ADDIS ABABA UNIVERSITY
COLLAGE OF BUSINESS AND ECONOMICS
DEPARTMENT OF ACCOUNTING AND FINANCE

Evaluating Financial Distress Condition of Private Commercial Banks in Ethiopia

A Thesis Submitted to the Department of Accounting and Finance in Partial Fulfillment of the Requirement for the Degree of Master of Accounting and Finance

By:
Kiros Teklehaimanot

Addis Ababa, Ethiopia
November, 2020

ADDIS ABABA UNIVERSITY
COLLEGE OF BUSINESS AND ECONOMICS
DEPARTMENT OF ACCOUNTING AND FINANCE

Declaration

I, the undersigned, declare that this research work entitled "**Evaluating Financial Distress Condition of Private Commercial Banks in Ethiopia"** is outcome of my own effort and independently produced original study; farther it has never been presented to any university for academic credit. All information used from other sources are duly cited and acknowledged. The study complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

Name: Kiros Teklehaimanot

Signature: _____

ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF ACCOUNTING AND FINANCE

Certification:

This is to certify that the thesis prepared by Kiros Teklehaimanot, entitled "**Evaluating Financial Distress Condition of Private Commercial Banks in Ethiopia"** submitted in partial fulfillment of the requirement for master of accounting and finance complies with the regulation of the university and meets the accepted standards with respect to originality and quality.

Approved by:

Examiner (1): _____ **Signature:** _____ **Date:** _____

Examiner (2): _____ **Signature:** _____ **Date:** _____

Advisor: Alem Hagos (Ph.D.) **Signature:** _____ **Date:** _____

Acknowledgment

I would like to express my sincere appreciation to my advisor Dr. Alem Hagos who helped me to clearly describe and articulate the problem to be addressed, its purpose and objectives. Beside that; I also greatly appreciate my advisor for his valuable comments, suggestion and his meaningful appreciation and encouragement.

I also wish to thank my friends Robel Yohannes & Heruy Zeray for their valuable comment and support from the beginning till the completion of this paper. I am also indebted to authorities and staff of the selected private commercial banks who provided me necessary materials, information and other feed backs essential for the issue under the study.

I would like to thank also Mr. Kidane Berhane who helped me in writing and proof reading of the paper according to my interest.

Furthermore; my thanks go to my family, colleagues and friends who helped me morally and financially to accomplish my study successfully.

Last but not least, I would like to express my sincere appreciation for the contribution of those foreign and Ethiopian scholars that are cited in my paper.

Table of Contents

List of Tables

List of Figures

Acronyms

AIESM	Artificially Intelligent Expert System Models
BVE/BVD	Book Value of Equity to Book Value of Debt
CAMELS	Capital Adequacy, Asset Quality, Management Efficiency, Earning Ability
CBR	Case-Based Reasoning
CGM	Corporate Governance Model
EBIT/TA	Earnings Before Interest & Taxes to Total Assets
FD	Financial Distress
GA	Genetic Algorithms
MDA	Multiple Discriminant Analysis
MVE/BVD	Market Value of Equity to Book Value of Debt
NBE	National Bank of Ethiopia
NN	Neural Networks
RE/TA	Retained Earnings to Total Assets
RPA	Recursive Partitioning Analysis
WC/T	Working Capital to Total Assets
Z”	Financial Distress Measure of Financial Institution without Constant +3.25.

Abstract

A robust banking system is obviously one of the pillars of a financial system of any economy specially a country like Ethiopia its financial sector mainly dominated by commercial banks. The banking system in Ethiopia showing progress in performance and almost all banks are reporting positive profit and ensures a sustainable economic development and welfare by forming adequate capital and allocating funds efficiently for investment projects, payment services, strong financial systems. This study strives to assess the financial distress condition of private commercial Banks in Ethiopia for the period 2012-2019. The analytical tool used in the study is the Altman's bankruptcy prediction model of 1993. The result showed that the studied private commercial banks on average categorized under 'Gray Zone'. Specifically, Abyssinia, Dashen, Hebret, Awash, Wogagen, Addis, Zemen and Anbesa bank were categorized under 'Gray Zone' while the remaining seven banks namely: Abay, Berhan, Buna, Nib, Oromia International and Cooperative bank of Oromia banks were categorized under 'Distress Zone'. Therefore, banks categorized under distress zone needs to take corrective actions in order to avoid bankruptcy.

***Keywords**: financial distress, bankruptcy, financial soundness, commercial banks, Altman's Z-score, Multiple discriminant analysis*

CHAPTER ONE: INTRODUCTION

The background of the study, problem statement, research objective, Significance of the research, the scope of the study, and the organization of the paper are sequentially organized in this chapter as follows.

1.1 Background of the Study

Allocating scarce resource for different systems is the main function of economic system that contributes a significance role for the development of nations since financial system is an integral part of economic system. Financial institutions like Commercial banks play a vital role in the financial system by channeling funds from depositors to investors continuously. It is very necessary to get survived and perform regular financial operations. Hence; financial institutions need to generate necessary income to cover the operational cost they incurred. Furthermore; the financial condition is also a critical implication for the financial and economic growth of a given nation. According to Vincent et al. (2013), if the performance of banks is poor it can lead to different financial as well as economic problems like bank failure and distress or crisis. On the other hand; good performance will encourage additional investment that leads to economic growth which in turn has a positive reward for the main shareholders of the banks.

It is not as such easy to define financial distress since it is also associated partly with the variety of events responsible for financial distress. Financial distress is defined as "a situation where a firm's operating cash flows are not sufficient to satisfy current obligations (such as trade credits or interest expenses), and the firm is forced to take corrective action." (Wruck, 1990; Stephen et.al., 2012).

Financial distress is defined as "the condition of being in severe difficulties over money, especially being close to bankruptcy" in which such difficulties come in whenever the banks cannot meet or have difficulty in paying off their financial obligations to their creditors (Chang-e, 2006).

Even though Altman's Z-score is considered as the best and most known predictive model for financial distress there are also other known models that has been used by different firms and writer's like: Oholson's (O- score), Bankometer (S- score), Logit, Probit and Hazard models etc.

These models highly use different ratios for their inference around and measure the bank performance. In relation with this, Rinaldo et al. (2014), stated that in the process of making relevant decisions by investors, lenders, auditors, regulators and mainly managers in the banking sector financial ratio information is very essential..

Cipollini (2009) conducted a research on European commercial banks in the interval period of 2003 up to 2007 clearly shows the impact of financial distress.

Fiordelisi (2009) conducted research on financial distress in Africa mainly in sub Saharan Africa countries like Nigeria, Kenya, Uganda, Tanzania etc.… also experienced financial distress in the year of 1980s and 1990s; and because of this financial distress a number of banks are closed, merged and taken over by the national banks of their respective countries. At the same time researches that has conducted in countries like US in 2008, China in 1998; and some other European countries had proven that financial distress is changed to financial crises.

Ephrem (2015) conducted a research on assessment of financial distress condition of private commercial banks of Ethiopia. However; there are two researchers who conducted a research to know the determinants or factors of financial distress in the private commercial banks of Ethiopia: Tadesse (2017) and Robel (2018) by using Altman's 1993 z-score model. According to their findings it is clearly seen that the selected private commercial banks are already distressed and bankruptcies are expected in the subsequent years ang they ended up their study by listing out the determinants that may affect financial distress.

Although many studies were conducted in Ethiopia by focusing on financial distress in different sectors none of them tried to predict the situation of the companies related with possibility of financial distress for individual banks since 2012. Hence, the main purpose of the study is to evaluate & predict the financial distress conditions of private commercial banks in Ethiopia using Altman's 1993 Z-score model developed for private non-manufacturing businesses without a constant for the study period pf 2012 to 2019.

1.2 Statement of the Problem

Financial distress is one of the major factors that describe financial difficulties associated with a lack of required liquidity, profitability, efficiency and solvency. As Hasanah, Nur (2010) stated,

financial distress is an early stage expressed in one or two years as indicator of bankruptcy and Almilia (2004) also defined Financial distress as an early warning system of bankruptcy.

Financial distress has a negative effect on the economy of a given nation. As a result, governments often take remedy to rescue their financial institutions by offering some emergency programs like liquidity and post security programs (Hellen, 2013). Furthermore; financial distress will lead to financial depression and bankruptcy since it incurs additional costs to resolve the problem. As different scholars indicate there are two types of costs for bankruptcy: Direct and indirect costs. As Brealey et al. (2012) indicates costs that incurred for legal cases to declare insolvency of the firm are good example of indirect costs. While the bankruptcy or insolvency itself is considered as direct cost.

Each company wants to anticipate how they would be or in what status will they be in near future. No one wants be surprised and discourage that the company they invested in turns out to be bankrupted. Firms would prefer knowing the possibilities beforehand.

Therefore, financial institutions need a greater concern on how to manage their business in a better way and used to predict the probability of financial distress before bankruptcy is occurred. This early warning system shows sign of possibilities of bankruptcy before it actually happens and it will lead financial institutions to take action and minimize the cost associate with it. Hence; financial information is relevant to predict future financial distress using different failure prediction models.

Bankometer (S-score), Ohlson (O-score), Logit, Probit, and Hazard etc. are financial distress prediction models used to predict financial soundness, distress and bankruptcy over time; however, no specific technique has strong solution for financial institution on predicting accurately financial distress (John et al., 2011). Edward I. Altman developed a model in 1993 used for private non-manufacturing firms and emerging market economy and it was developed after a number of trails made by him starting from 1968. After the announcement of the new model by Altman in 1993, specifically designed for private none-manufacturing firms; many scholars used and verified the applicability for financial institutions and they confirm its accuracy ranges from 72% - 95% in predicting financial distress for one to two prior to bankruptcy occurred and then it becomes

the most dominant predictive model used in the area worldwide (Naidoo, 2006; Chotalia, 2014; Veni and Jyothi, 2018; Sinkey et al., 2012; Mwawughanga and Ochiri, 2017; Ezejiofor, Nzewi and Okoye, 2014; Samanhyia, Oware, and Anisom-Yaansah, 2016; Ephrem, 2015; Tadesse, 2017; Robel, 2018).

But there is no such type of trends in Ethiopia; predicting financial distress using different early warning systems; Except; 'Stress Testing' by NBE (National Bank of Ethiopia). As mentioned above if financial distress is not properly managed and resolved with some vital decisions, it will lead to bankruptcy. Therefore; it is very important for financial institutions to implement those early warning systems to understand their existing conditions and predict the upcoming situations.

According to Mullu (2011), commercial banks in Ethiopia are profitable. However; reporting earnings or accounting profits and disclosing better progress in performance is not a guarantee to the ongoing concern of the banks. Such situations mean not that the banks are healthy enough to achieve their short term and long term obligations because accounting profits are not always collected through cash or easily be available to cover immediate obligations.

Ephrem (2015) has also conducted a research focused on financial distress whose major objective was to know the financial conditions of private commercial banks in Ethiopia using one of the Altman's model known as ZETA – Score which is developed in 2002 for analyzing credit risk management. Originally; Altman's 1993 Z-score model has two versions: the first one is for private non-manufacturing companies while the second one is used for private non-manufacturing that has emerging market economy with a +3.25 constant term in addition to the other four variables. The model I used in this study is adopted from Altman's 1993 model.

Though Ephrem has conducted a study on the same issue on six banks for the period of 2002/03 to 2011/12 using ZETA model, as to the knowledge of the researcher no comprehensive financial distress prediction analysis for each banks has been done in Ethiopia since 2012 using Z Score 1993 model. Thus, the study tried to fill the gap on this limitation by using an appropriate Altman's Z- Score 1993 model with no constant term which is recommended by Altman for financial institutions (Chotalia, 2014). The researcher also assumed the dynamic nature of the banks operation will affect results of the previous studies conducted by different researchers. This

model has its own advantage over other models like Bankometer, Logit and Probit since it overcomes accuracy problems on predicting the financial distress on the financial institutions.

1.3 Objective of the Research

1.3.1 General Objective

The main objective of this study is to Evaluate the Financial Distress Conditions of the Private Commercial Banks in Ethiopia using Edward I. Altman's Z"-Score 1993 model.

1.3.2 Specific Objectives

The specific objectives of this study are:

1) To assess the financial distress condition of private commercial banks in Ethiopia using Altman's Z" score 1993 model;
2) To provide an insight to stakeholders of the financial sector in general and management of the specific banks to be caution in their decision making; and
3) To contribute in the literature of empirical examination of financial distress condition of commercial banks.

1.4 Significance of the Study

1) It enables bank managers and stakeholders to know about their current financial condition and helps them to take corrective measures.
2) It help banks to predict their future by using different predictive models.
3) It contributes to the existing studies and also serve as a reference for future studies

1.5 Scope of the Study

The scope of the study is to assess the financial distress condition of private commercial banks in Ethiopia using Atlman's 1993 model. The study covers all private commercial banks which were operational during 2012 to 2019 fiscal years. Altman's 1993 model uses liquidity, profitability, efficiency and solvency variables to predict financial distress condition of a company.

1.6 Limitation of the Study

The absence of data about banks' financial soundness position compared to other banks in the industry throughout the period makes the study difficult to easily verify the predictive accuracy and

quality of Altman's 1993 Z"- Score model in Ethiopian financial institutions specifically private commercial banks.

1.7 Organization of the Study

The paper consists of five chapters. Chapter one deals with the introductory part of the study specifically discussing on the background of the research, problem statement, objective of the study, significance and scope of the study. The second chapter discusses on the theoretical and empirical literatures. Chapter three describes about the research methodology and model applied. Chapter four deals with date presentation as well as analysis. While the final chapter discusses the conclusion and recommendations.

CHAPTER TWO: LITERATURE REVIEW

2.1 Theoretical Literature

2.1.1 Meaning and Signs of Financial Distress

Bank failure is a common phenomenon that is observed in corporate finance and is termed as 'Financial Distress'. It is not as such easy to define financial distress since it is also associated partly with the variety of events responsible for financial distress. Financial distress is defined as the probability of bankruptcy and it depends on the level of liquid assets as well as on credit availability (Hendel, 1996 cited in Andualem, 2011).

Financial distress is defined as a situation where a firm's operating cash flows are not sufficient to satisfy current obligations such as trade credits or interest expenses, and the firm is forced to take corrective action (Wruck, 1990; Stephen et.al., 2012).

Financial distress is defined as the condition of being in severe difficulties over money, especially being close to bankruptcy" in which such difficulties come in whenever the banks cannot meet or have difficulty in paying off their financial obligations to their creditors (Chang-e. 2006).

According to Bahrain and Sentosa (2013), financially distressed firms are those firms that are highly experiencing financial difficulties in maintaining their normal operations and are potential candidates to the bankruptcy proceedings in most severe conditions. Similarly, Adeyemi (2011) defines financial distress as situation related to operational, managerial and financial difficulties that is manifested in banks. Sun et.al. (2018) confirmed that having a specific type of financial problems is financial distress

According to Ross (2008), financial distress is referred to as a state where current obligations within an organization cannot be satisfied by its operating cash flow resulting to corrective action mechanisms.

According to Outecheve (2007), financial distress is categorized into a four interval processes which are performance deterioration, followed by financial failure, then insolvency and lastly default. Financial failure and deterioration affects the company profitability whereas default and insolvency are rooted in the company's liquidity.

Financial distress may lead a firm to default on a contract, and it may involve financial restructuring between the firm, its creditors, and its equity investors. Usually the firm is forced to take actions that it would not have taken if it had sufficient cash flow. Thus, Financial distress is a situation where a firm's operating cash flows are not sufficient to satisfy current obligations and the firm is forced to take corrective action (Stephen Ross et al., 2012 cited in Robel, 2018).

2.1.2 Causes of Financial Distress

After defining and categorizing the prediction models, identifying the agents (causes) of financial distress are the main question. There are numerous and various reasons for companies' financial distress, Arasti, (2011). Different researchers are classified it with three main models named as: Neoclassical, financial and corporate governance models, Lizal (2002) cited in Fachrudin, (2008)

2.1.2.1 Neoclassical Model

Assumes bankruptcy will be registered if the allocation of resource is not right; as a result the restructuring of bankruptcy will have wrong mix of assets. The base to estimate assets, liabilities and measure profit were made using the financial statements specifically statement of financial position and statement of profit and loss; and other comprehensive income.

