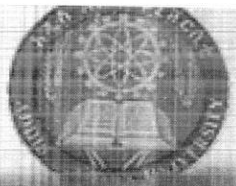
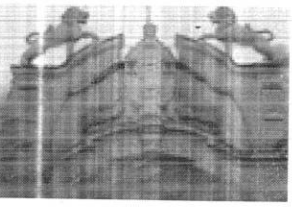




Addis Ababa University
School of Graduate Studies

Capital Structure Determinants: An Empirical Study on Insurance Industry in Ethiopia

By:

Bayeh Asnakew Kinde

June, 2011
Addis Ababa

11

Capital Structure Determinants: An empirical study on Ethiopian Insurance Industry

By:

Bayeh Asnakew Kinde

Advisor: Gebremedihn Gebrehiwot (Assistant professor)

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

June, 2011
Addis Ababa

Addis Ababa University

School of Business and Public Administration

Department of Accounting and Finance

Capital Structure Determinants: An empirical study on Ethiopian Insurance Industry

Approval Board of Examiners

Chairperson, Department	Signature	Date

Graduate Studies Committee

Advisor	Signature	Date
Examiner	Signature	Date

Declaration

I, undersigned declare that this thesis is my original work. Furthermore, all sources of materials used for the thesis had been duly acknowledged.

Name: Bayeh Asnakew

Signature: _____

Date: 22/06/2011

Place: Addis Ababa University

Acknowledgment

First, I would like thank my advisor Assistant professor, Gebremedihn Gebrehiwot, for his fruitful support, encouragement and for his invaluable comments to improve the quality of the work. So, I remain grateful and thankful always.

My thank also goes to employees of Ethiopian insurance companies in general and those working in finance section in particular for cooperating me by providing the required information. Besides, I also thank staffs of Accounting and Finance Department for making me capable to do this thesis.

Moreover, I thank my wife, Adanech, for her day to day general comment. I also extend my prime thank to Yeshambel Getahun and to all my friends for their priceless moral and material support.

Finally, yet importantly, I would like to express my appreciation to Melese Sitotaw, for his invaluable comments on the structure and language of the paper.

Above all, thanks my Almighty God!!

Table of Contents

Contents **Page**

List of tables

Page

List of figures

List of Acronyms

OLS	Ordinary least square
MM	Modigliani and Miller

Abstract

Businesses are living in a world of stiff competition. To be vigorous in this competition, cost effective mix of capital is a requisite, and organizations need to investigate more on the determinants of capital mix. Insurance industry in Ethiopia is currently a fast growing sector; however, there is virtually no formidable data on capital structure determinants about this industry. Thus, the major focus of this study is to investigate empirically capital structure determinants in the case of insurance industry in Ethiopia. All insurance companies were included in the sample frame if they had seven years annual report. Document review was used for collecting data from 2004-2010 annual reports. The study applied panel data model with its fixed effect estimate to test a series of hypotheses that emerge through the review of existing literature. To confidently forward conclusion, unit root test, normality, multicollinearity, heteroscedastcity and autocorrelation tests were conducted on the data. The data then was processed using Eviews 6 statistical package. The collected data then analyzed using descriptive statistics, correlation and OLS regression. The results show that growth, profitability and age of the firm were found to have significant influence on capital structure of Ethiopian insurance companies proxied by long term debt and total debt ratios. Liquidity was significant for long term debt and debt to equity. Business risk was also significant for debt to equity and debt ratio whereas age had also significant influence for leverage. However, among the hypothesized capital structure determinants asset tangibility and size of the firm were found to have insignificant contribution on capital structure of Ethiopian insurance companies.

Chapter One

1. Introduction

This thesis analyzes the explanatory powers of firm level characteristics that have been proposed in the literature to explain variations in capital structure, and identifying relevant theories in the context of Ethiopian insurance industry. Particularly, the purpose of this chapter is to provide background information on the thesis and it is structured in seven consistent sections. Section one deals with background of the study followed by the statement of the problem. Section three presents the objectives of the study. The fourth section discusses research hypotheses. Significance of the study is presented in fifth section. The sixth section also shows scope and limitations of the study. Finally, the structure of the thesis is presented in the seventh section.

1.1. Background of the study

In one way or another, business activity must be financed. Without finance to support their fixed assets and working capital requirements, business could not exist. There are three primary sources of finance for companies: Cash surplus from operating activities, new equity funding, borrowing from bank and non- bank sources. By taking into account a company's particular circumstances, management should decide what the most appropriate mix of internal and external funding, and of equity and debt, i.e. how the company should structure the necessary capital to finance its activities.

Capital structure refers to relationship between long term, short term forms of financing such as debentures, bonds, bank and trade credits, commercial papers, preference share capital and equity capital. In another words, it refers to relationship between equity capital and debt capital that are combined in target proportion to attain the goals of the firm. The capital structure of a firm is defined as specific mix of debt and equity that a firm uses to finance its

operations. Capital structure decision is important because it affects the financial performance of the firm and it is one of the tough challenges that firms face (Abor 2005).

The roots of the modern capital structure theory can be assumed to be grown up on the seminal paper of Modigliani and Miller (1958) commonly known as the MM theory, dating back to 1958 as one of the most influential papers in the economics literature. It states that based on the assumption of no brokerage, tax and bankruptcy costs, investors can borrow at the same rate as corporations and they would tend to have the same information as management about the firm's future investment opportunities. The MM theory proves that under some restrictions a firm's value would be unaffected by its capital structure and thus assumes that earnings before income tax (EBIT) would not have been related to the use of debt, that leads to the inference that capital structure may be considered irrelevant. Despite the fact that some of the fundamental assumptions of the theory can be assumed unrealistic in the eyes of investors and other economic agents, the MM irrelevance theory was generally accepted and subsequent research focused on relaxing some of its assumptions to develop a more realistic approach. In this sense, MM published another paper considering some of the criticisms or deficiencies of their theory and relaxed the assumption that there were no corporate taxes (Modigliani & Miller 1963).

The underlying rationale for the MM theory is that the value of the firm is determined solely by the left hand side of the balance sheet which reflects the company's investment policy. So their theory suggests that the value of the firm tends to be independent from the debt balance of the company, and instead, it is mainly affected by the presence of a number of projects handled with positive net present value (NPV). In line with these theoretical fundamentals,

the preceding arguments lead to the development of trade off theory which suggests that a firm's target leverage is determined by taxes and costs of financial distress.

Brounen & Eichholtz (2001) also explained that in the trade off theory the interest payments tend to be tax deductible, this makes debt less expensive than the use of equity financing; which leads us to assume that there would be a positive relationship between the corporate tax shield and the value of the firm. Brounen & Eichholtz (2001) further explained, in practice, the firms rarely use 100% debt financing. Because, when a firm raises excessive debt to finance its operations, it may default on this debt and thus can be exposed to bankruptcy costs. For these reasons, trade off theory claims that tax shield benefits of debt financing need to be adjusted for financial distress costs that rise with increasing debt levels, creating an optimal capital structure that balances both forces.

However, according to the pecking order theory of Myers (1984), companies prioritize their sources of financing - from internal financing to equity issues- according to the law of least effort, or of least resistance, preferring to raise equity as a financing means of last resort. Hence, internal funds are likely to be used first, and only when they are depleted, the firms apply to the new debt issues. Similarly, Mary et al. (2011) explained that in case of using external financing, the firms issue the cheapest security first so they start with debt, and then possibly apply to hybrid securities such as convertible bonds, and they issue equity only as a last resort. In contrast to the trade-off theory, there is no well-defined target leverage ratio in the pecking order theory.

Mary et al. (2011) further explained that if a company has too much debt, it may overextend its ability to service the debt and can be vulnerable to business downturns and changes in interest rates, and thus would be viewed to be financially risky. On the other hand, too much equity dilutes ownership interest and exposes the company to outside control. This may be discouraging to investors, because it means less profits being distributed to them. All these lead to non-stopping debates that make the topic to be researched in various countries.

So far studies have been conducted on an effort to preview capital structure decision and its impact on firm value on developed countries perspective though consensus still have no been reached about the different theories of capital structure and including the determinants. Debates are perpetuating. Therefore, this study attempts to replicate the same study empirically in the developing countries perspective by incorporating insurance companies of Ethiopia in the sample frame.

1.2. Statement of the problem

MM (1958) were the first authors who developed capital structure theory. Since then many researchers followed MM's path to develop new theory on capital structure and tried to departure from MM's (1958) assumptions. However, the empirical evidence regarding the alternative theories is still inconclusive (Rajan & Zingales 1995).

Firms can choose among many alternative capital structures. For example, firms can issue a large amount of debt or very little debt. Firms have options of arranging lease financing, use warrants, issue convertible bonds, sign forward contracts or trade bond swaps. They can also issue dozens of distinct securities in countless combinations though it depends on various

determinants. However, it attempts to find the particular combination that maximizes its overall market value (Abor 2005).

The determinants of capital structure have been debated for many years and still represent one of the main unsolved issues in the corporate finance literature. Indeed, what makes the capital structure debate so exciting is that only a few of the developed theories have been tested by empirical studies and the theories themselves lead to different, not mutually exclusive and sometimes opposed, results and conclusions ((Rajan & Zingales 1995).

Morri and Beretta (2008), moreover, explained that many theoretical studies and much empirical researches have addressed these issues, but there is no yet a fully supported and unanimously accepted theory; and debates on the significance of determinant factors is still unfolded. For instance, according to the trade-off theory, higher profitability lowers the expected costs of distress; therefore, firms increase their leverage to take advantage from tax benefits. Also, agency theory supports this positive relation because of the free cash flow theory of Jensen (1986). Therefore, leverage and profitability are positively related. On the other hand, according to pecking order theory, Myers (1984) discussed that firms prefer to finance with internal funds rather than debt if internal equity is sufficient due to the asymmetric information. Hence, profitability is expected to have negative relation with leverage; and this result supported by Naveed et al. (2010) empirical investigation. In line with this, Abor (2005) stated that the best that academics and practitioners have been able to achieve are prescriptions that satisfy short-term goals. Thus, the lack of a consensus about what would qualify as optimal capital structure has necessitated the need for this research.

To sum up, there is no universal theory of the debt-equity choice. There are several useful conditional theories that attempt to approach the determination of capital structure, each from different aspect. Thus, in this paper, the researcher examined some specific variables that determine the capital structure of insurance companies in Ethiopia, and a variety of variables (business risk, liquidity, tangibility, growth, firm size, profitability and age) that are potentially responsible for determining capital structure decisions have been selected based on the alternative capital structure theories and previous empirical works.

Besides, although earlier studies have made immense contributions to the theory of capital structure, they were inclined towards to the developed economy, and less developed countries received little attention in various literatures on this issue, consequently, a design feature that works well in one country may not in another. As Bird 2005 (cited in Yesegat 2009) noted this may be referred to as The No-One-Size-Fits-All (the NOSFA) principle. Specifically in Ethiopia, though few studies have been conducted on the determinants of capital structure, to the best of the researcher's knowledge, no single study has focused on insurance industry in Ethiopia, and thus it is an important research area that needs to be replicated by benchmarking the same researches undertaken in other countries. Therefore, the current study investigates empirically the determinants of capital structure of insurance industry in Ethiopia during the period 2004-2010, and fills this gap by providing full information about optimal capital structure with its determinants.

1.3. Objective of the study

1.3.1. General objective of the study

The main objective of this paper is to empirically examine the link between a number of potential firm-specific capital structure determinants and leverage, and to identify relevant theories as well, for the insurance industry in Ethiopia.

1.3.2. Specific objectives of the study

Having the aforementioned problem and general objective in mind, the researcher addressed the following specific research objectives:

- To examine the change in capital structure to the level of liquidity
- To investigate how business risk affect firms capital structure
- To check to what extent firm's growth influence capital structure
- To investigate the influence of tangible assets existence on financial leverage
- To examine how capital structure vary with the size of the business
- To evaluate the impact of profitability on financial leverage
- To see the change in capital structure of firms in relation to their years of operation

1.4. Hypotheses of the study

In order to achieve the objective of the study, a number of hypotheses were tested regarding the determinants of the capital structure choice on the Ethiopian insurance companies. These hypotheses could be formulated as follows:

Liquidity (LQ)

As predicted by the pecking order theory, firms with high liquidity will borrow less. In addition, managers can manipulate liquid assets in favor of shareholders against the interest

of debt holders, increasing the agency costs of debt; and as the firm's profitability and/or liquidity increase, the internal funds available to the firm and its ability to service previous debts will increase. Furthermore, it will earn a good reputation and hence sound more attractive to investors and shareholders, making it easier for the firm to raise more equity funds to meet future investment opportunities (Rataporn et al. 2004). Thus, the need for debt will become minimal; causing the leverage of the firm to fall; and it can be hypothesized as:

Hypothesis 1: There is a significant negative relationship between liquidity and leverage in Ethiopian insurance companies.

Business risk (BR)

One firm variable which impacts upon leverage is firm operating risk, in that the more volatile a firm's earnings stream, the greater the chance of the firm defaulting and being exposed to such costs. This shows that higher volatility of earnings increases the probability of financial distress, since firms may not be able to fulfill their debt servicing commitments. As Titman and Wessels (1988), firms with relatively higher operating risk will have incentives to have lower leverage than more stable earnings firms. Thus, firm's debt capacity decreases with increases in earnings volatility leading to an expected inverse relation with leverage. Thus, the hypothesis would be:

Hypothesis 2: There is a significant negative relationship between business risk and leverage on the Ethiopian insurance companies.

Growth (GR)

Applying pecking order arguments, growing firms place a greater demand on their internally generated funds. When growth and investment opportunities increase, huge capital funds will

be required for the firm to seize all these possible growth opportunities. Obviously, the internal funds will not be enough and the debt capacity will not suffice to undertake these investments. Thus, the firm will mainly turn to the external sources for financing the available opportunities. Therefore, the hypothesis could be justified on the following basis:

Hypothesis 3: There is a significant positive relationship between the assets growth and the leverage of the Ethiopian insurance companies.

Tangibility (TA)

According to pecking order and trade-off theories, the structure of assets has a direct impact on the capital structure; companies with more tangible assets have a higher probability to receive bank credits or to issue bonds. If banks do not have sufficient information regarding the companies claiming credits, they will allow less financing to those having more intangible assets. Rajan and Zingales (1995) shows that tangibility provides collateral value to the assets and thus become a determinant of debt ratio. The reason is that, these tangible assets can be used as collateral to enable firms to borrow at favorable terms. Thus, there should be positive relationship between these two variables. Therefore, it is expected that:

Hypothesis 4: There is a significant positive relationship between tangibility of assets and leverage in the Ethiopian insurance companies.

Size (SZ)

Firm size is another variable that has been widely used in capital structure studies. Larger firms can reduce bankruptcy risk by diversifying its businesses. At lower bankruptcy cost these firms can employ greater proportion of debts to achieve higher interest tax shield (Warner 1975). Under this assumption we can predict a positive relationship between firm

size and debt level. In addition, the trade-off theory postulates that large firms have lower agency costs of debt; relatively smaller monitoring costs, less volatile cash flows and easier access to credit market. Therefore, firm size is expected to have a positive impact on leverage.

Hypothesis 5: There is a significant positive relationship between the firm size and the debt level of the Ethiopian insurance companies.

Profitability (PR)

The pecking-order theory postulates that managers prefer to finance projects internally because of the informational asymmetry between managers and outside investors. In addition, Akhtar (2005) states that profitable firms prefer not to raise external equity in order to avoid potential dilution of ownership; this leads more profitable firms will hold less debt level than low profitable firms. Thus, it is expected the existence of an inverse relationship between profitability and leverage.

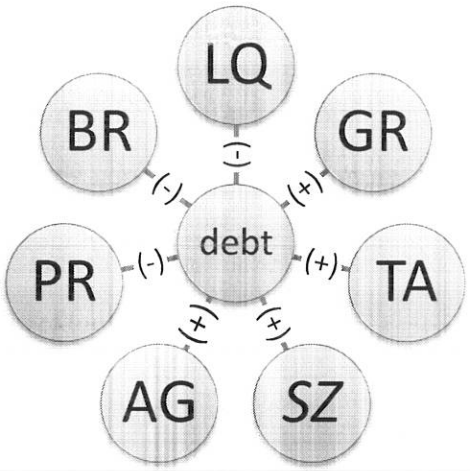
Hypothesis 6: There is a significant negative relationship between the profitability and the leverage of the Ethiopian insurance companies.

Age (AG)

This study has adopted this variable with the argument that firms survive in business for a long time then it can accumulate more funds for running the operations of the business and uses its reputation in accessing more debt, as firms grow older more information regarding their future viability becomes available and reduces information asymmetries. Lower information asymmetries imply higher leverage (Michael et al. 2008). In this context, we can assume that age of the firm is positively related with leverage.

Hypothesis 7: The leverage is higher for older firms than for younger ones.

Fig. 1.4: Summary of hypotheses



1.5. Significant of the study

The study will have significance from various directions:

- This study will supply evidence whether factors identified by previous studies are the same as the ones found to be determinants of capital structure of insurance companies in Ethiopia.
- Previous studies were made in developed countries context. This study attempts to replicate the same study in the developing countries context; particularly in Ethiopian insurance companies. Thus, this study have significant role to play in shading light on how to make capital structure decision at the optimal level since an appropriate capital structure is important to a firm as it will help in dealing with the competitive environment within which the firm operates. Once this optimal capital structure is established, a firm would be able to maximize returns to its stockholders and these returns would be higher than returns obtained from a firm whose capital is made up of equity only.

- It makes to understand the theoretical aspect of capital structure and its relevance in increasing the value of the firm through optimizing its proportion since optimal capital structure is related to the ability of the firm to meet the needs of its stakeholders. Specifically, the study is significant for the following reasons:

  - The study will give some information to educators in general and the management of the Ethiopian insurance companies in particular.
  - It will have some implications on capital structure decision by identifying its strength and weak spots of the Ethiopian insurance industry.
  - Finally, this paper can be an eye opener and serve as a stepping stone for further studies by adding literature in developing countries context, particularly in insurance industry.

1.6. Scope and limitation of the study

In the economic literature, the determinants of capital structure have been grouped into two broad categories (Hermanns 2006): external factors and firm specific factors. External factors (economic growth, inflation, the average interest rate) represented by each country's specific economic conditions in which the economic entities operate, and firm-specific factors that include some of their performances. The internal firm-specific factors are represented by profitability, asset tangibility, firms' size, their growth opportunities, liquidity, volatility of earnings, and age of the firm. Thus, due to time constriction, this study would be confined to firm-specific capital structure determinants on Ethiopian insurance industry over the period from 2004 to 2010. However, insurance companies operating for less than six years would no be included in this study.

Lack of previous research studies and accessibility of sufficient current literatures on the subject of capital structure in insurance companies in the Ethiopian context is one off-putting factor. Besides, using proxies for measuring variables might be imperfect representations of the theoretical features, and thus the use of these variables in the regression analysis could lead to measurement errors and wrong inferences. More significant results might be obtained by using other proxies for each variable.

1.7. Structure of the thesis

The thesis is structured as follows. The first chapter discusses background of the study, statement of the problem, objectives, hypotheses, significance, and scope and limitations of the study. Chapter 2 contains a review of the literature including theories of capital structure, empirical studies on determinants of capital structure, and conclusion and knowledge gap. The third chapter deals with about research methodology. The fourth is also presents the results of the different methods used, and in this chapter analyses are made for testing the hypotheses stated. Finally, chapter 5 presents an overview of the paper and its major findings with recommendations.

Chapter Two

2. Insurance sector in Ethiopia

This chapter provides information about overview of insurance industry in Ethiopia, characteristics of insurance industry, general criteria for client eligibility of insurance coverage and their contribution for economic growth.

2.1. Overview of insurance in Ethiopia

The Ethiopian insurance industry does not have a long history of development despite the country's long history of civilization. Ethiopia is one of the few countries with long history namely China, Persia, Greece and Egypt, and Roman Empire. Despite this, its level of development has been one of the lowest in the world, deprived of modernity, technology, innovations, and modern way of preserving from potential risks (Mezgebe 2010).

Hailu (2007) also indicates that the emergence of modern insurance in Ethiopia is traced back to the establishment of the Bank of Abyssinia in 1905.The Bank had been acting as an agent for a foreign insurance companies to underwrite fire and marine policies. The first domestic private insurance company was established in 1951 with a share capital of Eth Br 1,000,000. In the 1960s domestic private companies started to increase in number.

