



ADDIS ABABA UNIVERSITY
COLLEGE OF BUSINESS AND ECONOMICS
MASTERS OF SCIENCE IN MANAGEMENT

**Undeterred Non-Performance Loans in Development Bank of Ethiopia: The
Role of Agricultural Project Loans (2007-2019)**

**A Thesis Submitted for the Partial Fulfillment of the Requirements for Degree
of Master of Science (Msc) in Management**

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DECLARATION

STUDENT'S DECLARATION

This is my original work and has not been presented for a degree in any other university.

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ADVISOR'S DECLARATION

This Project has been submitted for examination with my approval as university advisor

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EXAMINERS' DECLARATION

The thesis prepared by Firew Yoans with the title "Effect of Agricultural Project Loans on Loan Performance of the Development Bank of Ethiopia and submitted in partial fulfillment for Masters of Science in Management, complies with the regulations of the university and meets the accepted standards with respect to originality and quality

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ABBREVIATIONS AND ACRONYMS

CSA	Central Statistics Agency
DBE	Development bank of Ethiopia
GDP	Gross Domestic Product
GOE	Government of Ethiopia
IMF	International Monetary Fund
ROA	Return on asset
NBE	National Bank of Ethiopia
NPL	Non-performing loans
PF	Project Finance
OCED	Organization for Economic Co-operation and Development
LLR/TL	Total loans ratio

ABSTRACT

Non-performing loans (NPLs) pose a great risk on a macroeconomic stability as well as Banks survival. NPLs are loans whose credit quality has deteriorated such that full collection of principal and/or interest in accordance with the contractual repayment terms of the loan and advances are in question. Based on the existing evidence and reports the level of NPLs at DBE is very concerning. In this study, we explore both the extent and effect of the agricultural loans on non-performing loans of the Development Bank of Ethiopia. The general objective of the study is to analyze the role of agricultural loan on non-performing loan (NPL) of the Development Bank of Ethiopia. Specifically, the study identifies the impact of agricultural non-performing loan on the overall non-performing loans of DBE and examines nature and characteristics of non-performing agricultural loans. This study uses binary logistic regression to predict Effect of agricultural project loan on loan performance of DBE, by taking all agricultural projects loans (n=726). Overall, the study finds that significant proportion of the loan is Non-performing largely orchestrated by defaults in Fiber Crops and Oil Crops. Investors in horticulture industries has better performing loans. Non-Resident Individual, Regional Government Federal Government, Micro Enterprise, Associations have a high Non-performing loan than private limited companies and resident individuals. The overall high nonperformance of governmental and government affiliated institutions is more likely to be associated to high risk taken by the policy bank to provide high risk loans without adequate collateral or appraisal procedures. In comparison, loans with high interest rate, approved by district banks, medium size loans ranging between 2.5 to 10 million were more likely to fall under non-performing loans. Over the past decade loans taken for Fiber Crops largely yielded Non-performing loans. The lending interest rate 12% is much more like to yield Non-performing of Agricultural project loans than interest rate 8.5%, 9%, and 9.5%. The study recommends that the management Special attention and close follow-up is essential on Agricultural projects in order to minimize NPL. This will reduce default and enhance loan collection of the bank and proper Implementation of NPLs Reduction action plan strategy combining quantitative and qualitative variables in as effects of agricultural performance could be considered in future.

Keywords: *Loan performance, Development Bank of Ethiopia, Agricultural Project Loans.*

CHAPTER ONE

1.1 Background of the study

In the past twenty years there has been a new wave of global interest in project finance as a tool for economic investment (International Finance Corporation, 2019). The origins of international Project Finance can be traced back as far as the middle Ages, when the British Crown financed silver mines (Esty et al., 2014). Modern history provides abundant examples for equally impressive landmarks such as the Burj Khalifa skyscraper, the EURO-Tunnel, the Hong Kong-Zhuhai Bridge, or the Ichthys oil field, offshore of Australia, in which a consortium of oil MNCs financed the exploitation of one of the world's largest underwater natural gas resources, using almost 34 billion USD in capital. In 2015 alone, a total of 275 billion USD loans were invested in PFs (Project Finance International, 2016).

According to Ravis(2013), the project finance risk analysis should consist of three steps, similarly to the process outlined for general corporate risk management. Risk identification and assessment, Risk allocation and transfer Analysis, management and mitigation of any remaining non-transferred risks.

According to Selvavinayagam(1995) state owned banks, whether agricultural, industrial or hybrid are their dependence on Government and external donors for resources at concessional interest rates, availability of larger subsidy than non-public banks, offer of narrow range of financial services and political pressure to lend to risky or non-creditworthy borrowers with consequent default rates running high.

Based on the literature, risk can be analyzed through various ways, namely credit risk, market risk, liquidity risk, overall risk etc. In this study, we consider only credit risk. In the literature, credit risk is measured by the ratio of non-performing loan to total loans (NPL), and a higher a higher ratio indicates that there is more risk for losses from loan defaults Zhang, et al (2013).

The International Monetary Fund defined non-performing loan (NPL) as any loan in which interest and principal payments are more than 90 days overdue; or more than 90 days' worth of

interest has been refinanced (IMF, 2008). On the other hand, the Directive of the National Bank of Ethiopia (NBE) states that NPL means whose credit quality has deteriorated such that full collection of principals and or interest in accordance with the contractual repayment terms of the loan advance is in question. National bank of Ethiopia has defined five stages of loan in terms of classification which includes Pass, Special Mention, Substandard, Doubtful and Loss (NBE, 2012). In addition the NBE classifies three categories of NPL as substandard, doubtful and loss loans based on the number of days a loan past due; substandard loans are medium and long term loans past due 180 (one-hundred-eighty) days or more, but less than 360 (three-hundred-sixty) days, doubtful loans are medium and long term loans past due 360 (three-hundred-sixty) days, but less than 3 (three) years; Loss loans are medium and long term loans past due 3 (three) years or more (NBE, 2012).

By June 2015, in Ethiopia state owned banks constitute about 93.6% of the total agricultural credit. Whereas, the remaining 16 private banks share the remaining 6.4% of the total agricultural credit portfolio. Private Banks do not grant adequate level of credit to agricultural projects, compared to other sectors (Nebiat, 2017), which mandated policy directions on government owned banks, such as Development Bank of Ethiopia to close the gap. As a result, the policy banks bear disproportionate burden of lending agricultural loans, for a sector which is highly vulnerable for failure due to natural and man-made challenges.

In 2015 and 2016, the issue of NPL in DBE became a public agenda after several media outlets such as Fortune Addis and Capital Ethiopia started reporting about the crisis of the agricultural loans in various regional states. The extent of the crisis was later announced by the Bank management in 2017. According to the public information, the Non-Performing Loan (NPL) ratio was reported to be 40 percent in 2017, a significant increase from 9.9% in the 2013/14 (Fortune, 2017; Capital Addis, 2018).

Agriculture continues to be a fundamental instrument for sustainable development and poverty reduction yet, ‘financial constraints in agriculture remain pervasive, and they are costly and inequitably distributed, severely limiting smallholders’ ability to compete’ (World Bank, 2008). Sudden and dramatic changes in food prices have exposed the vulnerability of agricultural production in meeting global demand and call for increased investment in agriculture at all

levels. The question is how the right amount of investment can be acquired, particularly in a challenging milieu where financial uncertainty causes a reduction in available resources along with increased fear and scrutiny of risk. An answer to addressing these constraints goes beyond conventional measures since agriculture has always been difficult to finance through formal financial institutions and approaches.

Chapter one introduces the problem followed by the objective of the study. In chapter two we will present literature review. In chapter Three we will present methods and procedures. In chapter four data analysis and results will be presented. The last two chapters will be dedicated for conclusion and recommendations.

1.2 Statement of the Problem

Globally, number of countries in Euro Zone, Africa and Asia are suffering from Nonperforming Loans (NPLs) in which banks are unable to get profit out of loans. Accordingly, issues of Nonperforming Loans (NPLs) gained increasing attentions in the past few decades. Poor loan management will contribute to NPLs. It is critical issue for every bank to manage bad loans (Petersson and Wadman, 2004). According to MacDonald, well managed loans increase the bank's profitability and sustainability in the future. However, if failed to do so, it will be the major threat to their survival (MacDonald, 2006). In the past decades, many countries and financial institution, especially the Banking Industry suffered various version of financial crisis, because non-performing loans have risen steadily. The problem of non-performing loans is seen as a burden on any country's economy or financial institution and putting downward pressure on its growth (Yoonhee, 2006).

NPLs have significant implications on the banking sector. For instance, a high rate of NPLs may cause expectations about the stability of the banking system to deteriorate, creating systemic risk that may in turn lead to a run on deposits, significantly reducing the intermediation power of banks (Anastasiou, 2019).

Based on the existing evidence and reports the level of NPLs at DBE is very concerning. According to some observers (Fortune, 2017), the NPL is consuming a huge chunk of the Bank's income. Although various figures are reported by different outlets (as high as 40% by Capital

Addis, citing the DBE President), there is a general concern that the NPL of the DBE is unacceptably high. For instance, Fortune Addis reported that there was 22% decline in net profit of the Bank for the second year in a row as the Non-Performing Loans (NPLs) ratio of the Bank increased from 16% to 25% as of June 2016/17 (Fortune Addis, 2018).

Besides, existing studies related to DBE mainly focus on credit policy and risk assessment. For instance, Mamuye (2015) analyzed the determinant of NPL in Development Bank of Ethiopia mainly focusing on the relationship between collateralized lending and NPL. As a matter of fact, the study found that the probability of NPL is higher when the Bank provided high risk loans.

