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# The Determinants of Financial Distres: An Emperical Study on Construction Companies in Amhara Region.

Mengistu Delele

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**BAHIR DAR UNIVERSITY**



**COLLEGE OF BUSINESS AND ECONOMICS**

**DEPARTMENT OF ACCOUNTING AND FINANCE**

**POSTGRADUATE PROGRAM**

**THE DETERMINANTS OF FINANCIAL DISTRES: AN  
EMPERICAL STUDY ON  
CONSTRUCTION COMPANIES IN AMHARA REGION.**

**BY: MENGISTU DELELE AKALEWORK**

**JUNE, 2021**

**BAHIR DAR, ETHIOPIA**

**BAHIR DAR UNIVERSITY**



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**THE DETERMINANTS OF FINANCIAL DISTRES: AN  
EMPERICAL  
STUDY ON**

**CONSTRUCTION COMPANIES IN AMHARA REGION.**

**A THESIS PAPER SUBMITTED TO THE DEPARTMENT OF ACCOUNTING  
AND FINANCE IN PARTIAL FULFILLMENT OF THE REQUIREMENTS  
OF THE AWARD OF THE DEGREE OF MASTERS OF SCIENCE IN  
ACCOUNTING AND FINANCE.**

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**JUNE, 2021**

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## **Declaration**

This is to certify that the thesis entitled “THE DETERMINANTS OF FINANCIAL DISTRES:  
AN EMPERICAL STUDY ON CONSTRUCTION COMPANIES IN AMHARA REGION.

The thesis, submitted in partial fulfillment of the requirements for the Master of Science in Accounting and finance of Department of Accounting and finance, Bahir Dar University, is a record of original work carried out by me and has never been submitted to this or any other institution to get any other degree or certificates. The assistance and help I received during the course of this investigation have been duly acknowledged.

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**POSTGRADUATE PROGRAM**

**Approval of Thesis for Defense**

I hereby certify that I have supervised, read, and evaluated this thesis titled “**The Determinants of financial distress: An Empirical Study on Construction Companies in Amhara Region**” By Mengistu Delele Akalework prepared under my guidance. I recommend the thesis be submitted for oral defense.

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**APPROVAL OF DISSERTATION/THESIS FOR DEFENSE RESULT**

As members of the board of examiners, we examined this dissertation/thesis entitled” **The Determinants of Financial distress: An empirical Study on construction companies in Amhara Region**” by **Mengistu Delele Akalework**. We hereby certify that the thesis/dissertation is accepted for fulfilling the requirements for the award of the degree of “masters of science in accounting & finance”.

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## **Abstract**

*When a construction companies are unable or struggles to satisfy its financial obligations as they mature, it is said to be in financial difficulty. Researchers rarely perform financial hardship studies that are matched with the needs of the Amhara Region's building industry, which is why this study was conducted. As a result, the primary goal of this research was to investigate macro & firm-specific factors. In order to achieve the objective, secondary data was collected from twelve construction companies for a sample period covering from 2013 to 2019 and analyzed using a random effect (RE) regression model. The endogenous variable used in the study was financial distress, which is measured by the debt service coverage ratio, while the exogenous variables employed in the study were leverage, liquidity, profitability, earnings, age, and economic growth. A quantitative research approach and explanatory design were adopted in carrying out this research. The results from the panel random effect regression output revealed that except for leverage which had a negative but significant effect on the debt service coverage ratio other variables like liquidity, profitability, earning, age and GDP have a positive and statistically significant effect on the debt service coverage ratio. On the other hand, leverage has a negative and statistically significant effect on a firm's debt service coverage ratio. In general, the study concludes that both firm-specific and macroeconomic factors determine the level of financial distress in Amhara construction companies. Finally, the study discovered that firm policies that improve the firm's profitability, liquidity, and earnings, as well as strategies that reduce the firm's leverage will help to lower the level of financial distress in companies.*

**Keywords:** Bankruptcy, Debt Service Coverage, Financial ratio, Panel Regression

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## List of Abbreviations and Acronyms

CLRM: Classical Linear Regression Model

CSA: Central Statistical Authority

DSC: Debt Service Coverage

DW: Durbin-Watson Statistic

EBIT: Earnings before Interest and Tax

EG: Annual Economic Growth

ERCA: Ethiopian Revenue and Customs Authority

FD: Financial Distress

FEM: Fixed Effect Model

GDP: Gross Domestic Product

HLTs: High leverage transactions

UA: Univariate analysis

JB: Jarque-Bera

LEV: Firm Leverage.

EEA: Ethiopia economic association.

LQ: Firm Liquidity

LOG: Natural Logarithm

OLS: Ordinary Least Square

PR: Profitability of Firm

REM: Random Effect Model

ROA: Return on Asset

TA: Total Assets of firm

TL: Total liability of firm

VIF: Variance Inflation Factor

MDA: Multiple discriminate analyses

OSS: Operational self-sufficiency

FSS: Financial self-sufficiency

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# CHAPTER ONE

## INTRODUCTION

### 1.1. Background of the study

According to the United Nations (UN), International Standards of Industrial Classification (ISIC), construction is "an economic activity directed to the creation, renovation, repair, or extension of assets in the form of buildings, land improvements of the country's economy in nature, and other such engineering constructions as roads, bridges, and other such engineering constructions as roads, bridges, and other such engineering constructions as roads, bridges, and other such engineering constructions as roads, bridges, dams & so forth.

It is a process that consists of the building or assembling of infrastructure in the fields of architecture and engineering. It comprises the building of new structures, including site preparation, as well as additions and modifications to existing ones. It also incorporates maintenance, repair, and improvements to these structures because of the process of adding structure to the real & sustained economy of a given country. According to the United Nations Environment Program (UNEP), the construction industry contributes significantly to a country's socioeconomic development process.

Its significance stems primarily from the direct and indirect impact it has on all economic activities in terms of contributing to national output and stimulating growth in other sectors via an economic policy system of linkages. The World Bank, as quoted in Rameezdeen et al (1984), also argues that the importance of the construction industry stems from its strong linkages with other sectors of the economy.

Although the National Accounts department of the Ministry of Finance and Economic Cooperation (MoFEc) used the same definition as ICD in its report on the Ethiopian economy, the activities covered by the industry are the construction and maintenance of: (1) Residential buildings in urban and rural areas, (2) Nonresidential buildings, i.e.

Construction industry plays a vital role for developing countries as they are considerably dependent on the growth and development of physical infrastructures. Construction industry makes significant contributions to the socio-economic development process of a country. Construction industry plays a vital role in any developing countries. This is mainly because

developing countries are considerably linkage of the construction industry to both economic and social sectors is very significant. Construction is not just the personnel's who are on the job site performing of actual Construction, but that it also includes many professionals who focus on research and development to discover new technologies and materials that improve the methods and process of construction (al.2004)., 2004)

The construction industry is unique in comparison to other industries. In general, the industry contains large projects where each project often requires high investments in relation to the construction companies' assets. Furthermore, the industry has a large number of business owners who have moved from being competent workers to starting their own businesses. One area could be the relatively low level of entry barriers, which makes it relatively easy for carpenters to start their own business without a lot of paperwork and governmental regulations (Informat, 2015).

Financial distress occurs when a company is unable or struggles to meet its financial obligations as they mature. Or which company or individual can-not generate revenue or income because it is unable to meet or cannot pay for its financial obligations (Ray S., 2011). This is mostly due to higher non-liquid assets, fixed costs, or revenues sensitive to economic declines. A company's financial distress refers to the inability of its capital needs to meet its liabilities and expand its business future.

According to Glen (2005) financial distress is a scenario where by a firm does not meet creditors' obligations or are met with difficulties. Financially distressed firms have problems in meeting and or paying off their due or overdue financial obligations to their creditors. Financial distress is a clear symptom that a company in the risk zone for a future bankruptcy ( Folkesson,2007).There are many definitions of financial distress, but one of the most commonly used is a situation where a company lack ability to pay off its external financial obligations, where this inability is not only temporary ( Koponen,2003). The construction industry got a better understanding of what causes that typically leads to financial distress within their industry. This knowledge could help entrepreneurs to avoid bankruptcies, which would have a positive effect on the business climate (Altman, 2006).

It is important to underline the indicators of distress, as to what are the reasons behind them and what possible solutions available before they reach at crisis stage, as many managers try to focus only on following year, at least in short term run ( Harlan & Marjorie,2002).As a result, an early warning system is essential for a company to monitor and measure its financial position and

health because strong companies today have chances to become weak tomorrow and companies that are already weak today might have chance to survive.

Economists and other researchers reveals that construction companies is the cornerstone complementary of to any economic investment and also a property-making institution of any country which is a vital and importantly the most engine of long-term growth and advancement of a nation. Although the institution is a prerequisite and a well predictor of future levels of economic growth, capital accumulation, and technological advanced, breaking of law like financial distress control or limit ability of the construction sector to facilitate economic activities of a country (Neusser & Kugler, 1998; Zamorski & Lee, 2015).

Hence, knowing the determinants of financial distress serves as an important area of focus for researchers due to its vital importance for firms and stakeholders, including investors, lenders, and participants in the sector in general. Thus, prior knowledge of financial distress can serve as a high-pitched sound mechanism to help corporate managers to take remedial measures.

Financial distress is a situation where a firm is unable to meet the financial obligations as they mature or does so with difficulties. Usually, the phenomenon may be reveals by insufficient cash flows, decline in market value, profit breaches and low growth in businesses (Andrade & Kaplan, 2013). Lin, KO and Blocher (2016) concurs that business failure results in enormous economic consequences. In many cases, the financial status of the company is often by financial distress. A firm in financial distress usually falls in a tight cash situation in which it is difficult to pay the owed amounts on the due date. The government, as a regulator in a competitive market, has concerns about the consequences of financial distress for firms, and it controls capital adequacy through the regulatory of capital requirement (Ming, 2016).

This shared interest among managers, employees, investors, and the government creates frequent inquiries and recurrent attempts to answer a persistent question about how to determine financial distress, or what reveals the credit risk of firms. Gruszczynski (2014) also explains that a company under financial distress can incur costs related to the situation, such as more expensive financing, opportunity costs of projects and less productive employees. The firm's costs of borrowing additional capital usually increase, making it more difficult and expensive to raise the much needed funds.

Lau (2017) further observes that managers of a distressed firm are often prompted to misappropriate entity's assets and resources and at the same time become more and more risk



averse. The immediate consequence of this scenario is that short-term decisions and interests are given attention as opposed to long-term strategies that would sustain the business in the long run (Bender, 2013). As a result, investments in the quality of the products and support through acquisition of the appropriate assets take a back seat. Further, accountability is not enhanced as the focus shifts to management of liquidity to avoid deepening the crisis.

The state of financial distress, therefore, leads to weakening of a financial system of the troubled firm and prejudices the rapport between the firm and various stakeholders (Altman, 2013). Past studies that are conducted by Zelig & Wassie (2011) provided some empirical evidence that financial distress arises in many cases, such as endogenous risks, miss-management, high leverage level, and an inefficient operating structure. In essence, a very low level of liquidity and negative cash flows combined with high leverage leads to financial distress (Shisia, Sang, Waitindi, & Okibo, 2014).

Even though empirical studies and related theoretical foundations conducted on financial distress were imprecise, the determinants that affect financial distress were identified based on their significance in the previous literature. Hence, firm age, leverage, liquidity, profitability, firm size and macro-economic factors like GDP and inflation are the major factors that determine financial distress position of a company (Bris, Welch, & Zhu, 2006; Pranowo, K, 2010; Cheluget, 2014).

In Ethiopia, the studies done on the subject of financial distress are very limited. Moreover, the existing studies have mainly focused on the banking industry's capital structure, particularly in the Amhara Region. So, this study will add value to the existing literature about financial distress, concentrating on the construction sector of Ethiopia, in the Amhara Region.

Besides, the study will enable investors and creditors to keep control of the issue of financial distress, which is very important to the security of their operations as well as to the economy as a whole in the region. Therefore, the study aims to identify those firm-specific and macro-economic determinants that affect the financial distress of construction companies in the Amhara Region.

Although several studies have been carried out to examine the financing pattern and to study the determinants of financial distress of firms across the globe, major empirical study on financial distress and its determinants is available from developed countries and relatively less work has been undertaken in a developing country like Ethiopia. Even in Ethiopia, despite the available research carried out in corporate finance identify the financial distress of Ethiopian companies,

few studies have actually examined the determinants of financial distress on construction companies in Ethiopia. In brief, it can conclude that there is little empirical research on determinants of financial distress of construction companies existing in Ethiopia.

In spite of substantial determined attempt of a lot exertion, the situation is difficult to find empirical evidence as to how construction companies actually make a choice between financial mechanisms to determine their financial distress and whether the choice of financial distress in determines the company's performance. Therefore, the purpose of this study will be to fill this gap by analyzing the determinants of financial distress of construction companies in Amhara Region.

In addition to this, the researcher would also eager to conduct this study and will put forward contributions on what determines the financial distress of construction companies in Ethiopia, the case of Amhara Region, while taking in to emphasis the absence of empirical investigation in to the determinants of financial distress of construction companies in Amhara Region, so this study will be conduct to do on such untouched empirical evidence in Amhara Region.

## **1.2. Statement of the Problem**

The initiation of this study would be largely due to the limited involvement and influence of construction related researchers of the institutes in the Amhara Region as well as in Ethiopia on the construction industry. This means that after identifying the root problems, the study would like to try to look at the past and current construction studies & study the future needs of the construction industry regarding the topic areas. According to Platt & Platt (2006), financial distress is the stage of decline in financial conditions that occurs prior to the occurrence of bankruptcy or liquidation.

When a firm's business becomes progressively worse to the point where it cannot meet its financial obligations, the firm is said to have entered a state of financial distress. As a result, anticipating the presence of financial distress in a company is extremely beneficial in preventing the company from entering the bankruptcy stage. Because a company in financial distress would suffer massive losses, knowing the determining factor of financial distress is critical to business success.

Financial difficulties in Ethiopia's construction companies occurred during the global financial crisis, which occurred in 2008, and raw material prices exploded in 2009, resulting in Ethiopian currency devaluation (Andualem, 2011).As a result, other factors the country witnessed many

corporate failures, companies become financially distressed or labeled totally bankrupt over the years for instance, Holland Car and Access Real Estate are among the companies who faced severe financial distress in Ethiopia.

According to Amhara National investment bureau report 2019, this situation is growingly becoming feel worse in construction companies industry of Amhara region. According to this report, the operation of construction companies in the region is under serious problem due to several reasons. These ideas offer some symptom that the construction industry is not revealing any sign of structural transformation and it is so far from being a motor of growth.

When companies become financially distressed, they have an effect on the company and negatively affect the economic stability of other sectors in a country (Hendel, 1996). Therefore, it is necessary to know financial distress on early stages. This early prediction may help managers in taking appropriate measures not to avoid but to minimize the potential determinants of financial distress. Therefore, it is significance to study the determinants of financial distress on construction companies to take timely for corrective actions.

The empirical studies suggest that; determinants of financial distress are numerous and vary across countries and regions (Zulkarnain, 2009). Some studies argue that, the main determinants of financial distress are firm-specific factors, whereas others claim that the macro-economic variables are the most important factors. Besides these, more than a few studies states that the key determinants of financial distress are both firm-specific and macro-economic factors. This infers that the findings were inconsistent across countries and regions which lead scholars to a continuous debating issue to identify the key determinants of financial distress in a given country.

In this regard, a considerable empirical examination have make, some of them are (Elloumi&Gueyie, 2001; Chancharat, 2008; Pranowo, K, 2010; Ahmad, 2013; Yohannes, 2014 ;). However, their findings deficient in of consistency: for instance, studies conducted by (Elloumi G., 2001; Yohannes, 2014 ;) indicate that corporate financial distress mount when there is an increase in firm leverage. Pararely, studies by (chancharat, 2008; Pranowo, K, 2010 ;) also revealed that the association between leverage and financial distress is positive. And also, studies conducted by Abdullah (2006) and Kristanti, Rahayu, & Huda (2016) revealed that the association between leverage and financial distress in negative. Pararely vein Ahmad (2013)

indicates that leverage has a negative relation with corporate financial distress. So farther is another contradiction with regard to the macro-economic factors.

According to Chancharat (2008) macroeconomic variables, such as GDP and inflation have significant effect on financial distress while Zeli (2014) disregard this effect. This confirms that there are no universally accepted findings about the determinants of financial distress; these may be for the reason that countries are different in their economic systems, political systems, financial systems and operating environments. Thus, the confusing results on the determinants of financial distress on literatures invite the inspiration for the study. In Ethiopia, specifically in Amhara Region studies search the determinants of financial distress on construction companies are rare; it is possible to say few in number which provides stimulation for the study.