2.1.2.2 Financial Model

As the name itself indicates this model assumes the cause for financial distress is financial performance measurements that the company used. Even if the financial ratios used to estimate bankruptcy are Total Asset Turn Over, Return On Asset, Return on Equity, profit margin, Account Receivable Turn Over, Debt ratio etc., liquidity is the main constraint for the financial structure when the mixture of asset is not true; i.e. the firm may survive in the long run but it should also go bankrupt in the short run. But still there are arguments about the explicit definition whether the bankruptcy is good or bad for re-structuralizing, Rinaldo et al., (2014).

2.1.2.3 Corporate Governance Model (CGM)

Based on CGM financial distress (bankruptcy) occurs because of poor management of mix of asset and lack of proper financial structure. Because of this inefficiency the firm will go out of the market as a consequence of the unsolved problems in the corporate governance, Fachrudin (2008).

In this regard, Edward et al., (2006) states that the main reason for financial distress is inadequacy of management and the ultimate cause is just running out of cash. Similarly; Darsono and Ashari

(2005) cited in Daul at Sihombing (2008) listed two causes of financial distress: internal and external. Internal factor originated from internal management like inefficient management (i.e. wastage of the cost, lack of management expertise and skills, and imbalance of number of owned capital with number of payable, receivable) is the first one and the second one is external factors are derived from macro factors that are directly related with the operation of the company. Like having huge amount of debts lead to huge amount of interest expense, lack of adequate collection of receivables are main reasons. Furthermore; cheating or providing incorrect information to users are also one of various external reasons of financial distress. Darsono and Ashari (2005).

On the other hand, Cyn-Young et al., (2013) listed out four conditions of financial distress:

1) If Non-performing loan is greater than 0.1 (10%)
2) If the cost of bank rescue is at least 0.02 (2%) of Gross Domestic Product
3) If the bank problems result to large-scale nationalization of other banks; and
4) Extensive bank runs lead to emergency measures

Luciana et al., (2003) and Rinaldo et al., (2014) cited in Robel (2018); also stated several sources of financial distress. These are:

1) Cash flows analysis for the recent and future period
2) Corporate strategies analyses that take into account potential competitors, relative cost structure, expansion plans in the industry, the ability of firms to pass on cost increases quality management and so forth.
3) Financial statements analysis of the company as well as its comparison with other companies. This analysis can be focused on a single financial variable or a combination of financial variables.
4) External variables such as return securities and bond valuation.

In addition to the above factors, Arnab, Bhattacharjee and Jie Han (2010) classified the factors as macro and micro. Accordingly micro causes are capital structure, profitability, cash flow, and characteristics of each firm; and macro factors are interest rate, exchange rate, inflation, etc. Similarly, Levratto (2013) stated internal and external circumstances of a company, including managerial mistakes, competition and loss of clients. According to Shepherd (2003), if company has not enough experienced personnel or resources, this could result in company distress. Ibrahim

(2017) demonstrated that keeping less money in organizations' account in order to get more profit could be done by some institutions. Thus, this might be another reason for companies distress.

2.1.3 Financial Distress Prediction

According to Altman et.al. (2015), the firm will face period of success and failure while they are working, and this will be natural for them.

Each company wants to anticipate how they would be or in what status will they be in near future. No one wants be surprised and discourage that the company they invested in turns out to be bankrupted. Firms would prefer knowing the possibilities beforehand. Predicting financial failure is an important factor which may have an effect on managing the works of institutions and economic growth. Indeed financial distress has much more disastrous consequences in the banking sector than it has in the mainstream business sector, financial health appraisal of financial institutions and banks in particular is critical (Mwawughanga & Ochiri, 2017). Moreover, Ng et. al. (2011) and Altman (1984) suggested the recognition of possible failure at the beginning is necessary for companies

Alifiah and Tahir (2018), pointed that there are four determinants of financial failure and these include liquidity ratios, profitability ratios, leverage ratios as well as the management of asset ratios. It might be good for companies, before being bankrupt or before failure, to study their financial conditions. Tyagi (2014), indicated that financial analysis is essential for companies to be able to know their financial statuses and wellbeing.

Maricica and Georgeta (2012) suggested that a good forecaster of corporate failure is financial ratios. Similarly, Prihadi (2011, cited in Marthy et. al., 2018) argued that an indicator of the financial failure of companies could be financial ratios. .

Assessment of financial distress is keen area of interest for different parties since long historical period of time in finance literature. Various models have been developed all over the world for financial distress prediction using different methodologies over the period of time by researcher and practitioners and academic. Francois van der Colff and Frans Vermaak (2015) cited in Robel

(2018), have pointed financial distress prediction methods to three main categories, i.e. classical statistical models, artificially intelligent expert system models, and theoretical models.

2.1.3.1 Classical Statistical Models

Univariate Model, Risk Index Model, Multiple Discriminant Analysis, and Logit and Probit analysis are commonly known type of classical statistical models around.

1) Univariate Model:

It was initially built by Beaver (1966) to predict company failure using different financial ratios of paired (failing and non-failing) samples. And disclosed three significant financial ratios to predict financial distress: Total Debt / Total Assets (Debt ratio) Net Income / Total Assets (returns on assets) and Cash Flow / Total Debt. Hellen (2013) cited in Robel (2018). The univariate model has an ability to classify as failed and non- failed company accurately five years before the failure.

2) Risk Index Model

It was developed by Tamari (1966) to disprove the Univariate model developed by Beaver (1966). It includes some different ratios as generally accepted as a measure of financial health of firms. Then he listed down firms with the higher value of the ratios calculated to lower. The firm with high ratio total has considered as a company with better financial position or situation. But there are questions often asked about this model; 'the multi-collinearity of ratios used, since there may be double counting of ratios can be existed (Hellen, 2013).

3) Multiple Discriminant Analysis (MDA)

It was the first financial distress predictor developed by Altman in 1968. He used several financial ratios to address the very limitations of both Univariate and risk index model developed previously. The conversion of univariate model to MDA was the main success of Altman. MDA has strength on ability to measure firms financial attribute and assesses on the interaction between ratios selected, He classified companies in to two and applied the ratios to find out the distressed firms. The model has different cut of points to classify companies. The results showed that the Z-score model had sound prediction performance one year and two years before financial distress, but did not indicate good prediction utility three to five years before financial distress occurred (Robel, 2018).

4) Logit and Probit analysis

Logit regression is used to predict the result of categorical dependent variables and independent variables, whereas Probit regression refers a model of binomial response variables. Like others, this model was built to overcome the limitations of previously developed models: Univariate, Risk-Index and MDA. The model uses selective ratios to forecast the financial conditions of firms but the numbers of ratios are limited and difficult to conclude (Judy et al., 2015).

2.1.3.2 Artificially Intelligent Expert System Models (AIESM)

This is the second main category of financial distress predictive model and it has five sub models they are: Recursive partitioning analysis, Case-based reasoning (CBR), Neural networks, Genetic algorithms (GA), and Rough sets model.

1) Recursive partitioning analysis (RPA)

It is a technique splits the samples in to two parts by partitioning the effect variables that highly modifies the homogeneity of category assignments applied to the two resulting groups. Mainly it is non-parametric procedures that estimate a classification rule as a sequence of partitions of independent variables. This model has some similarities with both multivariate procedure and univariate approach of classification (Harrison, 2005).

2) Case-based Reasoning (CBR)

Case based reasoning solves a new classification problem with the help of similar previously solved cases. CBR programs can be applied directly to bankruptcy prediction by application of its typical four-stage procedure for predicting bankruptcy. The first one is problem identification, then searching solution for same cases from previous bankruptcy case library (retrieval from case library), the third one is adaption of solved cases as a solution for the new case and finally evaluation of the suggested solution and storage for future use to case library (M. Adnan Aziz and Humayon, 2006 cited in Robel, 2018).

3) Neural networks

'Neurons' are nodes with weighted interconnections that are organized in layers (M. Adnan Aziz and Humayon, 2006). Based on M. Adnan Aziz and Humayon (2006), the nodes in the input layer are processing elements that collects basic information about the organization and converts them in to a single output signal. Then, in this point there are two options: the first one is accepting as a

classifying decision or the second one is transferring it to other nodes as an input signal. It will continue like this until we get the exact classification point that shows the firm will fail and satisfy the pre specified criteria.

4) Genetic Algorithms (GA)

Genetic Algorithms is a method of predicting bankruptcy categorized under AIESM. Genetic Algorithms is a stochastic technique used to find an optimal solution to a known problem from a large number of solutions; and the model was developed based on the idea of Darwinian Theory of natural evolution and idea of genetic inheritance. The model has three phases to possess: first representation and initialization of genetic, then selection of genetics and the third one is genetic operation. These processes will continue until the selected genetics coverage becomes increasingly homogeneous to the strings. Researchers execute a solution for the problems encountered on the classification phase of this model by setting different conditions. Accordingly, the rules (conditions) have certain cut-off point that would be used to predict whether or not the firms are likely to go to bankruptcy (M. Adnan Aziz and Humayon, 2006).

5) Rough Sets Model

This model works using its own theory on classifying the firms to bankrupt or not through imprecise information. Start by prepare a table that contains a set of conditions and decisions attributes that is used to drive the decision rule by inductive learning principles. Then every new firm can be then classified by matching their characteristics with that derived set of rules (Robel, 2018).

2.1.3.3 Theoretical Models

The third category of financial distress prediction methods is theoretical model. There are five theories named: trade-off, entropy, Gambler's run. Cash management and credit risk theories. The models are developed using or applying an adequate statistical methods. Unlike other categories i.e. statistical and AIESM; it attempts the distress conditions presented in the form and/or the main reasons (causes or factors) of their failure.

1) Trade-off Theory

According to Francois van der Colff and Frans Vermaak (2015), the cost of financial distress eventually becomes high and it erodes the tax benefit shield. And because of this the value of the

firm becomes decrease. The increase in the value of the firm as a result of leverage since it has tax advantage; will only be true to some point; unless let the company to default.

2) Entropy Theory

The theory that uses the composition of assets and liabilities over a certain period of time on the balance sheet is Entropy theory and sometimes called balance sheet decomposition. Based on this theory; if the balance sheet reflects significant changes in the composition; then the firm is assumed incapable of maintaining a healthy financial position resulting to distress,(Tadesse, 2017).

3) Gambler's Run Theory

The gambler starts out with a positive, arbitrary, amount of money where the gambler wins a dollar with probability p and loses a dollar with a probability (1-p) in each period. The gambler is very optimistic of winning until he loses everything. Gambler's run theory assumes the firm has given amount of money that the firm experiencing positive or negative cash flows. Thus, the more negative cash flow will lead the firm to bankruptcy, but on the other hand the company will continue its operation until positive cash flow. As the name indicates; the gambler plays with a certain amount of money with gain or loss probability. Companies which do not check or test their financial health state can be viewed as gamblers who are operating on chances (Robel, 2018)

4) Cash Management Theory

Similar to the above Gambler's run theory; that looks certain amount of cash management of the firm. Cash management theory also tries at cash and other short term assets of the firm. Extended imbalance of cash inflow and outflow will lead to bankruptcy (Hellen, 2013).

Cash management theory viewed an organization as a reservoir of liquid assets which is supplied by inflows and drained by outflows. The reservoir serves as a cushion or buffer against variations in the inflows. Accordingly the solvency of a firm can be defined in terms of the probability that the reservoir will be exhausted at which point the firm will be unable to pay its obligation as they mature (Beaver,1966). Cash management theory is concerned with the managing of cash flows into and out of the firm; cash flows within the firm and cash balances held by the firm at a point in time by financing deficit or investment surplus cash. Short-term management of corporate cash balances is a major concern of every firm (Robel, 2018)

5) Credit Risk Theory

Credit is the provision of goods and services to a person or entity on agreed terms and conditions where the payments are to be made later with or without interest. During the contract period, violation of contract terms by the debtor is legally actionable and classified as technical default. When the debtor does not pay their dues on the due date, the lender is exposed to credit risks which may in turn lead to default. It is a risk that any counterparty (borrower/ lender) will default for any reason (M. Adnan Aziz and Humayon, 2006). Credit risk theory uses different economic theories of corporate finance to find out the risk.

2.1.4 Development of Altman's Model

As briefly discussed above Edward Altman is the pioneer to introduce MDA so called 'Z – Score' on the area to predict financial distress using different financial ratios and then becomes the most popular and best known predictive model to predict financial distress. The model has proven to be a dependable instrument in forecasting failure in a diverse mix of business entities (Altman, 1968).

2.1.4.1 First Altman's 1968 Model (Original Z-Score: For Public Manufacturer)

The original Z-Score formulated only for public manufacturing firms; but not for small, non-manufacturing, and non-public companies; but still now different companies are using the original Z-Score. After detail examination and based on their popularity twenty two (22) classified ratios were classified to five categories; profitability, liquidity, leverage, management activities and solvency. Then the model had undergone various testing and showed improvement on accuracy. The five variables (ratios) used to develop Altman's (1968) with their cut of points are discussed as follows: **Z = 1.2 X1 +1.4X2 +3.3 X3 +0.6 X4 +.999 X5**

X1 = Working Capital /Total Assets

X2 = Retained Earnings/ Total Assets

X3 = Earnings before Interest and Taxes / Total Asset

X4 = Market Value of Equity / Book value of total Debt

X5 = Sales / Total Assets

The results are interpreted and analyzed according to the specific criteria. If the value of Z-score is above 2.99 safe (succeed) zone, if Z-score is between 1.81 and 2.99 gray (ignorance) zone, and is Z-score is less than 1.81 called distress (probable failure) zone.

X1: **Working Capital/Total Assets**: Working capital is the difference between current asset and liability. This ratio is a measure of net liquid assets of the firm relative to total capitalization and therefore a low Working Capital to Total Assets indicates liquidity problems. Negative net working capital of the firm has problem on their short term duty since sufficient current asset is necessary to cover the current liabilities. Lower the ratio indicates that liquidity of the company has dried up or going to dry and may face hardship to meet current liabilities. However, a positive working capital indicates that the firm is liquid and can meet its obligation as they fall due. Higher the ratio indicates that higher is the liquidity of the company & it can manage business in at the time of expansion as well as stress testing times.

X2: **Retained Earnings/Total Assets**. This is a leverage ratio and firms with high retained earing usually finance the business through accumulated profits. This ratio captures the age of the firm because established firms tends to have high retained earnings over the life of the business as compared to young firms. Altman noted that this ratio does not discriminate against young firms. In the real world, younger firms are more likely to enter bankrupt compared to older firms. Higher the ratio indicates that company is dependent on the retained earnings accumulated over the years through business operation. Company operates stress free with no or little financial burden Lower the ratio indicates that company's business has been unsuccessful in generating sufficient earnings that can fund its assets. Company may be dependent on external debt which put the company under financial stress which may ultimately lead towards bankruptcy

X3: **Earnings before Interest and Taxes/Total Assets**. Earnings before interest and taxes is a measure of a firm's profitability that excludes interests and taxes. It is obtained by subtracting operating expenses from revenue. This ratio measures management's ability to squeeze profits out of its available assets. Because of this ratio appropriateness particularly for corporate failure studies; the earning ability of the company becomes the most important for their existence Higher the ratio indicates that business is being running profitably and is able to generate sufficient cash inflow to meet exigencies and future commitments. Lower the ratio indicates that profit of the

company are diminishing and earning capability of the business is on decline and may need serious attention.

X4: **Market Value of Equity/ Book Value of Debt**: This ratio shows how much the firm's assets decline in value before the liability exceeds the assets and the firms becomes insolvent. Firms with high debt to equity ratio tend to move towards insolvency if earnings do not support the interest expenses. Higher the ratio indicates that market has positive sentiments towards the company and business commands value. Lower the ratio indicates that market is discounting the value of the business and company is losing its reputation in the market.

X5: **Sales/Total Assets**: This ratio measures management efficiency in generating sales from available assets. It also measures the firm's competitive ability, as it relates to sales of products (Tadesse, 2017). Higher ratio indicates that business is running smoothly and assets are utilized optimally, ultimately resulting the higher profit. Lower the ratio indicates that there is lower utilization of assets in comparison to industry peers, there need to overhaul the existing assets.

Generally; Edward Alman 1993 Z- Score model has a good accuracy on predicting bankruptcy in the first year but it decreases when we increase the year to two, three, four and five. The model was tested up to five years prior bankruptcy and disclosed the predictive accuracy. Accordingly the predictive accuracy of the model was 95%, 72%, 48%, 36% and 29% prior to first, second, third, fourth, and fifth year respectively (Naidoo, 2006).