In this study, we will explore both the extent and effect of the agricultural loans on the performance of the Development Bank of Ethiopia. The major focus will be on assessing factors contributed to the NPL of the loans based on secondary data. This study will conduct a robust analysis of NPL using the central database of the DBE which will settle the issue of different NPL reported by various outlets. Second, the study will analyze the nature of the loans and contexts in which the loans were approved, managed and monitored. This study assesses the impact of agricultural project loans on non-performing loans of DBE (2007-2019) in which the previous studies does not give concentration.

1.3. Research questions

- What is the effect of agricultural non-performing loan on the overall non- performing loans of DBE?
- What are the characteristics of borrowers disproportionately associated with nonperformance agricultural loans?
- Is there a regional and sub sectorial variation of agricultural loan performance?

1.4 Objective of the study

1.4.1 General objective of the study

The general objective of the study is to analyze the role of agricultural project loans to the undeterred non-performing loans of the Development Bank of Ethiopia between 2007 and 2019.

1.4.2 Specific objective of the study

The study was guided by the following specific objectives

- Identifying the role of agricultural non-performing loan on the overall non- performing loans of DBE.
- Examining the nature of performing vs nonperforming agricultural loans.
- Identify regional and sub-sectoral variation of agricultural loan performance.

1.5 Scope of the Study

The study was including loan data between 2007 and February 2019. Accordingly, the researcher was able to determine both the historical and current NPL in general and the agricultural loan specifically.

1.6 Limitation of the Study

The limitations of the study include:

- Exclusion of nonagricultural loans
- Limitations arising from the nature of the data (e.g. lack of data on exceptional approvals)

1.7 Significance of the study

The study described the nature and scope of the agricultural loans and their impact on non-performing loan of the DBE. The findings would be beneficial for the overall banking sector due to the development of new loan assessment methods, which incorporates factors beyond the investors' proposals and projects. The study will generate policy implications in relation to lending sectorial policies and loan management practices and could serve as an input for developing directives and regulatory standards. The study informed the current DBE management regarding various factors which affected the NPL of the agricultural sector and take remedial actions as needed.

1.8 Operational Definition

Credit risk – the risk arises as result when the borrower fails to conclude its financial contract according to the agreement with lender. It is an asset default by counter party.

Loan and advances: any financial asset granted by banks to borrower on a contract of an obligation to repay the principal amount with usually its interest either on due date or demand.

Performing loans: According to the International Monetary Fund, a performing loan is any loan in which: interest and principal payments are less than 90 days overdue; less than 90 days' worth of interest has been refinanced, capitalized, or delayed by agreement; and continued payment is anticipated.

Nonperforming loans - a loan whose credit quality has deteriorated and the full collection of principal and/or interest as per the contractual repayment terms of the loan/advances is in question and delayed for more than 90 days (NBE, 2008).

Borrower: - the one who borrows money from the lender (Bank).

Lending: - provision of loan by one party (lender) to another party (Borrower)

Interest rate: represents rate of returns available from the various alternative lending and investing activities. Fundamental problem of bank management is achieving the proper balance between return and risk.

Collateral: Collateral is an asset that a lender accepts as security for a loan. If the borrower defaults on the loan payments, the lender can seize the collateral and resell it to recoup the losses.

Fund Management: Is the overseeing and handling of a financial institution's cash flow. The fund manager ensures that the maturity schedules of the deposits coincide with the demand for loans. To do this, the manager looks at both the liabilities and the assets that influence the bank's ability to issue credit.

Loan Amount: the amount specified in the mortgage contract that the borrowers agree to pay back. The amount of points included, and various other costs make the loan amount different from the quantity of cash distributed by the lender.

Equity contribution: A contract on which the parties agree to provide capital for a project in return for shares proportional to the capital invested. Sufficient equity contribution shows a

lender that you have a commitment to the project and the ability to earn, save, and manage money.

Company: is a legal entity formed by a group of individuals to engage in and operate a business commercial or industrial enterprise. A company may be organized in various ways for tax and financial liability purposes depending on the corporate law of its jurisdiction.

Overdue Age: Loans, bills of exchange, and other obligations remaining unpaid past their due (or maturity) date. All financial arrangements become overdue one business day after their due date.

Provision: is an amount that you put in aside in your accounts to cover a future liability. The purpose of a provision is to make a current year's balance more accurate, as there may be costs which could, to some extent, be accounted for in either the current or previous financial year. These costs that distinctly belong to a specific year could be misleading if accounted for in the future.

1.9 Organization of the paper

The study was organized to have five chapters. The first chapter was introduces background of the study, Development bank background and context, statement of the problem, research question ,objective of the study ,scope of the study, limitation of the study, significance of the study and operational definition. Theoretical Review, Empirical and conceptual review of the study are presented in the second chapter. The third chapter deals with research methodology of the study. The fourth chapter discussed data results, analysis and discussions. The last chapter which is chapter five presents the conclusion and the recommendation

CHAPTER TWO

LITERATURE REVIEW

2.1 Theoretical Review

According to Jakob (2017) project financing is not a recent phenomenon. The origins of international Project Finance can be traced back as far as the middle Ages, when the British Crown financed silver mines through non-recourse loans from Italian merchant banks. However, wide-spread practice of Project Finance did not start until the early twentieth century oil field exploration in the United States (Esty et al. 2014).

There is no single agreed up on definition for project finance .For example, Finnerty (1996) defined project as the raising of fund to finance an economically separable capital investment project in which the providers of the finds look primarily to cash flow from the project as source of funds to service their loans and provides the return of and a return on their equity invested in the project. While Nevitt and Fabozzi(2000) defined as financing of a particular economic unit in which a lender to look initially to cash flow and earnings of the economic units as the source of funds from which a loan will be rapid and to the assets of the economic units as a collateral for the loan.

Typical project finance evolves through the construction and operational stages where the cash flows generated from the projects are used to offset the debts According to Fight (2006). Funding projects through Project Finance arrangements in contemporary Economic and Corporate and economic governance has become the catalyst for developing capital intensive projects in most Organizations and NationsJohn and Obeng(2014)

Esty (2004), who points out that project companies' average leverage ratio is 70%, which is significantly higher than the average debt-to-total capitalization ratio of a typical publically traded company. Second, financiers have only limited or no recourse to the sponsors, meaning that their involvement is limited in terms of time, amount and quality. Third, project risks are allocated to those parties that are best able to manage them. Four, the cash flow generated by the project must be sufficient to cover operating cash flows and service the debt. Finally, collateral is

given by sponsors to financiers as security for cash inflows and assets tied up in managing the project.

According to Nevitt(1983) a successful project financing has the following properties :- a professional and thorough feasibility study and financial planning, experienced operators and contractors with good track-records, an assured market for the project's products. political and country-risk problems under control, a project manager with clear identity, authority and continuity, a sponsor, motivated by adequate projected profits to make the project succeed, a sponsor with past experience in successful project financings and who is aware of the kinds of problems which may arise.

According Fabozzi et al. (2003) project financing has its own advantage that is the sponsor has the opportunity to obtain the required capital to complete the project which he himself cannot ensure, it is easier for the project to get the guarantees the sponsor would otherwise have difficulties in obtaining, in case of the creditor's low credit worthiness, and the project is good, chances are better that financial funds and more favorable conditions for the project are obtained, he financial load per investor related to the debt servicing is considerably smaller.

According to the United Nations Food and Agricultural Organization production year book, agriculture was defined to include cereals, starchy roots, sugar, edible oil, crops, nuts, fruits, vegetables, wine, cocoa, tea, coffee, livestock and livestock products. Also included in the group are industrial oil seeds, tobacco, fiber, vegetable and rubber.

Agriculture is a unique sector because of its dependence on the climate and biological variables. Therefore, in agriculture it is vital to identify and evaluate risks to be sure that decisions made on the farm will bring positive results. Scientific literature describes a lot of risk evaluation methods Girdžiūtė (2012).According to Baquet et al. (1997), there are five distinct risk factors in agriculture: production risk, marketing risk, credit risk, personal risk, and environmental risk. Whereas Hardaker et al (2004) expand this list with political and business risks. Major sources of risk in agriculture can be defined (OECD 2009) *Production risk* concerns variations in crop yields and in livestock production due to weather conditions, diseases, and pests; *Market risk* is related to the variations in commodity prices and quantities that can be marketed; *Financial risk*

relates to the ability to pay bills when due, to have money to continue farming, and to avoid bankruptcy ;Legal and environmental risk concerns the possibility of lawsuits initiated by other businesses or individuals, and changes in government regulation related to environment; Human resources risk concerns the possibility that family or employees will not be available to provide labor or management to the farming business.

2.2. Causes of Non-performing loans

Non-Performing Loans arise due to a number of causes according to Yoonhee (2006) like; a) Speculation: Investing in high risk assets to earn high income; b) Default: Willful default by the borrowers; c) Fraudulent practices: Fraudulent Practices like advancing loans to ineligible persons, advances without security or references; d) Diversion of funds: Most of the funds are diverted for unnecessary expansion and diversion of business; e) Internal reasons: Many internal reasons like inefficient management, inappropriate technology, labour problems, marketing failure, etc. resulting in poor performance of the companies; and f) External reasons such recession in the economy, infrastructural problems, price rise, delay in release of sanctioned limits by banks, delays in settlements of payments by government and natural calamities.

On the other hand, Rajan *et al* (2003) provide causes of non-performing loans such as interest rate, inflation rate, economic growth and unemployment rate. These are further elaborated as follows.