As the researcher understanding that the researchers tried to identify the relationship between dependent variable i.e. financial distress and the independent variables such as age, leverage, liquidity, profitability, firm size and macro-economic factors. Therefore, this study is needed to fill the literature gap regarding to the construction companies of Amhara region and contribute to the body of knowledge by: take in more firm-specific factors; including macroeconomic factors, which was not situated by the researchers and increasing the time period of the study in order to minimize limitation of the previous study. So, the study problem will be become apparent from the relationship between the construction industry centers regarding serving each other by solving real and actual problems.

Among many interrelation difficulties this study would be focuses on the research problem that the researcher do not know if the researchers mostly did not engage in study in related to financial distress align with the desires of the construction industry in Amhara Region. At last, the above researchers mostly didn't conduct study in the Region to address clearly the impact of each variable on the determinant of financial distress for Construction Company in Ethiopia, particularly in Amhara Region.

To solve this deficiency, the researcher would use a proper econometric model to estimate determinants of financial distress on of selected Construction Company in the context of Amhara region. In general, this paper would try to estimate the determinants of financial distress on Construction Company in Amhara region by filling the above elaborated shortcoming in the previous researchers to be informed that most researchers would be participate in the Region on Construction Company. This means, therefore due to the nonexistence of empirical studies in

Ethiopia, specifically in Amhara Region the researcher would be interested to put his own contribution to what extent do and on what factors of determinants of financial distress affecting construction companies and the problem is almost new and this shows that there is a knowledge gap on this area at Amhara Region.

### **1.3. Objective of the Study**

#### **1.3.1. General Objective**

The general objective of the study would be to look into the determinants of financial distress on in case of construction companies in Amhara Region.

#### **1.3.2. Specific Objectives**

Specific Objective of the study to achieve the general objective would be the following:

- ✓ To identify the determinants of financial distress on Amhara construction companies.
- ✓ To examine the effect of firm specific determinants (firm age, leverage, Liquidity, profitability, earning ability and) on financial distress of the construction sector in Amhara region.
- ✓ To examine the effect of macroeconomic variables (GDP) on the construction sector of Amhara region.

### **1.4. Hypotheses Development**

To achieve the objectives of the study, a number of hypotheses would be developed and tested regarding the determinants of financial distress of Construction Company in case of Amhara Region based on different empirical research and theoretical review. Debt service coverage is used as a proxy for financial distress.

Debt service coverage: is the firm's ability of covering current obligations of fixed charge such as interest, dividend and other fixed charges payable currently. The study would be examine only Debt service coverage as proxy of financial distress and relates to firm determinants of financial distress.

**Therefore, the following expected hypotheses is developed:**

H1: Leverage has negative and significant effect on firm's debt service coverage as a Proxy of financial distress.

H2: Liquidity has positive and significant effect on firm's debt service coverage as a proxy of financial distress.

H3: Profitability has positive and significant effect on firm's debt service coverage as a proxy of financial distress.

H4: "There is significantly positive relationship between age and DSC of the construction companies in Amhara Region.

H5: Gross Domestic Product (GDP) has positive and significant effect on firm's debt service coverage as a proxy of financial distress.

H6: Earning ability of the firm has a significant positive impact on DSC as a proxy of financial distress of construction sector in Ethiopia, particularly in Amhara Region.

### **1.5. Significance of the Study**

The study will be important to different stakeholders as it aims in identifying the determinants of financial distress on Amhara Construction Company. Finding of the study would be guide investors to make best investment decisions and to know determinants of financial distress in construction companies and empower their knowledge by offering vital information. Second, the study will assist the management of Construction Company to aware them about the variables that affect financial distress. Third, the study would also help in address adequate information for the regulatory body to make informative decisions in policy making.

Fourth, the outcome of this study would serve as a bases tone for corporate managers in monitoring their firms' financial position as this might provide an early warning symptom for corporate financial distress. The last, the study would adds to know how existing knowledge apply on the determinants of financial distress on construction company. And, it can serve as a bench point for further studies by providing informative and suggestive information on the area of study. The study would be used as source of empirical reference which would be provide a ground for further researchers. The purpose of the study would be to establish determinants of financial distress among selected firms listed Amhara region Construction Company.

In brief, the paper would help for stakeholders in the construction sector as a guide when they develop strategies and to understand the factors that makes construction business to grow. In addition, the paper would become as a source and guide to researchers who have an interest to study in the future on the area of Construction Company in Ethiopia in particular and as well as developing the region in general. In brief, from study, Scholars and academicians in the finance discipline would be benefits where they may conduct further studies to broaden the knowledge on financial distress.

Furthermore, they would be considering the methods and results of this research and possibly extend it in various directions. The study would adds to the present information on corporate governance and financial distress in Amhara region context. A developed conceptual framework has been tested to establish its applicability to the firms listed at Amhara region. This would be adds to the existing theoretical knowledge on financial distress and financial performance of the sector. Therefore in short, this study would help for other researchers as a starting point and can also assist to practitioners such as contractors, investors, construction cost consultants, and other construction professionals in making road map decisions.

### **1.6. Scope of the Study**

The study would be limited to construction companies in the Amhara Region in order to obtain fair and uniform comparisons and valid results. In other words, the reason why this study would be limited to construction companies is that construction is developing and prosperous in the Ethiopian economy as well as in the Amhara region. Particularly, the entire population of construction companies in Amhara Region that have been operating at least for the last seven years (2013 - 2019), would be considered and secondary data would be collected from their years' financial statements. Last, the study won't include the primary data such as interview of the construction companies in Amhara Region's financial manager to analyze their knowledge on financial distress and their financing decision practices.

The study would be much better that it have be able to encompass the exiting practices of their financing decisions. Therefore, this study would focus on the examination of the determinants of financial distress on Construction sector, particularly the Amhara Region. On the bases of objective of the study, the study would focus on the factors that significantly affect the determinants of financial distress on Construction Company of Amhara's Region construction business in relation to selected explanatory variables.

In a rap up, the aim of this study would be to identify the factors affecting the determinants of financial distress on twelve construction companies in Ethiopia, particularly at Amhara Region. Even if there are many construction companies in Ethiopia, particularly at Amhara Region, the study focuses only on twelve construction companies located in Ethiopia, particularly at Amhara Region. Hence the researcher would be try to point out the scope of the study on twelve construction companies and the quantitative measure factors affecting on construction companies“ of determinants of financial distress in Ethiopia, particularly at Amhara Region.

### **1.7. Limitation of the Study**

The study can't be made without constraints. So, the following below would be the main limitations of this study. The study won't include the primary data such as interview of the construction companies“ CEOs and financial manager's opinion to analyze their knowledge on financial distress and their financing decision practices. Fatherly, the study would be limited only to twelve construction companies in Amhara region that have at least seven years of experience and include only seven variables, though it would be more productive, comprehensive and result would be in better findings and solutions if the study includes more variables and all construction companies in the region.

In concise, however, due to the time constraints, non-voluntarily to give the data and difficult to obtain a profit and loss account from a construction company for study, due to commercial confidentiality, the researcher would be forced to limit the study only on twelve construction companies at Amhara Region among twenty four construction sectors .

Because the researcher has choose the sample because these firms would have good experience and consistent data in the construction sector and plays a major role in determination of financial distress in the entire research period. Therefore, this study is limited to the sample of 12 construction companies in Amhara Region that are selected from the Population of 24 construction companies in Amhara Region that are large taxpayer, have good experience and consistent data companies engaged in similar class of economy and listed in Ethiopian Revenues and Customs Authority (ERCA).More specifically, the entire Population of construction companies in Amhara Region that have been operating, at least for the last seven years (2013 to 2019), would be considered and secondary data is collected from their seven years “financial statements.



## **1.8. Organization of the Study**

This study will consist five chapters. Chapter one would discuss introduction part, chapter two provides a review of theoretical and empirical literature related to financial distress determinants and conceptual frame work. The research design, population, types of data and tools, method of data analysis, diagnostic test of method, validity and reliability and model specification with variable description would be discussed in the third chapter. Chapter four would be discussed the results of the empirical analysis in relation to testing the hypothesis and chapter five presents summary of major findings, conclusion and recommendation.

The problem statement is given and research objectives have been clearly described and based on which, hypotheses are formed. Apart from this, it also identifies the significance, scope and limitations of the study. It is here, that measurements of the variables are would be well defined.

## CHAPTER TWO

### 2. LITERATURE REVIEW

#### 2.1. Introduction

This chapter of the study consists of relevant review of theoretical and empirical related literatures about financial distress and its determinants in the case of Ethiopian construction companies, particularly, in Amhara Region. According to Ethiopian Economic Association (EEA), (2007) report on the Ethiopian Economy (2006/2007), explanations, in the world, the contribution of construction industry cannot be denied because it plays important roles towards the growth of socio-economic boosting in the country.

Therefore the objective of the study would be to examine the effect of both firm specific & macro-economic factors of construction companies' financial distress; so, this part discusses literature concern with financial distress determinants. Previous studies were highlighted & framework for the study also would be form under this review of literature, which helps in clearly identifying the gap in literature.

#### 2.2. Theoretical Review

This chapter discusses the literature concerning the financial distress determinants. This review of literature establishes framework for the study and highlights the previous studies, which helps clearly identifying the gap in the literature. It discusses the theoretical background and presents the most relevant theories with previous studies related on the determinants financial distress with supported by different authors regarding the financial distress & it's composed of the meaning of financial distress and the various theories of financial distress.

##### 2.2.1. A "wrecker's theory" of financial distress:

Opler and Titman (1994) show that a financially distressed (highly leveraged) firm loses significant market share to their healthy competitors during industry downturns. In a sample of 31 high leveraged transactions (HLTs), Andrade and Kaplan (1997) isolate the effect of economic distress from financial distress and estimate the cost of financial distress as 10-20% of firm value. There are three important sources of deadweight losses due to financial distress –each one of them consistent with the interpretation of deadweight losses in the researcher model. First, a financially distressed firm may lose valuable customers, suppliers and key employees.

Griffin and Lemmon (2002) cited by Opler and Titman 1994 also find a negative relationship between financial distress and as peroxide by Ohlson's (1980) O-score and subsequent returns, even after correcting for the stochastic structure of returns by means of a Fama-French 3 factors model. In addition, they show that this relationship is driven by firms with a low book to market (BE/ME) ratio. The average return of low BE/ME firms in the highest quintile for Ohlson's Oscore is only 6.36%, about half of the average return in the other portfolios and slightly lower than the risk free rate over that period. In the subset of firms with a high BE/ME ratio, the returns of distressed firms are not lower than would be expected by their BE/ME.

In the quintile with the most distressed firms, the estimated return differential between high and low BE/ME firms is 14.44%. The results are robust to using the Altman (1968) Z-score indicator instead. Da and Pengjie (2005) repeat and interpret these estimations. They show that all the important results can be traced to first-month reversals, mostly due to data problems with penny stocks, such as bid-ask bounces and illiquidity. Two recent working papers complete the picture.

Garlappi, et al (2005) form six months' cumulative returns from portfolios sorted according to default risk. Using Standard and Poor's credit rating, they find an unconditional negative dependence of returns on default risk. Using instead the EDF measures generated by Moody's KMV data, they find a negative relationship in the sub-sample of firms with a low BE/ME ratio. This study is important because the authors use real world default risk indicators that were sold to tens of thousands of market participants. Campbell, et al (2005) break new ground by constructing their own reduced form default risk indicator based on a logic model for bankruptcy and a broader concept of company failure. Sorting firms into ten different portfolios according to their estimated default risk, they show that the distressed firms strongly underperform financially healthy firms.

### **2.2.2. Cash Managing Theory**

The cash management theory dictates that firm has to manage the cash outflows and inflows to avoid fund imbalance. The theory is concerned with the managing of cash flows into and out of the firm; cash balances held by the firm and cash flows within the firm at a point of time by financing deficit or investment surplus cash. It is obvious that every firm's major concern is to effectively manage short term corporate cash balances. This is so because it is difficult to predict cash flows accurately, particularly the inflows, and there is no Perfect coincidence between cash inflows and outflows (Aziz & Dar, 2006).

During some periods cash outflows will surpass cash inflows for the reason that payments for taxes, dividends or seasonal inventory is build up. On other times, cash inflow will be in excess of cash sales and debtors may recognize in large quantities promptly (Moynihan & Pandey, 2005). The imbalance between cash inflows and outflows would indicate failure of the management of cash function of the firm. Persistence of such an imbalance may cause financial distress to the firm and lead to business failure (Aziz & Dar, 2006). Due to these facts, management has to pay much attention to cash management function of the firm, to protect from the effect of financial distress.

### **2.2.3. Credit Risk Theory**

The credit risk theory, which was formulated by Merton (1974), states that the inability of a firm to adequately manage its credit risk exposes such a firm to the likelihood of financial distress. Credit is the provision of goods and services to a person or entity on agreed terms and circumstances where the payments are to be made later with or without interest.

The lender is exposed to credit risks when the debtor does not pay their dues on the due date, which may in turn lead to default. Credit risk is therefore the investor's risk of loss, financial or otherwise which arises from a borrower who does not pay its dues as fixed in the contractual terms (Lloyd-Nyunja & Paediatric, 2011). According to this theory the firm will face credit risk, which emanates from failure of debt holders to pay the amount owed when it comes due, that would prone the firm to financial distress and then business failure.

### **2.2.4. Static theory/ trade-off theory**

The trade-off theory, which was formulated by Modigliani & Miller (1963), states that the use of debt raises the value of the firm. However, there is a certain point at which further use of debt becomes unfavorable and continuous use of debt would be increase both the agency cost and bankruptcy cost which has the consequence of reducing the worth of the firm leading to the possibility of financial distress. This theory underlines that although the tax benefit of debt would cause the value of a firm to increase as per the increase in leverage, this becomes real to a point since leverage increases, so too does the likelihood of default. Sooner or later the cost of financial distress becomes so great that it erodes them.

The implication is that there is an optimal debt level, however, using leverage beyond this level would end with the decline in firms' value because of the increased probability of default. Even if the Modigliani and Miller (1950) theory was revised to incorporate the tax

benefit of debt; it still failed to incorporate the effect of financial distress. However, the theory still argues that firm can achieve optimal trade-off the benefit in the use of debt against the cost of the use of debt. As a result, the trade-off theory addresses the impact of financial distress on the prosperity of construction firms.

### **2.2.5. The Pecking Order Theory**

The Trade-Off of theory may be considered as a competitor theory to the Pecking Order theory. The proposition of Pecking Order Theory can be traced back to the year 1961 when Donaldson & Fox (2000) pointed out that firms follow a particular sequence of financing. They use internally generated cash flow as principal source of long-term financing. If the firm has insufficient cash flow from internal sources, it resorts to debt financing and as a last option a firm will use externally generated funds, i.e. equity funds.

Myers & Brealey (2003) extended the work of Donaldson & Fox (2000) by applying the term "pecking order" to Gordon Donaldson's description of firms' sequence of financing. The researcher considered their theory as a 'Modified Pecking Order Theory', and stated that companies prioritize sources of financing from internal financing to debt and finally to equity and chose to raise equity fund as a last resort of financing. The Pecking Order, theory which is the modified one was based on information asymmetry and recognized the costs of financial distress. The theory has also been used to explain why a firm goes into financial distress. This theory states that firm first exhausts the internal source of funds before going for the external source of funds (debt and equity) in a bid to reserve the stability and value of the firm.

The implication of this theory according to Fredrick (2019) is that an increased use of external source of funds may affect the firm negatively this may increase the likelihood of financial distress in firm. The Pecking Order Theory contends that firms that are highly profitable and having good cash flows may have low debt ratios because they do not need external financing as they have sufficient retained earnings to fall back up on to finance their investments these is reduce the level of financial distress on firms.

Firms with growth opportunities (future investments) may issue equity suggesting negative relationship between growth and leverage. When the firm's earnings are volatile, firms may have less leverage. The age of a company should be negatively relate to its leverage because mature firms May find shortage of good growth opportunities and hence may not need funds.

### **2.2.6. Agency theory:**

Agency theory initiated by Jensen and Meckling (1976) suggests that agency costs arise from the conflict of interest between debt-holders and equity-holders. Commonly, managers, being part of the owners, tend to collaborate with equity-holders, thus if the firm is approaching financial distress, equity-holders may encourage managers to pass decisions, which, in effect, extract wealth from debt-holders to equity-holders (Butler et al 2005).

### **2.2.7. Entropy Theory**

According to Aziz & Dar (2006), the entropy theory (Balance Sheet decomposition .Measure Theory) is the way of identifying firms' financial distress through a careful observation of changes in the balance sheets. According to this theory, if a firm is not capable of maintaining equilibrium state in their balance sheet component (Asset and liability) and is not able to control in near future, it is more likely to foresee distress (Aziz & Dar, 2006).

