conditions and can easily absorbed and turned the external opportunities into benefit of the company. In addition, they also give an opportunity to know and connect with so many business partners and easily absorbed opportunities and can prepared strategies to cope with external threat and internal weakness. The risk of failure is less, when the business operated by experienced person than those who have just started. The result is similar to Osman Yibrie and Prof. R. Ramakrishna (2017), the more the number of years in a business the better would be the loan repayment performance of borrower.

Table- 4.7: Mean of business experience of borrowers (in Years)

Loan status	Mean	p50	sdrange	min	max	
NPL(defaulter)	6.4	4.3	5.4	21	1.5	23
Performing Loan(non-Defaulter)	9	7.3	5.3	24	1.2	25
Total		8.3	6.7	5.4	24	1.2 25

4.1.8. Interest Rate

Table 4.8. Reveled the minimum and maximum interest rate is 9% and 12 % for defaulter/NPL/ borrowers or projects while 8% and 12% for non-defaulter/performing loan/ borrowers or projects. The mean of interest rate is 12% for both defaulter's borrowers and non-defaulter borrowers. The result indicated that interest rate has no significant impact on loan repayment performance of borrowers. Nevertheless, it has negative relationship with loan repayment performance of borrower. This result is supported by M.W. Kariuki and S. Ngahu, (2016) and Ali Othman Abbas(2017), that an increase in interest rates on credit facilities/loans/ to the borrowers is likely to deter them from servicing their loans according to the agreed terms and conditions. In other words, higher interest rate has an impact on loan repayment and has negative relationship between interest rate charged on loan and loan repayment.

Table- 4.8: Mean of interest rate (in Percent)

Loan status	Mean	p50	sdrange	min	max	
NPL(defaulter)	0.12	0.12	0.0087	0.03	0.09	0.12
Performing Loan(non-Defaulter)	0.12	0.12	0.0074	0.04	0.08	0.12
Total	0.12	0.12	0.0078	0.04	0.08	0.12

4.1.9. Project Follow-Up

Continues and frequent controlling and monitoring status of project work enables project to perform as per the schedule and within budget. It uses to provide feedback on costs, schedules, requirements, employee performance and other critical factors to determine project success. As shown table 4.9, the study result indicated that on average number of project follow-up/monitoring have conducted in the individual project by the bank is 1.3 times for defaulter projects/ borrowers and 2.9 times for the non-defaulter borrowers/successful projects/per annum. Continuous project follow up reminds borrowers to pay attention toward their business and enables to increase their perception of responsibility toward loan repayment and also increase loan collection rate. The result indicated, that as the number project follow up per year increase the probability borrowers of being non-defaulter increase while the number of follow up decreases, borrowers tend to be defaulter. This result is similar to Neema Mori, Thadei Nyantori and Donath Olomi (2016), effective ways of monitoring borrower's loan portfolios helps borrows to reduce the high loan delinquency and default rates.

Table- 4.9: Mean of project follow-up (in number per year)

Loan status	Mean	p50	sd	range	min	max
NPL(defaulter)	1.3	1	1.2	4	0	4
Performing Loan(non-Defaulter)	2.9	2	1.5	6	0	6
Total	2.4	2	1.6	6	0	6

4.1.10. Loan Repayment Period (in years)

As it is shown in table-4.10; the study result showed that the mean of loan repayment period for defaulter borrowers /project/ is 7.1 years while for non-defaulter borrowers is 10 years. These means defaulter borrowers repay their loan within a minimum of 1 year and a maximum of 15 years. On the other hand, non-defaulter borrowers repay their loan with a minimum of 2.4 years and a maximum of 18 years. The result indicated, as the repayment period increase the

probability of being non-defaulter is increase because it gives enough periods to accumulate profit while as the loan repayment is shorter the borrowers tend to be defaulter. The result is supported by Abebe (2012) and Solomon (2014).

Table- 4.10: Mean of loan repayment period (Total loan repayment years)

Loan status	Mean	p50	sd	range	min	max
NPL(defaulter)	7.1	8	3.3	14	1	15
Performing Loan(non-Defaulter)	10	9.8	2.8	16	2.4	18
Total	9.3	9.3	3.3	17	1	18

4.2. Econometrics Result Analysis

The econometric analysis of loan repayment of borrowers uses a model where the loan repayment-LRP (y_i) = [1, if the respondent is creditworthy /No-defaulter borrower otherwise 0, if the borrower is defaulter] is regressed on possible explanatory variables. The Logit regressions model was employed for the estimation of significant explanatory variables.

Table - 4.11.Econometric Result

Logit: regression

Iteration 0: log likelihood = -77.025863

Iteration 1: log likelihood = -18.838964

Iteration 2: log likelihood = -15.239469

Iteration 3: log likelihood = -10.364653

Iteration 4: log likelihood = -8.9701653

Iteration 5: log likelihood = -8.796432

Iteration 6: log likelihood = -8.7893108

Iteration 7: log likelihood = -8.7892811

Iteration 8: log likelihood = -8.7892811

Logistic regression

LR chi2(10) = 136.47

Prob> chi2 = 0.0000

Log likelihood = -8.7892811

Number of obs = 131

Pseudo R2 = 0.8859

loanstatus	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
loanamount	-1.16e-08	5.73e-09	-2.02	0.043	-2.28e-08 -3.64e-10
nofollowupperyear	3.5585	1.671992	2.13	0.033	.2814563 6.835544
totalrepaymentyears	1.559876	.6562349	2.38	0.017	.2736796 2.846073
educationalleveofborrowers	6.502778	2.704379	2.40	0.016	1.202292 11.80326
businessexperienceofborrowersyea	.4026197	.1815287	2.22	0.027	.04683 .7584095
accessibilityofmarket	5.948292	2.723527	2.18	0.029	.6102775 11.28631
graceperiodinyears	6.623989	3.139359	2.11	0.035	.4709576 12.77702
interstrate	-369.9184	543.3565	-0.68	0.496	-1434.877 695.0407
technologyadoption	7.427596	4.483553	1.66	0.098	-1.360006 16.2152
keepingbookofrecords	2.559082	2.546567	1.00	0.315	-2.432097 7.550261
_cons	-4.855786	62.81457	-0.08	0.938	-127.9701 118.2585