A) Interest rate

Interest rate is defined as the cost incurred by the borrower for the use of money they borrowed from a lender or a financial institution (Collins and Wanjau, 2011). This price has an impact on the financial performance of the commercial banks in particular through its assets (loan or credit extended). The effect can be either good or bad. It can be good in the sense that interest rate repayments enhance and increases commercial bank's profitability. However, it can be bad if the borrowers cannot make interest repayments as well as the principal amount which eventually results in defaulting or non-performing assets (Joseph *et al.* 2012).

Interest is a fee paid on borrowed assets. It is the price paid for the use of borrowed money or money earned by deposited funds. As for banks, their main profits come from interest rate (i.e. interest rate differed according to years of payment). The longer it takes to make settlement, the higher it will be for the interest rate. At a time when interest rate is at its lowest, demand for financing is high by customers. This shows negative relationship between interest rate and demand for loan, whereas when interest rate is high, demand for financing is low. People choose to save their money when interest rate is high, and only apply for financing when the rate is decreasing. By doing so, the amount that needed to pay for bank as a result for making a loan is slightly lower compared to when the time when interest rate is high. When the interest rate is low, net NPLs is also low. And when interest rate is high, the amount of NPLs will also be increased. High credit growth in the past could generate higher NPLs in the future. According to all models, NPLs are very persistent, which would suggest that the response of credit losses to the macroeconomic cycle could take time to materialize, although it would also imply that NPLs would then cumulate to high levels (Arthur, 2003). An increase in interest rate weakens loan payment capacity of the borrower therefore non-performing loans and bad loans are positively correlated with the interest rates.

B) Inflation rate

Generally, there is a wide variation of explanation regarding inflation and NPL. In one hand there is an empirical evidence of positive relationship between the inflation in the economy and non-performing loans (Fofack, 2005). While Nkusu (2011) has explained that this relationship can be positive or negative. According to Nkusu, inflation affects loan payment capacity of borrowers positively or negatively. Higher inflation can enhance the loan payment capacity of borrower by reducing the real value of outstanding debt; moreover, increased inflation can also weaken the loan payment capacity of the borrowers by reducing the real income when salaries/wages are sticky, moreover by highlighting the role of inflation in the presence of variable interest rate. Nkusu (2011) further explains that in this scenario inflation reduces the debt servicing capacity of the loan holders as lenders adjust the lending interest rates to adjust their real return. So according to literature relationship between inflation and non-performing loans can be positive or negative depending on the economy of operations.

C. Economic growth

Non-performing loans can lead to efficiency problem for banking sector. It is found by a number of economists that failing banks tend to be located far from the most-efficient frontier. Because banks don't optimize their portfolio decisions by lending less than demanded. What's more, there are evidences that even among banks that do not fail; there is a negative relationship between the non-performing loans and performance efficiency. The phenomena that banks are reluctant to take new risks and commit new loans is described as the "credit crunch" problem. According to the United States Council of Economic Advisors (1991), credit crunch is "a situation in which the supply of credit is restricted below the range usually identified with prevailing market interest rates and the profitability of investment projects". A "credit crunch" is a disequilibrium phenomenon. It is present when banks are unwilling to lend, especially when a firm with profitable projects cannot obtain credit in spite of low interest rates (lower than the expected marginal products). Credit crunch results in excess demand for credit and hence credit rationing, where loans are allocated via non-price mechanism. Eventually, it imposes additional pressure on the performance of the monetary policy.

D. Unemployment rate

Like any other market, the labour market consists of a supply side and a demand side. The labour supply of the population referred to as the economically active population or labour force, has two components; employed persons and unemployed persons (International Labour Organization, 2007). During unemployment, those who make loan from bank are unable to pay back to their creditors as the effect of losing their jobs. When an unemployment rate is high, so does it go with NPLs amount. An increase in the unemployment in the country negatively affects the incomes of the individuals which increases their debt burden. It is obvious when a person loss his source of income it becomes difficult to return his loan, similarly an increased unemployment in the economy also negatively affects the demand of the products of firms which ultimately affects the production/sales of the firms, this ultimately leads to decline in revenues of the firms and a fragile debt condition.

2.3 Loans Classification and Provisioning Practice of Ethiopian Banks

Development Finance Institution means an institution which is engaged mainly in medium- and long-term project finance business, with the purpose of promoting development in the industrial, agricultural, construction, services, commercial or other economic sectors; (NBE, Directive No. SBB/52/2012, Article, 4.4)

Loans means any financial assets of a development finance institution arising from a direct or indirect advance of funds (i.e. unplanned over drawings, participation in loan syndication, the purchase of loans from another lender, etc.) or commitment to advance funds by a development finance institution to a person that are conditioned on the obligation of the person to repay the funds, either on a specified date or dates or on demand, usually with interest. The term includes a contractual obligation of a development finance institution to advance funds to or on behalf of a person, claim evidenced by a lease financing transaction in which the development finance institution is the lessor, and line of credit to be funded by the development finance institutions on behalf of a person. (NBE, Directive, No. SBB/52/2012, Article, 4.5) .

Non-performing Loan: There is no common definition of nonperforming loans (NPLs) in the whole country since it is recognized that it is possible that what is appropriate in one country may not be so in another. The most widely known international definition of nonperforming loans was developed by the IMF in the framework of the Financial Soundness Indicators (FSIs) endorsed by the IMF Executive Board. Non-performing loan are loans that are in default or close to being in default. (investopedia Inc. 2000) or non performing loans are loans or advance whose credit quality has deteriorated such that full collection of principal and interest in accordance which the contractual repayment term of the loan or advance is in question (NBE, 2002).

Loan Portfolio: Shall mean the full collection or assortment of loans extended to of the bank. (NBE, Directive, No.SBB/52/2012). Updated May 17, 2019

2.3.1 Non-Performing Loans as Per NBE

National Bank of Ethiopia (NBE) defined NPLs' of Development Financial Institutions' as loans whose credit quality has deteriorated such that full collection of principal and/or interest in

accordance with the contractual repayment terms of the loan and advances are in question. (NBE, Directive, No. SBB/52/2012) Generally, NPLs are loans that are past due both in its principal and interest contrary to the terms and conditions under the loan contract, for about ninety days or more.

As per NBE Directive, No.SBB/52/2012 NPLs of development finance institutions are classified into three categories as substandard, doubtful and loss loans based on the number of days a loan past due; substandard loans are medium and long term loans past due 180 (one-hundred-eighty) days or more, but less than 360 (three-hundred-sixty) days, doubtful loans are medium and long term loans past due 360 (three-hundred-sixty) days, but less than 3 (three) years; Loss loans are medium and long term loans past due 3 (three) years or more.

2.3.2 Provision for Nonperforming Loans

Development finance institutions shall maintain the following minimum provision percentages against the outstanding principal amount of each NPLs or advance classified in accordance with the criteria for the classification of NPLs, above. (NBE’s directive, No SBB/52/2012).

Provision of Short, Medium and Long Term NPLs

Period loans have been in arrears (year)	Classification/ Category of NPLs	Minimum provision for Medium- and Long-Term Loans % of NPL amount
½-1	Substandard	20
1 – 3	Doubtful	65
More than 3	Loss	100

Table 1 Source: NBE’s Directive, No SBB/52/2012

2.4 Current Situation of Banking Sector in Ethiopia

The Government of Ethiopia (GOE) allowed the establishment of private banks and insurance companies in 1994 but continues to prohibit foreign ownership in this sector. The Ethiopian banking sector is currently comprised of a central bank (The National Bank of Ethiopia or NBE), two government owned banks and sixteen private banks.

According to the National Bank of Ethiopia, in 2019 there are 18 banks, of which 16 were private and 2 are public owned institutions. In 2015/16 the total branch network of all banks reached 3,187. About 34.4 percent of bank branches were situated in Addis Ababa.

Development Bank of Ethiopia (DBE) disbursed fresh loans to the tune of Birr 88.0 billion in 2015/16 which was a 16.6 percent higher than a year ago. Of the total new loans, about 43.6 percent was made by private banks, and the rest by public banks. About 29.0 percent of the loans went to industry followed by domestic trade (17.1 percent), housing and construction (15.5 percent), agriculture (15.2 percent) and international trade (10.8 percent) and others (12.4 percent) (NBE 2015/16 Annual Report) Total outstanding credit of the banking system expanded by 20.4 percent and reached Birr 280.3 billion at the end of June 2016. Specifically, outstanding claims on private sector rose by 23.8 percent, on public enterprises 21.2 percent and on the central government 6.2 percent. Outstanding credit to industry accounted trade (18.5 percent), domestic trade (10.2 percent), housing and construction (10 percent) and agriculture (7.3 percent). The share of private sector (including cooperatives) in outstanding credit was Birr 179.2 billion (or 63.9percent) depicting a 21.5 percent annual growth (NBE 2015/16 Annual Report).

2.5 Development Bank of Ethiopia: Background and Context

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 from the priority areas of the government by mobilizing fund from domestic and foreign sources while ensuring its sustainability. As a state-owned institution, the mandate of the Bank is accelerating the national economic development (DBE, 2018a).

The recent focus of the government in relation to the revised credit policy of DBE (2018b) is to provide medium- and long-term loans for investment projects in the Government priority areas such as Commercial Agriculture, Agro-processing, Manufacturing Industries, Mining and Extractive Industries preferably, export focused as well as lease financing for Small and Medium Enterprises. Regarding the agricultural sector priority areas are commercial scale production of a

agricultural products related to farming, forestry, diary, horticulture products, vegetables, fruits, and mushrooms (DBE, 2018b).

