
**COLLEGE OF BUSINESS AND ECONOMICS**

**DEPARTMENT OF ACCOUNTING AND FINANCE**

**THESIS PAPER SUBMITTED TO ACCOUNTING AND FINANCE DEPARTMENT FOR PARTIAL FULFILLMENT OF MSC IN ACCOUNTING AND FINANCE**

# DETERMINANTS OF CAPITAL STRUCTURE IN COMMERCIAL BANKS OF ETHIOPIA

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**APRIL, 2021**

**ADDIS ABABA**

## DECLARATION

I declare that this report is my own unaided work. It is being submitted in partial fulfillment of the degree of Master of Science in Accounting and Finance from Addis Ababa University. It has not been submitted before for any degree or examination to any other University.

Name: Merkin Messele Signature: _____ Date: _____

## CERTIFICATION

This is to certify that, the research project prepared and submitted by Merkin Messele Kacha entitled "Determinants of Capital Structure in commercial banks of Ethiopia" is an outcome of my independent and original work. I have duly acknowledged all the sources from which the ideas and extracts have been taken. The project is free from plagiarism and has n ot been submitted elsewhere for publication.

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## Acknowledgement

First and foremost, I would like to praise and thank God, the almighty, who has granted countless blessing, knowledge, and opportunity to the writer, so that I have been finally able to accomplish the thesis.

I would like to express my sincere gratitude to my advisor Prof. Alem Hagos for the continuous support of my MSC study and research, for his patience, motivation, enthusiasm, and immense knowledge. His guidance helped me in all the time of research and writing of this thesis.

Apart from the efforts of me, the success of this thesis depends largely on the encouragement and guidelines of many others. I take this opportunity to express my gratitude to the people who have been instrumental in the successful completion of this thesis. The writer hardly knows where to start expressing the gratitude but for sure the gratitude goes to all those who have assisted him in the process of completing this thesis. It would be impossible to list all names but several people deserve his sincere and special thanks.

If it becomes mandatory to list some of them, my special thanks go to my friends and colleagues Lewoye Bantie and Yonas Gashaw for their special support all over the research period for their courageous and motivational activities in order to finish the paper successfully.

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# *Abstract*

*Although there have been many prior studies on the determinants of capital structure, the question of what determines the best financing mix that maximizes a firm's value is still the most debatable issue in corporate finance. Besides, a great deal of previous studies focused mainly on developed countries' non-financial firms paying little attention to developing countries and financial sector. Therefore, this study attempted to fill the gap by analyzing the capital structure for commercial banks in Ethiopia. As a result, this study has examined the relationship between leverage and firm specific (profitability, liquidity tangibility, risk, size and growth) determinants of capital structure decision, and the capital structure theory that can explicate the capital structure of banks in Ethiopia. Quantitative research approach was utilized for data analysis by collecting secondary data in the form of document review. The study has used purposive sampling technique to select among eighteen banks currently operating in Ethiopia. More specifically, the study has used nine years (2011 - 2019) data for nine banks in Ethiopia. The panel data were analyzed with a clustered robust random effect regression model. The findings show that, size, tangibility, profitability and growth of the banks are important determinants of capital structure of banks in Ethiopia. But, risk and liquidity of banks are found to have no statistically significant impact on the capital structure of banks in Ethiopia. The empirical findings of the study mean that the two capital structure theories, static trade-off and pecking order, are explaining the capital structure decision of Ethiopian commercial banks. Commercial banks in Ethiopia should pay due attention to the microeconomic variables without overlooking the macroeconomic condition while articulating their optimal capital mix which can reduce the weighted average cost of capital and enhance the wealth of the company. Therefore, banks should give attention to profitability, tangibility, size and growth when they determine their optimum capital structure.*



*Key words: Capital structure, Determinant, Ethiopia*

# CHAPTER ONE

# INTRODUCTION

This chapter is divided in to different sections. The first section 1.1 presents about background of the study. Section1.2. presents background of the organization and the third section 1.3 describes about statement of the problem. The fourth section presents research questions. Section 1.5 presents objectives of the research. Section 1.6 presents the hypothesis of the study and the remaining sections shall present significance of the study, scope of the study, limitation of the study and organization of the paper respectively.

## 1.1 Background of the Study

Capital structure refers to a numerous alternatives that a given organization could use in order to get the necessary funds for its investing activities in a way that is consistent with its priorities. It takes much effort of the financial decision making process, which is centered on the determination of the optimal capital structure; where the firms' value is maximized and cost of capital is minimized. Capital structure theories suggest that firms determine target debt ratio; which is based on various trade-off between the costs and benefits of debt versus equity. Capital structure is defined as a company's outstanding debt and equity. Capital structure allows a firm to understand what kind of funding the company has to use to finance its overall activities and growth. In other words, it shows the proportions of senior debt, subordinated debt and equity (common or preferred) in the funding.

The modern theory of capital structure was first established by Modigliani and Miller (1958). Following the seminal work of Modigliani and Miller (1958), a vast theoretical literature developed, which led to the formulation of alternative theories, such as the static trade off theory, agency cost theory and pecking order theory.

Static trade- off theory proposes that the optimal debt ratio is set by matching the trade-off between the benefit and cost of debt. Static trade- off theory, the optimal capital structure is

achieved when the marginal present value of the tax shield on additional debt is equal to the marginal present value of the financial distress cost on additional debt (Myers 1984).

Pecking Order Theory emphasizes the information asymmetry between the firm insiders and the outside investors suggesting that firms use debt only when the internal financing is not available (Myers and Majluf 1984).

Agency Cost Theory predicts the capital structure choice is based on the reality of agency cost. This theory investigates the relationship between the manager of the firm, and the outside equity and debt holders (Jensen and Meckling 1986).

Starting with Modigliani and Miller (1958), the literature on capital structure has been expanded by many theoretical and empirical contributions. For non-financial firms the empirical literature has generally converged on particular variables that have been found to be consistently correlated with leverage such as: age, size, growth, profitability, market-to-book ratio, collateral value and dividend policy. On the other hand, the capital structure of banks is still a relatively under-explored area in the banking literature. As Amidu's (2007) study indicates, currently there is ambiguity on understanding on how do banks choose their capital structure and what factors influence their corporate financing behavior.

In Ethiopia as to the awareness of the examiner there were few studies which relate with determinants of capital structure, these are, Ashenafi (2005) a case study in Addis Ababa Small and Medium enterprises, Amanuel (2011) evidence from manufacturing share companies of Addis Ababa city and Bayeh (2011) evidence from Ethiopian insurance company. Therefore, given the distinctive financial features of banks and the surroundings in which they operate, there are strong grounds for a separate study on capital structure determinants of banks in Ethiopia. Therefore, the main purpose of this study was to examine the relationship between leverage and determinants of capital structure decision of banks in Ethiopia. This will provide financial managers with sensible knowledge of determining their capital structure, and play role in satisfying gap in understanding of the capital structure decision.

## 1.2 Background of the Banking Industry in Ethiopia

As a result of the agreement reached between Emperor Minilik II and Mr.Ma Gillivray, representative of the British owned National Bank of Egypt; modern banking in Ethiopia began in 1905 with the Bank of Abyssinia, a private company controlled by the Bank of Egypt In 1931. It was liquidated and replaced by the Bank of Ethiopia which was the bank of issue until the Italian invasion of 1936. During the Italian occupation, Bank of Italy banknotes formed the legal tender. Under the subsequent British occupation, Ethiopia was briefly a part of the East Africa Currency Board. In 1943; the State Bank of Ethiopia was established, with two departments performing the separate functions of an issuing bank and a commercial bank. In 1963, these functions were formally separated and the National Bank of Ethiopia (the central and issuing bank) and the Commercial Bank of Ethiopia were formed. In the period to 1974, several other financial institutions emerged including the state owned: The Agricultural and Industrial Development Bank (established largely to finance state owned enterprises); The Savings and Mortgage Corporation of Ethiopia; The Imperial Savings and Home Ownership Public Association (which provided savings and loan services). Major private commercial institutions, many of which were foreign owned, included the Addis Ababa Bank, the Banco di Napoli, the Banco di Roma. However, the banking business could not move further because of the nationalization of private investments by the Socialist regime (the Dergue regime) that came into power leaving only three government banks; the National Bank of Ethiopia, the Commercial Bank of Ethiopia and agricultural and Industrial Development Bank.

This was reversed when the Socialist regime was overthrown in 1991. Following the overthrown of the Dergue regime in 1991, the EPRDF declared a liberal economic system. Then after, banking and monetary proclamation of 1994 established the National Bank of Ethiopia (NBE) as a judicial entity, separated from the government and separately and clearly put its major function. Monetary and Banking proclamation No.83/1994 and the Licensing and Supervision of Banking Business No.84/1994 laid down the legal basis for investment in the banking sector. Consequently, shortly after the proclamation the first private bank, Awash International bank was established in 1994 by four hundred eighty six shareholders and by 1998 the authorized capital of the Bank reached Birr fifty million. Dashen bank was established on 20$^{th}$ of September, 1995 as a share company with an authorized and subscribed capital of Birr

fifty million. One hundred thirty one shareholders with subscribed and authorized capital of twenty five million and fifty million founded bank of Abysinia. Wegagen bank with an authorized capital of birr sixty million started operation in 1997 and the fifth private bank, united bank was established on 10th September 1998 by three hundred thirty five shareholders. Nib International bank that started operation on 26th of May, 1999 with an authorized capital of Birr one hundred fifty million. Cooperative bank of Oromia was established on 29th of October, 2004 with an authorized capital of Birr twenty two million. Lion International Bank with an authorized capital of Birr one hundred eight million started operation in 02th of October, 2006. Zemen bank that started operation on 17th of June, 2008, with an authorized capital of Birr eighty seven million. The last bank to be established to date is Oromia International bank that started operation on 18th of September, 2008 with an authorized capital of Birr 91 million. Source (www.NBE.gov.et).

## 1.3 Statement of the problem

How firms choose capital structure is one of the most important strategic financial decisions of firms; it has been the subject of considerable debate and investigation. The debate on what drives capital structure decisions is still open. Following the seminal work of Modigliani and Miller (1958), a vast theoretical literature developed, which led to the formulation of alternative theories, such as the static trade off model, pecking order theory and agency cost theory. These theories point to a number of specific factors that may affect the capital structure of firms such as (profitability, size, tangibility, growth, risk, liquidity, age, dividend payout). On the other hand, the empirical evidence regarding the alternative theories is still questionable (Rajan and Zingales 1995). For example, Static trade off-theory assumes a firm's optimal debt ratio is determined by a trade-off between the bankruptcy cost and tax advantage of borrowing, holding the firm's assets and investment plans constant. Static trade off-theory, higher profitability lowers the expected cost of distress; therefore, firms increase their leverage to take benefit from tax benefits. Which means in other word profitability is positively associated with leverage. Agency theory backs this positive relation due to the free cash flow theory of Jensen (1986). But, pecking order theory Myers and Majluf (1984) throws doubt on the existence of target capital structure, suggesting that firms use debt only when the internal financing is not available. For this reason, profitability is expected to have negative relation with leverage.

What determine capital structure have been debated for many years and still it remain one of the most unsolved and debatable issues in corporate finance literature. Indeed, what makes the capital structure debates so stimulating is that few of the developed theories have been tested by empirical studies and the theories themselves lead to different, not mutually exclusive and sometimes opposed result and conclusion (Rajan and Zingales 1995). Morri and Beretta (2008) explained many theoretical studies and much empirical research have addressed those issues, but there is not yet a fully supported and commonly accepted theory; and the debate on the significance of determinant factors is still extended. Besides, although earlier studies have wonderful contributions to the theory of capital structure, they were limited to developed financial system and restricted to non-banks. Less developed countries like, Ethiopia, received little attention in the literature.

According to Octavia and Brown (2008) the capital structure of banks are not well researched and under-explored area in the banking literature and the special nature of the deposit contract, the degree of leverage in banking and the regulatory constraints imposed on banks have meant that banks (and financial institutions in general) have been excluded in previous empirical studies on standard capital structure choice. Therefore, understanding the determinants of capital structure is as important for banks as for nonbank firms.

As Amidu's (2007) study indicates, currently there is ambiguity on understanding how do banks choose their capital structure and what factors influence their corporate financing behavior. Due to, the lack of harmony among the theories and researchers about what would qualify as optimal capital structure and lack of literature in the case of Ethiopia has motivated the researcher to do this study. Therefore, this study has tried to find out the relationship between leverage and firm specific determinants of capital structure decision.

In Ethiopia as per the awareness of the researcher there were few studies on determinants of capital structure. Some of these studies include Ashenafi (2005), Amanuel (2011) and Bayeh (2011). Ashenafi (2005) approached the question of capital structure using data from medium firms in Ethiopia. Ashenafi (2005) took variables like non-debt tax shield, economic risk, age of firms, and size of firms, tangibility, growth and profitability as independent variable and regressed against leverage, the dependent variable. The results showed that non-debt tax shield,

economic risk, profitability, growth, tangibility, and age showed a negative coefficient of correlation with debt to equity ratio.

Amanuel (2011) studied what determine the capital structure of manufacturing share companies in Addis Ababa, Ethiopia for the period over 2003-2010. The objective of the study was to examine the relevance of theoretical internal (firm level) factors determine capital structure of manufacturing share companies in Addis Ababa, Ethiopia. He used seven independent variables: tangibility, non-tax shield, growth, earning volatility, profitability, age and size, and three dependent variables: total debt ratio, short term ratio and long term ratio to establish the determinants of capital structure of manufacturing companies in Ethiopia. In relation to this, samples of twelve companies were taken and secondary data was collected from audited financial statement of the selected companies. The results of ordinary least square regression by Amanuel (2010) showed that non-debt tax shields, earning volatility, profitability, tangibility, and size of the firm variables are the significant determinants of capital structure of Addis Ababa manufacturing share companies at least for one of the model out of the three models employed in the study. But, there is no clear and statistically proved relations obtained for the variables, age of the firm and growth of the firm in any of the capital structure models.

Bayeh (2011) investigated empirically the determinants of capital structure in the insurance industry of Ethiopia. He has examined, nine insurance companies in the sample for the period over 2004 – 2010. Bayeh (2011) has also used seven independent variables: liquidity, tangibility, growth, business risk, profitability, age and size, and three dependent variables: total debt ratio, long term ratio and total debt to equity ratio to test the determinants of capital structure of insurance companies in Ethiopia. The ordinary least square result showed that growth, profitability, and age of the firm were found to have significant influence on capital structure of Ethiopian insurance companies. However, tangibility and size of the firm were found to have significant influence on capital structure of Ethiopian insurance companies.

However, most of the studies are made with reference to developed countries, which means they are not explained the issues for emerging market specifically for Ethiopian case. So, it is difficult to make generalization for the developing economy like Ethiopia, from the result of developed economy without making advanced research.

Furthermore, the financial sector of Ethiopian economy is dominated by banks, which has its own unique features, such as the banking regulation did not allow foreign nationals or organization fully or partially to acquire share of Ethiopian banks, there is no secondary market, etc. In light of these, the study was concerned with examining the firm specific determinants of capital structure of commercial banks in Ethiopia.