At present, there are twelve insurance companies in operation, of which one, the Ethiopian Insurance Corporation (EIC), is state-owned while the rest are private. Private insurance companies were nationalized by the socialist regime that prevailed from 1974 to 1993, and taken over by the government-owned Ethiopian Insurance Corporation. The dominance of state-owned insurance firms, as measured by capital or the number of branches, is more

limited. Ethiopian insurance company's share is approximately 41% of the total capitalisation and 25% of the branch network. In terms of total assets, the share of private insurance companies has steadily grown over the past years and reached 49% in 2009.

Currently, competition is stiff in the insurance industry. Private insurance companies (or at least some of them), ambitious to increase their sales volume, have been granting unfair and unjustifiable discounts to attract clients and attain their sales forecast. This aggressive pricing policy has led to an unhealthy spiral of premium cutting. Insurance companies' investment activities are heavily constrained by the restrictions that the National bank of Ethiopia investment proclamation imposed. This forces insurance companies to invest the majority of their funds in government securities and bank deposits at negative real interest rates. The lack of infrastructure, especially a stock market, further constrains insurance companies' investment activities (Mezgebe 2010).

2.2. Characteristics of insurance industry in Ethiopia

The Ethiopian insurance industry is among the lowest in the world and African countries in terms of the three measures namely: Insurance premium market share, market penetration rate and insurance density (insurance premium per capita). Hailu (2007) based on a survey of nine insurance companies and four insurance brokers, insurance market, identifies some features characterize the Ethiopian insurance industry. These include:

- High market concentration and weak competition with the market controlled by one or two insurance companies.
- The insurance companies rely on undue rate-cutting.

- There is no product differentiation (insurers offer identical underwriting policies to their customers).
- The industry lacks the capacity to exploit the benefits of information communication technology (example on-line or modern way of doing business).
- There is no enabling environment, such as code of conduct that can protect the industry from illegal and harmful market practices.
- Heavy dependence on the banking sector for both referral credit insurance business and returns on investment from shares held in banks.

2.3. General criteria for client (risk) eligibility of insurance coverage

- It is not possible to insure against a risk which likely to occur, like depreciation;
- The risk to be insured must be capable of being measured in financial terms;
- There must be legal relationship between the insured and the subject matter of insurance;
- The risk must be pure risk not speculative risk;
- The risk must be homogeneous as much as possible with other risks insured by the insurer.

2.4. Ethiopian insurance sector and economic growth

The contribution of insurance sector in the country for gross domestic product is insignificant for several years and number of people employed in the sector is very few when compared to other countries. Moreover, such underdevelopment of insurance is much more in life insurance division.

Hailu (2007) states that GDP grows at an increasing rate while the insurance industry remains almost stagnant over the study period. This implies that the insurance industry is not growing in line with the growth of the Ethiopian economy. On the other hand, the study finds positive association between the growth of the financial sector and GDP

The GDP has grown consistently at an increasing rate, while the financial sector is only moderately, especially since 2002. It still lags behind the growth of the GDP. This shows the contribution of the financial sector to the economic growth is being affected by low performance of the insurance industry as confirmed from the results of the relationship analysis between insurance growth with GDP and financial sector. The contribution of the finance sector to the GDP can be credited mainly to the performance of the banks (Mezgebe 2010).

In sum, the development of the insurance sector since 1994 in many ways resembles that of the banking sector, with the establishment of several new private insurance companies. The range of insurance products offered is limited indicating that the sector is still at an early stage of development. Besides, insurance companies have limited capacities – premium setting is based on outdated methods, and there is a considerable lack of risk assessment methodologies. But, in the simplest terms, insurance of any type is all about managing risk. One way of managing risk is wise financing mechanism; that is optimizing the capital structure since an appropriate capital structure is important to a firm as it will help in dealing with the competitive environment within which the firm operates.

Chapter Three

3. Literature review

This chapter discusses the literature concerning the capital structure determinants. This review of literature establishes framework for the study and highlights the previous studies, which in turn, helps in clearly identifying the gap in the literature. The discussion of the literature on capital structure determinants has four sections; the first section considers definitions and the general theory of capital structure. This is followed by a review of the empirical studies on the determinants of capital structure choice. The third section empirical studies on theories of capital structure. Finally, conclusions on the literature review and knowledge gaps are presented in section four.

3.1. Theoretical framework

This section deals about the theoretical framework supported by different authors regarding the capital structure. It is composed of definition of capital structure and the various theories of capital structure.

3.1.1. Theories on capital structure

Capital structure , in finance, according to the Modigliani-Miller theorem refers to the technique a corporation finances its assets through some combination of equity, debt, or hybrid securities. Firm's capital structure is then the composition or structure of its debt and equity.

The MM theorem, proposed by Franco Modigliani and Merton Miller (1958) forms the root for modern philosophy on capital structure, even if it is generally viewed as a solely theoretical result since it assumes away many important factors in the capital structure decision. The theorem utters that, in a perfect market, how a firm capital structure is

irrelevant to its performance. This result supplies the foundation with which to scrutinize factual world explanations why capital structure is pertinent, that is, a company's value is affected by the capital structure it employs. Some other reasons include bankruptcy costs, agency costs, taxes, and information asymmetry.

Capital structure is defined as the specific mix of debt and equity a firm uses to finance its operations. Myers and Majluf (1984) and Myers (1984) made an important toting up in capital structure literature by making available pecking order and static trade-off hypothesis respectively. The crucial importance of the theory is to explain the fact that corporations usually are financed to a certain extent with debt and the remaining with equity. The theory usually explains that there is a benefit to financing with debt, the benefit obtained from tax deductions of debt but it has its own cost using debt as source of financing; the costs of financial distress comprising bankruptcy costs of using debt and non-bankruptcy costs (e.g. staff leaving, suppliers demanding disadvantageous payment terms, bondholder/stockholder infighting, etc). The marginal relevance of additional increases in debt declines as debt increases; however, the marginal cost increases, so that a firm that is optimizing its overall value will focus on the trade-off when choosing how much debt and equity to use for financing. However, Myers (2001) states that there is no universal theory for the choice of capital structure and no reason to expect one. A general theory of the optimal capital structure is not possible because of the multitude and complexity of factors that explain how the firms are financed.

According to Baker and Wurgler (2002) there is also another theory, the market timing hypothesis, which focuses on how firms and corporations in the various economic sectors

come to a decision whether to finance their investment with internal sources or with external sources. It is one among the many theories of finance used in the capital structure, but its idea has some contradiction with other capital structure theories like the pecking order theory and the trade-off theory, for example. This theory hypothesis depicts that the first order factor in the firm specific characteristics of a corporation's capital structure, that is, the fractions of debt and equity in their liabilities, is the relative mis-match in the pricing of instruments when the firm is going to finance its investment. To be precise, firms do not generally be concerned whether they finance with debt or equity; they just choose the form of financing which, at that moment, gives the impression to be more treasured by financial markets. This theory can be classified as part of the behavioral finance literature, because it does not explain why there would be any asset mis-pricing, or why firms would be better able to tell when there was mis-pricing than financial markets. Rather it just assumes these mis-pricing exists, and describes the behavior of firms under the even stronger assumption that firms can detect this mis-pricing better than markets can. The empirical verification for this hypothesis is miscellaneous.

On the one hand, Baker and Wurgler (2002) themselves demonstrates that an index of financing that reveals how much of the financing was done during hot equity periods and how much during hot debt periods is a good pointer of firm leverage.

3.1.2. Pecking order theory

The pecking order theory was developed by Myers and Majluf (1984) and it is focused on asymmetric information costs. Asymmetric information shows information inequality between internal and external users of the organization that is external investors do not have

access to required information on the topic of the value of the firm's assets and growth opportunities. The information asymmetry may also explain why existing investors do not support new equity financing. The reason is that the new investors may require higher returns to reimburse the risk of their investment and this request dilutes the returns of existing investors. As stated by Myer (1984) in the pecking order hypothesis, the firm should follow specific hierarchy for financing its assets. At the outset, the firm utilizes internally produced fund i.e. retained earnings followed by debt and if more funds are required, as a final option, assets are financed by equity capital.

This pecking order theory suggests that firms will initially rely on internally generated funds, i.e., undistributed earnings, where there is no existence of information asymmetry; they will then turn to debt if additional funds are needed, and finally they will issue equity to cover any remaining capital requirements. The order of preferences reflects the relative costs of various financing options. Clearly, Myers (2001) also states that firms would prefer internal sources to costly external finance. Thus, according to the pecking order hypothesis, firms that are profitable and, therefore, generate high earnings are expected to use less debt capital than that do not generate high earnings. The pecking order theory also suggests that managers prefer to finance projects with retained earnings first because of the information asymmetry between managers and outside investors. Likewise, profitable firms might accumulate equity to avoid having to raise capital through risky security. Additionally, profitable firms prefer not to raise external equity in order to avoid the potential dilution of ownership.

3.1.2.1. Asymmetric information theory

The concept of optimal capital structure is expressed by Myers (1984) and Myers and Majluf (1984) based on the notion of asymmetric information. The presence of information asymmetries between the firm and likely finance providers causes the relative costs of finance to show a discrepancy among different sources of finance. For example, an internal source of finance where the funds provider will have more information about the firm than new equity holders, thus these new equity holders will expect a higher rate of return on their investments. This means it will cost the firm more to issue fresh equity shares than to use internal funds. Similarly, this argument could be provided between internal finance and new debt-holders. The conclusion drawn from the asymmetric information theory is that there is a certain pecking order or hierarchy of firm preferences with respect to the financing of their investments.

As noted by Myers and Majluf (1984), the pecking order theory suggests that firms have a particular preference order for capital used to finance their businesses. Owing to the presence of information asymmetries between the firm and potential financiers, the relative costs of finance vary between the financing choices where the funds provider is the firm's retained earnings, meaning more information than new equity holders, and the new equity holders will expect a higher rate of return on capital invested resulting in the new equity finance being more costly to the firm than using existing internal funds. In addition, the greater the exposure to the risk allied with the information asymmetries for the various financing choices besides retained earnings, the higher the return of capital demanded by

each source. Thus, the firm will give a sequence of financing, and prefer retained earnings financing to debt, short-term debt over long-term debt and debt over equity.

The hypothesized relationship between firm profitability and capital structure is put in plain words on Myers and Majluf (1984) pecking order hypothesis. The theory also states that, provided the information asymmetries between the firm and outsiders, firms have a preference for inside financing over outside financing, as the cost for outside capital should be greater for the firm. Therefore, profitable firms, which have access to retained profits, can use these for firm financing rather than accessing outside sources. Even though more profitable firms would be more likely to get access to such capital, these firms will have a preference for inside funds to finance their operations and investments.

3.1.3. Trade-off theory

Trade-off hypothesis, developed by Myers (1984), proposes that firm should have optimal capital structure based on balancing between the benefits of debt and costs of debt. In other words, firm sets target debt-equity ratio according to the nature and requirements of business and then gradually moves to achieve it. These are based on tax benefits associated with debt use, bankruptcy cost and agency cost. These three are described in terms of the static trade-off choice.

The trade-off theory postulates that a firm will borrow up to the point where the marginal value of tax shields on additional debt is balanced by increasing the present value of possible bankruptcy costs (Myers 2001). It also suggests positive and proportional relationship between firm size and leverage since larger firms are less likely to go bankrupt because

larger firms tend to be more diversified. This might entail that firm size could be viewed as an inverse proxy for unobservable credit risk. In addition, Fama and Jensen (1983) suggest that larger firms are likely to provide more information to debt holders, possibly leading to a reduction in monitoring costs for larger firms. Consequently, larger firms tend to have lower agency costs of debt. Moreover, larger firms tend to have less volatile cash flows, easier access to the debt market, and need more debt to fully benefit from the tax shields. Therefore, firm size is expected to be positively related to leverage. Logarithm of total asset can be used as proxy in this study, similar approach followed by Mohammad (2007). He discusses the logarithm of total sales as an alternate; however, he accepted the total assets as a better proxy for the measure of size.

According to the trade-off theory, higher profitability lowers the expected costs of distress; however, firms increase their leverage to take advantage from tax benefits. Moreover, agency theory supports this positive relation because of the free cash flow theory of Jensen (1986). Therefore, leverage and profitability are positively related. On the other hand, according to pecking order theory, Myers (2003) discusses that firms prefer to finance with internal funds rather than debt if internal equity is sufficient due to the asymmetric information. Hence, profitability is expected to have negative relation with leverage. Most studies using large listed companies, in the developed countries context, have found this negative relationship, including Rajan and Zingales (1995) and Booth et al. (2001).

The trade-off theory also suggests that firms with more investment opportunities have less leverage because they have stronger incentives to avoid under-investment and asset substitution that can arise from stockholder-bondholder agency conflict. Jensen's (1986) free

cash flow theory similarly discusses that firms with more investment opportunities have less need for the disciplining effect of debt payments to control free cash flows. In this paper, growth opportunities defined as annual change in total asset similar with the previous study on insurance sector by Naveed et al. (2010).

3.1.3.1. Tax consideration model

Capital structure of the firm can also be explained in terms of the tax benefits allied with the use of debt. It is observed that tax policy has an important effect on the capital structure decisions of firms. Firms consider within the static trade-off framework, taxes provide relief for firms by deducting interest on debt in computing taxable profits. This advocates that firms entirely move to 100% debt financing due to the resultant effect obtained from tax diminution relief. This benefit is created, as the interest payments associated with debt are tax deductible; however, payments associated with equity, such as dividends, are not considered in the tax deduction, and thus various theories among other things foretell a positive relationship between tax and leverage. Therefore, this tax effect encourages debt use by the firm, as more debt increases the after tax proceeds to the owners (Modigliani & Miller 1963).

It is imperative to note that when there is firm tax benefit follow-on from the deductibility of interest payment on debt portion; investors entertain these interest payments as income. The interest income received by the investors is also taxable on their personal account, and this leads to personal income tax effect to have negative impact on debt financing. As the supply of debt from all corporations expands, investors with higher and higher tax brackets have to be persuaded to seize corporate debt and to receive more of their income in the form of interest rather than capital gains. But later the interest rates get higher as more and more debt

is included in the capital structure of the firm, and consequently corporations face rising costs of debt as compare to the cost of issuing equity. Then tax benefits arising from the issue of more corporate debt may be counterbalanced by a high tax on interest income. It is the trade-off that ultimately determines the net effect of taxes on debt usage (Myers 2001).

3.1.3.2. Agency cost model

Debt financing may also lead to agency costs. Agency costs are the costs that take place as a result of a principal-stakeholder relationship, such as the relationship between equity-holders or managers of the firm and debt holders. Myers and Majluf (1984) show that, given the incentive for the firm to benefit equity-holders at the expense of debt holders, debt-holders need to hamper and keep an eye on the firm's behavior. These contracting behaviors increase the cost of capital offered to the firm. Thus, firms with relatively higher agency costs due to the inbuilt conflict between the firm and the debt-holders should have lower levels of outside debt financing and leverage.

Agency theory advocates that firms with high leverage be inclined to invest sub-optimally and under-invest which might imply the transferring of wealth from debt holders to shareholders. As a result, lenders must require collateral. For firms that could not provide enough collateral, lenders might ask for higher lending costs. There are various conceptions for the effect of tangibility on leverage decisions. If debt can be secured against assets, the borrower is restricted to using debt funds for specific projects. Creditors have an improved guarantee of repayment, but without collateralized assets, such a guarantee does not exist. Hence, the trade off theory predicts a positive relationship between measures of leverage and the proportion of tangible assets. On the other hand, managers of highly levered firms will be

less able to consume excessive perquisites, since bondholders more closely monitor such firms. The monitoring costs of this agency relationship are higher for firms with less collateralizable assets. Therefore, firms with less collateralizable assets might voluntarily choose higher debt levels to limit consumption of perquisites. This agency model predicts a negative relationship between tangibility of assets and leverage (Myers 2003). The tangibility is estimated as the ratio of fixed assets to total assets in the empirical model for this study.

Given agency and bankruptcy costs, there are incentives for the firm not to fully utilize the tax benefits of 100 percent debt within the static framework model. The more likely a firm will be exposed to such costs, the greater their incentive to reduce their level of debt within the capital structure of the firm. One firm variable which impacts upon this exposure is firm operating risk, in that the more volatile firm earnings streams, the greater the chance of the firm defaulting and being exposed to such costs. Consequently, these firms with relatively higher operating risk will have incentives to have lower leverage than other more stable earnings firms.

Agency theory suggests that information asymmetry and moral hazard will be greater for smaller firms. Conflicts between shareholders and creditors may arise because they have different claims on the firm. Equity contracts do not require firms to pay fixed returns to investors but offer a residual claim on a firm's cash flow. However, debt contracts typically offer holders a fixed claim over a borrowing firm's cash flow. When a firm finances a project through debt, the creditors charge an interest rate that they believe is adequate compensation for the risk they bear. Because their claim is fixed, creditors are concerned about the extent to which firms invest in excessively risky projects. For example, after raising funds from debt-

holders, the firm may shift investment from a lower-risk to a higher-risk project (Chittenden et al. 1996).

Jensen and Meckling 1976 (cited in Gabriela 2011) explains that in order to control the agency costs created by free cash flow, firms with more profitable assets in place use a large fraction of their earnings to debt payments. Thus, controlling for investment opportunities, the leverage is positively related to profitability. The underinvestment and asset substitution problems, which arise when debt is risky and the stockholder-bondholder agency problem exists, lead to the prediction that firms with more investments have less leverage.

3.1.3.3. Bankruptcy cost model

According to the words of Myers (2001) and in the context of theory of corporate finance, bankruptcy costs of debt are the increased costs of financing with debt instead of equity that result from a higher probability of bankruptcy. The fact that bankruptcy is generally a costly process in itself and not only has a transfer of ownership implied that these costs negatively affect the total value of the firm; these costs can be thought of as a financial cost, in the sense that the cost of financing increases because the probability of bankruptcy increases. One way to understand this is to realize that when a firm goes bankrupt investors holding its debt are likely to lose part or all of their investment, and therefore, investors require a higher rate of return when investing in bonds of a firm that can easily go bankrupt. This implies that an increase in debt which ends up increasing a firm's bankruptcy probability causes an increase in these bankruptcy costs of debt.

Bankruptcy cost, as stated by Cassar and Holmes (2003), is a cost directly incurred when the perceived probability that the firm will default on financing is greater than zero. One of the bankruptcy costs is liquidation costs, which represents the loss of value as a result of liquidating the net assets of the firm. This liquidation cost reduces the proceeds to the lender, should the firm default on finance payments and become insolvent. Given the reduced proceeds, financiers will adjust their cost of finance to firms in order to incorporate this potential loss of value. Firms will, therefore, incur higher finance costs due to the potential liquidation costs. Bankruptcy costs must be trivial or nonexistent if one assumes that capital market prices are competitively determined by rational investors. Bankruptcy costs are also the loss in profits incurred by the firm as a result of the unwillingness of stakeholders to do business with them. Customer dependency on a firm's goods and services and the high probability of bankruptcy affect the solvency of firms. If a business is perceived to be close to bankruptcy, customers may be less willing to buy its goods and services because of the risk that the firm may not be able to meet its warranty obligations.

Another cost that is associated with the bankruptcy cost is distress cost. Houston et al. (1997) states that this is the cost a firm incurs if non-lending stakeholders believe that the firm will discontinue. These stakeholders' behavior effectively reduces the value of the firm. Therefore, firms which have high distress cost would have incentives to decrease debt financing so as to lower these costs. Given these bankruptcy costs, the operating risk of the firm would also influence the capital structure choice of the firm because firms which have higher operating risk would be exposed to higher bankruptcy costs, making cost of debt financing greater for higher risk firms.

3.2. Review of empirical studies

This section deals with the empirical framework supported by different researchers regarding the capital structure determinants.

3.2.1. Empirical evidences on capital structure determinants

Following from above theoretical standpoints, a number of empirical studies have identified firm-level characteristics that affect the capital structure of firms. Among these characteristics are: liquidity, firm risk, growth, tangibility of assets, size of the firm, profitability and age of the firm.