2.6. Empirical Literature

Louzis et al. (2012) discussed Macroeconomic and bank-specific determinants of non-performing loans in Greece: This paper uses dynamic panel data methods to examine the determinants of non-performing loans (NPLs) in the Greek banking sector, separately for each loan category (consumer loans, business loans and mortgages). The study is motivated by the hypothesis that both macroeconomic and bank-specific variables have an effect on loan quality and that these effects vary between different loan categories. The results show that, for all loan categories, NPLs in the Greek banking system can be explained mainly by macroeconomic variables (GDP, unemployment, interest rates, public debt) and management quality. Differences in the quantitative impact of macroeconomic factors among loan categories are evident, with non-performing mortgages being the least responsive to changes in the macroeconomic conditions.

Messai and Jouini (2013) studied about Micro and macro determinants of non-performing loans in three countries. In this study tried to detect the determinants of non-performing loans for a sample of 85 banks in three countries (Italy, Greece and Spain) for the period of 2004-2008. These countries have faced financial problems after the subprime crisis on 2008. The variables used are macroeconomic variables and specific variables to the bank. The macroeconomic variables are included the rate of growth of GDP, unemployment rate and real interest rate with respect to specific variables opted for the return on assets, the change in loans and the loan loss reserves to total loans ratio (LLR/TL). After the application of the method of panel data, the researchers found that the problem loans vary negatively with the growth rate of GDP, the profitability of banks' assets and positively with the unemployment rate, the loan loss reserves to total loans and the real interest rate.

Malede (2014) assessed on Determinants of Commercial Banks Lending: Evidence from Ethiopian Commercial Banks. The study was mainly aimed to confirm the main determinants of commercial bank lending in Ethiopia by using panel data of eight commercial banks in the

period from 2005 to 2011. It tested the relationship between commercial bank lending and its some determinants (bank size, credit risk, gross domestic product, investment, deposit, interest rate, liquidity ratio and cash required reserve). Seven years financial data of eight purposively chosen commercial banks were used for analysis purpose. Ordinary least square (OLS) was applied to determine the impact of those predictor variables on commercial bank lending. The result suggests that, there is significant relationship between commercial bank lending and its size, credit risk, gross domestic product and liquidity ratio. But deposit, investment, cash required reserve and interest rate does not affect Ethiopian commercial bank lending for the study period. The study suggests that commercial bank have to give more emphasis to credit risk and liquidity ratio because it weakens banks loan disbursement and leads a bank to be insolvent.

Rajha(2016) discussed on Determinants of non-performing loans Evidence from the Jordanian banking sector this paper investigates the determinants of non-performing loans in the Jordanian banking sector during the period 2008-2012. The study used macroeconomic and bank specific factors to identify the determinants of NPLs of Jordanian banks. Using panel data regression, our results report that among bank specific factors, the lagged NPLs and the ratio of loans total assets were the most important factors that affect nonperforming loans positively. However, contrary to international evidence the results show that large banks are not necessarily more effective in screening loan customers when compared to their smaller counterparts. With respect to the macroeconomic factors, the researcher found that economic growth and inflation rate have a negative and significant effect on non-performing loans. In addition, they found that global financial crisis lead to higher non-performing loans in Jordan.

Gezu, G. (2014). Discussed on Determinants of nonperforming loans: Empirical study in case of commercial banks in Ethiopia. This study was conducted to examine both bank specific (loan to deposit ratio, capital adequacy ratio, return on asset and return on equity) and macroeconomic (lending rate, inflation and effective tax rate) determinants of NPLs of commercial banks in Ethiopia. To this end, the researcher has selected eight senior commercial banks in Ethiopia judgmentally. This study used secondary sources of data, which is panel data in nature, over the period 2002-2013 These data were collected from NBE and CSA. Furthermore, fixed effect model was used to examine the determinants of NPLs. This research is an explanatory research design that identifies the cause and effect relationships between the NPLs and its determinants.

The study shows a down ward sloping of nonperforming loans for commercial banks in Ethiopia. The finding also revealed as LTD ratio had positive whereas INFR had negative, but insignificant effect on NPLs of commercial banks in Ethiopia. However, bank profitability measured in terms of ROE, banks capital adequacy ratio and lending rate had negative and statistically significant effect where as bank profitability measured in terms of ROA and effective tax rate had positive and statistically significant effect on NPLs of commercial banks in Ethiopia. The finding of this study is significant since once identifying the determinants of NPLs might enable management body to make appropriate lending policies that prevent the occurrence of NPLs. Furthermore, the study recommended as bank managers should emphasize the management of current assets and loans than fixed assets in order to reduce the level of nonperforming loans. Besides, it is better for the loan officers to provide financial counseling to the borrowers on the wise use of loan and also to make decision on timely fashion to meet their need.

2.6.1 Business ownership

State owned enterprises (SOEs) also known as government-owned corporations are defined as a legal entity that is created by the government in order to take part in activities on the government's behalf (in our case federal government and regional government), according to different studies like (Tatiana and Stela, 2013) the effect of ownership forms on companies and financial performance is more significant. Coravos (2010) reported that the kind of business ownership or ownership structure could bring about default. Usually, sole proprietors are more susceptible to higher default as compared to ownership types with more members.

Business can be set up in the form of sole proprietorship, business organizations incorporated in Ethiopia (a private limited company (PLC), a share company or partnerships), State – owned enterprises also known as government-owned corporations are defined as a legal entity that is created by the government in order to take part in activities on the government's behalf. (Doing business in Ethiopia, 2015)

2.6.2 Credit policy

A credit policy includes detailed guidelines for the size of the loan portfolio, the maturity periods of the loan, security against loan, the credit worthiness of the borrower, the liquidation of loans, the limits of lending authority, the loan territory etc. According to Saba et al. (2012) determinants of NPL are bank specific determinants, macroeconomic variables, and at last the regulatory framework. In bank specific factors, total loans, and credit policy are important.

2.6.3 Amount of Loan

Amount of loan refers to the amount specified in the mortgage contract that the borrowers agree to pay back. The amount of points included, and various other costs make the loan amount different from the quantity of cash distributed by the lender. The loan approving process and the amount of loan approved by the bank were the causes for the occurrence of NPLs. The result of the study supports the finding by (Pasha and Khemraj, 2005) that found banks which charge relatively higher interest rates and lend excessively are likely to incur higher levels of non-performing loans

2.6.4 Interest Rate

Interest rates are fundamental to a capitalistic society and are normally expressed as a percentage rate over the period of one year (Sayedi, 2013). Interest rate as a price of money reflects market information regarding expected change in the purchasing power of money or future inflation. Interest rates are derived from macroeconomic factors which is the study of the behavior of the economy as a whole such as total output, income, employment levels and the interrelationship among diverse economic sectors (Karl et al 2009). Coravos (2010) reported that high interest rates increase the probability of loan default.

2.6.5 Fund Management

Fund management is associated with managing the cash flows of a financial institution. The responsibility of the fund manager is to assess the maturity schedules of the deposits received and loans given in order to maintain the asset-liability framework. The fund management practices should ensure an institution is able to maintain a level of liquidity sufficient to meet its

financial obligations in a timely manner; and capable of quickly liquidating assets with minimal loss (Uniform Financial Institutions Rating System 1997, p. 8)

2.6.6 Agricultural Subsector

The Agricultural Sector is divided into four main sub-sectors, namely: Crops; Livestock (both production and animal health); Fisheries and Aquaculture (including capture fisheries); and, Forestry. In the case of Development bank of Ethiopia Agricultural sub sectors are dividing in to Oil crops, Fiber Crops and Horticulture, Coffee, Cereals & Pulses, Agro-Services, Spices and Herbals, Livestock (DBE, 2018c).according to International Journal of Economics and Finance; Agricultural sub-sectors contribute positively and significantly in the agriculture GDP.A lot of research has been documented regarding the performance of agriculture sector over the years. According, Anweret al. (2015) has analyzed the role of agriculture sector share in GDP. They used time series data by using OLS method. The study reveals that positive and significant relationship between GDP and agriculture.

