ADDIS ABABA UNIVERSITY
SCHOOL OF BUSINESS AND PUBLIC ADMINISTRATION
DEPARTMENT OF ACCOUNTING AND FINANCE
(GRADUATE PROGRAM)

DETERMINANTS OF CAPITAL STRUCTURE DECISIONS OF THE CONSTRUCTION COMPANIES IN ADDIS ABABA, ETHIOPIA

A THESIS SUBMITTED TO SCHOOL OF GRADUATE STUDIES OF ADDIS ABABA UNIVERSITY IN PARTIAL FULFULIMENT OF THE REQUIRMENT FOR DEGREE OF MASTER OF SCIENCE IN ACCOUNTING AND FINANCE

BY

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DETERMINANTS OF CAPITAL STRUCTURE DECISIONS OF THE CONSTRUCTION COMPANIES IN ADDIS ABABA, ETHIOPIA

A thesis submitted to the school of graduate studies of Addis Ababa University in partial fulfillment of the requirements for the degree of masters of Science in Accounting and Finance.

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Statement of declaration

I, Netsanet Belay, declare that this thesis entitled "Determinants of capital structure decisions of Construction companies in Addis Ababa, Ethiopia" is my own original work, which has not been presented for degree in this or any other universities and that all sources of materials used for the thesis have been properly acknowledged.

Declared by:	Confirmed by Advisor
Name: Netsanet Belay	Name: Dr. Ulaganthan S.
Signature:	Signature:
Date: 06/04/2012	Date: 06-04-2012

Statement of Certification

This is to certify that Netsanet Belay Yitayih has carried out his research work on the topic entitled "**Determinants of Capital Structure Decisions of the Construction Companies in Addis Ababa, Ethiopia**". The work is original in nature and is suitable for submission for the reward of the M.Sc Degree in Accounting and Finance.

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ABSTRACT

The company's capital structure is influenced by a number of factors, and several studies have been conducted to examine the factors that can affect the capital structure of companies in various countries. However, no such study has been conducted in Ethiopia, where majority of construction companies have no clear financing pattern. Thus, the factors affecting their capital structure are not clear and therefore, this study was conducted in order to fill this existing knowledge gap. In examining the determinants of capital structure of those construction companies, quantitative research approach is used. A panel data collected from 11 randomly selected construction companies, covering the period from 2006 to 2010 was used. The findings from the panel random effect estimation appear to support the pecking order theory of capital structure. Specifically, the result reveals that the variables including growth opportunity, tangibility, and non-debt tax shield positively affect the variations on the capital structure of construction companies. Profitability of the companies, size, earning volatility, liquidity and age, on the other hand, inversely affect their capital structure. Furthermore, among the whole independent variables, which are tested in this study, growth opportunity, tangibility of assets, liquidity and age of the company's are found as significant variables that explains the variations of the capital structure of construction companies.

Key words: Determinants of Capital structure, Pecking Order theory, Trade of Theory, Ethiopian Construction Companies

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E.C	Ethiopian Calendar
ERCA	Ethiopian Revenue and custom authority
GDP	Gross Domestic product
GLS	Generalised least square
LTO	Large Taxpayers Office
POT	Pecking Order Theory
SPSS	Software package for social sciences
TOT	Trade off Theory
UCBP	University Capacity Building Program

CHAPTER ONE - INTRODUCTION

1.1. Background of the Study

For the development of construction industry in Ethiopia it is necessary that all stakeholders should contribute their own part. Besides the direct contribution made by those stakeholders supportive research study in all area to be studied on construction companies should be conducted and it has priceless contribution for development of the sector in general. Thus, this research study entitled 'Determinants of capital structure decisions of the construction companies in Addis Ababa, Ethiopia' is the one, which is conducted to enhance the competitiveness of the companies in the industry. The study examines the determinants of capital structure decisions of firms in Ethiopian Construction Industry.

Since the seminal work of Modigliani and Miller (1958), the issue of capital structure has created intense debate in the area of corporate finance. The capital structure of a firm consists of a particular combination of debt and equity issued by the firm to finance the operation of the business. The basic question of whether a unique combination of debt and equity capital maximizes the firm

value, and if so, what factors could influence a firm's optimal capital structure have been the subject of frequent debate in the capital structure literature.

Millers and Modigliani (1958) theory of capital structure, also called, irrelevance theory of capital structure, argued that external borrowing has no effect on firm's value. They introduced this theory with a world without transaction costs and taxes and concluded that any capital mix of the firm is irrelevant for achieving the goal of a firm. However, five years after this breakthrough in 1963 they reached a different conclusion after allowing for the inclusion of corporate taxes. In this setting companies should be entirely debt financed. Back then, they paved the way towards the modern trade-off theory. In addition, Miller (1977) included personal taxes and suggested the same solution, this time with less benefit to the investors. Trade-off theory was finally completed by the contribution of Jensen & Meckling (1976), who introduced the costs of financial distress. According to this final setting, the firm should use leverage to the extent that the marginal benefits of additional debt (tax saving and a lower cost of debt capital) and its costs of financial distress are equal (Jensen & Meckling, 1976).

During this period, among others, three main theories emerged to explain the behavior of the firm in choosing its capital structure. These are Pecking Order Theory (POT), Static Trade-off Theory (TOT), and Signaling theory of capital

structure. Two main theories, that is, Pecking order theory (POT) and Trade-off theory (TOT), were extensively tested by various researchers and plays important role in determining capital structure (Kraus and Litzenberger, 1973; Scott, 1977; Kim, 1978; Myers, 1984; Myers and Majluf, 1984; Shyam et al. 1999; Dang 2005). Furthermore, the relationship between capital structure decisions and firm value has been extensively investigated in the past few decades.

Although a majority of those previous researches conducted on the area of capital structure decisions are conducted based on developed countries data, some researchers now a days trying to investigate this researchable area in developing countries. Among the researches based on developing countries data, the study by Booth, et al. (2001) is the one which examine the capital structure of firms in a sample of 10 developing countries and it concluded that variables that are relevant for explaining capital structures in the United States and European Countries are also relevant in developing countries. Likewise, Rataporn Deesomsak, et al. (2004) also investigated the determinants of capital structure of firms in four countries from the Asia Pacific region and they try to show the effect of variables on the firm's capital structure determination. According to their finding the firm size has positive effect on the leverage and growth opportunities, non-debt tax shield, liquidity and share price performance has the

negative effect on leverage which mainly support to major capital structure theories.

In Ethiopia, no adequate researches have been conducted on this arguable area and the available literatures are highly focused on manufacturing companies (for example Ashenafi (2005); and Amanuel (2011)) and Insurance companies by Kinde (2011).

Basically, the capital structure (financing decisions) of the companies is affected by a number of factors. Several studies have been conducted to examine the determinants of capital structure of companies in varies countries. However, no such study has been conducted in Ethiopia, where majority of construction companies have no clear financing pattern. Therefore, the factors affecting their capital structure are not yet clear and therefore this study was conducted to fill this knowledge gap. Furthermore, in addition to identifying and analyzing the factors investigated by prior researchers, this study have investigated the effect of other important variables such as earning volatility and liquidity, on the capital structure decisions of the firms in Ethiopian Construction Industry.

A firm in the construction industry here in this study refers to the companies engaged in the activities specified by Ministry of Urban Development and

Construction, Ethiopia. The report by The Federal Democratic Republic of Ethiopia, Central Statistical Agency, on Contract construction survey (2008/09), referring the Ministry of Urban Development and Construction, Ethiopia, defines the term construction as: "an economic activity directed to the creation, renovation, repair or extension of fixed assets in the form of buildings, land improvements of an engineering nature, and other such engineering constructions as roads, bridges, dams and so forth". Thus, this study was empirically investigated the determinants of capital structure decisions of companies in Addis Ababa engaged in these construction activities.

To meet this objective the researcher used quantitative research approach through collecting data from secondary sources of data. Mainly the Panel data which combines the features of both time-series and cross-sectional data were collected for 11 sample construction companies to be used for regression analysis.

In analyzing the determinants of capital structure of construction companies in this study, panel random effect estimation technique was used. The result of the regression analysis reveals that the variables including growth opportunity, tangibility of assets, and non-debt tax shields have positive effect on the capital structure (measured by leverage ratio) decisions of construction companies. On

the other hand, profitability, size, earnings volatility and age of the firms affect their capital structure negatively. Furthermore, the study found that variables including growth opportunity, tangibility of assets, liquidity and age of the firm are the significant variables that explain the variations of the capital structure of construction companies.

The remainder of this paper is divided into five main sections. The next section includes the remaining part of Chapter one which includes statement of the problem, Objectives of the study, Significance of the Study, Scope and Limitation of the study and Organization of the research Report. The second chapter deals about Review of related literature. Specifically this chapter includes the theoretical framework of capital structure, prior empirical findings on developed and developing countries, in Ethiopia and for construction companies. Overview of Construction Industry in Ethiopia also discussed in chapter two. Furthermore, the third chapter discusses about Methodology and method used for the study. The empirical result and discussions are presented on chapter four and finally the conclusions and recommendations for future researchers are forwarded on chapter five.

1.2. Statements of the problem

Decisions in relation to financing of the operations of the firm are an important issue for insuring the general financial well being of the firm. The financing decisions, which are mainly made by the finance manager of the firm, are highly affected by various factors directly or indirectly. Beside these factors, the financing pattern of the firms, therefore, have to be in a manner that maximizes the value of the firm. However, maximization of firm value is not an easy job because it involves the selection of debt and equity financing in a balanced proportion keeping in view of different costs and benefits coupled with these two sources of finance.

In Ethiopia the research study on the financing decisions or generally capital structure of the firm is not yet extensively investigated. Supporting this idea, Booth et al (2001) have noted that "although a lot of theoretical and empirical studies have been conducted in the area of capital structure, most of them focus on the data obtained from the firms in developed countries". (Booth et al (2001))

The first study on the determinants of capital structure on the case of Ethiopian firms was conducted by Ashenafi (2005). The study has considered the Ethiopian medium sized enterprises covering the period from 1991-1996 E.C. The study tested seven firm-specific independent variables including other fiscal benefits,

economic risk, size of the firm, age of the firm, asset composition, profitability and growth opportunity of the firm and it found mixed results. Following this study Amanuel (2011), also tried to conduct a study on the determinants of Capital Structure on Addis Ababa Manufacturing firms and found that variables including tangibility of assets, non-debt tax shield, earning volatility, profitability and size of the firms are the significant determinants of capital structure. Likewise, Kinde (2011) conducted research on determinants of capital structure by taking Ethiopian Insurance Company as a case. The result shows that firm specific variables including growth opportunity of the firm, profitability, business risk, liquidity and age of the firm have statistically significant influence on capital structure of Ethiopian Insurance Companies.

However, the empirical evidence suggests that there is significant industry influence on capital structure decisions of the companies. For instance Harris and Raviv (1991) noted that "firms in the same industry have more in common than firms in different industries" and thus, the capital structure of firms is highly affected due to industry difference. Furthermore, Esperança et al. (2003) reported that industry effect is important because risk levels and capital structures significantly differ among industries. So, analyzing separate industry, in this case the Ethiopian Construction industry individually may produce better results. In connection to this, although the Ethiopian government uses the construction

sector as an instrument to eradicate unemployment problems and, consecutively, reducing poverty and ensuring sustainable economic growth of the country, no attention has been given for this sector to investigate the financing decisions of the firms in the industry. Moreover, through updating the dataset and including some important explanatory variables; such as Earning volatility and Liquidity, the result can be improved. Therefore, this empirical study is designed to address these short coming and, further, to find out industry specific determinants of capital structure by taking Ethiopian Construction Industry sector as a case.

1.3. Objectives of the Study

The general objective of the study is to empirically examine the determinants of the capital structure decisions of companies in Ethiopian Construction Industry; and then testing the result in light with major capital structure theories i.e. Pecking Order Theory (POT) and Trade off Theory (TOT) of capital structure.

Specifically, the study is designed

- To show how the construction companies finance their business operation in Ethiopia,
- To show how the variables including profitability of the firm, firm's growth opportunity, size of the firm, asset tangibility, non-debt tax shield, firm's earning volatility, liquidity and age of the firm

influences the capital structure (leverage ratio) decisions of the construction companies;

- To identify which capital structure theory i.e. Pecking Order Theory (POT) or Trade off Theory (TOT) can more explain the variations on capital structure of Ethiopian Construction Companies; and

1.4. Research Questions

Every research study is conducted to answer a certain research questions. Therefore, this paper is conducted to answer the following two specific research questions.

1. How and to what extent a certain firm specific factors i.e. profitability, growth opportunity, size, tangibility of the assets, non-debt tax shield, earnings volatility, liquidity and age of the firms determine the capital structure decisions of the Ethiopian construction companies?
2. Which capital structure theories (Pecking order or Static trade-off theory) can more explain the capital structure choice of firms in Ethiopian Construction Industry?

1.5. Significance of the Study

The central purpose of this proposed research study is to find out and examine the main firm level determinants of capital structure choice of firms in Ethiopian Construction industry, and analyze whether the trade off theory, pecking order theory or other capital structure theory can explain the financing pattern of the firm, in turn findings of the research will add to the existing knowledge on the area of corporate finance. Specifically, this study is significant in the sense that it will:

- ✓ Allow the identification of the concept and framework of determinants of capital structure decisions in Ethiopian context.
- ✓ Create meaningful awareness among the concerned body such as the finance managers of firms in construction industry about the capital structure in general, in turn; it will enhance the value of the firm.
- ✓ Provide useful knowledge on factors that might have impact on the capital structure decisions of firms in Ethiopian Construction Industry in general; and
- ✓ The finding of the paper will also encourage other potential researchers on related researchable area in this specific attractive industry.

1.6. Scope and Limitation of the Study

Although analyzing every firm-specific factors that might explain the Capital Structure decisions of firm is equally important for all type of organizations, this research is conducted mainly with a focus on firms in Ethiopian Construction Industry operated for at least six years.

Every research study faces a certain limitations till its end. While conducting this research study, a number of limitations were occurred. The first challenge occurred in this study were getting all necessary data. To test all of the potential firm specific determinants of capital structure, it is required to have well organized data in all areas to be studied. In Ethiopia, in which secondary stock market is not yet established, the data needed to measure all explanatory variables of the study is not fully available, in turn; the researcher highly depend on a limited number of variables. Therefore, such a limitation may adversely affect the findings of the study.

In addition, as noted by Kisgen (2006) credit rating directly affects capital structure decisions by managers. But in Ethiopia, since there is no any rating agency and no attempt has been made by firms to rate their level of credit worthiness, it is difficult to test the impact of credit rating on the capital structure of the firms. Furthermore, a certain prior empirical study suggests that the development of financial market in a specific country, in which a study is carried out, has a significant impact on the decisions of the firms' finance managers on

the specific mix of debt and equity. But, in Ethiopia since there is no financial market at all it is impossible to test its effect on the firm's capital structure. Therefore, these difficulties enforce the researcher to exclude these and other key possible explanatory variables from the study.

1.7. Organization of the research paper

This study focus on examining the effects of firm specific factors on the capital structure decisions of companies in Ethiopian Construction Industry. This research report is organized into five chapters. The first chapter deals with introduction of the study. The second chapter presents the review of related literature on the theoretical framework of capital structure and prior empirical findings on the determinants of capital structure decisions. It also discusses about the overview of Ethiopian construction industry in general. Then, the third chapter explains about methodology and methods of the study. Empirical findings and analysis are presented in the fourth chapter. To provide further elaboration of the results this section is supported by a series of tables and graphs. The last chapter i.e. Chapter Five presents the conclusion and recommendations of the study which is drawn from the findings of the study.

CHAPTER TWO - LITERATURE REVIEW

2.1. Overview of Construction Industry

Construction industry plays a vital role in the socio-economic development of the country. Besides its direct contribution for the socio-economic development of the country such as in generating employment and contribute to the GDP growth of the country, the construction sectors support other sectors in order to be active participant to the development of the country's economy.

Field and Ofori (1988) (cited in Khan (2008)), noted that "the construction industry makes a noticeable contribution to the economic output of a country; it generates employment and incomes for the people and therefore the effects of changes in the construction industry on the economy occur at all levels and in virtually all aspects of life". From this it can be understand that neglecting the construction sector in general means that neglecting all sectors, because the construction sector connects directly or indirectly with other sectors of the country. Therefore, it can be said that the construction industry is the driver of the economic growth of the country.

Although, this sector generally seen as a driver of economic growth of the country, the construction companies in Ethiopia have no clear financing trend , and consequently it is difficult to predict the prospects of the construction industry in general. Thus, this study aimed at to know how the construction companies, in Ethiopia, finance their business; and to give some suggestions depending on the result of the study.

2.1.1. **Classification of construction Companies**

Construction companies in the industry are classification in different ways. For instance, according to the economywatch.com, the construction industry can be categorized into three basic categories. These are;

1. Construction involving heavy and civil engineering- It includes the construction of large projects such as bridge, road, etc.
2. General construction-The construction works that involve building of real estate ones such as residential or commercial real estate assets, etc.
3. Construction projects involving specialty trades- Construction works that involve building up of specialized items namely, electric related works, works on woods, etc.

In the same manner, the Ethiopian Government, Ministry of Urban Development and Construction, classifies the construction sector as the companies engaged in

such as an economic activity directed to the creation, renovation, repair or extension of fixed assets in the form of buildings, land improvements of an engineering nature, and other such engineering constructions as roads, bridges, dams and so forth.