From the results in Table 4.11 above, a likelihood ratio (LR) statistic of 136.47 with a chi squared (χ^2) distribution at ten degree of freedom is significant at 5% predictive probability level. This means that at least one of the independent variables in the model has a significant effect on loan repayment in the observed population. Additionally, the P=0.000 means that the model is significant and Pseudo R2 is 0.8859 means that the explanatory variables explain the dependent variable about 88.59%. Accordingly, eight significant explanatory variables listed in the table are accepted up to 10% level significance and 7 significant explanatory variables listed in the table above are accepted up to 5% level significance.

4.2.1. Analysis of Significant Variables

Out of the ten variables hypothesized as determinants of loan repayment of the project financing scheme, seven of them were found to be statistically significant at 5% level of significance and eight variables are significance at 10% level of significance. The maximum likelihood estimates of the logit regression model shows that loan amount, number of project follow-up (per year), loan repayment period (in years), market accessibility , grace period(in years), educational level of borrowers and business experience of borrowers(in years) were significant factors determining the loan repayment of DBE's financed projects/borrower's at 5% level of significance. The coefficient of interest rate is statistically insignificant at 10% level of significance. On the other hand, the coefficients of technology adoption and keeping books of records were less influential in explaining loan repayment performance of DBE's financed projects or borrowers at 5% level of significance.

Loan amount: - the result of the logit model shows that loan amount has significant and negative effect on loan repayment of DBE's borrowers/project owners. This is because of the fact that project owners/borrower who have received large amount of loan could divert the loan for other purpose apart from the prior aim of the loan or recklessly utilized for other trade purpose, or can't manage the fund well , and the accumulated debit deter borrowers from timely payment of its loan. As the loan amount received by DBE's borrower increases by one unit keeping other things constant the log odds of being non-default decreased by a factor of 1.16e-8 or the probability of being default is increase vise-versal. This also confirms the result of Ghahremanzadeh, M. Ainollahi, and R. Ferdowsi (2015), thatas the volume of loans borrowed or receiving becomes large; borrowers tend to be more defaulters.

Educational level of borrowers: -the result of the logit model shows that education level of borrowers/ project owners has significant and positive effect on loan repayment of borrower's or projects. It might be because of the fact that borrowers/project owners, who have higher education level could see things in different ways and from different perspective, easily stand the with the external threat and, absorbed and can utilized as an opportunities, operate even within its weakness and their vision also contributed to offset its weakness and continue to do things in the right way, take advantage of comparative advantages from similar projects, understand well the credit terms, find better market for their products, and they could be cost conscious that is cost-effective usage of resources. These and other reasons make the project owner/ borrowers who have a higher education level to have a superior loan repayment performance. Having BA/BSs or above education level increases the log odd of non-default by a factor of 6.5027 that is significant at 5% significant levels keeping other things constant. This implies that a borrower will likely have greater loan repayment ability when he/she has or completed a higher educational level keeping other thing constant or as the borrower educated more and more, the probability of being non-defaulter or credit worthiness increases. This also confirms the results of O.Ombongi (2015) and Neema Mori, Thadei Nyantori and Donath Olomi (2016).

Business experience of borrowers: - borrowers/ project owners business experience is a significance (at 5%) variable and has a positive coefficient of 0.0402. This means that the likelihood of the financed projects or borrower's able to repay its loan will increase when the number of the borrowers/ project owner business experience increase and vis-à-vis. The implication is that borrower's business experience could probably lead to proper utilization of the financed project fund and inputs, and this could have a positive effect on project success and

profitability. Business experience of borrower's increases the probability of being non-default increase or as business experience of borrowers increase by one year probability of borrower's loan repayment increase by 0.0402 keeping other things constant. This is because borrower's acquired more and more business experience and they acquired problem solving skill. This also confirms the results of Osman Yibrie and Prof. R. Ramakrishna (2017).

number of project follow-up(per year): continuous and frequent follow up has positive and significant impact on loan repayment of borrower/project owners and has a positive coefficient of 3.5585. This means as the number of follow up increase by one the probability of borrowers being non default increase by a factor of 3.5585 being other things constant. This is mainly because of continuous and frequent project follow up reminds borrowers to pay attention toward their business and enables to increase their responsibility towards loan repayment and also increase loan collection rate of the bank. This result confirms the result of Neema Mori, Thadei Nyantori and Donath Olomi (2016).

Accessibility of Market: -market access for their output/products is an important factor which is positively and significantly affects borrower's/project owner's loan repayment ability. Probability of borrower's loan repayment ability increased by a factor of 5.9485 when they accessed market for their product being other things is constant. In other words borrowers loan repayment increase by a factor of 5.9485 when they access market for their product. These because project owner or borrowers having large market for its product can easily sale its product, and can generate cash and get profit. Thus, it can repay its loan or debit timely. This confirmed the result of Ayele (2016) & Sisay (2017).