3.2.1.1. Liquidity

Liquidity has been extensively studied, particularly in the market microstructure literature. Various researchers investigated the link between liquidity and capital structure, and some find positive relation and some others provided negative relation evidences.

Opler et al. (1999) investigates an empirical analysis of corporate holding of liquid assets. Their sample covers U.S. non-financial firms during the 1952-1994 periods. They found a positive relationship with respect to growth opportunities (measures by market to book ratio or by R&D spending), and a negative relation between debt and corporate liquidity.

Similarly, Morellec (2001) gives a comprehensive analysis of the implications of liquidity that build up the asset transformation theme by applying dynamic model of a levered firm whose net revenue follows a geometric Brownian motion; and showed that partial asset sale increases the value of equity and reduces the value of debt. Thus, asset liquidity (i.e., the capacity to engage in asset sales) reduces the value of the firm and the debt capacity of the

firm. Consequently, asset liquidity can result in underinvestment relative to the illiquid asset benchmark case, and leads to an inverse relationship with the level of debt.

Ronald (2002) tested empirically by estimating the determinants of liquid asset holdings using panel data sets of Belgian and UK firms. But the result evidenced that a positive relation between leverage and liquid asset holding. This result leads to identify a possible linkage from high debt to high liquidity to slow growth. In light of this it is discussed that the possible implications of the development of stock markets, private equity, and venture capital markets.

Besides, two recent studies by Frieder and Martell (2006) and Lipson and Mortal (2010) applied OLS regression method, and offered empirical evidence on the theoretical prediction of liquidity and debt level. Frieder and Martell (2006) found that higher liquidity is associated with lower leverage, as predicted by the trade-off model. Likewise, Lipson and Mortal (2010) discover that firms with more liquid equity carry less debt. Further, when considering external financing, firms with more liquidity are more inclined to raise equity than debt. The economic magnitude of the effect of liquidity on capital structure seems to be significant as well, and these two studies provide insightful empirical evidence on the association between liquidity and leverage. In the methodology, Naveed et al. (2010) empirical investigation on Pakistan Life Insurance Sector shows a negative relation between liquidity and leverage.

3.2.1.2. Business risk

Despite the broad consensus that firm risk is an important inverse determinant of corporate debt policy, empirical investigation has led to contradictory results. For instance, unusually, Rafiq et al. (2008) found positive relationship between leverage and risk.

Likewise, an empirical study by Mary et al. (2011) on the determinants of capital structure in listed Egyptian Corporations also indicates that a positive relation between business risk and leverage, which contradicts the theoretical background and the findings observed in most developed and developing countries and they gave their justification for the result as:

> *A probable justification of such result could be that the investors in Egypt out of pure cultural reasons tend to be highly risk averse and low-trusting relative to their counterparts in other foreign countries. Thus, once the business risk of any firm acquires an increasing trend, the investors can sensibly be expected to move away from its stock, making it increasingly difficult for the firm to raise additional equity from the stock market. On the other hand, the strong personal relationships that tend to exist between the firm's managers and their main banks, especially for large firms, in most developing countries enable them to raise more debts to assist them out of their financial distress, as the bank would be willing to launch several rescue operations to save the firm; e.g. by renegotiating loans, reducing the interest rate, or refinancing existing debt. ------ --- thus, as the firms' business risk increases, they would find it easier to raise debt rather than equity finances, causing their leverage ratio to increase; and vice versa, when their business risk falls, investors will be more willing to provide equity finances to the firm, causing its debt-equity ratio to decrease.*

Moreover, some other empirical evidences between risk and leverage suggested a positive rather than negative relationship (Chittenden *et al.* 1996). Similarly, Naveed et al. (2010) using total claims to total premiums is used as a proxy to measure the risk of the life

insurance companies in Pakistan come across positive relationship between capital structure and risk of the insurance companies i.e. debt ratio increases with the increase of claim ratio. This indicates that in order to fulfill the claims of the life insurance policyholder at the time of death or expiry of the policy, risky companies acquires external funds. But most theories and empirical findings (Titman & Wessels 1988) indicate an inverse relationship between risk and debt ratio.

3.2.1.3. Growth

Growth is measured as the annual change on the earnings or annual growth of firm's total assets. Empirical evidence seems inconclusive. Most researchers evidenced that higher growth firms use less debt. For instance, in the cross sectional study of the determinants of capital structure, Rayan and Zingales (1995) examine the extent to which at the level of the individual firm; and they noted that the capital structure may be explained by four key factors, namely; market-to book, size, profitability and tangibility. Their analysis is performed upon a firm-level sample from each of the countries, and although the results of their regression analysis differ slightly across countries, they appear to uncover some fairly strong conclusion; and find a negative relationship between growth and the level of leverage on data from the developed countries. This is consistent with trade-off theory. On the other hand, some others found positive relationships between growth and leverage; for example, Booth et al. (2001).

The empirical investigation of Naveed et al. (2010) on Pakistan life insurance companies indicated a positive relationship between growth and debt ratio. However, this positive relationship is found statistically insignificant. Though positive sign confirms that growing

firms are expected to have high debt ratio (Pecking order theory) but insignificant result indicates that growth is not considered as a proper explanatory variable of leverage in life insurance sector, and this results rejected their hypothesis that agency cost of debt are expected to be higher of growing firms because these firms are more flexible with respect to future investments.

In the investigation of Ebru (2011) in Turkish firms, growth was found to be significantly and positively affecting total debt ratios through the higher use of short term debt ratios. This variable was insignificant at the highest quantile for both the short term and total debt ratios. Growth variable was significant in the lower quantile through fifth quantile for the long term debt ratios. This indicates that fast growing firms borrow funds to finance their high financing needs. Positive sign of growth is along the lines of pecking order theory.

3.2.1.4. Asset tangibility

Tangible assets are likely to have an impact on the borrowing decisions of a firm because they are less subject to informational asymmetries and usually have a greater value than intangible assets in case of bankruptcy. In most empirical investigations, tangibility is measured by the ratio of net fixed assets to total assets. Static trade-off and pecking order theories maintain that there is a positive correlation between debt ratio and tangibility. The majority of empirical studies in developed countries also found a positive relationship between tangibility and leverages (Rajan & Zingales 1995). However, empirical studies for developing countries found mixed relationship between these variables. On the other hand, some studies reported a negative relation between tangibility of assets and debt level; for example, Booth et al. (2001). Other studies also specifically suggested a positive relationship

between the assets structure and long term debt and negative relationship between the asset structure and short term debt.

The regression model of Naveed et al. (2010) on Pakistan Life Insurance Sector indicated that the beta value of explanatory variable tangibility of assets is positive. However, tangibility is not statistically significant with the large p-value, and they stated that although positive relationship shows a firm with the large portion of fixed assets can easily raise debt or obtains more debt at relatively lower rates by providing collaterals of these assets to creditor but due to the insignificant relationship tangibility is not considered a powerful explanatory variable to define the debt ratio of life insurance companies in Pakistan over seven years.

The most recent study by Ebru (2011) using quantile regression method on Turkish firms reported a positive relationship between tangibility and leverage, similar with the theoretical point of view. Tangibility was found positive and significant on long-term debt ratios except the lowest and highest quantiles. Both pecking order and trade-off theories maintain that there is positive correlation between debt ratio and tangibility. On the other hand, the relationship was found negative for both short term and total debt ratios in his study. Consistent with the findings of previous studies, the relationship between tangibility and short term debt ratio was negative and significant. Finally, the researcher stated that it is generally expected with respect to the short term debt that firms tend to match their duration of assets and debts. This means that firms with more fixed assets rely more on long term while those with more contemporary assets depend more on short term debt for financing their assets.

However, Ebru (2011) also reports significant negative relationship between tangibility and both short term and total debt ratios; which provided further support for agency cost theory and the existence of conflict between debt holders and shareholders. This variable was also insignificant in both lowest and highest quantiles for both short-term and total debt ratios. These results also confirmed with results of empirical studies for developing countries whereas studies for developed countries exhibited a positive relationship.

3.2.1.5. Firm size

The size of firm is defined as the logarithm of total sales or the logarithm of the total assets. The effect of size on debt ratios is ambiguous from the theoretical point of view, some authors encountered a positive relation between size and leverage; some others reported negative relation and others also found statistically insignificant relationship between them. Similarly, empirical studies like Bevan and Danbolt (2002) indicates that firm size is found to be negatively related regarding short term debt and positively related regarding long term debt; and concerning firm size and leverage Booth et al. (2001) also states as:

> *It is also argued that larger firms are more diversified and have easier access to the capital markets, and borrow at more favorable interest rates. Larger firms with less volatile benefits also have a greater likelihood of being able to fully use tax shields from interest payments, increasing the expected tax benefits of debt. For small firms, the conflicts between creditors and shareholders are more severe because the managers of such firms tend to be large shareholders and are better able to switch from one investment project to another. Informational asymmetries between insiders in a firm and the capital markets are higher for small firms. According to these arguments, most empirical studies in fact report a positive sign for the relationship between size and leverage.*

The empirical evidence investigating the relationship between sizes and financing for firms of similar scale to those examined in many developed countries generally supports a positive relationship between firm size and leverage, long-term leverage, outside financing and bank financing. A much earlier research by Rajan and Zingales (1995) suggests that the leverage of firms in the major industrialized countries is positively related to the size of the firm and the availability of tangible assets, but is negatively correlated with profitability and the level of investment opportunities.

According to Mary et al. (2011) recent work on the actively listed Egyptian corporations, the findings of the estimated model and the various other tests confirm the existence of a significant positive relation between the firm size and the debt-equity ratio. This finding conforms to those of the other empirical studies conducted in countries all over the world.

Naveed et al. (2010) investigation on Pakistan Life Insurance Sector shows that coefficient of variable size is positive and statistically significant at 1% level. This predicts that large size life insurance companies in Pakistan are preferred to utilize more debt in formation of capital. Thus, it showed a positive relationship between the leverage and size of life insurance sector over seven years book value data. These results also confirm the notion that large firms are employed more debt because these are less risky and diversified in nature (static trade- off theory). In addition, larger firms are preferred to issue more debt because it reduces direct bankruptcy costs due to market confidence. Moreover, smaller firms prefer to acquire lower debt because these firms might face the risk of liquidation at the time of financial distress.

Contrary to the above, Faris (2010) found a negative relationship between leverage and firm size. A quite different result was also obtained by Dilek et al. (2009) using panel data analysis within the time period 2000-2007 on Turkish firms; and they report as the coefficient of the size of the firm is statistically insignificant and also its coefficient takes a value about zero. Secondly, Rajan and Zingales (1995) include size (which is proxied by the natural logarithm for sales) in their cross sectional analysis and stated that there is no clear theory to provide expectations as to be effect which size should have on gearing.

Ebru (2011) on Turkish firms states that theoretical expectation about the relationship of size and leverage is ambiguous. Empirical studies experienced mainly positive relationships. In the similar manner, in the same empirical investigation, firm size was found to have positive relationships to short term debt and total debt ratios of firms but the relationship was negative although insignificant with respect to long term debt ratio in the firms. The results indicated that size is positively associated with higher short term as well as total debt ratio. With respect to firms' size, results showed that firms are more likely to acquire short term debt finance in their operations. The findings of the relationship with the firm size are in line with static trade-off and agency cost theory.

3.2.1.6. Profitability

As Chittenden et al. (1996) states that empirical evidence from previous studies examining on capital structure is consistent with pecking order arguments with leverage being found to be negatively related to profitability. Yu (2003) attempts to explain patterns of capital structure in Philippine firms and to verify if the theories developed in economically advanced countries apply to Philippine firms. Using firm-specific data on Philippine listed firms from

1996 to 2000, the study found that, using the total-debt-to-equity definition for leverage, proxy measures for profitability as past growth opportunities (average annual growth rate of total assets) negatively related with leverage. Akhtar (2005) also found significant and negative coefficients of profitability variable which conform to the pecking order theory.

Similarly, Naveed et al. (2010) analysis on Pakistan Life Insurance Sector indicates the negative relationship between leverage and profitability and predicts that, in Pakistan, profitable life insurance companies are preferred to utilize small portion of debt. This result confirms the notion that Pakistani life insurance companies follow pecking order pattern i.e. preferred to employ internal financing than debt. In addition, negative relationship also confirms the implication of agency theory which predicts that profitable firms are avoidable to get loan from inefficient markets due to the disciplinary role of debt.

Ebru (2011) quantile regression on Turkish firms' results in profitability is found to have negative effect on short term and total debt ratios for all quantiles except both lowest and highest quantiles. For long term debt ratio, profitability was found to be negative and significant from 40th to 80th quantile and this variable was insignificant regarding the other quantiles. The negative correlations explained by pecking order theory seemed to be more relevant for the firms since the costs of both debt and external equity are higher for them. If dividends are smoothed or very low, even if firms do not target a specific debt ratio, changes in profitability will generally affect retained earnings positively and, hence debt ratio negatively. A negative relationship between profitability and leverage is observed in the majority of empirical studies. This study provided similar results confirming the pecking order theory rather than static trade-off theory.

However, Mohammad (2007) made regression analysis on Bangladeshi companies and found that the coefficient of profitability is positive which is contrary to the researcher's previous argument; but statistically insignificant. Finally, the researcher gave the conclusion that the positive signs could be explained by the argument that profitable firms will be able to attract more debts from banks and the capital market and these firms will prefer debt in order to reduce their higher tax rate on profit. However, the fact that the coefficients are not significant implies that profitability does not have any material impact on capital structure decision for Bangladeshi companies. Likewise, Dilek et al. (2009) also found profitability to be the most significant variable with a positive sign.

3.2.1.7. Firm age

Age of the firm is a standard measure of reputation in capital structure models. As a firm continues longer in business, it establishes itself as an ongoing business and, therefore, increases its capacity to take on more debt; hence age is positively related to debt. 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. In particular, when it comes to highly indebted companies, they are essentially gambling their creditors' money. If the investment is profitable, shareholders will collect a significant share of the earnings, but if the project fails, then the creditors have to bear the consequences (Myers 2001).

Contrary to the theory, negative coefficient of variable age by Naveed et al. (2010) on Pakistan insurance companies specifies the negative relationship between age of the insurance companies and debt ratio. This inverse relationship predicts that in Pakistan older

or mature insurance companies are preferred to utilize small portion of debt in formation of capital. According to Naveed et al. (2010) one key reason to employ less debt ratio is that when firm survives in business for a long time then it can accumulates more funds for running the operations of the business and subsequently keeps away the firm to go for debt financing. In addition, positive relationship between leverage and age is not likely to apply in transition economies because experience or maturity of the firms before economic reforms is likely to be limited (Al-Bahsh & Sentis 2008). The following table shows determinant measurements used in previous studies.

Table 3.2: Determinant measurements in previous studies

Determinants	Proxy	References
Liquidity	Current asset divided by current liability	Naveed et al.(2010), Mary Dawood et al. (2011)
Risk	Standard deviation of operating income	Mary Dawood et al. (2011), Bathala et al. (1994)
Growth	Changes in total assets	Mary Dawood et al.(2011), Onaolapo and Kajola (2010)
Tangibility	Fixed assets divided by total assets	Cassar and Holmes (2003), Mohammed Amidu (2007), Adesola (2009)
Firm size	Natural log of total assets	Booth et al, (2001), Cassar and Holmes (2003), Mohammad Sayeed (2007), Mohammed A (2007), Adesola (2009), Onaolapo, and Kajola (2010)
Profitability	Return on asset	Booth et al. (2001), Cassar and Holmes (2003), Mohammed A (2007), Adesola (2009)
Age of the firm	Natural log of years of operation	Faris (2010), Onaolapo and Kajola (2010), Naveed et al.(2010)

Source: Literature review

3.3. Previous studies and theories of capital structure

Capital structure theories have generated strong empirical support. For instance, Agency theory posits that capital structure is determined by agency cost i.e. cost due to conflicts of interest. The literature in this area has been built on the early work by Jensen and Meckling 1976 (cited in Adesola 2009). These alternative theories lead to different conclusion regarding the influence of capital structure decision on corporate financing choice.

A much earlier research by Rajan and Zingales (1995) also suggests that the leverage of firms in the major industrialized countries is positively related to the size of the firm and the availability of tangible assets, but is negatively correlated with profitability and the level of investment opportunities. The same results were found by Antoniou et al. (2008) when they investigate the determinants of corporate leverage in UK, USA, Germany, France and Japan. The same study was conducted in Australia to investigate the determinants of capital structure in Australian SMEs. The results indicated that the traditional financing theories (trade-off and pecking order), typically developed to apply to large listed firms, appeared to hold for Australian SMEs.

The pecking order theory predicts a negative relationship between profitability and leverage. The empirical literature regarding the pecking order theory provided mixed evidence. On the one hand, Booth et al. (2001) found support for this theory in their empirical study which includes 10 developing countries. On the other hand, Frank and Goyal (2003) used a cross-sectional sample of publicly traded American firms from 1971 to 1998 in order to test the pecking order theory. The conclusion was that the theory is not supported by the evidence.

Wolfgang and Roger (2003) tested leverage predictions of the trade-off and pecking order models using Swiss data. At an aggregate level, leverage of Swiss firms is comparatively low, but the results depend crucially on the exact definition of leverage. Confirming the pecking order model but contradicting the trade-off model, more profitable firms use less leverage. Firms with more investment opportunities apply less leverage, which supports both the trade-off model and a complex version of the pecking order model. Finally, by estimating a dynamic panel model, they reached to a conclusion that Swiss firms tend to maintain target leverage ratios. In the same year, Philippe et al. (2003) analyze the determinants of the capital structure for a panel of 106 Swiss companies listed in the Swiss stock exchange. Both static and dynamic tests are performed for the period 1991-2000. It is found that the size of companies, the importance of tangible assets and business risk are positively related to leverage, while growth and profitability are negatively associated with leverage. The sign of these relations suggest that both the pecking order theory and trade off hypothesis are at work in explaining the capital structure of Swiss companies, although more evidence exists to validate the latter theory.

Fakher and Lynn (2005) provides further evidence of the capital structure theories pertaining to a developing country and examined the impact of the lack of a secondary capital market by analyzing a capital structure questions with reference to the Libyan business environment. The results of cross-sectional OLS regression show that both the static trade-off theory and the agency cost theory are pertinent theories to the Libyan companies' capital structure whereas there was little evidence to support the asymmetric information theory and they concluded that the lack of a secondary market may have an impact on agency costs, as

shareholders who are unable to offload their shares might exert pressure on management to act in their best interests. A major study conducted by Beattie et al. (2006) on the capital structures of firms in both Spain and the UK using questionnaire, found results consistent with the pecking order theory and the existence of a hierarchy of finance for firms in these countries, where about 60% of the firms tend to follow a financing hierarchy, and the pecking order appears to be a good description of the financing policies for large firms, while small firms resort a little more to equity than they do to debt financing.

According to Jalal (2007), the pecking order theory of capital structure depends, fundamentally, on the notion that equity market frictions are greater than debt market frictions. These frictions can be due to information asymmetries, adverse selection, or due simply to institutional costs of bringing a new issue to market. Many studies of the pecking order theory in recent years have followed the empirical structure. The researcher estimated regression equations of new debt financing on a firm's deficit of funds flow. The slope coefficient measures the extent to which marginal debt issues are explained by the external financing needs of firms, and also shows that high values of the coefficient estimates (or the pecking order betas) are observed in countries where these problems of information asymmetry and adverse selection are potentially more severe. Finally, the researcher concluded that the pecking order theory proposes that firms will use equity relatively rarely as a means to obtain external financing and will use equity financing only after they have exhausted all debt sources. As a result, a large amount, if not all, of the variability in marginal debt issuance should be explained by the funds flow deficit.

Mohammad (2007) also tries to see the impact of agency cost theory on leverage; data from 46 companies listed in Dhaka Stock Exchange (DSE) for seven years 1999 – 2005, and thus total number of observations was 322. OLS regression for panel data with cross section random effects was run with two equations. Total debt to market value of the company was used as the leverage ratio in one equation and long term debt to market value was used in another equation. The results showed that agency costs are negatively affecting the total debt ratios of Bangladeshi companies.