As it is mentioned above, in addition to its direct contribution for the socio-economic development, the construction sector highly support other sectors such as manufacturing, agriculture and service sectors in actively participating in the socio-economic development of the country. Without actively involving the construction sector in expanding the necessary infrastructures such as road, bridge and dams for irrigation, housing and generating employment, the expected contribution of those sectors to the economic development of the country cannot be realized.

Now a day, by considering its contribution in various aspects of the economy the FDRE government gives priority to the construction sectors in different ways. The increasing attention dedicated to their role in the economy of the country is clearly illustrated by the report by University Capacity Building Program (UCBP) in collaboration with Ministry of Education, Ethiopia in the year 2006. According to the report, starting from the year 2006, around fourteen heavy construction companies have been engaged in University Capacity Building

Program (UCBP) with a technical support of GTZ IS in building new universities throughout the country, Ethiopia.

Therefore, to enhance the capacity of the construction companies in Ethiopia it is necessary to investigate their trend of capital structure choice depending on the theoretical framework and prior empirical findings of capital structure and in turn, the result of the study will contribute its part to increase the value of the construction companies, and in turn for the industrialization process of the country.

2.1.2. Does financing Decisions in construction companies matter?

Construction companies, just like other types of business, have costs; both variable and fixed costs. Halpin and Senier (2009) noted that in construction companies, the variable costs are the direct costs for labor, machines, and materials as well as the field indirect costs (i.e. production support costs). They also mentioned that the fixed costs of the construction companies are costs incurred at a more or less constant rate independent of the volume of work-in-progress. In order to be in business, a certain minimum of staffs in the home offices, space for home office operations, telephones, supplies and the like must be maintained, and costs for this items are incurred (Haipin & Senior (2009)).

Thus, in order to finance all of these costs, the construction companies have to generate funds either internally or externally.

In connection with the accessibility of funds by construction companies Haipin & Senior (2009) stated the following important points;

> ".....the ability to borrow or access funds plays a critical role in the construction industry. Construction loan and credit can be thought of as the air that inflates the balloon we call the economy. Without it, the economy shrinks, business dries up and projects shut down....."
>
> (Haipin & Senior (2009))

From this we can understand that the construction companies have to get an abiliy to borrow or access funds. But the questions here is that how these companies should finance their business that can enhance the value of the firm.

According to Haipin & Senior (2009) construction financing is mainly concerned with;

1. Project financing; and
2. Company financing

Project financing is effectively a short term activity tied to "line of credit" issues and protocols. Short term financing, as the name indicates, has to do with loans or credits, which must be repaid in the near future (Haipin & Senior (2009)). Company fainancing, as noted by Haipin & Senior (2009), on the other hand, is

handled mainly using commercial bank loans and retained earnings from within the firm or organization.

Therefore, financing decision in construction companies, just like other types of business enterprise, is also crucial decisions that can help them to increase the value of the firm.

Generally, the debate concerning capital structure has been going on for the last few decades and constitutes one of the most important fields of study within financial theory. Modigliani and Miller (1958) showed that, in an idealized world without taxes, the value of a firm is independent of the debt-equity mix. In short, capital structure is irrelevant to the value of firm. The same authors, after five years in 1963 further elaborated that in the absence of taxes and a few assumptions stated in their early study could reveal the insignificance of capital structure to the overall value of the firm.

2.2. Theoretical Framework of Capital Structure

In order to maximize the value of the firm, attempt has been made by the firm's finance manager by employing an optimal capital structure for that particular firm. As Song (2005) describes the term capital structure "it is the mix of different types of securities (Debt, common stock, preferred stock, etc) issued by a company to finance its assets". Always there is a question that: How do firms

choose their capital structure? On the last few decades a number of theories have been developed to answer this puzzling question in explaining the mix of capital structure of the firm. Therefore, this section primarily focuses on reviewing the major capital structure theories; i.e. Modigliani and Miller Theory, Pecking Order Theory (POT), Static Trade-off Theory (TOT) and other capital structure theories.

2.2.1. The Modigliani & Miller (MM) Theory

Modigliani and Miller (1958) present the first capital structure theory called "The Irrelevance theory". This theory was the basis for modern thinking on capital structure and the theory states that, in the absence of taxes, bankruptcy costs, and asymmetric information, and in an efficient market, the value of a firm is unaffected by how that firm is financed. When financial managers are trying to find the particular combination that maximizes the market value of the firm, Modigliani and Miller's (MM's) (1958), famous proposition 1 states that no combination is better than any other in a perfect market. The firm's value is determined by its real assets, not by the securities it issues. It implies that the financing choices of the firm do not affect the firm's investment, borrowing, and operating policies. It also implies the choices of long-term versus short-term debt should have no effect on the overall value of the firm (Brealey, Myers, & Allen, 2008).

Furthermore, the MM's proposition 2 states that the capital structure does affect the expected rate of return on the common stock. According to the weighted-average cost of capital (WACC) developed by MM, return on equity increases in proportion to the debt-equity ratio, but any increase in expected return is exactly offset by an increase in risk and therefore leaving stockholders no better or worse off. The second irrelevance proposition of Miller and Modigliani(1961) concludes that "given a firm's investment policy, the dividend payout it chooses to follow will affect neither the current price of its shares nor the total return to its shareholders" (Miller and Modigliani, 1961). In other words, in perfect markets, neither capital structure choices nor dividend policy decisions matter.

Even though, the irrelevance theory states that any capital structure of the firm doesn't affect the value of the firm, the later researchers find that the assumptions set by M&M highly affected the capital structure of the firm and in turn the value of the firm (Kraus and Litzenberger, 1973; Scott, 1977; Miller, 1977; Kim, 1978; Myers, 1984; Myers and Majluf, 1984; Shyam ,Sunder and Myers,1999; Dang 2005),

2.2.2. Trade-off theory

One of the most arguable issues in corporate finance in general, and capital structure in particular, is whether firms have target debt ratios. The trade-off theory says that firms have an optimal debt-equity ratios, which they determine

by trading off the benefits of debt with the costs (Scott, 1977; Miller, 1977). According to Myers (2001), the trade-off theory justifies moderate debt ratios. It says that the firm will borrow up to the point where the marginal value of tax shields on additional debt is just offset by the increase in the present value of possible costs of financial distress. "Financial distress refers to the costs of bankruptcy or reorganization, and also to the agency costs that arise when the firm's creditworthiness is in doubt" Myers (2001)

As Brealey et al. (2008) state that:

> "Firm's debt-equity decision is a trade-off between interest tax shields and the costs of financial distress. The trade-off theory of capital structure recognizes that target debt ratios may vary from one firm to another. Companies with safe, tangible assets and plenty of taxable income to shield ought to have high target ratios, while companies with risky, intangible assets ought to rely primarily on equity financing. The theoretical optimum is reached when the present value of tax savings due to further borrowing is just offset by increase in the present value of costs of distress. (Brealey et al. (2008))

As noted by Stiglitz (1974 and 1988) (cited in Mei Qiu & Bo La (2010)) "a high level of debt may increase the risk of bankruptcy, so there is a trade-off between the potential tax-saving benefits and the potential bankruptcy costs resulting

from using debt" (Mei Qiu & Bo La (2010) P. 279). Therefore, large and profitable firms with mainly tangible assets should use more debt to reduce their tax obligations as these firms have relatively lower bankruptcy costs borne by each share compared to small firms or firms having mainly intangible assets (Warner, 1977). In general, the static trade-off theory states that firms have optimal capital structures, which they determine by trading off the costs against the benefits of the use of debt and equity. One of the benefits of the use of debt is the advantage of a debt tax shield. One of the disadvantages of debt is the cost of potential financial distress, especially when the firm relies on too much debt. Already, this leads to a trade-off between the tax benefit and the disadvantage of higher risk of financial distress. But there are more cost and benefits involved with the use of debt and equity.

Furthermore, one other major cost factor consists of agency costs. Agency costs stem from conflicts of interest between the different stakeholders of the firm and because of ex post asymmetric information (Jensen and Meckling (1976) and Jensen (1986)). Hence, incorporating agency costs into the static trade-off theory means that a firm determines its capital structure by trading off the tax advantage of debt against the costs of financial distress of too much debt and the agency costs of debt against the agency cost of equity. Many other cost factors have been suggested under the trade-off theory, and it would lead to far to

discuss them all. Therefore, this discussion ends with the assertion that an important prediction of the static trade-off theory is that firms target their capital structures, i.e. if the actual leverage ratio deviates from the optimal one, the firm will adapt its financing behavior in a way that brings the leverage ratio back to the optimal level.

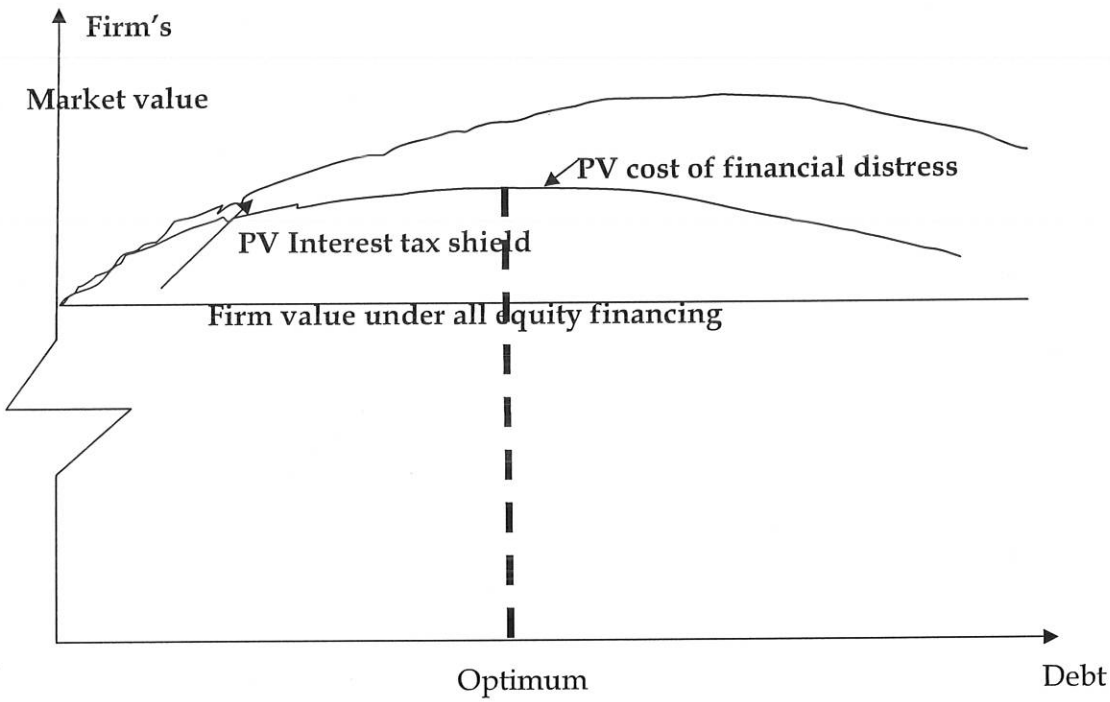


Figure 2.1: The static trade- off theory of Capital structure

Source: Myers (1984)

As the above figure (figure 2.1) shows, one major cost associated with debt is the cost of financial distress which makes firm's reluctant to highly depend on debt as a source of finance. At moderate debt levels the probability of financial distress is negligible but at later point of time the probability of financial distress increases rapidly with additional borrowings.

2.2.3. Pecking order theory

According to Myers and Majluf (1984) and Myers (1984) pecking order theory of capital structure is designed to minimize the inefficiencies in the firms' investment decisions. Due to asymmetric information cost, firms prefer internal finance to external finance and, when outside financing is necessary, firms prefer debt to equity because of the lower information costs. The pecking order theory states that there is no optimal capital structure since debt ratio occurs as a result of cumulative external financing requirements. As it is suggested by Myers and Majluf (1984) and Myers (1984) it starts with the assumption of asymmetric information, indicating that managers know more about their companies' prospects, risks, and values than do outside investors.

Companies want to issue shares when shares are fairly priced or overpriced. Investors understand it and the stock price usually falls when a stock issue is announced. Thus when companies need external financing they prefer debt to

underpriced external equity. This leads to a pecking order, in which investment is financed first with internal funds, reinvested earnings primarily; then by new issues of debt; and finally with new issues of equity. (Brealey, Myers, & Allen, 2008, p.517) This theory has no well-defined optimal target debt ratio because the current leverage of a firm reflects its cumulative requirements of external financing (Morri & Cristanziani, 2009). Pecking order theory assumes the attraction of interest tax shields is the second order. Debt is better than equity when the problem of asymmetric information is considered as the most important issue.

According to Hamberg (2001), the pecking order hypothesis is based on three assumptions: The first assumption says the management of the firm prefers internal financing to external financing. The second assumption that the pecking order theory depending on is as a result, the dividend policy changes so that cash flow from past investments match expected future investments needs.
And the third assumption is when forced to use external financing management choose the safest and least demanding source first, and as they are forced to obtain more external financing, they will do so by working their way down the pecking order.

Hence, the pecking order theory is a consequence of information asymmetries that exist between insiders of any firm and outsiders and it assumes that firms

meet their capital requirement through internal funds use first, before going for external borrowing and equity issuance.

2.2.4. Other Capital Structure theories

Signaling theory of capital structure states that information asymmetry between a firm and outsiders leads the former to make certain changes in the firm's capital structure. Ross (1977), and Myers & Majluf (1984) have shown that under asymmetric information, firms may prefer debt to equity financing. The outcome of the prevailed information asymmetry is that outsiders do not know quite enough or accurate information about the firm's future decisions. This may lead the firm to make certain changes in its capital structure to send certain signals to the outsiders concerning the quality of its financial decisions.

The other capital structure theory is Agency theory, which states that the owners of the firm or shareholders have to bear the cost of the firm. Shareholders have to provide incentives to the managers or agents for the efficient working and increased outputs. Jensen and Meckling (1976) described that if the firm takes loans then the managers have to act as the agent of owners as well as to the debt providers. Therefore, agency cost theory of capital structure states that the optimal capital structure is that point where the agency cost of all the interested parties is at the minimum level.

2.3. Empirical Findings on Capital structure

2.3.1. Empirical findings in developed countries

As evidenced from majority of prior empirical studies, the majority of researches on determinants of capital structure have conducted based on the data obtained from developed countries. Here, in this section a certain empirical findings conducted based on a developed countries data are reviewed.

The study by Deesomsak et al. (2004) have investigated the determinants of capital structure decisions of firms operating in the Asia Pacific region, by taking four countries as a sample namely Thailand, Malaysia, Singapore and Australia. The study uses annual financial data obtained from DATASTREAM covering the period 1993-2001 of respective national stock exchanges. To assess the determinants of capital structure in those of four sample countries, individual firm's leverage ratios are modeled as a function of several firm specific factors in a cross-sectional framework using OLS for each country. According to the report the size of the firm in the sample countries has a positive effect on leverage. It also found a negative relationship between leverage and growth opportunities, non-debt tax shield, liquidity and share price performance. Furthermore, according to the study it is found that the importance of the determinants of capital structure varies across countries in the region. The study, lastly, suggested that the capital structure decisions of firms is not only the product of

the firm's own characteristics but also the result of the corporate governance, legal framework and institutional environment of the countries in which the firm operates.

Mei Qiu & Bo La (2010) specifically investigated the capital structures of Australian firms in relation to firm characteristics. The study used an unbalanced panel of 367 firms observed over a 15-year period from 1992 to 2006. According to the result debt–asset ratio is positively related to asset tangibility but inversely related to growth prospects and business risk measured by unlevered beta of equity. The study also found that profitability of firms in Australia is inversely related to debt ratio of the firm. In relation to this, they noted that "although levered firms are generally more profitable than unlevered firms, profitability decreases the debt ratio of levered firms".

Kalu Ojah and Justo Manrique (2005) have conducted a research study on a topic entitled "Determinants of Corporate debt structure in a privately dominated debt market: a study of the Spanish capital market". The objective of the study was to investigate whether debt structure determinants differ from those in debt markets characterized both private and public debt supplies. The study was conducted on non-financial services firms that are listed on Bolsa de Madrid and that indicate their sources of debt for 1998/1999. The data used by the study were obtained from the data base of Central bank of Spain. Annual financial

reports, including balance sheet, income statements, source and uses of funds statements, and employment size for hundreds of Spanish firms were included in the study. According to the report a double-hurdle test approach were used by the study and the result shows that the likelihood of using bank debt is positively related to firms size and information availability and negatively related to firm's credit worthiness. The likelihood of using non-bank private debt, on the other hand, is positively related to firm size, growth potential, relative firm size and degree of leverage. Furthermore, the study found that except information availability, the amount of firm's bank debt is positively related to firm size, growth potential, information asymmetry and age. The amount of non-bank private debt, on the other hand, is negatively related to growth potential and age and positively related to firm size.

Darren (2006) conducted a study to examine whether capital structure decisions are directly affected by rating concerns focusing on a sample period from 1986 to 2001 based on the data obtained from Standard and Poor's Long Term Domestic Issuer credit Rating. Based on the empirical findings, he argued that besides the extensively investigated firm-level and macroeconomic, the credit ratings directly affect capital structure decisions by managers.