The theory makes use of univariate Analysis (UA) and Multiple Discriminate Analysis (MDA) in examining changes in the structure of balance sheets. The use of accounting-based ratios or market indicators for the distress risk assessment is usually done through univariate analysis (Outecheva, 2007). The financial ratios of each company, therefore, are compared once at a time and the difference of those companies through a single ratio with a cut off value is used to classify a company as either distressed or non-distressed (Nketiah, 2017). Multivariate Statistic or Multivariate analysis is a statistical analysis in which more than one variable are analyzed at the same time ( Slotemaker, 2008).

Therefore, if a firm's financial statements reflect significant changes in the composition of assets and liabilities on its balance sheet it is more expected that it is unable of keeping the equilibrium state. If these changes are likely to become uncontrollable in the near future, one can foresee financial distress in these firms (Aziz & Dar, 2006). So far, Aziz & Dar (2006) and Sun and Li (2008) as sighted in Kinyariro (2016) have used entropy theory as the theoretical foundation for investing studies on financial distress.

### **2.2.8. Liquid Asset Theory**

Initially developed by Beaver (1966) the theory also looks at a firm as a liquid asset reservoir that is either supplied or drained by inflow and outflow respectively and it acts as a buffer in flows variations. Also, the firm solvency is explained in the likelihood that there is an exhaustion of the reservoir this could bring failure due to incapability of the company to

settle matured obligations it is the assumption of the theory that a firm goes bankrupt when debt obligations exceed the profits in the current year or when a summation of both the expected equity value and current year profit becomes less than zero or negative.

The ability to borrow from the capital market and raise capital within a firm lies on positive cash flow whereas a negative one reduces the capacity of a firm to borrow increasing the probability of bankruptcy (Scott, 1981). The theory becomes relevant due to its concept which outlines primary criteria utilized in establishing financial distress within company i.e.net cash flows relative to current liabilities.

### **2.2.9. Gambler's Ruin Theory**

Gambler Ruin theory was developed by Feller (1968) who based it on the probability theory where a gambler wins or loses money by chance. The gambler starts out with a positive, arbitrary; amount of money where the gambler wins a dollar with likelihood and loses a dollar with a possibility (1-p) in each period. The game continues until the gambler runs out of (Eckbo, Thorburn, & Wang, 2016).

The firm can be supposed of as a gambler playing repetitively with some possibility of loss, continuing to operate until its net worth goes to zero (bankruptcy). With an assumed initial amount of cash, in any given period, there is a net positive that a firm's cash flows is constantly negative over a run of periods, ultimately leading to bankruptcy (Aziz& Dar, 2006). The major drawbacks of this theory are that it assumes that a company starts with a certain amount of cash.

The two main difficulties with this theory when predicting bankruptcy is that the company has no access to securities markets and the cash flows are consequences of independent trials and managerial action cannot affect the results (Shisia, Sang, Waitindi, & Okibo, 2014). In general, even if there are many available theories as discussed above, this research follows the entropy or balance sheet decomposition measure and the trade-off theory.

### **2.3. Determinants of financial distress**

The debt-service coverage ratio is defined as earnings before interest and income taxes plus one third rental charges, divided by interest expense plus one-third rental charges plus the quantity of principal repayments divided by one minus the tax rate, Lico Junior (2000). The debt service is interest payment plus repayments of principal to creditors, that is, retirement of debt.

The fixed-payment coverage ratio measures the firm's ability to meet all fixed payment obligations, such as loan interest and principal, lease payments, and preferred stock dividends.

Gitman (1991). The degree of financial distress of a company is determined by the ability to service its debts. This ability is routinely assessed by financing banks which may rate the commercial debts on the basis of their own credit rating models, e.g. along the recent Basel accords Gruszczynski (2004).

Initial studies on the determinants of financial distress have used financial ratios to predict the financial healthiness of firms. Due to their availability in the financial statements of and stable firms' financial ratios are easy to access. The use of financial ratios in differentiating distressed firms started in the mid-1930s with the work of (Winak or &Smith, 1935), where they used financial ratios to evaluate the financial soundness of firms. Based on these, the firm specific determinants of financial distress that the studies adopt were largely grouped as the following: Age of firm, liquidity, leverage, profitability, firm earning and macro-economic factors.

### **2.3.1. Firms Age:**

Diamond (1989) argues that aged firms with a long history of credits have relatively low default probability and lower agency costs using debt financing than newly established firms. Accordingly, a positive relationship is expected between age and debt ratio. On the other hand, according to pecking order hypothesis, firms prefer raising funds first from retained earnings and resort to external funds only if the former is insufficient, in which issuing debt is preferred over issuing equity. Therefore, young firms are more likely to depend on debt instruments since they do not have sufficient funds internally to finance new investment. Hall et al. (2004) argue that new firms will not have had time to cumulate funds and may be forced to borrow. This suggests an inverse relationship between age and debt ratio.

### **2.3.2. Liquidity**

Firm's liquidity is the ability of an asset to be converted to cash quickly at low cost. Liquid assets can be converted into cash quickly and cheaply Brealey et.al. (2000). the liquidity of a firm is measured by its ability to satisfy its short-term obligations as they come due. Liquidity refers to the solvency of the firm's overall financial position the ease with which it can pay its bills. Because a common precursor to financial distress and bankruptcy is low or declining liquidity, these ratios are viewed as good leading indicators of cash flow problems Gitman ((1991). Several studies have suggested that firms with low levels of liquidity are more likely to experience financial distress, because cash constrained firms are more vulnerable to exogenous negative shocks to cash flow (e.g. Altman (1968) among others).



In the multiple regressions analysis that follows, the researcher use the ratio of current asset to current liability to proxy liquidity and expect that it was positively related to the financial distress. Theoretically, the causes of financial distress are problems of liquidity, which is the inability of current assets to cover current liabilities: which is the measure of current ratio. The lower this ratio indicates that the firm has lower amount of current funds to cover the current obligation. The firm unable to meet its current obligation may have high probability of financial distress. Therefore, liquidity is an important determinant of financial distress. Liquid assets are often supportive for settling the liabilities of a firm. Liquidity refers to firm's ability to convert its assets in to cash quickly and economically to pay off its financial obligations (Brealey, Myers , & Allen, 2011).

Liquidity ratio is among the popular ratio that signifies the ability of a company to pay its debt when it comes due. The ratio of high liquidity implies company's ability to pay its debt when it comes due and vice versa. A firm should maintain a level of liquidity sufficient to meet its financial obligations in a timely manner. The liquidity ratio expresses the degree to which accompany is capable of fulfilling its respective obligations.

Liquidation is the measure of company's ability to pay debt obligations and its margin of safety through calculation of metrics including the quick ratio, current ratio and operating cash flow ratio. The coverage of short-term debts in an emergency was analyzed in relation to liquid assets (Amadasu, 2012). Different studies indicate that liquidity is another determinant of corporate financial distress. Liquidity which shows the firm ability to meet short term maturing obligation is measured by the ratio of current asset to current liability.

Research work of (ElloumiG., 2001; Turetsky& McEwen, 2001; Andualem, 2011) showed that increase in liquidity leads to decrease in corporate financial distress. Similarly, research work of (Nahar, 2006; Yohannes, 2014) indicates that there is a negative link between liquidity and financial distress. However, several studies also indicates that liquidity has a positive link with financial distress among them (Ahmad, 2013; Kristanti, Rahayu, & Huda, 2016; Pranowo, K, 2010).Generally, Several firms with low level of liquidity are more likely to experience financial distress, because firms with small amount of cash or other current assets are more exposed to exogenous negative shocks to cash flow (Altman, 2013). Liquidity ratio implies company's ability to cover their obligation when it comes due.

### **2.3.3. Leverage:**

Leverage is the portion of the fixed costs which represents a risk to the firm. Operating leverage, a measure of operating risk, refers to the fixed operating costs found in the firm's income statement, whereas financial leverage is a measure of financial risk, refers to financing a portion of the firm's assets, bearing fixed financing charges in hopes of increasing the return to the common stockholders. The higher the financial leverage, the higher the financial risk and the higher the cost of capital (Shim and Siegel 1998). Another determinant of financial distress is firm leverage. Once again, the theoretical underpinning for leverage as a predictor of distress lies in the fact that leverage limits the ability of the firm to withstand negative shocks to cash flow. Following Altman (1968) the researcher uses the ratio of total liabilities to total assets to control for the impact of leverage on distress.

The other causes of financial distress are increased leverage ratio, which is the measure of how heavily the firm is grateful. The reason for risk is the prevalence of fixed cost. Leverage is the use of debt financing, and the leverage ratios are measures of the relative contribution of stockholders and creditors, and of the firm's ability to pay financing charges (Lico Junior 2000). The debt ratio is an important factor for measuring firm's indebtedness. The higher this ratio indicates the greater the firm's degree of indebtedness and the more financial leverage it has.

The time of interest earned ratio and the fixed-payment coverage ratio are important risk indicators. The lower the ratio, the greater the risk to both lenders and owners; the greater the ratio, the lower the risk is. This ratio allows interested parties to assess the firm's ability to meet additional fixed-payment obligations without being driven into bankruptcy. In general the higher the firm's leverage, the lower the firm's ability to cover its debt services and this leads to financial distress. Therefore, leverage is an important determinant of financial distress (Lico Junior 2000).

### **2.3.4. Profitability:**

The firm's Profitability ratios are used to measure the firm's return on its investments Brealey et al (2000). The researchers conducted on financially distressed firm suggest staking actions of adjusting the business to increase profitability (Chang-e 2006). There were some researchers such as Hotchkiss (1995) who explored the achievement of bankrupt reorganization firms in US of America and focus on profitability. Financial distress plays a significant role in a firm's operation and profitability through the influence of cost implications, such as administrative and legal costs associated with the bankruptcy process (i.e., direct financial distress costs) or

increased costs of debt i.e., indirect financial distress costs for example,(Betker1997)and (Beaver1966).Other determinant of financial distress is profitability. In competitive markets, firms need to generate positive profits in order to survive. Firm profitability has linked to financial distress and bankruptcy in two ways. First, firms with poor management will ultimately be driven out of the market by more able management teams. Second, in the absence of a large reserve cushion, the lack of profits will ultimately be associated with low levels of liquidity. Here again, the researcher follow Altman (1968) in using the ratio of gross profit to total sales to proxy for firm level profitability.

### **2.3.5. Macroeconomic Determinants**

Construction companies have a major role in economic activity of every country through provision of advanced services. For the advancement of macro-economic, financial institutions has influence on economic events, macroeconomic variables also have impact on the performance of construction companies in a given country. The following macro-economic actors are reviewed from different construction company are an empirical studies (Pryshchepa, Aretz, &Banerjee, 2013).

### **2.3.6. Economic Growth (GDP) and Financial Distress**

It is the monetary value of all finished goods and services made within a nation during a specific period of time. Studies indicate that financial distress is strongly related to the growth of countries GDP. This is measured by the real GDP growth rate and it is hypothesized to affect construction companies“ financial distress in both said mean negatively or positively.

This is because the default risks lower in upturn than in down turn economy (Pryshchepa, Aretz, & Banerjee, 2013). Economic growth is measured by Real Gross Domestic Product (R.GDP) and it represents the general economic condition of any country. When the economy becomes good, Companies tend to do well and they can easily escape from financial distress and face a financial problem when the economy is bad.

### **2.3.7. Earning Ability**

Return on Asset (ROA) was applied because the construction company’s Financial Reporting Standards recommends the use of ROA and ROE as measures of profitability rather than financial self-sufficiency (FSS) and operational self-sufficiency (OSS) ( Muriu, 2011). The ROA reflects the ability of Construction Company’s management to generate profits from the construction company’s assets. It shows the profits earned per birr of assets and indicates how

effectively the construction company's assets are managed to generate revenues. For financial institutions, the most common measure of profitability is return on asset (ROA) (Sima, 2013).

And also to survive in a competitive construction business environment generating low volatile and diversified income is a must to attain. In accordance with Grier (2007) opinion, a consistent profit not only builds the public confidence in the construction company but absorbs loan losses and provides sufficient provisions. It is also necessary for a balanced financial structure and helps provide shareholder reward. Thus consistently healthy earnings are essential to the sustainability of construction Company. The proxy for the earnings ratio is the return on average equity or average assets. A higher return gives a construction company more buffers to deal with unexpected losses and stay in distress, Konstandina said (2006).

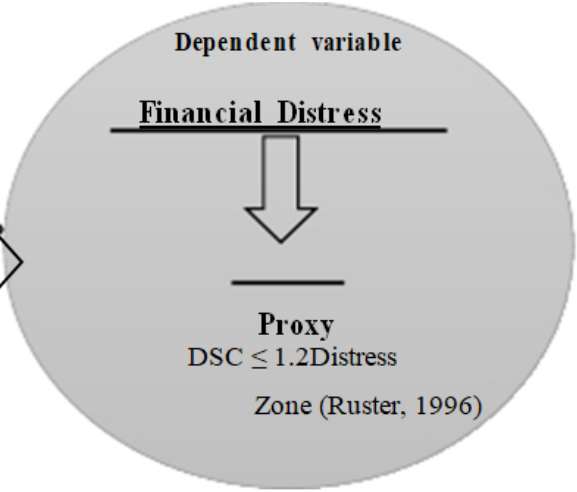
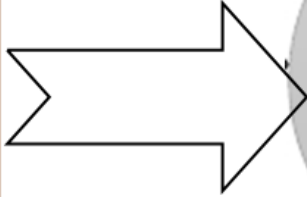
#### Conceptual Framework

The conceptual framework gives a portrayal of how the variables identified are related to each other. Financial distress is the dependent variable which is affected by the independent variables; such as, Profitability, liquidity, financial leverage and firm efficiency and Firm size. 'The literature review identifies variables that affect the determinants of financial distress of construction companies.

Therefore, in regarding to the literature review, this study can present the relationship between explanatory variables and response variable. Furthermore, according to Leshem and Trafford (2007), a conceptual framework helps the reader to quickly see the proposed relationships between variables in the study. Therefore, the conceptual framework in this study comprises of seven independent variables which the researcher will be thinks a determinant on determinants of financial distress in construction companies a represents by Figure in next page.

**Independent variable**

Leverage  
Liquidity  
Profitability  
Firm age  
R.GDP  
Age  
Earning



## CHAPTER THREE

### 3. Research Methodology

#### 3.1. Introduction

The third chapter of this study briefly discusses the methodology that would be applied in the study by briefly describing the research design, target population and sample of the study, the data collection as well as the data analysis techniques to be used to achieve the objective of the study. Then model specification and finally study hypotheses would be presented respectively.

Therefore, this chapter talks about the researcher methodology was going to gathering, analyzing, processing, interpreting and translating to meaning full information. In general this chapter includes data type, methods of data collection ,target population, research approaches, designs, sample size, sampling technics ,variable's , model specifications, data analysis technics and also definition for the term related to the topic are discovering .

#### 3.2. Research design and approach:

“A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. In fact, the research design is the conceptual structure within which study is conducted; it constitutes the blueprint collection, measurement and analysis of data”(Kothari,2004). That is why, it is a paramount to properly define and evaluate the research design before even conducting the research.

Therefore, under this study the researcher would use a quantitative research approach with explanatory research design in order to investigate the determinants of financial distress in Ethiopia, specifically in Amhara region. Since the dependent and independent variables are measurable at quantitatively, a quantitative research approach is appropriate. It is an approach for testing objective theories by examining the relationship among variables. These variables, in turn, can be measured, typically on instruments, so that numbered data can be analyzed using statistical procedures.

Explanatory design would use because it employs research hypotheses that explicitly state the nature and direction of the relationships among variables. According to (Cooper & Schindler, 2014), unlike descriptive studies, explanatory studies go beyond observing and describing the

condition and try to explain the reasons of the phenomenon. Hence, explanatory research type is useful in finding the relationship between dependent and independent variables.

Research design is a plan of a road map to the study that directs the entire performance of procedures to be undertaken. Kothari (2004) describes research design as the conceptual framework in which study is undertaken and it consists of the collection, measurement and analysis of data. And also it is a strategy of describing procedures about sample size, data sources, and means of collection and methods of data processing, analyzing and presenting based on the scope and depth determined in the beginning. It is believed in this study that explanatory research would be the best design for explaining, rather than simply describing, the reason why construction companies influenced by its determinants. Explanatory research in this context would be helps in understanding the problem more competently.

In general, Research design can be defined as an outline of the actual measures, adopted by an investigator for testing the correlation involving dependent variables as well as independent variables (Kothari, 2008).