2.1.4.2 The Revised Z'-Score Model: (For Private Manufacturer)

The former Z-score model was specifically designed for public manufacturing firms; but it is not used to apply in every situation; like for institutions whose capitals are not publicly traded. Because of this Altman revised his model simply by inserting some variables in to an existing model for the revised one; farther more he changed the fourth variable (i.e. X4); the book value of the equity with market value. This resulted in a change in the coefficients and in the classification criterion and related cut-off scores. The revised Z'- score model took the following form (Tadesse, 2017):

$$\textbf{Z'-Score} = 0.717X1 + 0.847X2 + 3.107X3 + 0.420X4 + 0.998X5$$

Where:

X1 = (Current Assets-Current Liabilities) / Total Assets

X2 = Retained Earnings / Total Assets

X3 = Earnings before Interest and Taxes / Total Assets

X4 = Book Value of Equity / Total Liabilities

X5= Sales/ Total Assets

The results are interpreted and analyzed according to the specific criteria. If the value of Z'-score is above 2.9 safe (succeed) zone, if Z'-score is between 1.23 and 2.9 gray (ignorance) zone, and is Z'-score is less than 1.23 called distress (probable failure) zone.

If firm's stock is not publicly traded the X4 which is Market of Equity/Market value of Debt in the original model cannot be calculated. Rather, the X4 term is computed using Book value of Equity/ Book value of liability. This resulted in a change in the coefficients and in the classification criterion and related cut-off scores (Tadesse, 2017).

The revised model Z'-score was developed for use with private companies. The weighting of the various ratios is different for this model as well as the overall predictability scoring. In addition, while the original score used the market value of equity to calculate the equity to debt formula, the revised model used shareholder's equity on the balance sheet. Although computerized statistical modeling would aid in determining the weighting of each ratio, common sense helps us understand the purpose of each ratio (Robel, 2018).

2.1.4.3 The Further Revised Z"-Score Model: (For Private Non-manufacturing & Emerging Market)

A further revision was required to assess the accuracy of the model without the fifth variable (ratio) for non-manufacturing and emerging markets. Altman did this to potentially minimize the industry effect that is more likely to take place on such sensitive industry for a variable like asset turnover. Furthermore, the new revision was required to know the accuracy and applicability of Z-score to non-US firm's financial health; specifically Mexican firms that had issued Eurobonds denominated in US dollars (Tadesse, 2017). The main modification made from the original model was the fourth (X4); the market value of the equity was replaced by book value of equity and the fifth ratio (X5) was completely removed because of industry sensitivity issue. The classification accuracy results are identical to the revised (Z'-Score).

The new Z''-Score model is: **Z'' = 3.25 + 6.56 (X1) + 3.26 (X2) + 6.72 (X3) + 1.05 (X4)**

All of the coefficients for variables X1 to X4 are different from the original Z-Score model, as the group means and cut-off scores. The constant +3.25 is used only for countries having emerging market economy, so as to standardize the scores with a score of zero equated to a default rated bond. For the purpose of this study as clearly classified above the revised Z"- score with four variables and without constant term is used to measure Z-score of financial institution.

The results are interpreted and analyzed according to the specific criteria. If the value of Z"-score above 2.6: The company is considered to be in the safe zone. Z"-score less than 2.6 but above 1.1: The company is considered to be in grey zone. Z"-score less than 1.1: The company is considered to be in distress zone.

2.2 Empirical Literatures

There are a lump sum of studies conducted in the area to know the condition of financial distress and its determinants worldwide. In this part the researcher tried to discuss sequentially starting from worldwide studies, then studies conducted in Africa and finally in Ethiopia.

2.2.1 World-wide Studies

Chotalia (2014) has examined the financial health of Indian private sector banks using Altman's Z-score model and he has concluded that the selected private sector banks understudy fell in' Grey Zone' as per Z-Score criteria and this indicates that the risk of financial distress was looming on the selected banks.

Veni and Jyothi (2018) has also conducted a comparative study of financial solvency and stability on Indian private banks using Altman's Z-score model. He clearly observed in his findings that all the four selected banks were financially robust and far away from bankruptcy. That is why; his study demonstrated that the Altman's Z-score value of all selected banks lied in Safe Zone in which its Z-score was greater than 2.6.

Sinkey et al (2012) conducted a study to test the cross-industry validity of ZETA model on failed commercial banks in US during the early 1980s. They used ZETA model developed by Edward I, Altman, 2002. The result of their study reviled that the ZETA model lacks accuracy as the original Z-score. The main reason they identified for in accuracy of the model was the inability of

the accounting data to reflect market value, the process by which banks are declared insolvent and the presence of criminal misconduct as a major contributing factor in the bank failures.

2.2.2 Studies in Africa

As to Mwawughanga and Ochiri (2017), most Kenyan commercial banks fell in grey zone when their financial performance is measured using Altman's Z-score model.

Ezejiofor, Nzewi, and Okoye (2014) have conducted a serious study using Altman's Z-score model to predict the potential bankruptcy of Nigerian banks. According to their findings, they came in to conclusion that the model was capable of determining realistically the failure potential of sound and healthy banks. At the same time, their research showed that Altman's bankruptcy prediction model could also successfully predicted the collapse of the banks that eventually suffered corporate failure in Nigeria.

Samanhyia, Oware, and Anisom-Yaansah (2016) have also conducted analysis on financial distress and bankruptcy prediction in Ghanaian selected listed banks and they found out that, individually, 80% of the selected banks have their average Z- score between 1.1 to 2.6 (grey zone).. This indicates that these banks were found to be neither financially distressed nor classified as safe. On the other hand, 20% of the selected banks were under the distress zone.

Samira (2013) tried to assess the applicability of MDA on predicting bankruptcy of firms listed in National Security Exchange (NSE) of Nairobi during the period from 2008 to 2018 and from a period 1996 to 2012 by dividing in to five different sectors. The model used to predict financial distress is Altman's Z-score and applied for failed and non-failed firms. The result indicates that the model is efficient to predict bankruptcy but NSE used model to differentiate failed and non-failed firms in the study was insufficient to predict bankruptcy prediction. As she stated that this is due to the nature of the model NSE used.

2.2.3 Studies in Ethiopia

As per the researchers knowledge except for one trial by (Ephrem, 2015) there is no research conducted on assessment of financial distress condition of private commercial banks after 2012. However; Tadesse (2017) and Robel (2018) were conducted a research to know the determinant factors of financial distress in the private commercial banks in Ethiopia.

Ephrem, (2015) conducted a research on commercial banks in Ethiopia to know their financial distress conditions & the determinants of financial distress by selecting six banks for the period of 2002 to 2011. He utilized balanced panel data for regression. The model used was the revised (Altman's, 2002) model called ZETA score; which is recommended for companies credit scoring and finally he listed out determinants one by one with positive and negative effect.

Tadesse (2017) also conducted research to find out the determinants of financial distress in order to address the limitations by Ephrem (2015); like adding additional variables (CAMELS) and some other macro variables as factors. Tadesse (2017) used the Altman's (1993) model developed for emerging market firms with constant of +3.25. But his conclusion has two dimensions; the descriptive statistics shows private commercial banks are distress but not the regression result. And he listed out those variables with positive and negative as well as significant and insignificant on financial distress. Capital Adequacy Ratio, Managerial Efficiency, Return on Equity and Size of bank have negative and significant effect except bank size. Other variables like Non Performing Loan to Total Loan and liquidity have same positive effect but insignificant. On the other hand Gross Domestic Products has significantly negative effect whereas inflation has negative and insignificant effect on financial distress.

Robel (2018) has also conducted a research with same title with Tadesse (2017) by using Altman's (1993) Z-score developed for non-manufacturing and private firms without a constant +3.25. He used fixed effect balanced panel data for fourteen private commercial banks for the study period of 2012 to 2017. The result of descriptive, correlation and regression result shows that all private commercial banks are distressed. But the main aim of his study was just to list out the determinants likewise Tadesse (2017). Accordingly, variables with negative and significant influence on Z-score are Capital Adequacy Ratio, Return on Equity, and Liquidity. Whereas bank size has positive and significant effect on Z-score; other variables such as Managerial Efficiency, Asset quality, and Gross Domestic Product resulted insignificant influence on Altman's 1993 z-score on private commercial banks.

Beyond the aforementioned studies in the financial institution area specifically commercial banks; there are also few studies conducted on manufacturing and merchandising areas; for instance Andualem (2011) was conducted research on merchandising firms in Ethiopia Yohannes (2014) and Andualem (2015) conducted research on manufacturing area. In general; most of them applied

Altman's' Z-score developed for such type of business and identified the determinants using panel data with random effect estimator and finally they concluded the existing conditions of firms included in the study by listing significant and insignificant ones randomly.

2.2.4 Summary and Knowledge Gap

Based on the above theoretical as well as empirical literature review, financial distress is referred to as a state where current obligations of a financial institution cannot be satisfied by its operating cash flow resulting to corrective action mechanisms.

There are number of theoretical bankruptcy prediction models developed by different scholars around glob and categorized with three main parts namely; Classical statistical (Univariate Model, Risk Index Model, Multiple Discriminant Analysis, and Logit and Probit analysis), Artificially Intelligent Expert System Models (AIESM) (Recursive partitioning analysis, Case-based reasoning (CBR), Neural networks, Genetic algorithms (GA), and Rough sets model) and theoretical models (trade-off, entropy, Gambler's run. Cash management and credit risk theories). Even if there are a number of predictive models worldwide most researchers prefers Altman's z- score often than others.

Altman developed a number of versions of Z-score since the first introduction in 1968; in 1983, in 1993, 1995, 2000 and 2002. The models are mainly developed to predict financial distress of manufacturing companies. But specifically the 1993 Altman's model is suitable for financial sectors. Therefore, this study used Altman's 1993 since the model overcomes the industry sensitive and variable selection limitation of other models as well as accuracy to forecast bankruptcy.

Although many theoretical and empirical studies conducted to assess financial distress condition of companies and to some extent financial institutions globally, as to the knowledge of the researcher only few studies conducted in Ethiopia specifically on commercial banks using Altman's models developed in different period by Ephrem (2015), Tadesse (2017) and Robel (2018). Moreover; except Ephrem, all of them are tried to come up with determinants of financial distress but they didn't specifically show financial distress conditions of each Banks they tried to address year by year. Moreover, since the banking industry is in the growth stage with opening of new banks and branches, this study is important to assess the financial distress condition of banks

by conducting empirical investigation to already established banks and operational during 2011/12 to 2018/19 fiscal year using Altman 1993 Z" Score model with no constant +3.25 which is recommended for countries with emerging market economy.

Therefore, the study evaluates the financial distress condition of private commercial banks operational during the fiscal year 2011/12 to 2018/19 using Altman's 1993 Z" Score model.

CHAPTER THREE: RESEARCH METHODOLOGY

The preceding chapter has indicated that the literature on the financial distress condition of private commercial banks. Both theoretical an empirical reviews were made and indicated the absence of adequate and specific studies in Ethiopia regarding assessing banks financial distress conditions. The objective of this chapter is to present the research methodology adopted by the study.

3.1 Research Design and Approach

The purpose of this chapter is to present the research approach adopted by the study. Quantitative research approach is used since it helps to conduct systematic empirical study of observable phenomena via statistical or mathematical techniques (Creswell, 2009). The objective of quantitative research is to develop and employ mathematical models, theories and hypotheses pertaining to phenomena. The process of measurement is central to quantitative research because it provides the fundamental connection between empirical observation and mathematical expression of quantitative relationships.

This study follows a deductive reasoning in describing the event. By applying the selected theory to explain the event, event characteristics will serve as empirical facts supporting the validity of the theory. Deduction is also the most commonly used research approach in combination with positivism (Sutrisna, 2009). However, it is believed the study is purely deductive as part of the research purpose was to figure out the financial distress condition of commercial banks.

3.2 Target Population and Sampling Procedure

Target Population:

The study targeted population or participants were all private commercial banks in Ethiopia. According to NBE report (2018/19), there are sixteen private commercial banks operational in the fiscal year 2018/19 such as Awash International Bank S.C (AIB), Dashen Bank S.c (DB), Bank of

Abyssinia S.C (BOA), Wegagen Bank S.C (WB), United Bank S.C (UB), Nib International Bank S.C (NIB), Cooperative Bank of Oromia S.C (CBO), Lion International Bank S.C (LIB), Oromia International Bank S.C (OIB), Zemen Bank S.C (ZB), Bunna International Bank S.C (BIB), Berehan International Bank S.C (BrIB), Abay Bank S.C (AB), Addis International Bank S.C (AdIB), Debub Global Bank S.C (DGB) and Enat Bank S.C (EB).

Sampling Frame:

Sampling frame for drawing sample included those private commercial banks having at least eight years working experience in Ethiopia (i.e. from 2012 to 2019). In Ethiopia there are fourteen commercial banks having at least eight years' experience which include all private commercial banks listed above excluding Debub Global Bank S.C and Enat Bank S.C. Therefore, the matrix for the frame is 8*14 that includes 112 observation.

Sample:

It is the portion of the study population and used when addressing the total population in the study is not possible. But in this case, since the number of banks in the country is small, the study assumed the data of all banks in the sample frame without taking sample.

Therefore, the sampling frame and the sample was the same. According to Brooks (2008, p 105), while there is no definitive answer for an appropriate sample size for model specification, it should be noted that most testing procedures in econometrics rely on asymptotic theory. This theory says that as the sample size approaches the population size, the results from the sample estimates are more appropriate for generalizing to the general population. Thus in this case the sample size was almost equal to the population which enabled to make appropriate generalization to the overall population.

3.3 Data Collection, Presentation and Analysis Techniques

3.3.1 Data and Data Collection Instrument

Only secondary data were used for the study. Conducting appropriate data gathering instruments helped researchers to combine the strengths and amend some of the inadequacies of any source of data to minimize risk of irrelevant conclusion. Consistent and reliable research indicates that research conducted by using appropriate data collection instruments increase the credibility and value of research findings (Koul, 2006). Accordingly, structured document review was used for this research to collect required information, which was relevant for addressing the objectives of

the study. Data were collected from audited financial statements (balance sheet and income statement) of each private commercial banks included in the sample. All data were collected on annual base and the figures for the variables were on June 30 of each year under study.

3.3.2 Data Presentation and Analysis Techniques

The systematic process that applies statistical techniques to evaluate data through inspecting, transforming and modeling data to draw useful information is called data analysis. To achieve the research objectives, statistical analyses caried out using the following methods:

First descriptive statistics of the variables were computed over the sample period to helps the researcher in picturing the existing situation and allows relevant information. Then Altman's 1993 model (Z-score) of financial distress condition assessment was employed. Financial data collected from different audited financial statements of the study period were analyzed using Microsoft Excel application to compute Z-score and descriptive statistics.

3.4 Altman's Z-score Model Specification

Financial distress prediction models like univariate, risk index, multivariant discriminant analysis (MDA), logit, probit, recursive partitioning, case based reasoning (CBR), neural networks, genetic algorithm (GA) and rough sets model has been used for many organizations basically manufacturing firms since the first introduction of univariate model in 1966. But most of the researches conducted on financial sectors used the MDA type of techniques developed by Edward I, Altman. But there are three different models developed for non-manufacturing private firms: the original 1968 model, the revised 1993 and farther revised 1993 model with four variables. Because of the applicability and accuracy of the model in predicting the financial distress conditions of nonmanufacturing business like financial institutions before one to five years; the researcher used the furtherly revised Altman's (1993) Z-score model with four variables and without constant +3.25; to measure the financial distress conditions of private commercial banks in Ethiopia. Based on the reviewed literature and adopted Altman's, (1993) model; the following general model was used:

Z"= 6.56X1+ 3.26X2+6.72X3+1.05X4

Where:

Z": Financial distress measure of financial institution

X1: Liquidity Ratio (Working capital / total assets)

X2: Profitability Ratio (Retained Earning / total assets)

X3: Efficiency Ratio (Earnings before interest and taxes / total assets)

X4: Solvency Ratio (Book value of equity/ book value of total liabilities)

Zones of discrimination

Accordingly; the cut-off zones are listed out in the following table; adopted from Altman's, (1993).

Table 1: Summary of discrimination zone

If, Z">2.6- "Safe" Zone	The business is financially stable, sound and there is least probability that the firm will face financial distress
If,1.1<Z"<2.6-"Gray" Zone	The firm falls in the gray area, which means there is less probability that the firm will face financial distress in the near future.
If, Z"<1.1- "Distress" Zone	This means that there is a high probability that the business will face financial distress in near future.