Joaquim and Jacinto (2009) have conducted a research entitled " A two-part fractional regression model for the financial leverage decisions of Micro, Small, Medium, and Large firms" based on the data obtained from central bank of Portugal by taking 4692 firms as a sample. The central objective of the study was to investigate whether the determinants of financial leverage decisions are different for micro, small, medium and large firms and, further, to know the factors that determine whether or not a firm issues debt are different from those that determine how much debt is issues. The study uses a binary choice model to explain the probability of a firm raising debt and a fractional regression model to explain the relative amount of debt issued by the firms. The findings of the study stated that the estimates obtained for the binary choice model indicates that only profitability and liquidity of the firm significantly influence the decisions of issuing debt for all four groups of firms (Micro, Small, Medium and Large firms). In consistent with the assumption implied by Pecking Order Theory, the report stated that the higher the profitability and the amount of liquid reserves of the firms, the less its probability of using Long Term Debt. Furthermore, except for micro firms, the study also found that a significant positive effect of asset tangibility and size of the firm on the probability of raising debt by those of Portuguese firms. The study suggested that the tangibility of assets does not have significant effect on the probability of micro firms in raising debt. According to the study, this is because of the most important source of collateral

for micro firms is the private collateral provided by their owners. But the study also noted that age of the firm is an important variable that explains the probability of firms in raising debt including micro firms. Beside these the study also found a statistically positive effect of Growth on the probability of medium and large firms using Long term debt.

2.3.2. Empirical Findings in Developing Countries

Even though most of the previous studies on the determinants of capital structure were conducted based on the data from developed countries, recently some researchers are starting to conduct a study based on the data from developing countries. For instance, Kunt and Maksimovic (1994) used sample of the largest publicly traded firms in ten developing countries and found that despite the difference between those developing countries and U.S. and other developed countries in terms of financial market development and tax treatment of debt and equity, agency theoretic and tax based models of capital structure predicted capital structure well. The result proves that leverage or total indebtedness is negatively related to the ratio of net fixed assets to total assets. This indicated that even firms with assets that could serve as collateral, finance themselves by retained earnings or equity issues rather than by issuance of long term debt. According to their suggestions the markets for long term credit do not

function effectively in several countries in those samples of 10 developing countries.

Sumit and Pradeep (1999) have examined the relationship between the level of debt in the capital structure and performance for a sample of Indian firms. As they are noted on the study firm level data set, containing information for over 1000 Indian firms for a period ranging from 1988 to 1994 were used for empirical analysis. The result of the study suggested that the effect of debt equity ratio of the sample firms on their performance is negative and significant.

Likewise, Booth et al (2001), have also conducted a research by taking 10 developing countries data to assess whether capital structure theories is portable across countries with different institutional structures. According to their finding, the decisions on capital structure choice of the firms of those developing countries are affected by the same variables as in developed countries. They argued that the variables that are relevant for explaining capital structures in the United States and European countries are also relevant in developing countries, despite the profound difference in institutional factors across these developing countries. Assets tangibility, average tax rate, size, business risk, profitability were taken as independent variables. The results showed that the more profitable the firm having free internal cash flow, the lower the debt ratio. They

also argued that the variables affecting the leverage in developed countries have the same significant effect on the debt ratio in developing countries. The long-term borrowings in developing countries were lower than those of developed countries due to the agency costs of borrowing are high in developing economies. Rataporn et al. (2004) are also investigated the determinants of capital structure of firms in four countries from the Asia Pacific region. According to their finding the firm size has positive effect on the leverage and growth opportunities, non-debt tax shield, liquidity and share price performance has the negative effect on leverage which mainly support to major capital structure theories.

The study that has been conducted by Jorgensen and Terra (2002) has investigated both firm specific, macroeconomic and institutional factors that determine the capital structure in seven Latin American Countries. In their analysis, the effect of tangibility, size, profitability, growth options, tax, and business risk were analyzed in each country. In addition, the effects of macroeconomic and institutional factors (GDP growth, inflation, real interest rate, and real stock returns) were investigated using pooled regression. According to the country-by-country estimation results, tangibility, size, and the presence of tax shields vary across the targeted countries; only profitability shows a consistent negative behavior, and limited support has been found for

business risk. In relation with the growth opportunities, the empirical evidence from their research offers more support for a positive relationship when book-value leverages are used, but the sign of the relationship turns into negative when market value leverage is used. The result of pooled country estimation also shows that only profitability is consistently negative across the different proxies of capital structure. The effect of real GDP growth and inflation are found to be negative, whereas their combined explanatory power is not remarkable. The most important finding of the study by Jorgensen and Terra (2002) is that the explanatory power of the firmspecific factors outweight the explanatory power of the institutional and macroeconomic factors.

Study by Joshua Abor, (2008), on the capital structure of publicly quoted firms, largely unquoted firms and Small and Medium Enterprise (SMEs) in Ghana shows that quoted and largely unquoted firms exhibit significantly higher debt ratio than do SMEs. Further, the result shows that age of the firm, size of the firm, asset structure, profitability, risk and managerial ownership are important in influencing the capital structure decisions of Ghanaian firms. According to the study the gender of the entrepreneur, export status, industry, location of the firm and form of business are also important in explaining the capital structure choice of Small and Medium Enterprises (SMEs).

Besides focusing on firm specific determinants of capital structure, some empirical studies proved the impact of macroeconomic variables on the capital structure decisions of the firm. The study conducted by Jong et al. (2008) to analyzed the direct and indirect impacts of firm-specific factors and country-specific factors of a number of firms from 42 developed and developing countries found that tangibility and firm size in half of the countries have a positive effect on long-term debt ratios at market value, whereas growth opportunities and profitability have a negative effect. With respect to the firm's risk and tax ratios, no plausible results could be obtained. The bond market development and GDP growth rate have a positive impact, while creditor right protection has a negative impact on the long-term debt ratios at market value. What's more, they indicate that market/bank-based financial systems and the stock market development have negative effects on the estimated coefficient of tangibility. On the other hand, the negative impact of profitability and liquidity is further strengthened when more domestic capital funds are accumulated.

More recently, Fawad Ahmed et al. (2011) conducted a research on the determinants of capital structure by using panel data of Pakistani non-financial firms. Besides in United States and other developed countries, the study proves that the two capital structure theories (i.e. Pecking order theory and trade-off theory) are also applicable in Pakistani non-financial sectors. Further, the study

shows that the variables including size, tangibility of assets, non debt tax shield, liquidity and payout has statistically significant relation with leverage. The study also shows that industrial type play very important role in determining capital structure of Pakistani non-financial firms. Based on the regression result of the study profitability, growth of the firm and tax are positively related with leverage and liquidity and size of the firm are inversely related with leverage.

Likewise, Sbeti and Mooa (2012) have conducted an empirical study to investigate the firm level determinants of capital structure in the absence of taxes, using data on 59 Kuwaiti shareholding companies. In order to identify the determinants of capital structure in their idealized tax free environment the study uses Extreme Bound Analysis (EBA). The result of the study shows that the pecking order theory capital structure more explains the variation of capital structure of Kuwaiti Shareholding Companies than trade of theory and it indicates that the robustness of growth opportunity and profitability as a determinants of capital structure. They also suggested that since there is evidence for the importance of those factors, growth opportunity and profitability, in determining capital structure, it is plausible to conclude that the capital structure decision does matter, even in the absence of taxes. Thus, in contrast to the finding by Modigliany & Millier (1958) and (1963), they argued

that in all cases i.e. environment with tax or with not tax, Kuwaiti shareholding companies are concerned with their capital structure.

2.3.3. Empirical Findings in Ethiopia

Although, the area of capital structure and its determinants need intense investigation, yet it is under investigated in Ethiopia. Attempt has been made to investigate the determinants of capital structure by Ashenafi (2005), Kinde (2011) and Amanuel (2011).

Ashenafi (2005) has conducted an empirical study on the determinants of capital structure by taking Ethiopian medium size enterprise as a case. The study tried to test the effect of seven firm level factors including other fiscal benefits, economic risk, size and age of the firm, asset composition, profitability and growth of the firm on the capital structure choice of the firm. To meet this objective the study made pooled time series cross section regression estimates for five years ranging from 1991 to 1996 E.C. According to the study, except size of the firm, all explanatory variables i.e. other fiscal benefits, economic risk, age of the firm, asset composition, profitability and growth of the firm are inversely related with leverage level of the firm.

Likewise, Amanuel (2011) has made a study on the determinants of capital structure evidence from manufacturing share companies in Addis Ababa city.

The objective of the study was to examine the relevance of theoretical internal (firm level) factors determine capital structure of manufacturing share companies in Addis Ababa. In achieving this objective seven explanatory variables i.e. Asset tangibility, non-debt tax shield, firm's profitability, age and size of the firm were regressed against three dependent variables i.e. total debt ratio, short-term debt ratio and long-term debt ratio on a sample of twelve manufacturing firms covering a period of six years from 1996 to 2002 E.C. The study proves that the variables such as tangibility, non-debt tax shield, earning volatility, profitability and size of the firm are the significant determinants of capital structure of the firm.

Furthermore, the study by Kinde (2011), made an empirical study on nine Ethiopian Insurance Companies over the period from 2004 to 2010. The objective of the study was to investigate the determinants of capital structure in the case of insurance industry in Ethiopia. Panel data model with OLS regression analysis technique were used. The study proves that growth, profitability, business risk and age of the firms are significant variables in explaining the capital structure pattern of those insurance companies included in the sample.

2.3.4. Empirical findings on the capital structure of Construction Companies

So far, the empirical studies on the capital structure of construction companies are rare. In relation to this, most of the prior empirical studies on the capital structure of companies in construction industry have been conducted based on developed countries data. For instance, as noted by Adjunct et al.(2008) most studies of capital structure determinants of companies from real estate industry have been performed using US data. In this section the available empirical studies on the capital structure of construction companies are reviewed.

Gau and Wang (1990) (cited in Adjunck et al (2008)) developed and tested a capital structure model for US real estate investment. The result of the study shows that the level of debt financing is negatively related to the amount of non-debt tax shields available, cost of financial distress and to the level of market interest rate. The study conducted by Adjunck et al (2008) itself empirically investigate the capital structure of UK real estate companies. The analysis had been conducted based on accounting data reported to the authority of the UK for the fiscal years 1998 to 2006. As a sample the study included 308 UK real estate companies. To investigate the capital structure of those of real estate companies the study uses panel data regression model. According to the study profitability, tangibility and size are found as a positively related with leverage while asset

turnover and earning variability are negatively related. Furthermore, the study found that UK real estate companies face large adjustment costs.

More recently, Hsien-Hung Herman Yeh (2011) investigated the adjustment behaviour of capital structure over the business cycle of the Taiwan Construction industry. The partial adjustment model with the generalized method of movement (GMM) estimation is used to examine the adjustment behaviour of capital structure in the construction industry within the context of Taiwan during the period 1982 to 2007. The result of the study suggested that the average rate of adjustment is 26.3% of the adjustment gap between the target debt ratios and the previous debt ratios for firms in the construction industry of Taiwan and firms with the financial constraint of over leverage relative to the target debt ratios have lower debt ratios than those firms with the financial constraint of under-leverage. In addition, the findings suggested that macroeconomic conditions do not have a significant, negative effect on debt ratios.

Generally, although construction companies have special features that make them an interesting case study for investigating their capital structure choice, no attention has been given to this sector in Ethiopia. Therefore, this study has been conducted to overcome this shortcoming and encourage the future researchers to go further for the development of the Ethiopian construction sector.

2.4. Empirical Determinants of Capital Structure

Considering the literature on capital structure, as well as available data, this section describes a number of factors that determine the capital structure decisions of firms which are already identified by a number of prior empirical studies.

The theoretical and empirical studies on the firm specific determinants of capital structure are extensive. In this regard, Harris & Raviv (1991) for instance, summarizes a number of empirical studies from US firms, suggesting that —leverage increases with fixed assets, non-debt tax shields, investment opportunities and firm size, and decreases with volatility, advertising expenditure, and the probability of bankruptcy, profitability and uniqueness of the product.

Although a lot of empirical studies have been conducted to test the firm specific determinants of firm's capital structure, it is found that the results are mixed. This may arise due to the proxies or measurements of determinants that are used by the researchers on different understanding or the study area that the researchers focus on. Under this section selected firm specific determinants of capital structure which are empirically studied by the researchers are extensively reviewed.

2.4.1. Profitability

There are conflicting theoretical predictions on the effects of profitability on leverage. In the Trade of Theory (TOT), a positive relationship between a firm's profitability and debt is expected because taxes, agency costs and bankruptcy costs push more profitable firms towards higher leverage. More profitable firms should prefer debt to benefit from the tax shield. Moreover, when firms are profitable, all things being equal, they increase their free cash flow and the marginal benefit of using debt to discipline managers. Finally, an increase in profitability reduces the likelihood of firm bankruptcy and the cost of financial distress originated by the use of debt. Thus, all these reasons lead the TOT to predict a positive relationship between profitability and debt.

According to the Pecking Order theory (POT) by Myers and Majluf (1984), the contrary relationship is predicted when firms prefer using internal sources of financing first, then debt and finally external equity obtained by stock issuing. According to this argument, firms passively accumulate retained earnings, becoming less levered when they are profitable, and accumulate debt, becoming more levered when they are unprofitable. All things being equal, the more profitable the firms are, the more internal financing they will have, and therefore we should expect a negative relationship between leverage and profitability.

Most empirical studies showed a negative relationship between leverage and profitability, for example Harris and Raviv (1991), Rajan and Zingales, (1995), Huang and Song, (2002), Booth et al., (2001), Titman and Wessels, (1988), Friend and Lang (1988) and Kester, (1986). Ashenafi (2005) also found the inverse relationship between leverage (capital structure) and profitability. He justified the reason for this relationship as the Ethiopian medium sized enterprise put less reliance on bank loans as their profitability increase. Likewise, Kinde (2011) on his study focusing on Ethiopian Insurance Company found that a significant negative relationship between profitability and long-term debt.

On the other hand, Mei Qiu & Bola (2010) empirically found that profitability of the firm is directly related with its leverage. According to their finding, levered firms are generally more profitable than unlevered firms, and result shows that only 17.3% of levered Australian firms were unprofitable compared with 43.7% of unlevered firms running at losses.

Thus according to what is forecast by pecking order theory, the most profitable companies with greater capacity to self-finance, resort less to external equity, compared to less profitable companies, and so the study expects inverse relationship between profitability of the firm and level of leverage or debt ratio.

2.4.2. Growth Opportunity

Pecking order theory by Myers and Majluf (1984) stated that firms finance their projects from the internally generated funds. However, the growing firms may not be capable to finance all its growth by the internally generated funds. Consequentially, firms with relatively high growth will tend to issue securities less subject to information asymmetries, i.e. short-term debt. This should lead to firms with relatively higher growth having more leverage. Therefore, according to pecking order theory assumption growing firm requires high capital and internal funds are insufficient to meet requirements, and so firms use external borrowing. This results increase in level of leverage.

Trade-Off Theory, on the other hand, argues the existence of a negative relationship between growth opportunities and level of debt. According to this theory as companies with good opportunities for growth are encouraged to invest in high risk projects so as to maximise shareholders' income in detriment to creditors (Myers (1977)). This will results a negative relation with debt. As noted by Shah & Khan (2007) "deeming their investments at risk in future, bondholders will impose higher costs at lending to growing firms. Growing firms, thus, facing higher cost of debt will use less debt and more equity".

The empirical findings on the relationship between growth opportunity and leverage of the firm are also mixed. For instance, consistence with pecking order theory Ronny & Clairette (2003) found statistical significant, positive relationship between growth and leverage of non-financial corporate of Mauritius. Likewise, Paulo & Zelia (2007) reported positive but insignificant relationship between growth opportunity and leverage. More recently, in Ethiopia Kinde (2011) and Amanuel (2011) empirically found significant positive relationship. On the other hand, Titman and Wessels (1988), Barclay et al. (1995) and Rajan and Zingales (1995) (cited in Shah & Khan (2007)) all found a negative relationship between growth opportunities and leverage. In conformity with this Shah & Khan (2007) themselves found a statistically significant negative relationship between growth opportunity and leverage and they mentioned that growing listed Pakistanis' non-financial firms do not use debt financing.

2.4.3. Size of the firm

Trade off theory predicts a positive relationship between company size and their level of leverage. According to Warner (1977) and Ang et al. (1982), (cited in Paulo et al (2007)) this positive relation exists because larger companies present greater possibilities to diversify and a lower risk of bankruptcy.

There are several theoretical reasons why firm size would be related to the capital structure. Chung, (1993) and Grinblatt and Titman, (1998) justified that

smaller firms may find it relatively more costly to resolve informational asymmetries with lenders and financiers, which discourages the use of outside financing and should increase the preference of smaller firms for equity relative to debt.

> "Larger firms tend to be more diversified and fail less often, so size (computed as the logarithm of net sales) may be an inverse proxy for the probability of bankruptcy. If so, size should have a positive impact on the supply debt. However, size may also be a proxy for the information outside investors have, which should increase their preference for equity relative to debt." Rajan and Zingales (1995 P. 1451)

A study by Mei Qiu & Bo La (2010) found that a positive relationship between firm size and leverage level of the firm. They suggested that "on average, indebted firms are five times larger than firms that do not use debt financing". Thus, in relation to size of the firm in this empirical study, the researcher expects a direct relationship between firm size and level of leverage.