### **3.3. Research Approach**

The quantitative research relies on the measurement and analysis of statistical data to produce quantifiable conclusions. Quantitative research is a means for tests objective theories by examining the relationship among variables (Creswell, 2011). So, for this study quantitative approach would be employed to see the relationship between financial distress of Amhara construction companies and firm specific and macro-economic factors affecting financial distress in the region by establishing causal relationship. A quantitative strategy is best suited as the research has a large focus on numbers and the use of hypothesis and statistical tools to analyze them.

Therefore, quantitative nature of data, that researcher will use quantitative research approach to examine the cause and effect relationships between dependent and independent variables under the study. The reason for selecting quantitative technique is also economical. The study also would be adopted an explanatory research approach by using balanced panel research design to meet the research objective. As explained by (Bhattacharjee, 2012), explanatory research attempts to identify causal factors and outcomes of the target phenomenon.

A panel data is stand for information across both time and space, and it measures some quantity about them over time (Brooks, 2014). One of the merits of using panel data is addressing broader

range of the subject and tackles more complex problems that would be impossible in pure time-series data. Therefore, on bases the above academicians in order to explore the relation sheep between the factors of financial distress on Construction Company with firm specific, industry and macroeconomic factors, the researcher have been used quantitative research approach.

### **3.4. Population and sampling method**

Population refers to the total set of items to be observed and measured (Maxwell 2012). Therefore, target population refers to the complete collection of objects to which a researcher intends to generalize the findings or outcomes of the study (Mugenda & Mugenda, 2003). For the intent of the study, construction companies found in Amhara region listed at the ANRS investment bureau comprised the target population.

In this study, the data needed for the intent of analysis will be collect from sources of secondary data: audited financial statements, basically of balance sheet and income statement of sample construction companies in Amhara Region for a period of seven years (20013-2019). The second level of sampling criteria would be that the total study population includes merely, large tax payer construction companies in Amhara Region's integrated in the same class of economy and listed in Ethiopian Revenues and Customs Authority (ERCA) large tax payer that have a sustained operation throughout the study period. The researcher would make the following sample limitation criteria to arrive at a definite study population.

The sample limitation would be that the construction companies in Amhara Region within consistent financial data for a period seven years in form 2013–2019 is excluded from the study so as to examine the financing decision of the construction companies in Amhara Region without any interruption. After makes the above restriction the total population is found as 24 construction companies in Amhara Region that operate in Amhara Region. With this regard covering the entire companies in the study makes the study difficult (Cohen, 2005). Hence, 12 construction companies in Amhara Region that satisfy the above criterion are included in the sample study using a sampling technique of purposive sampling. Finally, researcher would be employed purposive sampling technique for the selection of construction companies in Amhara region. So, target population of the study will include construction companies in Ethiopia, Particularly in Amhara region covering annual aggregate data from 1913 to 2019 using panel data.



Table 3-1: sample construction companies in Amhara Region

No	Name of Company	ProjectAddress	Permitted Date inG.C.	Sector
1	AGUNTA CONSTRUCTION PLC	D/Birhan	8/1/2000	Construction
2	ATAAY CONSTRUCTION PLC	Bahir Dar	21/3/2000	Construction
3	KURKUR CONSTRUCTION PLC	D/Tabor	14/04/2001	Construction
4	YADOT CONSTRUCTION PLC	D/Birhan	27/3/2001	Construction
5	KIBRA CONSTRUCTION PLC	Bahir Dar	16/3/2003	Construction
6	A.G.M.M CONSTRUCTION PLC	D/Markos	7/4/2003	Construction
7	BIRUH DAN CONSTRUCTION PLC	Bahir Dar	11/4/2003	Construction
8	ATENAS CONSTRUCTION PLC.	Gondar	23/2/2005	Construction
9	M.K.T CONSTRUCTION PLC	Bahir Dar	19/2/2005	Construction
10	T.W.D CONSTRUCTION PLC	Dessie	15/1/2005	Construction
11	HUSEN CONSTRUCTION PLC	Gondar	1/4/2007	Construction
12	PALIM CONSTRUCTION PLC	Enjibara	23/2/2005	Construction

**Sources:** Ethiopian Revenues and Customs Authority (ERCA) and at Amhara Regional governmental investment beuro.

### 3.5. Data type and source

The researcher would initially be based on secondary data that would be collected from annual reports of Amhara region investment beuro, the company financial statement and other related documents. The study would be relied on secondary data. Secondary data would be gathered from financial statements, contractor Handbook, as well as websites of firms studied. Financial information of a year period of between 2013 and 2019 is used since it would be considered as a current and long enough to prove sufficient variables that would assist in determining the determinants of financial distress with the data frequency being yearly. The collecting data would be quantitative in nature. In rap up, the study would be used secondary data for the analysis and secondary data utilized in this study would be extracted from company's annual audited financial reports that are income statements and balance sheets of the selected private

construction companies from 2013 up to 2019 seven years coverage of annual data. And also the researcher would be use related scholarly articles from academic journals and relevant text books would be used.

### **3.6. Variable Description and Measurement**

The study would be focused on identifying the determinants of financial distress on Amhara construction companies by tests hypotheses in considering the relationships between financial distress of firms and firm specific and macro-economic factors. As previous studies, from literatures the researcher would I understands that firm specific factors like financial leverage, liquidity, profitability, age, earning ability and macro-economic variables like GDP the key factors that influences corporate financial distress in firms would be incorporated in the study. Hence, for this study the financial ratios would be chosen based on their popularity and significance in the previous studies.

A vital step in designing for quantitative research is identifying the variables that are manipulated, measured, and described. A variable that would be selected in the study to determine its relationships to the observed outcomes of the research is known as independent variable. The variable being measured as an outcome which depends up on other variable, namely outcome, response, explained variable is known as dependent variable. By itself, so as to discuss the description and operational definitions of selected variables are present here under **below:**

#### **3.6.1. Dependent Variable**

Debt service coverage ratio is the ability of a company to pay all debt obligations, including repayment of principal and interest. DSC is the firm's ability of covering current obligations of fixed charge such as interest, dividend and other fixed charges payable currently. This study was examine only Debt service coverage as proxy of financial distress and relates to firm determinants of financial distress and macro-economic variables.

Purnanandam (2008) on his study shows that a firm concentrating financial distress usually experiences a decline in profitability, is over leveraged or has insufficient cash flows to cover current obligations. Financial distress may facilitate problem of liquidity and profitability on firms through failure and in solvency as a result of unremitting losses. The fixed-payment coverage ratio measures the firm's ability to meet all fixed payment obligations, such as loan interest and principal, lease payments, and preferred stock dividends (Pruitt &Gitman, 1991).

Furthermore, financial distress may impact on DSC, because financial distress causes the cessation of operation, non-payment of current obligations due to cash flow problems, the firm's total liabilities are in excess of total assets, and the formal declaration of bankruptcy (Altman & Hotchkiss, 2010). Thus, for an assortment of why, financial distress decreases firm's DSC.

DSC increment improves a firm's profitability, liquidity, leverage and hence financial distress effect on firm becomes very minimal. Various financial indicators have be select to make a model of corporate financial distress and tabulation data have be make for the steps of integral corporate financial distress. The study concerns on the ability of the companies to fulfill its obligation to the third parties **such as:** interest rate, repayment bank loan, coupon bond, vendors' obligation, employee's obligation as well as dividend payout. In the assessment, the researchers use Debt Service Coverage (DSC)  $\leq 1.2$  is a proxy of financial Distress (Ruster, 1996).

Debt Service Coverage (DSC) ratio as a proxy of corporate financial distress is defined by the ability of company to fulfill its obligation to the third parties in current liabilities. This means in side generated fund consist of Earning after Tax (EAT) plus depreciation of fixed assets plus amortization of intangible assets should be higher than its obligation to the third parties and shareholders at the short-term period of time. The computation DSC can be defined as **follows:**

$$\text{DSC} = \frac{\text{EAT} + (\text{DEPR} + \text{AMORT}) + (\text{INTEREST}) - \text{Tax}}{\text{Principal} + \text{Interest and or Coupon}}$$

Note:

**EAT:** Earning after tax is the bottom line of profitability. **Depreciation:** the cost allocation for fixed assets e.g. machineries, building etc. **Amortization:** the cost allocation for intangible assets e.g. pre-operating cost, patent. **Principal:** Installment of periodically loan payment or repayment of corporate bond. **Interest:** interest rate of the bank loan. **Coupon:** the interest rate of corporate bond.

### 3.6.2. Independent Variables

This section describes the independent variables that are used in the econometric model to estimate the dependent variable DSC as a proxy of financial distress. According to the model presented, there are seven identified variables that determine DSC of firms; these are leverage,

profitability, liquidity, earning, firm age, gross domestic product and. Each independent variable presents by the following **sections**:

### **I. Leverage**

This study chose debt to asset ratio as a measure of leverage variables. Debt to asset ratio is the ratio used to measure the extent to which the total assets of the company have been financed using borrowed funds. The higher the debt to asset ratio, the lower the company's funding provided by the shareholders. So, the use of too much debt leads to higher financial risks and deteriorate financial stability. High leverage leads to financial distress (Outecheva, 2007).A number of studies consider debt ratio as a measure of leverage by Shyam Sunder and Myers (1999), Fama and French (2002), Frank and Goyal (2002), and Zingales and Rajan (1995).Therefore, in this study Leverage is **measured by**:

$$\text{Debt to asset ratio} = \frac{\text{Total Liabilities}}{\text{Total Asset}}$$

### **II. Profitability**

Profitability is a standard of earning power of a company. According to Ohlson (1980), profitability ratio measures how big the company's ability to generate profits. This study decided to choose return on asset as a measure of profitability variable. It is because ROA shows the competence of company's management in utilizing assets at its disposal to earn profit.

This means that the higher ROA of the company, the higher the value of the company will be which helps firms to escape from financial distress. This is certainly an attraction for investors to invest in the company. Profitability is measured in several accepted ways and in this study; profitability is measured as the ratio of net income to total assets (Ebaid, 2009). Therefore, in this study profitability is measured **by**:

$$\text{Profitability} = \frac{\text{Net income}}{\text{Total assets}}$$

### **III. Liquidity**

Liquidity is the capacity of a firm to offset its current obligations using current assets. A company with current assets that is greater than its current liabilities is considered in a liquid condition to cover its current liabilities possible financial distress. The liquidity variable put forward to test this hypothesis may be defined as the ratio between Current liabilities and current asset (Alkhatib, 2012). Therefore, in this study liquidity is measured **by**:

$$\text{Liquidity} = \frac{\text{Current assets}}{\text{Current Liabilities}}$$

## **VI. Age**

The reputation of companies can be measured by the age of the companies. When a company exists longer in business (which is represented by a variable age), it usually creates a reputation, especially in the minds of creditors, by fulfilling its payment obligations. This reputation is well known in the market and makes it easier to get debt financing. This means that age of the firm is a standard measure of reputation in capital structure models. As a firm continues longer in business, it establishes itself as an ongoing business and therefore increases its capacity to take on more debt; hence age is positively related to debt (Abor, 2008).

As firms became aged, the long years of track record will enable them to easily convince creditors. In addition experience enables the firm expertise in finding alternative credit source cost effectively or in favorable terms when going for debt capital. This induces a positive relationship between leverage ratios and age of the firm. The number of years of stay in business was used as indicators. The number of years a construction company has been in business is used to calculate its age (Ellili& Farouk, 2011). Therefore, in this study, age is measured **by: Age =** Number of years stayed in business.

## **VII. Economic Growth**

It is the monetary value of all finished goods and services made within a country during a specific period of time. Studies indicate that financial distress is strongly related to the growth of countries GDP. This is measured by the real GDP growth rate. Real GDP growth is one of the explanatory variables commonly used as determinants of economic growth. Gross Domestic product (GDP) refers to the total market value of all final goods and services produced within a country in a given period of time, usually a calendar year. It is also considered as an estimate of the total money value of all final goods and services produced in a given year by factors of production owned by a particular country's residents.

**Table 3-2: variable description, source, measurement and their expected sign**

Variables	Description	Measurements	Justification	Expected Sign	
				DSC	FD
<b>DSC</b>	Debt service Coverage ratio	–	(Yohannes, 2014; Andualem, 2011;Pruitt&Gitman, 1991)	<b>NA</b>	<b>NA</b>
<b>LEV</b>	Leverage	Total debt to Total asset	(Kristanti, Rahayu, & Huda, 2016;	-	+
<b>LQ</b>	Liquidity	Current asset to Current liability	(Elloumi&Gueyie , 2001; Turetsky & McEwen, 2001; Abdullah,	+	-
<b>PR</b>	Profitability	Net income to Total asset	(Thim, Choong, & Nee, 2011; Baimwera & Muriuki, 2014; Ikpesu	+	-
AG	Age	Number of years	(Ellili & Farouk, 2011)		
<b>R.GDP</b>	Gross Domestic Product	Real Gross Domestic Product	(Kashif and Mohammed, 2008)	+	-
<b>EA</b>	Earning ability	<i>(EBIT)/Total Assets</i>		+	

**Source:** researcher’s summary

- (+) when the independent variable increases (decreases), the dependent variable will also increase (decrease) respectively.
- (-) When the independent variable increases (decreases), the dependent variable will decrease (increase) respectively.

As it can be seen from table above, it is expect that only two factors would have negative impact on firms DSC ratios while the rest five variables are expect to have positive impact on firms DSC.

### **3.7. Method of Data Analysis**

Data analysis is a systematic process which applies statistical techniques to evaluate data through in spacing, transforming and modeling data to draw useful information or decision making. Description data producing processes such as checking, editing, coding, and transcribing as well as specifying any special or unusual treatments of data would be conducted before they are analyzed. After the data would be collected and cleared, the panel data would be analyzed to achieve the objective of the study. The panel regression results would be present in a tabular form evaluating using individual statistical significance test (T-test) and overall statistical significance test (F-test). The goodness of fit of the model would be tested using the coefficient of determination (R-squared). The researcher would also perform diagnostic tests to ensure whether the assumptions of the classical linear regression models (CLRM)/ OLS are violated or not. In conducting all the data analysis, and regression model estimation the study would be used eviews/stata. In last, the Data is would be presented in a way that users or readers can easily understand and interpret.

Therefore, typically involves application of statistical measures and logical methods to evaluate and establish a relationship between data (Tully, 2014). Data collected would be analyze through the use of Microsoft Excel (MS Excel) and Statistical Software for Social Scientists (eviews/stata. Eviews/stata and MS Excel are preferred as they produced output that found adequate statistical inference and generally easy to use. The output of the data analysis would be reported in various tables highlighting the relevant statistics.

Therefore, after the necessary data was collecting the next footstep was that analyzing the data in accordance with the stated objective of the study. In order to analysis the specified data the researcher using statistical software package for social sciences (STATA) software, after this the collected data was regressed by panel data ordinary least square (OLS) regression method and the data was interpretable using statistical description including standard deviation, mean ,minimum and maximum by using descriptive statistics.

It is used to check whether there was or not substantial variation between dependent & independent variables. To observe the direction and the magnitude of the relationship among variables the researcher also used correlation coefficient analysis. But it does not give the assurance for independent and dependent variables. And also inferential statistics was also included in the study to check the proposed hypotheses and made the general conclusion.

### **3.8. Model Specification**

To estimate the determinant effect of the explanatory variables on financial distress in Construction Company and this study would use OLS TECHNIQUES .Most of the existing empirical studies on determinants of financial distress use linear regression techniques with proxies for the determinant factors used to explain the variation in determinants of financial distress in construction companies. The following ordinary least square (OLS) regression model is specified and used to test the relationship between the financial distress and its determinate factors in the selected construction companies in Amhara Region.

Finally, by applying the OLSL technique it is possible to obtain unbiased and efficient estimators of the model (Harris & sollis, 2003).To capture the relationship independent & dependent variable, macroeconomic variables on financial distress which is measure DSC the researcher specifies the following functional relationship: financial distress = DSC ( age of firm, leverage, Profitability, Liquidity, Earning, macro-economic factors).Specification of the Model on the bases of theoretical and empirical literatures in the previous chapter, the study comes up with the following model. Therefore, in regarded the hypotheses stated above, the main issue is identifying the relationship that exists between the financial distress of in Construction Company in Amhara region and each of explanatory variables that has be identify through literature and theories i.e. leverage, liquidity, profitability, Earning, age, macro-economic factors. Other factors that are not explicitly included in the model will be captured by the error term in the model.

The natures of data that would be used in this study enable to use panel data model which is reflected in the period of study (2013-2019). The advantage of panel data in the stated question is due to it contains more information; it incorporates variability among units (Gujarati, 2004). According to Brooks (2008), a panel of data is embodying information in detail and it measures some quantity about the data. The advantage of using panel data is to address a broader range of issues and tackle more complex problems than will be possible with data of panel alone. Panel data has also advantage of giving more informative data as it consists of both the cross-sectional information which captures individual variability and the time series information that captures dynamic adjustments (Brooks, 2008). In light of the above, in order to investigate the determinants of firm specific and macro-economic factors of financial distress construction company debt service coverage ratio, the general multivariate regression model will be adopted.