This study, therefore, tried to examine determinants of capital structure of Ethiopian commercial banking environment by using its internal (firm-specific) determining factors. Ethiopia differs from other developing countries previously studied in such a way it has no secondary capital market which makes things easier for firms to raise funds and choose the best mix of debt and equity sources. In general, the researcher is motivated to conduct this study because of the following reasons:

I. There is no clear evidence about the potential determinants of capital structure of commercial banks operating in Ethiopia.
II. There is no clear evidence whether the financing decisions made by commercial banks in Ethiopia provide empirical support for the existing capital structure relevancy theories.
III. The banking regulation did not allow foreign nationals or organization fully or partially to acquire share of Ethiopian banks.

Therefore, this paper fills the stated gap by identifying the factors that determine capital structure decision and providing additional facts to the theories of capital structure relevancy evidencing commercial banks in Ethiopia. Thus, taking in to consideration the financial features of banking industry in which they operate, there are strong grounds for a separate study on capital structure determinants of banks in Ethiopia.

## 1.4 Research questions

The researcher developed the following research questions based on the research gap to conduct the study.

1. What determine the capital structure of Ethiopian commercial banks?
2. Which theory do most explains the financing behavior adopted by Ethiopian banking industry?

## 1.5 Objective of the Study

### 1.5.1. General objectives of the study

The study's general objective is to examine the bank specific factors that affect leverage and to understand about the theories of capital structure that can explain the capital structure of Ethiopian banking industry.

### 1.5.2. Specific objectives of the study

The research tries to answer the following specific objectives of the study. These are:

1. To identify the bank specific characteristics that determines the capital structure decisions of Ethiopian commercial banks.
2. To identify the capital structure theory which most explain Ethiopian banking industry.

Based on the wide research objective, the researcher developed the hypothesis to be tested as follows.

## 1.6 Hypotheses (HP)

The researcher has developed six hypotheses regarding the determinants of capital structure choice on the Ethiopian banking industry, which were tested and presented in detail as follow.

**Profitability:**

Capital structure theories have different view on the relationship among leverage and profitability. The trade-off theory argues that firms generally favor debt for tax considerations. Profitable firms would, therefore, employ more debt because increased leverage would increase the value of their debt tax shield (Myers 1984). In addition to the tax advantage of debt, agency and bankruptcy costs may encourage highly profitable firms to have more debt in their capital structure. This is because highly profitable firms are less likely to be subject to bankruptcy risk because of their ability to meet debt repayment obligations on time as per their agreement and governing law. Thus, they will demand more debt to maximize their tax shield at more attractive

costs of debt. For these considerations, the trade-off theory predicts a positive relationship between leverage and profitability.

However, the pecking order theory of Myers and Majluf (1984) predicts the opposite. It predicts a negative association between leverage and profitability because high profitable firms will be able to generate more funds through retained earnings and then have less leverage. Therefore, it is expected that there is "negative relationship between profitability and leverage ratio".

**Hypothesis 1: There is a negative relationship between leverage ratios and profitability**

**Growth:**

According to pecking order theory firms with high growth opportunities will try to get their financing from external funds. Myers (1977) confirms this and concludes that firms with a higher proportion of their market value accounted for by growth opportunity will have debt capacity. Therefore, it is expected that "there is a positive relationship between growth and leverage ratio."

**Hypothesis 2: There is a positive relationship between leverage ratios and growth.**

**Tangibility:**

Tangibility is an important determinant of the capital structure of a firm. The trade-off theory predicts a positive relation between tangibility and debt levels. As the value of intangible assets disappears (almost entirely) in the cases of bankruptcies, the presence of tangible assets is expected to be important in external borrowing as it is easy to collateralize them. Tangible assets a lot reduce the costs of financial distress since they tend to have higher liquidation value (Titman and Wessels 1988; Harris and Raviv 1991). Pecking order theory of Myers and Majluf, (1984) bring to a close that issuing debt secured by property, avoids the costs related with issuing shares. This suggests that firms with more collateralized assets (fixed assets) will be able to issue more debt at a nice-looking rate as debt may be more readily available. This results in a positive association between leverage and tangibility. Therefore, it is projected that there is a "positive relationship between tangibility and leverage ratio".

**Hypothesis 3: There is a positive relationship between leverage ratios and tangibility.**

**Risk**

Given agency and bankruptcy costs, there are incentives for the firm not to utilize the tax benefit of debt within the static framework model. Firms with high earnings volatility face a risk of the earnings level dropping below their debt servicing commitments, thereby incurring a higher cost of financial distress. Accordingly, these firms should reduce their leverage level to avoid the risk of bankruptcy. Therefore, the trade-off theory predicts a negative relationship between leverage and earning volatility of firms. The pecking order theory allows the same prediction. Empirical evidence suggests that there is a negative relationship between risk and leverage (Titman and Wessels, 1988). Hence, risk is expected to have "negative impact on leverage ratio".

**Hypothesis 4: There is a negative relationship between leverage ratios and risk.**

**Size**

In accordance with trade-off theory, firm size could be an inverse substitute for the probability of the bankruptcy costs. Larger firms are likely to be more diversified and fail less often. They can lower costs (relative to firm value) in the occasion of bankruptcy. Larger firms are more likely to have higher debt capacity and are likely to borrow more to maximize the tax benefit from debt because of diversification (Titman and Wessels (1988). Therefore, size has a positive effect on leverage. Size can be regarded as a substitute for information asymmetry between managers and outside investors. Large firms are subject to more news than small firms because the investment community would be more concerned with gathering and providing information about large firms. This makes large firms more closely observed by analysts and less subject to information asymmetry than small firms. Thus, they should be more capable of issuing equity which is more sensitive to information asymmetry and have lower debt (Rajan and Zingales, 1995). This suggests that pecking order theory predicts a "negative association between leverage and the size of firm".

**Hypotheses 5: There is a positive relationship between leverage ratios and size.**

**Liquidity**

There are two different opinions on the association between liquidity and capital structure: First view implies a positive significant relation that is consistent with trade off theory. Companies with more liquidity (more current assets) tend to use more external borrowing, because of their ability in paying off their liabilities. Second view points to a negative significant relation that is consistent with the pecking order theory, arguing that companies with more liquidity will decrease external financing, relying on their internal funds. Thus, liquidity ratios may have a mixed effect on the capital structure decisions. Most of the previous studies, confirm the negative relation, (Ahmed et al., 2010, and Najjar and Petrov 2011). Hence, "liquidity is expected to have negative impact on leverage ratio".

**Hypothesis 6: There is a negative relationship between leverage ratios and liquidity.**

## 1.7 Significance of the study

Since banking industry is emerging and flourishing in the Ethiopian economy, assessing the factors determining capital structure decision will help concerned parties innovate actions that can fortify their competitive position in the industry. This study, therefore, apart being a step for the researcher's educational career, has the following immense importance:

First, even though research studies related to the area of capital structure decisions are plenty, those that are concerned in the financial system of developing countries are few. This study, therefore, attempts all its best to contribute to the literature by assessing the capital structure decision determining firm-specific factors of commercial banks in the developing countries like Ethiopia.

Second, the study will have great importance to external investors and shareholders, bank managers, lenders and policy makers in making knowledgeable decisions and regulations considering the financing patterns of the banking sector in Ethiopia.

Finally, the study notably contributes to other studies to be made in different economic sectors by providing the picture of the firm level factors determining capital structure decisions of commercial banks in Ethiopia by serving as a reference point.

## 1.8 Scope of the study

In any study area, it is expected to encounter numerous issues such as the concentration of field study, data collection and others which are constrained by available resources like timeframe, financial and availability of information. This study is of no exceptions where the scope is delimited to the study of determinants of capital structure of commercial banks in Ethiopia, the sample size and lastly the time horizon of the study. Thus, this study was limited to the relationship between leverage and firm specific determinants of capital structure decision of Ethiopian banks over the period 2011 to 2019 and theories of capital structure that can explain the capital structure of Ethiopian banking industry. The study considered only firm-specific determinants of capital structure. External factors such as macroeconomic determinants of capital structure (Inflation, GDP growth, Interest rate, etc.) which are beyond the control of the firm are not included the study

## 1.9 Limitation of the study

Due to insufficiency of the research project time, the researcher could not include suspected macroeconomic (external) factors in Ethiopia which may have a certain contribution to the determination of the financing mix of a firm. The other one is due to the unavailability of secondary market; the researcher was limited to take only determinant factors that can be measured only by taking data from the banks financial statements. Finally the researcher didn't include the primary data such as interview of the banks' CEOs and financial managers to analyze their knowledge on capital structure and their financing decision practices. The study would have been much better had it been able to encompass the exiting practices of their financing decisions.

## 1.10. Organization of the thesis

The study was organized into five chapters. The first chapter presents research introduction, statement of the problem, research questions, objective of the study, hypothesis of the study, scope of the study, limitation and significance of the study. The second chapter of the study presents review of theoretical and empirical literatures on determinants of capital structure and research gap. The third chapter presents the research methodology. Chapter four presents results and analysis of the study and the last chapter present conclusions and recommendations.

# CHAPTER TWO

# REVIEW OF RELATED LITERATURE

Capital structure refers to several alternative ways that a given organization could adopt to get the required funds for its investing activities in a way that is consistent with its priorities. The mixture of debt and equity is called capital structure. Two major sources of financing that are offered to firms are debt and equity. Most of the effort of the financial decision making process is centered on the determination of the optimal capital structure; where the firms' value is maximized and cost of capital is minimized. This chapter presents the theoretical and empirical literature review over the capital structure theme.

Corporate sector growth is vital to economic development. The issue of finance has been identified as an immediate reason why businesses in developing countries fail to start or to progress. It is imperative for firms to be able to finance their activities and grow over time if they are ever to play an increasing and predominant role in providing employment as well as income in terms of profits, dividends and wages to households. So, a path to development could not be realized without enabling to evaluate the business environmental factors particularly factors affecting access to finance. Consequently, managerial decisions related to finance are at the center of the economic or business activities, which are the subject matter of financial management discipline.

Financial management discipline has three major decision functions/activities:

I. Capital budgeting (Investment) decision: deal with the efficient utilization of capital or funds to acquire assets. It is more concerned with the size, type and percentage composition of assets of a firm.
II. Capital structure (financing) decisions: emphasize on the proper selection of mix of capital i.e. debt vs. equity. It deals mainly with the size, type and percentage composition of capital sources.
III. Asset management decision: is the other decision area that deal with efficient utilization of assets, being acquired through investment decision.

Here, the literature focuses on capital structure decisions' general theories, and particularly the related determinants of capital structure.

Section 2.1 covers theoretical literature review, section 2.2 was about capital structure relevancy theories, section 2.3 covers theoretical determinants of bank capital structure, section 2.4 reviews prior empirical studies including those conducted in Ethiopia and section 2.5 provides conclusions and knowledge gap. Finally, section 2.6 presents the conceptual framework of the study.

## 2.1. Theoretical review of Capital structure

This part of the chapter explains different theories which are related with the development of capital structure. These theories include Modigliani and miller (MM), very popular theories of capital structure decision, static trade-off theory, pecking order theory, and agency cost theory. The main objective of this section is to review all the listed theories of capital structure and to get greater insight on each of their arguments in relation to capital structure decisions.

### 2.1.1. Capital Structure Irrelevancy Theory

#### 2.1.1.1. Modigliani and Miller (MM) theory

The first and very popular of all capital structure theories are Modigliani and Miller theory (1958). Which argue that capital structure is irrelevant to the value of a firm, under perfect capital market conditions with no corporate tax and no bankruptcy cost. This implies that the firm's debt to equity ratio does not influence its cost of capital.

A firm's value is only determined by its real asset, and it cannot be changed by pure capital structure management. Consequently, it means that there is no optimal capital structure. However, there is a fundamental difference between debt financing and equity financing in the real world with corporate taxes. Dividends paid to shareholders come from the after tax profit. By contrast, interest paid to bondholders comes out of the before-tax profits.

Thus, Miller and Modigliani (1963) argued that in the presence of corporate taxes, a value-maximizing company can obtain an optimal capital structure. In other words, if the market is not

perfect, as a result of, say, the existence of taxes, or of underdeveloped financial markets, or of inefficient case, firms must consider the costs entailed by these imperfections. A proper decision on capital structure can be helpful to minimize these costs.

## 2.2. Capital Structure Relevancy Theories

According to Buferna et al (2005), in the literature of capital structure, three important and popular but conflicting capital structure relevancy theories have been developed, which includes the Static trade-off theory, Pecking order theory and Agency costs theory. These theories are explained below:

### 2.2.1. Static Trade-off Theory

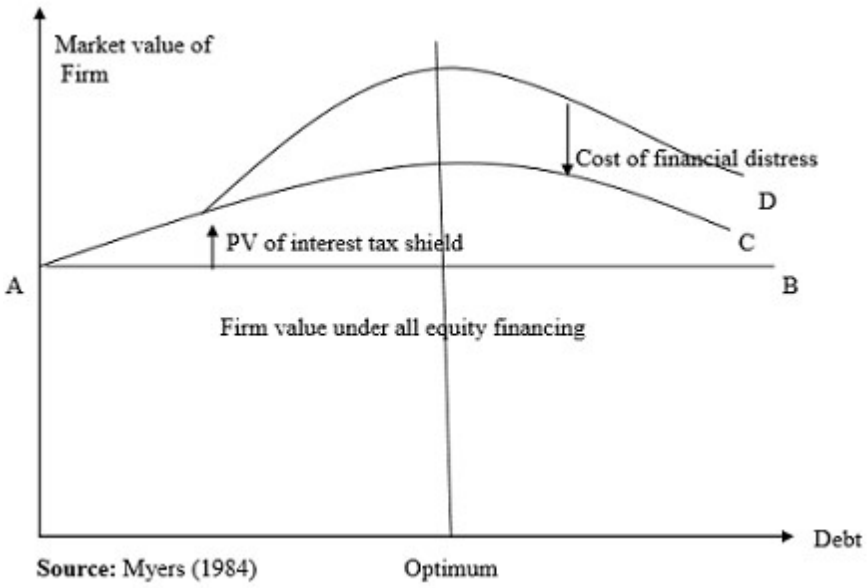
Trade-off theory claimed that a firm's optimal debt ratio is determined by a trade-off between the bankruptcy cost and tax advantage of borrowing, holding the firm's assets and investment plans constant (Myers, 1984). The major aim of setting the optimum debt to equity ratio is creation and or maximization of the firm's value for that reason, debt and equity are used as substitutes. According to this theory, higher profitability decreases the expected costs of distress and let firms increase their tax benefits by raising leverage; therefore, firms should prefer debt financing because of the tax benefit. As per this theory firms can borrow up to the point where the tax benefit from an extra dollar in debt is exactly equal to the cost that comes from the increased probability of financial distress (Ross, 2002, p.586).