2.4.4. Tangibility of Assets

According to trade-off theory, the asset's tangibility is assumed to have a positive impact on the use of debt by the firm to finance its operations. It means that the higher the firm's tangible assets or fixed assets, the higher the firms inclined to

use debt financing. Thus, it is expected that higher levels of collateral contribute to the firm turning more to debt. Mayers (1977) noted that "a higher fixed- to-total assets ratio provides greater possibilities for collateralizing bank loans or other debt arrangements". Furthermore, Scott (1977) stated that, companies with higher levels of collateral find it easier to access debt, given that companies' fixed assets contribute to reduced information asymmetry between managers/shareholders and creditors, as a consequence of the latter being able to recuperate the capital owed in the form of collateral in the case of company failure. Thus, as it is assumed from the theoretical point of view, that tangible assets can be used as collateral. Therefore higher tangibility lowers the risk of a creditor and increases the value of the assets in the case of bankruptcy. As Booth et al. (2001) state: "The more tangible the firm's assets, the greater its ability to issue secured debt and the less information revealed about future profits." Thus a positive relation between tangibility and leverage is predicted.

Rajan and Zingales, (1995), Friend and Lang, (1988) and Titman and Wessels, (1988) found positive relation between tangibility and leverage. On the other hand, Huang and Song (2002) experience a negative relation between tangibility and leverage. But regarding maturity structure, Booth et al. (2001) argued that the influence of tangibility will differ between the long-term and total-debt ratios as firms match the maturity of their debt to the tangibility of their assets.

According to the result, the more tangible the asset mix, the higher the long term debt ratio, but the smaller the total-debt ratio (Booth et al., 2001)

In Ethiopia, just like Huang and Song (2002), Ashenafi (2005) also found an inverse relationship between asset tangibility (asset composition) and capital structure. Although, the result shows statistically insignificant, Kinde (2011) also found negative relationship between asset tangibility and capital structure.

2.4.5. Non-debt tax shields

From the theoretical point of view, the Trade of Theory (TOT) predicts that companies have an incentive to take debt because they can benefit from the tax shield due to interest deductibility such as depreciation. Thus, TOT assumes an inverse relationship between non-debt tax shield and leverage. Some empirical studies confirm the theoretical prediction. For example, Titman and Wessels, (1988) and Huang and Song(2002) found a negative relation between non-debt tax shields and leverage. The study that has been conducted by Ashenafi (2005) on Ethiopian medium size enterprise also shows an inverse relation between capital structure (leverage) and non-debt tax shield (also called other fiscal benefit). Amanuel (2011) also found significant inverse relationship between non-debt tax shield and both long-term and total debt ratio.

In addition, according to DeAngelo and Masulis, (1980) and Graham (2000) description, if firms have non-debt tax shields (NDTS), such as depreciation and

investment tax credits, they have a lower incentive to use debt from a tax shield point of view and hence use less debt.

2.4.6. Earnings Volatility

Earnings volatility is a proxy for the probability of financial distress and the firm will have to pay a risk premium to outside providers of funds. To reduce the cost of capital, a firm will first use internally generated funds and then outsider funds. This suggests that earnings volatility is negatively related with leverage. This is the combined prediction of trade-off theory and pecking order theory. Empirical study by Bradley et al. (1984) and Titman and Wessels (1988) confirmed the negative relationship between earning volatility and leverage. However, as Huang and Song (2002) suggestions based on findings of Hsia (1981): "As the variance of the value of the firm's assets increases, the systematic risk of equity decreases. So the business risk is expected to be positively related to leverage." In connection to this Kim and Sorensen, (1986) and Huang and Song (2002) found a positive relation between volatility and leverage.

Ashenafi (2005) have empirically proved negative relationship between economic risk (measured as a variability of sales) and capital structure. In contrast, Kinde (2011) found significant positive relationship between business risk and the ratio of debt to equity and long term debt.

2.4.7. Liquidity

Trade of theory and Pecking order theory has two contrasting views about the relationship between liquidity and debt ratio (leverage ratio). According to TOT the more liquid firm would use external financing due to their ability of paying back liabilities and to get benefit of tax-shields, resulting in positive relationship between liquidity and leverage. POT, on the other hand, assumes that the more liquid firm would use first its internal funds and would decrease level of external financing, resulting in negative relation between liquidity and leverage.

Empirical evidence confirmed the negative relationship between liquidity and leverage; for example Mazur (2007) , Shahjahanpour et al. (2010) and Fawad Ahmed et al. (2011) found negative relationship between leverage and liquidity. Inversely, Kinde (2011) found a significant positive relationship between liquidity and leverage in Ethiopian Insurance Companies capital structure.

2.4.8. Age of the Firm

Since the establishment of the business, the number of years in which the business is in operation is considered as an important determinant of capital structure. Based on trade of theory, it is argued that as a firm operates for a long period of time, it establishes a reputation and increases its capacity to take more debt from any lenders. In this regards, as mentioned by Joshua Abore (2008) concerning banks first task as "before granting a loan, banks tend to evaluate the

creditworthiness of entrepreneurs as these are generally believed to pin high hopes on very risky projects promising high profitability rates" and it reveals that age of the firm is positively correlated with leverage.

On the other hand, it may also be argued that as the firm matures it builds reputation leading to better access to equity markets and it implies that age should be negatively related to leverage, and is consistent with pecking order theory.

Consistent with trade of theory, majority of the empirical results in Ethiopia shows that there is a positive relationship between age of the firm and leverage. Kinde (2011) and Amanuel (2011). Ashenafi (2005), in the contrary found inverse relation between age and leverage in consistent with pecking order theory.

In general, one of the important decisions that the finance managers of construction companies are concerned with is decisions relating to capital structure. In order to formulate the target capital structure of the firm that may increase its value, finance manager of the firm should concerned with the trading off possible benefit of financing the operation of the firm through debt and its cost.

Prior empirical study in Ethiopia mainly focuses on examining the determinants of capital structure of companies from different sector (e.g Ashenafi (2005) and

Amanuel (2011)). However, the empirical evidence suggests that there is significant industry influence on capital structure decisions of the companies. As noted by Harris and Raviv (1991) and Esperança et al. (2003) firms in the same industry have more in common than firms in different industrie and thus, the capital structure of firms is highly affected due to industry difference. So, analyzing separate industry, in this case the Ethiopian Construction industry individually may produce better results. Moreover, through updating the dataset and including some important explanatory variables; such as Earning volatility and Liquidity, the result can be improved. Therefore, this empirical study is designed to address these short coming and, further, to find out industry specific determinants of capital structure by taking Ethiopian Construction sector as a case.

CHAPTER THREE - RESEARCH METHODOLOGY

The study aims to conducting a research study to examine the determinants of capital structure decisions of large construction companies in Addis Ababa. In this section the choice of research approach with the way how the data have been collected, Method of Sampling and sample size, Variables descriptions and related Hypothesis, Econometric Model specification and discussion of different measures of both dependent and independent variables are explained.

3.1. Research Approach

According to Creswell (2003), the problem that is going to be investigated in the study is used as a base for determining the research approach. He noted that if the problem is identifying factors that influence an outcome, the utility of an intervention or understanding the best predictors in outcomes, then a quantitative approach is best. Therefore to understand and analyze the possible determinants of capital structure decisions of companies in Ethiopian construction industry and to know which capital structure theory explains the variations on the capital structure of the companies the researcher has adopted a quantitative research approach.

In general Creswell (2009) stated three basic types of research approaches, i.e. qualitative, quantitative and mixed research approach. In the quantitative approach, results are based on numbers and statistics that are presented in figures, whereas in qualitative research approach where focuses on describing an event with the use of words. Mixed research approach, on the other hand, lies in between.

Thus, to gain a deeper understanding of the issue of determinants of capital structure firms in Ethiopian Construction Industry and ultimately to achieve the above mentioned objectives of this research study the researcher has used quantitative research approach. As noted by Yesgat (2009) the quantitative research approach translated the research problem in to specific variables and hypothesis to be tested (Yesgat, 2009, p.70). Thus, it enables the researcher to get a deep understanding about the area being investigated. In investigating the determinants of capital structure of firms in Ethiopian Construction industry, the researcher tried to test the relationship between leverage ratio, which is a dependent variable, and eight explanatory variables. Therefore, in such a case a quantitative research approach plays a vital role and Yesgat (2009) noted to support this idea as a "quantitative research approaches tests the theoretically established relationship between variables using sample data with the intention of statistically generalising for the population under investigation". Thus, this study

was conducted to test which capital structure theory, mainly trade off theory (TOT) or Pecking Order theory (POT) of capital structure, can explain the variation on the leverage ratio of the companies by taking the construction industry as a case.

In examining the capital structure decisions of large construction companies' one dependent variable i.e. Leverage Ratio of the companies which is measured by the ratio of total debt (short-term liability plus long-term liability) and total asset, were regressed against eight firm specific independent variables. This attempting to know the relationship between dependent and independent variables reveals that the study is mainly explanatory type of research.

3.2. Method of Sampling and Sample size

As noted by Cohen et al. (2005) the "questions of sampling arise directly out of the issue of defining the population on which the research will focus". Further, they stated that "factors such as expense, time and accessibility frequently prevent researchers from gaining information from the whole population. Therefore they often need to be able to obtain data from a smaller group or subset of the total population in such a way that the knowledge gained is representative of the total population under study" (Cohen et al. (2005) P.92).

This study was conducted on Ethiopian Construction Industry, in which a total of forty-five construction companies[1] are operating at the moment and classified as a large construction companies by Ethiopian Revenue and Custom Authority. Therefore, as noted by Cohen et al. (2005), covering the entire construction firms in the study makes the study difficult. Therefore the researcher decided to draw only 11 companies as a sample from the total population. To give equal chance for each construction company being included in the sample, random sampling technique have been used. Thus only 11 construction companies, which is 24 percent of the total population, have, therefore, been drawn randomly from the whole population. Those sample construction companies includes

- ADAM CONSTRUCTION
- AFRO-TSION CONSTRUCTION P.L.C
- DMC CONSTRUCTION
- ELIMO OLINDO CONSTRUCTION
- MIDROK CONSTRUCTION
- NASEW CONSTRUCTION P.L.C.
- SUR CONSTRUCTION P.L.C.
- BLUE NILE CONSTRUCTION
- UNIVERSAL CONSTRUCTION
- YOFTAY CONSTRACTION
- YOTEK CONSTRUCTION P.L.C

[1] Those 45 large construction companies were obtained from Ethiopian revenue and custom authority, office of large tax payers. List of all construction companies are presented on appendix 5.

3.3. Source of data and Data Collection Instruments

To meet the objectives of this study, the researcher highly relayed on secondary source of data. Panel data i.e. annual financial report of 11 construction companies, covering the period from 2006 to 2010 were used for the study. To increase the reliability of the data used in the study and in order to avoid possible distortion of the data, audited financial statements of the companies obtained from Ethiopian Revenue and Custom Authority (ERCA) were collected and used. To further explain the result manuals, journal articles, books, doctoral and master thesis, and materials from different internet sites have been used as a supportive source of data.

3.4. Variables Description and related Hypotheses

The study aims to conduct a research study to investigate the determinants of capital structure of large construction companies. On the basis of research objectives one dependent variable against eight independent variables were investigated in this study. Variables examined in this study and their measurements are formulated from existing literature (e.g. Rajan and zingals(1995), Joshua Abor and Nicholas Biekpe (2005), Akinlo Olayinka (2011) and Fawad Ahmad (2011)) with some adjustments to suit this study and it has been useful for the meaningful comparison of the last findings with these and other prior empirical studies.

The description of both dependent and independent variables with related hypothesis is discussed below;

3.4.1. Dependent Variables

The dependent variable in this study is Leverage ratio, measured by the ratio of total liabilities (short term liability plus long term liability) and total assets. This is supported by various prior empirical studies such as Rajan and Zingales, (1995); Demirguc-Kunt and Maksimovic, (1996); and Booth et al., (2001). The majority of prior literatures does not give a clear cut definition of leverage ratio and researchers choose its measurement depending on the objective of their study. For instance, Rajan and Zingales (1995) apply four alternative definition of leverage (i) the ratio of total liabilities and to total assets (ii) the ratio of debt to total assets (iii) the ratio of total debt to net assets and (iv) the ratio of total debt to capital.

For this study the researcher has used the leverage ratio as a dependent variable which is measured by the ratio of total debt to total assets. Due to some missing data the researcher restricted on examining the relationship between the ratio of total debt and total assets and eight explanatory variables.

3.4.2. Independent Variables

As an independent variables the researcher has tested a total of eight firm-specific explanatory variables i.e. Profitability, Growth opportunity, size, asset tangibility, Non-debt tax shield, Earning volatility, Liquidity and age of the firm. The description of those explanatory variables and related hypothesis is described as follows;

3.4.2.1. Profitability

There are conflicting theoretical predictions on the effects of profitability on leverage. In the Trade of Theory (TOT), a positive relationship between a firm's profitability and debt is expected because taxes, agency costs and bankruptcy costs push more profitable firms towards higher leverage. More profitable firms should prefer debt to benefit from the tax shield. Moreover, when firms are profitable, all things being equal, they increase their free cash flow and the marginal benefit of using debt to discipline managers. Finally, an increase in profitability reduces the likelihood of firm bankruptcy and the cost of financial distress originated by the use of debt. Thus, all these reasons lead the TOT to predict a positive relationship between profitability and debt.

According to the Pecking Order theory (POT) by Myers and Majluf (1984), the contrary relationship is expected when firms prefer using internal sources of

financing first, then debt and finally external equity obtained by stock issuing. According to this argument, firms passively accumulate retained earnings, becoming less levered when they are profitable, and accumulate debt, becoming more levered when they are unprofitable. All things being equal, the more profitable the firms are, the more internal financing they will have, and therefore we should expect a negative relationship between leverage and profitability. This negative relationship is one of the most systematic findings in the empirical literature. Harris and Raviv (1991), Rajan and Zingales (1995), and Boot *et al.* (2001), among others, have highlighted that the debt ratio is inversely related to profitability.

Thus, according to what is forecast by pecking order theory, the most profitable companies with greater capacity to self-finance resort less to external equity, compared to less profitable companies. Thus, negative relationship between profitability and leverage ratio has been hypothesized for this study. Profitability in this study was measured as a ratio of earnings before interest and tax (EBIT) to total assets.

In literatures, various measures such as ratio of operating income over sales and operating income over total assets (Titman and Wessel (1988)), the return on total assets, which is calculated as the ratio of EBIT to total assets (Rajan & Zingals

(1995), Ozkan (2001), Gaud et al(2005)) were used as a measure of profitability. In this study the researcher used the ratio of EBIT to total assets as a measure of profitability.

Hypothesis 1: There is negative relationship between profitability of the construction companies and its leverage ratio

3.4.2.2. Growth Opportunity

Based on the Pecking order theory of capital structure, firms mostly relied to finance its projects from the internally generated funds. But, the growing firms may not have sufficient internal funds to finance all of its growth by the internally generated funds and consequentially, firms with relatively high growth will tend to issue securities less subject to information asymmetries, i.e. short-term debt. This should lead to firms with relatively higher growth having more leverage. Therefore, according to packing order theory assumption growing firm requires high capital and internal funds are insufficient to meet requirements, and so firms use external borrowing. This results increase in level of leverage.

Contrary to this, Trade-Off Theory suggested that companies with good opportunities for growth are encouraged to invest in high risk projects so as to maximise shareholders' income in detriment to creditors (Myers (1977)). This

will result existence of a negative relationship between growth opportunities and level of debt. As noted by Shah & Khan (2007) "deeming their investments at risk in future, bondholders will impose higher costs at lending to growing firms. Growing firms, thus, facing higher cost of debt will use less debt and more equity".

As per the pecking order theory hypothesis, in this study the researcher hypothesized that there is a positive relationship between growth opportunity of the firm and its debt ratio. Several measurements have been used by different researchers to measure the growth opportunity of the companies. For example, Titman & Wessel (1988) used the firm's annual growth rate of total assets as a proxy of firm's growth opportunity. The ratio of advertising expense to total sales as a proxy of growth opportunity was used as a proxy by Graham (2000). Similarly, the ratio of market value of assets to book value of assets can be used as a proxy of firm's growth opportunity (Mayers (1977), Rajan & Zingals (1995), Gaud et al (2005)).

In this study, growth opportunity of the firm is measured by the annual growth rate of total assets.

Hypothesis 2: The construction companies with high growth opportunity have high leverage ratio

3.4.2.3. Size

There are several theoretical reasons why firm size would be related to the capital structure. Chung, (1993) and Grinblatt and Titman, (1998) justified that smaller firms may find it relatively more costly to resolve informational asymmetries with lenders and financiers, which discourages the use of outside financing and should increase the preference of smaller firms for equity relative to debt. To proxy for the size of a company, the natural logarithm of annual total revenue can be used as a measure of size. Another possibility is to proxy the size of a company by the natural logarithm of total assets. Since most of the prior empirical studies used natural logarism of total revenue as the proxy of size of the firm (e.g. Titman and Wessels, 1988; Rajan and Zingales, 1995; Ozkan, 2001), the researcher in this study used Natural Logarism of sale as a proxy for the size of the firm and expected that it will have positive effect on the leverage level of the construction companies.

Hypothesis 3: There is positive relationship between company's size and leverage

3.4.2.4. Asset Tangibility

According to trade-off theory, it is expected that higher levels of collateral contribute to the firm turning more to debt. In relation to this, Scott (1977) stated that, companies with higher levels of collateral find it easier to access debt, given that companies' fixed assets contribute to reduced information asymmetry

between managers/shareholders and creditors, as a consequence of the latter being able to recuperate the capital owed in the form of collateral in the case of company failure. As noted by Gaud et al. (2005), tangible assets are likely to have an impact on the borrowing decisions of a firm because they are less subject to informational asymmetries and they have a greater value than intangible assets in case of bankruptcy. Therefore, based on trade-off theory forecast, the study forecast a positive relationship among the level of the firm's tangible assets (fixed assets) and their leverage ratio. For this study the ratio of total fixed assets to total assets were used as a proxy for tangibility of assets (supported by Gaud et al. (2005), Akinlo Olayinka (2011), Fawad Ahmed (2011)).