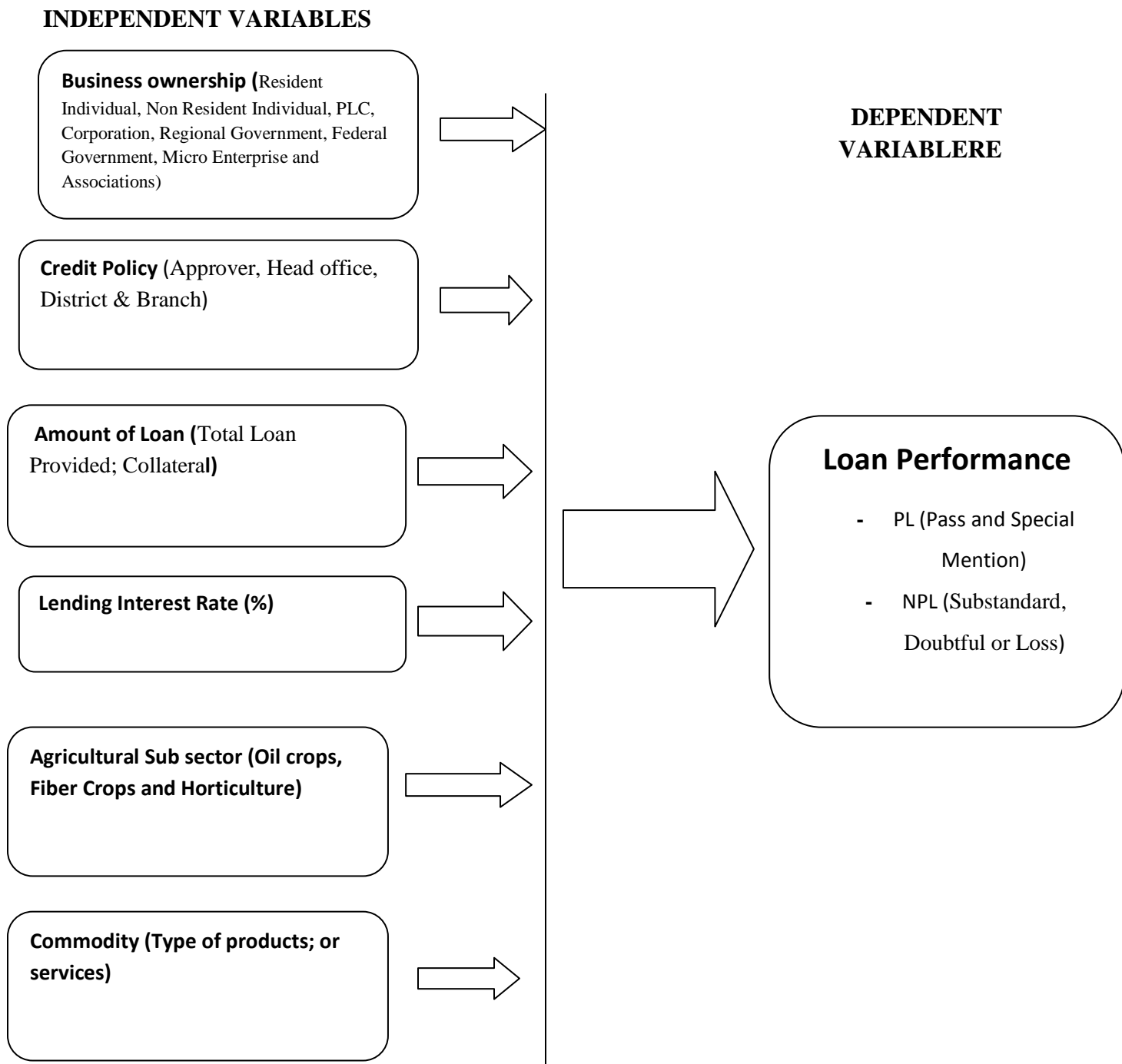
2.6.7 Commodity

Commodity defined as raw material or primary agricultural product that can be bought and sold. Commodity is an economic good or service that has full or substantial fungibility (commodity .com) Agricultural commodities are staple crops and animals produced or raised on farms or plantations. It is quite clear that risk exposure of all commodities/products is not the same. (Yescombe, 2002)

2.7. Conceptual Framework

Conceptual framework involves forming an idea about the relationship between variables in the study and showing the relationship graphically or diagrammatically (Mugenda&Mugenda 2003).The study will be proposed that the performance of agricultural project loan is influenced by Business ownership, Credit policy, Amount of loan, Lending interest rate, Fund management and Commodity.

Figure 1: Conceptual Framework



Source: Own construct for literature review, 2019

CHAPTER THREE

RESEARCH METHODOLOGY

This Chapter discusses the methodology of researches that the researcher employed in carrying out the research. It covers the research design, study of population and sampling procedure, data analysis and techniques and model specification.

3.1. Research Design

There is no standard methodology that applies to all research cases, but rather the methodology has to be selected based on the nature and scope of the topic at hand and the type of data available Bell (2005). As per the objectives of the study, a secondary quantitative data were collected and analyzed. The methodology to carry out the research is based on the objectives of the paper and the availability of relevant data. To comply with the objective of this research, the paper is primarily based on quantitative research, which constructed an econometric model to identify and measure the effect of agricultural project loan on loan performance of DBE. Logit and probit models are the most commonly used models (McKenzie and Schweitzer, 2001). Gujarat (2004) argues that although both models result in similar outputs, the logit model is easier in estimation.

To measure the Undeterred Non performance loans in development bank of Ethiopia: The role of agricultural project loans (2007-2019), logistic regression analysis model is adopted. Hence, logistic regression may be thought of as an approach that is similar to that of multiple linear regressions, but takes into account the fact that the dependent variable is categorical. The model selected because loan performance, which is the dependent variable, binary variables are coded as 0 and 1 for performing loan and Non-performing loans respectively.

3.2 Study of Population and Sampling Procedure

Population refers to the entire group of people, events, or things of interest that the researcher wishes to investigate. The target populations of this study were those Agricultural projects which were financed by Development Bank of Ethiopia. The study was including all agricultural loan recipients since 2007 irrespective of their loan size and repayment status. The central repository of the DBE loan management system has about 4,414 borrowers of which 726 were agricultural

borrowers by the end of February 2019. All agricultural loan borrowers (n=726) was included for the secondary data collection

3.3 Data Analysis Technique

The quantitative data exported to and analyzed using SPSS 24.0. The researcher used conduct descriptive and inferential analysis. Proportions (percentages), measures of central tendency, and measures of dispersion are used to describe the findings of the data. Results presented using narrative and tables summaries as well as regression models. Binary logistic regressions were used to determine the effects of subsectors, commodity, category of borrowers, lending interest rates, Approvers and loan amount on performance of agricultural project loans.

Finally, to get reliable results from the study, the researcher tested for Goodness of Fit Measures for Logistic Regression Among them the major ones are: The Omnibus and Hosmer-Lemeshow tests were run to test the ‘goodness of fit’ of the model was addressed based on the theoretical concepts of the assumptions and results of the statistical analyzing software.

3.4 Model Specification

Logistic regression sometimes called the logistic model or logit model, analyzes the relationship between multiple independent variables and a categorical dependent variable, and estimates the probability of occurrence of an event by fitting data to a logistic curve. There are two models of logistic regression, binary logistic regression and multinomial logistic regression. Binary logistic regression is typically used when the dependent variable is dichotomous and the independent variables are either continuous or categorical. Logistic regression estimates the probability of the event occurring ($P(Y=1)$), it is necessary to code the dependent variable accordingly. That is the desired outcome should be coded to be 1.

The logistic probability function is expressed as

$$P(NPL) = \alpha_0 + \beta_1 \text{Agri.subsector} + \lambda_1 \text{Agri.commodity} + \phi_1 \text{Category of borrowers} + \\ + \Psi_1 \text{Lending interest rate} + \Upsilon_5 \text{Approvers} + Z_6 \text{Loan Amount} + \varepsilon$$

Where; NPL = 1 if a borrower misses a payment contrary to the loan agreement

Expanding the equation to include all the variables to be estimated;

$$P(NPL) = \alpha_0 + \beta_1 \text{oil crops} + \beta_2 \text{Fibercrops} + \beta_3 \text{horticulture} + \beta_4 \text{other subsectors} + \\ \lambda_1 \text{Oilseeds} + \lambda_2 \text{cotton products} + \lambda_3 \text{vegetable products} + \lambda_4 \text{other commodity} + \\ \phi_1 \text{PLC} + \phi_2 \text{Residential individual} + \phi_3 \text{share company} + \phi_4 \text{other borrowers} + \\ \Psi_1 8.5\% \text{interest rate} + \Psi_2 9\% \text{interest rate} + \Psi_3 9.5\% \text{interest rate} + \\ \Psi_4 12\% \text{interest rate} + \Upsilon_1 \text{District} + \Upsilon_2 \text{Head office} + \Upsilon_3 \text{Branch} + \\ Z_6 \text{ up to 2.5 million} + Z_2 2.5 \text{ million up to 4.5 million} + Z_2 2.5 \text{ million up to 4.5 million} \\ + Z_2 4.5 \text{ million up to 10 million} + Z_2 \text{more than 10 million}$$

3.5 Variable of Interest

The major dependent variable of the study is the status of nonperformance in agricultural loan. Several independent variables that contributed to the nonperformance assessed including:

- Status of the loan (Pass. Special Mention, Substandard, Doubtful or Loss)
- Company Type (Resident Individual, Non Resident Individual, PLC, Corporation, Regional Government, Federal Government, Micro Enterprise and Associations)

- Subsector(Oil crops, Fiber Crops and Horticulture)
- Commodity(Type of products; or services)
- Amount of Loan (Total Loan Provided; Collateral)
- Overdue Age(number of days)
- Interest rate (in percentage)
- Credit Policy(Approver, Head office, District & Branch

3.6 Validity and Reliability

Validity is concerned with whether the findings are really about what they appear to be about. Refers to how accurate an instrument is at measuring what it is trying to measure. Validity is often defined as the extent to which an instrument measures what it asserts to measure Blumberg et al., (2005). Validity of a research instrument assesses the extent to which the instrument measures what it is designed to measure Robson (2011). According to Gay (1987) Reliability is the degree to which a test consistently measures whatever it measures.

Reliability refers to the extent to which your data collection techniques or analysis procedures will yield consistent findings. It can be assessed by posing the following three questions Easterby.et al., (2002).Will the measures yield the same results on other occasions?

Will similar observations be reached by other observers? And is there transparency in how sense was made from the raw data? Unreliable data could impede on the quality of research results and conclusions

Assessing secondary data reliability can entail reviewing existing information about the data, which may include interviewing officials of audited Organization; performing simple analysis on the sample of data, including advanced electronic analysis; tracing to and from source documents; and reviewing selected system controls Shuttleworth (2009).

While reliability is necessary, it alone is not sufficient. For a test to be reliable, it also needs to be valid. The development bank of Ethiopia banking system was developed by the world famous company Temenos Group AG TM.in this study Documentary data retrieving from DBE loan management system are reliable and valid .The purpose of establishing reliability and validity in research is essentially to ensure that data are sound and replicable, and the results are accurate.

3.7 Ethical Considerations

Blumberg et al. (2005) define ethics as the ‘moral principles, norms or standards of behavior that guide moral choices about our behavior and our relationships with others. Because of the nature confidentiality of data the name of borrowers are coded to them but the researcher uses them only for academic purpose.

