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THE EFFECT OF FINANCIAL LEVERAGE ON PROFITABILITY OF COMMERCIAL BANKS IN ETHIOPIA

BY

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A Thesis submitted to the department of accounting and finance in partial fulfillment for requirement of Degree of Masters Science in Accounting and Finance

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Statement of Certification

This is to certify that the thesis entitled, the effect of Financial Leverage on profitability of commercial banks in Ethiopia and submitted in partial fulfillment of the requirements for the Degree of Master of Science Accounting and Finance. Undertaken by Tilahun Wolde under the supervision of Sewale Abate (PhD) complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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Statement of Declaration

I Tilahun Wolde, hereby declare that this thesis entitled "The effect of Financial Leverage on profitability of commercial banks in Ethiopia" submitted by me in partial fulfillment of the required for the award of the degree of Master of Science in Accounting and Finance at Addis Ababa university is my original work and it has never been presented in any Universities. In carrying out the thesis, I have used different sources and material which have been acknowledged.

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List of Acronym and Abbreviations

ATM - Automatic Teller Machine

CLRM - Classical Linear Regression Model

DCL - Degree of Combined Leverage

DFL - Degree of Financial Leverage

DOL - Degree of Operating Leverage

EBIT - Earnings before Interest and Tax

EBT - Earnings before Tax

EPS - Earning Per Share

ERCA - Ethiopian Revenue and Custom Authority

GDP - Gross Domestic Product

MFIs - Micro-Finance Institutions

MM - Modigliani and Miller

NBE - National Bank of Ethiopia

NPV- Net Present Value

OLS - Ordinary Least Square

ROA - Return on Asset

ROE - Return on Equity

ROI - Return on Investment

SP- Share Price

Abstract

The main objective of this study is to examine the effect of financial leverage on profitability of commercial banks in Ethiopia. The study sampled 10 banks over eight year period from 2010 to 2017 and extracted data from the National Bank of Ethiopia. Data was analyzed using descriptive statistics, correlation analysis as well as panel regression analysis. Then, regression result indicates that, the degree of financial leverage had negative and statistically significant impact on profitability of commercial banks. Moreover, debt to equity had negative insignificant relationship with profitability, while debt to asset and capitalization ratio had positive and statistically strongly significant relationship with profitability. Finally, bank size had statistically significant effect on profitability. Therefore, banks should give due consideration to manage their debts properly, mobilize deposit sufficiently, increase loan advances, spread, and size in their financing decisions.

Keywords: *Return on equity, Financial Leverage, debt to asset, capitalization ratio, Degree of financial leverage, debt to equity, and Bank Size, Ethiopian Commercial Banks*.

CHAPTER ONE

INTRODUCTION

This chapter bring into being by presenting brief background of the study then followed by the statement of the problem. In the statement of the problem, the research states the full picture to carry out this study. Succeeding the statement of the problem, the objectives of the study, research hypotheses, significance of the study, scope (delimitation) of the study, limitations of the study and organization of the paper sequentially presented.

1.1. Background of the Study

To achieve the objective of a firm management should take rational financing decisions regarding optimal capital structure, which in turn would minimize its cost of capital (Goyal, 2013). As Gitman (2009), points out that, financing decision determines both the mix and type of financing used by the firm and firms finance investment activities using either equity or leveraged funds. Thus, most of the effort of the financial decision, making process centered on the determination of the optimal capital structure; where the cost of capital is minimized and firms' value is maximized.

The concept capital structure generally described as the combination of debt and equity that make the total capital of firms. Firm's decision on the use of different forms of financing results into different capital structures which may have different impact on the firm profitability. In one way or another, business activities needs finance. Without finance, the companies cannot support their fixed assets and working capital requirements. Without finance, businesses firms could not exist, therefore, financing is playing a vital role in the business world.

Capital structure theory suggests that firms determine what often referred to as a target debt ratio; which is based on various trade-off between the costs and benefits of debt versus equity. Modigliani and Miller first established the theory of capital structure in 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, pecking order theory, agency cost theory, and Market Timing Theory. As stated by VanHorne (2002) financial structure constitutes the combination of common equity, preferred stock and short and long-term liabilities that this is the manner in which the firm finances its assets constitute its financial structure. If we subtracted short-term liabilities from the firm's financial structure, we obtain its capital structure. In other words, the firms permanent or long-term financing consisting of common equity, preferred stock, and long-term debt is called capital structure.