Adesola (2009) tested two models with the purpose of finding the best empirical explanation for corporate financing choice of a cross section of 27 Nigerian quoted companies within the period 1996-2006 by using ordinary least square multiple regression methods, aiming at establishing which of the two theories has the best explanatory power for Nigerian firms. The models were primarily developed to represent the static trade-off theory and the pecking order theory of capital structure with a view to make comparison between theoretical predictions and empirical results. Based on the regression result, the study led to the conclusion that both theories appears to be a good description of the financing policies of those firms for the period under review. As explained in Adesola (2009) Nigerian firms shows that return on asset is the significant determinant of capital structure which confirms the fact that the trade off theory as tested by ROA exerts the only significant influence on the capital structure of firm. The influence of the pecking order theory as tested by the negative relationship between return on assets and capital structure is statistically insignificant. However, it is also observed that negative growth which is used in testing the agency theory

exerts a significant influence on the capital structure although negative growth is a consistent test for the pecking order theory of capital structure.

The following table summarized the expected theoretical relation of different variables with leverage, mostly reported in the empirical literature and the various theories of capital structure.

Table 3.3: Theories and empirical studies

Variables	Expected theoretical relation	Mostly reported in the empirical literature	Theories
Liquidity	(-)	(-)	• Agency theory • Pecking order theory
	(+)		• Trade-off theory • Ability to meet short-term
Risk	(−)	(−)	• Trade-off theory
	(+)		• Agency theory
Tangibility	(+)	(+)	• Pecking order theory • Trade-off theory
	(-)		• Agency theory • Information asymmetry
Growth	(-)	(−)	• Agency theory • Trade-off theory
	(+)		• Pecking order theory
Firm size	(+)	(+)	• Trade-off theory • Agency theory
	(-)		• Pecking order theory
Profitability	(-)	(-)	• Pecking order theory • Trade-off theory
	(+)		• Trade-off theory: tax

Source: Organized from literature

3.4. Conclusion and knowledge gap

The review of the literature reveals the existence of gap, and it shows that capital structure is full of loopholes issue that needs further investigation. The various theories of capital structure have been resulting in dissimilar conclusions. Different scholars using empirical investigation on the determinants of capital structure are debating. For instance, Fakher and Lynn (2005) provides an evidence of the capital structure theories pertaining to a developing country and showed that both the static trade-off theory and the agency cost theory are pertinent theories to the Libyan companies' capital structure; however, their finding had got little evidence to support the asymmetric information theory. Besides, Mohammad (2007) on Bangladeshi companies found that the coefficient of profitability is positive, which is contrary to pecking order theory, but the most recent study by Ebru (2011) on Turkish firms supports the pecking order theory. Moreover, Adesola (2009) on Nigerian firms demonstrates that return on asset is the only significant factor among the capital structure determinants. The understanding of the factors that resulted in these contrasting finding is important for furthering understanding of capital structure and financing choices by insurance companies.

In addition, there is also a high concentration of capital structure determinants studies in developed countries, and less developed countries received little attention in various literatures on this issue. Besides, so far to the best of the researcher's knowledge, there is no study conducted empirically on this specific area in the context of Ethiopia, particularly insurance industry. Therefore, the current study will be an eye opener for further studies in the local context.

Chapter Four

4. Research methodology

The preceding chapter has indicated that the literature on capital structure determinants empirically is limited. Especially from Ethiopian perspective, insurance sector in particular, it has been shown that there is no comprehensive study in the determinants of capital structure. The purpose of this chapter is to present the underlying principles of research methodology and the choice of the appropriate research method for the study.

Depending on the nature of the research problem and the research perspective, a research method could be based on the philosophy[1] of quantitative or qualitative or a combination of these two approaches. As Creswell (2003) noted, quantitative research employs a review of the existing literature to deductively develop theories and hypotheses to be tested i.e., in this approach, the research problem is translated to specific variables and hypotheses. Quantitative research approach tends to assume that there is a cause and effect relationship between known variables of interest. In line with this, quantitative research tests the theoretically established relationship between variables using sample data with the intention of statistically generalizing for the population under investigation and it uses statistical methods in describing patterns of behavior.

Well designed and implemented quantitative research has the merit of being able to make generalizations, for a broader population, based on findings from the sample. To enhance the generalization of findings, quantitative research methods follow, at least theoretically, standardized procedures in sample selection, instrument design, implementation and analysis.

[1] The philosophy of knowledge claim can be positivism, constructivism or pragmatism (Creswell 2003).

This standardization in turn increases the replicability of procedures and the reliability of findings and also can mitigate the impact of interviewer and interviewee biases. However, quantitative research is based on the assumption that research procedures, including instrument design, sample selection and implementation, can be standardized and would lead to reliable outcomes. In reality this may neither be easy nor true since the research problem may require exploration of new ideas, which may not be achieved by following structured procedures (Yesegat 2009)[2].

Similarly, Creswell (2003) describes qualitative approach as it uses the philosophical assumption of social constructivism worldview that provides an understanding of social reality based on the subjective interpretation. Besides, the third approach is mixed research approach that seeks a pragmatic knowledge claim philosophy that consists of both quantitative and qualitative approaches.

McKerchar 2008 (cited in Yesegat 2009), in general, the choice among the three research approaches is guided by mainly the research problem apart from the underlying philosophy of each research method. That is, whether the research problem is based on a framework developed deductively through a review of the literature and prefigured information to be collected in advance of the study or to allow it to emerge from participants in the project or both.

Thus, in order to achieve the objectives stated in the preceding section, considering the nature of research problem and the research perspective, this study mainly employed quantitative

[2] Further, this approach has been criticized for its attempt to study human or social phenomenon independently of its contextual setting (Yesegat 2009).

research approach on the determinants of capital structure on insurance companies in Ethiopia over the period of 2004-2010. In this study, the empirical methodology is adopted mainly from Naveed et al. (2010) with some modifications.

4.1. Data sources

The data used for this study were purely secondary taken from each insurance company in Ethiopia. The data for the empirical analysis derived mainly from the financial statements of each insurance company. The book value based yearly financial data were used and collected from the audited financial statements of insurance companies. Besides, related books, journals articles and various manuals were also be used as sources of data.

Book value based yearly financial information was used for this study since data availability problem restrict to measure the variables in book value alone, while the theory of capital structure suggests that they should be measured in market value terms (Panno 2003). However, Myers (1984) argued that managers focus on book value information because book value is better supported by assets in place than it is by growth opportunities. Book value is also preferred because financial markets fluctuate a great deal and managers are said to believe that market value numbers are unreliable as a guide to corporate financial policy. Consistent with the academic perception of managers' view, a large number of managers indicate that they do not rebalance their capital structure in response to equity market movements. The presence of adjustment costs prevent firms from rebalancing continuously.

4.2. Study population and sample size

Currently, twelve insurance companies are working in Ethiopia; and the researcher believe that, for meaningful analysis, there is no need to sample from the twelve insurance companies as they are already few in number to collect information over the period of 2004-2010. However, three insurance companies (Lion, Oromia and Ethio-Life) did not have information for the required period; their year of service was below five, and thus they were excluded in the sampling frame to make the panel data model structured, i.e. every cross-section follows the same regular frequency with the same start and end dates. Therefore, only nine insurance companies' information over the period of 2004-2010 was incorporated in this study.

4.3. Data collection instruments

Conducting appropriate data gathering instruments helped researchers to combine the strengths and amend some of the inadequacies of any source of data to minimize risk of irrelevant conclusion. Consistent and reliable research indicates that research conducted by using appropriate data collection instruments increase the credibility and value of the research findings (Koul 2006). Accordingly, document review was used for this research to collect required information, which was relevant for addressing the objectives of the study, from manuals and audited financial statements of each insurance company included in the sample frame.

4.4. Definition and measurement of variables

To remain consistent with previous studies and see the result in the Ethiopian context and for the meaningful comparison of findings with prior empirical studies in developed and

developing countries, measures pertaining to determinants of capital structure were taken from reviewing previous studies. Previous studies have used the different forms of leverage ratio to represent the capital structure of a firm. The differences exist both in selecting the numerator as well as the denominator of the leverage ratio. Some researchers have used only long term debt to total asset (Chkir & Cosset 2001) while others opted for total debt to total asset (Dilek et al. 2009), and others also used total debt to equity ratio (Mary et al. 2011) as proxy to the dependent variable. Rajan and Zingales (1995) argue, the choice of measures for both leverage and the explanatory variables is crucial, as it may affect the interpretation of the results and they showed that the determinants of capital structure are sensitive to the measure of leverage. Thus, different measures of leverage were used to assess the robustness of the results presented in the paper. Table 3.4 below summarizes the list of explanatory variables examined in this study, the operational definitions used as a measure to represent them and their expected effect on the dependant variable. These variables are hypothesized to be: liquidity, business risk, growth, tangibility, profitability, firm's size, and firm's age in which it operates.

This study used the total debt, long term debt and debt to equity ratios as a measure of leverage, defined as book value of total debt divided by the book value of total assets, long term debt to total asset, and total debt divided by equity, respectively. The total debt is the sum of short-term and long-term liabilities. Long term debts, are liabilities beyond one year to maturity, and short term ones have less than one year to expiry date and have to pay off within the current year. Long-term leverage is included, as not all components of leverage are homogenous.

Table 4.4: Potential determinants of capital structure, measurements/definitions and hypothetic effects on leverage

Determinants	Definition(proxy)	Expected impact on leverage
Liquidity	Ratio of current assets to current liabilities	(-)
Business risk	Standard deviation of operating income	(-)
Growth	Annual changes in total assets[3]	(+)
Tangibility	Fixed Assets divided by total assets	(+)
Size of firm	Natural log of total assets[4]	(+)
Profitability	Operating income to total asset	(-)
Age of firm	Natural log of years of operation	(+)

Source: Literature review

Apart from the obvious maturity and duration differences, long-term leverage is more fixed and arguably more deliberate, with greater contractual obligations and screening processes required. Although, the strict notion of capital structure refers exclusively to long-term debt, this study has included short-term debt as well because of its significant proportion in the make up of total debt. On average short-term debt represents 70 percent of the total debt employed by the companies included in this sample. The profound dependence of firms on short-term debt confirms the findings of Nadeem and Zongjun (2011) that a major difference between developing and developed countries is that developing countries have substantially lower amounts of long-term debt.

[3] Growth can also be measured by annual change total sales or market-to-book ratio (Dilek et al. 2009).
[4] Size can also be measured by natural log of total sales or premium (for instance, Naveed et al. 2010).

4.5. Data analysis methods

To test the proposed hypotheses, statistical analyses were carried out using the following methods: First, descriptive statistics of the variables and the different percentiles of the dependant variable (leverage ratios) were calculated over the sample period since according to Malhotra (1997) using descriptive statistics methods helps the researcher in picturing the existing situation and allows relevant information.

Second, before going to perform multiple regressions, the investigator first has done various specification tests and correlation matrixes. Correlation matrix has been used to identify the relationship of each variable among them and with dependant variables. Pearson's correlation matrix test was run to separate the set of significant explanatory variables influencing the capital structure of the sampled Ethiopian insurance companies from the list of hypothesized independent variables, and to check the existence of multi-collinearity among independent variables.

Then, multiple regressions was carried out, and thus OLS was conducted using the statistical package 'EVIEWS', to test the causal relation between the firms' capital structure and their potential determinants, and to determine the most significant and influential explanatory variables affecting the capital structure of the insurance industry in Ethiopia. Petra (2007) stated that OLS outperforms the other estimators when the following holds: the cross-section is small and the time dimension is short. Finally, the results of both descriptive as well as inferential statistics results were presented by appropriate graphs and tables.

4.6. Model specification

The nature of data used in this study enables the researcher to use panel data model which is deemed to have advantages over cross section and time series data methodology. Panel data involves the pooling of observations on a cross-section of units over several time periods. A panel data approach is more useful than either cross-section or time-series data alone. As Brook (2008) stated the advantages of using the panel data set; first and perhaps most importantly, it can address a broader range of issues and tackle more complex problems with panel data than would be possible with pure time-series or pure cross-sectional data alone.

Second, it is often of interest to examine how variables, or the relationships between them, change dynamically (over time). To do this using pure time-series data would often require a long run of data simply to get a sufficient number of observations to be able to conduct any meaningful hypothesis tests. But by combining cross-sectional and time series data, one can increase the number of degrees of freedom, and thus the power of the test, by employing information on the dynamic behavior of a large number of entities at the same time. The additional variation introduced by combining the data in this way can also help to mitigate problems of multicollinearity among explanatory variables that may arise if time series are modeled individually.

Third, by structuring the model in an appropriate way (fixed or random effect), we can remove the impact of certain forms of omitted variables bias in regression results and it can allow controlling for individual unobserved heterogeneity among the cross sections. Thus, the general model for this study, as is mostly found in the extant literature is represented by;

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \text{----} + \beta_k X_{kit} + e_{it}$$

$$= \beta_0 + \beta X_{it} + e_{it} \quad \text{----------} (1)$$

with the subscript *i* denoting the cross-sectional dimension and *t* representing the time series dimension. The left-hand variable, Y_{it}, represents the dependent variable in the model, which is the firm's leverage ratio. X_{it} contains the set of explanatory variables in the estimation model, β_0 is the constant, β represents the coefficients and e_{it} is the error term. Therefore, the models for the empirical investigation, built in line with the hypotheses of the study, are given as follows:

DE Model: debt-equity ratio as dependent variable

$$D/E = \beta_0 - \beta_1 (LQ_{it}) - \beta_2(BR_{it}) + \beta_3(GR_{it}) + \beta_4(TA_{it}) + \beta_5(SZ_{it}) - \beta_6(PR_{it}) + \beta_7(AG_{it}) + \acute{\varepsilon}_1 \text{ --------(2)}$$

LTD Model: long term debt ratio as dependent variable

$$LTD/TA = \beta_0 - \beta_1(LQ_{it}) - \beta_2(BR_{it}) + \beta_3(GR_{it}) + \beta_4(TA_{it}) + \beta_5(SZ_{it}) - \beta_6(PR_{it}) + \beta_7(AG_{it}) + \acute{\varepsilon}_2 \text{--- (3)}$$

DEBT Model: debt ratio as dependent variable

$$TD/TA = \beta_0 - \beta_1(LQ_{it}) - \beta_2(BR_{it}) + \beta_3(GR_{it}) + \beta_4(TA_{it}) + \beta_5(SZ_{it}) - \beta_6(PR_{it}) + \beta_7(AG_{it}) + \acute{\varepsilon}_3 \text{ ----- (4)}$$

Where:

D/E = Debt to equity ratio
TD/TA = Total debt to total asset
LTD/TA = Long term debt to asset
LQ = Liquidity
BR = Business risk
GR = Growth
TA = Tangibility
SZ = Size of the firm
PR = Profitability
AG = Year of operation
ε = the error term

With the above multivariate regression equation, the impact of each of the explanatory variables on the leverage ratio estimate was assessed in terms of the statistical significance of

the coefficients 'β_i'. Using a 10%, 5% and 1% levels of significance, an estimated coefficient was considered to be statistically significant if p-value ≤ 0.1, p-value ≤ 0.05 and p-value ≤ 0.01 respectively. However, the real challenge faced in the choice of parametric approach such as t- tests, and Pearson correlation coefficient and to run multiple regressions, the data has to meet certain assumptions such as stationary, normality, homogeneity of variance and serial independent. Thus, the above panel data regression models were designed by considering the basic assumptions required for the estimator in OLS. The basic assumptions are:

- Correct model: $E(\hat{u}_{it}) = 0$
- Homoscedasticity: $Var(\hat{u}_{it}) = ó^2$, constant
- Serial independent: $Cov(\hat{u}_{it}, \hat{u}_{js}) = 0$ for $i \neq j$, $t \neq s$
- Exogeneity: $Cov(x_i, \hat{u}_{i)} = 0$; x_i is the independent variable
- Normality: $\hat{u}_{it} \sim N(0, ó2)$

The first assumption is that the expectation or mean of the error term or unobservable term is zero. This assumption is plausible assumption since there is an intercept in the above equations. The second assumption states that the variance of error terms is constant. Assumption three is made on the disturbance terms that the covariance between the error terms over time (or cross- sectionally, for that type of data) is zero, In other words, it is assumed that the errors are uncorrelated with one another. If the errors are not uncorrelated with one another, it would be stated that they are 'auto-correlated' or that they are serially correlated, so that the standard error estimates could be wrong. Thus, there exists the possibility that wrong inferences could be made about whether a variable is or is not an

important determinant of variations in the dependent variable (Brook 2008). Similarly, assumption four also deals about the covariance between the error terms and explanatory variables are zero. As stated in Brook (2008) if one or more of the explanatory variables is contemporaneously correlated with the disturbance term, the OLS estimator will not even be consistent. This results from the estimator assigning explanatory power to the variables where in reality it is arising from the correlation between the error term and dependent variable. The last assumption, one of the most commonly applied tests for normality is the Bera—Jarque test, states that error terms are normally distributed.

Besides, since the co-efficient of the explanatory variables (β_1..... β_7) could be estimated by the use of OLS technique and panel data methodology was adopted in this study, there was a need to check for the level of stationary of the data. This was done by the use of Unit Root test. Thus, all the variables were stationary at level except business risk; first differencing was taken. The natural logarithms for some variables were also used in the regression model to reduce any heteroscedasticity and other violation of assumptions that might exist. In this regard, Gujurati (2003) stated that log transformation very often reduces heteroscedasticity compared with the use of OLS without transformation.

Moreover, the OLS regression result indicated the existence of serial correlation, expressed in its low Durbin Watson test. Thus, it necessitated to look out for fixed and random effects estimates. Hausman tests were run to verify suitability of the random effect model for the data set. This test is necessary especially when the estimates differ widely between the two models. Unfortunately the test results found adequate evidence against the null hypothesis

that there is no misspecification in the model. Thus, the investigator could use the fixed effect model with the following form, adopted from Ebru and Nazan (2010).

$$Y_{it} = \beta X_{it} + u_{it} \quad i = 1 \ldots N \quad t = 1 \ldots T \text{----------} \quad (5)$$

Where $u_{it} = \alpha_i + \delta_t + \acute{\varepsilon}_{it}$ (for two way error component), Y_{it} is the dependent variable with i= entity and t= time. X_{it} represents independent variable. The vector β. is the vector of coefficients of independent variables; the term u_{it} is presumed to capture the unobservable and non-measurable characteristics that differentiate the individual units. The individual effect α_i is regarded to be constant over time (t) and specific to the individual cross-sectional unit (i). The term δ_t on the other hand, includes the time fixed effects, and $\acute{\varepsilon}_{it}$ is the stochastic term. The constant, β_0, is omitted from this fixed effect model because it would be collinear with α_i. Besides, the individual[5] effect, α_i, is correlated with the regressors, X_{it}, i.e. Cov (x_{it}, $\alpha_i) \neq 0$. However, unlike the fixed effect model, the constant, β_0, is rendered to be included in the case of random effect model since the individual effect, α_i, is uncorrelated with β_0, i.e $Cov(x_{it}, \alpha_i) = 0$.

[5] Individual: This word is used in this empirical work in its general connotation that it could mean companies, households, individuals, industries, etc.

Chapter Five

5. Data analysis and interpretation

This chapter deals with data analysis and interpretation. It has six sections. The first is about specification and misspecification test, the second section is about descriptive statistics and the third on correlation analysis among the determinants of capital structure. The fourth section is panel data regression analysis and followed by its different techniques (fixed effect and random effect models). Lastly, discussions of results will be presented.

To empirically investigate on the determinants of capital structure and achieve the objectives stated in the first chapter, all insurance companies, their year of service greater than six years, were included. Based on the stated year of service, nine Ethiopian insurance companies' financial data over the period of 2004-2010 was collected. Therefore, sixty three (9*7) observations were used to empirically analyze the capital structure determinants in insurance industry within the Ethiopian context.

To analyze the collected data, the investigator first used descriptive statistics and then correlation to make sure about the relationship between independent variables (liquidity, business risk, growth, tangibility, size of the firm, profitability, and age of the firm.) Finally, after applying various tests on the data, multiple regression analysis was employed. Multiple regressions were conducted in order to know the contribution of predictor variables in explaining the dependent/regressed variables (debt to equity, long term debt and total debt ratios). The outputs of correlation and regression were evaluated using 1%, 5% and 10% significance levels, and finally the results were presented by using the appropriate tables.