CHAPTER FOUR

DATA RESULTS, ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter presents the study findings based on Effects of Agricultural project loan on loan performance of Development Bank of Ethiopia. These data were collected from the central repository of the DBE loan management system. Binary logistic regressions were used to determine the effects of subsectors, commodity, category of borrowers, lending interest rates, Approvers and loan amount on performance of agricultural project loans.

4.2 Status of the Loan

Overall 726 borrowers received loan from DBE since 2007. While the average loan frequency was one, about 7% borrowers received multiple loans ranging from 2-4 times. Among the total loan about 720 (99.2%) are categorized as active by February 2019 while only 0.7% were categorized as inactive. Only one loan case has been handled at courts and is categorized as a loan at legal stage. By definition, active loan doesn't necessarily means performing loan. As per the definition of the Development Bank, an active loan is used to represent loans that are being actively serviced.

This is consistent assumption with a chi-square test of independence that was performed to examine the relation between status of loan and loan performance found that the difference is not significant, $X^2(2, N = 726) = .838, p > 0.05$.

Table 1: Status of the loans

Status of loans	Frequency	Percent	Valid Percent
Active	720	99.2	99.2
Inactive	5	0.7	0.7
Legal	1	0.1	0.1
Total	726	100	100

4.2.1 Distribution of loans by subsector

Regarding the subsector majority of the loan was provided to the oil sector which contributed for 39.4% of the loan recipients followed by Fiber Crops (21%). Livestock and spices and herbals sector benefited least, contributing for 2.2 and 0.1% respectively (Table 2). Among the total loan 91.7% was provided to a priority sector with a lower interest rate (8.5 %) and the remaining 8.3 (60 loans) were provided to non-priority agricultural sectors with an interest rate of (9-12%). Priority Area Projects are medium and long term investment projects which have strategic importance to the development of the country as set by the government. These priority area projects are categorized as commercial agriculture, agro-processing and manufacturing and extractive industries.

Table 2: Distribution of loans by subsector

Subsector	Frequency	Percent	Valid Percent	Cumulative Percent
Oil Crops	286	39.4	39.4	39.4
Fiber Crops	153	21.1	21.1	60.5
Horticulture	111	15.3	15.3	75.8
other ¹	176	24.2	24.2	100.0
Total	726	100.0	100.0	

4.2.2 Distribution of Loan by commodity

DBE provided the largest number of loans (60%) to two commodities namely oil seeds and cotton production. Among the total recipients 39.4% of the beneficiaries were oil seed producers followed by cotton producers (20.5%).

¹ Coffee, Cereals and Pulses, Agro-Services, Spices and Herbals, Livestock

Table 3: Distribution of loans by commodity

Commodity	Frequency	Percent	Valid Percent	Cumulative Percent
Oil Seeds	286	39.4	39.4	39.4
Cotton Products	149	20.5	20.5	59.9
Vegetable products	76	10.5	10.5	70.4
Other ²	215	29.6	29.6	100.0
Total	726	100.0	100.0	

4.2.3 Distribution of Loan by Interest rate

Lending rate is the bank rate that usually meets the short- and medium-term financing needs of the private sector. This rate is normally differentiated according to creditworthiness of borrowers and objectives of financing. The minimum and maximum loan interest rate was found to be 8.5% and 12% respectively. Majority of the loan beneficiaries (82.9%) granted loans with the highest interest rate, which is 12%. In actual markets often multiple interest rates coexist, depending on the level of competitiveness, rules and regulations governing loans and deposits, and the position and status of creditors and debtors. Several adjustments are made in 2019 including increasing interest rate (DBE Internal Circular, March 1, 2019). Effective as of March 1, 2019, the new rate has increased borrowing rates for priority area projects to 11.5%. Borrowers who export 80pc of their products have been paying nine percent interest, while import substitution companies were paying 9.5% interest. The lending interest rate for lease financing has also increased by 2.5 percentage points to 11.5%. Borrowers running non-priority projects will pay 12pc interest, unchanged from the previous rate. The lending interest rate of the Bank remains lower than the average borrowing rate in the private banking industry of 13.5% during the last fiscal year.

²Coffee Cleaning & Hulling, Coffee Plantation & Development, Wet Coffee Processing, Agricultural machinery hiring, Coffee Marketing, Crop marketing, Agricultural inputs, Veterinary services, Cereals Production, Pulses Production, Improved seed multiplication, Sisal Production, Fruits production, Poultry Farm, Dairy Farm, Apiculture & Bee keeping, Cattle Fattening, Growing of spices

Table 4: Distribution of loans by interest rate

Interest rate	Frequency	Percent	Valid Percent	Cumulative Percent
8.5%	2	.3	.3	.3
9.0%	68	9.4	9.4	9.6
9.5%	54	7.4	7.4	17.1
12.0%	602	82.9	82.9	100.0
Total	726	100.0	100.0	

4.2.4 Distribution of Loan by Approver

A study by Gao et al (2018) reported that loan officers have a substantial impact on both the contract terms (loan spreads, covenants, and maturity) and the performance of corporate loans. Accordingly, an analysis of level of approval in loan processing provides insights regarding the loan performance in Banks like the DBE. Regarding the approver majority of the loan was approved by branch which contributed for 52.3% of the loan recipients followed by District (43.8%). Among the total loan 96.1% was approved by district and branch.

Before 2018, In the past, it used to be that all district offices could only disburse 25 million Br for projects. However, since 2018, the Development Bank of Ethiopia (DBE) has enlarged the amount of money its district offices can disburse in loans for projects by 50pc to 200pc. The amount the district offices of Addis Abeba, Mekelle, Hawassa, Adama and Bahir Dar can disburse has increased almost two-fold to 45 million Br. For Nekemt, Jimma, Dessie and Dire Dewa districts, it has been increased to 40 million Br. In the cases of WelaytaSodo, Gambella, Gonder, and Butajira districts the Bank increased their authority to disburse loans worth up to 35 million Br. The following table summarizes distribution of borrowers by approver levels.

Table 5: Distribution of loans by Approver

Loan Approval Level	Frequency	Percent	Valid Percent	Cumulative Percent
District	318	43.8	43.8	43.8
Head Office	28	3.9	3.9	47.7
Branch	380	52.3	52.3	100.0
Total	726	100.0	100.0	

4.2.5 Distribution of Loan by Amount

The study population (total loan treated) in this study is about 7.3 billion Birr. The mean and median loan size was 10.01 million (\pm ETB60.5 million) and 4.3 million ETB. The large standard deviation indicates that there are extreme cases at either side of the loan size. As indicated from the range which is about 158 million few large loans have skewed the loan pattern. The minimum observed loan size was 3,796 compared to the maximum loan size of 1.58 Billion provided to a Coffee Plantation & Development industry.

Table 6: Distribution of loans by Loan Amount

Loan Amount	Frequency	Percent	Valid Percent
Up to 2.5 million	255	35.1	35.1
2.5 million up to 4.5 million	135	18.6	18.6
4.5 million up to 10 million	175	24.1	24.1
More than 10 million	161	22.2	22.2
Total	726	100.0	100.0

4.2.6 Distribution of loans by category of borrowers

Out of 726 loans analyzed, 47.2% of the borrowers were private limited companies, followed by resident individuals. Less than 10% of the borrowers were either share companies or other groups.

Table 7: Distribution of loans by category of borrowers

Category of Borrowers	Frequency	Percent	Valid Percent
Private Limited Companies	343	47.2	47.2
Resident Individual	321	44.2	44.2
Share company	35	4.8	4.8
Others	27	3.7	3.7
Total	726	100.0	100.0

4.3 Descriptive Statistics

In section 4.3 the study presents the research finding on the descriptive statistic in the data collected. Overall, we found that about 56% of the borrowers had non-performing loans. In terms of subsectors, majority of the borrowers engaged in Fiber Crop registered highest proportion of nonperformance (73.2%). This is generally attributable to various textile and cotton related investments. About 54.2% of the loans provided for oil crops were nonperforming. Relatively investors in horticulture industries had better performing loans (60%).

In a broader interpretation of the data, according to these findings, Fiber Crops are much more likely to Non-performing Loans than Oil Crops, Horticulture and Other subsectors. The conditional probability of Fiber Crops Non-Performing Loans is 0.732, the probability of Oil crops Non-performing loans is 0.542, the probability of Horticulture Nonperforming Loan is 0.441 and others subsectors it is 0.50. Thus, majority of the nonperformance in terms of borrower category is attributable to the nonperformance risk in the fiber crops and oil crops.

Table 8: Descriptive statistics of subsector

Subsector		Overdue Status		Total
		Performing Loans(PL)	Non-performing loans(NPL)	
Oil Crops	Count	131	155	286
	% within Subsector	45.8%	54.2%	100.0%
Fiber Crops	Count	41	112	153
	% within Subsector	26.8%	73.2%	100.0%
Horticulture	Count	62	49	111
	% within Subsector	55.9%	44.1%	100.0%
Other	Count	88	88	176
	% within Subsector_	50.0%	50.0%	100.0%
Total Count	Count	322	404	726
	% within Subsector	44.4%	55.6%	100.0%

Sub-sectoral analysis and commodity yielded consistent data in relation to non-performance. From the below table, cotton products, which are categorized in fiber sector are much more likely to hold Non- performing loans than Oil seeds, Vegetable products and other commodities. The probability of Cotton products Non-performing Loans is 0.725, mainly attributable to failures in North Eastern (Humera) and Western Ethiopia (Gambella), the probability of oil seeds Non-performing loans is 0.542, vastly attributable to failures around Humera, the probability of vegetable (horticultural) products Non performing Loan is 0.434 and others commodities it is 0.52.