CHAPTER FOUR: DATA ANALYSIS AND DISCUSSION OF RESULT

In the preceding chapters important literatures relating to the topic were reviewed that gives enough understanding about the topic and used to identify knowledge gap on the area. To meet the broad research objective and the research design used for this study also discussed in the preceding chapter. In this chapter the data collected were presented and Z-score results were discussed.

The current chapter has two sections. Under the first section (section 4.1) the descriptive statistics of the variables were presented followed by the results of Z"-score under section 4.2.

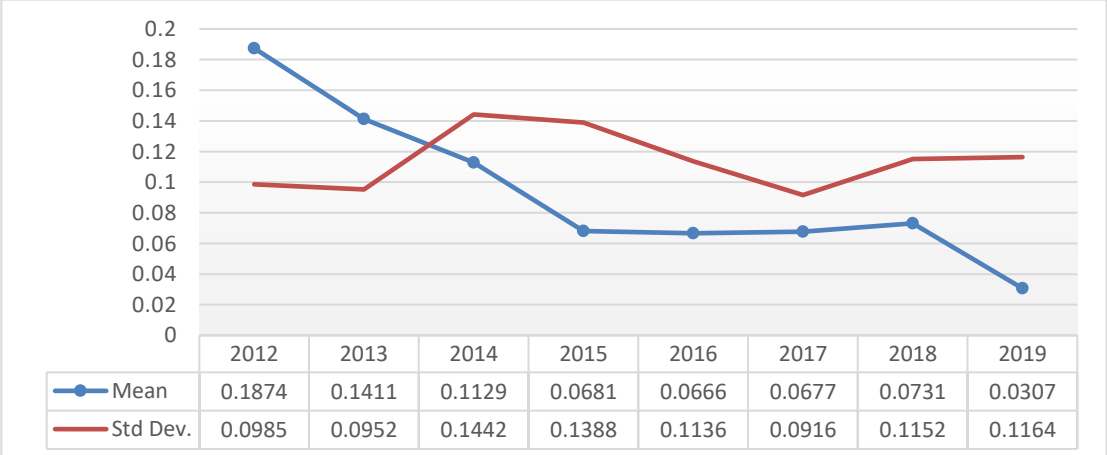
4.1 Descriptive Statistics of the Data

4.1.1 Descriptive Statistics of Net-Working Capital/Total Asset (X1)

Net-working capital/total asset ratio indicates the liquidity position of the studied commercial banks. By nature, banks usually require huge working capital to meet depositor's withdrawal request. The descriptive statistics of liquidity ratio of the studied private commercial banks are summarized in the following table. The highest mean is observed in 2012 and the lowest observed on 2019. The mean liquidity ratio of the studied banks, except in 2018, have steadily decreasing from 2012 to 2019 which shows that the liquidity distress of the studied banks have progressively increased.

Moreover, from the studied commercial banks we have observed that the highest deviation from the mean in 2014 which means there was a highest variability in the liquidity position amount the studied private commercial banks that is 0.1442.

Figure 1: Descriptive statistics of liquidity ratio

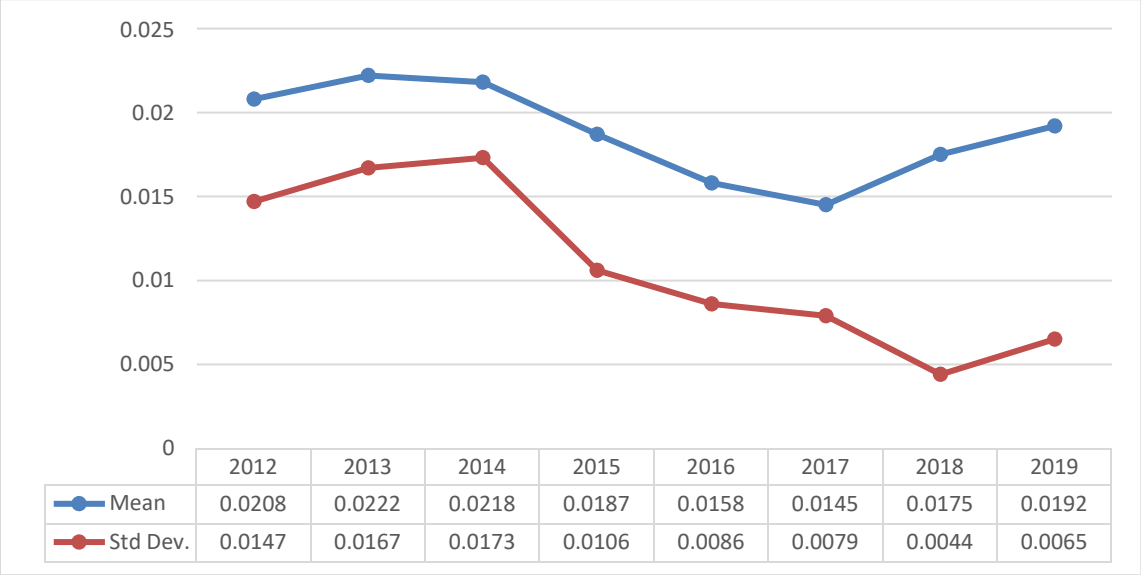


	2012	2013	2014	2015	2016	2017	2018	2019
Mean	0.1874	0.1411	0.1129	0.0681	0.0666	0.0677	0.0731	0.0307
Std Dev.	0.0985	0.0952	0.1442	0.1388	0.1136	0.0916	0.1152	0.1164

4.1.2 Descriptive Statistics of Retained Earning/Total Asset (X2)

This part presents the ratio of Retained Earning to Total Asset. This ratio measures cumulative profitability over time as a proportion of total assets. It indicates the managerial efficiency in terms of profitability of the bank. But higher ratio of Retained Earning to Total Asset sometimes indicates a lack of investment opportunity that may lower the profitability of the banks. The descriptive statistics of the studied private commercial banks reveal that the highest profitability ratio was observed in 2013 whereas the lowest was observed in 2017. In general, the mean profitability ratio was higher at the beginning of the study year and declined in the middle and then raised at the end of the study period. Moreover, the deviation from the mean was not shown significant variation but slowly decreased from 2012 to 2019.

Figure 2: Descriptive statistics of profitability ratio



	2012	2013	2014	2015	2016	2017	2018	2019
Mean	0.0208	0.0222	0.0218	0.0187	0.0158	0.0145	0.0175	0.0192
Std Dev.	0.0147	0.0167	0.0173	0.0106	0.0086	0.0079	0.0044	0.0065

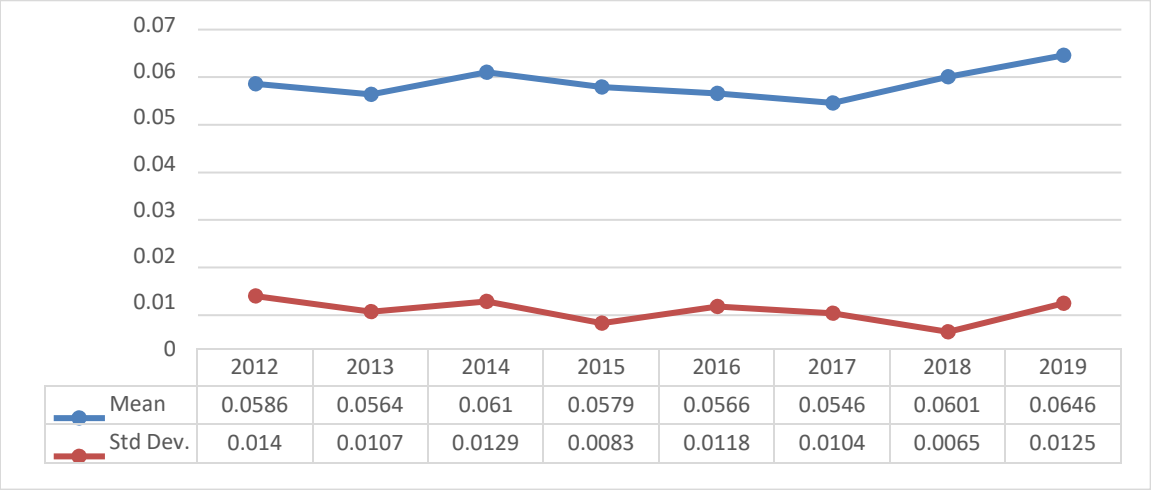
4.1.3 Descriptive Statistics of EBIT/Total Asset (X3)

EBIT/Total Asset shows the managerial efficiency in terms of profitability of the banks. Earnings before interest and tax (EBIT) have been used as operating efficiency of the banks. Researchers often use ROA as a proxy of operating efficiency.

As shown in the following table, the mean efficiency ratio of the studied private commercial banks have fluctuated over the study period though generally shows increasing trend. The highest efficiency ratio of 0.0646 observed on 2019 whereas the lowest ratio of 0.0546 observed on 2017.

Moreover, the highest deviation of efficiency ratio of from the mean of 0.0140 have observed on 2012 whereas the lowest ratio of 0.0065 observed on 2018.

Figure 3: Descriptive statistics of efficiency ratio



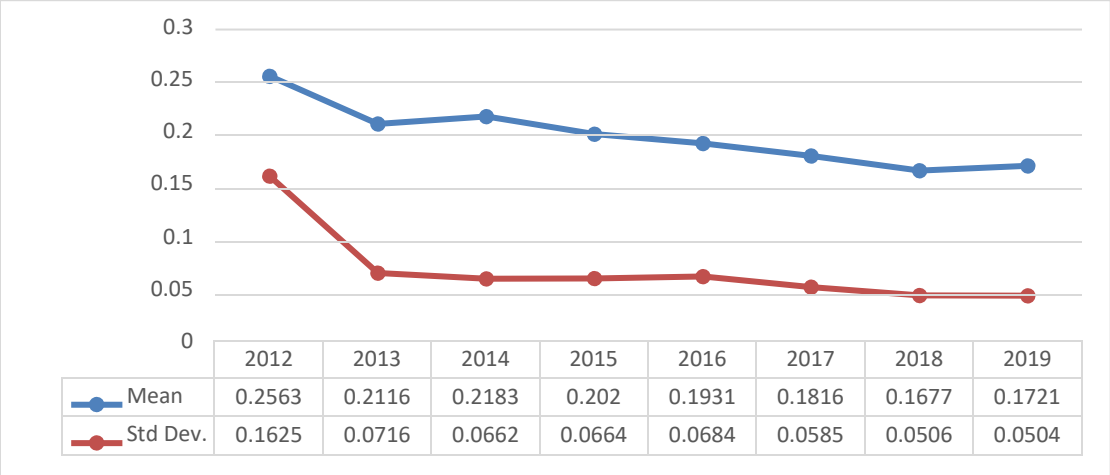
	2012	2013	2014	2015	2016	2017	2018	2019
Mean	0.0586	0.0564	0.061	0.0579	0.0566	0.0546	0.0601	0.0646
Std Dev.	0.014	0.0107	0.0129	0.0083	0.0118	0.0104	0.0065	0.0125

4.1.4 Descriptive Statistics of Book Value of Equity/Book Value of Liability (X4)

Solvency ratio shows the ratio of Book Value of Equity to Book Value of Liability. A high value of this ratio expresses a bank's aggressiveness in financing its growth with debt. In the banking industry large amount of debt arises in the form of bank deposit. If a bank makes bad investments or loan decisions, this ratio indicates the leverage position that can enhance the chances of bank run and leads to the bankruptcy.

As shown in the following table, the mean solvency ratio of the studied private commercial banks have steadily declined from 0.2563 in 2012 to 0.1677 in 2018. Similarly, the deviation from the mean have declined from 0.1625 in 2012 to 0.0662 in 2014 ; raised to 0.0684 in 2016 and finally decline from 0.0585 in 2017 to 0.0504 in 2019.

Figure 4: Descriptive statistics of solvency ratio



4.1.5 Overall Descriptive Statistics of the Variables

Overall mean of liquidity, profitability, efficiency and solvency ratio have been 0.093, 0.019, 0.059 and 0.20, respectively. Moreover, high variability of 0.05 is observed on X1 and minimum variability of 0.007 observed on X2. In addition, the minimum ratio of 0.014 is observed on X2 and the maximum ratio of 0.26 was observed on X4.

Table 2: Descriptive statistics of the variables

Variables	Mean	Median	Minimum	Maximum	Standard Div.	Observation
X1	0.09345	0.0706	0.0307	0.1874	0.050503	112
X2	0.01881	0.01895	0.0145	0.0222	0.002775	112
X3	0.05873	0.05825	0.0546	0.0646	0.003144	112
X4	0.20034	0.19755	0.1677	0.2563	0.028909	112

***Source**: Audited financial statements private commercial banks and own computation using Excel.*

4.2 Z" Score Result and Discussion

4.2.1 Z" Score Analysis of Dashen Bank

The following table indicates the Z"-score of Dashen Bank which is calculated based on the Altman 1993 Model. As it can be seen from the table below, from the period 2012 through 2019, the bank had been in a category of "gray" zone as Altman names it when a Z" score is lies between 1.1 and 2.6. This indicates that, there is less probability that the bank will face financial distress in the near future.

This could be attributed to the increase in profitability and increase in liquidity from 2012 to 2016 though sharply declined from 2016 to 2019. Moreover, efficiency and solvency remain stable

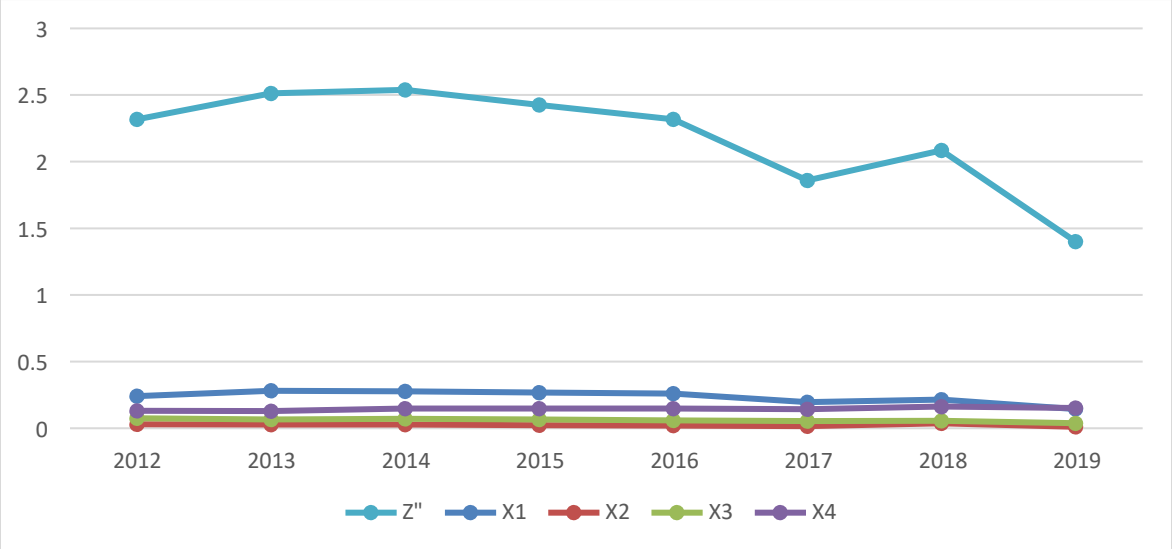
throughout the study period. The overall average Z" score of the Bank becomes 2.1823 which shows that the Bank falls in the gray area.

Table 3: Z" score analysis of Dashen Bank

Year	Z"-Score	Average Z" Score	Discriminant Zone
2012	2.3183	2.1823	Gray Zone
2013	2.5119		Gray Zone
2014	2.5395		Gray Zone
2015	2.4250		Gray Zone
2016	2.3183		Gray Zone
2017	1.8591		Gray Zone
2018	2.0855		Gray Zone
2019	1.4008		Gray Zone

As depicted in the following chart, the trend of Z" consistently followed liquidity ratio, that means financial distress condition of the bank is highly influenced by liquidity position of the Bank. Both liquidity and Z" score steadily rises from 2012 to2014 and steadily decline from 2015 to 2019 and reaches its lowest level during 2019.