5.1. Specification and misspecification tests

5.1.1. Unit root test

The study employed Eview 6 to carry out unit root tests (Augmented Dickey- Fuller, 1979) in order to determine the stationarity of the variables (see appendix A). All the explanatory variables were stationary at level, hence they are integrated of order zero, I(0) except business risk, for which further tests were extended for the first differencing, I(1).

Table 5.1.1: Unit root test for explanatory variables (ADF)

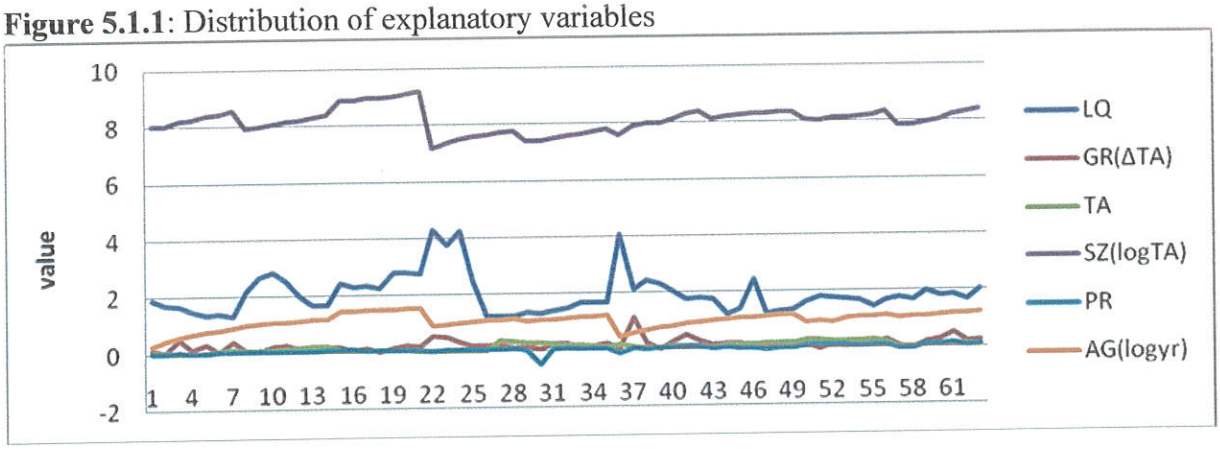
Variable	LQ	BR	GR	TA	SZ	PR	AG	dlnBR
t-statist	-3.688	-1.614	-7.206	-2.961	-2.820	-7.114	-3.455	-7.687
p-value	0.006	0.469	0.000	0.044	0.061	0.000	0.012	0.000

Source: Generated from Eviews

The line graph below also shows that the explanatory variables for 63 observations seem stationary (without outliers); and the mean and the 5% trimmed mean for each independent variable close to each other, and it proves the non existence of outliers. If the variables in the regression model are not stationary, then it can be proved that the standard assumptions for asymptotic analysis will not valid. In other words, the usual "*t*-ratios "will not follow a *t*-distribution, so we cannot validly undertake hypothesis tests about the regression parameters.

However, figure 5.1.2 below demonstrates that there are outliers in the debt to equity ratio distribution, varying from 4.58 (maximum value) to 0.5 (minimum value), with in the first cross-section with mean of 1.9424 and 5% trimmed mean after removing outliers was 1.8860. This might lead to either separate treatment or using dummy variables for these peaked observations; this may not also fit for structured panel data model.

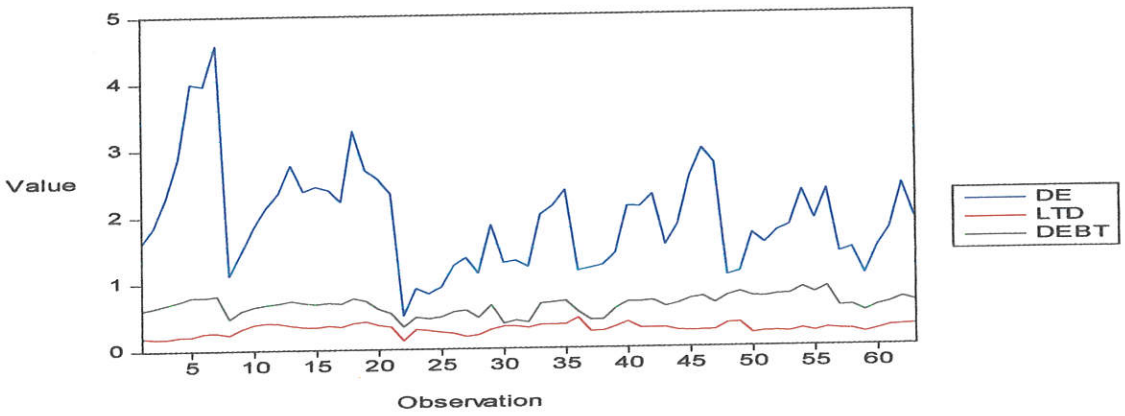
Figure 5.1.1: Distribution of explanatory variables



Source: Generated from Eviews

Therefore, the researcher used linearized series of debt to equity ratio from Eviews. On the contrary, the distribution for long term debt and total debt ratios seem to be normally distributed without outliers since the mean and 5% trimmed mean were almost the same (LTD: mean = 0.2839; 5% trimmed mean= 0.2839 and debt ratio: mean= 0.6404; 5% trimmed mean = 0.6437), and their stationary were tested using Augmented Dickey-Fuller (ADF), p-value 0.0047 and 0.0084 respectively; this implying that rejecting the null hypothesis of non stationary.

Figure 5.1.2: Distribution of dependent variables

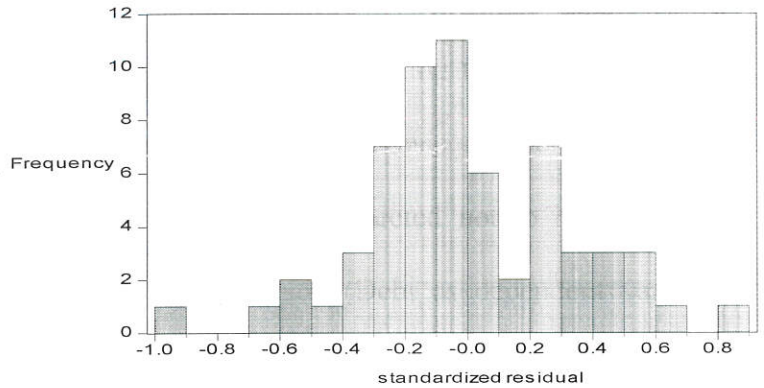


Source: Generated from Eviews

5.1.2. Normality assumption

A normal distribution is not skewed and is defined to have a coefficient of kurtosis of 3. Bera-Jarque formalizes this by testing the residuals for normality and testing whether the coefficient of skewness and kurtosis are zero and three respectively. The Bera-Jarque probability statistics is also expected not to be significant (Brook 2008). Therefore, the normality test for this study (Debt as dependent variable) as shown in figure 5.1.3 the kurtosis is close to 3, and the Jarque-Bera statistic had a p-value of 0.733, implying that the data were consistent with a normal distribution (constant variance); it satisfied $\hat{u}_t \sim N(0,\sigma^2)$ and $E(\hat{u}_{it}) = 0$ assumptions. Similarity, Bera-Jarque probability is not significant for DE and LTD models too.

Figure 5.1.3: Normality test for residuals



Source: Generated from Eviews

5.1.3. Collinearity diagnosis

One obstacle that presents difficulty in rendering analysis is the existence of multicollinearity. The standard statistical method for testing data for multicollinearity is analyzing the control variables' correlation coefficients, condition index (CI) and variance inflation factor (VIF). Therefore, based on the correlation coefficient in table 5.3, it seems

that there is no problem of multicollinearity. Malhotra (2007) stated that multicollinearity problem exists when the correlation coefficient among the variables should be greater than 0.75, but in this study there is no correlation coefficient greater than 0.75.

Moreover, according to Gujarati (2003), some authors believe that the condition index (CI) is the best available multicollinearity diagnostic. It is used here for detecting multicollinearity based on the following definition.

$$\text{CI} = \frac{\sqrt{Maximum\ eigenvalue}}{minimum\ eigenvalue}$$

The calculated value for the present sample data was 26.64. As the value interval 10 to 30 would indicate, according to a rule of thumb, the existence of possible multicollinearity, the phenomenon under discussion does not seem to pose a problem for this work. Severe multicollinearity is the real problem, but this, according to the same rule of thumb, only happens if the CI value exceeds 30.

Table 5.1.2 presents Collinearity statistics, an alternative method, for checking the presence of multicollinearity among independent variables. Variance inflation factors (VIF) is one of the tools used to measure the degree of co-linearity present for each factor. It tells us how much the variance of the estimated coefficients increases is due to collinear independent variables. According to Craney et al. (2002) multicollinearity exists when each variable's VIF result is greater than 10 and tolerance values that are less than 0.10 may merit further investigation. The maximum VIF (1/tolerance) result for the variables in this study was 1.753; it is far less than 10 and the minimum tolerance was 0.570, far greater than 0.10. These also evidenced the nonexistence of multicollinearity.

Table 5.1.2: Collinearity statistics

Variables	95% confidence interval		Collinearity statistics	
	Lower bound	Upper bound	Tolerance	VIF
LQ	0.010	0.061	0.707	1.415
BR	0.000	0.000	0.772	1.296
GR	-0.106	0.080	0.798	1.254
TA	0.099	0.352	0.604	1.656
SZ	-0.013	0.080	0.570	1.753
PR	-0.398	0.030	0.824	1.214
AG	0.026	0.170	0.704	1.420

Source: Generated from SPSS

5.1.4. Heteroscedasticity and autocorrelation tests

Surprisingly, the results of heteroscedasticity and autocorrelation tests confirmed that all specifications of the three models suffered from these problems (see appendix B). Therefore, the White correction technique to the standard errors was applied for to handle heteroscedasticity problem. Besides, to resolve the autocorrelation problem identified in low Durbin- Watson sta, fixed effect and random effect models were taken in to consideration. Moreover, the study employed sample of Ethiopian insurance companies, hence the tendency for the fixed effect and random effect models' estimates to differ significantly and thus Hausman chi-square test was conducted and the result showed that rejecting the null hypothesis of the random effect model is appropriate (see table 5.5.1 and appendix C). Therefore, fixed effect estimate was preferable to random effect estimate. Besides, the results of the fixed effect estimates differ significantly from the OLS estimates; and thus considering these differences, discussions were made using the results of the fixed effect estimates.

5.2. Descriptive Statistics

Table 5.2 below provides a summary of the descriptive statistics of the dependent and explanatory variables for 63 observations, and it indicates the results over the period from 2004 to 2010 in Ethiopian insurance industry. This shows the average indicators of variables computed from the financial statements.

5.2.1. Determinants of capital structure

The mean of total debt ratio (total debt to total asset) was 64 percent with the standard deviation of 12.7 percent. Debt ratio was high in this study. In the US, the mean of debt ratio is around 58 percent, while in the UK debt is around 54 percent (Rajan & Zingales, 1995). Theoretically, firms in developed countries are highly levered compared to firms in emerging markets, but here the result was reverse. The reason for this high leverage might be the lack of well developed stock markets or the market inefficiency in the developing countries; companies may not raise equity funds by issuing stocks in the market, and the nature of insurance sector is also the prominent reason.

However, Tugba Bas et al. (2009) on developing countries' small firms found lower debt as compare to developed countries. This may be small firms have limited access to finance compared to medium and large size companies since lenders may prefer to fund large companies because the quality of information provided by them is more reliable than small firms. Besides, the mean, median and standard deviation of debt to equity ratio and long term debt were 1.94, 1.85, 0.79 and 28.4, 27.9, 7 percent, respectively. Log term debt was low (28.4%) in comparison with developed countries (USA, 37%; Japan, 53%; Germen, 38%; France, 48% and Canada, 39%). This might be due to the limited access for financing long

term projects in developing countries, short term debt is cheaper than long term debt and above all, this study incorporated only insurance companies in the sample frame.

Besides, on average, these insurance companies have the liquidity ratio of 1.99. Maximum and minimum values were 4.300361 and 1.230098 with standard deviation of 0.713913. The variability of returns that is, business risk, measured by the standard deviation of returns had the mean value of 6,553,084. Similarly, the mean of growth (the annual percentage change in total assets) was 19.8 percent with the standard deviation of 18.5 percent. The maximum value of growth was 116 percent and the minimum value of growth was 2.3 percent. This higher growth standard deviation might be due to the inclusion of Ethiopian Insurance Corporation, the oldest government owned insurance, in the sample.

The descriptive statistics also displays that, on average, 13.8 percent of the firms' assets were fixed assets which can be used as collateral. Capital structure theories state that firms with high asset tangibility should have greater borrowing capacity. The mean of asset tangibility for listed companies in the UK is 35.6 percent while tangibility in the US is 39.5 percent (Antoniou et al. 2008). Theoretically, stock markets in developing countries are not as efficient and liquid as in developed countries; therefore, equity financing may not be available. Hence, firms in developing countries rely on high asset tangibility for debt financing, but the asset tangibility ratio was low in this study. The reason might be this study considers only insurance companies, and insurance companies hold less fixed assets resembling to other financial institutions.

Table 5.2: Summary of descriptive statistics for panel data

Variables	Mean	SD	Minimum	Median	Maximum
DE	1.942435	0.789566	0.502881	1.850188	4.584716
LTD	0.283936	0.070358	0.131987	0.279259	0.446238
Debt ratio	0.640423	0.127167	0.334611	0.666238	0.877312
LQ	1.991992	0.713913	1.230098	1.788648	4.300361
BR	6,553,084	2,948,157	1,473,029	6,547,408	12,314,115
GR	0.198466	0.184702	0.023278	0.174771	1.159961
TA	0.137739	0.087842	0.023278	0.108399	0.368079
SZ	18.70025	1.017420	16.52656	18.70537	21.18084
PR	0.047792	0.079150	-0.477141	0.057178	0.147723
AG	13.22222	7.658949	2.000000	12.00000	35.00000

Source: Annual report and own computation

The mean of profitability in the sample was 4.8 percent. The profitability in the UK is 9 percent; whereas, it is 7 percent in the US (Antoniou et al. 2008). Tugba Bas et al. (2009) shows that firms in developing countries have higher profitability than firms in the UK and US (for instance, Zimbabwe, 12 percent; Thailand, 13 percent)[6]. They justify that funding options are limited in developing countries; firms prefer to keep their profits in the company as an internal funding source. However, this study found profitability below the developed countries. The reason might be most insurance companies in Ethiopia are recently established in 1990's and some in 2000's, and they are at growth stage of the industry's life cycle. In addition, summary of descriptive statistics shows that age of companies had a wide dispersion with an average of 13 years.

[6] Turkey, 10 percent; Pakistan, 9 percent; German,6 percent; India, 7 percent (Booth et al. 2001).

5.3. Correlation analysis

Table 5.3 below displays the correlation between the explanatory variables and leverage. To find the association of the variables or determinants (magnitude and direction) with debt to equity, log term debt and debt ratios, Pearson product moment of correlation coefficient was used. Besides, correlation coefficient helps us to detect the strength of their relationship. As it is illustrated from simple bi-variant correlation between variables, the result of the correlation shows positive as well as negative relation among themselves.

The dependent variable, debt to equity ratio (DE) seems to be negatively correlated with liquidity, growth and tangibility of the firm. It shows that firms with higher debt to equity have less liquidity, growth rate and asset tangibility. However; risk, size, profitability and age have positive correlation with debt to equity ratio; the correlation with size is significant at 1%. Table 5.3 further reveals a positive correlation between explanatory variables and long term debt (LTD) except negative insignificant correlation with growth, asset tangibility and profitability, and only age is significant at 1%.

Asset tangibility is negatively correlated with debt to equity and long term debt in contrast to what is expected. According to the trade-off theory and pecking order theory, since fixed assets can be used as collateral, debt level should increase with higher fixed assets. The correlation, however, results in positive relation when we look at the correlations between asset tangibility and debt ratio (proxied by total debt to total asset). Similarly, debt ratio has a positive relation with business risk, size, profitability and age of the firm. The correlation with profitability is not consistent with pecking order theory; profitable firms prefer to finance internally. However; the correlation with liquidity and growth were negative. The

debt ratio correlation with liquidity and size were statistically significant at 1% level, and its correlation with growth and profitability were also significant at 5% level; but its correlation with others was insignificant. A more detail analysis can be made considering the multivariate regression outcomes.

Table 5.3: Correlation (Pearson) matrix

	DE	LTD	Debt	LQ	BR	GR	TA	SZ	PR	AG
DE	1.00									
LTD	0.173	1.00								
Debt	0.683**	0.111	1.00							
LQ	-0.295*	0.253*	-0.386**	1.00						
BR	0.216	0.144	0.149	-0.043	1.00					
GR	-0.076	-0.152	-0.291*	0.214	-0.006	1.0 0				
TA	-0.056	-0.036	0.173	-0.461**	-0.312*	-0.244	1.00			
SZ	0.640**	0.300*	0.569**	-0.088	0.391**	-0.136	-0.215	1.00		
PR	0.127	-0.088	0.313*	0.015	0.137	0.237	-0.110	0.300*	1.00	
AG	0.162	0.446**	0.144	-0.009	0.103	-0.225	0.070	0.473**	0.167	1.00

** Correlation is significant at the 0.01 level * Correlation is significant at the 0.05 level

Source: Generated from Eviews

5.4. Regression analysis

The correlation result and various techniques above approved the nonexistence of multicollinearity. This helped the researcher to employ multiple regressions to predict the magnitude of each explanatory variable's impact on the dependent variable.

5.4.1. Estimation result of DE model

The first model empirically tested for the dependent variable (DE) was displayed as follows:

$$DE = \beta_0 - \beta_1 LQ - \beta_2 BR + \beta_3 GR + \beta_4 TA + \beta_5 SZ - \beta_6 PR + \beta_7 AG + \tilde{e} \text{---------- (6)}$$

The coefficients of the OLS regression result could be stated as follows:

This model incorporates the main firm specific variables and constructs which have been empirically investigated in capital structure research, and all explanatory variables were stationary at level, integrated of order zero, I(0) except business risk (BR), which was stationary at first differencing, integrated of order one, I(1). Thus, dlnBR(logBR – logBR(-1)) was used as input in the OLS regression below.

Table 5.4.1: OLS regression results of DE model

Variables	Coefficients	standard error	*t*-Statistics	*p*-value
Constant	-7.554552	1.695446	-4.455790	0.0000***
LQ	-0.261859	0.102497	-2.554796	0.0135**
dlnBR	0.099091	0.206877	0.478984	0.6339
GR	0.207266	0.624397	0.331947	0.7412
TA	-0.124180	0.843066	-0.147296	0.8843
SZ	1.321850	0.240298	5.500884	0.0000***
PR	-0.742971	0.627917	-1.183231	0.2419
AG	-0.659691	0.399455	-1.703301	0.0943*

Notes: R^2 = 0.5072; Adj R^2 = 0.4433; F-statistics = 7.93977; and *Prob* (F-statistics = 0.0000); Durbin-Watson stat = 1.10395

*** Significant at 1%, ** Significant at 5%, * Significant at 10%.

Table 5.4.1 presents results of debt to equity ratio (dependent variable) and firm-specific regressors for the overall sample. The beta coefficient may be negative or positive; beta indicates that each variable's contribution for insurance industry in Ethiopia to determine its debt to equity ratio. The column for t-statistics also indicates the significance of each variable to support the alternative hypothesis whereas p-value indicates at what percentage or precession level of each variable is significant. In general, beta coefficient, t-value and p-value are the key inferential statics for this study to reject or support hypotheses.

Therefore, in line with this explanation, the results indicate a negative and significant relationship between debt to equity and liquidity at 5% level[7]. Debt to equity also shows the same relationship with tangibility, profitability and age. The relationship with age was significant at 10% level[8]; however, relationship with tangibility and profitability were statistically insignificant. Besides, debt to equity has positive relation with growth and business risk though it was insignificant, but the relationship between debt to equity and size was positive and highly significant at 1% level[9].