Loan repayment period:-when borrowers gets longer repayment period, periodic repayment amount are lessen so that they can accumulate enough cash and profit. Loan repayment period is an important that determines the loan repayment performance of borrower and significant variables which has a positive coefficient of 1.5598. This means as the loan repayment period increase by one year, the probability of borrower's loan repayment performance increase by 1.5598 being other things constant. In other words, as the loan repayment elongated by one year, the probability DBE's borrowers being non-defaulters increase by 1.5598 keeping other things constant. The confirmed the result of Abebe (2012) and Solomon (2014).

Grace period:- grace period is another significant and important variable which has a positive coefficient of 6.6239 in the logit regression. Grace period is the period given by the financial institution to the borrower before the first installment is due. It has a significant impact on

project implementation, commissioning, testing, production of goods, marketing of good and sales generation of the borrowers. In this study, the analysis shows that when grace period increase the probability of borrowers being non-default increase and vice versal. In other words, grace period increased by one year, the Probability of DBE's borrower being non-defaulter increase by 6.6239 or as grace period increase by one year, the probability of borrower's repayment performance increase by 6.6239. The result can substitute the finding of Makorere (2014).

4.2.2. Analysis of Insignificant Variables

The maximum likelihood estimates of the logit regression model specifies that interest rate, technology adoption and keeping books of records were insignificant factors determining the loan repayment of DBE's financed projects or borrower's at 5% level of significance. The coefficient of interest rate is statistically significant at 10% significant level. On the other hand, the coefficients of technology adoption and keeping books of records were less influential in explaining loan repayment of DBE's borrowers /financed projects.

Interest rate: the model confirms that interest rate has an insignificant and negative impact on loan repayment of project/borrowers financed by DBE. The predictive probability of borrowers/ project owners being defaulter increases by a factor of 369.9184 as interest rate increased by one percent keeping other things being constant. In other words, the probability of borrowers being non-defaulter decreased by a factor 369.9184 as interest rate increased by one percent other things being constant. Nevertheless, interest rate has negative relationship with loan repayment of borrower because an increase in interest rates on credit facilities/loans/ to the borrowers is likely to deter them from servicing their loans according to the agreed terms and conditions. This result substituted the finding of M.W. Kariuki and S. Ngahu, (2016) and Ali Othman Abbas(2017).

Techology adoption: the model shows that technological adoption has positive relationship but insignificant variables. It has a positive coefficient of 7.4275. This means, as the borrower adopted a technology of 0-5 year old technology the probability of being non-defaulter is increased by a factor 7.4275 being other things constant. The result is supported by Garomsa (2017).

Keeping book of Records:- the other variable considered in the study is keeping books of records. The model shows keeping book of records has a positive coefficient of 2.5590 but insignificant variables. This means being other things remain constant, borrower's non-defaulter

rate increase by 2.5590 when they practiced or adopted a keep a book of records. The result confirmed Sisay (2018).

4.3. Correlation Analysis between Independent Variables

A correlation is a statistical method that determines the degree of relationship between two different variables. It is also known as a bivariate statistic, with bi- meaning two and variate indicating variable or variance. It exists between two variables when the values of one variable are somehow associated with the values of the other variable (Adams, 2019). According to econometrics book (Chapter 10, Regression and Correlation), correlation coefficient is ranges or lies $[-1, +1]$. It means -1 : perfectly negatively correlated, $+1$ means perfectly positively correlated and 0 means no correlation between two variables.

The result of correlation analysis shows that eight of the independent variables used in the analysis i.e; project follow up, loan repayment period, educational level of borrowers, business experience of borrower, market accessibility, grace period and technology adoption to loan amount have high negative correlation. Thus, ones the borrower access the loan from the lender institution (i.e; DBE), the bank started calculating interest rate on the loan, disbursed the approved loan and follow the activities of the customer or borrower at every stages of the project implementation. On the other hand, the borrower or customer expected to purchase and install the technology, start production, utilized its grace period, find market and sales its product, adopt keep book of records and repay the loan as per the contractual agreement with in the loan repayment period. Hence, the researcher (me) had used a loan amount for my analysis.

Table - 4.12. Correlation Analysis between Independent Variables

Correlation matrix of coefficients of logit model

	loanst-s										
e(V)	loanam-t	nofoll-r	totalr-s	educat-s	busine-a	access-t	gracep-s	inters-e	techno-n	keepin-s	_cons
loanstatus											
loanamount	1.0000										
nofollowup-r	-0.8740	1.0000									
totalrepay-s	-0.9474	0.8913	1.0000								
educationa-s	-0.8975	0.8659	0.9414	1.0000							
businessex-a	-0.7706	0.7952	0.8193	0.7927	1.0000						
accessibil-t	-0.7351	0.6318	0.7252	0.6442	0.6883	1.0000					
graceperio-s	-0.8251	0.8426	0.8271	0.7745	0.6970	0.7622	1.0000				
interstrate	0.2183	-0.2409	-0.2229	-0.2123	-0.2499	-0.2640	-0.2566	1.0000			
technology-n	-0.7182	0.8196	0.7113	0.6641	0.6147	0.4627	0.6730	-0.2368	1.0000		
keepingboo-s	0.0740	-0.0125	0.0856	0.1081	0.2261	0.1156	-0.0119	-0.0680	-0.0379	1.0000	
_cons	0.0540	-0.0390	-0.0661	-0.0707	-0.0096	0.0406	-0.0028	-0.9542	-0.0028	0.0085	1.0000

4.3.1. Loan Amount

As shown in table 4.12, loan amount has strong negative relationship with number of project follow up, loan repayment period, educational levels of borrowers, business experience of borrowers, market accessibility, grace period and technology adoption. The degree of correlation between loan repayment period, educational level of borrowers, project follow up, grace period, business experience of borrowers, market accessibility and technology adoption was 94.74%, 89.75 %, 87.47%, 82.51%, 77.06%, 73.51% and 71.82% negative relationship in descending order respectively. When evaluated the positive relationship of the result shows interest rate and keep of books of records was 21.83% and 7.4% respectively. The result told that, the bank didn't do its part i.e; continuous and frequent follow-up at every stage of the project implementation, not gave enough grace period and loan repayment period. Borrowers on the other hand didn't purchased and install the technology, start production as per the schedule, utilized its grace period properly, unable to get market and sold its product, didn't adopted keep book of records and repay the loan as per the contractual agreement with in the loan repayment period as expected.