Due to the net tax advantage to corporate debt financing, the firm's optimal capital structure will involve distinctions in firm-specific characteristics, target leverage ratios will vary from company to company. Institutional differences, such as different financial systems, tax rate and bankruptcy law will also lead the target ratio to differ across countries.

The trade-off theory predicts that safe firms, firms with more tangible assets and more taxable income to shield should have high debt ratios. While risky firms, firms with more intangible assets that the value will disappear in case of liquidation, ought to rely more on equity financing. In terms of profitability, trade-off theory predicts that more profitable firms should mean more debt-serving capacity and more taxable income to shield, Therefore, based on this theory, firms

would prefer debt over equity until the point where the probability of financial distress starts to be important. This is illustrated by figure 2.1

**Figure 2.1: The-static-tradeoff theory of capital structure**




**Source:** Myers (1984)

In figure 2.1 the straight line AB shows the market value of the firm under the Modigliani and Miller (1958) regime, in which the value of the firm is irrelevant and the capital structure is equal to the value of an all-equity firm. If a firm uses debt in their capital structure they have to pay interest which is generally tax deductible. Interest payments act as a tax shield and allow the firm to increase its value. As the firm takes more debt its value increases (curve AC). However, after a certain proportion of debt (the optimum level) the value of the firm starts to decrease as the costs of debt start to outweigh the benefits of debt. Curve AD illustrates how the costs of financial distress rise as firms use increasing amounts of debt in their capital structure. At higher levels of debt, the interest payments of firms increase to cover for the potential risk of financial distress. Firms trade-off the tax benefits that may be gained through using debt with costs of financial distress and agency costs to maintain an optimal level of debt in their capital structure as shown in figure 2.1.

The general results of various work in this aspect of leverage choice is that if there are significant leverage-related costs, such as bankruptcy costs, agency costs of debt, and loss of non-debt tax

shields, and if the income from equity is untaxed, then the marginal bondholder's tax rate will be less than the corporate rate and there will be a positive trade-off between the tax advantage of debt and various leverage-related costs.

### 2.2.2. Pecking order theory

Pecking Order Theory is developed by Myers and Majluf (1984) which states that capital structure is initiated by firm's desire to finance new investments, first internally, then with low-risk debt, and finally if all fails, with equity. Therefore, the firms prefer internal financing to external financing. The pecking order theory discussed the association between information asymmetry and investment and financing decisions. According to pecking order theory, informational asymmetry, which firm's managers or insiders have inside information about the firm's returns or investment opportunities, increases the leverage of the firm with the same extent. So due to the asymmetric information and signaling problems associated with external financing, the financing choices of firms follow an order, with a preference for internal over external finance and for debt over equity.

Myers and Majluf (1984) argue that the capital structure can help to ease inefficiencies in a firm's investment decision that are caused by information asymmetries. They demonstrate that if there is an asymmetry of information between investors and firm insiders, then the firm's equity may be underpriced by the market. As a result, new equity, which is used to finance new investment projects, will be also underpriced. Therefore, if management has favorable inside information and acts in the best interest of the existing shareholders, then management will refuse to issue equity even if it means passing up positive net present value projects because the net loss to existing shareholders (due to underpricing problem) might outweigh the project's Net present values. On the other hand, passing up positive net present value projects is contrary to the wealth maximization. Using financial sources that may not be undervalued by the market, particularly internally generated funds could solve this under-investment problem. Accordingly, the existence of sufficient internal finance allows firms to accept desirable investments without relying on costly external finance.

Myers and Majluf (1984), also argue that firms are most likely to generate financial slack (i.e. liquid assets such as cash and marketable securities) to be used for internal funding. Thus, in

order to protect present shareholders, firms with financial slack and in the presence of asymmetric information, will not issue equity, even though it may involve passing up a good investment opportunity. If investors realize this point, then the market will take the decision not to issue shares as good news. On the other hand, if management does offer a new share issue, it will be interpreted as a bad news, and the firm's share issue will be underpriced. This adverse selection problem has an influence on the choice between internal and external financing. This choice leads to the Pecking Order theory, which Myers (1984) summarized as follows: Firms prefer internal finance. Firms adjust their target dividend payout ratios to their investment opportunities, although dividends are sticky and target payout ratios are gradually adjusted to shifts in available investment opportunities. Sticky dividend policies as well as unpredictable fluctuations in both profitability and investment opportunities mean that internally generated funds are more or less than investment outlays. If internally generated cash flow is less than investment outlays, the firm first exhausts its cash balances or marketable securities portfolio. If external financing is required, firms will resort to the safest security first. They start with debt, then hybrid securities such as convertible bonds and finally equity as a last resort. A single optimal or target debt-equity ratio does not exist in the pecking order theory since financing decision does not rely on the trade- off between marginal benefits and costs of debt.

Moreover, Myers (1984) introduced implication similar to the pecking order theory known as the modified pecking order theory. In this framework, both asymmetric information and costs of financial distress are incorporated. Myers argued that as firm climbs up the pecking order it faces higher probability of both incurring costs of financial distress and passing up future positive net present value projects. Thus, firm may rationally decide to reduce these costs by issuing stock now though new equity is not needed immediately to finance real investment, just to obtain financial slack and move the firm down the pecking order. Therefore, when issuing new capital, those costs are very high, but for internal funds, costs can be considered as none. For debt, the costs are in an intermediate position between equity and internal funds. Therefore, firms prefer first internal financing (retained earnings), then debt and they choose equity as a last option.

### 2.2.3. Agency cost theory

Agency theory focused on the costs which are created due to conflicts of interest between shareholders, managers and debt holders. According to Jensen and Meckling (1976), capital structures are determined by agency costs, which includes the costs for both debt and equity issue. The costs related to equity issue may include: the monitoring expenses of the principal (the equity holders), the bonding expenses of the agent (the manager) and reduced welfare for principal due to the divergence of agent's decisions from those which maximize the welfare of the principal.

Besides, debt issue increases the owner-manager's incentive to invest in high-risk projects that yield high returns to the owner-manager but increase the likelihood of failure that the debt holders have to share if it is realized. If debt holders anticipate this, higher premium will be required which in turns increase the costs of debt. Then, the agency costs of debt include the opportunity costs caused by the impact of debt on the investment decisions of the firm; the monitoring and bond expenditures by both the bondholders and the owner-manager; and the costs associated with bankruptcy and reorganization. Since both equity and debt incur agency costs, the optimal debt-equity ratio involves a trade-off between the two types of cost.

Jensen and Meckling (1976) introduced two types of conflicts that are a major source of agency costs and these are: agency costs that arise due to the conflicts of interest between managers and shareholders and agency costs that arise as a result of the conflicts of interest between shareholders and debt holders. The subsequent discussions present shareholders-managers conflicts and shareholder-bondholder conflicts in an orderly manner.

#### 2.2.3.1 Shareholders-manager's conflicts

This kind of conflict stems from the separation of ownership and control. If managers do not own 100% of the firm, they can only capture a fraction of the gain earned from their value enhancement activities but they need to bear the entire costs of these activities. The shareholders-manager's conflicts take several distinct forms:

According to Jensen and Meckling (1976) managers prefer to make use of less effort and have greater perquisite levels, such as luxuriant office and corporate jets, different from the shareholder's interest of firm value maximization. In this case, increasing the managers' equity holdings will help to align the interests of shareholders and managers. Or, keeping manager's equity investment constant, increasing the debt level also helps to mitigate the loss of conflicts between shareholders and managers. Since debt forces managers to pay out cash, reducing the free cash flow managers can waste on the perquisites. According to Masulis(1988) conflict may arise because managers may prefer short-term projects, which produce results early and enhance their reputation quickly, rather than more profitable long-term projects.

According to Harris and Raviv (1991) managers want to stay in their positions, so they wish to minimize the likelihood of employment termination. As this increases with changes in corporate control, management may resist takeovers, irrespective of their effect on shareholder value. On operating decisions, managers and shareholders may also have different preferences: Harris and Raviv (1991) observed that managers will typically wish to continue operating the firm even if liquidation is preferred by shareholders. A special case of the conflicts between shareholders and managers is the over investment problem. Jensen (1986) argued that, instead of working under shareholder's interests to maximize firm's value, managers prefer to increase firm's size to enjoy the benefit of control. In this case, managers have incentives to cause their firm to grow beyond the optimal size and accept negative net present value (NPV) projects. Jensen (1986) argued that the overinvestment problem can be motivated by more free cash flow and less growth opportunities.

Issuing debt helps to mitigate agency problems that arise from managerial behavior under divergent interests between shareholders and managers. For example, the overinvestment problem can be mitigated by issuing debt since debt obligates firm to pay out cash so prevents managers from investing in negative NPV projects. Jensen (1986) refers to the non-discretionary nature of debt as the disciplining role of debt. As Hunsaker (1999) pointed out, an increase in debt also increases the risk of bankruptcy, therefore limits management's consumption of perquisites. Besides, issue convertible debt also helps to discipline managers' behavior because they give managers a chance to share in a firm's profits in case of good performance and thus reduces the monitoring costs.

### 2.2.3.2 Shareholder-bondholder conflicts

The typical phenomenon of these conflicts is that the shareholders or their representatives make decisions transferring wealth from bondholders to shareholders. Certainly, the bondholders are aware of the situations in which this wealth expropriation may occur, therefore, will demand a higher return on their bonds or debts. Different essential sources of equity-holders and debt-holders' conflicts have been identified in the agency cost literature;

The direct wealth-transfer from bondholders to shareholders (Smith and Warner 1979): Shareholders can increase their wealth at the expense of bondholders' interests by increasing the dividend payment; the issuance of debt with higher priority will expropriate wealth from current bondholders.

Asset-substitution is another source of the conflicts (Jensen and Meckling 1976): When signing debt contracts, bondholders demand an interest rate according to the riskiness of the firm's investment activities. While debt contracts give shareholders an incentive to invest in risky projects because if it succeeds the returns above the face value of debt will be owned by shareholders and in case of failure, the consequence is mainly born by bondholders because of shareholders' limited liability.

This excessive return from risky projects makes safe projects less attractive to shareholders since returns from the safe projects are sufficient to pay the bondholders. If bondholders can anticipate shareholder incentive of substituting safe projects by risky projects, they will ask for a higher risk premium. Also the anticipation of wealth expropriation will lead to the increase in risk premium. The increased costs of debt are then born by shareholders since they are residual claimants of the firm.

Underinvestment problem is another agency problem results in shareholder bondholder conflicts Myers (1977): Underinvestment problem mostly incurs in financial distress. The extension of debt decreases the shareholder incentives to invest in new projects (even the projects with high growth opportunities will be passed through) because the profits from these projects will be exhausted in debt repayment.

One way to minimize these conflicts is that firms with high growth opportunities should have lower leverage. The conflicts can also be mitigated by adjusting the properties of the debt contracts, for example, the adjustment can be done by including covenants such as adding limits on the dividends payment or setting restrictions on the disposition of assets. Alternatively, debt can be secured by collateralization of tangible assets in the debt contracts.

## 2.3 Theoretical determinants of bank capital structure

Following from the above theoretical standpoints, a number of empirical studies have identified firm-level characteristics. As a result of these studies, some broad categories of capital structure determinants have emerged. Titman and Wessels (1988), and Harris and Raviv (1991), however, point out that the choice of suitable explanatory variables is potentially debatable. In this study, to identify the determinant factors and which of the capital structure theories is applicable in the Ethiopian Commercial Banking context, the researcher have concentrated on 6(six) key variables as identified in studies by Titman and Wessels (1988) in USA, Ashenafi (2005) in Ethiopia, Buferna et al (2005) in Libya, Rajan and Zingales (2006) in G7 countries, Gropp and Heider (2007) in developed countries, Octavia and Brown (2008) in developing countries, Al-Dohaiman (2008) in Saudi Arabia. The selected six variables are Profitability, Tangibility, Size, Growth, risk of the Firm and liquidity. However, there is significant disagreement among the capital structure theories, in particular, between the trade-off and the pecking order theories about the influence of some factors on the firm's capital structure. In this section, therefore the discussion involves the viewpoints of the capital structure theories about the effect of these attributes on leverage ratio from the view of different prior empirical researches.

**Profitability:**

Capital structure theories have different views on the relationship between leverage and profitability. The trade-off theory argues that firms generally prefer debt for tax considerations. Profitable firms would, therefore, employ more debt because increased leverage would increase the value of their debt tax shield (Myers 1984). In addition to the tax advantage of debt, agency and bankruptcy costs may encourage highly profitable firms to have more debt in their capital structure. This is because highly profitable firms are less likely to be subject to bankruptcy risk because of their increased ability to meet debt repayment obligations. Thus, they will demand

more debt to maximize their tax shield at more attractive costs of debt. For these considerations, the trade-off theory predicts a positive relationship between leverage and profitability. However, the pecking order theory of Myers and Majluf (1984) predicts the opposite. It predicts a negative association between leverage and profitability because high profitable firms will be able to generate more funds through retained earnings and then have less leverage.

**Growth:**

In accordance with pecking order theory, firms with high growth will tend to look to external funds to finance the growth. Myers (1984) confirms this and concludes that firms with a higher proportion of their market value accounted for by growth opportunity will have debt capacity.

**Tangibility:**

Tangibility is an important determinant of the capital structure of a firm. The trade-off theory predicts a positive relation between tangibility and debt levels. As the values of intangible assets fade away (almost entirely) in the cases of bankruptcies, the presence of tangible asset is expected to be important in external borrowing as it is easy to use them as collateral. Tangible assets regularly reduce the costs of financial distress because they have a tendency to have higher liquidation value (Titman and Wessels 1988; Harris and Raviv 1991). Pecking order theory of Myers and Majluf, (1984) conclude that issuing debt secured by property, avoids the costs associated with issuing shares. This suggests that firms with more collateralized assets (fixed assets) will be able to issue more debt at an attractive rate as debt may be more readily available. This results in a positive association between leverage and tangibility.

**Risk**

While agency and bankruptcy costs, there are incentives for the firm not to utilize the tax benefit of debt within the static framework model. Firms with high earnings volatility face a risk of the earnings level dropping below their debt servicing commitments, thereby incurring a higher cost of financial distress. Accordingly, these firms should reduce their leverage level to avoid the risk of bankruptcy. The pecking order theory allows the same prediction. Empirical evidence

suggests that there is a negative relationship between risk and leverage (Titman and Wessels,1988).

**Size**

According to trade-off theory, firm size could be an inverse proxy for the probability of the bankruptcy costs. Larger firms are likely to be more diversified and fail less often. They can lower costs (relative to firm value) in the occasion of bankruptcy. Larger firms are more likely to have higher debt capacity and are expected to borrow more to maximize the tax benefit from debt because of diversification (Titman and Wessels (1988). Therefore, size has a positive effect on leverage. Size can be regarded as a substitute for information asymmetry between managers and outside investors. Large firms are exposed to more news than small firms due to the fact that the investment community would be more concerned with gathering and providing information about large firms. This makes large firms o get more attention by investors, regulatory bodies and analysts and less subject to information asymmetry than small firms. As a result, large firms are more capable of issuing equity which is more sensitive to information asymmetry and have lower debt (Rajan and Zingales, 1995). This suggests that pecking order theory predicts a negative association between leverage and the size of firm.