Therefore, developing of a model involves specifying of relationship between two or more variables developing descriptive or predictive equations (Tegegn, Sera et al. 2020) for the attainment of the researcher's objective panel data linear regression model is used to identify the relationship between determinants of financial distress of construction company and explanatory variables. Panel data are longitudinal data which involves both time and space data (Kebede 2016). According to (Reshid2015) panel data is favored over pure time series or cross sectional data. It can control for individual heterogeneity and there is less degree of multi linearity between variable.

The researcher also determines whether the random effect or fixed effect approach is appropriate by running hausman model specification test. Generally, this model is specified as:

$DSC_{it} = \alpha + \sum \beta_i X_{it} + \varepsilon_{it}$  The left hand variable  $Y_{it}$  is the dependent variable,  $\beta_0$  is intercept term,  $\beta$  is coefficient which represents the slope of the explanatory variables and  $X_{it}$  is a vector of the explanatory variables for firms  $i$  in time  $t$ ,  $t = 1, \dots, T$ ;  $i = 1, \dots, N$  and  $\varepsilon_{it}$  is the error term. Therefore, the general model which incorporates all of the variables to test hypotheses of the study, And the General Form of the Equation is:

$$DSC_{it} = \beta_0 + \beta_1 LEV_{it} + \beta_2 LIQ_{it} + \beta_3 PRO_{it} + \beta_4 GDP_{it} + \beta_5 EAR_{it} + \beta_6 AGE_{it} + \varepsilon$$

**Where:**

DSC = Debt coverage ratio,  $\beta_0$  = coefficient of intercept (Constant term),  $\beta_1$  = coefficient of Leverage ratio,  $\beta_2$  = coefficient of liquidity ratio  $\beta_3$  = coefficient of profitability ratio,  $\beta_6$  = coefficient of macroeconomic factors,  $\beta_7$  coefficient earning ability,  $i = 1 \dots 12$  (construction company)  $t = 1 \dots 7$  years (2013-2019 years)  $\varepsilon$  = the error term Therefore, the estimated regression coefficient measures how much units of debt service coverage (DSC) ratio change with a unit change in the independent variables will be included in the model.

Generally the function of financial distress = DSC (age of firm, Profitability, Liquidity, leverage, Earning ability and GDP).

## CHAPTER FOUR

### 4. DATA PRESENTATION AND ANALYSIS

This chapter deals with the results of the study, which include descriptive statistics of variables, correlation results for dependent and explanatory variables, model specification tests (tests for the Classical linear Regression Model assumptions), and finally, presentation of panel data regression analysis and discussion of results. In addition, the researcher performs the Hausmann test to determine whether the model is a fixed or random effect, as well as the unit root test for data stationary and the classical linear regression model (CLRM) assumptions test, to increase the study's reliability.

Thus chapter deals about analysis of the given panel data and interpreted in to meaning full information by observing cross section and time period variables. These study covered from the time period 2013 up to 2019 and a across 12 construction companies that are found in Amhara region. In this chapter includes model specification and tests for the classical linear regression model assumption, descriptive statistics and correlation analysis. The results of the discussion are also presented and summary of the main finding are concluded.

#### 4.1. Testing of Data

The most critical assumptions related to CLRM of panel data are tested in the following sub-sections. Normality, multicollinearity, heterosekacity, autocorrelation, and other properties have been added to make the data available, provide reliable results, and allow the model to fit the data. These assumptions were required to be tested because the estimation technique, multivariate ordinary least squares (OLS), has a number of desirable properties. Hence, the hypothesis testing regarding the coefficient estimates could validly be conducted. In addition to this, the other crucial one, stationary test is conducted.

#### 4.2. Descriptive Statistics of variables

The study conducted descriptive statistics in order to give the readers more understanding of the study variables that were being analyzed. Descriptive studies produced the mean, minimum, maximum and standard deviation for each variable. So, in this section, the study presents the results based on the descriptive statistics for dependent variables, DSC, and the independent variables. So, the distribution of the data set for dependent and independent variables used in the study is explained by descriptive statistics. The central idea of descriptive statistics for a given study is the measurement of location and variability. The central value of the variables denoted

by location is measured by the mean, whereas the spread of the data from the mean, denoted by variability, is measured by the standard deviation.

In summary, descriptive statistics present the mean, maximum, and minimum values of variables used in this study, along with their standard deviations, and they are used to describe the basic features of the data in the study. Descriptive statistics summarize the information in a data set by revealing the average indicators of the variables used in the study and presenting that information in a convenient way. Each of the variables is examined based on the mean, standard deviation, minimum and maximum values. Summary descriptive statistics are proposed in Table 4.1 to provide general descriptions of the dependent and independent variables. The total number of observations for each variable is 84[i.e., data for 12 construction companies for seven years (2013-2019)]. Accordingly, the mean, standard deviation, maximum and the minimum values of each variable were discussed here to show the nature of the data used for detailed analysis here below in **table**:

**Table 4-1: Descriptive statistics**

summarize DSC	PR	LEV	LQ AG	RGDP EA		
Variable		Obs	Mean	Std. Dev.	Min	Max
DSC		84	.9831262	.5292487	.04	2.5342
PR		84	.7034199	.1220665	.1178	.99525
LEV		84	2.654155	5.451389	.1	21.3
LQ		84	1.767694	.7348717	.4078	3.9278
AG		84	20.58333	5.346338	12	36
RGDP		84	.4552894	.6407341	.0300647	0.1145
EA		84	.3170857	.0263703	.2652	.3537

**Sources:** STATAS output (2013-2019)

The table-3 above shows, dependent variable, debt coverage (DSC) which is measured by  $(EAT + (DEPR + AMORT) + (INTEREST) - Tax) / (\text{principal} + \text{Interest and coupon for eighty four observations})$  shows a mean value of 0.9831262 in the period (2013-2019). Relative to Ruster (1996), a debt service coverage ratio of 0.983 indicates that the construction companies are generating sufficient operating income on average to cover their annual debt and interest payments with a maximum value of 21.30 and a minimum value of 0.04.

Even if the average value of DSC ratio on construction companies is worthy, the minimum value gives some insight that construction companies cannot free from financial distress during the study period as the researcher stated in the evaluation that Debt Service Coverage below 1.2 is a

proxy of financial Distress (Ruster, 1996). Generally, the analysis indicated that DSC of Amhara construction companies has exhibited an increasing trend within the study period from 2013 to 2019.

This indicates that the mean of Debt services coverage that is 0.983 in the study period (2013-2019) reveals that the construction company has cover their current mandate by 0.983, with maximum value of 21.30 and a minimum value of 0.04 revealing there is financial distress in construction companies as the researcher indicated in the study, used debt services coverage (DSC)  $\leq 1.2$  is a proxy of financial distress ( Jeff Rustes,1996),standard deviation is 0.5292487, which implies large difference in debt services coverage in construction sector.

As shown in table above, the explanatory variable of profitability shows the average profitability of Construction Company in Amhara Region under the study is 0.7034 which means a construction company in Amhara Region obtains 0.7034 cents from birr one investment. The maximum and minimum value of profitability (return on asset) under the study period was 0.995 and 0.1178 respectively. The standard deviation of profitability for construction companies in Amhara Region under the study is 0.122 which indicates the existence of variation in profitability among sampled construction companies in Amhara Region.

The researcher confer that there is moderate variation among the values of profitability across listed construction companies in Amhara Region over the period under investigation. And the ratio reveals that how much of the resources of the firm which were invested in the company and profitability varied across the firm mean standard deviation of 0.122 for the sample companies.

The mean value of leverage (TL to TA) was 2.654155 with the standard deviation of 5.451389. Debt ratio was high in this study. Theoretically, firms in developed countries are highly levered compared to firms in emerging markets, but here the result was reverse. The reason for this high leverage might be the lack of well-developed stock markets or the market inefficiency in the developing countries; companies may not raise equity funds by issuing stocks in the market, and the nature of construction sector is also the prominent reason.

Minimum and maximum descriptive help the study in checking or outliers and is efficient when applied to level data and the leverage of sampled firm also varied across firms with standard deviation of 5.451389.The mean value of liquidity as measured by the ratio of current asset to current liability was 1.7676, which indicates that for one birr current liability there is an available of 1.7676 birr of current asset. In other word the variable liquidity measures the ratio of current

asset to current liability. This means that for a one birr current liability there is an available 1.7676 cents on average on current assets, a maximum liquidity position of 3.9278 and minimum of 0.4048 with a significant variation of 0.7348 across the selected construction companies based on the standard deviation.

**Age:** construction sector refers to that construction company has been in operation since its initial inception, previously in hypothesis revealed that Age of construction sector has a positive significant relationship DSC which means increase the financial distress of construction sector in Amhara Regional state. The mean value of the variable of age of construction companies in Amhara Region under the study is 20.5119 years which has a standard deviation of 5.34. The minimum and maximum value of the variable age of construction companies in Amhara Region under the study is 12 and 36 years respectively. This indicates that, the largest observed operating experience of the sampled construction companies in Amhara Region is 36 years while the smallest is 12 years of in servicing experience.

The description shows this study accepts the hypothesis of Age of the construction company has a significant positive relationship with DSC as a proxy of financial distress construction sector. The coefficient is 20.5119 which mean increase financial health of the construction company, since high DSC means low financial distress. A positive relationship between Age financial health of the construction company Amhara Regional state implies that as a nature, and thus obtains considerable experience in the construction industry have diligently or carefully applied credit risk management so implement efficient monitoring tactics to attain an advanced goal in construction industry. GDP is the most commonly used macroeconomic indicators, as it is a measure of total economic activity with in an economy and the study used real GDP as a proxy of macroeconomic environment. As far as the macroeconomic factors are concerned, the Ethiopian economy continued to grow and the overall economic performance reflected rapid expansion of the country.

Among the expected macroeconomic factors that could affect companies' financial distress, GDP was growing by 0.4552894 on average for the last seven years with the standard deviation of 0.6407341. During the sample period, the maximum growth rate of the economy was recorded as 0.1145 and the minimum was recorded as 0.0300647), which implies good variation in the value of GDP rate across the study years.

In other word to be clear the above description the coefficient value of GDP was 0.8528 with P-value of 0.000, this revealed that a growth rate of GDP had a positive relationship and statistically significant impact on DSC in Amhara Regional state. Therefore, this study found that real GDP growth is positively affect the construction sector financial health in Amhara Regional state. So, the study accepts the hypothesis namely real GDP has positive impact on DSC as a proxy of financial distress of Amhara Region construction sector. This result is consistent with the result which is identified by Shaut and Mill (2011).

### **4.3. Correlation Analysis**

According to Brooks (2008), correlation between two variables measures the degree of linear association between them, the purpose of undertaking correlation analysis is to check whether the variables move together or not in the same direction and the correlation coefficient indicates the strength of a linear relationship between two variables to find the association of the independent variables with the dependent variable A correlation coefficient of one indicates a perfect positive relationship between two variables, while a correlation coefficient of one indicates a perfect negative relationship between two variables.

A correlation coefficient of zero, on the other hand, indicates there is no linear relationship between the two variables. So, prior to regression result, it is important to check the correlation between different variables on which the analysis is built. Correlation is the way to index the degree to which two or more variables are associated with or related to each other. On the other hand it measures both the e strength and direction of the linear relationship between two variables, (Bryman and Bell, 2003, pp362).

The Pearson correlation coefficient is a numerical index or number between -1 and +1 that measures both the strength and direction of the linear relationship between two variables. A correlation coefficient of zero represents no linear relationship which means the correlation coefficient of -1 or +1 means that the relationship is perfectly linear i.e. all of the dots fall exactly on a straight line.

The sign (+/-) of the correlation coefficient indicates the direction of the correlation. A positive (+) correlation coefficient means that as values on one variable increase, values on the other variable tend to increase; a negative (-) correlation coefficient means that as values on variables increase, values on the other tend to decrease, that is, they tend to go in opposite directions (Salkind,2010, p114-115).

This means if the correlation coefficient is 0, the movement of variables is said to have no correlation.

**Table 4-2: Correlation matrix with dependent variable**

correlate	prlevlq	agrgdp	ea				
dsc							
(obs=84)							
	dsc	pr	lev	lq	ag	rgdp	ea
dsc	1.0000						
pr	0.2457	1.0000					
lev	-0.4930	-0.1711	1.0000				
lq	0.1968	-0.1148	-0.0513	1.0000			
ag	0.1043	-0.1392	0.7515	0.0825	1.0000		
rgdp	0.5046	-0.0206	0.2640	0.0867	0.4751	1.0000	
ea	0.3086	0.1821	-0.0276	-0.1292	0.0208	0.1362	1.0000

**Source:** Stata output and Researchers endeavor

Correlation is a statistical measure that indicates the extent to which two or more variables fluctuate together. A positive correlation indicates the extent to which those variables increase or decrease in parallel; a negative correlation indicates the extent to which one variable increases as the other decreases. So, from the year 2013-2019 in the above table-4.2 shows the DSC (dependent variable) is correlated at 0.2457 with profitability, at -0.4930 with leverage, at 0.1968 with liquidity, at 0.1043 with Age, at 0.5046 with real GDP, at 0.3086 with earning.

Therefore, as revealed on the above table 4.2, all firm specific and macro- economic variable except leverage had positive relationships with DSC, as a measure of financial distress. The negative sign of leverage ratio indicates that a company which has a lot of loan tends to get financial –distress easier due to liabilities of the loan repayment: principal, interest or coupon of bank loan. This finding is consistent with (Eloumi & Gueyie, 2001). Based on the STATA output, other variables are positively correlated with DSC. The positive correlation figure shows that when the mentioned independent variables coefficients increase DSC also increases and vice versa. In addition to the correlation result the above table shows the multi collinearity between explanatory variables.

Even though there is a problem to test multicollinearity assumption due to lack of clear cut-off point to determine the existence of near multicollinearity, Cameron & Trivedi (2005) argued that correlation coefficient below 0.8 may not cause serious multicollinearity problem, while

(Malhotra,2007) stated that multicollinearity problem exists when the correlation coefficient among variables is greater than 0.75.However, the results in the above correlation matrix show that the highest correlation of 0.7515 between age and leverage and real GDP and age is 0.4751. Thus, there was no such series pair-wise correlation that exceeds 0.75 which suggests there is no serious problem of multicollinearity or the problem of multi collinearity did not exist among the explanatory variables in the study model.

#### 4.4. Stationary Test:

The Augmented Dickey Fuller (ADF) test is employed to test the stationary of the variables in the model. The reason for knowing whether a variable has a unit root (that is, whether the variable is no stationary) is to avoid the problem of spurious regression case where the results of regression suggest that there are statistically significant long run relationship among the variables in the regression model. As a rule of thumb, non-stationary data are unpredictable and cannot be modeled or predicted. Using non-stationary panel data results in an output that is spurious in a sense that there is a sign for the existence of a relationship between two variables where one does not exist. So, to avoid working with non-stationary data, which yields spurious results, unit root tests using Levin-Lin Chu test was undertaken. If the variables in the regression model are not stationary, then the standard assumptions for asymptotic analysis will not be valid. The hypotheses of the tests are also stated as a **Table-4.3 below:**

**Table 4-3: Stationary Test**

Varaiables	Levin-Lin-Chu Test		Integration of order
	Statistic-t	P-value	
<b>DSC</b>	-3.0463	0.0012**	I (o)
<b>Leverage</b>	-4.5653	0.0000***	I (o)
<b>Liquidity</b>	-3.4400	0.0003**	I (o)
<b>Profitability</b>	-4.9914	0.0000***	I (o)
<b>Earning</b>	-4.4170	0.0000**	I (o)
<b>Age firm</b>	-3.89658	0.00312***	I (o)
<b>Real GDP</b>	-7.1443	0.0027***	I (o)

Note:\*\*\*and\*\*denote significance at 1% and 5% significance levels respectively, I (o) indicates stationary at level. The stationary properties of the variables were first examined as a preliminary test prior to investigating the determinants of financial distress in Amhara construction sector. As



indicated in table-4.3 ,the results of Levin-Lin-Chu unit root test reveals that all variables became stationary at level i.e. (I<sub>0</sub>);hence, the null hypothesis of the existence of unit root test is rejected since all of the variables p-value is less than 5%.Stationary variables including the dependent variable, DSC specify that their extents are not affected by time.