4.3.2. Project Follow-Up

As shown in table 4.12, project follow up has strong positive relationship with number of loan repayment period, educational levels of borrowers, business experience of borrowers, market

accessibility, grace period and technology adoption. The degree of correlation between loan repayment period, educational levels of borrowers, business experience of borrowers, market accessibility, grace period and technology adoption was 89.13%, 86.59%, 84.26%, 81.96%, 79.52% and 63.18% positive relationship in descending order respectively. When evaluated the negative relationship of the result shows interest rate and keep of books of records was 24.09% and 1.25% respectively. The result told that, as the number of project follow-up increase per year loan collection increase. The borrowers did as per the predetermined project implementation schedule they become more non-defaulters.

4.3.3. Loan Repayment Period

As shown in table 4.12, loan repayment period has strong positive relationship with educational levels of borrowers, grace period, business experience of borrowers, market accessibility and technology adoption. The degree of correlation between educational levels of borrowers, grace period, business experience of borrowers, market accessibility, and technology adoption was 94.14%, 82.71%, 81.93% ,71.13%, and8.56% positive relationship in descending order respectively. When evaluated the negative relationship of the result shows interest rate was 22.29%. The result told that, as length of the loan repayment period elongated borrowers get more slack time to repay their loan while on the other hand it is increase the loan interest rate and thus slightly (in some extent) negatively affect borrower's loan repayment ability.

4.3.4. Educational Level of Borrower

As shown in table 4.12, educational level of borrowers has strong positive relationship with business experience of borrowers, grace period, technology adoption, market accessibility and keep book of records. The degree of correlation between business experience of borrowers, grace period, technology adoption, market accessibility and keep book of records was 79.27%, 77.45 %, 66.41%, 64.42% and 10.81% positive relationship in descending order respectively. When evaluated the negative relationship of the result shows interest rate was 21.23%. The result told that as educational level increase or as borrowers educated more it enables them to easily adopt new and utilize updated technology, effectively utilizes its grace period, easily understand the credit term and adopt keep of books of records. Thus, makes borrowers helps to made payment of its debit on time and become non-defaulters.

4.3.5. Business Experience of Borrower

As shown in table 4.12, business experience of borrower has strong positive relationship with grace period, market accessibility, technology adoption and keep book of records. The degree of

correlation between grace period, market accessibility, technology adoption and keep book of records was 69.70%, 68.83%, 61.47%, and 22.61% positive relationship in descending order respectively. When evaluated the negative relationship of the result shows interest rate was 24.99%. The result told that as borrower's business experience increases (from year to year), it helps to adopt new ways of thinking and get more market connection and thus enables them to get more customers for its product. Thus brings great opportunities to borrowers to sales its product easily and get profit accordingly. After all, the borrower's become more creditworthy and non defaulters.

4.3.6. Market Accessibility

As shown in table 4.12, Market accessibility has strong positive relationship with grace period. The degree of correlation between grace period, technology adoption and keep book of records was 76.22%, 46.27% and 11.56% positive relationship in descending order respectively. When evaluated the negative relationship of the result shows interest rate was 26.40%. The result told that as borrowers get large market for its product, it can easily sell its product and it can generate more cash. In addition, when the borrowers get enough grace period before starting loan repayment it acquired more slack time for finding more markets and get enough time to enter sales contract agreement with large buyers. A borrower adopting latest technology can produced up to date products and accordingly the product of the borrower increases and attracts more consumer, so that it makes them more competent and enables to get large share from the existing market.

4.3.7. Grace Period

As shown in table 4.12, grace period has strong positive relationship with technology adoption and negative with interest rate and keeping books of records. The degree of correlation between technology adoption, interest rate and keep book of records was 67.30% positively and 25.66% and 1.19% negative relationship respectively. Thus indicated that in the grace the borrowers has enough time to evaluate perform invoices of the technology from technical and financial perspective, enables to scrutinize new and different markets, have enough time before decided the technology going to installed, purchase and installed ,and enables borrowers to properly recruited well and trained manpower to run the technology. While keeping books of records is negative and insignificant relationship (below- 0.5) that it is due to in the grace period borrowers didn't recorded because they didn't start production or sales but interest rate is calculated and accumulated till borrowers started loan repayment.

4.4. Post Estimation

4.4.1. Multicollinearity Tests

Multi-collinearity problem occurs when the explanatory variables are very highly correlated with each other and it leads to unreliable and unstable estimates of regression coefficients. Hence, it causes strange results when attempting to study how well individual independent variables constitute to an understanding of the dependent variable. In the construction of an econometric model it may happen that two or more variables giving rise to the same piece of information are included, that is we may have redundant information or unnecessarily included related variables. Multicollinearity problem is identified when the independent variables have a linear combination of each other. A common rule to use can be either VIF(Variance Inflation Factor) or tolerance. Accordingly, VIF greater than 10 is considered as an indicator of multi-collinearity or collinearity. As shown in the table, the independent variables in the model have all less than 10 VIF. Thus, there is no possible serious threat of multi-collinearity problem to the model.