**Liquidity**

There are two different opinions on the association between liquidity and capital structure: First view implies a positive significant relation that is consistent with trade off theory. Companies with more liquidity (more current assets) tend to use more external borrowing, because of their ability in paying off their liabilities. Second view points to a negative significant relation that is consistent with the pecking order theory, arguing that companies with more liquidity will decrease external financing, relying on their internal funds. Thus, liquidity ratios may have a mixed effect on the capital structure decisions. Most of the previous studies, confirm the negative relation, (Ahmed et al., 2010, and Najjar and Petrov 2011).

## 2.4. Empirical studies on the determinants of capital structure

Empirical studies serve for testing whether the attributes suggested by the various theories are able to explain the capital structure employed by firms or not. The attributes implied by the related literature are profitability, growth, non-debt tax shields, size, tangibility, volatility (or risk), liquidity, and uniqueness. This section will give the theoretical relevancy and empirical evidence for determinant of capital structure.

Since the pioneering work of Modigliani and Miller (1958), the question of what determines firms' choices of capital structure has been a major field in the corporate finance literature. Then after, several studies have been conducted in developed and developing countries to identify those factors that have an effect on firms' choice of capital structure. Given the time constraint and the amount of empirical literature available on the topic of this research it would have been quite difficult to present the results of all the studies. Thus, the review of the empirical studies in this section on the determinants of capital structure decision has a particular focus on those that have been conducted since the 1988s.

Titman and Wessels (1988) studied the determinants of capital structure choice of manufacturing firms in the U.S. They have extended empirical work on capital structure theories in 3 different ways. 1$^{st}$ they have tried to look a much wide set of capital structure theories, many of which have not previously been analyzed empirically. 2$^{nd}$, since the theories have different empirical implications in regard to different types of debt instruments, the authors analyzed measures of short-term, long-term, and convertible debt rather than an aggregate measure of total debt. Finally, they used a factor-analytic method that may avoid the measurement problems encountered when working with proxy variables. Titman and Wessels (1988) specifically tested how asset structure, non-debt tax shields, growth, uniqueness, industry classification, firm size, earnings volatility and profitability can affect the firm's debt-equity choice. Their results indicated that debt levels are negatively related to the uniqueness of a firm's line of business. The short-term debt ratio was negatively related to firm size. Besides that, a strong negative relationship was noted between debt ratios and past profitability which is consistence with pecking order theory.

Myers and Majluf (1984) however, did not provide strong empirical support on variables like non-debt tax shields, volatility, collateral value and future growth.

In a comparative study, Rajan and Zingles (1995) investigate whether the capital structure in other developed countries is associated to factors similar to those influencing the US companies for the period of 1987-1991. Firm size, tangible assets, market to book ratio, and profitability are suggested as determinants of capital structure in these countries. Rajan and Zingles (1995) find that firms with more collateralized assets are not highly levered. In addition, they have also found that market to book ratio and profitability are negatively related to leverage. However, Rajan and Zingles (1995) argue that the negative relationship with leverage appeared to be initiated by firms with high market to book ratio rather than by firms with low market to book ratio. The study provides no evidence supporting the effect of the firm size on leverage. Finally, the findings were not varied across the G-7 countries so they concluded that capital structure in other countries was affected by factors similar to those that influence the US companies. Booth et al. (2001) assessed whether capital structure theory is portable across developing countries with different institutional structures. The sample firms in their study are from Malaysia, Zimbabwe, Mexico, Brazil, Turkey, Jordan, India, Pakistan, Thailand and Korea.

Booth et al. (2001) used 3 measure of debt ratio; long-term book debt ratio, total debt ratio, and long-term market debt ratio with average tax rate, assets tangibility, business risk, size, profitability, and the market to book ratio as explanatory variables. The study showed that the more profitable the firm, the lower the debt ratio, regardless of how the debt ratio was defined. It also showed that the more the tangible assets, the higher the long-term debt ratio but the smaller the total debt ratio. Booth et al. (2001) concluded that the debt ratio in developing countries seemed to be affected in the same way by the same types of variables that were significant in developed countries. However, they pointed out that the long-term debt ratios of those countries are considerably lower than those of developed countries. This finding may indicate that the agency costs of debt are significantly large in under developed countries or markets for long term outstanding debt are not effectively performing in these countries. Finally, Booth et al. (2001) argued that their results are in line with Rajan and Zingales (1995) except for the tax and the market-to-book ratio.

Bevan and Danbolt (2002) who extended the work of Rajan and Zingales (1995) tested the determinants of capital structure in the United Kingdom non-financial firms by using four measures of financial leverage. They used non-equity liabilities to total assets, total debt to total assets, total debt to capital (where capital is defined as total debt plus common shares with preferred shares), and adjusted debt to adjusted capital. All the measures were regressed on market-to-book value, natural logarithm of sales (size), profitability, and tangibility of assets. They found that determinants of capital structure were significantly changed with respect to each measure of debt used. With the same leverage definition as Rajan and Zingales, Bevan and Danbolt (2002) reported similar results.

In another study, Bevan and Danbolt (2004) analyzed the determinants of capital structure of one thousand fifty four United Kingdom's Companies from the period 1991-1997. Secondly, they also investigated the extent to which the influence of these determinants is affected by time invariant and firm specific heterogeneity. Bevan and Danbolt (2004) as Bevan and Danbolt (2002) use market-to book value, natural logarithm of sales (size), profitability, and tangibility of assets as determinants of capital structure. In addition to the time invariant and firm specific heterogeneity, the focus was on the variety of long - run and short run debts components rather than on the aggregate measures. They found that large firms use long and short term debt more than small ones. Tangibility is found to be positively related to both short and long-term debt, while profitability is found to be negatively related. However, they find that profitable firms tend to use short-term debt more than less profitable one.

The paper of Deesomsak et al. (2004) investigated the determinants of capital structure of firms operating in the Asia Pacific region, in four countries with different legal, financial and institutional environments, namely Thailand, Malaysia, Singapore and Australia. In their study, ordinary least square estimation model was used to analyze sample data included two hundred ninety four Thailand, six hundred sixty nine Malaysian, 345 Singaporean, and two hundred nineteen Australian firms for the period 1993-2001. Overall they found leverage to be positively related to firm size and growth opportunities, non-debt tax shields, liquidity to be negatively related to leverage. Moreover, they also found that capital structure decision is not only the product of the firm's own characteristics but is also affected by the specific corporate governance, legal structure and institutional environment of the countries.

The study of Huang and Song (2009) employed regression model to document the determinants of capital structure of Chinese listed companies. The data included market and accounting figures of more than one thousand two hundred companies for the time period 1994-2003 G.C. Huang and Song (2009) find that leverage (long-term debt ratio, total debt ratio, and total liability ratio) decreases with profitability, non-debt tax shield and managerial shareholdings, while it increases with firm size and tangibility. Additionally, the tax rate positively affects long-term debt ratio and total debt ratio. Furthermore, they find a negative relationship between leverage and firm growth opportunities.

Buferna et al. (2005) carried further evidence of the capital structure theories pertaining to a developing country and examined the impact of lack of a secondary capital market by analyzing a capital structure question with reference to the Libyan business environment. They developed four explanatory variables that represent profitability, growth, tangibility and size to test which capital structure theories best explained Libyan companies' capital structure. The results of cross-sectional Ordinary least square regression showed 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. 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 study carried by Amidu (2007) examined what determine capital structure of Ghanaian banks by employing panel regression model. Amidu (2007) has highlighted the importance of distinguishing between long and short forms of debt while he made inferences about capital structure. Amidu (2007) specifically tested the significance of bank size, profitability, corporate tax, growth, asset structure, and risk in determining bank capital structure. The result showed that short-term debt of banks is negatively related to banks profitability, risk, and asset structure and positively related to bank size, growth and corporate tax. In contrast, the long-term debt of the banks is positively related to banks' asset structure and profitability and inversely related to bank risk, growth, size and corporate tax. Generally, the variables examined were consistent with the static trade-off and pecking order arguments, with the only exception being risk.

Gropp and Heider (2009) approached the issue from a different perspective. Using a sample of banks from developed countries, they specifically tested the significance of size, profitability, market-to-book ratio, asset tangibility, and dividend paying status in determining bank leverage. In the process, they made a stark distinction between bank book and market leverage as well as controlled for asset risk and macroeconomic factors. They further examined whether asset risk captures the effect of risk adjustments on the minimum capital required or it rather represents factors pertaining to the standard capital structure theories. Overall, their results provided strong support for the relevance of standard determinants of capital structure on bank capital.

Caglayan and Sak (2010) studied the determinants of capital structure of banks in Turkey. The objective of the study was to examine the relationship between the leverage level and a set of explanatory variables (Tangibility, Size, Profitability, and Market to book ratio) by using panel data analysis to establish the determinants of capital structure of bank over the period 1992-2007. The main results of their study reveal that size and market to book ratio have positive and statistically significant impact on the book leverage while the variables of tangibility and profitability have negative and significant impacts on the book leverage. These findings strongly confirm the pecking order theory; except the relationship with tangibility which weakly confirms the agency cost theory. Khrawish and Khraiwesh (2010) examined the determinants of capital structure; evidence from Jordanian industrials companies over the period (2001- 2005) using panel data, Leverage ratio, Long-term debts/total Debts and five explanatory variables that represent size, tangibility, profitability, long-term debt and short-term debt were calculated. Based on the statistical analysis, they found that there was a significant positive relationship between leverage ratio and size, tangibility, long-term debt and short-term debt and there was a significant negative relationship between leverage ratio and Profitability of the firm.

Ahmed et al., (2010) investigated the effect of firm level characteristics on capital structure of life insurance companies of Pakistan over the period of seven years from 2001 to 2007. For this purpose, leverage was taken as dependent variable while profitability, size, growth, age, risk, tangibility of assets and liquidity were selected as independent variables. The result of Ordinary least square regression model indicated that profitability, liquidity, risk and age have negative relationship with leverage which follows pecking order theory while size indicated positive relationship with leverage which shows consistency with trade- off theory. The results also

indicated that leverage has statistically insignificant relationship with growth and tangibility of assets.

Gurcharan (2010) analyzed the determinants of capital structure in four countries of the Asian members, namely Malaysia, Indonesia, Philippine and Thailand, for the period from 2003 to 2007 with a sample of one hundred fifty five main listed companies from four selected Asian stock exchange index-links. Based on the empirical result, he found that profitability and growth opportunities for all selected Asian countries reveal statistical significant with inverse relationship with leverage. Whereas non-debt tax shield has significant negative impact on leverage mainly for Philippines and Malaysia index link companies only. The study shows size of firm has a positive significant relationship for Indonesia and index link companies. Also he found that stock market capitalization, gross domestic product, country-effect factors and growth rate show significant relationship with leverage while bank size and inflation indicate insignificant impacts on leverage.

Najjar and Petrov (2011) studied capital Structure of insurance companies in Bahrain. The goal of the study was to investigate the effect of specific firm characteristics on capital structure. They used panel data derived from annual reports and financial statements of five insurance companies listed on the Bahrain Stock Exchange for the period of 2005-2009 and apply multiple linear regression analysis using SPSS to identify those effects. Najjar and Petrov identified a strong relationship between firm characteristics, such as tangibility of assets, profitability, firm size, revenue growth, and liquidity. The results of their study reveal that tangibility and size shows a positive significant relationship with the debt ratio which confirms the static trade off theory while liquidity shows negative significant relationship with debt ratio which confirms the pecking order theory. But, profitability and revenue growth are not statistically significant and require further research.

Then beyond, the paper of Olayinka (2011) examined the determinants of capital structure of sixty six firms listed on the Nigerian stock Exchange during the period 1999-2007 using panel data. He used six independent variables namely; sales growth, tangibility, profitability, liquidity, size and business environment and leverage as dependent variable. The ordinary least square results of the study by Olayinka (2011) showed that there is a negative relationship between

leverage and growth opportunities which is consistent with the prediction of the tradeoff theory. In the same way, leverage is negatively related with tangibility and profitability which is consistent with the predictions of pecking order theory but positively related to liquidity as well as size which is consistent with trade-off theory. In general, as per Olayinka, three of the variables are not significant determinants of capital structure.

However, most of the studies are made with reference to developed countries, which means they are not explained the issues for emerging market specifically for Ethiopian case. So, it is difficult to make generalization for the developing economy (like Ethiopia) from the result of developed economy without making any research. Furthermore, the financial sector of Ethiopian economy is dominated by the banks, which has its own features, such as the banking regulation did not allow foreign nationals or organization fully or partially to acquire share of Ethiopian banks, there is no secondary market, etc. In light of these, the study has examined the determinants of capital structure of commercial banks in Ethiopia. In our country Ethiopia, there were some studies on determinants of capital structure. These studies include Ashenafi (2005), Amanuel (2011) and Bayeh (2011). Ashenafi (2005) approached the question of capital structure using data from medium firms in Ethiopia. Ashenafi (2005) has used seven independent variables, these are; non-debt tax shield, economic risk, profitability, age of firms, size of firms, tangibility and growth and leverage as a dependent variable. The results showed that non-debt tax shield, economic risk, profitability, growth, tangibility, and age showed a negative coefficient of correlation with debt to equity ratio.

Amanuel (2011) studied determinants of capital structure of manufacturing share companies in Addis Ababa, Ethiopia for the period over 2003-2010. The objective of the study was to examine the relevance of theoretical internal factors determine capital structure of manufacturing share companies in Addis Ababa, Ethiopia. He used seven explanatory variables: tangibility, non-tax shield, growth, earning volatility, profitability, age and size, and three dependent variables: total debt ratio, short term ratio and long term ratio to establish the determinants of capital structure of manufacturing companies in Ethiopia. In relation to this, samples of twelve companies were taken and secondary data was collected from audited financial statement of the selected companies. The results of Ordinary least square regression by Amanuel (2010) showed that tangibility, non-debt tax shields, earning volatility, profitability, and size of the firm variables are

the significant determinants of capital structure of Addis Ababa manufacturing share companies at least for one of the model out of the three models employed in the study. In contrast, there is no statistically proved relations obtained for the variables growth of the firm and age of the firm in any of the capital structure models.

Bayeh (2011) investigated empirically the determinants of capital structure of insurance industry in Ethiopia. In connection to this, nine insurance companies were included in the sample for the period over 2004 - 2010. Bayeh (2011) also used 7 explanatory variables: liquidity, tangibility, growth, business risk, profitability, age and size, and three dependent variables: total debt to equity ratio, total debt ratio and long term ratio to test the determinants of capital structure of insurance companies in Ethiopia. The ordinary least square result showed that profitability, growth and age of the firm were found to have considerable influence on capital structure of Ethiopian insurance companies. But, tangibility and size of the firm were found to have insignificant influence on capital structure of Ethiopian insurance companies.