Hypothesis 4: A firm with higher percentage of fixed assets will have higher leverage ratio.

3.4.2.5. Non-debt tax shields

The Trade of Theory (TOT) predicts that companies have an incentive to take debt because they can benefit from the tax shield due to interest deductibility. However, according to DeAngelo and Masulis, (1980) and Graham (2000), if firms have non-debt tax shields (NDTS), such as depreciation and investment tax credits, they have a lower incentive to use debt from a tax shield point of view and hence use less debt. Thus, based on the empirical results reported by DeAngelo and Masulis, (1980) and Graham (2000), the researcher for this study predicted a negative coefficient for NDTS in the equation explaining firm's

leverage. Following the measurement used by Titman & Wessel (1988), Ozkan (2001) and Fawad Ahmed (2011), the ratio of annual depreciation expense to total assets has been used as a proxy for non-debt tax shield in this study.

Hypothesis 5: There is negative relationship between NDTS and leverage ratio of the companies.

3.4.2.6. Earning Volatility

Earnings volatility is a proxy for the probability of financial distress and the firm will have to pay a risk premium to outside providers of funds. To reduce the cost of capital, a firm will first use internally generated funds and then outsider funds. This suggests that earnings volatility is negatively related with leverage. This is the combined prediction of trade-off theory and pecking order theory. Thus following the prediction of trade-off theory and pecking order theory, this study expects negative relationship between Earning volatility and leverage. To measure volatility of the company's earnings the absolute value of change in earnings before interest and tax (EBIT) has been used as a proxy.

Hypothesis 6: There is negative relationship between earning volatility and leverage ratio of the companies

3.4.2.7. Liquidity

Trade of theory and Pecking order theory has two contrasting views about the relationship between liquidity and debt ratio (leverage). According to TOT the more liquid firm would use external financing due to their ability of paying back liabilities and to get benefit of tax-shields, resulting in positive relationship between liquidity and leverage. POT, on the other hand, assumes that the more liquid firm would use first its internal funds and would decrease level of external financing, resulting in negative relation between liquidity and leverage. Since most of prior empirical studies have found the negative relationship, in this it was expected that there is a negative relationship between liquidity and leverage. Liquidity is measured as a ratio of total current asset to short term liability.

Hypothesis 7: There is negative relationship between Liquidity and leverage of the firm

3.4.2.8. Age of the firm

Trade of theory argued that as a firm operates for a long period of time, it establishes a reputation and increases its capacity to take more debt from any lenders and it reveals that age of the firm is positively correlated with leverage. This suggested positive relationship between age of the firm and leverage is confirmed by number of researchers. For example, Petersen and Rajan (1994) suggest that older firms are higher quality firms and should have higher debt ratios. Likewise, Barton et al. (1989) noted that it is expected that matured firms

will experience lower earnings volatility, and hence, they will have higher debt ratios.

On the other hand, it may also be argued that as the firm matures it builds reputation leading to better access to equity markets and it implies that age should be negatively related to leverage, and is consistent with pecking order theory.

A positive relationship between firm's age and leverage is hypothesized in this study and age is measured by the number of years since the establishment of the companies.

Hypothesis 8: The age of the companies is positively related with their leverage ratio

The following table summarizes the dependent and independent variables, their measurements (proxy) and expected effect on the leverage ratio of the construction companies.

Table 3.1: Potential determinants of Capital Structure, Corresponding measures and expected effect on Leverage ratio.

Variables	Measures (Proxies)	Expected effect
Dependent Variable		
Leverage Ratio	Total liability/Total asset	
Independent Variables		
Profitability	EBIT/ Total Assets	-
Growth Opportunity	Growth of total assets	+
Size	Natural Logarithm of annual revenue	+
Tangibility of Assets	Fixed assets / Total assets	+
Non-debt Tax Shield	Annual depreciation expense/Total asset	-
Earning Volatility	Absolute value of percentage change of EBIT	-
Liquidity	Total Current assets/ Current liabilities	-
Age of the Companies	Number of years in operation	+

Note: EBIT is Earning before interest and tax (Operating Income)

3.5. Regression Model Specification

The study used a panel data which combines the features of both time-series and cross-sectional data. As noted by Shah & Khan (2007), "Panel data follows a given sample of individuals over time, and thus provides multiple observations on each individual in the sample". They also noted that panel data provides information on a number of statistical units for a number of years. (Shah & Khan (2007) P.273)

Regarding the use of panel data, Paula & Zelia (2007 P.552) mentioned two basic benefits. The first benefit of working with panel data is understanding the development overtime of the relationship between explained variables and explanatory variables. The other benefit of using panel data is allowing the

researcher to measure the difference between companies which are not observable and these differences having the name of individual effect.

Furthermore, Shah & Khan (2007) noted that "panel data usually provides the researcher a large number of data points, increasing the degree of freedom and reducing the collinaerity among explanatory variables and therefore, it improves the efficiency of econometric efficiency".

As noted by Ooi (1999) (cited in Guven Sayilga et al. (2006)), the panel regression equation differs from a regular time-series or cross-section regression by the double subscript attached to each variable. According to Brook (2008), there are two types of models used for estimating the coefficients, used for panel types of data. (i) Panel fixed effect model and (ii) Panel random effect model. He further mentioned the distinctive features of both types of models. A random effects model is more appropriate when the entities (in this case construction companies) in the sample can be thought of as having been randomly selected from the population but a fixed effect model is more plausible when the entities in the sample effectively constitute the entire population. Additionally, Brook (2008) stated two basic importance of panel random effect estimation. The first one is the transformation involved in the GLS procedure under the random effects approach will not remove the explanatory variables that do not vary over time, and hence their impact on *yit* can be enumerated. And the other one is

since there are fewer parameters to be estimated with the random effects model (no dummy variables or within transformation to perform) and therefore degrees of freedom are saved, the random effects model should produce more efficient estimation than the fixed effects approach. Therefore, because of sampling procedure adopted for the study and aforementioned importance, the panel random estimation has been used for this study.

The difference between panel fixed effect and random effect model also lies on the effect of individual effect of the constant term α_i on the explanatory variables. In panel fixed effect model, the individual effect α_i *is correlated* with explanatory variables X_{it}, while in panel random effect model, the individual effect α_i is uncorrelated with explanatory variables X_{it} and thus, the error term become $(\mu_{it} + \varepsilon_{it})$, where is a group specific random element.

The panel random effect regression model that has been used for this study is, therefore, shown as:

$$y_{it} = \alpha + \beta' X_{it} + (\mu_{it} + \varepsilon_{it}),$$

with $i = 1,\ldots\ldots,11;\ t = 1,\ldots\ldots,5$ .....(1)

(Rajan and zingals(1995), Guven Sayilga et al. (2006), Shah & Khan (2007), Akinlo Olayinka (2011) and Fawad Ahmad et al. (2011))

in which *i* represents the number of construction companies in the sample or it is a cross-section dimension and *t* is the time-series dimension or period of time covered by the study. The variable **yit** represents the explained variable, Leverage Ratio, for the ith company at time t, α represents the company-specific intercepts, $\beta^{'}$ is the vector of the evaluated parameters, ***Xit*** contains the set of explanatory variables for the *i*th firm in the ***t*th** period and $\mu it + \varepsilon it$ represents the error vector.

The full regression model for the empirical investigation in estimating determinants of capital structure for construction companies is, therefore, given as:

$$LEVR_{i,t} = \alpha + \beta 1PRO_{i,t} + \beta 2GROW_{i,t} + \beta 3SIZE_{i,t} + B4TANG_{i,t} + \beta 5NDTS_{i,t} + \beta 6EVOL_{i,t} + B7LIQU_{i,t} + \beta 8AGE_{i,t} + (\mu it + \varepsilon it) \ldots\ldots (2)$$

Where:

LEVR $_{i,t}$ = Leverage Ratio (Total debt/ Total assets) for firm i in time t

PRO $_{i,t}$ = Profitability (ratio between Operating Income and Total Assets) for firm i in time t

GROW$_{i,t}$ = Growth Opportunity (Growth of total assets) for firm i in time t

SIZE $_{i,t}$ = Size of the firm (Logarithm of Total revenue) for firm i in time t

TANG $_{i,t}$ = Asset structure (Fixed Assets / Total Assets) for firm i in time t

NDTS $_{i,t}$ = Non debt tax shields (annual depreciations expense /Total Assets) for firm i in time t

EVOL i,t = Earnings Volatility (absolute value of percentage change of Operating Income) for firm i in time t

LIQU i,t = Liquidity (the ratio of current assets to Short-term liability) for firm i in time t

AGE i,t = Age of the companies (since its establishment)

$\mu it + \varepsilon it$ = Error tem which is assumed to have a normal distribution and α is constant term, $\beta 1$, $\beta 2$, $\beta 3$, $\beta 4$, $\beta 5$, $\beta 6$, $\beta 7$and $\beta 8$ are the coefficients of firm- specific variables

3.6. Data Analysis technique

The above econometric model reveals that there is a regression analysis between one dependent variable (leverage ratio) against eight independent variables (Profitability, growth opportunity, size, tangibility of assets, non-debt tax shield, earnings volatility, liquidity and age) and therefore, multiple regression analysis have been used for the study. In analyzing the data, the researcher used SPSS 16 software packages. The diagnostic tests and estimating the result for the study were conducted through SPSS 16 software package, because the researcher believes that SPSS software package is relatively simple to understand for diagnostic test, estimating and interpretation of the result.

In general, to examine the determinants of capital structure of construction companies' quantitative research approach with unstructured interview have been employed. Of the total population of 45 large construction companies

obtained from ERCA office of large tax payers, only 11 companies have been included in the study. Factors that might explain the capital structure decisions of firm are a broad concept that needs further investigation from different perspective. This is the one which tried to investigate and analyze the determinants of capital structure decision of Firms in Ethiopian Construction industry. The aim of the study is to investigate and analyze the firm-specific determinants of capital structure decisions of companies in Construction industry of Ethiopia by including a certain important new explanatory variables which are empirically investigated by few researchers.

CHAPTER FOUR - EMPIRICAL RESULTS AND DISCUSSIONS

The study examines the determinants of the capital structure choice of large construction companies operated in Addis Ababa, Ethiopia. The sample contains 11 large construction companies listed at Ethiopian Revenue and Custom Authority (ERCA) as large tax payers, for which five consecutive year's financial data for the period between the years 2006 – 2010 were used.

In examining the determinants of capital structure of construction companies, the researcher used a regression analysis to test the effect of eight independent (explanatory) variables on the dependent (explained) variable i.e. LEVERAGE RATIO. Thus, in this study the researcher used multiple regression analysis, in which tests have been made to examine whether one or more independent variables influence the variation on dependent variable. In relation to this, the researcher also examined whether the independent variables have a positive or negative effect on the variations of the dependent variable i.e leverage ratio.

In this chapter, along with the regression analysis and discussion for the study have been made using SPSS 16 software package, the researcher also conduct a diagnostic test to increase the reliability of the study.

4.1. Diagnostic test

In order to show how the estimation technique used for this study is appropriate and the hypothesis tests regarding the coefficient estimates are correctly made, a diagnostic test was conducted by using SPSS software package. Here, in this section all of the necessary tests are made with the help of a series of tables.

4.1.1. Goodness of fit

In examining the determinants of capital structure of construction companies, the researcher included eight explanatory variables (i.e. profitability, growth opportunity, size, tangibility, non-debt tax shield, earnings volatility, liquidity and age) and one dependent variable (i.e. leverage ratio). The functional relationship between variables in this study is therefore, Leverage ratio is a function of profitability, growth opportunity, size, tangibility of assets, non-debt tax shield, earnings volatility, liquidity and age.

However, to show how well the model containing those of eight explanatory variables actually explains the variations in the dependent variables (i.e. leverage ratio) it is necessary to test it through goodness of fit statistic.

Table 4.1: Testing the model through ANOVA (Goodness of fit statistic)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.496	8	.437	11.997	.000[b]
	Residual	1.675	46	.036		
	Total	5.171	54			

a. Dependent Variable: Levr

b. Predictors: (Constant), age, liq, evo, grw, sz, ndts, prof, tang

Source: SPSS regression result

The above table summarises the information about the variation of the dependent variable explained by the existing model used for this study, and the residual that indicates the variation of the dependent variable that are not captured by the model. Mean square, shown on the 4th column of the table, is the sum of square divided by the degrees of freedom. F-statistic, on the other hand, is the regression mean square divided by the residual mean square.

The hypothesis to be tested in goodness of fit statistic is;

H0: There is no relationship between explained and explanatory variables

H1: There is a relationship between explained and explanatory variables

Therefore, by comparing the significance value of F-statistic from the table with the P-value at 5 percent significance level, we may reject or fail to reject the null hypothesis of the fitness of the model is not good.

The significance value of F- statistic or regression model in general, from the table shows 0.000. Thus, the statistical significance of the regression model that is used for the study is less than 0.05. (i.e. $P < 0.000$), and therefore we reject the null hypothesis of "there is no relationship between explained and explanatory variables" indicating that, over all, the model used for the study is significantly good enough in explaining the variation on the dependent variable.

Similarly, the goodness of fit of the model can be measured by the square of the correlation coefficient also called R^2. According to Brook (2008) the most common goodness of fit statistic is R^2. He stated that R^2 is the square of the correlation between the value of the dependent variable and the corresponding fitted values from the model. This square of the correlation coefficient (R^2) is always lie between 0 and 1. If this correlation is high (close to one), the model fits the data well, while if the correlation is low (close to zero), the model is not providing a good fit to the data. (Brook (2008)).

Table 4.2: Goodness of fit through R Square

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.822[a]	.676	.620	.1908494	1.311

a. Predictors: (Constant), age, liq, evo, grow, sz, ndts, prof, tang

b. Dependent Variable: Levr

Source: SPSS regression output

Both R^2 and adjusted R^2 measure the fitness of the model i.e. they measures the proportion of the variation in dependent variable explained by the model. But since adjusted R^2 is the modification for the limitation of R^2 the value of the adjusted R^2 is considered to measure the fitness of the model.

Thus, as it is shown on table 4.2, the value of adjusted R^2 is 0.620, indicating that the independent variables in the model are explaining 62% of the variations on the dependent variables. Thus, we can understand that the model of the study is providing a good fit to the data.

4.1.2. Multicolleniarity test

The multicoleniarity test table (table 4.3) summerises the unstandardized and standardized coefficient, t-statistic and statistics for colleniarity for all of eight explanatory variables. The t-statistic helps us to determine the relative importance of each variables in the model. Among the statistics for colleniarity TOLERANCE is the one which is used to determine how much the independent variables are linearly related to one another. A variance with a very low TOLERANCE contributes little information in to a model, can cause computational problem. VARIANCE INFLATION FACTOR (VIF), is the other indicator of multicoleniarity and it is the reciprocal of the tolerance. As an indication if the VIF is low there is no evidence for the presence of multicoliniarity. But as the VIF increase, the variance of the regression coefficient is high and making it unstable estimate. If there is high VIF value, it is an indication of multicoliniarity and therefore, it needs further investigation.

As a conventional rule a very small values of tolerance is an indication that a predictor is redundant, and values that are less than 0.10 may merit for further investigation and a variable whose VIF values are greater than 10 may merit furt-her investigation.

But in this study there is no variables with the value of tolerance less than 0.10 and no variables whose VIF values are greater than 10. This means that there is

no evidence for the presence of multicoliniarity in this study. But the researcher suspect that there may be relatively high multicoriliation between Tangibility of assets and Non-debt tax shield. This is because their value of tolerance (i.e. 0.135 and 0.140 respectivelly) is relatively low and corresponding VIF (i.e 7.426 and 7.123 respectivelly) is also relatively high. But still there is no evidence for the presence of multicolleniarity among independent variables.