According to Erasmus and Josephine (2014) Capital structure, decision is amongst the major rationale seeking issues in business firms for both small and large firms. Most of the businesses firms, especially small ones said to perform poorly due to different challenges faced by managers and/or owners on the financing decisions. The key responsibility of determining the optimal mix of debt and equity that will ensure maximization of shareholders wealth falls under the financial managers, accordingly long-term decisions bases on capital sourcing and dividend of all time firm owners while the short- term financing decisions involve liquidity decisions (Maina, 2013).

According to Seyoum (2018) financing decision in commercial banks is not similar to other business firms due to the nature of operations of financial institutions. A bank is the financial institution that initiates its organization by raising an equity fund from certain number of individuals, which called shareholders (Share Byers) which then deals with monetary activities by accepting deposits and lending it to various parties playing an important role in the growth and development of a nation economic sector. As an initial task banks restructures the information i.e. problems between investors and borrowers by monitoring the latter and ensuring a proper use of the depositors' funds. The Second task would be provision of inter-temporal smoothing of risk that cannot be diversified at a given point in time as well as insurance to depositors against unexpected consumption shocks. Because of the maturity mismatch between their assets and liabilities, however, bank is subject to the possibility of runs and systematic risk. The other role of banks is to contribute to the growth of the economy by performing an important role in corporate governance. The relative importance of the different

roles of banks varies substantially across countries and times but banks are always critical to an upgraded financial system and economic development (Allen et al. 2015).

Although commercial banks are able to raise finance using equity and debts, the fact that they mobilize deposits, which can act as a source of finance, make their capital structure unique as compared to other business firms (Taani, 2013). To what extent does leverage in commercial bank affect performance and in which direction, is among the major concern of studies in commercial banks. Different studies have tried to examine the application of different capital structure theories in the banking sector and other financial institutions and their results are diverse.

Therefore, the aim of this research is to examine the effect of financial leverage on the profitability of commercial banks in Ethiopia over the period of 2010-2017. This helps the commercial banks to give due emphasis on the management of identified variables and provides them with understanding of their impact on profit and enhance their financial decision.

1.2. Statement of the Problem

According to Dare (2010) financial leverage refers to the amount of debt in the capital structure of the business firm. The use of fixed-charged funds, such as debt and preference capital along with the owners' equity in the capital structure is called financial leverage or gearing. The degree of financial leverage is higher in those companies which operate with a large amount of debt capital. According to Zafar (2010) financial leverage affect the level and variability of the firms after - tax earnings, and therefore, the firms overall risk and return. Fixed financial charges are to be paid irrespective of the level of EBIT as they are fixed in nature and do not vary with earnings before interest and tax. So, an increase in earnings before interest and tax will result in a higher percentage increase in return on equity. It is because the degree of financial leverage largely depends on the amount of interest and fixed financial charges. If firms have more debt than equity that further requires paying more interest on the debt. Since, law regardless of a company's profit margins (Mwangi, 2014) requires payment of debt. This caused in the degree of financial leverage is higher in the long run financial risks are higher.

The degree of financial leverage measures the extent to which debt finance which forms a component of the capital, contribute to the debt obligation of the financial institution (Gatsi, 2013).

Financing decision in commercial banks is not very similar to other business firms due to the nature of operations of financial institutions. Banks as compared to other business firm their capital structure and performance pace seems a bit different, thus as they use to raise finance using equity, debts and the fact that they mobilize deposits which can act as source of finance Abdabi & Abu-Rub (2012) and Taani (2013). In research work of Tamirat (2015), supports the above statement by firm's decision on the use of different forms of financing results into different capital structures, which may have different impact on the firm performance. Thus, banks that are able to make their financing decisions carefully would have **a** competitive advantage in the industry and as a result banks makes superior profits. According to Myers (2003) there are two views mathematically that financial leverage can either increase or decrease the return on equity (ROE) one may want to know, where the commercial banks in Ethiopia stand towards the two mathematical views of Myers.