## 2.5. Conclusion and knowledge gap

This chapter reviewed the literature on determinants of capital structure decision, starting with the famous irrelevance theory of Modigliani and Miller (1958). However, by comforting the theory of Modigliani and Miller's (1958) assumptions of perfect capital markets, several theoretical frameworks have been developed to explain the firm's capital structure such as static trade-off theory, pecking order theory, and agency theory. Static trade off-theory assumes that a firm's optimal debt ratio is determined by a tradeoff between the bankruptcy cost and tax advantage of borrowing, holding the firm's assets and investment plans constant. Whereas, pecking order theory is another dimension of the capital structure theories. According to this theory capital structure is driven by firm's desire to finance new investments, first internally, then with low-risk debt, and finally if all fails with equity. Therefore, firms prefer internal financing to external financing. Agency theory focuses on the costs which are created due to conflicts of interest between shareholders, managers and debt holders. According to this theory capital structures are determined by agency costs, which includes the costs for both debt and equity issue. This shows that theories of capital structure have been resulting in different conclusions.

On the same way, the findings of prior empirical studies have provided varying evidence related to the determinants of capital structure. For instance, Caglayan and Sak (2010) have studied the determinants of capital structure of banks in Turkey and provided evidence that pecking order theory is pertinent theory to Turkish banks. Besides, Buferna et al. (2005) provided evidence that trade-off theory and agency are pertinent theories of the capital structure to a developing country. On the other hand, Amidu (2007) on Ghanaian banks supports the static trade-off and pecking order argument. On the other hand, in the context of our country Ethiopia as to the awareness of the researcher there is no study conducted on the capital structure of the banking industry. In addition, most empirical work on capital structure has predominantly relied on quantitative analysis of secondary data to examine the determinants of capital structure. Therefore, this study will narrow the gap by examining the determinants of capital structure in the context of Ethiopian banking industry by collecting data related with firm specific determinants.

## 2.6. Conceptual framework

A conceptual framework is a structure which the researcher believes can best explain the natural progression of the phenomenon to be studied (Camp, 2001). It is linked with the concepts, empirical research and important theories used in promoting and systemizing the knowledge espoused by the researcher (Peshkin, 1993). It is the researcher's explanation of how the research problem would be explored. The conceptual framework presents an integrated way of looking at a problem under study (Liehr & Smith, 1999). In a statistical perspective, the conceptual framework describes the relationship between the main concepts of a study. It is arranged in a logical structure to aid provide a picture or visual display of how ideas in a study relate to one another (Grant & Osanloo, 2014). The framework makes it easier for the researcher to easily specify and define the concepts within the problem of the study (Luse, Mennecke & Townsend, 2012). Miles and Huberman (1994, p.18) opine that conceptual frameworks can be 'graphical or in a narrative form showing the key variables or constructs to be studied and the presumed relationships between them.

Based on the literature review and the problem on hand the researcher has developed the following relationship among leverage and independent variables.

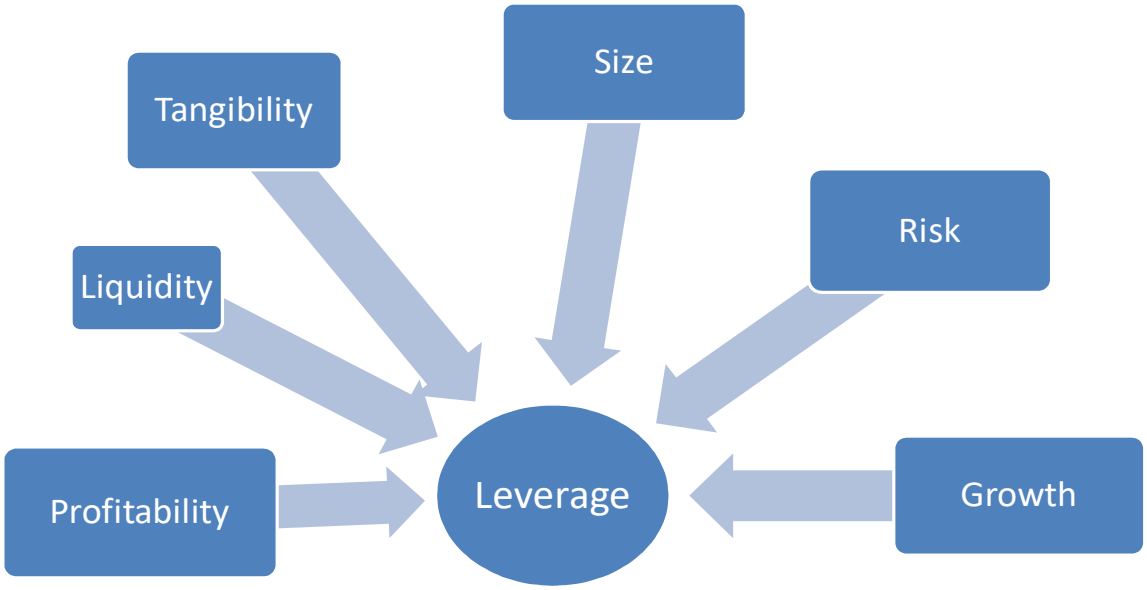



Figure 2.2. Conceptual frame work

# CHAPTER THREE

# RESEARCH DESIGN AND METHODOLOGY

## 3. Introduction

This section presents the research design and methodology that is employed to achieve the objective of the research work. As the study employs a quantitative approach it begins with the Quantitative research approach, research design, data type and source, population and sample design, goes on describing the econometric model and its specifications, operational definitions and measurements of the variables are dealt.

## 3.1. Research Approach

Considering the research problem and objective along with the philosophy of the different research approaches, quantitative research approach was found to be appropriate for this study. The quantitative method was mainly used to collect data to know what determines capital structure in commercial banks of Ethiopia and which theory mostly determine the financing of banks in Ethiopia.

### 3.2 Explanatory Research Design

After reviewing and summarizing prior studies' findings pertaining to capital structure of financial firms especially in insurance industry, the research design that is highly considered to investigate the determinants which are peculiar to banking industry should be employed. In order to understand the determinants of capital structure of banks better in this study, the researcher employs explanatory research design. To accomplish this task, explanatory research design which focuses on explaining the aspects of the study in a detailed manner was used. Explanatory research has been quantitative in nature and has typically tested prior hypotheses by measuring relationships between variables; the data are analyzed using statistical techniques. Therefore, by taking in to consideration the research questions, explanatory research design is selected to carry out this research. The design helps to identify the relationships among dependant and independent variables and also relationships among independent variables.

## 3.3 Type and Source of Data

To address the research objectives a panel data is considered to be the most appropriate. A panel data is the combination of cross-sectional and time series data. A panel data approach is more useful than either cross-section or time-series data alone. According to Baltagi (2005) there are many benefits of using panel data among these: controlling for individual heterogeneity; gives more useful data, more variability, less collinearity among the variables, more degrees of freedom and more efficiency. While time-series is plagued with multicollinearity; Panel data has the ability to identify and measure effects that are simply not noticeable in pure cross-section or pure time-series data; Panel data are usually gathered on micro units, like individuals, firms and households. Many variables can be more accurately measured at the macro level, and biases resulting from aggregation over firms or individuals are eliminated.

The study is designed to examine the determinants of capital structure of commercial banks in Ethiopia. To achieve the objective of the study the researcher employed secondary data. The secondary data for this study is to be secured from various sources. The major data that is used in the empirical analysis is retrieved from audited financial statements of selected banks and National bank of Ethiopia.

## 3.4. Population

A research population is generally a large collection of individuals or objects that is the main focus of a scientific query. It is for the benefit of the population that researches are done. All individuals or objects within a certain population usually have a common, binding characteristic or trait. Therefore, the population of the study was eighteen commercial banks registered by NBE. Currently as per NBE, (2018/19) annual report, eighteen banks are operating in Ethiopia.

## 3.5. Sampling design

Purposive sampling technique was used to select nine banks among eighteen commercial banks currently working in Ethiopia, considering that these banks have adequate data during the study periods. Consequently, the study period for the model was between (2011to2019) taken from nine commercial banks. Namely; Dashen Bank, Awash International Bank, Nib International Bank, commercial bank of Ethiopia, Bank of Abyssinia, Wegagen Bank, Zemen Bank, United

Bank and Cooperative Bank of Oromia. Though the period of establishment for these selected banks varies, they all have well documented and convenient data for analysis for the study periods. The researcher believes that the data collected from those banks shall indicate how the remaining banks get their capital financing because they all are operating in the similar industry.

## 3.6. Data analysis method

Data collected through document review from financial statements were analyzed statistically using both descriptive and inferential statistics. Descriptive statistics of the variables and different percentiles of the dependent variable were calculated over the sample period. Correlation matrix was also used to identify the relationship of independent variables among them and with dependent variable. Then, using statistical package 'STATA', t-statistic and GLS (generalized least squares) multiple regressions were carried out to test the association between leverage and their possible determinants. In addition multiple regressions also used to determine the most significant and influential explanatory variables affecting the capital structure of banks in Ethiopia.

### 3.7. Econometric Model and Specification

#### 3.7.1. Econometric Model

In this study a panel regression model is employed. In line with the previous determinants of capital structure of banking literature and other industries, the study employs panel data multiple regression model to investigate the relationship between the explanatory variables and leverage. Panel data can also control for individual heterogeneity due to hidden factors, which, if neglected in time series or cross-section estimations leads to biased results (Baltagi, 2005). The panel regression equation differs from a regular time-series or cross-section regression by the double subscript attached to each variable. This study examines the determinants of the capital structure of sampled Ethiopian commercial banks overtime using the following multiple regression model: The general form of the model can be specified as: $\mathbf{Yit=\alpha+\beta Xit+\mu it}$ with the subscript i denoting the cross-sectional dimension and t representing the time-series dimension. The left hand variable, Yit, represents the dependent variable in the model, which is the firm's leverage

measured as debt to asset ratio. Xit contains the set of explanatory variables in the estimation model, α is the constant and βi represents the coefficients. The empirical model is given as:

$$LEV_{it} = \beta_0 + \beta_1(PR_{it}) + \beta_2(TA_{it}) + \beta_3(GR_{it}) + \beta_4(RS_{it}) + \beta_5(SZ_{it}) + \beta_6(LQ_{it}) + \varepsilon$$

Where;

LVit= debt asset ratio (Total debt /Total Asset) for Banks i in time t

PRit = earnings before interest and taxes / total assets for Banks i in time t

TAit = fixed asset of banks (Fixed Asset/Total Asset) for Banks i in time t

GRit = growth rate in total asset for Banks i in time t

RSit = (EBIT current year-EBIT previous year)/EBIT previous year for Banks i in time t

SZit = the size of the firm (log of total assets) for Banks i in time t

LQit = (Liquid assets/Total Deposits) for Banks i in time t

eit = the error term

### 3.7.1.1 Dependent Variable (Leverage)

Various measures of capital structure have been considered in the literature, however most studies use a measure of leverage that is a measure of the indebtedness of firms. There is no consensus on what measure of leverage should be used. A number of studies consider debt ratio as a measure of leverage (Shyam-Sunder and Myers (1999), Fama and French (2002) and Frank and Goyal (2003). In the previous studies such as Rajan and Zingales (1995), and Ashenafi (2005), also used leverage as a dependent variable.

### 3.7.1.2. Measurements of Banks Capital Structure

There is no single measurement that can be used as a proxy for capital structure. Researchers agree that measures of capital structure should vary depending on the purpose of analysis. However, most studies including the current study used total debt ratio (TDR) to measure leverage level of a firm (Sheikh & Qureshi, 2017; Sritharan, 2014; AL Mutairi & Naser, 2015; Güner, 2016; Proença et al., 2014; Neves et al., 2019). The total debt ratio is the ratio of total liabilities (current and non-current) to total assets (Handoo & Sharma, 2014; Cevheroglu acar, 2018). In this research, book leverage is used rather than the market value leverage. Therefore

the researcher considered one measure of leverage which is Debt to Total asset Ratio. Debt to Asset ratio is, therefore given by:

Debt to Asset ratio =Total Debt / Total Asset

### 3.7.1.3. Independent Variables

I. Profitability

Profitability is a measure of earning power of a firm. The earning power of a firm is the basic concern of its shareholders. Profitability is measured in several accepted ways. (Eldomiaty & Ismail, 2009) use the ratio of operating income to total assets to measure profitability. This research also uses this to be an appropriate measure of profitability.

Profitability =Ratio of EBIT/ total asset

II. Tangibility

Collateral values of assets, also known as Asset Composition, are those assets that creditors can accept as security for issuing the debt. The tangibility of assets represents the effect of the collateral value of assets of a firm's gearing level. Tangibility is then defined as the ratio of tangible (fixed) assets to total assets.

Tangibility =fixed asset /Total Assets

III. Size

Size is the measure of how large the firm's operational capacity is. Various studies have used a number of measures to capture the size of firms. Titman and Wessels (1988) and Benito (2003) use the log of total assets to measure size. Similarly, this study also finds that the log of total assets to be an appropriate measure of size.

Size = Natural Logarithm of total assets = LN (Total Assets)

IV. Growth

Different studies have used varying measures of growth (investment opportunities). Titman and Wessels (1988, used annual percentage increase in total assets as a measure of growth. This study measures growth as a percentage increase in total assets of the commercial banks every year.

Growth = TA current year- TA previous year/TA current year

V. Liquidity

The degree to which an asset or security can be quickly bought or sold in the market without affecting the asset's price. Liquidity= Liquid asset /Total Deposit

VI. Risk

Risk was considered to be one of the key factors that can affect the capital structure of banks in Ethiopia. The researcher has used operating income for this study to measure risk which is calculated as the volatility of operating income throughout the selected sample period.

Risk=EBIT current year-EBIT previous year/ EBIT previous year

### 3.7.2.Validity

Validity explains how well the collected data covers the actual area of investigation (Ghauri and Gronhaug, 2005). Validity basically means a measure what is intended to be measured (Field, 2005). If research has high validity, which means it produces results that correspond to real properties, characteristics, and variations in the physical or social world.

### 3.7.3. Reliability

Reliability is defined as the probability that a product, system, or service will perform its intended function adequately for a specified period of time, or will operate in a defined environment without failure. As clearly indicated in the data analysis section, correlation coefficient can be used to assess the degree of reliability. If a test is reliable it should show a high positive correlation (Ohba, M. (1984).

### 3.7.4. Ethical consideration Research

Ethics involve requirements on daily work, the protection of dignity of subjects and the publication of the information in the research. Which are, informed consent, do not harm, respecting confidentiality and privacy. The study has gone deep to ensure certain beliefs about the nature of the study could not intentionally or unintentionally manipulate the outcome of the study in a way that favor the expected outcomes. The researcher has assured about the intention, objective & ethical considerations of the study. This has enabled the outcomes of the study could not get biased through the insertion of researcher's assertions for expected outcomes. Therefore, the researcher has made the study understood this aspect and go deep to manage it so that his expectations should not guide the study findings.