Figure 5: Variable and Z" score of Dashen Bank



4.2.2 Z" Score Analysis of Awash Bank

The following table indicates the Z-score of Awash Bank. As it can be seen from the table below, from the period 2012 through 2019, the bank had been in a category of "gray" zone because Z"

score is lay between 1.1 and 2.6 this is the intermediate position between distress and healthy zones. Specifically, the highest Z" score is in year 2012 which is 2.60 and the lowest is in year 2019 which is 1.14.

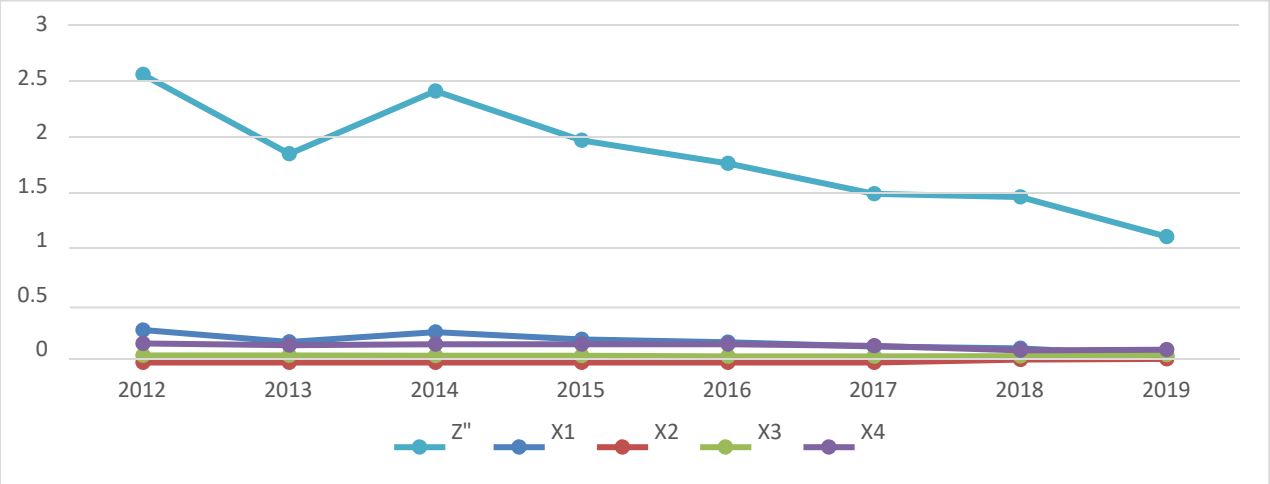
Moreover, the overall average Z" score of the Bank becomes 1.86 which shows that the Bank falls in the gray area, which means there is less probability that the firm will face financial distress in the near future.

Table 4: Financial ratio and Z" score of Awash Bank

Year	Z" Score	Average Z" Score	Discriminant Zone
2012	2.5959	**1.8598**	Gray Zone
2013	1.8815		Gray Zone
2014	2.4468		Gray Zone
2015	2.0041		Gray Zone
2016	1.7969		Gray Zone
2017	1.5214		Gray Zone
2018	1.4945		Gray Zone
2019	1.1368		Gray Zone

As shown in the following figure, after the year 2012, except some raise in 2014, the value of Z" score steadily decreasing and reached the lowest Z"-Score 1.14 in 2019. This shows that the financial performance of the bank will face financial distress in the near future in alarming way if they do not properly respond to it.

Figure 6: Variables and Z" score of Awash Bank



4.2.3 Z" Score Analysis of Wogagen Bank

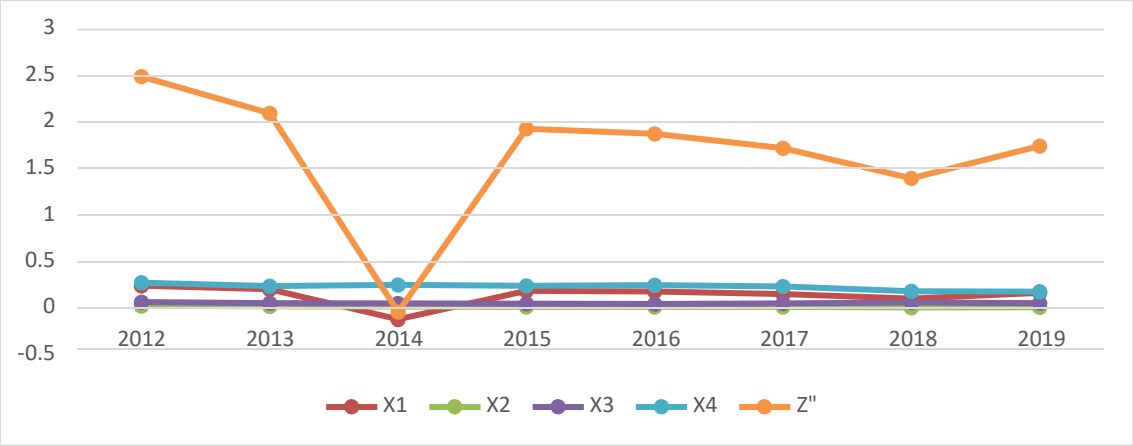
As shown in the following table, financial performance of Wogagen Bank is becoming decreasing from year 2012 onwards i.e. its maximum was 2.49 in the year of 2012 which was in gray zone. But in the year 2014 the Bank's financial condition shows a very serious difficulties which fall in distress zone. Immediately after 2014, financial condition of the Bank started to increase. Therefore, despite financial distress zone change from gray-zone to distress zone, from distress zone to gray-zone over the study period, the overall average Z" score of the Bank becomes 1.6555 which shows that the Bank falls in the gray zone, which means there is less probability that the bank will face financial distress in the near future.

Table 5: Financial ratio and Z" score analysis of Wogagen Bank

Year	Z" Score	Average Z" Score	Discriminant Zone
2012	2.4942	1.6555	Gray Zone
2013	2.099		Gray Zone
2014	-0.0358		Distress Zone
2015	1.9357		Gray Zone
2016	1.8789		Gray Zone
2017	1.7242		Gray Zone
2018	1.4002		Gray Zone
2019	1.7473		Gray Zone

As depicted in the following chart, the trend of Z" consistently followed liquidity ratio (X1), that means financial distress condition of the bank is highly influenced by liquidity position of the Bank. Both liquidity and Z" score become at its lowest level during 2014.

Figure 7: Variables and Z" score of Wogagen Bank



4.2.4 Z" Score Analysis of Hebret Bank

As shown in the following table, the bank's highest score ever in the entire period of the study is recorded in 2012 which is 2.7399. This indicates the bank was in the "Safe" zone which is a year where the bank is financially stable, sound and there is least probability that the firm will face financial distress. But in the remaining years the bank's health declined to the gray zone.

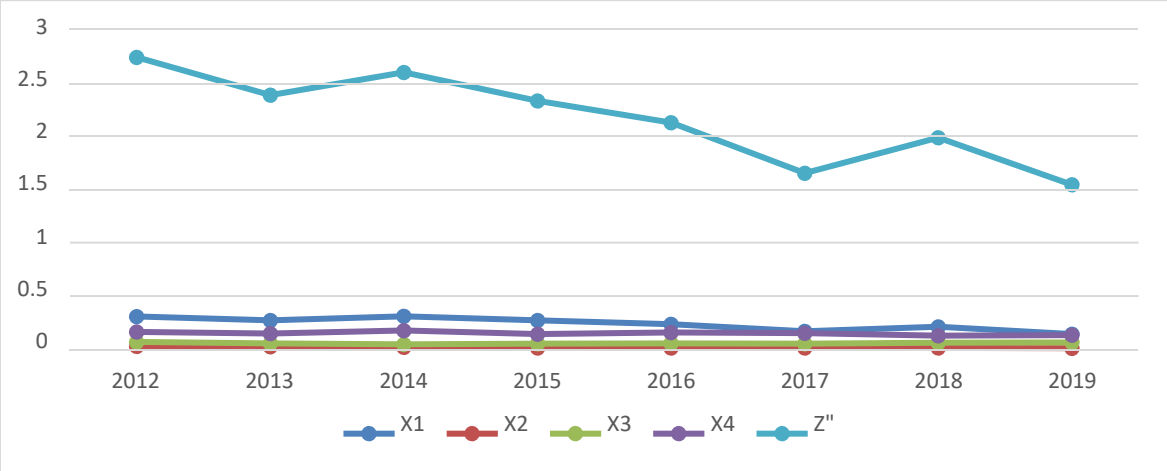
The overall result showed the bank is classified under 'Gray Zone' based on (Altman's, 1993) discrimination zone.

Table 6: Financial ratio and Z" score analysis of Hebret Bank

Year	Z" Score	Average Z" Score	Discriminant Zone
2012	2.7399	2.1705	Safe Zone
2013	2.3861		Gray Zone
2014	2.5985		Gray Zone
2015	2.3297		Gray Zone
2016	2.126		Gray Zone
2017	1.6526		Gray Zone
2018	1.9865		Gray Zone
2019	1.5443		Gray Zone

As depicted in the following chart, the trend of Z" consistently declined from year 2012 which is 2.74 to 2019 which is 1.54. The movement of Z" has followed the trend of liquidity, that means financial distress condition of the bank is influenced by liquidity position of the Bank. Both liquidity and Z" score become at its lowest level during 2017.

Figure 8: Variables and Z" score of Hibret Bank



4.2.5 Z" Score Analysis of Abyssinia Bank

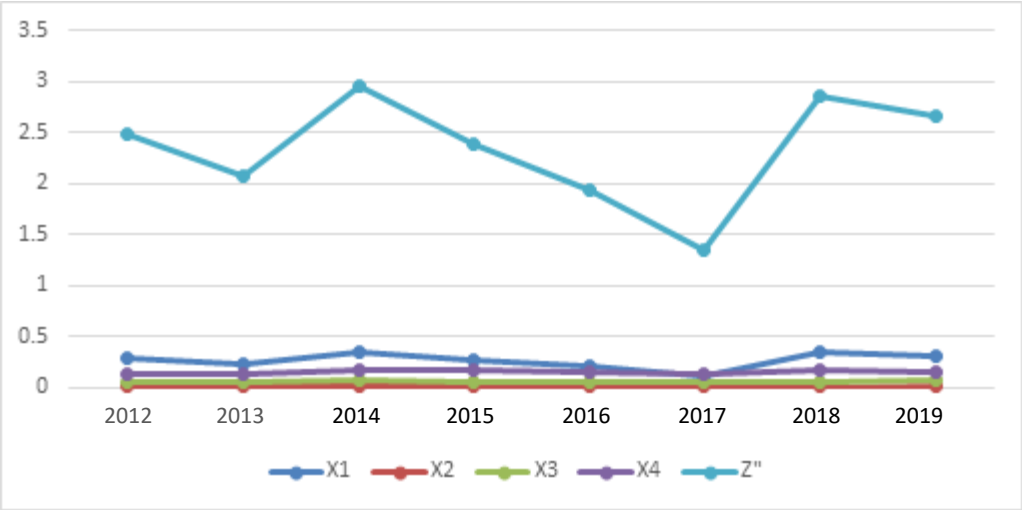
The financial health of BOA was in a " gray "for the first two years of the study period that is 2.489 and 2.06 in 2012 & 2013. respectively. The bank's health had shown improvement & it fall in to the safe zone in 2014. However, the health of the bank declined back to the "gray" zone in the period 2015 to 20017. It is noticed from the table below, there was a sudden improvement in the financial health of the bank in the last two consecutive years. This increase could be attributable to positive changes in the liquidity, net profit and management efficiency.

Table 7: Financial ratio and Z" score analysis of Abyssinia Bank

Year	Z" Score	Average Z" Score	Discriminant Zone
2012	2.4849	2.3354	Gray Zone
2013	2.0644		Gray Zone
2014	2.9565		Safe Zone
2015	2.388		Gray Zone
2016	1.9272		Gray Zone
2017	1.338		Gray Zone
2018	2.8628		Safe Zone
2019	2.6617		Safe Zone

The data is also presented in a graphical way to depict the general trend of financial distress position of the bank. Therefore, the overall result of BOA was categorized under "Gray Zone"

Figure 9: Variables and Z" score of BOA



4.2.6 Z" Score of Oromia International Bank

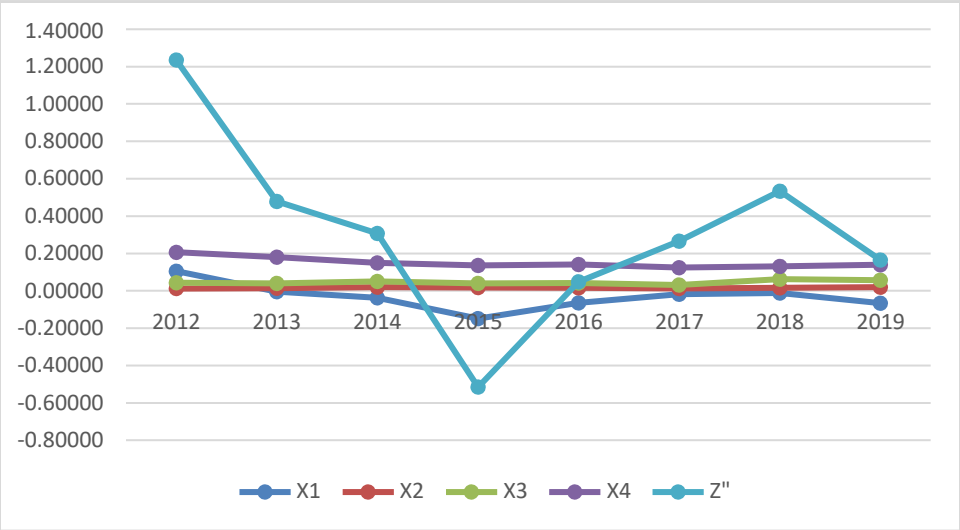
Oromia International Bank is one of the banks classified under 'Distress Zone'. The trend of the bank for the past 7 years indicated the bank has been running low; which was below 1.1. The only Z" score out of distress zone was registered in the early study period 2012 which is 1.2347. But in succeeding years the bank was put in the distress zone; the bank's health was deteriorated from 2013 to 2019. In general, the sum of liquidity, working capital, return on equity, and retain earning over total asset of the bank is laid the bank on financial distress. Thus, OIB is one of the banks that should take immediate measure to retrieve the activities to go out of distress zone.

Table 8: Financial ratio and Z" score analysis of Oromia International Bank

Year	Z" Score	Average Z" Score	Discriminant Zone
2012	1.2347	0.3144	Gray Zone
2013	0.4785		Distress Zone
2014	0.3065		Distress Zone
2015	-0.5155		Distress Zone
2016	0.0481		Distress Zone
2017	0.2665		Distress Zone
2018	0.5326		Distress Zone
2019	0.1641		Distress Zone

The data is also presented in a graphical way to depict the general trend of financial distress position of the bank. Therefore, the overall financial distress condition of the Bank classified at distress zone.

Figure 10: Variables and Z" score of OIB



4.2.7 Z" Score Analysis of Cooperative Bank of Oromia

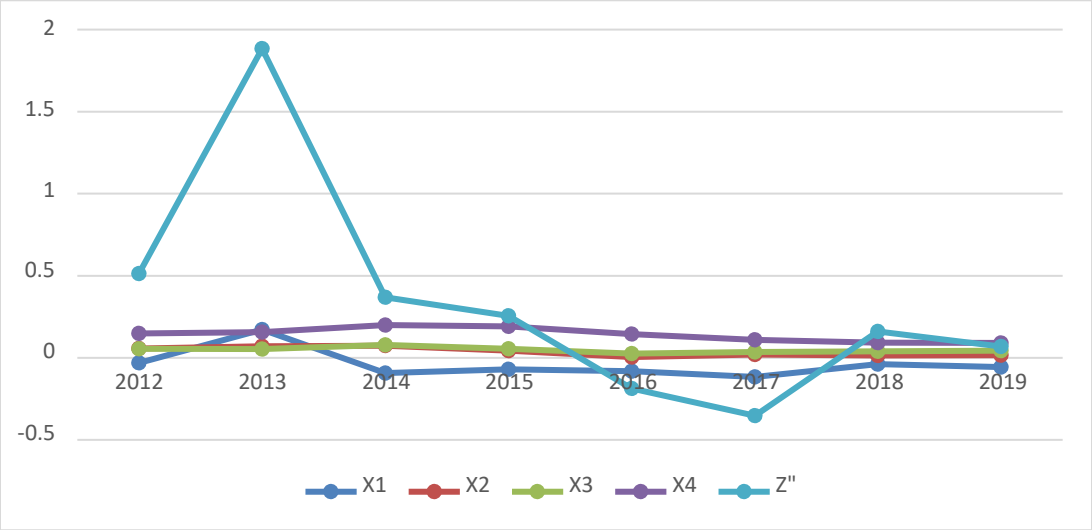
The financial health of CBO was in a " distress " area for the first year of the study period with the Z" score of 0.5135 in 2012. The bank's health had shown improvement & it fall in to the gray zone in 2013. However, the health of the bank deteriorated & returned back to the "distress" area in the period 2014 to 20019. It is noticed from table below that the bank has been on financial distress since the average Z" value of the bank was 0.3390.