Table 4.3: Multicoliniarity test table

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.136	.510		2.227	.031					
	prof	-.165	.200	-.092	-.824	.414	-.040	-.121	-.069	.565	1.769
	grow	.166	.059	.265	2.831	.007	-.007	.385	.238	.803	1.246
	sz	-.035	.026	-.142	-1.352	.183	-.210	-.196	-.113	.641	1.560
	tang	.361	.148	.559	2.445	.018	.653	.339	.205	.135	7.426
	ndts	.290	.180	.360	1.608	.115	.611	.231	.135	.140	7.123
	evo	-.002	.001	-.144	-1.617	.113	-.122	-.232	-.136	.883	1.132
	liq	-.005	.002	-.195	-2.264	.028	-.216	-.317	-.190	.948	1.055
	age	-.016	.006	-.350	-2.819	.007	.001	-.384	-.237	.456	2.194

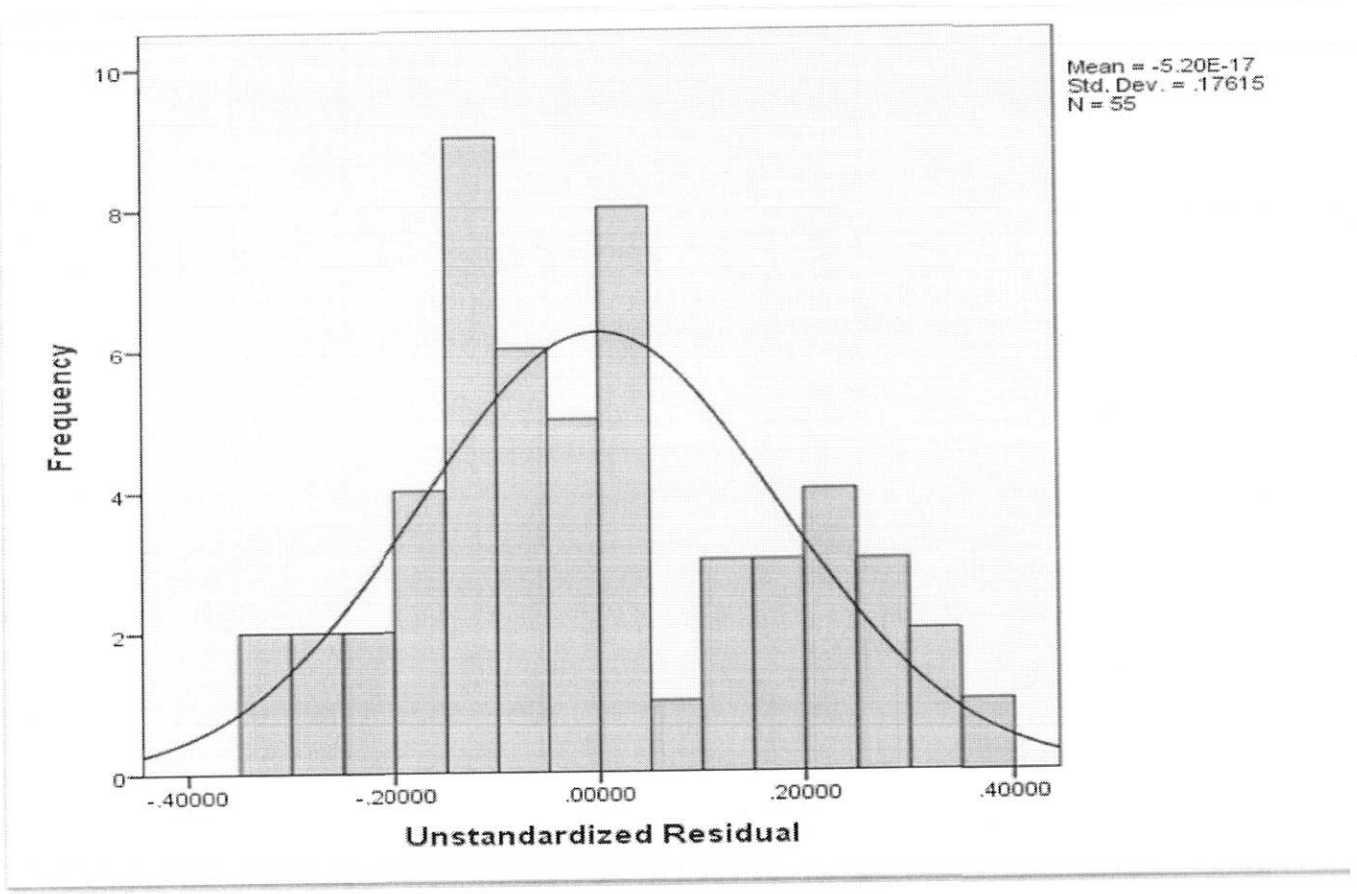
a. Dependent Variable: Levr

Source: SPSS regression result

4.1.3. Test of Normality of residuals

Brook (2008) noted that in order to conduct single or joint hypothesis test about the model parameter, the normality assumption must be fulfilled. For this study both graphical and numerical methods of testing normality have been made. Both of these methods of testing normality are presented below.

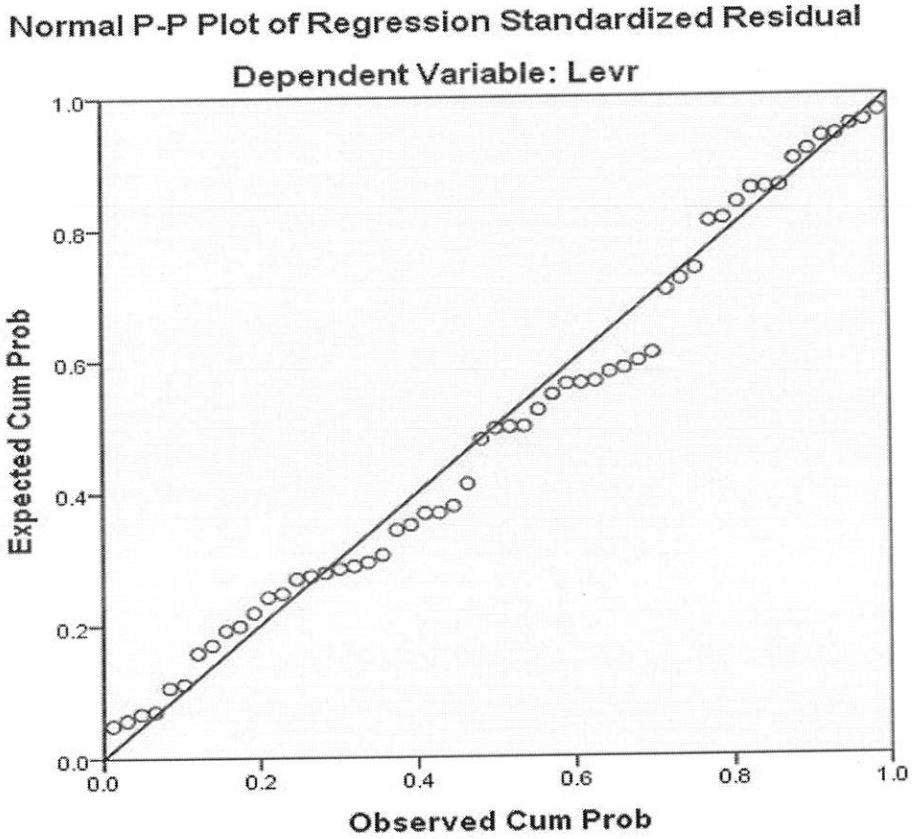
Figure 4.1: Histogram



Source: SPSS regression output

If the residuals are normally distributed around its mean of zero the histogram shows a bell-shaped. The shape of the histogram shown above is indicated the residual is normally distributed around its mean of zero.

Figure 4.2: Normal P-P Plot



Source: SPSS regression output

Similarly, P-P plot shown on figure 4.2 confirms the normality of the residual distribution around its mean of zero. Therefore, since the normality assumption is fulfilled based on looking at histogram and p-p plot it can be concluding that

the inferences the researcher made about the population parameter from the sample parameter is somewhat valid.

In addition to the graphical method of assessing the normality of the data used for the study, a numerical method called Kolmogorov-Smirnov and Shapiro-Wilk normality test methods are also used. Table 4.4 below shows the Kolmogorov-Smirnov and Shapiro-Wilk test results. According to these two tests of normality, the test should not be significant enough, in order to be the data normal. This means that if the test is not significant, then data are normal. Thus any value above 0.05 indicates normal distribution of the data. In other words, under these numerical test of normality of residuals the following hypothesis is tested;

H0: The normality of the residuals are normally distributed

H1: The normality of the residuals are not normally distributed

Among the two numerical test of normality, Shapiro-Wilk normality test is more appropriate for small sample size and as a rule of thumb if the sample size is less than 50 the Shapiro-Wilk normality test is more appropriate. This study has used 45 large construction companies as a target population, of which 11 companies are selected as a sample, which is relatively small, and because of this, Shapiro-Wilk normality test has used for this study. Based on the significant value of the

Shapiro-Wilk normality test statistics we may or may not reject the null hypothesis of not normality of the distribution of residuals. The test result shown on the table below clearly shows, there is no significant test result, indicating the data are normally distributed. This is because, the test result under Shapiro-Wilk normality test, is above 0.05 and therefore, we fail to reject the null hypothesis of the distribution of the residuals are normally distributed. Therefore, the data are normally distributed around its mean of zero and thus the normality assumption is fulfilled.

Table 4.4: K-S and S-W normality test

Tests of Normality[b,c]

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	age	Statistic	df	Sig.	Statistic	df	Sig.
Levr	7	.260	2	.			
	8	.178	4	.	.982	4	.912
	9	.191	6	.200*	.927	6	.559
	10	.217	7	.200*	.894	7	.295
	11	.142	9	.200*	.963	9	.832
	12	.160	7	.200*	.947	7	.706
	13	.233	5	.200*	.935	5	.633
	14	.364	3	.	.800	3	.114

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

b. levr is constant when age = 25.0000. It has been omitted.

c. levr is constant when age = 30.0000. It has been omitted.

Source: SPSS regression result

4.1.4. Test of Heteroscedasticity

The other assumption for the linear regression model is that the disturbances appearing in the population regression are homoscedastic i.e the variance of the error term is constant. If the errors do not have a constant variance, they are said to be heteroscedastic (Brook(2008))

To test whether there is a presence of hetroscedasticity, the researcher used a white test for this study. To do that, the residual square for each observation have been calculated and it was regressed against the explanatory variables. The result finally obtained from the regression is shown below.

Table 4.5: White test regression

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.365[a]	.133	-.017	.03547660

a. Predictors: (Constant), age, liq, evo, grw, sz, ndts, prof, tang

b. Dependent variable: e2

Source: SPSS regression result

Table 4.6: Chi Square calculated and tabulated

Test	t-statistic X^2calculated $=nR^2$	Chi Square(5% sig level) $X^2\alpha(P)$, where p=xi+1
White's test	7.315	16.919

The hypothesis to be tested under white test of heterocedasticity is:

H0: No Heterocedasticity

H1: Heterocedasticity

According to white test , if the Chi square value obtained in the whites test (i.e. X^2 calculated) exceeds the value obtained from Chi square table at 5% significant level (i.e. X^2 tabulated), then we have to reject the null hypothesis of no heterocedasticity, otherwise we fail to reject the null hypothesis.

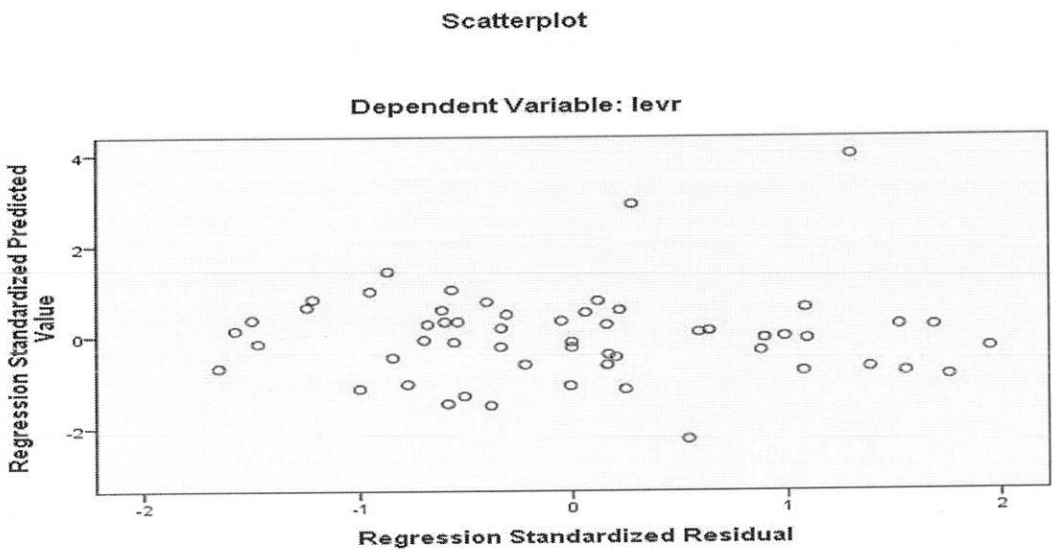
That is, if X^2 calculated > X^2 tabulated at 5% sig. level=reject H0 and

If X^2 calculated < X^2 tabulated at 5% sig. level= fail to reject H0

The t-statistic (Chi square Calculated) from table 4.6 is 7.313 which is less than Chi square tabulated at 5% significant level, 16.919 (i.e. 7.315 < 16.919). Thus, we fail to reject the null hypothesis of no heterocedasticity. This result indicates that

there is no an evidence for the presence of heterocedasticity. The Graph shown below also confirmed for no presence of heterocedasticity.

Figure 4.3: Test of Heteroscedasticity



Source: SPSS regression result

4.2. Analysis of the result

4.2.1. Descriptive statistics

The table 4.7 below shows the descriptive statistics of dependent variables, Leverage ratio and eight independent variables.

Table 4.7: Descriptive Statistics

Variables	Mean	Median	Maximum	Minimum	Std. Dev.
levr	0.6217	0.6040	1.8853	0.1304	0.3095
prof	0.0883	0.0428	1.1057	-0.1357	0.1731
grw	0.3214	0.2110	2.4122	-0.5277	0.4929
sz	18.2478	18.0500	20.5600	15.7500	1.2673
tang	0.6508	0.4732	2.8756	0.1944	0.4795
ndts	0.3717	0.2844	2.1970	0.0269	0.3849
evo	5.3108	0.6028	173.3039	0.025	24.0805
liq	6.9019	2.4619	89.2363	0.3264	13.2388
age	13.9091	11.0000	30.0000	7.0000	6.7557

Source: SPSS regression output

As it is shown above on the table the Leverage ratio has a mean (median) value of 0.6217 (0.6040). This indicates that large construction companies in Addis

Ababa, Ethiopia are financed their total assets through debt to the extent of 62.17% and less than 38% of the total asset is financed through equity capital. Construction companies generally need huge capital to invest on construction machineries and other necessary equipment used in their operation. Thus, the result shows that the percentage of debt is high as compared to equity in financing the assets of construction companies in Addis Ababa.

The profitability of the companies, on the other hand, has shown a mean value of 0.0883, indicating that the construction companies earn around 8.83% profit before interest and tax on their total assets. The highest average leverage ratio of construction companies shown above or excessive use of debt financing may adversely affect the profitability of construction companies.

Growth opportunity, likewise, shows a mean value of 0.3214, indicating that the annual revenue of construction companies are increased by 32.14% annually. The reason for the growth of revenue of construction companies is highly related with the recent rapid growth of construction in the country. Hopefully, this increment of the growth of the construction companies will continue even at a higher rate in the future. This is because the FDRE government massively promotes the sector and they continually announces that domestic construction companies is given priority than foreign companies in construction of dams, building, road, bridge and others infrastructure development. In addition to this, to increase the competitiveness of construction companies and to create

awareness about the construction sector in general a certain exhibitions at exhibition center have been held. For instance, more recently, on the exhibition prepared for construction companies from January 25–29 in collaboration with Century Promotion Service, a number of construction companies have been participated. Such a type of exhibitions may have a great contribution for the growth of the construction companies in particular and for the construction sector in general.

The mean value of size is 18.2479. It indicates that the average annual total revenue of construction companies is Birr 104,065,599. Tangibility shows a mean value of 0.6508, indicating that out of the total assets owned by large construction companies, 65.08% is categorized as tangible or fixed assets. Construction companies generally assumed to have huge machinery and equipment used in their operation and the result strengths this fact and majority of their assets are fixed assets. Non-debt tax shield, on the other hand, shows a mean value of 0.37173, indicating that the average annual depreciation of the total assets of construction companies is 37.17%.

The earnings volatility of construction companies indicates a mean value of 5.3108 and median of 0.6028 ranging between a minimum of 0.025 and a maximum of 173.3039. This high volatility of earnings for construction companies may become the barrier to them to get debt financing from lending

institutions. Banks and other lending institutions need to see stable earnings over time to provide debt for the companies.

Liquidity shows a mean value of 6.9019. This means that the construction companies have current assets (liquid assets) that are 6.9019 times greater than their short term liabilities. Thus, since they have adequate current assets which are assumed to be used to cover their current liability, this high liquidity positions for construction companies may assist them in generating debt financing because their ability in paying liabilities is assumed to be high. The mean value of age is 13.9091, indicating that the average age of the construction companies is 13.9091 years, ranging between the minimum of 7 years and maximum of 30 years.

Finally, as it is presented on table the profitability, Growth opportunity, Non-debt tax shield, earnings volatility and liquidity of the construction companies shows some volatile behaviour. This is because their standard deviations are above their mean.

4.2.2. The correlation Matrix

The table 4.7 shows the summary of correlation coefficient between leverage ratio and eight explanatory variables and among the explanatory variables. The sign (+) or (-) shown in the table indicates the manner how variables are related each other.

4.2.2.1. Correlation between Dependent Variable and Independent Variables

The correlation coefficient between leverage ratio and profitability is -0.040091. This shows that as the profitability of the construction companies' fall down their leverage ratio increases. This finding is consistent with the argument of pecking order theory (POT). According to this theory of capital structure, there must be a negative relationship between leverage ratio and profitability; this is because as the firm becomes more profitable, they more inclined to finance their operation from internally generated funds and vice versa. Therefore, the negative relationship between profitability and leverage ratio obtained in this study is supported by Pecking Order Theory.

The correlation between leverage ratio and growth opportunity is -0.006979. This indicates that as the increment of total revenue of construction companies, their level of leverage ratio decreases. In consistent with this finding Titman and Wessels (1988), Barclay et al. (1995) and Rajan and Zingales (1995) (sited in Shah & Khan (2007)) all found a negative relationship between growth opportunities and leverage. In conformity with this Shah & Khan (2007) also found a statistically significant negative relationship between growth opportunity and le verage.