#### 4.5. Test for Model Selection/estimation: Fixed Effect versus Random Effect Models

**The Hausman Test:** In a panel data there is the challenge of choosing which estimators to apply. Is it the fixed effects estimator or the random effects estimator? In the panel model, effort is exerted on testing whether the individual effects in the model ( $\alpha_i$ ) correlate with the x variables (X<sub>it</sub>) or are independent of the explanatory variables.

The null hypothesis of the Hausman Test is random effects are independent of explanatory variables while the alternative simply says the null is not true. Hence, if ( $\alpha_i$ ) correlates with the x variables (X<sub>it</sub>), we cannot use the random effects estimator rather we have to use the fixed effect estimator.

Therefore, there are two classes of panel estimator approaches that can be employed in financial research: fixed effect (FEM) and random effect models (REM). Even if these two approaches end up with nearly the same result, there are situations that they will deviate widely. The decision on which model to adopt rely on the Hausman test results.

#### HausmanTest (Random effect):

Figure 4-1: Hausman Test

```

                b = consistent under Ho and Ha; obtained from xtreg
                B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                =          5.72
    Prob>chi2 =          0.5734
                (V_b-V_B is not positive definite)

```

**Source:** Stata Output & Researcher endeavor.

The result had provided evidence in favor of the random effect model as presented in figure 4-2and appendix of p-value for tests is 57.34 % which is greater than 5% for the model and supports recommendation that the random effects method is an efficient estimator for the study mode. The Hausman test was not biased towards the Random Effects model because the Random

Effects coefficients and Random effects coefficients have large differences. Hence the study adopted the Random Effects Model.

#### **4.6. Testing Assumptions of Classical Linear Regression Model**

As discussed in the methodology (chapter 3), multiple regression analysis is the most powerful tool that is widely used, but also is one of the most abused statistical techniques ( Mendenhall & Terry , 2003). Hence, before using the ordinary least square (OLS) estimator to test the significance of the slopes and analyzing the results, tests should be made on the assumptions of classical linear regression model (CLRM) so that we can be certain on the goodness of the data and accuracy of the model.

##### **4.6.1. Test for average value of the error term is zero ( $E(U_t) = 0$ )**

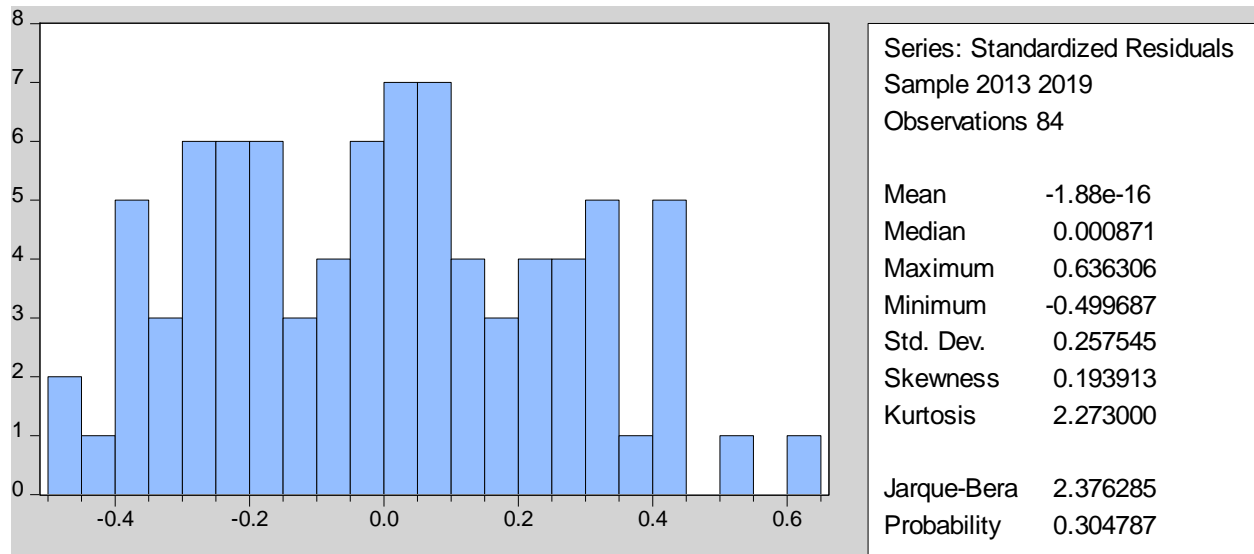
The first assumption required to be tested in CLRM is that the average value of the errors is zero. According to Brooks (2008), in fact, if a constant term is included in the regression, this assumption will never be violated. Therefore, this assumption was not a problem for the model since it includes a constant term in the regression which forces the residuals to equal zero.

##### **4.6.2. Test of Normality (Bera- Jaque) Assumption Test**

The Jarque-Bera normality test was used to determine whether the regression errors are normally distributed. It is a joint asymptotic test whose statistic is calculated from the skewness and kurtosis of the residuals. This test is performed to confirm the assumption of CLRM which states that the disturbance terms are normally distributed. One of the most commonly applied tests for normality is the Jarque–Bera(BJ) test.

According to Brooks & Chris(2008), if the residuals are normally distributed, the histogram should be bell-shaped and the Jarque-Bera statistic would not be significant. This means that the p-value given at the bottom of the normality test screen should be greater than 0.05 to support the null hypothesis of presence of normal distribution at the 5% level or the null hypothesis of normality should not be rejected at 5% level.

**Figure 4-3: Normality test**



**Sources:** Eviews output & researcher Endeavor.

As it can be seen in the above graph and the Figure 4-4 on the right side of the graph, the P-value of Jarque-Bera (JB) test is 0.304787 which is higher than 5% hence the null hypothesis that the data is normally distributed is could not be rejected. Therefore p-value of 0.304787 (greater than 0.05) which the researcher insignificant for the model helps the researcher to reject the null hypothesis, which says the residual value is normally distributed. Therefore, there is no normality problem on the data used for this study.

#### **4.6.3. Test of Multicollinearity Assumption**

The term Multicollinearity indicates that the existence of exact linear association among some or all explanatory variables in the regression model. When independent variables are multicollinear, there is overlapping or sharing of predictive power. If there is a perfect multicollinearity it is difficult to get the correct coefficient of the independent variables and their standard errors are immeasurable (Gujarati, 2004). A correlation matrix used to ensure the correlation between explanatory variables. (Cooper & Schindler, 2009) suggested that a correlation coefficient above 0.8 between explanatory variables should be corrected for because it is a sign for Multicollinearity problem. And also (Hair, et al., 2006) argued that correlation coefficient below 0.9 may not cause serious Multicollinearity problem.

On the other hand, the presence of near Multicollinearity would be thus make confidence intervals for the parameters very wide, and significance tests might give inappropriate conclusions, and so make it difficult to draw sharp inferences. Therefore, Explanatory variables

that are strongly related cannot be included in the same regression equation. The problem of Multicollinearity can further be verified using the Mean Variance Inflation factor, where the inclusion of all explanatory variables is confirmed.

**Table 4-4: Multicollinearity test: Variance inflation factor**

Variable	VIF	1/VIF
EA	1.73	0.576602
Age	1.65	0.607755
Lev	1.47	0.681826
Rgdp	1.20	0.831252
Lq	1.15	0.868230
Pr	1.10	0.910696
<b>Mean VIF</b>	<b>1.43</b>	

Source: Stata output & researcher endeavour.

The study found a mean variance inflation factor of 1.43 and the statistic is less than the rule of thumb 4 (Cameron, & Trivedi, 2005 indicating that there is no strong multicollinearity. The study would be proceeding of running its regressions & assured of efficient unbiased estimators.

#### **4.6.4. Tests for Heteroskedasticity assumption ( $\text{var}(\text{Ut}) = \sigma^2 < \infty$ )**

The classical linear regression model assumes that the variance of errors is constant across all levels of the independent variables. This means that researchers assume that errors are spread out consistently between the variables. This is evident when the variance around the regression line is the same for all values of the explanatory variable. When heteroskedasticity is present it can lead to distortion of the findings and weaken the overall analysis and statistical power of the analysis, which result in an increased possibility of Type I error, unreliable and untrustworthy F-test results, so that results will end with erroneous conclusions (Osborne & Waters, 2002).

Therefore, the incorrect estimates of the variance lead to the statistical and inferential problems that may hinder theory development (Gujarati, 2004). The assumption of homoscedasticity says that the variance of the error term is constant,  $\sigma^2$  this is known as the assumption of homoscedasticity. If the residuals of the regression have systematically changing variability over the sample, that is a sign of heteroskedasticity. (Brooks, 2008) if the errors do not have constant variance they are said to be heteroskedasticity. In this study which is indicated below; the test result presented on table both F – statistics and Chi square showed that there is no evidence that there is heteroskedasticity because the result in the P-value is more than 0.05; I can say that there

is no evidence for the presence of heteroskedasticity. Thus, the conclusion of the test has shown that no evidence of heteroskedasticity and the null hypothesis is accepted.

H0: The variance of the error term is homoskedasticity

H1: The variance of the error term is heteroskedasticity

**Table 4-5: Heteroskedasticity White Test**

F-statistic	1.591247	Prob. F(27,56)	0.0715
Obs*R-squared	36.46740	Prob. Chi-Square(27)	0.1054
Scaled explained SS	20.64207	Prob. Chi-Square(27)	0.8028

**Sources:** Eviews& Researcher endeavor.

Heteroskedasticity is a systematic pattern in the errors where the variances of the errors are not constant (Ndung & Thuo, 2016). Heteroskedasticity results in making estimators of ordinary least square not efficient because the estimated variances and covariance of the coefficients ( $\beta_i$ ) are biased and inconsistent and hence, the results of hypothesis testing are no longer valid. In this study, the non-graphical methods of White's Test of testing Heteroskedasticity are used and the results obtained are presented in the Tables above. The above Table 4-6 indicates that, the P-value is 0.8028 which is greater than 0.05. Hence, it can't reject the null hypothesis of homoscedasticity in this research.

#### **4.6.5. Tests of Serial –Correlation Assumption**

The CLRM assumption requires absence of autocorrelation or the covariance between the error terms is zero. In other words, it is assumed that the errors are uncorrelated with one another. If the errors are correlated with one another, it would be stated that they are “autocorrelated” or that they are “serially correlated”. The first step in testing whether the error series from an estimated model are auto correlated would be to plot the residuals and looking for any patterns. However, graphical methods are difficult to interpret in practice and hence a formal statistical test should also be applied. The researcher has used Durbin-Watson autocorrelation test and Breusch-Godfrey serial correlation LM test. Both methods confirm that there is no problem of autocorrelation.

##### **A. First order Durbin-Watson Serial correlation Test**

The other assumption of regression model assumes that there is no pattern in the errors or disturbance terms i.e. the covariance between the error terms over time or cross-section ally is

zero (Brook, 2008, p 139). This is called autocorrelation. One way that autocorrelation is detected is using Durbin Watson (DW) test, the first order autocorrelation test, that is the relationship between error term and its immediate previous value. Accordingly to say that there is no autocorrelation, the DW test statistic should be closer to 2.

Testing for serial correlation helps to identify any relationships that may exist between the current values of the regression residuals and any of its lagged values. According to Brooks (2008), when the error term for any observation is related to the error term of other observation, it indicates that a serial correlation problem exists in the model. Serial correlation error occurs when there is a serial correlation between residuals and their own past values.

In this regard the test of serial correlation problem was made by using Durbin-Watson (1951). Durbin-Watson (DW) test is a test for first order autocorrelation i.e. it tests only for a relationship between an error and its immediately previous value. A Durbin Watson statistic around two is generally accepted though there are zones of indifference and zones of both positive and negative correlation. The null hypothesis for the DW test is no autocorrelation between the error term and its previous lag. According to Brooks (2008), DW has two critical values; an upper critical value (dU) and a lower critical value (dL) and there is also an intermediate region where the null hypothesis of no autocorrelation can neither be rejected nor not rejected.

**Table 4-7: A Durbin test**

Variable		DW test statistics result
Debt service coverage as a proxy for Financial distress	Durbin-Watson stat	1.948947

**Sources:** Eviews output & researcher endeavor.

a. Predictors: (Constant), EA, LEV, LQ, PR, RGDP, AG

b. Dependent Variable: DSC

Testing to see if autocorrelation problem exists is occurred using the Durbin Watson (DW) d test (Gujarati). Therefore, the null hypothesis is: Therefore, as per the result indicated in the above table 10, the value of DW statistics is 1.948947 which is in the non-rejection region. Therefore, there is no autocorrelation problem.

**Else test for the presence of autocorrelation is by using Breusch-Godfrey Serial Correlation LM Test:**

**B. Breusch-Godfrey Serial Correlation LM Test**

Breusch-Godfrey Serial Correlation LM Test is another test for autocorrelation in residuals. This test is used because DW test is not reliable when lagged values are used in the model. The Breusch-Godfrey test is much more general in that it allows for both AR and MA error structures as well as the presence of lagged regress and as an explanatory variable (Guajarati, 2004).

**Table -7: Breusch-Godfrey Serial Correlation LM Test:**

F-statistic	23.47872	Prob. F(1,76)	0.4050
Obs*R-squared	2.675736	Prob. Chi-Square(2)	0.26240

The above table 11 shows that Breusch-Godfrey Serial Correlation LM Test gives an F-statistic of 23.47872 with a probability of 0.4050 and chi-square version gives 19.82547 with probability of 0.26240 as result, we fail to reject null hypothesis of no auto correlation in the residuals even at 10% significance level. This means both versions of test; an F-version and a  $\chi^2$  version of the test indicate that no autocorrelation. The conclusion from both versions of the test in this case is that the null hypothesis of no autocorrelation is not rejected.

**4.6 Tests for Model Specification: Ramsey RESET Tests**

Further implicit assumption of the classical linear regression model is that the appropriate functional form is linear. Model specification error occurs when omitting a relevant independent variable, including unnecessary variable or choosing the wrong functional form. When the omitted variable is correlated with the variable which included, the estimators would be biased and inconsistent and model specification error would tend to occur.

If the omitted variable is not correlated with the included variable, the estimators are unbiased and consistent and model specification error would not occur. Therefore, in order to select a correct estimated model, the researcher had conducted the Ramsey-RESET Test to check on the model specification. Therefore, model stability is confirmed when Ramsey RESET Test F-statistics and Log likelihood ratios are greater than 5 %.The researcher would test the model stability with the help of Ramsey RESET Test as stable. The test for stability checks the P-value and Prob. Chi-Square both greater than 5% (Fujaw, 2018).

**Table 4-8: Model Specification test**

```
. ovtest  
  
Ramsey RESET test using powers of the fitted values of dsc  
Ho: model has no omitted variables  
F(3, 73) = 1.81  
Prob > F = 0.1521
```

Regarding the result, as it can be seen from the above test, there is limited evidence for non-linearity in the regression equation since 0.1521 is greater than 0.05, we do not reject the null hypothesis in favor of the alternative hypothesis, thus it would be concluded that the model specification is linear and thus, do not reject null hypothesis  $H_0$  which states the model specification is correct.

## **4.7. Results of Regression Analysis and Interpretation**

### **4.7.1. Results of Regression Analysis**

Regression result output is presented in the next coming paragraphs. The study model used to test the determinants of financial distress, as indicated in chapter three, is as **follows**:

Therefore, it is worth to investigate the extent to which the obtained results are sensitive to the changes in the estimation method. The value of the variables data are computed for seven consecutive years (2013-2019), using audited financial statements of the selected construction companies in Amhara Region which was gathered from the Ethiopian Revenues and Customs Authority (ERCA) and at Amhara Regional governmental investment bureau.

Therefore, the panel data computed by ordinary least square (OLS) regression is carried out or so as to in to provide a comprehensive analysis about the determinants of capital structure of construction companies in Amhara Region. Therefore, the linear regression model of this study is: So, the relationship between the dependent variable and explanatory/determinant variables is briefly described and interpreted in light of theoretical underpinnings and contextual realities of Amhara Region. After satisfying all of Ordinary Least Square basic assumptions and conducting unit root test, regression analysis is conducted.

The regression results examine the determinants of financial distress for the Amhara construction companies in Ethiopia. To identify the appropriate methodology, the study performed the Hausman's test. It is used to test whether the fixed-effect model or the random effect model is the best model and, accordingly, the test results show that the random effect model is more appropriate. The operational panel regression model used to find the statistically significant



determinants of financial distress on Amhara construction companies in order to know the effect of those independent variables on construction sector presents the regression result was on table **below**;

$$DSC_{it} = \beta_0 + \beta_1 LEV_{it} + \beta_2 LQ_{it} + \beta_3 PR_{it} + \beta_4 r - GDP_{it} + \beta_5 EA_{it} + \beta_6 AG_{it} + \varepsilon$$

Accordingly, table below presents the result of random effect regression model that examines the impact of explanatory variables on DSC as a proxy of financial distress. Hence, DSC is explained variable whereas leverage, liquidity, profitability, earning, age, economic growth are explanatory variables. The dependent variable is determinants of financial distress which is measured in terms of DSC proxy and the explanatory variables are earning (EA), profitability (PR), liquidity (LQ), age (AG), and GDP measured with the most known proxies used in many related studies.