# CHAPTER FOUR

# RESULTS AND ANALYSIS

The preceding chapters presented the orientation of the study, literature review and the research methodology adopted in the study. This chapter presents the research questions/ hypotheses, results and analysis of data from documentary analysis. The first section 4.1 presents research hypotheses and questions as presented in the previous chapter. This is followed by the results of documentary analyses (structured review of documents) in section 4.2. Section 4.3 discusses the results of the study.

## 4.1. Research hypotheses and questions

As stated in the previous chapter this study was intended to examine the connection among firm specific (profitability, tangibility, growth, risk, size and liquidity) determinants of capital structure decision and to understand about theories of capital structure that can clarify the capital structure of banks in Ethiopia. In addition, as noted previously, in order to achieve this broad objective, the study developed the following hypotheses and research questions.

HP 1: There is a negative relationship between leverage ratios and profitability.
HP 2: There is a positive relationship between leverage ratios and growth.
HP 3: There is a positive relationship between leverage ratios and tangibility.
HP 4: There is a negative relationship between leverage ratios and risk.
HP 5: There is a positive relationship between leverage ratios and size.
HP 6: There is a negative relationship between leverage ratios and liquidity.
The research questions were
RQ1. What determine the capital structure of banks in Ethiopia?
RQ2. Which theory explains the financing behavior adopted by Ethiopian banking industry?

## 4.2. Results

This section discusses the results of the structured review of financial statements and other useful documentary data sources.

### 4.2.1. Documentary analysis (structured review of financial records)

Documentary analysis was mainly used for this study, to investigate the determinants of capital structure of banks in Ethiopia. To this end, the data which were essential to undertake the study was collected from the financial statements of nine banks and National bank of Ethiopia for nine consecutive years (2011-2019). Income statement and balance sheet were mainly used to analyze the determinants of capital structure of Ethiopian selected commercial banks under the study. Based on the above data source, the following discussions present the results of the documentary analysis. Accordingly, the result of descriptive statistics, correlation analysis, the test of classical linear regression model assumption and result of the regression analysis are presented in the following sub-sections.

#### 4.2.1.1. Descriptive statistics

The study examined the determinants of capital structure for nine banks over the time period from 2011-2019. The descriptive statistics of the dependent and explanatory variables for the selected commercial banks were summarized under table 4.1 below. The total observation for each dependent and explanatory variable of the study was 81, which is nine years data of nine selected commercial banks of Ethiopia under the study. Furthermore, the table also shows the mean, standard deviation, minimum and maximum values for the dependent and independent variables.

The mean leverage (total debt to total asset) of commercial banks under the study was 83 percent with the standard deviation of 17 percent. This means that, out of 100 percent financing, 83 percent of the banks in Ethiopia were financed by debts. This is due to huge amount of customer deposit. Leverage for the sample period was ranged from 45 percent to 100 percent with a standard deviation of 17 percent.

Profitable firms are strong enough to face financial distress and stronger to continue operation very easily in the future. Profitability, given as the ratio of pre-tax profits plus interest expense to total assets, registered a mean value of 4.1 percent indicating a return on assets of 4.1 percent, with a standard deviation of 4.8 percent and profitability for the sample was ranged from 2

percent to 45 percent. This shows the existence of great variation in profit among banks in Ethiopia.

Growth was measured as the annual percentage change in total asset and this shows a mean of 26.3 percent. This shows that, on average, during the nine years period bank's growth rate was 26.3 percent and total asset growth for the sample period were ranged from 38 percent to 160 percent with standard deviation of 19.9 percent. As it is indicated in table 4.1 below, there is huge variation in growth rate among Ethiopian commercial banks. Tangibility, measured by fixed asset to total asset shows that on average, 9.1 percent of the firms' assets were fixed during the study period. This indicates that the remaining amount is categorized as current asset. The fixed assets to total asset for the sample were ranged from 0.0 percent to 86.7 percent with standard deviation of 18 percent. On the other hand the firm's risk which is presented by the standard deviation of operating income or volatility of earning has the mean value of - 0.72 percent and a standard deviation of 1.61. This indicates that Commercial banks under the study have varying risk appetite in adopting risk; the study indicates risk, which was ranged between -14.4 to 87 percent.

**Table 4.1: Summary of descriptive statistics for dependent and independent variable**

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Leverage | 81 | .83 | .17 | .45 | 1.06 |
| RISK | 81 | -.072 | 1.61 | -14.04 | .87 |
| Profitability | 81 | .041 | .048 | -.002 | .45 |
| SIZE | 81 | 9.88 | 1.30 | 7.34 | 13.41 |
| Liquidity | 81 | 28.42 | 14.65 | 5.92 | 70.65 |
| Growth | 81 | .263 | .199 | -.38 | 1.60 |
| Tangibility | 81 | .091 | .18 | .0000 | .867 |

Source: review of financial statements, 2021

The mean of the firms' size which was represented by the natural logarithm of total assets was 9.88 with a standard deviation of 1.30. Natural logarithms of total assets for the sample were ranged from 7.34 to 13.41. Besides, summary of test statistic shows that the mean of liquidity was 28.42 percent with the standard deviation of 14.65 percent. This reveals as there was high

variation in liquidity among selected Ethiopian banks. Beside, for the study sample liquidity was ranged in between 5 percent to 70.65 percent.

### 4.2.1.2. Correlation analysis

Table 4.2, shows the relationship between the explanatory variable and leverage in this study. As noted in Brooks (2008), correlation between two variables measures the degree of linear connection between them. To find the association of the independent variables with the leverage, Pearson product moment of correlation coefficient was used. Values of the correlation coefficient are always ranged between positive one and negative one. A correlation coefficient of positive one indicates that a perfect positive association between the two variables; while a correlation coefficient of negative one indicates that a perfect negative association between the two variables. A correlation coefficient of zero, on the other hand, indicates that there is no linear relationship between the two variables.

The correlation matrix in Table 4.2 shows that leverage (dependent variable) was negatively correlated with profitability, growth, tangibility, risk of the firm. Which indicates that firm with higher leverage have less profitability, growth, tangibility and risk. However, size and liquidity has positive correlation with leverage. The result also shows that leverage was correlated at 0.28 with size and had statistically significant correlation. Similarly, leverage was correlated at 0.27 with liquidity and had statistically significant correlation. Besides, leverage was correlated at -0.08, and -0.27, with risk and profitability. Growth and tangibility respectively had statistically significant correlation.

**Table 4.2: Correlation (Pearson) matrix**

| | Leverage | Risk | Profitability | Size | Liquidity | Growth | Tangibility |
|---|---|---|---|---|---|---|---|
| Leverage | 1.00 | | | | | | |
| RISK | -0.08 | 1.00 | | | | | |
| Profitability | -0.27 | 0.04 | 1.00 | | | | |
| SIZE | 0.28 | -0.00 | -0.16 | 1.00 | | | |
| Liquidity | 0.27 | 0.02 | 0.11 | -0.50 | 1.00 | | |
| Growth | -0.43 | 0.03 | 0.08 | 0.09 | -0.20 | 1.00 | |
| Tangibility | -0.83 | 0.03 | 0.10 | -0.22 | -0.34 | 0.22 | 1.00 |

Source: review of financial statements, 2021

### 4.2.3. Classical Linear Regression Model (CLRM) Assumptions Tests

Different tests were run to make the data ready for analysis and to get reliable output from the research. These tests were estimated to check whether the classical linear regression model assumptions, are fulfilled when the explanatory variables are regressed against the dependent variables. Accordingly, the following sub-section presents tests of classical linear regression model of the study.

**Test of Normality**

One assumption of classical linear regression model (CLRM) is the normal distribution of the residual part of the model. As noted by Gujarati (2004), ordinary least square estimators are BLUE regardless of whether the ui are normally distributed or not. If the disturbances (ui) are independently and identically distributed with zero mean and constant variance and if the explanatory variables are constant in repeated samples, the ordinary least square coefficient estimators are asymptotically normally distributed with means equal to the corresponding β's.

However, as per the central limit theorem, if the disturbances are not normally distributed, the ordinary least square estimators are still normally distributed approximately if there are large-sample data. Thus, since the sample size for this study is large enough, it is approximately considered as normally distributed. This implies that residuals are asymptotically normal in this study.

**Test of multicollinearity**

To check the possible existence degree of multicollinearity among the explanatory variables, correlation matrixes of the selected explanatory variables were presented in table 4.3. Usually the multicollinearity exists if the correlation between two independent variables is more than 0.75 (Malhotra, 2007). As it is clearly indicated in the correlation matrix table 4.3, there is no such high correlation between the explanatory variables. As a result, there is no problem of multicollinearity in this study. This means that, all the independent variables are almost free from the problem of multicollinearity.

**Table 4.3: Correlation matrix between explanatory variables**

| | Risk | Profitability | SIZE | Liquidity | Growth | Tangibility |
|---|---|---|---|---|---|---|
| Risk | 1.0000 | | | | | |
| Profitability | 0.0392 | 1.0000 | | | | |
| SIZE | -0.0026 | -0.1618 | 1.0000 | | | |
| Liquidity | 0.0214 | 0.1090 | -0.4980 | 1.0000 | | |
| Growth | 0.0310 | 0.0762 | 0.0898 | -0.1981 | 1.0000 | |
| Tangibility | 0.0325 | 0.1049 | -0.2204 | -0.3458 | 0.2181 | 1.0000 |

Source: review of financial statements2021

**Test of Heteroscedasticity**

In the classical linear regression model, one of the basic assumptions is Homoskedasticity assumption that states as the probability distribution of the disturbance term remains same for all observations. That is the variance of each ui is the same for all values of the explanatory variable. However, if the disturbance terms do not have the same variance, this condition of non-constant variance or non-homogeneity of variance is known as heteroscedasticity (Bedru and Seid, 2005).

Accordingly, in order to detect the heteroscedasticity problems, White's test was utilized in this study. This test states that if the p-value is significant at 95 confidence interval, the data has heteroscedasticity problem, whereas if the value is insignificant (greater than 0.05), the data has no heteroscedasticity problem. Thus, as shown in table 4.4, there is no heteroscedasticity problem for this study hence the p value is 12.8% showing insignificant value. This is calculated by a command imtest, white.

**Table 4.4: Heteroscedasticity Test: White test**

| White'stest for Ho:homoskedasticity |
|---|
| against Ha:unrestricted heteroskedasticity |
| chi2(27)= 43.60 |
| Prob> chi2= 0.128 |

Source: review of financial statements, 2021

**Test for Assumption of Autocorrelation**

As noted in Brooks (2008) this is an assumption that the covariance between the error terms over time (or cross-sectional, 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.

```
Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,       8) =      4.383
           Prob > F =      0.0696
```

## 4.2.3.1. Model Specification Tests (Fixed Effect versus Random Effect)

In many financial studies utilizing panel data, fixed effect model (FEM), and the random effect model (REM) are the three commonly applicable panel data estimator models. Which model has the best estimation power, however, depends on the results of different model specification tests such as the Hausman model specification test and Breusch and pagan Lagrangian Multiplier (LM) test.

## Fixed Effect versus Random Effect Models

The Hausman model specification test was conducted, and the test result suggested that the Random Effect model was preferable over the Fixed Effect model as the test result was insignificant at 5% level of significance (chi2(8) = 6.04, Prob>chi2 = 0.4183).

**Table 4.5: Housman test**

```
. hausman fe re

                 ---- Coefficients ----
                 (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
                  fe           re         Difference          S.E.
-------------------------------------------------------------------------
        RISK   -.0034061    -.003646        .0002399        .0008012
Profitabil~y   -.7883078    -.5663614       -.2219464        .1472192
        SIZE    .0663212     .0406625        .0256587        .0108659
   Liquidity    .0017524     .0011437        .0006087        .0002942
      Growth   -.2682772    -.2507717       -.0175055        .0097223
Tangibility   -.9248497    -.6463073       -.2785424        .1815552
-------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =        6.04
                Prob>chi2 =      0.4183
                (V_b-V_B is not positive definite)
```

Source: review of financial statements, 2021

## 4.2.4. Results of Regression analysis

As shown in chapter three, the model used to find out and explain the association between the dependent variable and the independent variables was:

$$LEV_{it} = \beta_0 + \beta_1(PR_{it}) + \beta_2(TA_{it}) + \beta_3(GR_{it}) + \beta_4(RS_{it}) + \beta_5(SZ_{it}) + \beta_6(LQ_{it}) + \varepsilon$$

Where:

LEV= leverage

PR = profitability

TA = tangibility

GR = growth

RS = risk

SZ = size

LQ = liquidity

This study used panel data models, where the random effect and fixed effect models could be used to estimate the relationships among variables. An appropriate model for this analysis,

testing random versus fixed effects models, was selected. To perform this comparison, the character of the individual effects was tested through the Housman Test. According to Housman Test results shown in table 4.5, the random effects were found to be more appropriate for the model at the 1 percent level. Thus, the relationship between leverage and the explanatory variables were examined by the random effects model in this study. The result obtained by the random effect model is reported in Table 4.6.

**Table 4.6: Random effect model estimates**

| Leverage | Coef. | Std. Err. | Z | P>z | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| RISK | -.003646 | .0053233 | -0.68 | 0.493 | -.0140795 | .0067874 |
| Profitability | -.5663614 | .1867818 | -3.03 | 0.002*** | -.932447 | -.2002758 |
| SIZE | .0406625 | .0120401 | 3.38 | 0.001*** | .0170644 | .0642606 |
| Liquidity | .0011437 | .0007951 | 1.44 | 0.150 | -.0004147 | .002702 |
| Growth | -.2507717 | .0440297 | -5.70 | 0.000*** | -.3370684 | -.164475 |
| Tangibility | -.6463073 | .0955495 | -6.76 | 0.000*** | .8335809 | -.4590337 |
| _cons | .5435504 | .1360966 | 3.99 | 0.000*** | .276806 | .8102949 |
| sigma_u | .05313557 | | | | | |
| sigma_e | .07289142 | | | | | |
| Rho | .34700084 | (fraction | of variance due | | To | u_i) |

| | | |
|---|---|---|
| Random-effects GLS regression | Number of obs | = 81 |
| Group variable: bank | Number of groups | = 9 |
| R-sq: within = 0.4301 | Obs per group: min | = 9 |
| between = 0.9247 | Avg | = 9.0 |
| overall = 0.7886 | Max | = 9 |
| | Wald chi2(6) | = 102.84 |
| corr(u_i, X) = 0 (assumed) | Prob> chi2 | = 0.0000 |

***indicate significant at the 1%5% and 10%

Source: review of financial statements, 2021

The random effect result in table 4.6 indicates that profitability was strongly statistically significant (p-value = 0.00) at 1 percent level and had negative relation with leverage ratio. Similarly, growth was strongly statistically significant (p-value = 0.00) at 1 percent level and had negative relation with leverage ratio. In the same way, size was statistically significant (p-value = 0.00) at 1 percent level and had positive relation with leverage ratio. Besides, the random effect table 4.6 reveals that liquidity was statistically insignificant (p- value = 0.15) at 5 percent level and had negative relation with leverage ratio. But risk does not have statistically significant relationship with leverage with a p-value of 0.493. Furthermore, the table 4.6 shows that the adjusted R square is 0.78 which indicates that about 78 percent of the variability in leverage is explained by the selected firm-specific factors (Profitability, Tangibility, risk, Growth, liquidity, and Size).