Table-4.13. Multi-collinearity Test

. vif

Variable	VIF	1/VIF
technology~n	2.88	0.347647
accessibil~t	2.35	0.425697
educationa~s	1.93	0.519465
totalrepay~s	1.29	0.775964
nofollowup~r	1.28	0.783690
interstrate	1.22	0.819934
keepingboo~s	1.18	0.849852
businesssex~a	1.15	0.868465
graceperio~s	1.15	0.871143
loanamount	1.09	0.919223
Mean VIF	1.55	

The mean of VIF is 1.55 which is lower than 10, so there is no multi-collinearity problem

4.4.2. Model Selection Criteria after Logit Regression

As shown in the following Table 4.14, the null hypothesis for model selection is that the model is good model or all the independent variables have a power of explaining the dependent variable.

Table 4.14. Goodness of fit for model selection

<u>Logistic model for loanstatus, goodness-of-fit test</u>	
Ho: the model is good model	
Ha: the model is not good model	
number of observations =	131
number of covariate patterns =	131
Pearson chi2(120) =	38.71
Prob > chi2 =	1.0000

According to, Book (2014), as the value of R^2 close to 1 indicates that the model explains nearly all of the variability of the dependent variable about its mean value while a value close to zero indicates that the model fits the data poorly. So, the model table 4.14, research result indicated we fail to reject the null hypothesis and hence, the model is well specified to analyze the determinant of loan repayment of the financed borrower or projects by DBE. Additionally, the model pseudo R^2 is 88.59% or 0.8859 as it is depicted in the logistic regression. This result indicates that, the logit model explained about 88.59% of the variation, which lies between [0, 1].

4.4.3. Sensitivity and Specificity Analysis

As shown in Table 4.15, the overall rate of correct classification is estimated to be 97.71%, with 97.92% of the non defaulter in loan repayment group correctly classified (specificity) and 97.14% of the defaulter in loan repayment group correctly classified (sensitivity). Classification is sensitive to the relative sizes of each component group and always favors classification into the larger group (non-defaulter group).

Table 4.15. Sensitivity and Specification

Sensitivity	Pr(+ D)	98.95%
Specificity	Pr(- ~D)	94.44%
Positive predictive value	Pr(D +)	97.92%
Negative predictive value	Pr(~D -)	97.14%
False + rate for true ~D	Pr(+ ~D)	5.56%
False - rate for true D	Pr(- D)	1.05%
False + rate for classified +	Pr(~D +)	2.08%
False - rate for classified -	Pr(D -)	2.86%
Correctly classified		97.71%

4.5. Marginal effect of significant variables

Marginal effects are computed differently for discrete (i.e. categorical) and continuous variables. Marginal effects measure discrete change for binary independent variables to predicted probabilities change as the binary independent variable changes from 0 to 1. On the other hand,

marginal effects for continuous variables measure the instantaneous rate of change. Marginal effects can be an informative means for summarizing how change in a response is related to change in a covariate. To know the level of impact of the significant variables on loan repayment of borrowers the marginal effect of independent variables undertake after logit model estimation.

Table 4.16: Marginal effect of significant variables

Expression : Pr(loanstatus), predict()

dy/dx w.r.t. : loanamount nofollowupperyear totalrepaymentyears educationallevelofborrowers businessexperienceofborrowersyea
accessibilityofmarket graceperiodinyears interstrate technologyadoption keepingbookofrecords

	Delta-method					
	dy/dx	Std. Err.	z	P> z	[95% Conf. Interval]	
loanamount	-2.43e-10	8.81e-11	-2.76	0.006	-4.15e-10	-7.01e-11
nofollowupperyear	.0745278	.0239636	3.11	0.002	.0275601	.1214955
totalrepaymentyears	.0326694	.0079366	4.12	0.000	.017114	.0482249
educationallevelofborrowers	.1361916	.0307117	4.43	0.000	.0759977	.1963855
businessexperienceofborrowersyea	.0084323	.0023871	3.53	0.000	.0037537	.0131109
accessibilityofmarket	.1245787	.035892	3.47	0.001	.0542317	.1949256
graceperiodinyears	.1387302	.0452657	3.06	0.002	.050011	.2274493
interstrate	-7.747423	11.03953	-0.70	0.483	-29.3845	13.88966
technologyadoption	.1555606	.0791524	1.97	0.049	.0004248	.3106964
keepingbookofrecords	.0535964	.049389	1.09	0.278	-.0432042	.150397

As shown in the table 4.16, the marginal effect of loan amount has statistically significant and negative effect on loan repayment of DBE's borrowers. The marginal effect of being non-defaulter or credit worthy is decreased by $-2.43e^{-10}$ when the loan amount increase by one birr or

the rate of defaulter increased by same amount when a loan amount increased by one birr other things remains constant. The other significant and has positive impact on borrowers' being non-defaulter is number of project follow-up. Other things remain constant when the number of follow up conducted increased by one unit, the probability of being non-defaulter increased by 0.0745. Length of loan repayment period also has positive and significant impact on borrower's loan repayment level or performance. Other things remain constant, when the length of loan repayment period increased by one year, the probability of loan repayment of borrowers increased by 0.037. Along these, educational level of borrowers and business experience of borrowers has significant and positive effect on the loan repayment of borrowers. Accordingly, other things remain constant as a borrower educated more, the probability of borrower being non-defaulter increased by 0.136 while as borrower acquired business experience increased by one year, the probability of loan repayment increased by 0.0084 other things remain constant.