The beta values ( $\beta_i$ ) explain how much the variation in the dependent variable is explained by the estimated linear regression model. Therefore, results of the regression analysis are discussed in relation to each of the independent variables with the dependent variables under the estimated regression analysis through STATA 14 software has been shown **below**:

**Table 4-9: Results of Regression Analysis**

Source	SS	Df	MS	Number of obs.	=	84
				F(6, 77)	=	41.36
Model	17.7429971	6	2.95716619	Prob > F	=	0.0000
Residual	5.50564961	77	.071501943	R-squared	=	0.7632
				Adj R-squared	=	0.7447
Total	23.2486468	83	0.280104178	Root MSE	=	.2674
DSC	<b>Coef.</b>	<b>Std.err.</b>	<b>t</b>	<b>P&gt; t </b>	<b>[95% Interval]</b>	
LEV	-.073227	.0084506	-8.67	0.000***	-.0900543	-.0563998
LQ	.095962	.041384	2.32	0.023 **	.0135558	.1783681
PR	.5831527	.249521	2.34	0.022 **	.0862929	1.080013
EA	3.973875	1.154264	3.44	0.001***	1.675442	6.272308
AG	.0190162	.0093562	2.03	0.046 **	.0003857	.0376467
RGDP	.4763731	.0532971	8.94	0.000 ***	.370245	.5825012
<b>_cons</b>	-1.270714	.4249707	-2.99	0.004	-2.116939	-.4244895

<b>F-statistic</b>	<b>31.96467</b>	<b>Durbin-Watson stat</b>	1.948947
<b>Prob(F-statistic)</b>	<b>0.000000</b>		

Source: STATA output results 2021 and researcher's computation.

Note: P-value denotes significance at 1% and 5% significance levels respectively. Therefore, \*Significant at 1% level, \*\*Significant at 5% level \*\*\*Significant at 10% level.

**4.7.2 Interpretation of R-Squared, Adjusted R-Squared and F-Statistic:** Whereas R<sup>2</sup> tell us how much variation in the dependent variable is accounted for by the regression model, the adjusted value tells us how much variance in the dependent variable would be accounted for if the model had been derived from the population from which the sample was taken. Specifically, it reflects the goodness of fit of the model to the population taking into account the sample size and the number of predictors used (Brooks C., 2008).

The R<sup>2</sup> measures the success of the regression in predicting the values of the dependent variable in the sample. The statistic would equal one if the regression fits perfectly, and zero if it fits no better than the simple mean of the dependent variable. There is a rule of thumb which can be used to determine the R<sup>2</sup> value is as follows: 0.1: poor fit, 0.11 to 0.30: modest fit, 0.31 to 0.50: moderate fit, >0.50: strong fit (Mugenda & Mugenda, 2013).

Here, in this study, the output of the econometrics model by random effect shows that strong explanatory power of the model, hence, R-square coefficient of 0.7632 has been obtained from the estimated regression model; revealing that 76.32% of variation in DSC as a proxy of financial distress is explained by the selected explanatory variables (leverage, liquidity, profitability, earning, GDP and age). An adjusted R<sup>2</sup> value which takes into account the loss of degrees of freedom associated with adding extra variables were inferred to see the explanatory powers of the model and it is an output in which we shall use for better interpretation.

It can be interpreted as the fraction of the variance of the dependent variable explained by the independent variables. Herein the study adjusted R<sup>2</sup> of 74.47% indicates that the formula is strongly fit for predicting the financial distress of Amhara construction companies. This indicates that 74.47% of changes that occur in the dependent variable are attributable to the independent variables.

The F-statistics tests the fitness of the model and a recommended F-statistics should be greater than 5 for it to be considered fit. The regression F-statistic takes a value of 31.96467 which is

greater than 5% the model was fit for estimation. Furthermore, F-statistics tests for the joint impact of all explanatory variables on the dependent variables.

A corresponding p-value of zero attached to the test statistic shows that the null hypothesis that all of the slope parameters are jointly zero should be rejected even at 1% level of significance. This implies that all selected explanatory variables can jointly affect financial distress of Amhara construction companies.

#### **4.7.3 Interpretation of Regression Results**

This section presents a detailed discussion on both firm specific and macroeconomic factors of construction's co. financial distress. The dependent variable was debt service coverage ratio as a proxy of financial distress whereas regressor variables were leverage, liquidity, profitability, earning, age and economic growth. There should be care while determining the relationship between DSC and financial distress to explanatory variables; that means, the positive coefficient of explanatory variable on DSC indicates the explanatory variable as having negative effect on financial distress of construction's co. and vice versa.

In the regression output, beta coefficient may be negative or positive; beta indicates that the level of influence of each independent variable on the dependent variable. The positive beta coefficient means that variable has a positive effect on the dependent variable, and a negative coefficient means it has a negative effect on the dependent variable.

It informs us on average when independent variable coefficients increase by one unit the dependent variable increases or decreases by beta amount but the independent variables should be statistically significant. The regression result of a random effect model in the above table 13 reveals that all explanatory variables except leverage have positive effect on DSC. Thus, outputs of regression results show that firm specific factors and macroeconomic factors jointly determine firms' financial distress.

The negative and statistically significant effect of leverage on DSC of the and construction is consistent with the first hypothesis. As it can be evidenced from the regression analysis presented in table, leverage had statistically negative and significant effect on firms' DSC with a coefficient of -0.073227 and p-value of 0.0000. This enables the research to reject the null hypothesis at 1% level of significance. Based on beta coefficient, it can be concluded that a unit increase in leverage bring a -0.073227 unit decrease in DSC or increase in the level of financial distress.

Hence, as a firm increases its leverage, there will be higher probability of financial distress or low level of DSC. On the other hand, a company which has a lot of loan tends to get financially-distress easier due to liabilities of the loan repayment: principal, interest or coupon of bank loan. The result shows leverage is statistically negative and significant in 1% level of confidence interval. This result is in agreement with the general truth that the use of too much debt leads to higher financial risks and deteriorates financial stability.

High leverage leads to financial distress (Outecheva, 2007). This finding is consistent with (Elloumi G., 2001; Chancharat, 2008; Yohannes, 2014; Gathecha, 2016) who found higher liability to asset ratio or a rise in the firm leverage will result to a rise in the likelihood of financial distress. According to the trade-off theory, which was formulated by Modigliani & Miller (1963), the use of debt raises the value of the firm.

However, there is a certain point at which further use of debt becomes unfavorable and continuous use of debt will increase both the agency cost and bankruptcy cost which has the implication of reducing the value of the firm leading to the likelihood of financial distress. This means, it has a negative relationship and significant with DSC with p-value 0.0000 and coefficient  $-.073227$ . This means if one unit leverage increase will make DSC lower to  $-.073227$ . The more leverage, there is higher probability of financial distress.

In other word DSC will be less. On the other hand, a company which has a lot of loan tends to get financially-distress easier due to liabilities of the loan repayment: principal, interest or coupon of bank loan. The result shows leverage is negative and significant in 1% and 5% level of confidence interval but its negative and significant in 1% level of confidence interval.

### **Liquidity (Liq.) and Financial Distress:**

The positive coefficient of liquidity for the regression output implies that the increase of the current assets over current liability positively affects firm's DSC. This is in line with both theoretical reasoning in corporate finance and findings of previous empirical studies (Thim, Choong, & Nee, 2011). The positive effect of liquidity on DSC of construction of Amhara region is consistent with the second hypothesis.

Based on beta coefficient, a unit increase in liquidity will bring 0.095962-unit increase in DSC; and the study rejects the null hypothesis since p-value (i.e., 0.023) this is statistically significant at 5% level of significance. This implies, if a company is able to meet its short-term obligations,

obtain a high level of profit, and able to use company funds in accordance with the portion then the company can avoid financial distress.

In line with these, the statistical result is in agreement with the liquidity and profitability theory, which suggests “a positive and high level of profitability and liquidity indicator designates a lower risk of being bankrupt”. The positive and significant effect of liquidity on DSC is not consistent with (Ahmad, 2013; Gathecha, 2016; Kristanti, Rahayu, & Huda, 2016) who identified that liquidity has a negative link with DSC or a positive link with financial distress. However, many other researchers like (Turetsky & McEwen, 2001; Nahar, 2006; Ahmad, 2013; Yohannes, 2014) showed that increase in liquidity leads to decrease in corporate financial distress or increase in firms DSC. Similarly, research work of Thim, Choong, & Nee (2011) indicates that there is a negative link between liquidity and financial distress. In general, these two and the current researchers like Ikpesu & Eboiyehi (2018) agreed on one thing; that is, a higher current asset over current liability signals firm’s high probability of potential for covering their debt.

This suggest that a fall in the liquidity position of the firm will increase the probability of such firm going into financial distress since the firm will be unable to meet and honor their obligation as at when due. Firms with low liquidity have insufficient fund to meet both short-term, medium-term and long-term obligation. The failure of firm in meeting their obligation as at when due usually result in such firm becoming financial distressed. This show has a positive relation with DSC, with coefficient 0.095962 and p-value 0.023.liquidity is measured by current ratio or current asset to current liability. The result shows liquidity positive and significant in 5% level of confidence interval.

#### **Profitability (Pro) and Financial Distress:**

The positive and statistically significant effect of profitability on DSC of the construction is also consistent with the third hypothesis (H3).As revealed in table 4.9 above, profitability had significantly positive effect on DSC with a beta coefficient of 0.5831527 and p-value (0.022).The value of this significance indicates a change in positively affects financial distress. That is, the better better the use of the company's equity in generating profit Increases Company’s ability to cover their obligation.

The more net profit owned by the company, the more the company will be avoided from financial distress. This enables the research to reject the null hypothesis at 5% level of

significance. Generally, it indicates how profitably a firm has used its investment in total assets. The beta coefficient indicates that a one-unit increase in profitability ratio brings 0.5831527-unit increase in DSC or decrease in the level of financial distress. This implies that large ratio of net income to total asset increases firm's potential to cover the company's debt and other fixed charges which reduce exposure of firms for financial distress.

This result is consistent with the liquid asset theory, which suggests that "a firm is anticipated to go bankrupt whenever the current year's profit or net cash flow is negative". The finding is also consistent with previous research work of (Andualem, 2011; Eboiyehi, 2017; Ikpesu&Eboiyehi, 2018).

**Age of construction sector:** The Age of construction sector refers to the period that Construction Company has been in operation since its initial inception. Previously, in hypothesis indicated that age of the constructions company has a positive relationship with proxy of DSC which means decrease the financial distress of construction sector in Amhara region, Ethiopia.

The findings of this study accept hypothesis age of the construction company has a significant positive relationship with DSC as a proxy of financial distress of construction sector. The coefficient is 0.0190162 with p-value of 0.046 and statistically significant at 5% significance level or in the other interpretation holding constant all other variables, increasing age by one year would lead to increase DSC by 0.0190162 which means it increases the financial health of the construction sector since high DSC means low financial distress.

The positive relationship between age and financial health of construction sector in Amhara region, Ethiopia implies that as construction sector mature, and thus gets considerable experience in the construction industry have diligently or carefully applied credit risk management and also implement efficient management techniques to attain the goal of the institutions.

**Economic Growth (GDP):** is the most commonly used macroeconomic indicators, as it is a measure of total economic activity within an economy and the study used real GDP growth as a proxy of the macroeconomic environment. The coefficient value of GDP was 0.4763731 with a p-value 0.0000 this indicated that a growth rate of GDP had positive relationship and statistically significant at 1% level of confidence & impact on DSC of construction in Amhara region, Ethiopia.

Therefore, this study found that real GDP growth is positively affect the construction financial health Amhara region, therefore, the study rejects hypothesis real GDP has positive impact on DSC as a proxy of financial distress of Amhara region construction. This result is consistent with the results identified by Shaut and Mill (2011) and inconsistent with Sainz-Fernandez et al. (2015). Economic Growth (eg) With regard to macroeconomic factors, the real GDP growth is positive and significant factor of DSC. As discussed in the methodology part there is a clear anticipation to have a positive relationship between the current Amhara, Ethiopian courage economic progress and DSC as a proxy financial distress. The study justified a positive and significant impact of Amhara region real GDP movement and DSC in 1% and 5% level of confidence interval but it's significant in 1% level of confidence interval. This is because, as we know, stimulated economy could create a new and potential demand for construction business.

**Earning Ability:** Earning of the construction sector measured by the Return on Asset (ROA), which indicates or measures how well the institution uses all its asset. It is also an overall measure of profitability which reflects both the profit margin and the efficiency of the sector.

The coefficient of the ROA has significant positive influence on the financial health of the construction with coefficient of 3.973875 and the p-value of 0.0000. This confirms the hypothesis, namely that an earning measured by ROA has significant positive impact on DSC this in turn will lead to increase financial health of the construction company since high DSC mean low financial distress.

The findings presented that taking all other variables constant, one unit increase in ROA would lead to increase 3.973875 in the DSC of the construction which means increase the financial health of the construction. This result is consistent with the results identified by Andualem U., (2011), Shaut and Mill (2011), Dorfleitner et al., (2014) and Yohannes T., (2014).

### **Summary of Findings**

The objective of this study is to examine the determinants of financial distress of construction in Amhara region as determinants of financial distress measured by DSC. Leverage, earning, liquidity, age, and GDP are selected as explanatory variables. Descriptive statistics and regression analysis were performed to describe the determinants of financial distress of construction Company. In general, this chapter discusses the results of the study regarding to the determinants of financial distress in Amhara construction. Descriptive statistics and diagnostic tests for classical linear regression model assumptions were presented.

The descriptive statistics confirmed that data are in a good level of consistency and stability in distribution. Following the descriptive statistics, tests for normality, heteroscedasticity, multicollinearity and autocorrelation problems were checked. Eventually, the regression result shows that financial distress of construction in Amhara region was mainly driven by firm specific and macroeconomic factors. Generally, this chapter has presented the results of the methods adopted in the study, quantitative method, to investigate the determinants of financial distress. Data obtained through survey of construction companies and their document review is regressed to see their impact on debt service coverage as a proxy of financial distress.

Generally the previous chapter presented the results and discussed the analysis of construction company determinants of financial distress. From data analysis, Amhara region Construction Company highly affected by variables included in this study. The findings of the study showed that leverage have statistically significant and negative relationship with construction company determinants of financial distress in the proxy of DSC.

The result of this finding is summarized in the following table 4.10 below:

**Table 4-10: Summary of actual expected signs of dependent variables on dependent variables**

Variables	Description	Expected		Final Result		SignificanceLevel
		DSC	ED	DSC	ED	
<b>Lev</b>	Leverage	-	+	-	+	Significant, 1%
<b>Liq.</b>	Liquidity	+	-	+	+	Significant, 5%
<b>Pro</b>	Profitability	+	-	+	+	Significant, 5%
<b>Ea</b>	Earning	+	-	+	+	Significant, 1%
<b>AG</b>	Age	+	-	+	-	Significant, 5%
<b>R.GDP</b>	Real gross domestic	+	-	+	-	Significant,1%



## **CHAPTER FIVE:**

### **CONCLUSION AND RECOMMENDATION**

#### **5.1. Introduction**

The study analyzes the determinant factors which are responsible for financial distress of those selected construction sectors under the study. The main objective of this study was to examine the determinants of financial distress in Amhara region construction industry. Quantitative research approach, explanatory research design was adopted to achieve this objective. The CLRM assumptions such as heteroskedasticity, normality, multicolliner autocorrelation and test of stability such as Ramsey reset tests have been performed.

The researcher had selected twelve construction industries in Amhara region purposely as samples from each of construction sector, that fulfilled seven years of data and purpose of the study was to determine the financial healthiness of the construction sector and to determine those determinant factors of firms under financial distress. OLS estimation technique was adopted to achieve the objective of this study. The panel's random effect approach measures financial distress and other determinants of financial distress. Therefore, based on the analysis, the study reached on the following

#### **5.2. Conclusions**

Leverage ratio variable has negative and significant relationship with DSC at 5% significance level. Variable revealed that a negative relation with DSC and is finding to be a very important determinant of construction companies in Amhara Region's financing pattern. This indicates firms with low level of leverage were going to have less DSC. Thus, the use of higher debt financing will negatively affect the financial healthiness of Construction companies in Amhara region. Liquidity of Construction companies has a positive and significant relationship with DSC even at 1% significance level suggesting that keeping other things constant, when the ratio of current assets to current liabilities increases, the financial healthiness of Construction companies will be improved and vice versa.