5.4.2. Estimation result of LTD model

Table 5.4.2 also tried to present the important OLS regression results by taking long term debt (LTD) as dependent variable. The model is for testing the impact of the same independent variables on LTD. This model empirically tested for the dependent variable, LTD, and it was presented as follows:

$$LTD = \beta_0 - \beta_1 LQ - \beta_2 BR + \beta_3 GR + \beta_4 TA + \beta_5 SZ - \beta_6 PR + \beta_7 AG + \varepsilon \quad (7)$$

[7] If 0.01<P-value <0.05 then it is considered as 5% significant level.
[8] If 0.05< p-value < 0.1 then it is significant as 10% significant level.
[9] If 0<P-value <0.01 then it is considered as 1% significant level.

The results of table can be re-written with the coefficients and t-statistics of each variable as:

LTD = -0.195+0.038LQ + 0.051BR + 0.002GR + 0.065TA + 0.036SZ – 0.184PR + 0.102AG

(-1.186) (2.307) (1.624) (0.0719) (0.587) (1.738) (-2.665) (2.4499)

Table 5.4.2: OLS regression results of LTD model

Variable	Coefficient	Standard error	*t*-statistics	*p*-value
Constant	-0.195584	0.164870	-1.186289	0.2407
LQ	0.038008	0.016472	2.307485	0.0249**
dlnBR	0.051015	0.031416	1.623879	0.1102
GR	0.002133	0.029649	0.071926	0.9429
TA	0.065105	0.110828	0.587444	0.5594
SZ	0.036424	0.020951	1.738575	0.0878*
PR	-0.184555	0.069258	-2.664734	0.0101**
AG	0.101666	0.041497	2.449947	0.0176**

Note: R^2 = 0.3718; Adj R^2 = 0.2903; F-statistics = 4.5656; *Prob* (F-statistics = 0.0004); Durbin-Watson stat = 0.793957

** Significant at 5%, * Significant at 10%

From LTD model, as elucidated in table 5.4.2, all the variables have a positive relationship with long term debt except profitability, which was significant at 5% level. Similarly, age and liquidity were also significant at 5% significant level. Although growth, tangibility and business risk positively explaining long term debt, their contribution was not statistically significant even at 10% level. However, the association of long term debt with firm size was significant at 10% level.

5.4.3. Estimation result of DEBT model

The DEBT model, total debt ratio was taken as dependent variable, and table 5.4.3 is also put on view the usual regression outputs for analyzing the impact of the same explanatory

variables tested in previous models on total debt ratio (proxied by total debt divided by total asset). The model could be expressed as follows:

$$DEBT = \beta_0 - \beta_1 LQ - \beta_2 BR + \beta_3 GR + \beta_4 TA + \beta_5 SZ - \beta_6 PR + \beta_7 AG + \varepsilon \text{---------- (8)},$$

and the equation with the coefficients and the t-statistics(in parentheses) would be:

$$DEBT = \underset{(-2.1156)}{-0.603} - \underset{(-2.4388)}{0.033LQ} + \underset{(0.9569)}{0.019BR} - \underset{(-2.5784)}{0.164GR} + \underset{(1.8498)}{0.267TA} + \underset{(4.9157)}{0.177SZ} + \underset{(4.2901)}{0.4058PR} - \underset{(-2.5761)}{0.147AG}$$

Size and profitability of the firm were positively and statistically significantly affect leverage at the 0.01 level whereas liquidity, growth and age of the firm have a negative influence on debt ratio, significant at 5% level. Tangibility has also positive relationship with total debt ratio, significant at 10% level. However, business risk was the only insignificant variable though it has a positive impact on total debt ratio.

Table 5.4.3: OLS regression results of DEBT model

Variable	Coefficient	Standard error	*t*-statistics	*p*-value
Constant	-0.603608	0.285310	-2.115619	0.0390**
LQ	-0.033496	0.013734	-2.438858	0.0181**
dlnBR	0.019875	0.020769	0.956948	0.3429
GR	-0.163983	0.063598	-2.578441	0.0227**
TA	0.267572	0.144644	1.849866	0.0698*
SZ	0.177707	0.036151	4.915715	0.0000***
PR	0.405882	0.094607	4.290186	0.0001***
AG	-0.147253	0.057159	-2.576189	0.0128**

Note: R^2 = 0.5759; Adj R^2 = 0.5209; F-statistics = 10.477; *Prob* (F-statistics = 0.0000); Durbin-Watson stat = 1.373392

*** Significant at 1%, ** Significant at 5%, * Significant at 10%

In all the equations, R^2 and adjusted R^2 values show that the independent variables could not explain much about the variability of the leverage ratios as compare to Naveed et al.(2010) on Pakistan insurance companies (R^2 = 0.977, Adj R^2= 0.968) using the same explanatory variables. However, other previous studies show lower explanatory power of the independent variables used in this study. For instance, Akhtar (2005) has showed R^2 values of 21%, 18% and 22% for three different models. The lowest explanatory power (R^2 = 0.084) also found by Dilek et al. (2009). One major concern of this study was the low Durbin-Watson stat values, which indicates that the regressions might be affected by autocorrelation or serial correlation of residuals. In that case, the researcher could have biased standard errors and R^2, and F-statistic could also become unreliable. Therefore, alternative technique of panel data analysis was required to alleviate the serial correlation of residuals that existed in the above OLS regression results.

5.5. Fixed effect and random effect models/Robustness

The above diagnostic tests approved the existence of autocorrelation between the error terms, and between error term and regressor variable i.e. endogeneity. Brook (2008) stated that, in the econometric context, a regressor is said to be endogenous if it is correlated with the error term of the data generating process in the population. Endogeneity problems mainly arise due to omitted variables, measurement error of explanatory variables, or if there is a reverse causality between the dependent and the explanatory variables, i.e. the dependent variable causing some explanatory variable as well. The problem of omitted variables is presumably the most common reason for endogeneity. For instance, endogeneity may occur if either some variable suggested by the underlying theory in a capital structure analysis is ignored, or the variable cannot be considered due to data unavailability. As a consequence, the variation

of the omitted variable is captured in the error term. If omitted variables are correlated with some regressors in the specification, the error term and these regressors will be correlated and thus be endogenous.

Capital structure is also influenced by firm's customers and/or suppliers i.e. a firm's product/service characteristics interact in a significant way with the debt level. Titman (1984) argues that liquidation of a firm may impose costs on its customers such as inability to obtain the product/service. These costs are transferred to the stockholders in the form of lower prices for the firm's products/services. Besides, capital structure choice differs for different groups of firms; it might be due to asymmetric information and/or due to other immeasurable issues. All these result in autocorrelation problem. The consequence of endogeneity is that OLS will be biased and inconsistent, which renders all point estimates of coefficient and inferences invalid.

As Paul (2005) stated, for many years, the most challenging task in statistics has been the effort to devise methods for making causal inferences from non-experimental data. Within that project the most difficult problem is how to statistically control for variables that cannot be observed. For experimentalists, the solution to that problem is easy. But in non-experimental research, the classic way to control for potentially confounding variables is to measure them and put them in some kind of regression model. Paul (2005) further described that a class of regression methods, called fixed and random effects models that make it possible to control for variables that have not or cannot be measured.

Petra (2007) also suggested a solution for serially correlated residuals data by assuming the omitted variables are time invariant. A simple fixed effects panel estimator would robust the findings of OLS regression, because the dummy variables included to control for the individual effect automatically control for any time-invariant variable. This constitutes a compelling reason to employ panel estimators wherever possible. It also makes a strong argument to use fixed effects rather than random effects estimators, because random effects require that the regression's other explanatory variables are uncorrelated with the individual effects. In a more modern framework Wooldridge (2002) also stated that the unobserved differences are always regarded as random variables. Then, what distinguishes the two approaches is the structure of the correlations between the observed variables and the unobserved variables. In a random effects model, the unobserved variables are assumed to be uncorrelated with all the observed variables. In a fixed effects model, the unobserved variables are allowed to have any correlations whatever with the observed. This is what makes the fixed effects approach so attractive.

However, Jean and Michel (2006) suggested that the fixed effects model is preferred in cases where conclusions have to be made on the sample and if the observation (panel data) is less, fixed effects will be more efficient than random effects, while the interests of random effects model are on the overall population. On the other hand, fixed effects models are difficultly handled by insurance companies since too many individual effects had to be considered. Random effects models should then be preferred, but as mentioned above, some theoretical aspects prohibit its use since estimates of the parameters are biased when heterogeneity is not independent from the regressors.

Therefore, considering the above justifications, the researcher decided to conduct Hausman chi square test (see appendix C), and as depicted in table 5.5.1 the result shows that the Hausman test is significant at 5% level for DE model and LTD model, and significant at 1% level for DEBT model. The implication of this is that rejecting the null hypothesis of random effect model is appropriate, and reaching to a conclusion that the fixed effect estimate is preferable to the random effect estimate in order to make robust the previous OLS regression results.

Table 5.5.1: Hausman Chi-sq. test

	DE Model	LTD Model	DEBT Model
Results of Hausman Test (Ho: an appropriate model is random effect model)			
Chi-sq.	19.507	14.382	31.708
	(0.0218)**	(0.0448) **	(0.0000) ***
Results of Redundant Fixed Effect Test (Ho: There is no fixed effect)			
Cross-section/period chi-sq.	64.63	66.709	48.477
	(0.0000)***	(0.0000) ***	(0.0000) ***

, * significant at 5% and 1% level, respectively

Thus, in this paper, based on Ebru and Nazan (2010), the following fixed effect model was used:

$$Y_{it} = \beta X_{it} + \alpha_i + \delta_t + \acute{\varepsilon}_{it} \quad i = 1 \ldots N \quad t = 1 \ldots T \text{----------} \quad (9)$$

Table 5.5.2 below shows fixed effects panel model result and it shows the impact of each explanatory variable on the three dependent variables (DE, LTD and DEBT). The table displays that fixed effect model result is relevant since it is not identical with the above OLS

regression result. The values in the parentheses provide information about the significant level (p-value) for each variable.

The fixed effect model result in table 5.5.2 reveals that only profitability has negative relation with DE similar to OLS regressions result, but it was statistically insignificant. All the remaining variables, in DE model, have a positive impact on DE ratio. Liquidity was significant at 10% level, and business risk and age of the firm were highly statistically significant at 1% level. However, in the OLS regression size, liquidity and age were significant at 1%, 5% and 10% level respectively. Similar to OLS regression, growth and tangibility also have positive insignificant relationship with DE, but contrary to the OLS regression, size was found to be not worth mentioning relation with DE. Thus, DE model as a whole was statistically significant, while the adjusted R^2 points out that about 69.6% of the variations in the DE ratio can be explained by the variations in the explanatory variables included in the previous regression model with the significance level of the model, prob(F-statistics) = 0.00000.

Table 5.5.2 (column 3) also depicts that, except growth and profitability, all explanatory variables have a positive influence on LTD ratio, and liquidity, profitability, growth and age were significant at 5% level, but the impact of remaining variables was immaterial with (Adj R^2 = 65.2%, sig F = 0.0000). Besides, the fourth column in table 5.5.2 shows that except growth (significant at 5% level) and tangibility, all variables were contributing positively for total debt ratio. Though liquidity and size have positive relation with debt ratio, they were found not significant determinants.

Table 5.5.2: Fixed effect model result

Variable	DE model	LTD model	DEBT model
Constant	-8.667165	-0.411321	-0.104090
	(0.0760)*	(0.5039)	(0.9375)
LQ	0.196041	0.045692	0.020468
	(0.0521)*	(0.0108) **	(0.3479)
dlnBR	0.263842	0.036130	0.081820
	(0.0036)***	(0.1941)	(0.0017) ***
GR	0.243176	-0.040257	-0.066524
	(0.1978)	(0.0126) **	(0.0393) **
TA	0.543905	0.028891	-0.038400
	(0.3828)	(0.8614)	(0.8050)
SZ	0.833767	0.049900	0.012783
	(0.2561)	(0.5632)	(0.9454)
PR	-0.632505	-0.096447	0.192904
	(0.2123)	(0.0427) **	(0.0448) **
AG	3.153331	0.195934	0.572087
	(0.0038)***	(0.0366) **	(0.0089) ***
Adj R^2	0.696143	0.652137	0.709828
F- Statistics	10.3168	8.6237	10.9480
Prob(F-statistics)	(0.00000)***	(0.00000)***	(0.00000)***

*, **, *** indicate significance at the level 10%, 5% and 1%, respectively

However, business risk and age of the firm were highly significant at 1% level, and profitability was also significant at 5% level with the overall explanation power of the model (Adj R^2 = 70.98%), which was significant at prob (F-statistic) = 0.000002.

Generally, the study has found significant difference between the fixed effect model estimate and the panel data OLS regression result. Thus, considering the existence of differences, the

discussion of findings and conclusions forwarded would be based on the results of fixed effect model since it incorporates the impact of unobservable variable in its estimation, and considers the effect of omitted variables and measurement errors of explanatory variables.

5.6. Discussion of results

In order to be able to investigate whether each of the research hypotheses discussed in chapter one should be accepted or rejected, this section analyzes the statistical findings of this study against the ones suggested by the theoretical literature and the ones found in other empirical studies as illustrated in chapter two.

5.6.1. Factors determining capital structure

Result discussion below is categorized on the basis of these independent variables and focuses on their associations with capital structure theories and previous findings.

Liquidity

The results of fixed effect model indicates that liquidity has a positive role on debt to equity, long term debt and total debt ratios against hypothesis 1, and it was statistically significant determinant of capital structure (measured using debt to equity and long term debt). This result implies when considering external financing, firms with more liquidity are more inclined to raise debt than equity. According to trade-off models of capital structure there is a positive relationship between the liquidation value of the firm and its leverage. Thus, expected liquidation values are higher for firms with more liquid assets, which imply that firm's debt is positively associated with asset liquidity (Harris and Raviv 1990). In addition, companies with higher liquidity ratios might support a relatively higher debt ratio due to greater ability to meet short-term obligations. Thus, a high asset liquidity ratio could be

considered by institutional investors to be a positive signal because it indicates that the firm can easily pay its obligations and hence face a lower risk of default.

The positive and statistically significant influence of liquidity in this study is consistent with the theoretical analysis of firms with high liquidity ratios may have relatively higher debt ratios due to their greater ability to meet short-term obligations and the trade-off theory. It is also in line with the empirical investigation of Faris (2010) and Basil and Peter (2008).

Business risk

The results also show a positive relationship between risk and leverage as opposed to hypothesis 2, and its relationship was statistically significant at 1% level except with long term debt. This may suggest that higher risk may leave the indebted firms to demand more debt; it is in line with the agency theory and supported by Naveed et al. (2010) empirical study. This indicates that in order to fulfill the claims of the insurance policyholder, risky companies acquire external funds. But most theories and empirical findings (Titman and Wessels 1988) indicate inverse relationship between risk and leverage. A probable justification of such result could be that investors in Ethiopian insurance industry might be highly risk averse and low-trusting relative to their counterparts in other foreign countries. Thus, once the business risk of any firm acquires an increasing trend, investors might short their hand in providing equity finances, making it increasingly difficult for the firm to raise additional equity in market. But when their business risk falls, investors will be more willing to provide equity finances to the firm, causing its leverage to decrease. This idea is in line with Mary et al. (2011) justification.

Growth

According to the theoretical discussions above, the researcher expect a positive relationship between expected growth and leverage due to higher costs of financial distress (trade-off and agency theory). Contrary to the theory, growth has significant negative impact on long term debt and total debt ratio, significant at 5% level in this study. The negative association between growth with long term debt and total debt ratio is in line with Akhtar (2005), agency theory and trade-off (financial distress) theory. This suggests that firms with more investment opportunities have less leverage ratio because they have stronger incentives to avoid under-investment and asset substitution that can arise from stockholder-bondholder agency conflict. Jensen's (1986) free cash flow theory similarly supports this finding that firms with more investment opportunities have less need for the disciplining effect of debt payments to control free cash flows. The finding between growth and long term debt and total debt ratio rejects the third hypothesis (H3) of firms with more investment opportunities have less debt level in their capital structure.

However, the results obtained here also show that there exists no significant relationship between expected growth and debt to equity ratio. The positive relationship with debt to equity was found statistically insignificant (p- value = 0.1978). The insignificant result indicates that growth is not considered as a proper explanatory variable of leverage in the Ethiopian insurance sector. One possibly explanation may be that the effects of the two different theories neutralize each other. Another reason may be that the measure used here, the percentage change in total assets, did not reflect future growth possibilities enough. Thus, other more significant results might be obtained by using another measure (proxy) for

growth, for instance, annual change in sales or market-to-book ratio, commonly used proxies for expected growth.

Asset tangibility

A positive relationship is expected between tangibility and leverage from the theoretical point of view. In this study, tangibility was found positive and insignificant impact on debt to equity and long-term debt. The positive correlation is in line with the pecking order theory.

On the other hand, the relationship was found negative with total debt ratio. This implies that since it has a positive relation with long term debt, tangibility has significant negative relation with short term debt. Consistent with the findings of previous studies (Ebru 2011), the relationship between tangibility and short term debt was negative and significant. It is generally expected, with respect to the short term debt that firms tend to match their duration of assets and debts. This means that firms with more fixed assets rely more on long term while those with more contemporary assets depend more on short term debt for financing their assets (Abor 2005). A negative relationship between tangibility and total debt ratio in this study; it is also in line with information asymmetries theory. According to this theory, companies with smaller share of tangible assets tend to be more subject to information asymmetries. It is because intangible assets are more difficult to price. Therefore, intangible firms will face underinvestment problem more often. Hence, ceteris paribus, these firms will tend to accumulate more debt over time. However, insignificant result indicates that tangibility is not considered as a proper explanatory variable of leverage in Ethiopian insurance sector since insurance sector holds less fixed assets like other financial institutions,

and this result rejected the hypothesis (H4) that firms with more tangible assets are expected to have more leverage proportion in their capital structure.

Firm size

According to hypothesis five (H5), size of the firm has a positive association with leverage, implying that leverage is higher for large firms and lower for small firms. As firms size increases, they become more diversified and have more stable cash flows. They are less often bankrupt compared to small firms so that they can afford higher levels of leverage. Similarly in this study, size positively affects leverage in all debt levels though it was statistically insignificant. This is in line with trade-off theory and agency theory. Thus, this study can affirm that hypothesis five (H5) was maintained. This position is also supported by Rajan and Zingales (1995) and Akhtar (2005).

However, the result was insignificant; the reason might be that the inability of log of assets to serve as a good proxy for firm size. Thus, other more significant results might be obtained by using another measures (proxy) for size, for instance, log of sales or premium, commonly used proxy for size of insurance sector. Otherwise, almost nil regression coefficients of size can also taken to show absence on the part of lending institution of considering size of the firm as a component of their credit analysis, and bankers often give less regard to factors other than collaterals.

Profitability

The coefficient estimate for profitability was negative for long term debt and debt to equity ratios, suggesting that as profitability increases, leverage decreases. Firms follow pecking

order theory (Myers & Majluf 1984); they use retained earnings first and then move to debt and equity. In this study, profitability negatively affects long term debt (significant at 5% level) and debt to equity ratios (accepting H6). The negative association between profitability and long term debt is in line with pecking order theory and agency theory. It is also in line with the findings of Rajan and Zingales (1995), Cassar and Holmes (2003), and Akhtar (2005).

However, the coefficient of profitability was positive and significant (p-value=0.0448) for total debt ratio (rejecting H6), which is in line with the tax trade-off model, predicts that profitable firms will employ more short term debt since they are more likely to have a high tax burden and low bankruptcy risk. Also, profitable firms are more capable of tolerating more debt since they may be in a position to service their debt easily and on time. Besides, profitable firms are more attractive to financial institutions as lending prospects; therefore, they can always take on more debt capital. In supporting this finding, empirical study by Petersen and Rajan (1994) found a significantly positive association between profitability and debt ratio.

Firm age

In agreement with the stated hypothesis (H7) based on the various theoretical justifications, the fixed effect model result also indicates that positive and highly significant coefficient of variable age at 1% significant level for debt to equity and total debt ratio, at 5% significant level for long term debt. Consistent with the information asymmetry theory and the empirical study by Onaolapo and Kajola (2010); this positive relationship predicts that in Ethiopia

older or mature insurance companies prefer to utilize large portion of debt in formation of capital.