Table 9: Financial ratio and Z" score analysis of Cooperative Bank of Oromia

Year	Z" Score	Average Z" Score	Discriminant Zone
2012	0.5135	0.3391	Distress Zone
2013	1.8833		Gray Zone
2014	0.369		Distress Zone
2015	0.2562		Distress Zone
2016	-0.1856		Distress Zone
2017	-0.3524		Distress Zone
2018	0.1597		Distress Zone
2019	0.0685		Distress Zone

As shown in the following chart, Z" value goes together with liquidity value (X1) and it reaches at the highest level in 2013 and its lowest level in 2017.

Figure 11: Variables and Z" score values of CBO



4.2.8 Z" Score Analysis of Bunna Bank

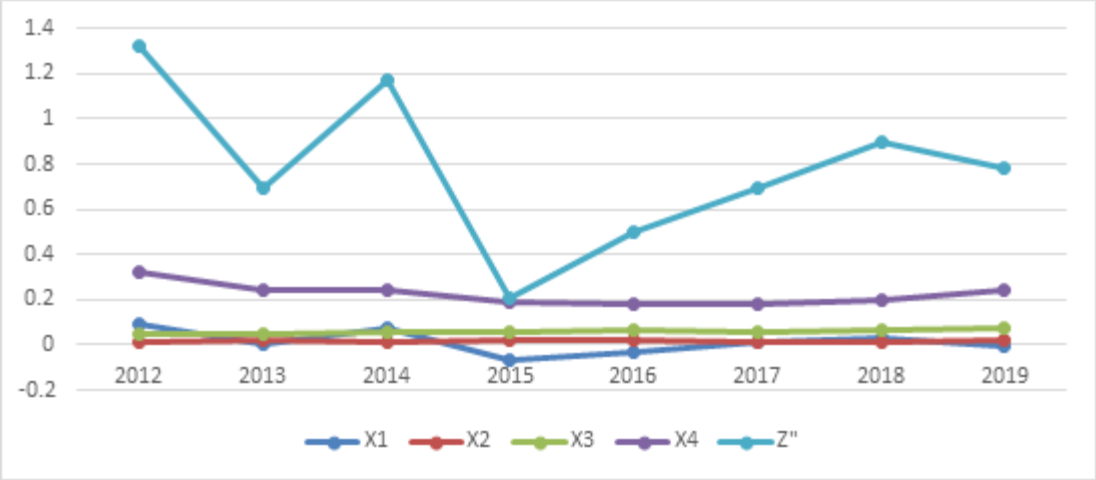
As depicted in the following table, the Z" scores of Bunna bank, as it was depicted in the above table in the year 2012 and 2014 was1.318 & 1.1759 indicating that the bank was in the "gray" zone which is an area between health zone & distress zone. But in succeeding years, the health of the bank deteriorated and fall under "distress" zone. This implied that there is a high probability that the business will face financial distress in near future.

Table 10: Financial ratio and Z" score analysis of Bunna bank

Year	Z" Score	Average Z" Score	Discriminant Zone
2012	1.318	0.7833	Gray Zone
2013	0.6979		Distress Zone
2014	1.1759		Gray Zone
2015	0.2114		Distress Zone
2016	0.4955		Distress Zone
2017	0.6935		Distress Zone
2018	0.8953		Distress Zone
2019	0.7791		Distress Zone

The data is also presented in the following chart, the general trend of financial distress position of the bank was fall under "Distress" Zone as the average Z" Score was 0.78.

Figure 12: Variable and Z" score of Bunna Bank



4.2.9 Z" Score Analysis of Nib Bank

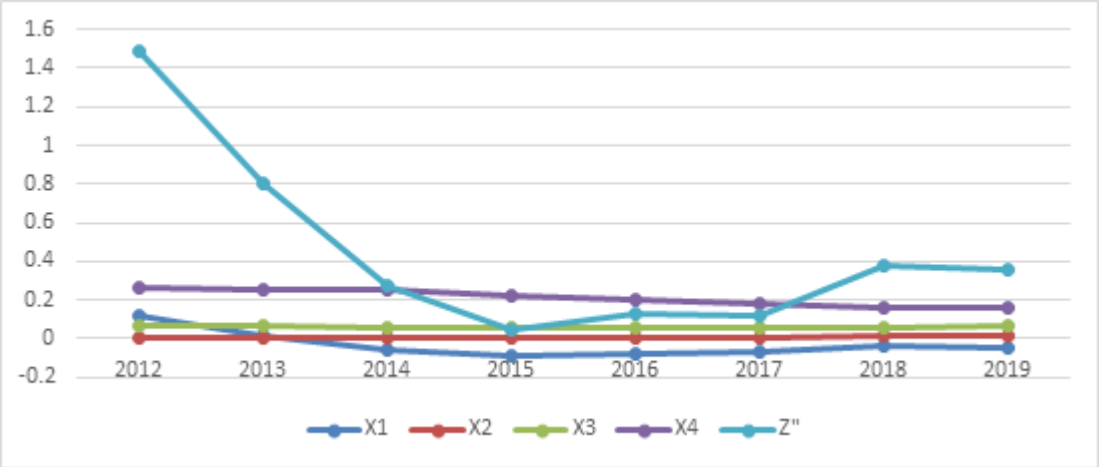
NIB is one of the banks classified under 'Distress Zone' with the average Z" score 0.4497. The trend of the bank for the past 7 years indicated the bank has been running low; which was below1.1. The only Z"-score out of distress zone was registered in the early study period of 2012 which is 1.4927. But in succeeding years the bank was fall in the distress zone; the bank's health was deteriorated from 2013 to 2019. In general; the sum of liquidity, working capital, return on equity, and retain earning over total asset of the bank is laid the bank on financial distress. Thus, NIB is one of the banks that should take immediate measure to retrieve the activities to go out of distress zone.

Table 11: Financial ratio and Z" score analysis of Nib bank

Year	Z" Score	Average Z" Score	Discriminant Zone
2012	1.4927	0.4497	Gray Zone
2013	0.8043		Distress Zone
2014	0.2763		Distress Zone
2015	0.0421		Distress Zone
2016	0.1293		Distress Zone
2017	0.1174		Distress Zone
2018	0.3765		Distress Zone
2019	0.3588		Distress Zone

The data is also presented in the following chart, the general trend of financial distress position of the bank was fall under "Distress" Zone as the average Z" Score was 0.45.

Figure 13: Variable and Z" score of Nib bank



4.2.10 Z" Score Analysis of Addis International Bank

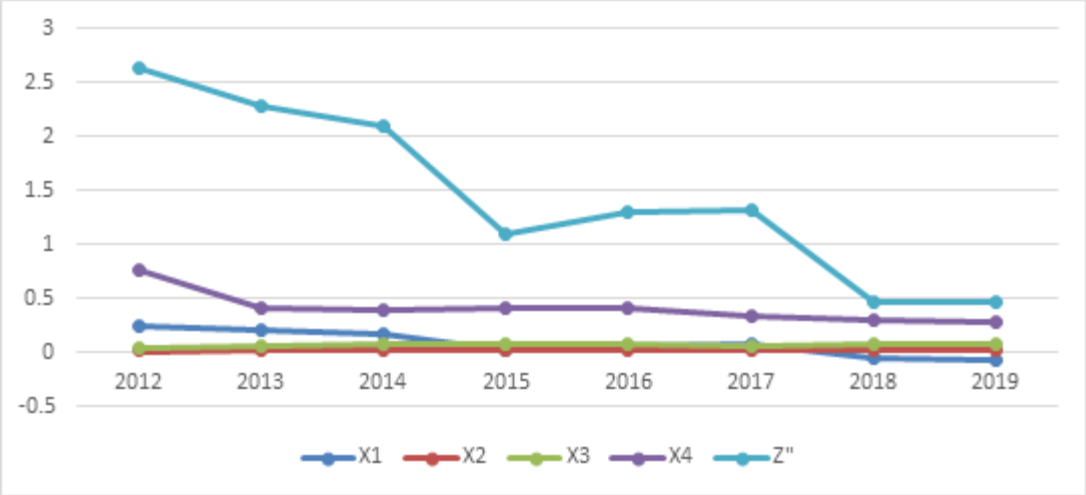
The general trend in the financial health of AdIB has been depicted in the following table. The Bank's highest score ever in the entire period of the study is recorded in 2012 which is 2.6389. This indicates the bank was in the "Safe" area which is an area where the bank is financially stable, sound and there is least probability that the firm will face financial distress. However, the bank's health deteriorated back to the gray area in succeeding two continuative years 2013 to 2014 and 2016 to 2017 finally move to distress area in remaining two years of the study period.

Table 12: Financial ratio and Z" score analysis of Addis International bank

Year	Z" Score	Average Z" Score	Discriminant Zone
2012	2.6389	1.4581	Safe Zone
2013	2.2786		Gray Zone
2014	2.1005		Gray Zone
2015	1.0978		Distress Zone
2016	1.3066		Gray Zone
2017	1.314		Gray Zone
2018	0.4633		Distress Zone
2019	0.4651		Distress Zone

Moreover, as depicted in the following Chart, the overall Z" Score result showed 1.46 which means the bank fall in the gray zone.

Figure 14: Variables and Z" score of Addis Bank



4.2.11 Z" Score Analysis of Berehan Bank

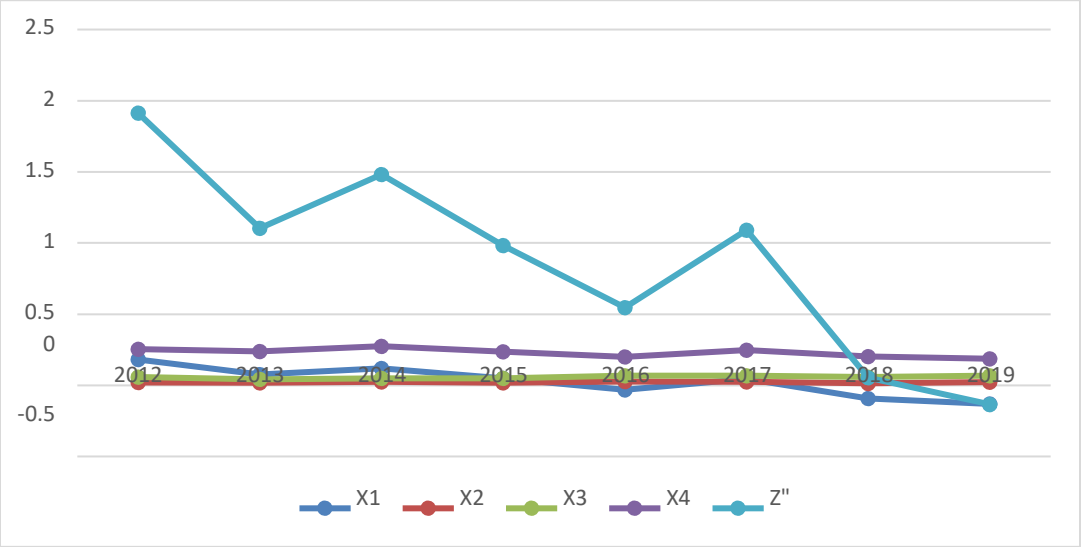
As depicted in the following table, in the period from 2012 through 2014, the bank fall in gray zone. But starting from 2015 the health of the bank deteriorated and fall in distress zone. This implied that there is high probability that the firm will face financial distress in the near future.

Table 13: Financial ratio and Z" score analysis of Berehan bank

Year	Z" Score	Average Z" Score	Discriminant Zone
2012	1.9129	0.8800	Gray Zone
2013	1.1044		Gray Zone
2014	1.4828		Gray Zone
2015	0.9821		Distress Zone
2016	0.5461		Distress Zone
2017	1.0908		Distress Zone
2018	0.0548		Distress Zone
2019	-0.1334		Distress Zone

The data is also presented in a graphical way to depict the general trend of financial distress position of the bank and showed the bank's financial condition steadily declined from 2012 to 2019. Moreover, the overall average Z" score become 0.88 which means the Bank is in distress zone.

Figure 15: Variables and Z" score of Berhan Bank



4.2.12 Z" Score Analysis of Zemen Bank

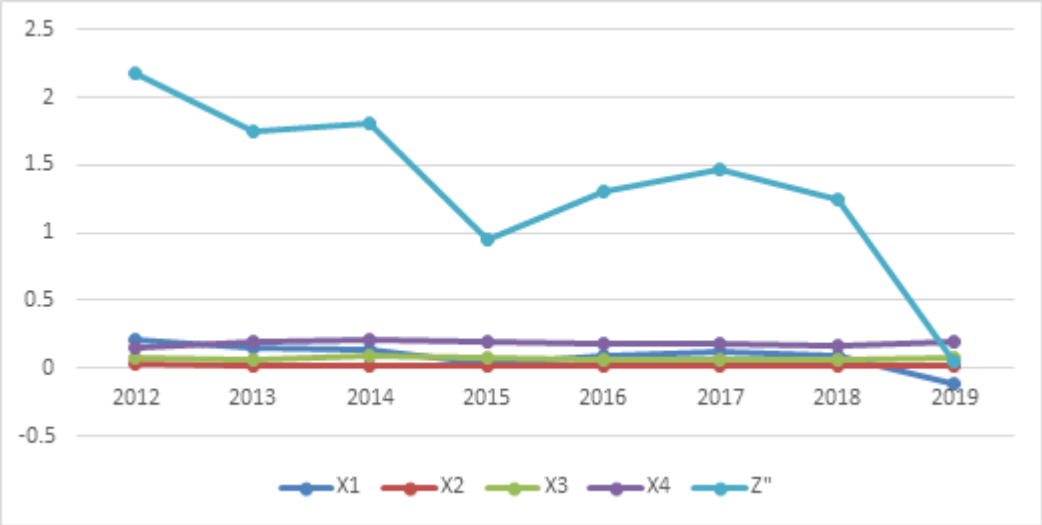
As depicted in the following table, Zemen bank was in the "gray" area in the period of 2012 to 2014 with Z" score value of 2.1816, 1.7448 and 1.8061, respectively. This area is an area between health zone & distress zone. But in succeeding year in 2015, the bank's financial condition was deteriorated and fall under distress zone and improved to gray zone in succeeding three consecutive years from 2016 to 2018. In the last year, the Bank's financial condition returned back to distress condition. This means that there is a high probability that the business will face financial distress in the near future.

Table 14: Financial ratio and Z" score analysis of Zemen bank

Year	Z"-Score	Average Z" Score	Discriminant Zone
2012	2.1816	1.3422	Gray Zone
2013	1.7448		Gray Zone
2014	1.8061		Gray Zone
2015	0.9447		Distress Zone
2016	1.3026		Gray Zone
2017	1.4715		Gray Zone
2018	1.245		Gray Zone
2019	0.0414		Distress Zone

The data is also presented in a graphical way to depict the trend of financial distress condition of the bank and showed that the bank is in “gray” Zone. The bank’s lowest score ever in the entire period of the study is recorded in 2019 which is 0.0414. This indicates liquidity of the bank has been dried up or going to dry and may face difficulty to meet current liabilities on time.

Figure 16: Variables and Z" score of Zemen Bank



4.2.13 Z” Score Analysis of Abay Bank

Abay Bank is one of the banks classified under ‘Distress Zone’ with average Z” score 0.9640. The trend of the bank showed that in 2012 the bank was under "gray" zone , but in succeeding five consecutive years from 2013 to 2017 it moves to the "distress" zone. This indicated that the bank has been running low; which was its Z” score is below 1.1. The only Z” score out of distress zone was registered in the early study period of 2012 which is 1.4927. In general, the sum of liquidity, working capital, return on equity, and retain earning over total asset of the bank is laid the bank on financial distress.