As Tigist (2014), Ethiopian banking sector has shown a rapid progress in terms of number of commercial banks, total assets and capital, widening their branch network, increasing their outreach to remote areas and continuously reporting profits of different magnitude, the examination of the determinants of financial performance is very necessary. In order to maximize commercial banks profitability it required large amount of investment. According to Tsegabirhan (2010), the Ethiopian banking industry is underfinanced itself due to limited capital base relative to the credit demand of the economy. In regard with the findings of researchers on financing decision made by financial managers in financing investment opportunities, no single best way to follow on what type of financing that when pursued results in increase of profitability of the banks.

In the context of Ethiopia, there are studies in relation to determinants of capital structure, the impact of capital structure on profitability and determinants of profitability by different researchers. Researchers like Belayneh (2011); Dawit (2017) and Habtamu (2012), also

conducted their study on the determinant of commercial banks profitability. And still others studies on profitability of private banks were made by Birhanu (2012) and Habtamu (2012). In Ethiopian banking, sector studies like Aragaw (2015) and Seyoum (2018) conducted a study on the impact of capital structure on profitability of commercial banks. Abera (2012) assessed factors affecting profitability of banks with a focus on overall performance in addition, Tigist (2014) on her empirical study she examined the determinants of financial performance on Ethiopian commercial banks, Tamirat (2015) examined in his study the effect of debt financing on profitability of commercial banks in Ethiopia,) conducted a research on the effect of leverage on profitability of privet commercial banks in Ethiopia.

However, in this study the researcher used the following explanatory variables (debt to asset ratio, debt to equity ratio, capitalization ratio and degree of financial leverage) to test the profitability of financial leverage on the selected commercial banks. However, in the work of Seyoum (2018), he tested leverage by giving emphasis on operational leverage, furthermore Aragaw (2015) to measure profitability of capital structure by focused on core business operation of commercial banks, as well Tamirat (2015) tested the profitability of banks related to debt financing by using interest coverage ratio. Therefore, because of these, this study is differing from the above studies.

The effect of leverage on firm profitability is significant meaning to all businesses. Banks are especially sensitive to changes in financial leverage due to their low level of equity capital to total assets. Furthermore, the capital structure of banks is highly regulated, and the largest class of bank liabilities is trade deposits, which insured by the public. The government through central bank has also required commercial banks to increase their capital. At this time, most of the commercial banks have engaged in the expansion program, which have need some of huge capital. However, according to the researcher understanding all these studies carried out within Ethiopia focus on the financial leverage (fixed charge financing instrument), but they didn't give emphasize to the effect of capital/financial leverage on the profitability of commercial banks. Then the above idea to give attention and increase the researcher motivation to investigation of effect of financial leverage on profitability of commercial banks liked with

capital structure on listed commercial banks.

Therefore, this study is aiming to examine the effect of financial leverage and profitability of commercial banks in Ethiopia so as to promote profitability through designing the right financing decisions to adopt.

1.3. Objective of the study

1.3.1. General Objective

The general objective of this study is to examine the effects of financial leverage on profitability of commercial banks operating in Ethiopia.

1.3.2. Specific Objectives

i. To examine the effect of debt to asset ratio on profitability.
ii. To evaluate the relation of debt to equity ratio with profitability.
iii. To examine the effect of capitalization ratio on profitability.
iv. To analyze the effect of degree of financial leverage on Profitability.

1.4. Research hypothesis

In order to manage the objective of the study the following research hypotheses was developed based on review of the theories and empirical studies on the effect of financial leverage on profitability of Commercial Banks to be examined.

H1:- Debt to Asset Ratio has negative and significant effect on profitability.

H2:- Debt to Equity Ratio has negative and significant effect on profitability.

H3:- Capitalization Ratio has negative and significant effect on profitability.

H4:- Degree of Financial Leverage has negative and significant effect on profitability**.**

H5: Bank size has positive and significant effect on return on equity.

1.5. Significance of the Study

This study is very important because debt is a risky choice whose consequences on the corporate profitability can be considerable (e.g. the risk of bankruptcy and its consequences for the stakeholders). Therefore, the study tries to assess the effect of financial leverage on profitability of Commercial Banks in Ethiopia.

The findings of this research would be of significance to the following groups specifically: government bodies such as National Bank of Ethiopia may use as a base for policy-issues.

Bank Board of directors, management of banks used as an input for the concerned bodies such as regulator and policy makers to forecast the overall health and soundness of the commercial banks in Ethiopia and will used to decide appropriate financial decision.