One key reason to employ more leverage is that when firm survives in business for a long time then it can accumulate more funds for running the operations of the business and uses its reputation in accessing more debt, as firms grow older more information regarding their future viability becomes available and reduces information asymmetries. Lower information asymmetries imply higher leverage, and age of the firm may also proxy for lower information asymmetries. Bondholders would be more likely to lend to firms they know more about than lending to firms they know less about. Besides, Myers (2001) states that as a firm continues longer in business, it establishes itself as an ongoing business and therefore increases its capacity to take on more debt.

Moreover, for triangulating the discussions above, Wald coefficient restriction test has also been done (see appendix D) in hypothesis testing for identifying the significant of each variable [C(2) = 0, C(3) = 0, C(4) = 0, C(5) = 0, C(6) =0, C(7) = 0, C(8) = 0]. This hypothesis test indicates that C(2), C(3) and C(8) are different from zero, implying that rejecting the null hypothesis of liquidity, business risk and age of the firm have no impact on leverage in the DE model. In the LTD model, C(2), C(4), C(7) and C(8) $\neq$ 0, and this signifying that liquidity, growth, profitability and age of the firm were determinant factors in the capital structure of insurance industry in Ethiopia. However, in DEBT model C(3), C(4), C(7) and C(8) $\neq$ 0, indicating that liquidity, growth, profitability and age of the firm were statistically significant in explaining the capital structure of insurance companies in Ethiopia.

To put it in a nut shell, the fixed effect estimate results suggest that the capital structure of the Ethiopian insurance industry was significantly affected by: liquidity, business risk and age of the firm for capital structure proxied by DE ratio; liquidity, growth, profitability and age for capital structure measured by long term debt; and business risk, growth, profitability and age of the firm for capital structure represented by total debt to total asset. The variables suggested by theoretical and empirical literatures that seem not to affect capital structure of Ethiopian insurance industry, in all leverage ratios, were size and tangibility. The insignificant results indicate that size and tangibility were not considered as proper explanatory variables of leverage in the Ethiopian insurance sector. In most empirical studies size is found as positive significant variable in the capital structure decision; the reason for insignificant result in this study might be the measurement error. But tangibility is not considered as a proper explanatory variable of leverage in financial institutions since they often hold less fixed assets.

Table 5.6: General results

Regressor	DE model	LTD model	DEBT model	Hypothesis status
Liquidity	(+) significant	(+) significant	(+) insignificant	Rejected
Business risk	(+) significant	(+) insignificant	(+) significant	Rejected
Growth	(+) insignificant	(-) significant	(-) significant	Rejected
Tangibility	(+) insignificant	(+) insignificant	(-) insignificant	Support/reject
Size	(+) insignificant	(+) insignificant	(+) insignificant	Supported
Profitability	(-) insignificant	(-) significant	(+) significant	Support/reject
Age	(+) significant	(+) significant	(+) significant	Supported

Note: significant levels 1%, 5% and 10%

To sum up, the difference in long-term versus short-term debt is much pronounced in Ethiopian insurance companies; this might limit the explanatory power of the capital structure models derived from developed economy settings. However, the results of this empirical study suggest that some of the insights from modern finance theory are portable to Ethiopia because certain firm-specific factors that are relevant for explaining capital structures in developed countries are also relevant in Ethiopian insurance industry. Besides, the findings of the fixed effect model on liquidity, business risk, growth, tangibility, size, profitability and age of the firm for this study are in line with the findings of Faris (2010), Naveed et al. (2010), Akhtar (2005), Abor (2005), Rajan and Zingales (1995), Cassar and Holmes (2003), Onaolapo and Kajola (2010) respectively. But the magnitude in contribution of these determinants is quite different. These differences may be partly explained by the following factors: sample size, proxy used in the measurement of variables, methodology of data analysis, the difference in the sectors in which the studies were conducted and the different the economic background beyond the industry that differs across countries.

Chapter Six

6. Summary, conclusion and recommendations

The purpose of this last chapter is to sum up the whole thesis but in comprehensive manner. Accordingly, the first part presents an overview of the thesis and its major findings, and finally the chapter ends up with recommendations.

6.1. Summary and conclusion

The capital structure of a company consists of a particular combination of debt and equity issues to relieve potential pressures on its long-term financing. To examine such issues, many theories have been developed in the literature and they generally focus upon what determinants are likely to influence the leverage decisions of the firms. In line with the theoretical contributions of these approaches briefly stated, this study analyses the determinants of capital structure decisions of Ethiopian insurance industry by examining some recently developed theories.

The determinants are selected based on previous studies and three prominent theories of capital structure: static trade-off theory, pecking order theory and agency theory, and tried to find out which one explain better the financial decision behavior of the sampled insurance firms. All these theories possess different traits to explain the corporate capital structure. Static trade-off theory suggests that optimal capital structure is a trade off between net tax benefit of debt financing and bankruptcy costs. Pecking order theory also states that firms prefer internal financing to external financing and risky debt to equity due to information asymmetries between insiders and outsiders of firm. Agency cost theory illustrates the financial behavior of firms in context of agent and principal relationship.

The researcher has formulated seven hypotheses. For testing these hypotheses, seven explanatory attributes from array of renowned previous research works on the capital structure have been selected. To achieve the intended goals, data from 9 insurance companies in Ethiopia for seven years (2004 – 2010) against each attribute has been collected from respective annual reports. Total debt to equity of the company was used as the leverage ratio in one equation, long term debt to total asset was used in the second equation and total debt to total asset was used in the third equation. Finally, OLS regression for panel data with fixed effects estimate was run with three equations and then the proposed hypotheses have been tested.

The empirical results indicate that:

- Tangible assets do not have influence on firm's financial decisions since the study could not get enough statistical significance though it has positive relationship with DE and LTD capital structure measures. However, it has negative relationship with total debt ratio. This association is consistent with extended form of pecking order theory of capital structure that deals with debt in context of short term and long term financing. The insignificant result shows that insurance sector holds more liquid assets like other financial institutions.

- Size displays a positive relation with financial leverage but it is found to be an insignificant determinant of insurance financing patterns. Positive size's association with financial leverage supports static trade-off theory and agency cost theory. This has an implication that larger firms in Ethiopian insurance sector can maintain high leverage ratios.

- Negative relation between growth and leverage for long term debt and total debt ratios also found out as important determinant of firm's financial behavior. In Ethiopian insurance sector, firms with high growth rate use less debt financing sources. This might be due to scarcity of long term financing sources or due to being more risk averse. Moreover, Mezgebe (2010) found that, currently, Ethiopia is the lowest insurance per capita country in the world. This shows that the industry has huge market potential. Thus, it needs more long term debt for financing their growth opportunities since Harris and Raviv (1990) stated that an active stock market and an ability to enter to long term contracts allow firms to grow at faster rate than they could attain by relying on internal sources funds and short term credit alone. Even though the negative relation between growth and financial leverage supports trade-off and agency theories of capital structure, it may restrict the use of the market opportunity available.

- For profitability the study obtained an inverse relation for long term debt and debt to equity; the relationship is significant only with long term debt that confirms the pecking order theory. The results suggest that more profitable firms do not often finance their investments by debt source in the insurance sector of Ethiopia. The agency theory which also predicts that profitable firms are avoidable to get long term loan from inefficient markets due to the disciplinary role of debt. However, the study found significant positive relationship with total debt ratio in favor of trade-off theory. This implies that profitable companies access more short term debt for harvesting the tax benefit.

- Business risk also displays a positive relation with financial leverage and found statistically significant for debt to equity and long term debt. This positive relation verifies that more risky firms use more debt than equity. The justification of such result might be that the investors in Ethiopia tend to be highly risk averse and low-trusting due to information asymmetry. Thus, once the business risk of any firm acquires an increasing trend, investors do not support new equity financing and they can sensibly be expected to move away from stock, making it increasingly difficult for the firm to raise additional equity from the market.

- Liquidity was found to have positive significant effect on leverage. Positive sign of liquidity is in agreement with the trade-off theory and ability to meet short term obligations. This also supported by recent empirical studies on developing countries. This leads to attracting potential investors since high asset liquidity ratio can be considered by institutional investors to be a positive signal; it indicates that the firm can easily pay its obligations and hence face a lower risk of default.

- The empirical result also shows positive and statistically significant relationship between age and leverage. It is consistent with information asymmetry theory. This implies that recently established insurance companies getting difficulties in accessing external sources of finance or attracting more insured.

As a conclusion, it can be stated that the findings show evidence that static trade-off theory; pecking order theory and agency theory are partially accepted in insurance sector of Ethiopia though the trade-off theory appears to dominate the Ethiopian insurance sector capital

structure. However, lower explanatory power (R^2) of variables was obtained relative to previous studies in the same sector.

6.2. Recommendations

Based on the major findings obtained from the result, the researcher provided the following recommendations.

- The analysis indicated that insurance companies utilized lower debt for their growth opportunities and lower long term debt proportion in their capital structure. Considering the current growth opportunity for insurance companies in Ethiopia, internal sources of fund might not be enough. Therefore, it is advisable not depending on only internal sources of fund available. Since having reasonable proportion of long term debt in the capital structure is considered as a priority for growth in developing countries and it helps them to utilize the market opportunity available.

- The positive relation between risk and leverage implies that investors in Ethiopian insurance industry might be highly risk averse and low-trusting. Thus, the managements of insurance companies should do more in eliminating the information asymmetries with investors. Otherwise it may lead to bankruptcy by loading more debt on these companies.

- Clearly, the static trade-off theory mainly appears to exert influence on the Ethiopian insurance industry capital structure. It is, therefore, important for this industry to be directed at optimizing the tax shield benefit of debt and the bankruptcy costs and

establishing appropriate financing schemes might assist it in setting its optimal capital structure. Moreover, the industry should keep in touch with the trade-off theory since it has strong practical appeal; it rationalizes moderate debt ratios and sets a target debt to equity ratio. Gradually moving towards till it indicates that some form of optimal capital structure exists that can maximize the firm value.

Further research directions

- The relatively low overall explanatory power (R^2) in this study reveals that there might be imperfect representations of theories in using proxies or the existence of other factors affecting the firms' financing decision than those hypothesized by this study. These factors might encompass the ownership structure of the firm, awareness of public about insurance and macro economic factors (inflation, interest rate and GDP). Therefore, further research should investigate the aforementioned factors using alternative proxies of variables.

References

Abor, J 2005, 'The effect of capital structure on profitability: empirical analysis of listed firms in Ghana', *Journal of Risk Finance*, vol.6, pp. 438-45.

Adesola, W A 2009, 'Testing static trade-off theory against pecking order models of capital structure in Nigerian firms', *Global Journal of Social Sciences*, vol.8, pp.61-76.

Akhtar, S 2005, 'The determinants of capital structure for Australian multinational and domestic corporations', *Australian Journal of Management,* vol. 30, pp. 321-41.

Al-Bashs, R & Sentic, P 2008, 'Determinants of capital structure in Gulf region states and Egypt', Working Paper, University of Montpellier.

Antoniou, A, Guney, Y & Paudyal, K 2008, 'The determinants of capital structure: capital market oriented vs. bank oriented institutions', *Journal of Financial and Quantitative Analysis*, vol. 43, pp. 59-92.

Baker, M & Wurgler, J 2002, 'Market timing and capital structure', *Journal of Finance,* vol. 57, pp. 1-32.

Basil Al-Najjar & Peter, T 2008,'The relationship between capital structure and ownership structure, *Journal of Managerial Finance*, vol. 34, pp. 919-933.

Batahala, C, Moon, P & Rao, R 1994, 'Managerial ownership, debt policy and the impact of institutional holdings', *Financial Management*, vol. 23, pp. 38-50.

Beattie, V, Goodacre, A & Thomson, S 2006, 'Corporate financing decisions: UK survey evidence', *Journal of Business Finance and Accounting,* vol. 33, pp. 1402-34.

Bevan, A, & Danbolt, J 2002, 'Capital structure and its determinants in the UK analysis', *Journal of Applied Financial Economics*, vol. 12, pp. 159-70.

Booth, L, Aivazian, V, Demirgüc-Kunt, A & Maksimovic, V 2001, 'Capital structure in developing countries', *Journal of Finance*, vol. 56, pp. 87-130.

Brooks, C 2008, *Introductory Econometrics for Finance*, 2nd ed., the ICMA Centre, University of Reading.

Brounen, D & Eichholtz, P A, 2001, 'Capital structure theory: Evidence from European property companies capital offerings', *Journal of Real Estate Economics*, vol. 2, pp. 4-21.

Cassar, G & Holmes, S 2003, 'Capital structure and financing of SMEs: Australian

Evidence', *Journal of Accounting and Finance*, vol. 43, pp. 123-47.

Craney, T, Surles, A & James, G 2002 'Model dependant variables inflation factors cutoff values' *Quality engineering,* vol.14, pp. 391-403.

Chittenden, F, Michaelas, N and Poutziouris, P 1996, 'Financial policy and capital structure choice in UK SMEs: empirical evidence from company panel data', *Journal of Small Business Economics,* vol. 12, pp. 113–30.

Chkir, E & Cosset, J 2001, 'Diversification strategy and capital structure of multinational Corporations', *Journal of Multinational Financial Management,* vol.11, pp. 17-37.

Creswell, J W 2003, *Research design: qualitative, quantitative, and mixed methods approaches,* 2nd ed., Sage publisher, California.

Dilek Teker, Ozlem Tasseven, & Ayca Tukel 2009, 'Determinants of capital structure for Turkish firms: A panel data analysis', *International Research Journal of Finance and Economics,* vol. 29, pp. 1450-2887.

Ebru,Ç 2011, 'An empirical investigation on the determinants of capital structures of Turkish firms', *Journal of Finance and Economics*, vol. 9, pp. 35-42.

Ebru, Ç & Nazan, Ş 2010, 'The determinants of capital structure: Evidence from Turkish Banks', *Journal of Money, Investment and Banking*, vol. 15, pp. 57-65.

Fakher, B & Lynn, H 2005, 'Determinants of capital structure: Evidence from Libya', Working Paper, University of Liverpool, UK.

Fama, F & Jensen, M 1983, 'Agency problems and residual claims', *Journal of law and Economics,* vol. 26, pp. 327-49.

Frank, M, & Goyal, V 2003, 'Testing the pecking order theory of capital structure', *Journal of Financial Economics*, vol. 67, pp. 217-48.

Faris AL- Shubiri 2010, 'Determinants of capital structure choice: A case study of Jordanian Industrial Companies, *An-Najah Univ. J. of Res,* vol. 24, pp. 2457-94.

Frieder, L & Martell, R 2006, 'On capital structure and the liquidity of a firm's stock', Working Paper, Purdue University.

Gabriela, M 2011, 'The effects of the market conditions on the firms' capital structure', PhD theses, Aabeş-bolyai University.

Gujarati, N 2003, *Basic Econometrics,* McGraw-Hill Book Company, Singapore.

Hailu, Z 2007, *Insurance in Ethiopia: Historical Development, Present Status and Future*

Challenges, Master Printing Press, Addis Ababa, Ethiopia.

Harris, M & Raviv, A 1990, 'Capital structure and the informational role of debt', *Journal of Finance*, vol. 45, pp.321-49.

Hermanns, J 2006, *Optimal capital structure and Market Timing*, Editura DUV, German.

Houston, J, James, C & Marcus, D 1997, 'Capital market frictions and the role of internal capital markets in banking', *Journal of Monetary Economics*, vol. 35, pp. 389-411.

Insurance Companies 2004, 'Annual report', Ethiopian Insurance Companies, Addis Ababa.

Insurance Companies 2005, 'Annual report', Ethiopian Insurance Companies, Addis Ababa.

Insurance Companies 2006, 'Annual report', Ethiopian Insurance Companies, Addis Ababa.

Insurance Companies 2007, 'Annual report', Ethiopian Insurance Companies, Addis Ababa.

Insurance Companies 2008, 'Annual report', Ethiopian Insurance Companies, Addis Ababa.

Insurance Companies 2009, 'Annual report', Ethiopian Insurance Companies, Addis Ababa.

Insurance Companies 2010, 'Annual report', Ethiopian Insurance Companies, Addis Ababa.

Jalal, M 2007, 'The pecking order, information asymmetry, and financial market efficiency', Working Paper, University of Minnesota, Minneapolis.

Jean, P & Michel, D 2006, 'Fixed versus random effects in Poisson regression models for claim counts: A case study with motor insurance', Universit´e Catholique, Belgium.

Jensen, M C 1986, 'Agency costs of free cash flow, corporate finance, and take-overs', *American Economic Review*, vol. 76, pp. 323-29.

Koul, L 2006, *Method of educational research*,Vikas Publishing House, New Delhi.

Lipson, M & Mortal, S 2010, 'Liquidity and capital structure', *Journal of Financial Markets*, vol. 28, pp. 345-56.

Malhotra, N 2007, *Marketing Research*: *An Applied Orientation*, 5th ed., PHI, New Delhi.

Mary Hany A, Dawood, El-Sayeda, M & Mohamed, S 2011, 'The determinants of capital structure in listed Egyptian corporations', *Journal of Middle Eastern Finance and Economics*, vol. 9, pp. 84-99.

Mezgebe, M 2010, 'Assessment of the reinsurance business in Developing Countries: Case of Ethiopia', MA thesis, Graduate School of Business Leadership, University of South Africa.

Michael, P, Matthias, S and Hannes, W 2008, 'Capital structure, corporate taxation and firm age', Working Paper, No. 08/29, Center for Business Taxation, Oxford University.

Modigliani, F & Miller, M 1958, 'The cost of capital, corporation finance and the theory of investment', *American Economic Review*, vol. 48, pp. 261-97.

Modigliani, F & Miller, M 1963, 'Corporation income taxes and the cost of capital: a Correction', *American Economic Review*, vol. 53, pp. 433–43.

Mohammad, A S 2007, 'The determinants of capital structure for selected Bangladeshi listed Companies', Working Paper, Jahangirnagar University.

Mohammed Amidu 2007, 'Determinants of capital structure of banks in Ghana: an empirical approach', *Baltic Journal of Management* vol. 2, pp. 67-79.

Morellec, E 2001, 'Asset liquidity, capacity choice and the pricing of corporate securities', *Journal of Financial Economics*, vol. 61, pp. 173-206.

Morri, G, & Beretta, C 2008, 'The capital structure determinants of REITs, Is it a peculiar industry?' *Journal of European Real Estate Res*; vol. 1, pp. 6-57.

Myers, S C 1984, 'The capital structure puzzle', *Journal of Finance*, vol. 39, pp. 575-92.

Myers, S C 2001, 'Capital structure', *Journal of Economic Perspectives*, vol. 15, pp. 81–102.

Myers, S C 2003, 'Financing of corporations', *Handbook of the Economics of Finance,* vol. 1, pp. 216-253.

Myers, S C & Majluf, N 1984, 'Corporate financing and investment decisions when firm have information that investors do not have', *Journal of Financial Economics*, vol. 13, pp. 187-221.

Nadeem, A & Zongjun,W 2011, 'Determinants of capital structure : An empirical study of manufacturing industry of Pakistan', *Managerial Finance*, vol. 37, pp. 117-33.

Naveed, A, Zulfqar, A & Ishfaq, A 2010, 'Determinants of capital structure: A case of life insurance sector of Pakistan', *European Journal of Economics, Finance and Administrative Sciences*, vol. 24, pp. 7-12.

Onaolapo, A & Kajola, S 2010, 'Capital structure and firm performance: Evidence from Nigeria', *European Journal of Economics and Finance*, vol. 25, pp. 70-82.

Opler, T, Pinkowitz, L, Stulz, R & Williamson, R 1999, 'The determinants and implications of corporate cash holdings', *Journal of Financial Economics*, vol. 52, pp. 3-46.

Panno, A 2003, 'An empirical investigation on the determinants of capital structure: the UK and Italian experience', *Journal of Applied Financial Econ*, vol. 13, pp. 97–113.

Paul, D A 2005, *Fixed effects regression methods in SAS*, University of Pennsylvania.

Petersen, M & Rajan, R 1994, 'The benefits of lending relationships: Evidence from small business data', *The Journal of Finance,* vol. 49, pp. 3–38.

Petra, T 2007, *Panel data: Fixed effects, Random effects, Dynamic panel data models,* Cambridge University Press.

Philippe, G, Martin, H & André, B 2003, 'The capital structure of Swiss companies: an empirical analysis using dynamic panel data', *Journal of finance*, vol. 4, pp. 46-62.