The Z” score analysis of Abay Bank indicates that the financial health of the bank was fluctuating until 2019. In 2012 the score of the bank was 1.5637 which indicates that the bank was in gray zone which is between distress and healthy zones. However, in the year 2013 to 2017, it showed a financial deterioration and it falls under distress zone. However, the health of the bank deteriorated & returned back to the “gray” zone in the period 2018 to 2019.

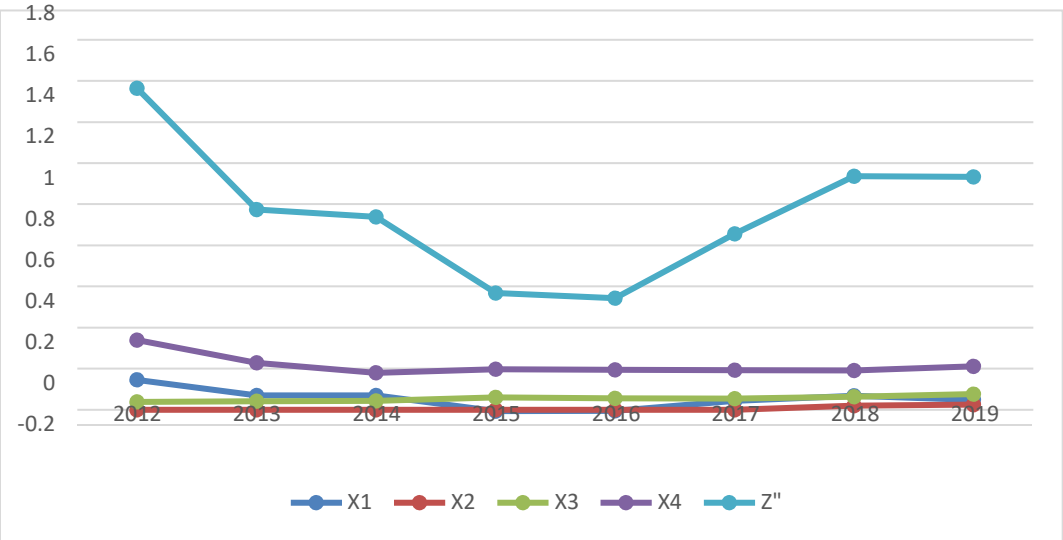
According to Altman's classification the overall average Z" score of the Bank is classified under "distress zone" because the average Z" Score is 0.9640.

Table 15: Financial ratio and Z" score analysis of Abay bank

Year	Z"-Score	Average Z" Score	Discriminant Zone
2012	1.5637	0.9640	Gray Zone
2013	0.974		Distress Zone
2014	0.938		Distress Zone
2015	0.5684		Distress Zone
2016	0.5428		Distress Zone
2017	0.8562		Distress Zone
2018	1.1356		Gray Zone
2019	1.1331		Gray Zone

As depicted in the following chart, the trend of Z" score follows the trend of liquidity ratio.

Figure 17: Variables and Z" score of Abay Bank



4.2.14 Z" Score Analysis of Anbesa International Bank

AIB is one of the banks classified under 'Gray Zone' with the average Z" score of 1.1769. The trend of the bank's Z" score for the past five years. However, in the period 2012 to 2014, the bank has been in unhealthy "gray" area with Z" Score of 1.9504, 1.4738, 1.3495, respectively. But in succeeding years the bank fall under distress zone. This means that there is a high probability that the bank will face financial distress in the near future.

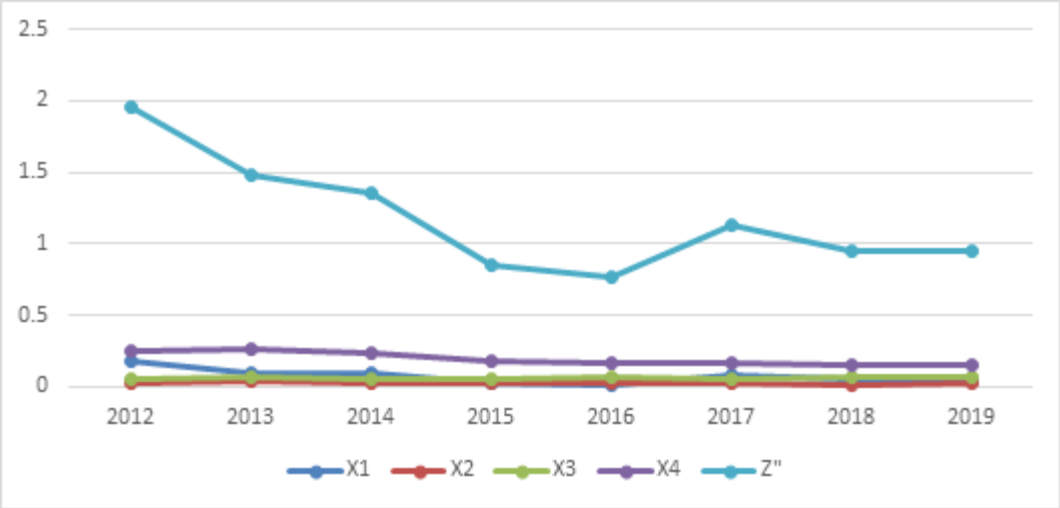
The highest Z” Score was registered in 2012 which was 1.9504 and the lowest was observed in 2015 which was 0.9427. Thus, AIB is one of the banks that should be conscious in managing its liquidity.

Table 16: Financial ratio and Z" score analysis of Anbesa bank

Year	Z”-Score	Average Z" Score	Discriminant Zone
2012	1.9504	1.1769	Gray Zone
2013	1.4738		Gray Zone
2014	1.3495		Gray Zone
2015	0.8535		Distress Zone
2016	0.7694		Distress Zone
2017	1.1319		Gray Zone
2018	0.9442		Distress Zone
2019	0.9427		Distress Zone

Moreover, as depicted in the following Chart, the Bank’s financial distress trend consistently follows the trend of liquidity ratio, that means financial soundness condition of the Bank is significantly influenced by liquidity status.

Figure 18: Variables and Z" score of Anbesa Bank



4.3 Summary of Findings

As shown on the tables below, the financial condition of the studied private commercial banks fall under gray and distress zone. Specifically, 8 banks falls in the 'Gray Zone'; which means there is less probability that the firm will face financial distress in the near future; and the remaining 6 private commercial banks fall under 'Distress Zone', this means that there is a high probability that the banks will face financial distress in near future.

Table 17: Summary of financial condition of all banks

Classification	Frequency	% of frequency
Distress Zone	6	43
Gray Zone	8	57
Safe Zone	--	--
Total	**14**	**100**

The overall result of this research contradicts the previous studies conducted in the country: (Ephrem, 2015), (Tadesse, 2017) and (Robel, 2018). Ephrem (2015) stated that the financial health statues of selected private commercial banks has been increasing and healthy; but there had been observed some fluctuations in the study period from 2002 to 2011. Whereas, Tadesse (2017) mentioned in two dimensions i.e. descriptive and fixed effect regression: based on descriptive statistics private commercial banks are categorized under 'Distress Zone'; but, the mean z-score of the selected banks in the study period is 3.07 which is categorized under 'Safe Zone' since he categorized the discriminate zone based on (Altman's, 2006)[1]; whereas, the fixed effect regression model used shows the private commercial banks are not distressed. Robel (2018) result also shows that all private commercial banks are categorized under 'Distress Zone' since the average mean value of selected banks was 0.5141.

In general, 57% of the studied private commercial banks have categorized under 'Gray Zone' because based on Altman's 1993 model their average Z" score result fall between 1.1 and 2.6. Furthermore, as the name indicates this zone is sends a signal on the possibilities of bankruptcy if they do not properly manage their financial activities.

[1] This is not the appropriate model and the actual model he mentioned in the methodology was (Altman's, 1993) developed for emerging market economy with a constant +3.25.

On the other hand, 43% of the studied private commercial banks fall under distress zone which is the worst of all discriminate zones. Based on (Altman's, 1993) this zone most probably leads to bankruptcy on the coming two years.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

As discussed in the previous four chapters; the researcher used Z"-Score Model which is a Multivariate Discriminant Statistical Analysis Model to assess the financial distress conditions of the private commercial banks. The study used panel data for the period of 2012 to 2019 on the fourteen banks selected as a sample out of the sixteen private commercial banks that were operating on these periods. This final chapter presents a conclusion of the study by summarizing the study's findings and then it provides recommendations for the stakeholders as well as for further studies.

5.1 Conclusion

The descriptive statistics and the Z" score analysis results show the overall picture of the studied private commercial banks in Ethiopia which have lead the researcher to the following conclusions.

The overall result of the descriptive statistic and the average Z" Score analysis reviled that the selected private commercial banks is not showing a sound financial health since the Z" score values are less than 2.6 which is on average 1.2794. This situation can lead to financial distress in the near future. However, in spite of that, the situation the banks are still operating satisfactorily. However; when we compare their individual Z" Score value under the study period, eight of the selected private commercial banks namely: Abyssinia, Dashen, Hebret, Awash, Wogagen, Addis, Zemen and Anbesa bank were under 'Gray Zone' while the remaining seven banks namely: Abay, Berhan, Buna, Nib, Oromia International and Cooperative bank of Oromia banks were under 'Distress Zone' that is their Z" Score is less than 1.1; this implies that there is a high probability that these banks will face financial distress in near future. However; this situation implied that no bank is classified under 'Safe zone'.

According to my findings, there is contradiction with the previous studies conduct in this country by: (Ephrem, 2015), (Tadesse, 2017) and (Robel, 2018). As to (Ephrem, 2015) all banks under the study were healthy/ safe zone while (Tadesse, 2017) and (Robel, 2018) have concluded the banks under their study were under distress area. But this study reveals that 57% of the banks under the study were on Gray Zone while the remaining 43% of the banks under study were on distress Zone.

5.2 Recommendations

Based up on the conclusion given above and the overall assessment of this study; these three main recommendations are provide:

The first recommendation of this study is to inform to all the selected private commercial banks that are located on both the 'Gray and Distress Zone' have to take immediate remedies on those specific variables (financial ratios) considered to measure the Altman's 1993 Z" score value to minimize the possibility of facing financial distress or getting bankrupt in subsequent years. On the other hand; being on 'Gray Zone' doesn't mean that they have stable financial status; rather they need a serious follow up and corrective measure on their day to day activities to reduce the uncertainty and to have better financial position in the future. The only bank that was close to 'Safe Zone' (Dashen bank) should also be curious on its future financial activities to get protected from financial distress by improving its' current status. Being very close to safe zone, doesn't mean it is always safe. Therefore, Dashen bank should also have to take preventive measures by taking experiences from banks that were under financial distress. Likewise; identifying the main cause that led the banks into financial distress must led into reviewing of the performance of the management team as to how it conducts a review of the operational process, developing different strategies to resolve the problem, and consulting professionals in the area.

However, Z" score is regarded as a useful tool to provide a quick analysis of a specified bank compared to its competitors, investors and depositors should not only rely on this Z" score model. They further posit that factors like political, economic, social, technological, business, international and legal environments also influence the financial performance of the banks. Therefore, Banks under study should take corrective actions in order to avoid bankruptcy. Further studies in the same area shall be conducted in order to appraise the overall financial health of the financial sector in Ethiopia.

The third recommendation is provided to those researchers who involved in further studies to make their focus on some other predictive models to know the financial distress conditions of private commercial banks in the country. In addition I suggested that they should also compare the predictive models ability and power of prediction on financial institution. Furthermore; they should also assess the knowledge and trend of evaluating the financial distress condition of financial institution.

REFERENCE

Adeyemi, B. (2011). Bank Failure in Nigeria: A consequence of Capital inadequacy, Lack of Transparency and Non-Performing Loans. Banks and Bank System, 6(1), 99-109.

Altman, R. and Kousyri, H.(2015). A Comparative Study of Financial Failure Forecasting Model. Tishreen university Journal for Research and Scientific Studies-Economic and legal Science Series, 37(5):127-146.

Alifiah, M.N. and Tahir, M.S. (2018). Predicting Financial Distress companies in the manufacturing and non-manufacturing sectors in Malaysia using macroeconomic variables. Management Science Letters, 8: 593-604.

Altman, E. (1968). Financial Ratios, Discriminant Analysis, and the Prediction of Corporate Bankruptcy. The Journal Of Finance, 23 (4), 589-609.

Altman, E. (1993). Corporate Financial Distress. Wiley Inter science, New York.

Altman, E. I. (2002). Revisiting Credit Scoring Models in a Basel 2 Environment.

Almilia, L,S, and Kristijadi. (2003). Financial Ratio Analysis to Predict Financial Distress Conditions in Manufacturing Company in Jakarta stock Exchange. JAAI, 7 (2), 183-210.

Andualem, U. (2015). Determinants of Financial Distress in Manufacturing Firms of Ethiopia. Research Journal of Finance and Accounting, 6 (17), 9-16.

Andualem, u. B. (2011). Financial distress and its determinants in selected beverage and metal manufacturing firms in Ethiopia. Masters of Science in accounting and finance, Addis Ababa University, Addis Ababa.

Arasti, Z.(2011). An Empirical Study on the Causes of Business failure in Iranian Context. African Journal of Business Management. 5(17): 7488-7498

Baharin, I., & Sentosa, I. (2013). Capital Structure and the Post Performance Factors of Malaysian PN 17 Firms. International Journal of Business and Management Invention, 2(3), 50–56.

Beaver, W. H. (1966). Financial ratios as predictors of failure. Journal of Accounting Research, 71-111.

Bhattacharjee, A. & Hany, J.,(2010). Financial Distress in Chinese Industry: Microeconomic, Macroeconomic and Institutional Influences, St. Andrews: Scottish Institute for Research in Economics , 39 p. (SIRE Discussion Papers; no. 2010-53).

Bhattacharjee, Arnab & Han, Jie, (2014). "Financial distress of Chinese firms: Microeconomic, macroeconomic and institutional influences," China Economic Review, Elsevier, vol. 30(C), pages 244-262.

Brook, C (2008). Introductory Econometrics for Finance, Second Edition, The ICMA Centre, University of Reading, Published in the United States of America by Cambridge University Press, New York.

Chotalia, P. (2014). Evaluation of financial health of sampled private sector banks with Altman Zscore model. International Journal of Research in Management, Science & Technology, 2(3), 42-46.

Cyn-Young Park and Rogelio V. Mercado, Jr. (2013).Determinants of Financial Stress in Emerging Market Economies. ADB Economics Working Paper Series, Asian Development Bank.

Darsono and Ashari, (2005). Practical Guidelines for Understanding Financial Statements.

Yogyakarta: CV. Andi Offset.

Demiguc, Kunt, and E Detraigaialche. (1998).The Determinants of Banking Crises in Developing and Developed Countries. IMF Stuff Papers.

Ephrem G. Selassie, Ganfure Tarekegn & Andualem Ufo. (2016). Analysis of Financial Distress and its Determinants in Selected SME'S in Wolayita Zone. Global Journal of Management and Business Research, C- Finance, 16 (8).

Ephrem, G., (2015). Determinants of Financial Distress Conditions of Commercial Banks in Ethiopia: A Case study of Selected Private Commercial Banks. Journal of Poverty, Investment and Development, Volume 13.

Ezejiofor, R. A., Nzewi, U. C., & Okoye, P. V. (2014). Corporate bankruptcy: An application of Altman model in predicting potential of failure in Nigerian banking sector. International Journal of Empirical Finance, 2(4), 152-171.

Fachrundin, K.A. (2008). Kesulitan kevangan perusa haan dan personal. medan: USU Press

Fiordelisi, Franco and Cipollini, Andrea, (2009). The impact of Bank Concentration on Financial Distress: The Case of the European Banking System, February, 15

Folajimi Festus Adegbie, T. O. Asaolu & E. P. Enyi . (2013). Distress Resolution in Nigerian Banking Sector: The Role of Assets and Liabilities Management. International Journal of Financial Research, 4 (3), 70-82.

Francois van der Colff and Frans Vermaak. (2015).Predicting Financial Distress Using Financial and Non-Financial Variables. Journal of Economic and Financial Sciences /JEF/, 8 (1), 243-260.

Glenn W. Harrison, Eric Johnson, Melayne M. McInnes and E. Elisabet Rutström, (2005).The American Economic Review Vol. 95, No. 3 (Jun., 2005), pp. 897-901 (5 pages).