Table 9: Descriptive statistics of specific commodities

Specific commodity		Overdue Status		Total
		Performing Loans(PL)	Non-performing loans(NPL)	
Oil Seeds	Count	131	155	286
	% within Commodity	45.8%	54.2%	100.0%
Cotton Products	Count	41	108	149
	% within Commodity	27.5%	72.5%	100.0%
Vegetable products	Count	43	33	76
	% within Commodity	56.6%	43.4%	100.0%
Other	Count	107	108	215
	% within Commodity	49.8%	50.2%	100.0%
Total Count	Total Count	322	404	726
	% within Commodity	44.4%	55.6%	100.0%

From the below table we can see that, other borrowers (i.e. Non-Resident Individual, Regional Government Federal Government, Micro Enterprise, Associations) is much more likely to Non-performing loans than PLC, Resident Individual and share companies. The probability of Other Borrowers Non-Performing Loans is 0.704, the probability of Residential individual Non-performing loans is 0.639, the probability of PLC borrowers Non-performing Loan is 0.507 and Borrowers of share companies it is 0.52. The overall high nonperformance of governmental and government affiliated institutions is more likely to be associated to high risk taken by the policy bank to provide high risk loans without adequate collateral or appraisal procedures. However, Private limited companies have relatively a higher scrutiny during loan processing as well as implementation of tools to get the loan paid.

Table 10: Descriptive statistics of category of borrowers

Category of borrowers		Overdue Status		Total
		Performing Loans(PL)	Non-performing loans(NPL)	
PLC	Count	169	174	343
	% within Category Borrowers	49.3%	50.7%	100.0%
Resident Individual	Count	116	205	321
	% within Category Borrowers	36.1%	63.9%	100.0%
Share company	Count	29	6	35
	% within Category Borrower	82.9%	17.1%	100.0%
Others	Count	8	19	27
	% within Category Borrowers	29.6%	70.4%	100.0%
Total	Count	322	404	726
	% within Category Borrowers	44.4%	55.6%	100.0%

Lending interest rate is one of the critical factors associated to loan performance and could implicate the levels of credit defaulting. From the below table we can see that, the lending Interest rate 12% is much more likely to yield Non- performing loans than, interest rate 8.5%, interest rate 9% and interest rate 9.5%. The probability of interest rate 12% Non-performing Loans is 0.60, while 50% of those loans with 8.5% interest rate are nonperforming. The probability of interest rate 9% Non-performing Loan is 0.426 and lending interest rate 9.5% it is 0.556.

Table 11: Descriptive statistics of interest rate

Interest Rate		Overdue Status		Total
		Performing Loans(PL)	Non-performing loans(NPL)	
8.5%	Count	1	1	2
	% within Interest Rate	50.0%	50.0%	100.0%
9.0%	Count	39	29	68
	% within Interest Rate	57.4%	42.6%	100.0%
9.5%	Count	41	13	54
	% within Interest Rate	75.9%	24.1%	100.0%

12.0%	Count	241	361	602
	% within Interest Rate	40.0%	60.0%	100.0%
Total	Count	322	404	726
	% within Interest Rate	44.4%	55.6%	100.0%

From the above table we can see that, loan approved by District is much more likely to Non-performing loans than Head office and branches. The probability of Loan approved by district Non-performing Loans is 0.808, the probability of loan approved by Head office Non-performing loans is 0.429, and Loan approved by branches it is 0.355.

Table 12: Descriptive statistics of Approver

Level of Approval		Overdue Status		Total
		Performing Loans (PL)	Non-performing loans(NPL)	
District	Count	61	257	318
	% within Approver	19.2%	80.8%	100.0%
Head Office	Count	16	12	28
	% within Approver	57.1%	42.9%	100.0%
Branch	Count	245	135	380
	% within Approver	64.5%	35.5%	100.0%
Total	Count	322	404	726
	% within Approver	44.4%	55.6%	100.0%

From the below table we can see that, Loan amount between 2.5 million and 4.5 million is much more likely to Non-performing loans than Loan Amount between 4.5million and 10 million, loan amount more than 10 million and loan amount less than 2.5 million. The probability of loan amount between 2.5 million and 4.5 million Non-performing Loans is 0.704, the probability of Loan Amount between 4.5million and 10 million Non-performing loans is 0.659, the probability of Loan Amount more than10 million Non-performing Loan is 0.509 and loan amount less than 2.5 million it is 0.475.

Table 13: Descriptive statistics of Loan Amount

Loan Size		Overdue Status		Total
		Performing Loans(PL)	Non-performing loans(NPL)	
Up to 2.5 million	Count	134	121	255
	% within Loan Amount	52.5%	47.5%	100.0%
2.5 million up to 4.5 million	Count	46	89	135
	% within Loan Amount	34.1%	65.9%	100.0%
4.5 million up to 10 million	Count	63	112	175
	% within Loan Amount	36.0%	64.0%	100.0%
more than 10 million	Count	79	82	161
	% within Loan Amount	49.1%	50.9%	100.0%
Total	Count	322	404	726
	% within Loan Amount	44.4%	55.6%	100.0%

4.4 Regression Analysis

In this section the study presents the research findings on the relationship between various independent variables on the logistic regression model and the dependent variable loan performance of development bank of Ethiopia. The study was conducted Binary regression analysis to test the influence among predictor variables by using statistical package for social sciences (SPSS) to code, enter and compute the measurements of the regressions.

The 95% confidence interval (CI) is used to estimate the precision of the odds ratio (OR). A large CI indicates a low level of precision of the OR, whereas a small CI indicates a higher precision of the OR. It is important to note however, that unlike the p value, the 95% CI does not report a measure's statistical significance (Szumilas, 2010). Odds ratio with 95% confidence interval (CI) can be used to assess the contribution of individual predictors (Katz, 1999). It is

important to note however, that unlike the p value, the 95% CI does not report a measure's statistical significance. It is used as a proxy for the presence of statistical.

4.5 Goodness of fit tests

According to Akwaa-Sekyi (2019) the Omnibus and Hosmer-Lemeshow tests run to test the 'goodness of fit' of the model. The H-L test provides a Chi-Square test of whether or not the model is 'adequate fit' to the data. The test of the predictive power of the set of individual coefficients of the model also known as the 'goodness of fit test' is shown by the Omnibus test.

The Chi-square value is 215.502 with 16 degrees of freedom. This means the model is able to distinguish between performing loans and Non-performing loans of agricultural projects. Hosmer and Lemeshow test which prescribes that a significance value less than 0.05 is an indication of poor fit. The Chi-square value for the Hosmer-Lemeshow test is 3.754 with 8 degrees of freedom and a significance value of 0.879. The significance value is far above 0.05 therefore indicating support for our model.

Table 14: Goodness of fit Tests of Model Coefficients

Goodness of fit Tests of Model Coefficients				
Omnibus test		Chi-square	df	Sig.
	Step	215.502	16	.000
	Block	215.502	16	.000
	Model	215.502	16	.000
Hosmer and Lemeshow Test		3.754	8	0.879

Table 15: Table 1 - Logistic Regression Predicting Likelihood of Non-performing loans of Agricultural projects

		Variables in the Equation							
		B	S.E.	Wald	df	Sig.	Exp(B)	95% CL. for EXP(B)	
								Lower	Upper
Step 1 ^a	Subsector			26.456	3	.000			
	Fiber crops *	.837	.218	14.768	1	.000	2.309	.837	.218
	horticulture	-.404	.225	3.217	1	.073	.668	-.404	.225
	Other subsectors	-.168	.192	.769	1	.381	.845	-.168	.192
	Constant	.168	.119	2.009	1	.156	1.183	.168	.119
Step 1 ^a	Commodity			23.596	3	.000			
	Cotton Products*	.800	.218	13.419	1	.000	2.226	1.451	3.416
	Vegetable products	-.433	.260	2.771	1	.096	.649	.390	1.080
	Other commodities	-.159	.181	.773	1	.379	.853	.599	1.216
	Constant	.168	.119	2.009	1	.156	1.183		
Step 1 ^a	Category Borrowers			30.432	3	.000			
	Residential Individual*	-.836	.435	3.691	1	.055	.434	.185	1.017
	Share company	-.296	.437	.457	1	.499	.744	.316	1.753
	Other borrowers*	- 2.441	.615	15.725	1	.000	.087	.026	.291
	Constant	.865	.421	4.212	1	.040	2.375		
Step 1 ^a	INTEREST_RATER			27.730	3	.000			
	8.5%	-.404	1.417	.081	1	.775	.668	.042	10.724
	9.0%*	-.700	.259	7.316	1	.007	.496	.299	.825
	9.5%*	- 1.553	.329	22.275	1	.000	.212	.111	.403
	Constant	.404	.083	23.597	1	.000	1.498		
Step 1 ^a	Approver			131.42 3	2	.000			
	District*	2.034	.178	130.23 1	1	.000	7.646	5.391	10.843
	Head office	.308	.397	.604	1	.437	1.361	.626	2.962
	Constant	-.596	.107	30.916	1	.000	.551		
Step 1 ^a	Loan Amount			18.901	3	.000			
	Up to 2.5 million	-.139	.201	.478	1	.489	.870	.586	1.291
	2.5 million up to 4.5 million*	.623	.240	6.706	1	.010	1.864	1.163	2.986
	4.5 million up to 10 million*	.538	.223	5.831	1	.016	1.713	1.107	2.651
	Constant	.037	.158	.056	1	.813	1.038		

*significant variables in the model

We can now use this model to predict the odds Ratio that a subject of a given sub sector. The odds prediction equation is. If our subject is Oil crops, That is, Fiber Crops are 2.309 times more likely to Non- performing loans than Oil crops. If our subject is horticulture is 0.668 times as likely to non-performing loans as Oil Crops. If our subject is other subsectors³ is 0.845 as likely times to Non- performing loans as oil crops. Both horticultures and other subsectors are statistically insignificant for the contribution of Non- performing loans of Agricultural projects.