Rafiq, M, Iqbal, A & Atiq, M 2008, 'The determinants of capital structure of the chemical industry in Pakistan', *The Lahore Journal of Economics*, vol. 13, pp. 139-58.

Rajan, R, & Zingales, L 1995, 'What do we know about capital structure? Some evidence from international data', *Journal of Finance,* vol. 50, pp. 1421-60.

Rataporn, D, Krishna, P & Gioia, P 2004, 'The determinants of capital structure: evidence from the Asia Pacific region', *Journal of Multinational Financial Management*, vol. 14, pp. 387–405.

Ronald, J 2002, 'Determinants of liquid asset holdings: evidence from Belgian and UK firms', *Journal of Financial Economics*, vol. 18, pp. 325-34.

Titman, S 1984, 'The effect of capital structure on a firm's liquidation decisions', *Journal of Financial Economics*, vol.13, pp. 137–51.

Titman, S & Wessels, R 1988, 'The determinants of capital structure choice', *Journal of Finance*, vol. 43, pp. 1-19.

Tugba Bas, Gulnur Muradoglu & Kate Phylaktis 2009, 'Determinants of capital structure in Developing Countries', Cass Business School, London.

Warner, J, 1975, 'Bankruptcy cost: some evidence', *Journal of Finance,* vol.32, pp.337-47.

Wolfgang, D & Roger, F 2003, 'What are the determinants of the capital structure? Some evidence for Switzerland', *Journal of Financial Economics*, vol. 12, pp. 40-51.

Wooldridge, M 2002, *Econometric analysis of cross-section and panel data*, MIT Press, Massachusetts.

Yesegat, W A 2009, 'Value added tax in Ethiopia: A study of operating costs and compliance', PhD thesis, University of New South Wales, Australia.

Yu, Darwin 2003, 'Determinants of capital structure for Philippine listed firms', Discussion Paper, No. 0303, UP College of Business Administration.

Appendices

Appendix A: Unit root tests

Null Hypothesis: DE has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.902126	0.0035
Test critical values:	1% level	-3.540198	
	5% level	-2.909206	
	10% level	-2.592215	

Null Hypothesis: DEBT has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.601598	0.0084
Test critical values:	1% level	-3.540198	
	5% level	-2.909206	
	10% level	-2.592215	

Null Hypothesis: LTD has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.836455	0.0043
Test critical values:	1% level	-3.540198	
	5% level	-2.909206	
	10% level	-2.592215	

Null Hypothesis: LQ has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.688980	0.0066
Test critical values:	1% level	-3.540198	
	5% level	-2.909206	
	10% level	-2.592215	

Null Hypothesis: BR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.614523	0.4692
Test critical values:	1% level	-3.540198	
	5% level	-2.909206	
	10% level	-2.592215	

Null Hypothesis: D(BR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.706437	0.0000
Test critical values:	1% level	-3.542097	
	5% level	-2.910019	
	10% level	-2.592645	

Null Hypothesis: TA has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.961229	0.0443
Test critical values:	1% level	-3.540198	
	5% level	-2.909206	
	10% level	-2.592215	

Null Hypothesis: GR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.206315	0.0000
Test critical values:	1% level	-3.540198	
	5% level	-2.909206	
	10% level	-2.592215	

Null Hypothesis: SZ has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.820386	0.0612
Test critical values:	1% level	-3.540198	
	5% level	-2.909206	
	10% level	-2.592215	

Null Hypothesis: PR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.114022	0.0000
Test critical values:	1% level	-3.540198	
	5% level	-2.909206	
	10% level	-2.592215	

Null Hypothesis: AG has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.455627	0.0126
Test critical values:	1% level	-3.540198	
	5% level	-2.909206	
	10% level	-2.592215	

Appendix B: Heteroscedasticity Test

Heteroscedasticity Test: White (LTD Model)

F-statistic	2.249571	Prob. F(35,26)	0.0175
Obs*R-squared	46.60877	Prob. Chi-Square(35)	0.0908
Scaled explained SS	22.41577	Prob. Chi-Square(35)	0.9508

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Sample: 2 63
Included observations: 62

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.189308	0.368080	-0.514313	0.6114
LQ	-0.011593	0.036574	-0.316965	0.7538
LQ^2	0.001012	0.001416	0.714904	0.4810
LQ*DLOGBR	0.017459	0.033044	0.528346	0.6017
LQ*GR	0.025846	0.012129	2.130987	0.0427
LQ*TA	0.063844	0.031965	1.997308	0.0564
LQ*SZ	-0.000979	0.005036	-0.194406	0.8474
LQ*PR	0.012123	0.070163	0.172790	0.8642
LQ*AG	0.005691	0.011878	0.479078	0.6359
DLOGBR	-0.244750	0.620037	-0.394734	0.6963
DLOGBR^2	0.011879	0.033041	0.359505	0.7221
DLOGBR*GR	0.008467	0.455319	0.018596	0.9853
DLOGBR*TA	0.076211	0.198584	0.383775	0.7043
DLOGBR*SZ	0.033823	0.088014	0.384294	0.7039
DLOGBR*PR	-0.294405	0.703458	-0.418512	0.6790
DLOGBR*AG	-0.059359	0.108471	-0.547231	0.5889
GR	-0.198512	0.180605	-1.099150	0.2818
GR^2	-0.018369	0.011461	-1.602739	0.1211
GR*TA	0.202749	0.075194	2.696357	0.0121
GR*SZ	0.019449	0.021020	0.925284	0.3633
GR*PR	0.003095	0.099051	0.031244	0.9753
GR*AG	-0.026839	0.026926	-0.996787	0.3281
TA	-0.096657	0.247354	-0.390762	0.6992
TA^2	0.043008	0.094036	0.457354	0.6512
TA*SZ	-0.007779	0.030129	-0.258207	0.7983
TA*PR	-0.257415	0.326154	-0.789244	0.4371
TA*AG	0.039055	0.061952	0.630409	0.5339
SZ	0.051149	0.096558	0.529716	0.6008
SZ^2	-0.002629	0.006629	-0.396534	0.6949
SZ*PR	-0.152520	0.084053	-1.814567	0.0811
SZ*AG	-0.004433	0.026418	-0.167803	0.8680
PR	1.509237	0.697995	2.162246	0.0400
PR^2	0.159587	0.138317	1.153779	0.2591
PR*AG	-0.228217	0.113129	-2.017313	0.0541
AG	-0.031632	0.208247	-0.151897	0.8804
AG^2	0.036069	0.020495	1.759914	0.0902

R-squared	0.751754	Mean dependent var	0.003040
Adjusted R-squared	0.417578	S.D. dependent var	0.003451

Heteroskedasticity Test: White (DE Model)

F-statistic	2.261108	Prob. F(35,26)	0.0169
Obs*R-squared	46.66789	Prob. Chi-Square(35)	0.0898
Scaled explained SS	53.67033	Prob. Chi-Square(35)	0.0226

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/20/11 Time: 20:33
Sample: 2 63
Included observations: 62

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	112.9868	57.23868	1.973959	0.0591
LQ	1.153478	5.687425	0.202812	0.8409
LQ^2	0.015110	0.220207	0.068619	0.9458
LQ*DLOGBR	-8.658372	5.138534	-1.684989	0.1040
LQ*GR	0.930038	1.886097	0.493102	0.6261
LQ*TA	0.468002	4.970776	0.094151	0.9257
LQ*SZ	0.423942	0.783101	0.541363	0.5929
LQ*PR	-4.268729	10.91071	-0.391242	0.6988
LQ*AG	-4.161920	1.847129	-2.253183	0.0329
DLOGBR	-85.92972	96.41965	-0.891205	0.3810
DLOGBR^2	8.065044	5.138125	1.569647	0.1286
DLOGBR*GR	102.3255	70.80488	1.445176	0.1604
DLOGBR*TA	-24.96708	30.88096	-0.808494	0.4261
DLOGBR*SZ	14.13225	13.68671	1.032553	0.3113
DLOGBR*PR	-87.24321	109.3920	-0.797528	0.4324
DLOGBR*AG	-19.93596	16.86792	-1.181886	0.2479
GR	-22.73984	28.08525	-0.809672	0.4255
GR^2	3.140124	1.782304	1.761834	0.0899
GR*TA	10.51933	11.69310	0.899618	0.3766
GR*SZ	2.489276	3.268669	0.761556	0.4532
GR*PR	-22.77251	15.40310	-1.478437	0.1513
GR*AG	-1.328261	4.187159	-0.317222	0.7536
TA	-50.13445	38.46512	-1.303374	0.2039
TA^2	20.21727	14.62312	1.382555	0.1786
TA*SZ	8.416439	4.685181	1.796396	0.0841
TA*PR	-49.29509	50.71895	-0.971926	0.3400
TA*AG	-22.51868	9.633841	-2.337456	0.0274
SZ	-46.21559	15.01544	-3.077870	0.0049
SZ^2	3.902840	1.030822	3.786145	0.0008
SZ*PR	-28.59000	13.07082	-2.187315	0.0379
SZ*AG	-14.52958	4.108217	-3.536712	0.0015
PR	224.4170	108.5426	2.067548	0.0488
PR^2	30.39484	21.50908	1.413117	0.1695
PR*AG	19.89073	17.59228	1.130651	0.2685
AG	116.8684	32.38373	3.608862	0.0013
AG^2	5.493725	3.187074	1.723752	0.0966

R-squared	0.752708	Mean dependent var	0.306321
Adjusted R-squared	0.419815	S.D. dependent var	0.537749
S.E. of regression	0.409603	Akaike info criterion	1.344994
Sum squared resid	4.362132	Schwarz criterion	2.580104

Heteroskedasticity Test: White (DEBT Model)

F-statistic	1.800571	Prob. F(35,26)	0.0616
Obs*R-squared	43.89170	Prob. Chi-Square(35)	0.1440
Scaled explained SS	40.89477	Prob. Chi-Square(35)	0.2275

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/20/11 Time: 20:37
Sample: 2 63
Included observations: 62

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.801325	1.252637	1.438026	0.1624
LQ	-0.122338	0.124466	-0.982899	0.3347
LQ^2	-0.002662	0.004819	-0.552326	0.5854
LQ*DLOGBR	-0.225214	0.112454	-2.002721	0.0557
LQ*GR	0.009662	0.041276	0.234070	0.8168
LQ*TA	-0.120916	0.108783	-1.111540	0.2765
LQ*SZ	0.035711	0.017138	2.083766	0.0472
LQ*PR	-0.070834	0.238775	-0.296656	0.7691
LQ*AG	-0.125199	0.040423	-3.097187	0.0046
DLOGBR	-2.036106	2.110092	-0.964937	0.3435
DLOGBR^2	0.153780	0.112445	1.367605	0.1831
DLOGBR*GR	2.429250	1.549526	1.567737	0.1290
DLOGBR*TA	-0.495144	0.675813	-0.732664	0.4703
DLOGBR*SZ	0.330272	0.299526	1.102649	0.2803
DLOGBR*PR	-1.820284	2.393985	-0.760357	0.4539
DLOGBR*AG	-0.424418	0.369145	-1.149733	0.2607
GR	-0.042391	0.614630	-0.068970	0.9455
GR^2	-0.055792	0.039005	-1.430378	0.1645
GR*TA	-0.137413	0.255897	-0.536986	0.5958
GR*SZ	0.022174	0.071533	0.309984	0.7590
GR*PR	-0.107070	0.337088	-0.317632	0.7533
GR*AG	-0.090643	0.091634	-0.989192	0.3317
TA	0.824987	0.841788	0.980041	0.3361
TA^2	-0.329776	0.320019	-1.030487	0.3123
TA*SZ	-0.070799	0.102533	-0.690499	0.4960
TA*PR	1.657351	1.109957	1.493167	0.1474
TA*AG	-0.020405	0.210831	-0.096783	0.9236
SZ	-0.583928	0.328605	-1.776991	0.0873
SZ^2	0.040211	0.022559	1.782493	0.0864
SZ*PR	-0.604917	0.286048	-2.114739	0.0442
SZ*AG	-0.074766	0.089906	-0.831604	0.4132
PR	3.868447	2.375395	1.628549	0.1155
PR^2	1.197007	0.470714	2.542957	0.0173
PR*AG	0.732575	0.384998	1.902805	0.0682
AG	0.867078	0.708700	1.223476	0.2321
AG^2	-0.027140	0.069747	-0.389122	0.7004

R-squared	0.707931	Mean dependent var	0.006853
Adjusted R-squared	0.314760	S.D. dependent var	0.010829

Appendix C: Hausman test

Correlated Random Effects - Hausman Test
Equation: LTD
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	14.382267	7	0.0448

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LQ	0.045692	0.038378	0.000039	0.2434
DLOGBR	0.036130	0.036285	0.000031	0.9778
GR	-0.040257	-0.028439	0.000144	0.3246
TA	0.028891	0.044994	0.001627	0.6897
SZ	0.049900	0.038940	0.006261	0.8898
PR	-0.096447	-0.097189	0.000710	0.9778
AG	0.195934	0.127819	0.017342	0.6050

Cross-section random effects test equation:
Dependent Variable: LTD
Method: Panel Least Squares
Date: 04/26/11 Time: 12:16
Sample: 2004 2010
Periods included: 7
Cross-sections included: 9
Total panel (unbalanced) observations: 62

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.411326	0.563960	-0.729353	0.4695
LQ	0.045692	0.012491	3.657933	0.0007
DLOGBR	0.036130	0.019218	1.880047	0.0664
GR	-0.040257	0.036310	-1.108708	0.2733
TA	0.028891	0.100909	0.286312	0.7759
SZ	0.049900	0.084468	0.590756	0.5576
PR	-0.096447	0.084041	-1.147613	0.2571
AG	0.195934	0.141652	1.383205	0.1733

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.737677	Mean dependent var	0.285261
Adjusted R-squared	0.652137	S.D. dependent var	0.070135
S.E. of regression	0.041366	Akaike info criterion	-3.315096
Sum squared resid	0.078711	Schwarz criterion	-2.766158
Log likelihood	118.7680	Hannan-Quinn criter.	-3.099569
F-statistic	8.623763	Durbin-Watson stat	1.517912
Prob(F-statistic)	0.000000		

Correlated Random Effects - Hausman Test
Equation: DE
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	19.507344	7	0.02183

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LQ	0.196041	0.085359	0.001914	0.0114
DLOGBR	0.263842	0.175530	0.001665	0.0304
GR	0.243176	0.169586	0.010295	0.4683
TA	0.543905	0.514699	0.065044	0.9088
SZ	0.833767	1.509222	0.543113	0.3594
PR	-0.632505	-0.444280	0.033603	0.3045
AG	3.153331	0.977093	1.482569	0.0739

Cross-section random effects test equation:
Dependent Variable: DE
Method: Panel Least Squares
Date: 04/26/11 Time: 12:20
Sample: 2004 2010
Periods included: 7
Cross-sections included: 9
Total panel (unbalanced) observations: 62

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.667165	5.973491	-1.450938	0.1536
LQ	0.196041	0.132308	1.481697	0.1452
DLOGBR	0.263842	0.203556	1.296164	0.2014
GR	0.243176	0.384595	0.632291	0.5303
TA	0.543905	1.068836	0.508876	0.6133
SZ	0.833767	0.894694	0.931902	0.3563
PR	-0.632505	0.890170	-0.710544	0.4810
AG	3.153331	1.500384	2.101683	0.0411

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.770862	Mean dependent var	1.947807
Adjusted R-squared	0.696143	S.D. dependent var	0.794850
S.E. of regression	0.438147	Akaike info criterion	1.405112
Sum squared resid	8.830750	Schwarz criterion	1.954050
Log likelihood	-27.55846	Hannan-Quinn criter.	1.620639
F-statistic	10.31682	Durbin-Watson stat	1.372638
Prob(F-statistic)	0.000000		

Correlated Random Effects - Hausman Test
Equation: DEBT
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	31.708882	7	0.0000

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LQ	0.020468	-0.023820	0.000168	0.0006
DLOGBR	0.081820	0.032916	0.000142	0.0000
GR	-0.066524	-0.132312	0.000550	0.0050
TA	-0.038400	0.175810	0.008544	0.0205
SZ	0.012783	0.177901	0.018714	0.2274
PR	0.192904	0.357438	0.003304	0.0042
AG	0.572087	-0.107538	0.052250	0.0029

Cross-section random effects test equation:
Dependent Variable: DEBT
Method: Panel Least Squares
Date: 04/26/11 Time: 12:21
Sample: 2004 2010
Periods included: 7
Cross-sections included: 9
Total panel (unbalanced) observations: 62

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.104090	0.941251	-0.110587	0.9124
LQ	0.020468	0.020848	0.981758	0.3314
DLOGBR	0.081820	0.032075	2.550938	0.0141
GR	-0.066524	0.060601	-1.097735	0.2780
TA	-0.038400	0.168418	-0.228003	0.8207
SZ	0.012783	0.140978	0.090676	0.9281
PR	0.192904	0.140265	1.375279	0.1757
AG	0.572087	0.236417	2.419817	0.0195

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.781182	Mean dependent var	0.640826
Adjusted R-squared	0.709828	S.D. dependent var	0.128165
S.E. of regression	0.069039	Akaike info criterion	-2.290642
Sum squared resid	0.219256	Schwarz criterion	-1.741704
Log likelihood	87.00991	Hannan-Quinn criter.	-2.075115
F-statistic	10.94801	Durbin-Watson stat	1.520095
Prob(F-statistic)	0.000000		

Appendix D: Wald coefficient test

Wald Test:
Equation: DE(Dependent variable)

Test Statistic	Value	df	Probability
F-statistic	3.975778	(1, 46)	0.0521
Chi-square	3.975778	1	0.0462

Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(2)	0.196041	0.098319

Restrictions are linear in coefficients.

Wald Test:
Equation: DE(Dependent variable)

Test Statistic	Value	df	Probability
F-statistic	9.400857	(1, 46)	0.0036
Chi-square	9.400857	1	0.0022

Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(3)	0.263842	0.086052

Restrictions are linear in coefficients.

Wald Test:
Equation: DE(Dependent variable)

Test Statistic	Value	df	Probability
F-statistic	7.486571	(1, 46)	0.0088
Chi-square	7.486571	1	0.0062

Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(8)	3.153331	1.152466

Restrictions are linear in coefficients.

Wald Test:
Equation: LTD(Dependent variable)

Test Statistic	Value	df	Probability
F-statistic	7.064396	(1, 46)	0.0108
Chi-square	7.064396	1	0.0079

Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(2)	0.045692	0.017191

Restrictions are linear in coefficients.

Wald Test:
Equation: LTD(Dependent variable)

Test Statistic	Value	df	Probability
F-statistic	6.743395	(1, 46)	0.0126
Chi-square	6.743395	1	0.0094

Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(4)	-0.040257	0.015502

Wald Test:
Equation: LTD(Dependent variable)

Test Statistic	Value	df	Probability
F-statistic	4.345061	(1, 46)	0.0427
Chi-square	4.345061	1	0.0371

Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(7)	-0.096447	0.046269

Restrictions are linear in coefficients.

Wald Test:
Equation: LTD(Dependent variable)

Test Statistic	Value	df	Probability
F-statistic	4.635129	(1, 46)	0.0366
Chi-square	4.635129	1	0.0313

Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(8)	0.195934	0.091008

Restrictions are linear in coefficients.

Wald Test:
Equation: DEBT(dependent variable)

Test Statistic	Value	df	Probability
F-statistic	11.08889	(1, 46)	0.0017
Chi-square	11.08889	1	0.0009

Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(3)	0.081820	0.024571

Restrictions are linear in coefficients.

Wald Test:
Equation: DEBT(dependent variable)

Test Statistic	Value	df	Probability
F-statistic	4.498626	(1, 46)	0.0393
Chi-square	4.498626	1	0.0339

Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(4)	-0.066524	0.031364

Restrictions are linear in coefficients.

Wald Test:
Equation: DEBT(dependent variable)

Test Statistic	Value	df	Probability
F-statistic	4.255757	(1, 46)	0.0448
Chi-square	4.255757	1	0.0391

Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(7)	0.192904	0.093509

Restrictions are linear in coefficients.

Wald Test:
Equation: DEBT(dependent variable)

Test Statistic	Value	df	Probability
F-statistic	7.468475	(1, 46)	0.0089
Chi-square	7.468475	1	0.0063

Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(8)	0.572087	0.209337

Restrictions are linear in coefficients.