Hasanah, Nur, (2010). Analysis of Financial Ratios for the Altman Model and Springate Model as an Early Warning System for Predicting Public Problem Conditions: Management Study Program, Faculty of Economics, Andalas University

Hellen, N. K., (2013).The Effect Of Financial Distress On Financial Performance Of Commercial Banks In Kenya

Ibrahim, S.S. (2017).The impact of Liquidity on profitability in Banking sectors of Iraq: A case of Iraq Commercial Banks. Journal of Finance and Banking Studies. 6(1): 113-121

John et al, (2011). Predicting Financial Distress and the Performance of Distressed Stocks. Journal of Investment Management, 9(2), pp. 14-34.

John W. Creswell (2009). Research design: Qualitative, Quantitative and Mixed method

Approach, sage publications, January

Judy Ramage Lawrence, Surapol Pongsatat and Howard Lawrence. (2015). The Use of Ohlson's O-Score for Bankruptcy Prediction in Thailand. The Journal of Applied Business Research, 31 (6), 2069-2075.

Koul, I.(2006). Methodology of Education Research Delhi: Hindustan offset Printers

Levratto, N.(2013). From Failure to corporate Bankruptcy: a review Journal of innovation and Entrepreneurship. 2(1): 1-15

Luciana, Spica, and Almilia. (2003). Analysis of factor affecting Financial Distress Perusahaan yang Jakarta. Jurnala kuntansidan Auditing Indonesia (JAAI) , 7 (2), 1-27.

M. Adnan Aziz and Humayon. (2006). Predicting corporate bankruptcy: where we stand? CORPORATE GOVERNANCE: Emerald Group Publishing Limited, 6 (1), 18-33.

Maricica, M. and Georgeta, V.(2012). Business Failure Risk Analysis Using Financial Ratios. Procedia - Social and Behaviotal Science. 62: 728-732

Mtrhy, B.S.R., Nara, M., N3, R. and Gurukamal, M. (2018).Financial Strength Analysis of Unitech Company using Altman's Z score Model. International Research Journal of Engineering and Technology (IRJET). 5 (4): 1804-1809

Mullu, Aberra, (2011). Determinants of Profitability of Banks in Ethiopia, AAU

Mwawughanga, C. W., & Ochiri, G. (2017). Application of Edward Altman's Z Score model on measuring financial health of commercial banks in Kenya. The Strategic Journal of Business & Change Management, 4(2), 722-741.

Naidoo (2006). A predictive model of the states of financial health in South African businesses; Southern African Business Review Volume 11 Number 3

Ng, S.T., Wong, M.W. and Zhang, J.(2011) Applying Z score model to distinguish insolvent construction companies in china. habitat International. 35: 599-607

Ohlson, J. (1980). Financial ratios and the probabilistic prediction of bankruptcy. Journal of Accounting Research, 18.

Olukotun, G. Ademola, James, O. Olusegun & Olorunfemi Kehinde, (2013): Bank Distress in Nigeria and the Nigeria Deposit Insurance Corporation Intervention. Global Journal of Management and Business Research Finance, 8(13).

Ong, M., (2002). "Credit Rating: Methodologies, Rationale and Default Risk," London Risk Books, New York University, New York.

Oscar Taurell and Viktor Augustsson, (2012). Variables Important for Bankruptcy Prediction: A Logit Binary Approach.

Outecheva, (2007). Corporate Financial Distress; An Empirical Analysis of Distress Risk", The university of St. Gallen Switzerland

Richard, A. Brealey, lan A. Cooper, Evikaplains, (2012). International propagation of the credit crisis: Lessons for Bank regulation: Journal of Applied Corporate Finance. Volume 24. Issue 4, December.

Rinaldo Sjahril, Andry Priharta, Andi M. Alfan Parewangi and Hermiyetti. (2014). Modeling Financial Distress: the case of Indonesian Banking Industry. In U. O. Muhammadiyah (Ed.), International Economic Modeling Conference. Bali – Indonesia: Central Bank of Indonesia and EcoMod.

Robel Yohannes (2018). The Determinants of Financial Distress: Empirical Evidence from private commercial Banks in Ethiopia. Master Thesis, Addis Ababa University, Addis Ababa.

Ross, Stephen A; Wester field, Randolph w.; Jordan, Bradford D; LIM, Young Saint, Joseph; and Tan, Ruth. (2012). Fundamentals of Corporate Finance Research Collection Leekong chain School of Business.

Samanhyia, S., Oware, K. M., & Anisom-Yaansah, F. (2016). Financial distress and bankruptcy prediction: Evidence from Ghana. Expert Journal of Finance, 4, 52-65.

Samira, M. (2013). Bankruptcy Prediction of Firms Listed At The Nairobi Securities Exchange. Master's Thesis in Finance, University of Nairobi, Nairobi.

Sheherd, D.A.(2003). Learning from Business Failure Propositions of Grief Recovery for the self-Employed. The Academy of Management Review. 28(2): 318-328.

Sinkey et al, (2012). Macroeconomic variables in financial distress: A non-parametric method. Working paper serious, IPAG Business School, Paris.

Sun, J., LL. Hua Huang, Q. and He, K. (2014) Predicting Financial Distress and Corporate failure: A review from the state-of-the-art definitions, modeling, sampling, and featuring approaches. Knowledge- Based System. 57: 41-56.

Sutrisna, M., (2009). Research Methodology in Doctoral Research: Understanding the Meaning of Conducting Qualitative Research. Working Paper presented in ARCOM.

Tadesse Yirgu. (2017).The Determinants of Financial Distress: Empirical Evidence from Banks in Ethiopia. Master Thesis, Addis Ababa University, Addis Ababa.

Tamari (1966). Financial Ratios as a Means of Forecasting Bankruptcy; Management International Review; Vol. 6, No. 4 , pp. 15-21 (7 pages)

Tyagi,V. (2014). A Study to Measures the Financial Health of Selected Firms With Special Reference to Indian Logistic Industry: An Application of Altman's Z score. Industrial Engineering Letters. 4(4):43-56

Vincent Okoth Ongore and Gemechu Berhanu Kusa. (2013). Determinants of Financial Performance of Commercial Banks in Kenya. International Journal of Economics and Financial Issues, 3 (1), 237-252.

Veni, L. K., & Jyoth, V. L. (2018). Financial health of selected private sector banks using Altman Z-score: Comparative analysis. International Journal of Management and Social Sciences Research, 7(4), 10-15.

Wruck, Karen Hopper, (1990). Financial distress, reorganization, and organizational efficiency. Journal of Financial Economies, Elsevier, Vol. 27(2). PP 419-444, October

Yohannes, T. (2014.:The Determinants of Financial Distress in the Case of Manufacturing Share Companies in Addis Ababa-Ethiopia. Master's Thesis , Addis Ababa University, Addis Ababa.

APPENDIXES

Appendix One: Z" Input Variable Ratios and Descriptive Statistics

Name of Bank	Year	X1	X2	X3	X4
	2012	0.2419	0.0290	0.0744	0.1300
	2013	0.2811	0.0274	0.0660	0.1291
	2014	0.2782	0.0270	0.0703	0.1469
Dashen Bank	2015	0.2676	0.0221	0.0659	0.1476
	2016	0.2597	0.0191	0.0592	0.1475
	2017	0.1960	0.0164	0.0549	0.1437
	2018	0.2156	0.0365	0.0567	0.1630
	2019	0.1443	0.0113	0.0382	0.1531
	2012	0.2961	0.0034	0.0683	0.1750
	2013	0.1894	0.0037	0.0683	0.1603
	2014	0.2776	0.0036	0.0651	0.1679
Awash International Bank	2015	0.2125	0.0040	0.0628	0.1669
	2016	0.1840	0.0040	0.0597	0.1671
	2017	0.1465	0.0037	0.0578	0.1524
	2018	0.1314	0.0294	0.0623	0.1121
	2019	0.0620	0.0353	0.0731	0.1175
	2012	0.2472	0.0302	0.0717	0.2786
	2013	0.2074	0.0245	0.0602	0.2424
	2014	-0.1144	0.0212	0.0561	0.2557
Wogagen Bank	2015	0.1903	0.0194	0.0546	0.2446
	2016	0.1848	0.0175	0.0511	0.2533
	2017	0.1572	0.0191	0.0565	0.2394
	2018	0.1096	0.0132	0.0658	0.1866
	2019	0.1697	0.0137	0.0592	0.1824
	2012	0.3073	0.0275	0.0689	0.1630
	2013	0.2706	0.0251	0.0554	0.1490
	2014	0.3095	0.0202	0.0471	0.1769
Hebret Bank	2015	0.2719	0.0147	0.0518	0.1428
	2016	0.2347	0.0147	0.0553	0.1590
	2017	0.1685	0.0131	0.0513	0.1524
	2018	0.2125	0.0131	0.0619	0.1280
	2019	0.1436	0.0102	0.0640	0.1327

	2012	0.2858	0.0196	0.0603	0.1339
	2013	0.2338	0.0196	0.0491	0.1304
	2014	0.3379	0.0181	0.0751	0.1681
Bank Of Abyssinia	2015	0.2739	0.0159	0.0549	0.1628
	2016	0.2041	0.0168	0.0550	0.1558
	2017	0.1133	0.0159	0.0588	0.1403
	2018	0.3461	0.0113	0.0570	0.1646
	2019	0.3089	0.0125	0.0644	0.1540
	2012	0.1049	0.0119	0.0433	0.2067
	2013	-0.0038	0.0148	0.0397	0.1795
	2014	-0.0380	0.0188	0.0502	0.1496
Oromia International Bank	2015	-0.1492	0.0175	0.0393	0.1351
	2016	-0.0655	0.0166	0.0410	0.1410
	2017	-0.0179	0.0133	0.0312	0.1242
	2018	-0.0114	0.0161	0.0623	0.1300
	2019	-0.0662	0.0193	0.0578	0.1396
	2012	-0.0300	0.0581	0.0542	0.1491
	2013	0.1721	0.0704	0.0537	0.1559
	2014	-0.0935	0.0740	0.0791	0.2001
Cooperative Bank of Oromia	2015	-0.0690	0.0429	0.0548	0.1915
	2016	-0.0806	0.0052	0.0258	0.1453
	2017	-0.1166	0.0196	0.0347	0.1100
	2018	-0.0386	0.0138	0.0403	0.0921
	2019	-0.0560	0.0156	0.0431	0.0910
	2012	0.0951	0.0162	0.0458	0.3177
	2013	0.0070	0.0185	0.0503	0.2419
	2014	0.0767	0.0167	0.0544	0.2402
Bunna International Bank	2015	-0.0705	0.0190	0.0608	0.1936
	2016	-0.0277	0.0206	0.0629	0.1784
	2017	0.0139	0.0156	0.0538	0.1809
	2018	0.0326	0.0154	0.0627	0.1994
	2019	-0.0074	0.0242	0.0735	0.2426
	2012	0.1163	0.0048	0.0654	0.2617
	2013	0.0143	0.0073	0.0631	0.2503
	2014	-0.0560	0.0060	0.0541	0.2479

Nib International Bank	2015	-0.0912	0.0084	0.0564	0.2228
	2016	-0.0740	0.0071	0.0563	0.2027
	2017	-0.0726	0.0000	0.0602	0.1799
	2018	-0.0327	0.0124	0.0575	0.1564
	2019	-0.0432	0.0145	0.0636	0.1595
	2012	0.2385	0.0129	0.0336	0.7683
	2013	0.2077	0.0248	0.0617	0.4009
	2014	0.1739	0.0265	0.0678	0.3981
Addis International Bank	2015	0.0186	0.0258	0.0700	0.4011
	2016	0.0474	0.0261	0.0718	0.4073
	2017	0.0743	0.0204	0.0610	0.3334
	2018	-0.0556	0.0182	0.0672	0.3020
	2019	-0.0685	0.0225	0.0811	0.2817
	2012	0.1817	0.0197	0.0582	0.2534
	2013	0.0776	0.0190	0.0419	0.2395
	2014	0.1198	0.0239	0.0490	0.2756
Berhan International Bank	2015	0.0503	0.0189	0.0508	0.2369
	2016	-0.0319	0.0265	0.0683	0.2002
	2017	0.0453	0.0251	0.0671	0.2483
	2018	-0.0918	0.0148	0.0589	0.2027
	2019	-0.1300	0.0225	0.0670	0.1868
	2012	0.2109	0.0314	0.0791	0.1565
	2013	0.1530	0.0216	0.0691	0.1970
	2014	0.1411	0.0244	0.0853	0.2166
Zemen Bank	2015	0.0272	0.0242	0.0710	0.1999
	2016	0.0913	0.0209	0.0660	0.1826
	2017	0.1152	0.0209	0.0684	0.1795
	2018	0.0911	0.0153	0.0630	0.1657
	2019	-0.1190	0.0238	0.0795	0.2007
	2012	0.1452	0.0000	0.0380	0.3392
	2013	0.0698	0.0000	0.0410	0.2290
	2014	0.0693	0.0000	0.0438	0.1795
Abay Bank	2015	-0.0070	0.0000	0.0606	0.1976
	2016	-0.0053	0.0000	0.0555	0.1949
	2017	0.0436	0.0000	0.0547	0.1928
	2018	0.0686	0.0191	0.0630	0.1905

	2019	0.0483	0.0250	0.0762	0.2119
	2012	0.1830	0.0268	0.0588	0.2544
	2013	0.0948	0.0338	0.0702	0.2573
	2014	0.0986	0.0249	0.0560	0.2337
Lion International Bank	2015	0.0277	0.0288	0.0571	0.1844
	2016	0.0108	0.0265	0.0646	0.1689
	2017	0.0804	0.0201	0.0545	0.1648
	2018	0.0466	0.0157	0.0631	0.1554
	2019	0.0438	0.0188	0.0640	0.1561
Mean		**0.0934**	**0.0188**	**0.0587**	**0.2003**
Median		**0.0912**	**0.0188**	**0.0592**	**0.1797**
Maximum		**0.3461**	**0.0740**	**0.0853**	**0.7683**
Minimum		**-0.1492**	**0.0000**	**0.0258**	**0.0910**
Std Dev		**0.1266**	**0.0119**	**0.0112**	**0.0837**

Appendix Two: Average Z" Score of All Studied Banks and Discriminant Zone

Name of Banks	Years								Average Z" Score	Overall Average Z" Score	Discriminant Zone
	2012	2013	2014	2015	2016	2017	2018	2019			
Dashen	2.3182	2.5119	2.5394	2.4251	2.3182	1.8591	2.0855	1.4007	2.1823	1.2794	Gray Zone
Awash	2.5960	1.8815	2.4468	2.0041	1.7969	1.5215	1.4945	1.1369	1.8598		Gray Zone
Wogagen	2.4943	2.0990	-0.0358	1.9358	1.8789	1.7242	1.4003	1.7473	1.6555		Gray Zone
Hibret	2.7399	2.3862	2.5985	2.3296	2.1261	1.6527	1.9866	1.5443	2.1705		Gray Zone
Abyssinia	2.4849	2.0644	2.9565	2.3880	1.9272	1.3380	2.8627	2.6617	2.3354		Gray Zone
Oromia	1.2348	0.4785	0.3064	-0.5155	0.0481	0.2665	0.5326	0.1641	0.3144		Distress Zone
CBO	0.5136	1.8834	0.3690	0.2562	-0.1856	-0.3523	0.1597	0.0686	0.3391		Distress Zone
Bunna	1.3180	0.6980	1.1758	0.2113	0.4955	0.6935	0.8953	0.7790	0.7833		Distress Zone
Nib	1.4927	0.8044	0.2764	0.0422	0.1292	0.1174	0.3764	0.3588	0.4497		Distress Zone
Addis	2.6389	2.2785	2.1004	1.0978	1.3066	1.3140	0.4633	0.4652	1.4581		Gray Zone
Berhan	1.9129	1.1044	1.4828	0.9821	0.5461	1.0907	0.0548	-0.1335	0.8800		Distress Zone
Zemen	2.1817	1.7448	1.8061	0.9447	1.3025	1.4715	1.2449	0.0414	1.3422		Gray Zone
Abay	1.5638	0.9739	0.9380	0.5684	0.5428	0.8562	1.1356	1.1331	0.9640		Distress Zone
Anbesa	1.9503	1.4739	1.3495	0.8535	0.7694	1.1319	0.9442	0.9427	1.1769		Gray Zone