We can now use this model to predict the odds Ratio that a subject of a given commodity. The odds prediction equation is. If our subject is Oil seeds, That is, cotton products are 2.226 times more likely to Non- performing loans than oil seeds. If our subject is vegetable product is 0.649 times as likely to non-performing loans as Oil seeds. If our subject is other commodity⁴ is 0.853 times as likely to Non- performing loans as oil seeds. Vegetable products and other commodities are statistically insignificant for the contribution of Non- performing loans of agricultural projects.

We can now use this model to predict the odds Ratio that a subject of a given category of borrowers. The odds prediction equation is. If our subject Category of borrowers is PLC, That is, Residential individual are 0.434 times as likely to Non- performing loans as PLC. If our subject is Share Company is 0.744 times as likely to non-performing loans as PLC. If our subject is other borrowers⁵ is 0.087as likely to Non- performing loans as PLC. Share Company is statistically insignificant for the contribution of Non-performing loans of agricultural projects

We can now use this model to predict the odds Ratio that a subject of a given lending interest rate. The odds prediction equation is. If our subject Lending interest rate 12%, That is, Lending

³. Coffee, Cereals & pulses, Agro-services, spices and herbals, livestock

⁴Coffee Cleaning & Hulling, Coffee Plantation & Development, Wet Coffee Processing, Agricultural machinery hiring, Coffee Marketing, Crop marketing, Agricultural inputs, Veterinary services, Cereals Production ,Pulses Production, Improved seed multiplication, Sisal Production, Fruits production, Poultry Farm, Dairy Farm, Apiculture & Bee keeping, Cattle Fattening, Growing of spices

⁵Non Resident Individual, Regional Government Federal Government, Micro Enterprise, Associations

interest rate 8.5% are 0.434 times as likely to Non- performing loans as Interest rate 12%. If our subject is lending rate 9.0% is 0.496 times as likely to non-performing loans as interest rate 12%. If our subject is interest rate 9.5% is 0.212 times as likely to Non- performing loans as interest rate 12%.Interest rate 8.5% are statistically insignificant for the Non-performing loans of agricultural projects.

We can now use this model to predict the odds Ratio that a subject of a given Approver. The odds prediction equation is. If our subject Approver is Branch, That is, District 7.646 times more likely to Non- performing loans than Branch. If our subject is Head office is 1.361 times more likely to non-performing loans than branch. Head office is statistically insignificant for the contribution of Non-performing loans of agricultural projects

We can now use this model to predict the odds Ratio that a subject of a given Loan amount. The odds prediction equation is. If our subject Loan Amount is More than 10 million, That is, Loan amount up to 2.5 million is 0.870 times as likely to Non- performing loans as Loan amount more than 10 million. If our subject is loan amount between 2.5 million and 4.5 million 1.864 times more likely to non-performing loans than Loan amount more than 10 million. If our subject is loan amount between 4.5 million and 10 million 1.713 times more likely to non-performing loans than Loan amount more than 10 million. Loan amount up to 2.5 million is statistically insignificant for the contribution of Non-performing loans of agricultural projects.

Table 16: Regression Model Summary

Model Summary

	Cox & Snell R Square	Nagelkerke R Square
-2 Log likelihood		
781.666 ^a	.257	.344

- a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

The model summary provides more reliable information usefulness of the general model. The Cox & Snell R Square and the Nagelkerke R Square reports on the amount of variation of the outcome variable (Non-performing Loans) explained by the model. These values do not represent the true R square but the pseudo R square statistics since logistic regression does not measure linearity. The results of Cox & Snell, and Nagelkerke R squared estimates indicated that the whole model explained between 25.7% and 34.4% of the variance that can be predicted from the independent variables. The R^2 statistics do not measure the goodness of fit of the model but indicate how useful the explanatory variables are in predicting the response variable and can be referred to as measures of effect size. The result indicates that between 25.7% and 34.4% of variations in the probability of Agricultural Non-performing loans is explained by the set of Subsector, Commodity, Category Borrowers, interest rate, Approver and Loan Amount specific variables. Out of the eighteen predictor variables included in the model, nine of them were significant predictors at 95% confidence interval. The significant variables fell under each of the categories of predictors.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION

5.1 SUMMARY OF FINDINGS

The objective of the study was analyzed the effect of agricultural loan on non-performing loan (NPL) of the Development Bank of Ethiopia. The study adopted descriptive research design study and inferential statistics in which binary logistic regression was applied to the data to examine the effect of the explanatory variables on performance of agricultural projects between 2007 and February 2019.

The study showed that both horticultures and other subsectors are statistically insignificant for the contribution of non- performing loans of agricultural projects. Vegetable products and other commodities are statistically insignificant for the contribution of Non- performing loans of agricultural projects. Share Company is statistically insignificant for the contribution of Non-performing loans of agricultural projects. Interest rates 8.5% are statistically insignificant for the Non-performing loans of agricultural projects. Head office is statistically insignificant for the contribution of Non-performing loans of agricultural projects. Loan amount up to 2.5 million is statistically insignificant for the contribution of Non-performing loans of agricultural projects.

The results of Cox & Snell, and Nagelkerke R squared estimates indicated that the whole model explained between 25.7% and 34.4% of the variance that can be predicted from the independent variables. The result indicates that between 25.7% and 34.4% of variations in the probability of Agricultural Non-performing loans is explained by the set of Subsector, Commodity, Category Borrowers, interest rate, Approver and Loan Amount at 95% confidence interval.

5.2 Conclusion

From the data collected and analysis made in previous chapter, the following conclusion and recommendations were made. The researcher had intended to determine the effects of the explanatory variables on performance of agricultural project loans of DBE and their contribution to NPL of the DBE.

The DBE provides substantial volume of loan for several economic sectors. Regarding most of the loan was provided to the oil sector followed by Fiber Crops which are identified as Priority Area Projects having strategic importance to the development of the country as set by the government. Specifically, two commodities namely oil seeds and cotton production received the largest volume of loans from DBE over the past decade.

The minimum and maximum loan interest rate was between 8.5% and 12% respectively. However, majority of the loan was provided by levying the highest interest rate. Despite this fact, the lending interest rate of the Bank remains lower than the average borrowing rate in the private banking industry in Ethiopia. The lending interest rate 12% is much more like to yield Non – performing of Agricultural project loans than interest rate 8.5%.9%, and 9.5%. This also supported by Coravos (2010) reported that high interest rates increase the probability of loan default. Majority of the loans from DBE are majority of the loan was approved by branch offices. The approval limits by Branches has grown significantly over the years.

Over the study period, about 7.3 billion Birr loan was granted, with a huge standard deviation ranging from few thousands to billions. Private limited companies and resident individuals are the predominant customers.

Overall, the study found that significant proportion of the loan was non-performing largely orchestrated by defaults in Fiber Crops and Oil Crops. Investors in horticulture industries had better performing loans. Non-Resident Individual, Regional Government Federal Government, Micro Enterprise, Associations have a high Non- performing loan than private limited companies and resident individuals. The overall high nonperformance of governmental and government affiliated institutions is more likely to be associated to high risk taken by the policy bank to provide high risk loans without adequate collateral or appraisal procedures.

In comparison, loans with high interest rate, approved by district banks, medium size loans ranging between 2.5 to 10 million were more likely to fall under non-performing loans. Over the past decade loans taken for Fiber Crops largely yielded Non- performing loans.

5.3 Recommendation

Based on conclusion of the findings, the study recommends that the management of DBE should conduct a thorough review and appraisal of agricultural project loans. Furthermore, agricultural project loans already provided require a closer follow and special attention in order to minimize the damage. This will reduce default and enhance loan collection of the bank. Based on the evidence generated, DBE shall give analyses both the internal process of review and project appraisal in terms of project selection i.e. agricultural subsectors, commodities, loan amounts, due diligence and critically appraise, test loan viability plus ensuring loan collateral coverage and equity contribution on loan processing as per the policy & procedures of the bank or else erect the credit policy of the bank.

Non-performing loans are often associated with district level approvals. As a result, the management should review the project appraisal process and strictly follow-up on district banks and branch on the lending activities. This may include a higher level review of some of the selected high risk loans including those provided to government and government affiliated institutions.

Despite the lower interest rate compared to market, within the DBE's category loans provided by higher interest rate are likely to fail. This might be due to the nature of the agricultural projects or the nature of the borrower. Accordingly, a realistic interest rate coupled with reasonable collateral should be set. Finally, to optimize its performance shall be treated (financed) based on set policies and procedures to insure prudent projects financing & sound portfolio quality. Loans forwarded based on full Collateral Coverage and Equity contribution of the promoter otherwise the loans are simply wastage to the Public Money. The bank shall give Special attention for proper Implementation of NPLs Reduction action plan strategy.

5.4 suggestions for further research

Explanatory variables of this study can explain performance of the agricultural project loan at an extent of 34.4%, as showed by the result of a Nagelkerke R Square 0.344. This implies that there are about 65.6% other than agricultural subsector, commodity, lending interest rate, Approver

and loan amount. Thus researcher ought to recommend that a study should be done on the effect of agricultural project loan on loan performance to find out other factors different from explanatory variables of this study.

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