## 4.3. Discussions of the Results

Section 4.1 and 4.2 present the overall results of the study and this section discusses in detail the analyses of the results for each explanatory variable and their importance in determining leverage ratio. In addition, the discussions analyses the statistical findings of the study in relation to the previous empirical evidences. Hence, the following discussions present the relationship between explanatory variables and leverage ratio.

**Profitability**

The results of random effect model in table 4.6 indicated that profitability had a negative relationship with leverage, and statistically significant (p-value = 0.00) at 1% level. Thus, the result was in accordance with the hypothesis. That is, if banks generate high profit, they do not worry for customer deposit. Because, generating high profit serves as an advertisement and customers will bring deposits without any additional efforts. This indicates that every one percent change (increase or decrease) in bank's profitability keeping the other thing constant has a resultant change of 56 percent on the leverage in the opposite direction.

The result also shows that; higher profits increase the level of internal financing in Ethiopian banking industry. Moreover the result revealed the suggestions that profitable banks accumulate internal reserves and this enables them to depend less on external funds. Though, profitable

banks have better access to external financing, the need for debt finance may possibly be lower, if new investments can be financed from accumulated reserves internally. The result of this study is consistent with the pecking order theory that suggests profitable firms prefer internal financing to external financing. Besides, a negative relationship between profitability and leverage was observed in the majority of empirical studies. Rajan and zingales (1995), Amidu (2007), and Caglayan and Sak (2010) were some of them.

**Size**

The result of random effect model in table 4.6 indicated that Size had positive relationships with the leverage of banks, and statistically significant (p-value = 0.00) at 1% level. This implies that every one percent change (increase or decrease) in the banks size keeping the other thing constant had a resultant change of 1 percent on the leverage in the same direction. The results also suggested that the bigger the bank, the more external funds it will use. The possible reason is that, larger banks have lower variance of earnings, and the providers of the debt capital are more willing to lend to larger banks as they are perceived to have lower risk levels. In addition, the results confirm the concept that large firms can borrow more easily, either because of a better reputation or because of a perceived lower risk due to better diversification.

This is largely consistent with the Static Trade-off Theory and agency cost theory. Besides, many previous studies indicated a similarly strong significant positive relationship, for example Titman &Wessels, (1988), Rajan and Zingales, (1995), Booth et al., (2001), Amidu (2007), and Caglayan and Sak (2010) were some of them. The nature of the industry also invites banks for debt because, whenever they open new branches and expands their operation through different mechanisms the probability of getting more debt will increase. Therefore, based on the study finding, the relationship between size and leverage was in accordance with the expected sign in the hypothesis.

**Tangibility**

The results of random effect model in table 4.6 indicated that the relationship between tangibility and leverage was found to be negative and statistically significant (p-value = 0.00) at 5% level. Therefore, the result was not in accordance with the expected sign. The result also implies that

every one percent change (increase or decrease) in the banks tangibility keeping the other thing constant had a resultant change of 64.6 percent on the leverage in the opposite direction. This significant negative relationship between tangibility and leverage contradicts with various previous research findings like Rajan and Zingales (1995), Amidu (2007), and Frank and Goyal (2009) which suggest that firm's borrowing capability depends upon collateral value of assets (tangibility) and with theories (Static trade-off theory and asymmetric theory) which stated the positive relation between leverage and tangibility.

The possible reason of this relationship might be that banking industry in Ethiopia had a close relationship with depositors because the relationship can substitute for collateral, which is they will get long term debt by clean basis.

**Risk**

Risk was considered to be one of the key factors that can affect the capital structure of banks in Ethiopia. Both theories i.e., static trade of theory and pecking order theory predict a negative relationship between risk and leverage ratio for at least two reasons: first, earnings volatility reduces investors ability to predict about future performance and earnings; second, the higher volatility lead to higher probability of default.

However, there was no support of risk influencing the level of leverage of banks in Ethiopia. The coefficient for risk on leverage was negative and statistically insignificant with the p-value of 0.493. Risky banks are expected to have less leverage ratio which was consistent with Pecking Order Theory and trade-off theory, but insignificant result indicates that risk was not considered as a proper explanatory variable of leverage in Ethiopian banking industry. This insignificant result was also consistent with the findings of Titman and Wessels (1988) and Amidu (2007).

**Liquidity**

The results of random effect model table 4.6 indicated that liquidity had a positive relationship with leverage, and statistically insignificant (p-value = 0.00) at 1% level. Thus, the result was not in accordance with the hypothesis which state that there is negative relationship between leverage and liquidity. The positive relationship among liquidity and leverage indicates that,

liquid banks can get debt easily as compared to not liquid banks and this is consistent with the trade-off theory.

**Growth**

According to the trade-off theory, firms holding future growth opportunities, which are intangible assets, tend to borrow less than firms holding more tangible assets because growth opportunities cannot be collateralized Myers (1978).On the other hand, the pecking order theory of Myers and Majluf (1984) predicts that growth and leverage are positively related. For growing firms, internal funds may be not enough to fully finance their positive investment opportunities and, hence, they are likely to be in requiring of external finances. According to the pecking order theory, if external funds are required, firms will prefer debt to equity because of lower information costs associated with debt issues. This results in a positive relationship between leverage and growth opportunities.

The result of random effects estimation model in table 4.6 revealed that there was a negative and statistically significant relationship between leverage and growth of banks. The negative coefficient of growth indicates a negative relationship between growth and leverage. This negative relationship is found statistically significant with the p-value of 0.00. Negative sign confirms that growing banks are expected to have less debt ratio which was consistent with trade off theory and previous empirical findings of Huang and Song (2005) and Olayinka (2011). The possible explanation for this finding is attributed to the fact that the internal funds for grew banks are sufficient to finance their positive investment opportunities.

## 4.4. Test of the Consistency of Capital Structure Theories

As presented in chapter two and summarized in Table 4.6, this study followed three capital structure theories: Static trade-off theory, Pecking order theory and Agency cost theory and tried to find out which one explain better the financial decision of the sample commercial banks in Ethiopia. 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. Firms with high tangible assets will be in a position to provide collateral for debts, so these firms can raise more debt. Larger and high

profitable firms maintain their high debt ratio, while firms with high growth rate use less debt financing. Pecking order theory 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.

Consequently, in Table 4.6, tests of the consistency of capital structure relevancy theories in Ethiopian commercial banks is made based on the expected and observed signs of the coefficients of the explanatory variables. Therefore, the following conclusion is made whether capital structure decisions that are made in the commercial banks provide empirical support for the existing theories.

Profitability is found to be negatively related with bank's leverage ratio. This result is consistent with predictions of pecking order theory which states that firms prefer to finance first with internal funds before raising external financing.

The negative coefficient of relation observed, between leverage and a tangibility variable provides a realistic evidence for the three theories given that the theories expected a positive relationship between variables. Therefore, tangibility variable supports consistency of pecking order theory with the financing decisions made in Ethiopian commercial banking case.

The positive relationship among liquidity and leverage indicates that, liquid banks can get debt easily as compared to not liquid banks and this is consistent with the trade-off theory.

Size is found to have positive impact on the commercial bank's financial leverage. Theoretically, static trade-off theory suggests that larger firms tend to have better borrowing capacity relative to smaller firms. Hence, the analyzed result is consistent with the implementation of static trade-off theory in Ethiopian commercial banking case.

The significant and negative relationship result of growth with capital structure is consistent with applicability of pecking order theory and static trade-off theory.

The coefficient for risk on leverage was negative and statistically insignificant which was consistent with pecking order theory and static trade-off theory

In general, looking at Tables 4.6, it can be concluded that, the empirical findings of the study imply that the two capital structure theories, static trade-off, and pecking order, are essentially explaining the capital structure decision of Ethiopian commercial banks.

## Summary

This chapter discussed the results of the documentary analysis and then presented the discussions of these results using the appropriate method. Accordingly, the chapter discussed the descriptive analysis, correlations between the variables and through the regressions analyses; it illustrates how the independent variables influence the dependent variable. Thus, a discussion of the result indicates that profitability, tangibility, size and growth were statistically significant factors that determine the capital structure of banks in Ethiopia. However, discussions of the result indicate that risk and liquidity were not an important explanatory variable of leverage in Ethiopian banking industry. The next chapter presents conclusions and recommendations of the study

# CHAPTER FIVE

# CONCLUSIONS AND RECOMMENDATIONS

The preceding chapter presented the results and discussion, while this chapter deals with the conclusions and recommendations based on the findings of the study. Accordingly, this chapter is organized into two sub-sections. Section 5.1 presents the conclusions and section 5.2 presents the recommendations.

## 5.1. Conclusions

Since the seminal work of Modigliani and Miller (1958), the issue of capital structure has attracted intense debate in the field of financial management. The basic question is whether there exists an optimal capital structure and what might be its determinants. Extensive research has attempted to identify these factors; however, the findings of prior empirical studies have provided varying evidence related to the impact of these factors on capital structure. Furthermore, the majority of these studies have been conducted in developed countries that have many institutional similarities.

In light of the above, the main objective of this study was to examine the association between leverage and firm specific (profitability, tangibility, growth, risk, size and liquidity) determinants of capital structure decision, and to understand about theories of capital structure that can most explain the capital structure of banks in Ethiopia. To achieve the intended objective, the study used quantitative approach. The quantitative data were collected through survey of document reviews from a sample of nine banks over the time period from 2011-2019. The collected data were analyzed by employing multivariate ordinary least square model using statistical package 'STATA'.

In order to conduct the empirical analysis, one dependent variable and six explanatory variables were chosen from major previous research works on capital structure; namely, growth, tangibility, risk, size, profitability, and liquidity. Thus, the results of the random effect estimation model showed the existence of the following relationship between leverage and six independent variables.

Profitability had statistically significant negative relationship with leverage, which was in line with prior expectation. This result also supports the pecking order theory and prefers using internal finance before raising debt or equity. In addition, the positive relationship among liquidity and leverage indicates that, liquid banks can get debt easily as compared to not liquid banks and this is consistent with the trade-off theory.

In relation to the effect of tangibility on the capital structure of banks in this study, the result shows that as there was negative and statistically significant relationship with leverage, which is in line with the extended form of pecking order theory. Moreover, the results of study indicate that bank size had statistically significant positive relationship with leverage, which was in line with trade- off theory and the expected sign. The result also implies that the bigger the bank, the more external funds it will use.

Surprisingly, growth and liquidity had a negative relationship with leverage, and statistically insignificant.

To conclude, the finding of the study suggests that profitability, growth, tangibility, and bank size were important variables that influence banks' capital structure. However, there were no support of banks' risk and liquidity influencing the level of leverage of banks in Ethiopia. The results of the study provide some implications to bank managers and other policymakers. The empirical findings of the study imply that the two capital structure theories, static trade-off, and pecking order, are essentially explaining the capital structure decision of Ethiopian commercial banks.

## 5.2. Recommendations

In light of the major finding obtained from the results, the following recommendations were made by the researcher.

The analyses result indicated that the variables of growth, size, profitability and tangibility were significantly related to leverage ratio. Therefore, banks should excel their maximum effort to these significant variables whenever determining their optimal capital structure. Because this indicated variable are the most determining factors of optimal capital structure as per the study result and needs great attention.

In this study, the researcher has mainly examined the factors that influence financing mix of commercial banks in Ethiopia. It might be interesting and crucial to extend this research to other sectors of the economy in the country.

This study has investigated only firm specific determinants of capital structure of banks in Ethiopia because of resource and time limitation.

Hence, future researchers may come up by including external variables like interest rate, inflation, gross domestic product and ownership structure, in order to show the impact of both firm specific and external factors on the choice of optimum capital structure.

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# Appendices

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Leverage | 81 | .8303038 | .1732512 | .045 | 1.057803 |
| RISK | 81 | -.071535 | 1.612246 | -14.04769 | .8717197 |
| Profitability | 81 | .0406824 | .047725 | -.0025592 | .45 |
| SIZE | 81 | 9.875738 | 1.304324 | 7.3457 | 13.41806 |
| Liquidity | 81 | 28.42183 | 14.65125 | 5.918519 | 70.65907 |
| Growth | 81 | .2626983 | .1996331 | -.3858961 | 1.599999 |
| Tangibility | 81 | .0907715 | .1834626 | .0000442 | .867 |

Descriptive statistics

Correlation matrix

| | Leverage | RISK | Profitability | SIZE | Liquidity | Growth | Tangibility |
|---|---|---|---|---|---|---|---|
| Leverage | 1.0000 | | | | | | |
| RISK | -0.0750 | 1.0000 | | | | | |
| Profitabil~y | -0.2697 | 0.0392 | 1.0000 | | | | |
| SIZE | 0.2845 | -0.0026 | -0.1618 | 1.0000 | | | |
| Liquidity | 0.2654 | 0.0214 | 0.1090 | -0.4980 | 1.0000 | | |
| Growth | -0.4345 | 0.0310 | 0.0762 | 0.0898 | -0.1981 | 1.0000 | |
| Tangibility | -0.8274 | 0.0325 | 0.1049 | -0.2204 | -0.3458 | 0.2181 | 1.0000 |

Pearson test for cross-sectional interdependency

```
Pesaran's test of cross sectional independence =     0.219, Pr = 0.8263

Average absolute value of the off-diagonal elements =     0.354
```

```
Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,       8) =      4.383
          Prob > F =      0.0696
```

## Fixed Effect Model

```
. xtreg Leverage RISK Profitability SIZE Liquidity Growth Tangibility, fe

Fixed-effects (within) regression               Number of obs      =        81
Group variable: bank                            Number of groups   =         9

R-sq:  within  = 0.4489                         Obs per group: min =         9
       between = 0.9097                                        avg =       9.0
       overall = 0.7720                                        max =         9

                                                F(6,66)            =      8.96
corr(u_i, Xb)  = -0.8552                        Prob > F           =    0.0000
```

| Leverage | Coef. | Std. Err. | t | P>\|t\| | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| RISK | -.0034061 | .0053832 | -0.63 | 0.529 | -.0141541 | .0073418 |
| Profitability | -.7883078 | .2378255 | -3.31 | 0.001 | -1.263142 | -.3134739 |
| SIZE | .0663212 | .0162183 | 4.09 | 0.000 | .0339404 | .098702 |
| Liquidity | .0017524 | .0008478 | 2.07 | 0.043 | .0000598 | .003445 |
| Growth | -.2682772 | .0450904 | -5.95 | 0.000 | -.3583031 | -.1782514 |
| Tangibility | -.9248497 | .2051633 | -4.51 | 0.000 | -1.334471 | -.5152279 |
| _cons | .3117801 | .1669841 | 1.87 | 0.066 | -.0216144 | .6451746 |
| sigma_u | .10083774 | | | | | |
| sigma_e | .07289142 | | | | | |
| rho | .65680391 | (fraction of variance due to u_i) | | | | |

```
F test that all u_i=0:     F(8, 66) =     3.05                 Prob > F = 0.0055
```