The last three significant and has positive effect on loan repayment of borrowers at 5% significant level are market accessibility, grace period and technological adoption. Other things remain constant, if borrowers access a market for its product, the probability of being non defaulter increase by 0.125. On the other hand, grace period increased by one unit, the probability loan repayment of borrowers increased by 0.139 being other things remains constant. Lastly, technological adoption has positive and significant effect on the probability of borrowers being non-defaulter. Accordingly, if borrowers adopted 0-5 years old technology, the probability of being non-defaulter increased by 0.156.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The chapter summarizes the overall findings and conclusions of the study withdrawing the possible recommendations to be addressed by the concerned bodies. Accordingly, the summary report presented below and followed with the conclusion and recommendations for Development Bank of Ethiopia, policymakers, lending institutes management and other stakeholder's decision makings at Bank and micro level.

5.1. Summary

The Development Bank of Ethiopia is a specialized financial institution established to promote the national development agenda through development finance and close technical support to viable projects for the priority areas sectors by mobilizing fund from domestic and foreign sources. It was established for the sole purpose of providing project financing to strategic projects as well as technical services and advice for those projects established by DBE. Because of its vital role in this respect, the government expects the bank to be efficient, effective, transparent, accountable and responsive to the needs and requirements of its customers. This being the reality, the bank copes with ups and downs at a different time and passed from generation to generation. Currently, the bank faced and gradual increment of non-performing loans rate of 12.5%, 17.71%, 24.98%, 39.43% and 33.91% for 2014/15, 2015/16, 2016/17, 2017/18 and 2018/19 which stand apart from NBE's directives No.SBB/43/2008 indicated the acceptable level of NPL is below 5%.

The main objective of the study is to investigate and identifies the major determinants/factors of loan repayment of borrowers in project financing scheme of Development Bank of Ethiopia. Specifically, the paper is intended to evaluate the effect of borrower, lender or bank, and project related factors. The research design employed were explanatory research design with qualitative and quantitative data that extracted from primary and mainly secondary data. To this end, descriptive and econometrics analysis method was used to analysis the result. In order to support the findings of the questionnaires for collecting primary data from respective contact credit officers were qualitatively and quantitatively analyzed. Logit model was adopted to determine as to whether the several explanatory variables, as hypothesized in the paper, have much to do with the loan repayment of DBE financed borrowers or projects.

Data for the study were collected from 131 individual borrower's files of the bank financed projects from January 2012 G.C to June 2018G.C. The study shows that 95(73%) of the financed project were creditworthy (non-defaulters) borrowers or projects whereas the remaining 36 (27%) were defaulters (non-creditworthy). In addition primary data were collected through structured questionnaire by preparing objective questions for the respective credit officers or contact officers/employs. The analysis of the study demonstrated that out of the ten independent/explanatory variables, which were hypothesized to determine the loan repayment of borrowers/projects financed by DBE, seven variables were statistically significant. These variables are loan amount, number of project follow-up (per year), loan repayment period (in years), market accessibility, grace period (in years), and educational level of borrowers and business experience of borrowers (in years). However, the remaining three variables like interest rate, technology adoption and keeping books were less powerful or statistically insignificant.

Loan amount is one of the significant explanatory variables, which has negative effect on loan repayment performance of the borrowers/project owners and statistically significant at 5% level of significant. This result shows as the loan amount increase, the probability of borrowers being default is increase.

Educational level of borrowers is another significant variable which determines loan repayment of borrowers in the project financing scheme. As estimated the variable was positively related to loan repayment and statistically significant at 5% level of significance. This result shows that project financed borrowers who have better educational level is more likely to be successful. Business experience of borrowers is also found to be one of the significant positive determinants of loan repayment of DBE financed projects or borrowers. The implication is that borrower's business experience could probably lead to proper utilization of the financed project fund and inputs and this could have a positive effect on project success and profitability. More over, as the borrower accumulated ample business experience, they can easily cope with external threat and can also manage internal weakness.

Number of project follow-up(per year) also a significant and positive effect on loan repayment of DBE financed borrower/projects. This is because contious and frequent project followup reminds borrowers to pay attention toward their business and enables to increase their perception of responsibility toward loan repayment and also increase loan collection rate of the bank.

Accessibility of Market is the most important variable in increment of loan repayment of borrowers. Borrowers who accessed market for their product are non-defaulters. This is because project owner or borrowers having large market for its product can easily sale its product, generate cash and get profit. Thus, it can repay its loan or debit timely.

Loan repayment period is another significant variable and has positive impact on loan repayment of borrowers. This means, the length of loan repayment period increase, the probability DBE's borrowers being non-defaulters increases. It is because when borrowers gets longer repayment period, the periodic repayment amount are lessen so that they can accumulate enough cash and profit.

Grace period is another significant and important variable which has a positive coefficient of 6.6239 in the logit regression analysis. It is the period given by the financial institution to the borrower before the first installment is due. It has a significant impact on project implementation, commissioning, testing, production, marketing of good and sales generation schedule of the borrowers. In this study, the analysis shows that when grace period increase the probability of borrowers being non-default increase and vice versal. In other words, grace period increased by one year, the probability of DBE's borrower being non-defaulter increase by 6.6239 or as grace period increase by one year, the probability of borrower's repayment increase by 6.6239.

On the other hand, interest rate has an insignificant and negative impact on loan repayment of borrower's or project's financed by DBE. It has negative relationship with loan repayment of borrower because an increase in interest rates on credit facilities/loans/ to the borrowers is likely to deter them from servicing their loans according to the agreed terms and conditions. While technology adoption and keeping book of records has positive coefficient but insignificant impact on loan repayment ability of Development Bank of ethiopia financed projects or borrowers.