Table 4.8 Correlation Matrix

	Levr	prof	grw	sz	tang	ndts	evo	liq	age
levr	1								
prof	-0.040091	1							
grw	-0.006979	-0.130351	1						
sz	-0.209924	-0.317882	0.162808	1					
tang	0.652557	0.303584	-0.40422	-0.352425	1				
ndts	0.610701	0.312882	-0.322093	-0.217728	0.907056	1			
evo	-0.122348	0.075601	0.033815	-0.278185	-0.032697	-0.06216	1		
liq	-0.216182	0.021112	-0.15602	0.123824	0.039922	0.063031	-0.04737	1	
age	0.000751	0.644800	-0.158009	-0.339206	0.413835	0.484984	-0.03442	0.034369	1

Source: SPSS regression output

Likewise, there is a negative relationship between size of the firm and leverage ratio with a correlation coefficient of -0.209924. This shows that the larger, in terms of total assets, of the construction companies the lower they relaying on debt financing. This negative relationship between size of the firm and leverage ratio is also supported by pecking order theory.

The correlation coefficient between leverage ratio and tangibility of assets is 0.652557, indicating that there is a significant positive correlation between asset tangibility and leverage ratio. To secure the debt, finance providers, most probably financial institutions needs a collateral. The majority of assets owned by construction companies are classified as fixed assets, and these nature of assets helps the companies to raise fund from financial institutions by providing those assets as a collateral. This significant positive correlation between these two variables reveals this fact. This finding is supported by Scott (1977). According to Scot (1977) companies with higher levels of collateral find it easier to access debt, given that companies' fixed assets contribute to reduced information asymmetry between managers/shareholders and creditors, as a consequence of the latter being able to recuperate the capital owed in the form of collateral in the case of company failure.

The correlation coefficient of 0.610701 between leverage ratio and non-debt tax shield reveals the existence of significant positive correlation between leverage ratio and non-debt tax shield.

The earnings volatility of the firm, on the other hand, shows a negative correlation with the leverage ratio with a correlation coefficient of -0.122348. This means that as the operating income of the construction companies is highly volatile from one year to another the level of their leverage ratio falls down. This is because of the fact that, if the volatility of operating income of the companies is considerably high, the lending institutions lucks confidence to provide fund. Therefore, the negative correlation exists between earnings volatility and leverage ratio. Both trade of theory and pecking order theory supports a negative correlation between earnings volatility and leverage ratio. According to the theoretical justification of both TOT and POT, earnings volatility is a proxy for the probability of financial distress and the firms are expected to pay a risk premium to the outside providers of funds. Thus to reduce the cost of capital, a firm will first use internally generated funds before going to the outside financer. Therefore, the existence of negative correlation between earnings volatility and leverage ratio is consistent with what TOT and POT justifies.

The correlation coefficient between leverage ratio and liquidity position of the construction companies shows a -0.216182, indicating that as the liquidity position of the construction companies increase, they decreases their reliance on

external financing and the companies first concentrate on internally available funds. This finding is supported by the justification provided by pecking order theory. The POT assumes that the more liquid firms would use first its internal funds and would decrease level of external financing, which resulting a negative relation between liquidity and leverage. Mazur (2007) , Shahjahanpour et al. (2010) and Fawad Ahmed et al. (2011) also found negative relationship between leverage and liquidity.

There is a positive correlation between leverage ratio and age of the companies with a correlation coefficient of 0.000751. The age of the companies has a positive effect on the leverage ratio of the companies. This is because as the age of the companies increase, the cost of borrowing fund for construction companies decrease due to that as the age of the companies increase, they build a reputation and can raise fund at a least cost from any lending institution.

4.2.2.2. **Correlation among Independent Variables**

The correlation matrix presented in table 4.2 shows a number of relatively high correlations between explanatory variables. Among those correlations between explanatory variables, the correlation between profitability and age shows 0.6448. This is due to the fact that the age of the construction companies highly affect their profitability. The positive correlation coefficient between profitability and age reveals that as the age of the company increase their level of profitability

also increased. The other high correlation exists between non-debt tax shields (NDTS) and tangibility of assets (TANG) with a correlation coefficient of 0.907056. The reason that this high correlation between non-debt tax shield and tangibility of assets arises is because the total asset figures have been commonly used in this study in measuring those variables. Non-debt tax shield (NDTS) is measured as a ratio of annual depreciation expense to total assets. Similarly, Tangibility of Assets (TANG) is measured as a ratio of total fixed assets to total assets. Therefore, using total assets in measuring both NDTS and TANG results a relatively high correlation between these two explanatory variables.

4.3. Hypothesis Testing & Interpretation of the results

Table 4.3 shows the empirical result of the study under panel random estimators. The result reveals that there is a positive relationship between the variables including growth opportunity, tangibility of assets and non-debt tax shield and leverage ratio of large construction companies in panel random effect estimators. On the other hand, the explanatory variables including profitability, Size, Earnings Volatility, liquidity and age of the companies have a negative effect on the leverage ratio of the companies. Of the total of eight explanatory variables tested in this study under panel random estimation technique, Growth opportunity, tangibility of assets, liquidity and age of the companies have found as the most significant variables that affect the leverage ratio of the construction companies

Table 4.9: Panel Random effect estimation result

Dependent Variable : LEVR **Independent Variables**	**Panel Random effect estimation result**
PROF	-0.165 -0.826 (0.200) [0.414]
GRW	0.166*** 2.831 (0.059) [0.007]
SZ	-0.035 -1.352 (0.026) [0.138]
TANG	0.361** 2.445 (0.148) [0.018]
NDTS	0.290 1.608 (0.180) [0.115]
EVO	-0.002 -1.617 (0.001) [0.113]
LIQ	-0.005** -2.264 (0.002) [0.028]
AGE	-0.016*** -2.819 (0.006) [0.007]
Observations	**55**
R^2	**0.676**
Adjusted R^2	**0.620**
F-statistic	**11.997 *** **
DW statistic	**1.311**

Source: **SPSS regression output**

NOTE:

- ✓ *[P-value] and (Std. Error)*
- ✓ ****, **, and * indicate statistical significance at 1, 5 and 10% significance level respectively*

The adjusted R^2, from the regression result shows 0.620. This means that 62% of the variation in leverage ratio of the construction companies could be explained by the model. And therefore, based on the above estimation result, the following estimated regression function is obtained.

$$Levr = 1.136 - 0.165PROF + 0.166GROW - 0.035SZ + 0.361TANG + 0.29NDTS - 0.002EVO - 0.005LIQ - 0.016AGE \quad \ldots\ldots (3)$$

Thus, this regression equation can be used to predict the value of the dependent variable based on a set of values for the independent variables. For instance, if all variables are held stationary, on average, an increase in profitability by 1% can reduce the leverage ratio of the construction companies by 16.5%. Similarly, increase in size of the firm, earnings volatility, liquidity, and age by 1% can respectively lead to the leverage ratio decreased by 3.5, 0.2, 0.5, and 1.6%. On the other hand, increase in growth opportunity, tangibility of assets, and non-debt tax shield by 1% will respectively lead to the leverage ratio increased by 16.6%, 36.1%, and 29%. In the next section the effect of each variable tested under this study is discussed and analyzed based on the theoretical predictions, prior empirical studies and hypothesis formulated for this study.

Profitability

In the Trade off Theory (TOT), a positive relationship between a firm's profitability and leverage ratio is expected because taxes, agency costs and bankruptcy costs push more profitable firms towards higher leverage. More profitable firms should prefer debt to benefit from the tax shield. On the other hand, the Pecking Order theory (POT), predicted a negative relationship between firm's profitability and leverage. According to this argument, firms passively accumulate retained earnings, becoming less levered when they are profitable, and accumulate debt, becoming more levered when they are unprofitable.

In this study, the regression result shows there is a negative relationship between profitability of the large Ethiopian construction companies and their level of leverage. As it is presented on table 4.9, the random effect estimation result shows a negative relationship between the profitability of construction companies and their level of leverage, with a regression coefficient of -0.165, t-statistic of -0.826 and P-value of 0.414. Thus, from the result it can be conclude that as the profitability of the construction companies increased, they minimize their reliance on debt financing. This result is consistent with the hypothesis of the study. Most empirical studies support this negative relationship between leverage and profitability, for example Harris and Raviv (1991), Rajan and

Zingales, (1995), Huang and Song, (2002), Booth et al., (2001), Titman and Wessels, (1988), Friend and Lang (1988) and Kester, (1986).

Growth Opportunity

Pecking order theory states that firms first go to finance its projects from the internally generated funds. However, the growing firms may not capable to finance all its growth by the internally generated funds. Consequentially, firms with relatively high growth will tend to issue securities less subject to information asymmetries, i.e. short-term debt. This should lead to firms with relatively higher growth having more leverage. Therefore, according to packing order theory assumption growing firm requires high capital and internal funds are insufficient to meet requirements, and so firms use external borrowing. This results increase in level of leverage. Trade-Off Theory, on the other hand, argues the existence of a negative relationship between growth opportunities and level of debt. According to this theory as companies with good opportunities for growth are encouraged to invest in high risk projects so as to maximize shareholders' income in detriment to creditors. This will results a negative relation with leverage ratio. (Myers (1977))

Consistent with Pecking Order Theory, in this study it is found that there is a statistical significant positive relationship between growth opportunity and

leverage ratio of large construction companies. The panel random effect estimation regression result shows a significant positive relationship between growth opportunity of the construction companies and their leverage ratio with a regression coefficient of 0.166, t-statistic of 2.831 and P-value of 0.007. In general, these finding of significant (at 1% significant level) positive relationship between growth opportunity and leverage ratio is consistent with what pecking order theory suggested in which a companies with relatively high growth needs more debt financing. Consistent with this finding Ronny & Clairette (2003), Paulo & Zelia (2007), Kinde (2011) and Amanuel (2011) also empirically found significant positive relationship between growth opportunity and leverage ratio of the firms.

Size of the firm

Trade off theory predicts a positive relationship between company size and their level of leverage. According to Warner (1977) and Ang et al. (1982), (cited in Paulo et al (2007)) the positive relationship between size of the firm and leverage ratio exists because larger companies, for instance, have greater possibilities to diversify and a lower risk of bankruptcy and thus they inclined to more debt. In contrast, Pecking Order Theory suggested a negative association between size of the firm and their leverage ratio. This is because of the fact that as the information asymmetry is less in larger companies, these being better able to

issue shares, so that it expected a negative relationship between size and level of debt.

As it is suggested by pecking order theory, in this study, the panel random effect estimation result reveals that there is insignificant negative relationship between size and level of leverage with a regression coefficient of -0.035, t-statistic of -1.352 and P-value of 0.183. Although, the t-statistic and P-value of the estimation result shows that variables have statistically insignificant relationship, it can be conclude that the size of the firm still explains the variation of the leverage ratio of the construction companies negatively. Therefore, the result of this study, based on panel random effect estimation, is supported by the Pecking order theory.

In consistent with the result of this study Marsh (1982) and Titman and Wessels (1988) have also reported a negative relationship between size of the firm and leverage ratio.

Tangibility of Assets

Regarding the effect of tangibility of the assets of the companies on their leverage ratio, the trade off theory suggests the existence of a positive relationship. The amount of fixed assets owned by the companies serve as collateral security for outside financer (Scott(1977), and Mayers & Majluf(1984)) and therefore, the

companies with high ratio of fixed assets to total assets can raise debt financing with relatively least cost. Thus, a positive relationship between tangibility of assets and leverage ratio is expected.

The panel random effect estimation result, in this study, shows a statistical significant positive relationship between tangibility of assets and leverage ratio with a regression coefficient of 0.361, t-statistic of 2.445 and P-value of 0.016. This means that a construction companies with high ratio of fixed assets to total asset have high leverage ratio, because in Ethiopia lending financial institutions require fixed assets as collateral to provide debt to those of construction companies. This finding is consistent with what trade off theory suggested.

The finding of this study is supported by the conclusions' forwarded by Rajan and Zingales, (1995), Friend and Lang, (1988) and Titman and Wessels, (1988).

Non-debt tax shield

Trade off theory suggested an inverse relationship between non-debt tax shield and leverage ratio of the companies. This is because companies have an incentive to take debt because they can benefit from the tax shield due to interest deductibility. Thus, as noted by DeAngelo and Masulis, (1980) and Graham (2000), if firms have non-debt tax shields (NDTS), such as depreciation and investment tax credits, they have a lower incentive to use debt from a tax shield point of view and hence use less debt.

In contrary to trade off theory and the hypothesis formulated for the study, the result of this study reveals a positive relationship between non-debt tax shield and leverage ratio. The panel random effect estimation result shows a statistical insignificant positive relationship between non-debt tax shield and leverage ratio with a regression coefficient of 0.290, related t-statistic of 1.608 and P-value of 0.115. Construction companies, generally, have special features of investing on huge construction machinery and equipment. Investing on these types of huge fixed assets generates a high level of depreciation and tax credit and the companies expected to have higher financial leverage.

Consistent with this finding Bradley et al. (1984) found a significant positive relationship between firm leverage and the amount of non-debt tax shields suggesting that firms that invest heavily in tangible assets, generate relatively high levels of depreciation and tax credits, tend to have higher financial leverage. Similarly, Fawad Ahmed et al (2011) found a statistical significant positive relationship between non-debt tax shield and leverage in Pakistani non-financial firms and they argued that most of Pakistani non-financial firms try to reduce the tax payment. The use of both more non-debt tax shield and leverage reduces the taxable income of the firm and, therefore, companies with high non-debt tax shield tend to use high leverage.

Earnings Volatility

Both trade off theory and pecking order theory predicts a negative relationship between earnings volatility and level of leverage. Earning volatility is a signal for financial distress and lending institutions lacks confidence to provide fund. As noted by Marsh (1982), companies with a higher level of earnings volatility are more likely to go bankrupt, and so they resort less to debt. Consistent with the capital structure theories (both trade of theory and pecking order theory), the regression result of this study shows that there is insignificant negative relationship between earnings volatility and leverage ratio of construction companies with a regression coefficient of -0.002, t-statistic of -1.617 and P-value of 0.113. Therefore, although it is statistically insignificant from the result it can be conclude that the large construction companies with high volatility of earnings have low leverage ratio and this finding is consistent with both TOT and POT.

Prior empirical studies support this negative relationship e.g. Bradley et al. (1984) and Titman and Wessels (1988) and Ashenafi (2005).

Liquidity

Trade off theory predicted a positive relationship between liquidity and leverage ratio, suggesting that the more liquid firm would use external financing due to their ability of paying back liabilities and to get benefit of tax-shields. In contrast

with this view, pecking order theory assumes that the more liquid firm would use first its internal funds and would decrease level of external financing, resulting in negative relation between liquidity and leverage.

Consistent with pecking order theory, the leverage ratio of Ethiopian construction companies are inversely related with their leverage ratio. The result shows that there is a statistically significant relationship at 5% significant level. Specifically, panel random effect estimation with a coefficient of -0.005, which is statistically significant at 5% significance level, with t-statistic of -2.264 and P-value of 0.028 confirmed a negative relationship between liquidity and leverage ratio. Consistent with the result of this study a number of prior empirical evidence found negative relationship between liquidity and leverage; (e.g Mazur (2007) , Shahjahanpour et al. (2010) and Fawad Ahmed et al. (2011))

Age

Trade off theory suggested that as a firm operates for a long period of time, it establishes a reputation and increases its capacity to take more debt from any lenders and, thus, age of the firm is positively related with leverage. Pecking order theory, on the other hand, argued that as the firm matures it builds reputation leading to better access to equity markets and it implies that age should be negatively related to leverage.

As it is suggested by pecking order theory, the age of the construction companies is negatively related with their leverage ratio under panel random effect estimation result of this study. The estimation result reveals a statistical significant (at 1% significance level) negative relationship between age of the construction companies and their leverage ratio with a coefficient of -0.016, t-statistic of -2.819 and P-value of 0.007.

The empirical study by Ashenafi (2005), also found an inverse relation between age and leverage ratio, which is consistent with pecking order theory.

4.4. Comparison of the test result with expectations'

Table 4.4 below summarizes the comparison of the test result for Ethiopian construction companies with the expectations. Therefore, as the table shows except the variables including Size, Non-debt tax shield, and Age, the test result of the variables are consistent with the hypothesis formulated for the study

Table 4.10. Comparison of the test result with expectations'

Variables	Expected Relationship with leverage ratio	Test result for Ethiopian construction Companies
Profitability	-	- (POT)
Growth opportunity	+	+(POT)
Size	+	-(POT)
Tangibility of assets	+	+(TOT)
Non-debt tax shield	-	+(POT)
Earnings Volatility	-	-(POT & TOT)
Liquidity	-	-(POT)
Age	+	-(POT)

Note: Supporting theory is in parenthesis

CHAPTER FIVE - CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

This study aims at conducting an empirical study to examine the determinants of capital structure decisions of construction companies in Addis Ababa. The study used a panel data of 11 large construction companies obtained from Ethiopian Revenue and Custom Authority (ERCA), office of large taxpayers (LTO), for the period ranging from the year 2006-2010.

There are several variables that might lead to the variation in capital structure across companies and factors that might influence the capital structure decisions of construction companies are may come from both internal and external environments. The external factors that might influence the capital structure of the companies are the macroeconomic conditions of the countries i.e. GDP growth rate, inflation rate, tax rate, stock market condition and others. But due to a certain limitations relating with those of external factors in Ethiopia, this study has concentrated on internal (firm specific) determinants of capital structure including the firms profitability, growth opportunity, Size, tangibility of assets, non-debt tax shield, earning volatility, liquidity and age of the companies.