Companies with a higher level of liquidity indicators would face lower financial risks. The regression analysis shows that profitability of construction companies has a statistically significant positive effect on the financial health condition of firms with a 1% level of significance. Keeping other things constant, the higher the level of profitability, the better financial healthiness, and stability of construction companies. Since profitability is measured by

return on asset employed ratio and have the highest beta coefficient than the other variables, it is regarded as the leading determinant of financial distress condition in the Amhara construction sector. However, these finding is against the gamblers ruin theory, which expect firm to take excessive risk and exposed to distress to get higher return until their net worth becomes negative (i.e., until the firm become insolvent or reached negative capital).Earing firms has positive and statistically significant at 5 % level.

This specifies firms with high level of distress were going to have high DSC which implies that a sound capital position is mandatory unable to pay all just debts. Expectedly GDP has positive but significant relationship with DSC even at 10 % significance level. Even if the regression result becomes significant the positive effect indicates that in a situation where there is an increase in economic condition DSC of construction companies also increases. As the growth in the GDP represents an increase in production and economic capacity in a nation, it can have effect in increasing DSC by widening demand for consumption. It is paradoxical to know that age variable displays a significant negative relation with the DSC ratio of construction companies in Amhara Region.

This positive relation verifies that construction companies in Amhara Region with that are Aged uses more debt than equity. Therefore, in general, the research has concluded that firm specific factors are not the only determinants of financial distress but also the macroeconomic factors as well. The study concludes in favor of many empirical works such as (Fredrick Ikpesu, 2019), (Andualem, 2011), (Gathecha, 2016) and (Eboiyehi, 2017) that have recommended firms to increase liquidity, profitability and to reduce leverage in order to maintain the financial healthiness of Construction companies.

Thus, applying policies which improve firm's profitability, liquidity, earning and strategies that reduce firms leverage will help to lower the financial distress level of construction companies. In line with this due attention must be given to changes in macro-economic factors. Generally, the result indicates that construction Company should try to maintain their distress level in order to sustain to be stable progress in their financial health. This shows that there is the need of to explore more in this context in Amhara region construction sector, due to no more researchers have been involved at studies in the region to dig out the root obstacle of the sector & to find an educative remedies to those problems.

Because construction firms are one of the pillars of projects for the advancement of the macro economy and the creation of other vital and supportive opportunities. This means that the

construction industry makes significant contributions to the socio-economic development process of a country and its importance emanates largely from the direct and indirect impact it has on all economic activities. In effect, the owner of a business can benefit from identifying factors affecting the determinants of financial distress of a construction company, which saves the firm's financial healthiness and allows the owner of the business and other stakeholders to manage and adjust their operating performance, and company profit can be maximized as well, adding value to the sharable.

Furthermore, because of the construction sector's substantial contribution to the country's economic growth, regulatory authorities such as the government may be able to aid with strategic planning and implementation. As a result, research on the factors that influence construction determinants of financial distress is critical for the government, stakeholders, regulatory authorities, and the construction industry. The objective of this study is to examine factors affecting construction company determinants financial distress as measured by DSC. In order to meet the purpose a seven years financial statement data were used from individual company annual year audited financial statements of the company reports from year 2013 to 2019 for twelve selected companies.

### **5.3. Recommendations**

Based on the key findings and conclusions of this study, the researcher forwarded the following recommendation as indicators, which may be essential for the betterment of the financial healthiness of construction **companies**:

- The management of Construction companies' should strive towards the improvement of financial stability. This can be done through improving profitability, liquidity, earning levels and reducing the level of leverage to the optimum level. Because these financial ratios are found to have significant effects on the financial healthiness of Construction companies companies.
- In addition, it is obvious that the failure of Construction companies may mislead the whole economy. Therefore, there should be increased supervision and control in the companies in order to prevent the incidence of bankruptcy.
- Furthermore, firms are recommended to increase their capital to boost their risk absorbing ability, including financial distress and should increase liquidity through improving cash collection and asset restructuring so that they can reduce the likelihood of financial distress and failure that primarily emanate from liquidity problems. Besides, since profitability ratio appeared the major determinant, the study recommends management of Construction companies to

improve profitability through closing distress performing units or replace (drop) departments, products or lines of the business which enables a company to channel resources to profitable areas thereby improving capital allocation.

- Since construction company have been the upper hand to supervise the liquidity, profitability, earning and leverage of firms through application of appropriate techniques during granting loans, the National Bank of Ethiopia should direct banks to lower the cost of borrowing for construction firms to ensure financial stability.
- Government needs to pay special attention to the construction companies industry by providing them tax incentives, conducive atmosphere and infrastructural facilities so as to reduce the likelihood of financial distress in the sector.
- Finally to summarize and to make on good decision on factors affecting construction company determinants of financial distress, contractors need to look the liquidity, leverage, before making an investment decisions. Because these factors have a significant impact on factors affecting construction determinants of financial distress either positively or negatively in Amhara region construction companies.

And also additional recommendations to address a piece of advice to Construction **companies:**

Construction companies are advised to diversify their work during recessionary times by tendering on different types of business, or even buying into firms that do work which complements their company (for example, subcontractors and suppliers of building material). Other possibilities include going into joint ventures or tendering for work in foreign countries to be achieve in sustain their intended goal.

Construction companies should avoid buying into other companies that do the same type of work as their own company which invite there operational activity to be move as gaming which invite there ongoing to be loss. Companies should also strategically re-align their resources when there is a low level of construction activity, and even lower their profit margins which will be invite uncertain opportunity of financial distress.

#### **5.4. Suggestions for Further Studies**

This study tried to bridge the gap on existing literatures as identified in the problem statement, outlined on study objective and hypothesized, but it has limitation that has to be addressed by other researchers. Therefore, further research should be conducted in the following areas in order to get complete knowledge on the subject matter. The prime focus of this research was examining determinants of financial distress in Amhara construction companies on seven

independent variables. However, there are so many firm specific and macroeconomic variables that were not included in this study.

Thus, future researchers are recommended to undertake similar study by considering additional variables such as efficiency, revenue growth, share price, inflation and exchange rate. Such researchers are useful to validate findings of the current study. Furthermore, the study didn't include primary data such as interview of construction companies' CEOs and financial managers' opinion to analyze their knowledge on financial distress and their financing decision practices. Therefore, further research should investigate the above-mentioned factors using alternative proxies of variables.

In brief, this study tried to associate the gap on existing literatures as identified in the problem statement, outlined on research objective and hypothesized, but it has limitation that has to be addressed by other researchers. Therefore, additional research should be steered in the following areas in order to get complete knowledge on the subject matter.

The principal concentration of this research was probing determinants of financial distress in Amhara construction's on six independent variables. However, there are so many firm specific and macroeconomic variables that were not included in this study. Such researchers are useful to validate findings of the current study. Likewise, the study didn't include primary data such as interview of construction companies' CEO and financial manager's opinion to analyze their knowledge on financial distress and their financing decision practices. Therefore, further research should investigate the above-mentioned factors using alternative proxies of variables. Generally, there are numerous opportunities for future study in this field as no more studies are there in literature of financial distress prediction in construction companies in Amhara region. In further, the output of the present study also initiate to further researcher in financial distress phenomenon in the context of construction companies.

**And the findings** of this study also deemed to benefit construction companies, investors, lenders, academicians and policy makers in the Region as well as in the country. Based on the conclusions above, the study has drawn the following recommendations to construction companies, investors and shareholders, lenders, academicians and policy makers at different level. Besides the literature review introduced a generic process for requirements of determinants of financial distress in practice potentially to be minimizing the involvement of debt/firm leverage in the construction industry.

The research study identified that the determinants of financial distress practice which expose for bankruptcy or economical loss. Therefore it is to be inclusive in brief and a competent manager to be managing the sectors requirements is necessary in capturing and tracing to be efficient & to be progress sector in development process. So, a practical framework is needed to improve the debt coverage ability through applying sound management practice within the construction industry by giving remedies to those factors of financial distress which affect on economic and financial situations in Amhara region. Therefore, the researcher has been proposed several solutions to reduce the investment loss of the construction units & also analyzes the existing problems of those determinant factors of financial distress and puts forward some solutions. Suggestions for further research are also forwarded.

**In general, Areas for future study,** research has used only seven years data in order to keep the sampled construction company representative as a chance only 12 construction company are included in this study but other researcher see numbers of companies and by including the data year. Therefore, future researchers could this research as a starting point and replicate this study using multiple years" data and more number of companies.

This research has used few company specific variables; future studies should also include more variables to examine on factors affecting construction company financial distress. I hope the results of this study would be useful for and contribute to the further development of Amhara region construction industry.

And also additional suggestions on solving the Problems Existing in construction **Company:**

Through the above analysis on the existing problems in the construction company, it can clear prove the importance of audit work for construction sector carried out smoothly in Amhara region, and to strengthen & solving the existing problems timely in construction company is where the healthy development of the construction industry by reduction those financial distress determinant factors & then to come up the construction sector able to cover their debt.

**To construction company:**

- The study recommend that, in carrying out their debt financing decision, construction companies in Amhara Region should prudently ascertain and properly measure the impact of

those significant variables like leverage, liability, profitability, liquidity, age and GDP on the DSC ratio in order to set the best possible determinants that maximum their value.

- In addition, the study also recommend that; Based on the result of the study, it is clearly observes that; static trade-off theory appears to dominate the construction companies in Amhara Region financial distress. It is therefore important for company's decision to be directed at improving the information environment.

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## Appendix

### Appendix 1: Descriptive Statistics

summarize DSC	PR	LEV	LQ AG	RGDP EA		
Variable		Obs	Mean	Std. Dev.	Min	Max
DSC		84	.9831262	.5292487	.04	2.5342
PR		84	.7034199	.1220665	.1178	.99525
LEV		84	2.654155	5.451389	.1	21.3
LQ		84	1.767694	.7348717	.4078	3.9278
AG		84	20.58333	5.346338	12	36
RGDP		84	.4552894	.6407341	.0300647	0.1145
EA		84	.3170857	.0263703	.2652	.3537

### Appendix 2: Correlation Matrices between Dependent and Independent

correlate	prlevlq	agrgdp	ea				
dsc							
(obs=84)							
	dsc	pr	lev	lq	ag	rgdp	ea
dsc	1.0000						
pr	0.2457	1.0000					
lev	-0.4930	-0.1711	1.0000				
lq	0.1968	-0.1148	-0.0513	1.0000			
ag	0.1043	-0.1392	0.7515	0.0825	1.0000		
rgdp	0.5046	-0.0206	0.2640	0.0867	0.4751	1.0000	
ea	0.3086	0.1821	-0.0276	-0.1292	0.0208	0.1362	1.0000

### Appendix 3: Stationary Test

Variables	Levin-Lin-Chu Test		Integration of order
	Statistic-t	P-value	
DSC	-3.0463	0.0012**	I (o)
Leverage	-4.5653	0.0000***	I (o)
Liquidity	-3.4400	0.0003**	I (o)
Profitability	-4.9914	0.0000***	I (o)
Earning	-4.4170	0.0000**	I (o)
Age firm	-3.89658	0.00312***	I (o)
Real GDP	-7.1443	0.0027***	I (o)

## Appendix 4: Hausman Test

```

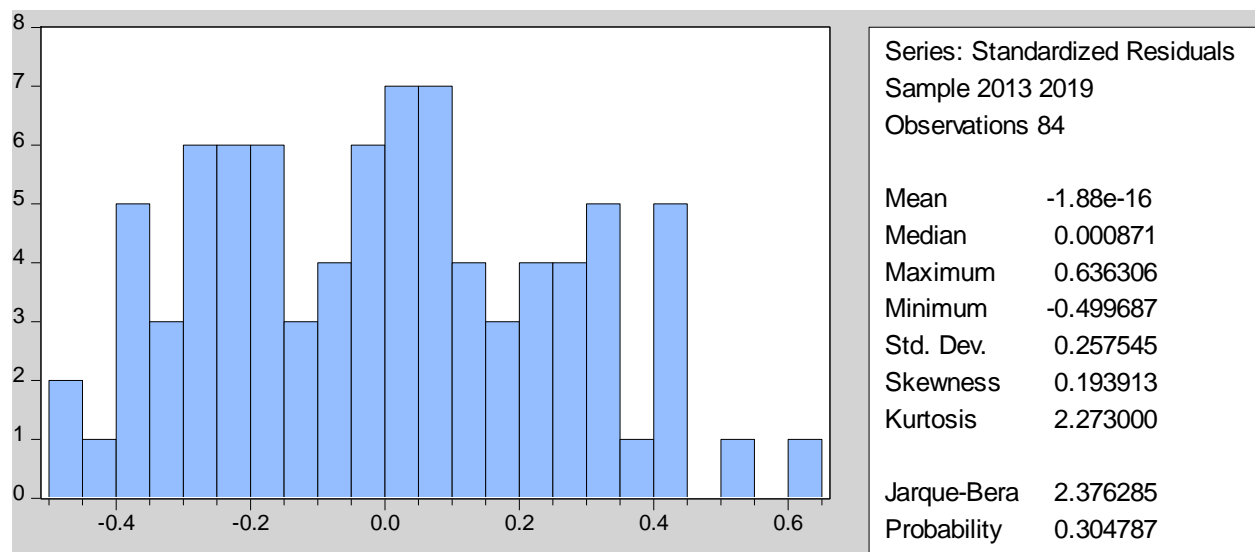
b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

      chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
            =          5.72
Prob>chi2 =          0.5734
(V_b-V_B is not positive definite)

```

## Appendix 5: Normality Assumption Test.



## Appendix 6: Multi collinearity Assumption Test.

Variable	VIF	1/VIF
EA	1.73	0.576602
Age	1.65	0.607755
lev	1.47	0.681826
rgdp	1.20	0.831252
lq	1.15	0.868230
pr	1.10	0.910696

## Appendix 7: Heteroskedasticity Assumption test

F-statistic	1.591247	Prob. F(27,56)	0.0715
Obs*R-squared	36.46740	Prob. Chi-Square(27)	0.1054
Scaled explained SS	20.64207	Prob. Chi-Square(27)	0.8028

### Appendix 8: Durban Test

Variable		DW test statistics result
Debt service coverage as a proxy for Financial distress	Durbin-Watson stat	1.948947

### Appendix 9: Serial autocorrelation

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F-statistic	23.47872	Prob. F(1,76)	0.4050
Obs*R-squared	2.675736	Prob. Chi-Square(2)	0.26240

---

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### Appendix 10: Ramsey Test

```
. ovtest

Ramsey RESET test using powers of the fitted values of dsc
Ho: model has no omitted variables
      F(3, 73) =      1.81
      Prob > F =      0.1521
```

### Appendix 11: Regression Result

Source	SS	Df	MS	Number of obs.	=	84
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				F(6, 7)	=	41.36
Model	17.7429971	6	2.95716619	Prob > F	=	0.0000
Residual	5.50564961	77	.071501943	R-squared	=	0.7632
				Adj R-squared	=	0.7447
Total	23.2486468	83	0.280104178	Root MSE	=	.2674
DSC	<b>Coef.</b>	<b>Std.err.</b>	<b>t</b>	<b>P&gt; t </b>	<b>[95%</b>	<b>Intervall</b>
LEV	-.073227	.0084506	-8.67	0.000***	-.0900543	-.0563998
LQ	.095962	.041384	2.32	0.023 **	.0135558	.1783681
PR	.5831527	.249521	2.34	0.022 **	.0862929	1.080013
EA	3.973875	1.154264	3.44	0.001***	1.675442	6.272308
AG	.0190162	.0093562	2.03	0.046 **	.0003857	.0376467
RGDP	.4763731	.0532971	8.94	0.000 ***	.370245	.5825012
<b>_cons</b>	-1.270714	.4249707	-2.99	0.004	-2.116939	-.4244895

<b>F-statistic</b>	<b>31.96467</b>	<b>Durbin-Watson</b>	<b>1.948947</b>
<b>Prob(F-statistic)</b>	<b>0.000000</b>	<b>stat</b>	

### Appendix 12: Actual expected signs of dependent variables on dependent variables

Variables	Description	Expected		Final Result		SignificanceLevel
		DSC	FD	DSC	FD	
<b>Lev</b>	Leverage	-	+	-	+	Significant, 1%
<b>Liq.</b>	Liquidity	+	-	+	-	Significant, 5%
<b>Pro</b>	Profitability	+	-	+	-	Significant, 5%
<b>Ea</b>	Earning	+	-	+	-	Significant, 1%
<b>AG</b>	Age	+	-	+	-	Significant, 5%
<b>R.GDP</b>	Real gross domestic	+	-	+	-	Significant,1%