5.2. Conclusion

Based on the findings it can be concluded that loan amount, educational level of borrowers, business experience of borrower, number of project follow-up per year, grace period, market accessibility for product and loan repayment period have significant impact on loan repayment performance; which means any increase (decrease) on the value of these variables leads to an increase (decrease) on loan repayment performance of DBE's financed projects or borrowers. While interest rate has insignificant and negative relationship with loan repayment of the Bank's

borrowers while technological adoption and keeping book of records have insignificant but positive relationship with loan repayment of Bank's borrowers.

5.3. Recommendation and Policy Implication

This study has a potential to support the policy makers of Development Bank of Ethiopia and main stakeholders (i.e; employees, management of the bank and borrowers) to take corrective measures on the most important determinants of loan repayment of the bank's borrowers or financed projects. The possible policy implications, emerged from the study, are forwarded below.

One of the vital policy implications has much to do with the strong relationship existing between loan amount approved or granted to the borrower and loan repayment level of borrowers. This negative association suggests that the bank should always require to made serious appraisal study, evaluate the purpose of the loan whether the borrower required for the project purpose or not, make sure the loan amount is enough for the project establishment, evaluated the presented Performa invoices(for machinery ,vehicles and other to be purchased equipments) and unite cost for civil work, made serious due-diligence assessment report, pass well and duly decisions over the utilization of the approved loan , set different terms and disbursement conditions and made progress report at every stage of the project implementation and close follow-up throughout the project life.

Another important policy implication is related to the strong association/relationship prevailing between educational level of borrowers or project owners/ general managers for private and corporate enterprises and, successfulness or creditworthiness of the borrowers to repay its loan on time or as per the entered contractual agreement. This relationship indicates to the bank how well educated borrowers are sensitive to repaying as per the timeframe set in the loan contract agreement. The bank must giving high emphasis on the requirement of educational level of borrowers or general managers in case of private limited Companies (PLC) in the bank's credit policy and loan manual before any loan is approved.

The other most important factors which is statistical significant and determine the loan repayment of borrowers or project finance of DBE is business experience of borrowers. Having experience in the business operations leads to proper utilization of the funds, borrower accumulated ample business experience can easily cope with external threat and can also manage internal weakness, can emanate problem solving skill from itself, effectively utilized its

employees capacity for the prior aim, take the competitive advantage from the existing market and can easily expand their business. Moreover, the risk of failure for both owner and the lender (i.e. DBE) is less when the business operated by experienced person than those who have just started a business. Hence, the bank gives priority for those experienced customer than those who just started and also incorporated in the credit policy and loan manual procedure of the bank.

Continuous and frequent project followup has positive and significant impact on loan repayment performance of borrower/project owners. In other words, the frequency of project follow-up has ultimate impact in the successfulness or creditworthiness of loan repayment of DBE financed borrower/projects. Continuous and frequent project followup reminds borrowers to pay attention toward their business and enables to increase their perception of responsibility toward loan repayment and also increase loan collection rate of the bank. To increase the loan collection and decrease the non performing loans of the bank, the respective bank management should give more emphasis for regular and frequent supervision or follow up of its financed projects.

Length of loan repayment period also found that a significant and has positive relationship with loan repayment of DBE's borrowers. The finding stated that as the borrowers granted longer loan repayment period it becomes more non-defaulters. This is because borrower's gets longer repayment period, the periodic repayment amount are less so that they can accumulate enough cash and can operate smoothly by using the generated cash and they also have enough slack time for repayment of its loan. Therefore, the bank policy maker has to put in credit policy of the bank and the bank should have given to its borrower's longer period to repay its loan.

Grace period has also a positive impact on the loan repayment of financed projects or borrowers. It has a significant impact on project implementation, commissioning, testing, production, marketing of good and sales generation schedule of the borrowers. The analysis shows that when grace period increase the probability of borrowers being non-default increase and vice versa. Hence, grace periods is a preparation time for commissioning, testing, production, marketing of good and sales, accesses of raw materials, procurement of employees and procurement of management staffs, the bank should give longer grace period/enough grace period (at least 0.9 years around 10.8 months) for its customers to increase the loan collection rate of the bank and decrease non performing loans. Moreover, by giving enough grace period it can reduce the

burden of the borrowers and enables them to repay its loan on time or as per the agreed loan contract.

The last significant factor that needs high consideration to the borrowers as well as the lending institution including DBE during project financing is accessibility of market for their products. Market access is an important factor which is positively and significantly affects borrowers/project owner's loan repayment ability. Project owner or borrower's having large market for its product can easily sale its product, can easily generate cash and get profit with shorter time while compared to those who did no access market for its product. Thus, the bank should made serious assessment of the destination of its borrower's product during due diligence assessment report before entering in to loan contract agreement. Hence, it is necessary for a bank to make sure the borrowers can accesses market for its product.