## Random effect model

```
. xtreg Leverage RISK Profitability SIZE Liquidity Growth Tangibility, re

Random-effects GLS regression                   Number of obs      =         81
Group variable: bank                            Number of groups   =          9

R-sq:  within  = 0.4301                         Obs per group: min =          9
       between = 0.9247                                        avg =        9.0
       overall = 0.7886                                        max =          9

                                                Wald chi2(6)       =     102.84
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =     0.0000
```

| Leverage | Coef. | Std. Err. | z | P>\|z\| | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| RISK | -.003646 | .0053233 | -0.68 | 0.493 | -.0140795 | .0067874 |
| Profitability | -.5663614 | .1867818 | -3.03 | 0.002 | -.932447 | -.2002758 |
| SIZE | .0406625 | .0120401 | 3.38 | 0.001 | .0170644 | .0642606 |
| Liquidity | .0011437 | .0007951 | 1.44 | 0.150 | -.0004147 | .002702 |
| Growth | -.2507717 | .0440297 | -5.70 | 0.000 | -.3370684 | -.164475 |
| Tangibility | -.6463073 | .0955495 | -6.76 | 0.000 | -.8335809 | -.4590337 |
| _cons | .5435504 | .1360966 | 3.99 | 0.000 | .276806 | .8102949 |
| sigma_u | .05313557 | | | | | |
| sigma_e | .07289142 | | | | | |
| rho | .34700084 | (fraction of variance due to u_i) | | | | |

## Hausman Test

```
. hausman fe re
```

| | Coefficients (b) fe | (B) re | (b-B) Difference | sqrt(diag(V_b-V_B)) S.E. |
|---|---|---|---|---|
| RISK | -.0034061 | -.003646 | .0002399 | .0008012 |
| Profitabil~y | -.7883078 | -.5663614 | -.2219464 | .1472192 |
| SIZE | .0663212 | .0406625 | .0256587 | .0108659 |
| Liquidity | .0017524 | .0011437 | .0006087 | .0002942 |
| Growth | -.2682772 | -.2507717 | -.0175055 | .0097223 |
| Tangibility | -.9248497 | -.6463073 | -.2785424 | .1815552 |

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

  Test:  Ho:  difference in coefficients not systematic

              chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                      =        6.04
            Prob>chi2 =      0.4183
            (V_b-V_B is not positive definite)
```

| Breuschand Pagan Lagrangian multiplier test for randomeffects | | |
|---|---|---|
| Leverage[bank,t] = Xb + u[bank] + e[bank,t] | | |
| Estimated results: | | |
| ---------+---------- | Var | sd = sqrt(Var) |
| Leverage | .030016 | .1732512 |
| e | .0053132 | .0728914 |
| u. | .0028234 | 0531356 |
| Test: Var(u) = 0 | | |
| | chibar2(01) = 2.04 | |
| | Prob> chibar2 = 0.003 | |

Heteroskedasticity test

| White'stest for Ho:homoskedasticity |
|---|
| against Ha:unrestricted heteroskedasticity |
| chi2(27)= 43.60 |
| Prob> chi2= 0.128 |

**Data from Financial Statements**

| Banks | Year | Tangibility | Growth | Liquidity | Size | Profitability | Risk | Leverage |
|---|---|---|---|---|---|---|---|---|
| AB | 2011 | 0.02545 | 0.21000 | 52.27550 | 9.22185 | 0.04993 | -0.60512 | 0.96413 |
| AB | 2012 | 0.02740 | 0.18001 | 34.33572 | 9.38737 | 0.04445 | 0.05054 | 0.96129 |
| AB | 2013 | 0.03205 | 0.24480 | 28.47001 | 9.60635 | 0.04388 | 0.22874 | 1.05780 |
| AB | 2014 | 0.03178 | 0.34794 | 33.64657 | 9.90493 | 0.04137 | 0.27083 | 0.97407 |
| AB | 2015 | 0.03797 | 0.19177 | 20.96058 | 10.08036 | 0.03608 | 0.03944 | 0.92274 |
| AB | 2016 | 0.03929 | 0.24047 | 25.36924 | 10.29585 | 0.03330 | 0.14486 | 0.91907 |
| AB | 2017 | 0.02846 | 0.41761 | 22.88419 | 10.64483 | 0.03217 | 0.36965 | 0.95653 |
| AB | 2018 | 0.04385 | 0.31670 | 26.77087 | 10.91995 | 0.03554 | 0.45444 | 0.88247 |
| AB | 2019 | 0.03413 | 0.35042 | 19.07305 | 11.22037 | 0.04490 | 0.70627 | 0.87085 |
| BOA | 2011 | 0.01189 | 0.14000 | 47.66723 | 8.89261 | 0.03550 | -0.92290 | 0.90916 |
| BOA | 2012 | 0.01160 | 0.13212 | 37.26097 | 9.01670 | 0.03502 | 0.11687 | 0.89000 |
| BOA | 2013 | 0.00004 | 0.22937 | 23.20119 | 9.22319 | 0.02849 | 0.00000 | 0.89369 |
| BOA | 2014 | 0.04320 | 0.11324 | 30.18972 | 9.33047 | 0.04643 | 0.81438 | 0.86441 |
| BOA | 2015 | 0.06397 | 0.21205 | 56.42411 | 9.52278 | 0.02736 | -0.28577 | 0.86753 |
| BOA | 2016 | 0.06418 | 0.23124 | 22.76311 | 9.73080 | 0.02778 | 0.25026 | 0.87376 |
| BOA | 2017 | 0.04899 | 0.50491 | 16.61430 | 10.13954 | 0.02908 | 0.57491 | 0.88530 |
| BOA | 2018 | 0.05599 | 0.26295 | 17.41292 | 10.37299 | 0.02394 | 0.03987 | 0.86723 |
| BOA | 2019 | 0.04968 | 0.22856 | 13.91197 | 10.57884 | 0.02606 | 0.33735 | 0.87402 |
| CBE | 2011 | 0.00666 | 0.35000 | 35.68617 | 11.64628 | 0.03709 | 0.34000 | 0.94520 |
| CBE | 2012 | 0.00573 | 0.38988 | 21.52991 | 11.97549 | 0.04994 | 0.87172 | 0.95130 |
| CBE | 2013 | 0.00535 | 0.24110 | 23.29504 | 12.19149 | 0.04466 | 0.10977 | 0.95435 |
| CBE | 2014 | 0.00681 | 0.21970 | 16.20835 | 12.39010 | 0.04029 | 0.10041 | 0.96546 |
| CBE | 2015 | 0.00630 | 1.60000 | 5.91852 | 13.34561 | 0.01862 | 0.20139 | 0.38312 |
| CBE | 2016 | 0.02001 | 0.38590 | 11.11174 | 12.85801 | 0.03159 | 0.04193 | 0.96144 |
| CBE | 2017 | 0.01939 | 0.27671 | 14.67646 | 13.10230 | 0.02385 | -0.03612 | 0.90909 |
| CBE | 2018 | 0.01944 | 0.17105 | 11.50889 | 13.26020 | 0.01744 | -0.14381 | 0.91774 |
| CBE | 2019 | 0.01949 | 0.17100 | 9.03000 | 13.41806 | 0.01275 | -0.14400 | 0.92653 |
| DB | 2011 | 0.01324 | 0.16000 | 52.57680 | 9.59286 | 0.04297 | -0.92646 | 0.90475 |
| DB | 2012 | 0.01496 | 0.19511 | 41.05488 | 9.77110 | 0.05099 | 0.41816 | 0.89568 |
| DB | 2013 | 0.01615 | 0.12712 | 38.23627 | 9.89077 | 0.04117 | -0.08989 | 0.89641 |
| DB | 2014 | 0.02727 | 0.11217 | 37.00407 | 9.99708 | 0.04360 | 0.17790 | 0.88172 |
| DB | 2015 | 0.02756 | 0.12757 | 27.90895 | 10.11714 | 0.03892 | 0.00650 | 0.88193 |
| DB | 2016 | 0.02798 | 0.15396 | 30.18932 | 10.26034 | 0.03327 | -0.01369 | 0.88250 |
| DB | 2017 | 0.02404 | 0.21165 | 18.91373 | 10.45232 | 0.02830 | 0.03067 | 0.88468 |
| DB | 2018 | 0.06194 | 0.31194 | 19.56567 | 10.72383 | 0.02517 | 0.16703 | 0.87085 |
| DB | 2019 | 0.05373 | 0.23760 | 13.61747 | 10.93700 | 0.02275 | 0.11861 | 0.87821 |
| NIB | 2011 | 0.01056 | 0.16038 | 70.65907 | 8.86947 | 0.04838 | 0.17099 | 0.83541 |
| NIB | 2012 | 0.01154 | 0.16370 | 51.05547 | 9.02108 | 0.04706 | 0.13196 | 0.81537 |
| NIB | 2013 | 0.01356 | 0.10499 | 33.88087 | 9.12091 | 0.04283 | 0.00564 | 0.81782 |
| NIB | 2014 | 0.02038 | 0.17527 | 24.18167 | 9.28241 | 0.03635 | -0.00255 | 0.81722 |
| NIB | 2015 | 0.02303 | 0.23344 | 18.39231 | 9.49221 | 0.03325 | 0.12831 | 0.83575 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NIB | 2016 | 0.02486 | 0.19419 | 23.97196 | 9.66969 | 0.03107 | 0.11583 | 0.84094 |
| NIB | 2017 | 0.02477 | 0.32781 | 19.99165 | 9.95322 | 0.03245 | 0.38689 | 0.85946 |
| NIB | 2018 | 0.07229 | 0.26971 | 17.97005 | 10.19200 | 0.02468 | -0.03431 | 0.87334 |
| NIB | 2019 | 0.06883 | 0.26335 | 14.21050 | 10.42577 | 0.02754 | 0.40940 | 0.86918 |
| UB | 2011 | 0.00764 | 0.23096 | 58.67709 | 8.94468 | 0.04207 | 0.23213 | 0.89006 |
| UB | 2012 | 0.01128 | 0.13327 | 42.36261 | 9.06979 | 0.04678 | 0.26029 | 0.88449 |
| UB | 2013 | 0.01360 | 0.13293 | 25.57303 | 9.19460 | 0.03108 | -0.24738 | 0.89158 |
| UB | 2014 | 0.01938 | 0.18355 | 38.00496 | 9.36311 | 0.02413 | -0.08111 | 0.84147 |
| UB | 2015 | 0.02564 | 0.20182 | 23.07126 | 9.54695 | 0.02558 | 0.27431 | 0.90521 |
| UB | 2016 | 0.02910 | 0.19852 | 22.38678 | 9.72803 | 0.02554 | 0.19626 | 0.90560 |
| UB | 2017 | 0.03452 | 0.26163 | 19.30622 | 9.96044 | -0.00256 | -1.12644 | 0.91570 |
| UB | 2018 | 0.04657 | 0.26505 | 19.61449 | 10.19555 | 0.02640 | 14.04769 | 0.93628 |
| UB | 2019 | 0.04585 | 0.27575 | 13.16966 | 10.43908 | 0.02383 | 0.15189 | 0.93290 |
| WB | 2011 | 0.01459 | 0.27730 | 69.51068 | 8.98031 | 0.05766 | 0.30690 | 0.84626 |
| WB | 2012 | 0.03845 | 0.01170 | 48.46787 | 8.99194 | 0.05701 | 0.00026 | 0.83889 |
| WB | 2013 | 0.03595 | 0.24820 | 36.75396 | 9.21365 | 0.04514 | -0.01162 | 0.85349 |
| WB | 2014 | 0.00311 | 0.11708 | 21.34064 | 9.32436 | 0.03571 | -0.11629 | 0.83727 |
| WB | 2015 | 0.04904 | 0.16619 | 24.78683 | 9.47810 | 0.03463 | 0.13072 | 0.86432 |
| WB | 2016 | 0.04793 | 0.18197 | 27.95741 | 9.64528 | 0.03097 | 0.05727 | 0.86635 |
| WB | 2017 | 0.04757 | 0.29447 | 27.85215 | 9.90338 | 0.03541 | 0.47993 | 0.87976 |
| WB | 2018 | 0.05181 | 0.30222 | 19.74461 | 10.16745 | 0.04032 | 0.48288 | 0.90487 |
| WB | 2019 | 0.05032 | 0.08840 | 18.18228 | 10.25216 | 0.02594 | -0.29992 | 0.89884 |
| ZB | 2011 | 0.01415 | 0.35000 | 60.81606 | 7.38611 | 0.07508 | -0.88171 | 0.85130 |
| ZB | 2012 | 0.01961 | 0.48395 | 50.20434 | 7.78082 | 0.05150 | 0.01797 | 0.88280 |
| ZB | 2013 | 0.01849 | 0.35679 | 44.83168 | 8.08594 | 0.03811 | 0.00406 | 0.84827 |
| ZB | 2014 | 0.01901 | 0.20819 | 49.28499 | 8.27506 | 0.05618 | 0.78086 | 0.83260 |
| ZB | 2015 | 0.01409 | 0.24194 | 30.19219 | 8.49174 | 0.04114 | -0.09062 | 0.84309 |
| ZB | 2016 | 0.01048 | 0.51281 | 40.24866 | 8.90571 | 0.03662 | 0.34680 | 0.86414 |
| ZB | 2017 | 0.05214 | 0.31127 | 42.01088 | 9.17671 | 0.03685 | 0.31930 | 0.86403 |
| ZB | 2018 | 0.04247 | 0.29164 | 39.58378 | 9.43262 | 0.02741 | -0.03918 | 0.86006 |
| ZB | 2019 | 0.04918 | 0.17614 | 21.73633 | 9.59486 | 0.04329 | 0.85750 | 0.84120 |
| CBO | 2011 | 0.67000 | 0.45000 | 12.45000 | 12.00000 | 0.03000 | 0.04500 | 0.78000 |
| CBO | 2012 | 0.45000 | 0.67000 | 15.00000 | 8.00000 | 0.04000 | 0.04560 | 0.56000 |
| CBO | 2013 | 0.34000 | 0.45600 | 23.00000 | 9.18000 | 0.45000 | 0.05670 | 0.34000 |
| CBO | 2014 | 0.67000 | 0.34500 | 14.00000 | 9.34000 | 0.00400 | 0.07890 | 0.34560 |
| CBO | 2015 | 0.65700 | 0.34560 | 14.00000 | 8.34500 | 0.04560 | 0.00560 | 0.45600 |
| CBO | 2016 | 0.45600 | 0.35600 | 13.23000 | 8.34560 | 0.06000 | 0.00400 | 0.34500 |
| CBO | 2017 | 0.45670 | 0.34500 | 14.45000 | 7.34570 | 0.03600 | 0.54000 | 0.45670 |
| CBO | 2018 | 0.67800 | 0.34560 | 12.34000 | 9.45800 | 0.04560 | 0.34000 | 0.45600 |
| CBO | 2019 | 0.86700 | 0.34400 | 16.45000 | 8.34560 | 0.00400 | 0.00560 | 0.04500 |