- The profitability level of the construction companies affect their leverage ratio negatively, which supports the pecking order theory and the hypothesis formulated for the study. Thus, from the result it can be

concluded that highly profitable construction companies are more likely relied on internally generated funds and equity capital than debt capital as the source of financing.

- Consistent with the argument of Pecking Order Theory, the study found a significant positive relationship between growth opportunity and leverage ratio of the construction companies. This indicates that the construction companies with relatively high growth opportunity needs more debt financing than less growing companies. Because internal fund is not sufficient for growing construction companies to meet their requirement, and therefore they go for external borrowing. This positive relationship between growth opportunity and leverage ratio was hypothesized for the study.
- Size of the construction companies has a negative relationship with their leverage ratio, which indicates that large sized construction companies (size in the study measured as a natural logarithm of total annual revenue), needs less debt financing than small sized construction companies. The result contradicts with the hypothesis formulated for the study. The negative relationship is found because when the revenue of the companies become large they highly relied on internally available funds to finance their operation rather than going for external borrowing.
- Tangibility of assets (measured as the ratio of total fixed assets to total assets) of the construction companies have a positive effect on their level

of leverage ratio. The estimation result shows it is statistically significant at 5% significant level. This is because construction companies heavily invest on huge fixed assets and this nature of the business supports them to raise debt financing from lending institution at relatively least cost. It is consistent with the hypothesis formulated for the study.

- In contrast with the hypothesis formulated for the study, it is found that there is an insignificant positive relationship between non-debt tax shield and leverage ratio. As noted by Bradley et al (1984) companies that invest heavily in fixed assets, generate relatively high level of depreciations and tax credit, then they tend to have higher financial leverage. Thus, this empirical findings of positive relationship between non-debt tax shield and leverage for Ethiopian construction companies implies that those companies are heavily invest on fixed assets to reduce the tax payments, in turn they have higher leverage ratio. Due to this fact this positive relationship between non-debt tax shield and leverage ratio of the companies is existed.
- The study also found statistically insignificant negative relationship between earnings volatility and leverage ratio of construction companies. Although it is statistically insignificant, result of the study is consistent with the combined prediction of both TOT and POT. It implies that the construction companies with relatively high earnings volatility have low leverage. This is because when the earnings of construction companies

shows somewhat volatile behaviour from one year to the other, lending institutions may not be interested to provide finance. Therefore, in order to get full of trust from the lending institution, companies should register a stable operating income over their operation.

- Similarly, consistent with the hypothesis formulated for the study, it is empirically found that the liquidity positions of the construction companies have inverse relation with their leverage ratio. It implies that the most liquid construction companies have less leverage ratio and they finance their operation through internally generated funds.
- Age of the companies has negative effect on the leverage ratio of the companies, and this is a contradicting result with the hypothesis of the study. However, this is due to that as the age of construction companies in Ethiopia increased they become strong enough to fiancé their operation by their own internal generated funds and they need less debt financing.

Generally, this empirical study has been conducted to critically examine the determinants of capital structure of construction companies, which are listed by ERCA as a large tax payer. The panel random effect estimation have been used for the study and the estimation result reveals that variables including growth opportunity, tangibility of assets and non-debt tax shield have positive effect on the companies leverage ratio and variables including profitability, size, earnings volatility, liquidity and age of the companies have found a negative effect on leverage ratio of the construction companies. Furthermore, the estimation result

reveals that growth opportunity, Tangibility of assets, liquidity and age of the companies are the significant variables that explain the variations of the capital structure of Ethiopian construction companies. In addition, as the test result reveals the variation on the capital structure of construction companies in Ethiopia are more explained by Pecking Order Theory (POT) of capital structure.

5.2. Recommendations

Capital structures of the construction companies are influenced by a several factors and a number of empirical studies have been conducted to examine those factors. However, no such study has been conducted in Ethiopia, where majority of construction companies have no clear financing trend. Thus, the factors affecting their capital structure are not clear and therefore, this study was conducted. Thus, depending on the findings of the study, the researcher forwarded the following recommendations.

- The empirical result of the study shows that the variations on the capital structure of construction companies are more consistent with Pecking Order Theory (POT) of Capital structure. However, trade off theory suggested that firms have optimal debt ratio, which is determined by trading off the benefit of debt financing with its cost and it expected to maximizes the value of the firm. But most of the result of this study is consistent with what pecking order theory suggests. Therefore, from this it can be concluded that construction companies in Ethiopia are not in a

position to trading off the benefits of debt financing and its cost, and in turn, they may not maintain the optimum debt ratio (leverage ratio), which can increases the value of the firm.

Thus, in order to minimize the possible financial distress and filling for bankruptcy and inturn, maximize the value of the firm, construction companies in Ethiopia should finance their operation based on trading off the benefits of debt financing with its cost.

- Large construction companies obtained from Ethiopian Revenue and Custom Authority (ERCA) registered as large tax payers are selected for this study. Although, this study mainly focuses on those of large construction companies, it cannot represent the entire population i.e. small, medium and large construction companies in Addis Ababa. Therefore, for comprehensive investigation and to get better result, future researchers may cover the entire populations (small, medium and large construction companies) and increase the sample size.
- Furthermore, the time period covered under this study is only 5 years ranging from 2006 to 2010, due to unavailability of organized data for long period of time. Thus, future researchers could extend this period of time in examining the determinants of capital structure decisions of construction companies over long period of time and can produce more reliable and better result.

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ADDITIONAL WEBSITES

- http://www.economywatch.com/world-industries/construction/
- http://www.bwint.org/pdfs/ILO%20constru%202001.pdf

APPENDICES

Appendix 1: Regression analysis output using SPSS

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.496	8	.437	11.997	.000[a]
	Residual	1.675	46	.036		
	Total	5.171	54			

a. Predictors: (Constant), age, liq, evo, grw, sz, ndts, prof, tang

b. Dependent Variable: levr

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.822[a]	.676	.620	.1908494	1.311

a. Predictors: (Constant), age, liq, evo, grw, sz, ndts, prof, tang

b. Dependent Variable: levr

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.136	.510		2.227	.031		
	prof	-.165	.200	-.092	-.824	.414	.565	1.769
	grw	.166	.059	.265	2.831	.007	.803	1.246
	sz	-.035	.026	-.142	-1.352	.183	.641	1.560
	tang	.361	.148	.559	2.445	.018	.135	7.426
	ndts	.290	.180	.360	1.608	.115	.140	7.123
	evo	-.002	.001	-.144	-1.617	.113	.883	1.132
	liq	-.005	.002	-.195	-2.264	.028	.948	1.055
	age	-.016	.006	-.350	-2.819	.007	.456	2.194

a. Dependent Variable: levr

Correlations

		levr	prof	grw	sz	tang	ndts	evo	liq	age
Pearson Correlation	levr	1.000	-.040	-.007	-.210	.653	.611	-.122	-.216	.001
	prof	-.040	1.000	-.130	-.318	.304	.313	.076	.021	.645
	grw	-.007	-.130	1.000	.163	-.404	-.322	.034	-.156	-.158
	sz	-.210	-.318	.163	1.000	-.352	-.218	-.278	.124	-.339
	tang	.653	.304	-.404	-.352	1.000	.907	-.033	.040	.414
	ndts	.611	.313	-.322	-.218	.907	1.000	-.062	.063	.485
	evo	-.122	.076	.034	-.278	-.033	-.062	1.000	-.047	-.034
	liq	-.216	.021	-.156	.124	.040	.063	-.047	1.000	.034
	age	.001	.645	-.158	-.339	.414	.485	-.034	.034	1.000
Sig. (1-tailed)	levr	.	.386	.480	.062	.000	.000	.187	.056	.498
	prof	.386	.	.171	.009	.012	.010	.292	.439	.000
	grw	.480	.171	.	.117	.001	.008	.403	.128	.125
	sz	.062	.009	.117	.	.004	.055	.020	.184	.006
	tang	.000	.012	.001	.004	.	.000	.406	.386	.001
	ndts	.000	.010	.008	.055	.000	.	.326	.324	.000
	evo	.187	.292	.403	.020	.406	.326	.	.366	.401
	liq	.056	.439	.128	.184	.386	.324	.366	.	.402
	age	.498	.000	.125	.006	.001	.000	.401	.402	.

Coefficient Correlations[a]

Model			age	liq	evo	grw	sz	ndts	prof	tang
1	Correlations	age	1.000	-.029	.144	.008	.245	-.338	-.566	.202
		liq	-.029	1.000	-.008	.161	-.140	-.027	-.016	.021
		evo	.144	-.008	1.000	-.030	.308	-.045	-.096	.080
		grw	.008	.161	-.030	1.000	-.017	-.116	.009	.260
		sz	.245	-.140	.308	-.017	1.000	-.328	.067	.391
		ndts	-.338	-.027	-.045	-.116	-.328	1.000	.064	-.894
		prof	-.566	-.016	-.096	.009	.067	.064	1.000	-.066
		tang	.202	.021	.080	.260	.391	-.894	-.066	1.000
	Covariances	age	3.243E-5	-3.288E-7	9.413E-7	2.589E-6	3.570E-5	.000	.000	.000
		liq	-3.288E-7	4.060E-6	-1.840E-8	1.913E-5	-7.224E-6	-9.639E-6	-6.438E-6	6.358E-6
		evo	9.413E-7	-1.840E-8	1.317E-6	-2.056E-6	9.041E-6	-9.367E-6	-2.207E-5	1.350E-5
		grw	2.589E-6	1.913E-5	-2.056E-6	.003	-2.576E-5	-.001	.000	.002
		sz	3.570E-5	-7.224E-6	9.041E-6	-2.576E-5	.001	-.002	.000	.001
		ndts	.000	-9.639E-6	-9.367E-6	-.001	-.002	.032	.002	-.024
		prof	.000	-6.438E-6	-2.207E-5	.000	.000	.002	.040	-.002
		tang	.000	6.358E-6	1.350E-5	.002	.001	-.024	-.002	.022

a. Dependent Variable: levr

Appendix 2: Descriptive Statistics using SPSS

		levr	prof	grw	sz	tang	ndts	evo	liq	age
N	Valid	55	55	55	55	55	55	55	55	55
	Missing	0	0	0	0	0	0	0	0	0
Mean		0.6217	0.0883	0.3214	18.2478	0.6508	0.3717	5.3108	6.9019	13.9091
Median		0.604	0.0428	0.211	18.05	0.4732	0.2844	0.6028	2.4619	11
Std. Deviation		0.3095	0.1731	0.4929	1.2673	0.4795	0.3849	24.0805	13.2388	6.7557
Minimum		0.1304	-0.1357	-0.5277	15.75	0.1944	0.0269	0.025	0.3264	7
Maximum		1.8853	1.1057	2.4122	20.56	2.8756	2.197	173.3039	89.2363	30

Appendix 3: Regression Data file

Year	Co.	LEVR	PROF	GRW	SZ	TANG	NDTS	EVO	LIQ	AGE
2006	AD	0.8109	0.016	0.3555	16.43	0.6596	0.1353	0.609	0.6878	8.000
2007	AD	0.6924	0.0166	0.0781	16.2	0.8758	0.4165	0.117	0.7811	9.000
2008	AD	0.7744	0.0405	0.1958	16.58	0.9221	0.4444	1.921	0.6819	1.000
2009	AD	0.7735	0.0893	0.3528	17.68	0.4469	0.4038	1.981	3.1344	11.000
2010	AD	0.7566	0.1336	0.8309	18.05	0.4032	0.2571	1.738	1.7049	12.000
2006	AF	0.7384	0.0325	0.9704	15.92	0.6188	0.1238	0.603	1.7307	11.000
2007	AF	0.8431	0.0488	2.4122	18.31	0.2879	0.0867	4.119	1.0306	12.000
2008	AF	0.9263	0.0575	1.2881	19.2	0.204	0.0709	1.696	0.9597	13.000
2009	AF	0.4933	0.0673	0.7566	19.62	0.1976	0.1719	1.057	0.9632	14.000
2010	AF	0.4984	0.0513	0.9635	20.15	0.5549	0.0604	0.495	1.0025	15.000
2006	BN	0.6859	0.0055	0.1359	17.95	1.1332	0.7357	0.945	2.4619	25.000
2007	BN	0.5891	0.3157	-0.1081	17.13	1.3969	0.9081	49.81	5.9664	26.000
2008	BN	0.8203	0.3408	-0.1605	17.34	1.7476	1.2465	0.094	5.5591	27.000
2009	BN	1.8853	0.4542	-0.4209	16.42	2.8756	2.197	0.228	2.0397	28.000
2010	BN	1.4154	0.2538	0.3734	16.69	2.0709	1.7444	0.233	0.7504	29.000

2006	DMC	0.552	0.0302	-0.0103	17.82	0.466	0.1628	0.281	6.9015	11.000
2007	DMC	0.8143	0.0195	0.4898	18.03	0.4651	0.178	0.041	2.4108	12.000
2008	DMC	0.8083	0.0242	0.9341	19	0.4723	0.1369	1.405	1.9541	13.000
2009	DMC	0.7337	0.0387	-0.1862	19.17	0.5909	0.2844	0.302	23.427	14.000
2010	DMC	0.5443	0.0296	0.1469	19.03	0.447	0.3345	0.125	2.0297	15.000
2006	EO	0.5482	0.1624	0.5112	18.44	0.7262	0.3918	0.895	7.0152	7.000
2007	EO	0.6007	0.0958	0.211	18.74	0.6909	0.3966	0.285	8.4886	8.000
2008	EO	0.5594	0.0867	0.0781	18.59	0.6801	0.4333	0.025	6.2843	9.000
2009	EO	0.3448	0.1062	-0.0432	18.74	0.8265	0.528	0.172	89.2363	10.000
2010	EO	0.604	0.1067	0.8467	18.94	0.5511	0.3317	0.856	11.6796	11.000
2006	MID	0.5983	-0.0271	0.7351	18.45	0.7037	0.5067	11.88	13.139	7.000
2007	MID	0.9865	-0.0971	-0.2846	19.41	1.0219	0.6329	1.564	16.1568	8.000
2008	MID	0.7679	-0.0561	0.0149	19.55	0.8726	0.5446	0.414	9.3381	9.000
2009	MID	0.9989	-0.1357	-0.0475	20.03	0.7969	0.4749	1.304	9.1927	10.000
2010	MID	0.9728	0.0428	0.4049	19.73	0.8642	0.3889	1.443	16.8161	11.000
2006	NSW	0.6988	-0.1021	0.1765	17.34	0.3888	0.5198	0.548	0.7274	10.000
2007	NSW	0.5897	0.0407	0.6693	17.49	0.2645	0.1584	1.666	1.5549	11.000
2008	NSW	0.7084	0.0409	0.6073	17.7	0.2383	0.1266	0.613	1.2694	12.000
2009	NSW	0.7098	0.0372	0.0672	17.61	0.2405	0.143	0.027	1.2714	13.000
2010	NSW	0.7177	0.0958	0.1219	18.03	0.2615	0.1544	1.884	1.3019	14.000

2006	SUR	0.5595	-0.0212	0.5575	19.77	0.3947	0.0755	0.479	1.6465	9.000
2007	SUR	0.3542	0.0107	0.244	20.09	0.6393	0.4099	1.627	2.1753	10.000
2008	SUR	0.4835	0.0027	0.7712	20.34	0.3968	0.2588	0.558	2.4446	11.000
2009	SUR	0.6304	-0.0115	-0.2218	18.76	0.3684	0.1806	4.339	2.4292	12.000
2010	SUR	0.1304	0.0809	0.2273	20.56	0.4732	0.3403	9.664	10.0496	13.000
2006	UNI	0.1636	0.1516	0.337	17.23	0.5161	0.2911	0.111	41.1442	26.000
2007	UNI	0.1385	0.1636	0.2465	17.25	0.4589	0.2787	0.346	7.9138	27.000
2008	UNI	0.1929	0.131	0.1538	17.27	0.4493	0.2833	0.077	10.4254	28.000
2009	UNI	0.135	0.1743	0.3252	17.31	0.3495	0.2411	0.764	9.8747	29.000
2010	UNI	0.15	1.1057	0.144	17.71	0.3719	0.2306	6.256	5.807	30.000
2006	YFY	0.3735	0.1037	0.4964	15.75	0.3626	0.0547	173.3	2.5007	9.000
2007	YFY	0.7813	0.1185	0.0187	17.5	0.658	0.0812	0.164	0.7309	10.000
2008	YFY	0.7179	0.069	-0.1831	16.93	0.8863	0.1332	0.525	0.4641	11.000
2009	YFY	0.6529	0.1137	-0.0007	16.72	1.0303	0.1882	0.648	0.3264	12.000
2010	YFY	0.4289	0.1407	-0.289	16.85	0.9613	0.3491	0.12	1.2202	13.000
2006	YTK	0.3008	0.0139	0.5131	19.69	0.3547	0.2592	0.258	6.5713	8.000
2007	YTK	0.3426	0.0085	0.1218	19.63	0.303	0.2874	0.314	4.2186	9.000
2008	YTK	0.4215	0.0073	0.1161	19.85	0.2384	0.306	0.036	3.9392	10.000
2009	YTK	0.2071	0.015	-0.5277	19.15	0.4239	0.0269	0.032	2.689	11.000
2010	YTK	0.4681	0.0147	1.1603	19.76	0.1944	0.3387	1.104	3.3888	12.000