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APPENDICES I

Data collection Format for Secondary Data

This format is prepared to collect data's from the files of the individual borrowers at DBE to undertake the research titled 'Determinants Loan Repayment: the case of Development Bank of Ethiopia

Part I: Data collected from individual Borrowers file and Bank's Data Base

I. Background information of the Borrower's or General Manager(for plc or public Enterprises)

1.1. Name of the project-----

1.2. Educational Level of Borrowers or General Manager

1.2.1. Grade 1-8:-----

1.2.2. secondary school(9-12):-----

1.2.3. Certificate and College Diploma:-----

1.2.4. Degree and Above :-----

1.3. Business Experience of Borrowers or General Manger(for plc or public Enterprises)

1.3.1. Business experience _____ years

II. Project loan status(√)

2.1. NPLS _____

2.1.1. Doubtful: _____

2.1.2. Loss: _____

2.2. Performing Loans: _____

2.2.1. Pass: _____

2.2.2. Special Mention: _____

2.2.3. Substandard: _____

III. Total amount of Loan _____ (in Birr)

IV. Number of project follow-ups/ supervision conducted by the Bank per annum _____

V. How many months/years grace period given to the project

5.1. In Months _____

5.2. In years _____

VI. Length of loan repayment period in years: _____ (in years)

VII. Interest rate charged on the principal loan installment : _____ (in %).

Part II: Questionnaire for contact credit officers

My name is Anteneh Bezeye and I am currently working with the research component of the Master's Degree in Management (MSc.) at Addis Ababa University. The purpose of my study is to identify and examine loan repayment determinants of Development bank of Ethiopia Borrowers.

To this end, I have prepared a self administered questioner to help me gather the pertinent information from borrowers. The quality of the result of this research is based on the accuracy of the information you provided. Eventually, I promise you, the information you will provide me is going to be reported and communicated in aggregate and utmost care will be taken for its confidentiality.

In case you have any questions please call 0942201461 or email anteb2011@gmail.com.

Questioners for the respective contact Credit Officers

1. Name of the project :-----
2. Is the borrower/project adopted/practiced a keeping book of records for its transaction?
(√)
 - 2.1. Yes _____ (practiced a book of records)
 - 2.2. No: _____ (not started a book of records)
3. The technology adopted or installed by the borrower: _____
 - 3.1.0- 2 years old and could be updated for minimum cost
 - 3.2.3-5 years old and could be updated for minimum cost
 - 3.3. 6-9 years old and could be updated for minimum cost
 - 3.4. Above 10 years old
4. Market for the products of the project/borrowers((√)): _____
 - 4.1. Yes(√)
 - There are large number of customers for the product: _____
 - There are medium number customers for the product: _____
 - 4.2. No(√)
 - There are low number of customers for the product: _____
 - There are no customers for the product: _____

Thank You

APPENDICES II

Correlation Coefficients

. estat vce, correlation

Correlation matrix of coefficients of logit model

	loanst~s										
e(V)	loanam~t	nofoll~r	totalr~s	educat~s	busine~a	access~t	gracep~s	inters~e	techno~n	keepin~s	_cons
loanstatus											
loanamount	1.0000										
nofollowup~r	-0.8740	1.0000									
totalrepay~s	-0.9474	0.8913	1.0000								
educationa~s	-0.8975	0.8659	0.9414	1.0000							
businesssex~a	-0.7706	0.7952	0.8193	0.7927	1.0000						
accessibil~t	-0.7351	0.6318	0.7252	0.6442	0.6883	1.0000					
graceperio~s	-0.8251	0.8426	0.8271	0.7745	0.6970	0.7622	1.0000				
interstrate	0.2183	-0.2409	-0.2229	-0.2123	-0.2499	-0.2640	-0.2566	1.0000			
technology~n	-0.7182	0.8196	0.7113	0.6641	0.6147	0.4627	0.6730	-0.2368	1.0000		
keepingboo~s	0.0740	-0.0125	0.0856	0.1081	0.2261	0.1156	-0.0119	-0.0680	-0.0379	1.0000	
_cons	0.0540	-0.0390	-0.0661	-0.0707	-0.0096	0.0406	-0.0028	-0.9542	-0.0028	0.0085	1.0000

APPENDICES III

Covariance Coefficients

Covariance matrix of coefficients of logit model

	loanstatus									
e(V)	loanamount	nofollowup-r	totalrepay-s	educatio~s	business~a	accessib~t	graceper~s	interstr~e	technolo~n	
loanstatus										
loanamount	3.280e-17									
nofollowup-r	-8.370e-09	2.7955565								
totalrepay-s	-3.561e-09	.97798079	.43064429							
educatio~s	-1.390e-08	3.9153819	1.6706904	7.313668						
business~a	-8.012e-10	.24134341	.09759399	.3891439	.03295268					
accessib~t	-1.147e-08	2.8769679	1.2962023	4.7445872	.3403019	7.4175991				
graceperio~s	-1.484e-08	4.4226557	1.7039255	6.5751405	.39723306	6.516551	9.8555775			
interstrate	6.795e-07	-218.88532	-79.494296	-311.93603	-24.649502	-390.6555	-437.72048	295236.24		
technology~n	-1.844e-08	6.1444544	2.0927276	8.0527296	.5003086	5.6499847	9.4723524	-576.952	20.102247	
keepingboo~s	1.080e-09	-.05343036	.14299676	.74431986	.10451061	.80192729	-.09540488	-94.064986	-.43229422	
_cons	1.942e-08	-4.0937411	-2.7236716	-12.005899	-.11001509	6.9485772	-.55950884	-32567.257	-.78540381	

	loanstatus	
e(V)	keepingb~s	_cons
loanstatus		
keepingboo~s	6.4850018	
_cons	1.364959	3945.6697

APPENDICES IV

Heteroscedasticity Test Result

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. estat hettest
```

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of loanstatus

chi2(1) = 4.12

Prob > chi2 = 0.0424

Logistic model for loan status, goodness-of-fit test

Logistic model for loanstatus, goodness-of-fit test

```
number of observations = 131  
number of covariate patterns = 131  
Pearson chi2(120) = 38.71  
Prob > chi2 = 1.0000
```