Additionally, the result of this research contributes to knowledge in the field of finance and related studies. It provides basic information for further study in the sector by developing new hypotheses and design for new variables by using other debt ratio measurements that are not included in other researches.

1.6. Scope (delimitation) of the study

The scope of this study was limited to the effect of financial leverage on profitability of commercial banks over the period 2010-2017. This period helps to test the current data on the listed banks. From the pool of financial institutions that are operating in Ethiopia, this study considered particularly the banking sector. Of eighteen commercial banks operating in Ethiopia, this study taken ten commercial banks that were registered and licensed based on banking business Proclamation No. 592/2008.

The study used four financial leverage measures, these are: debt to total assets (TDA), debt to equity ratio (TDE), capitalization ratio (CR) and degree of financial leverage ratio (DFL). Bank size will be taken as control variables to ensure the accuracy of the result of the regression model.

1.7. Limitations of the Study

There are so many factors such as: capital structure, asset quality, bank management efficiency, earning quality, liquidity, bank age and size, technology, human capital, loan performance, inflation, regulation, income diversification and effective tax rate among others that affects commercial banks profitability.

However, this study was limited to only four factors such as debt to asset ratio, debt to equity ratio, capitalization ratio (CR), degree of financial leverage ratio (DFL) to measure the effect of financial leverage on the profitability of commercial bank and size was used as a control variable to ensure the accuracy of the results of the regression model.

Therefore, regarding the leverage measures the following limitation were affecting the research significance of expected out comes; this limitation was data inaccessibility in the same way to be in studied commercial banks, this was a challenge tackled by the researcher.

1.8. Organization of the paper

This paper organized in to five chapters. The first chapter presents about background of the study, statement of the problem, objective of the study, research hypotheses, and significance of the study, scope of the study and limitations of the study. The second chapter briefly presents the theoretical and empirical literatures. Then the third chapter deals about research methodology. The fourth chapter presents data presentation and analysis. Finally, chapter five states the conclusion and recommendation of the researcher.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

This chapter presents the review of the related literature on capital structure, financial leverage and banks profitability. A literature review is foundation for the study; it connected to the research topic and the appropriate research methodology, and in this chapter, a survey of previous studies related to the topic reviewed. In addition, the study debates different empirical studies done in similar field. In conclusion, the chapter summery and knowledge gap are stated. Also based on theoretical and empirical literature the conceptual framework was constructing.

2.2. Theoretical and Conceptual Review

The theoretical framework covers theories that are relevant to financial leverage so that to get a deeper knowledge and understanding of the concept. The theories considered are Modigliani and Miller, Trade-off theory, Pecking order theory, Agency cost theory and Market Timing Theory.

2.2.1.1 Modigliani and Miller Theory

Assumptions of Modigliani and Miller Approach

- There are no taxes.
- Transaction cost for buying and selling securities as well as bankruptcy cost is nil.
- There is symmetry of information. This means that an investor will have access to same information that a corporate would and investors would behave rationally.
- The cost of borrowing is the same for investors as well as companies.
- Debt financing does not affect companies' EBIT.

Modigliani and Miller Approach indicates that value of a leveraged firm (a firm which has a mix of debt and equity) is the same as the value of an unleveraged firm (a firm which is wholly financed by equity) if the operating profits and future prospects are same. That is, if an investor purchases shares of a leveraged firm, it would cost him the same as buying the shares of an unleveraged firm.

This approach with corporate taxes does acknowledge tax savings and thus infers that a change in debt equity ratio has an effect on WACC (Weighted Average Cost of Capital). This means higher the debt, lower is the WACC. This Modigliani and Miller approach is one of the modern approaches of Capital Structure Theory.

According to Modigliani and Miller's Publications (1958, 1961 and 1963), three important propositions, which form the base of their theorem, can be drawn (Breuer and Gürtler, 2008):

- Proposition I – A firm's total market value is independent of its capital structure.
- Proposition II – The cost of equity increases with its debt-equity ratio.
- Proposition III – A firm's total market value is independent of its dividend policy.

The First Proposition without the Effect of Taxes

In their study, Modigliani and Miller take into consideration and discuss two firms with different structures of capital, one including debt in its structure of capital whereas the other one without debt in its structure of capital. Modigliani and Miller have concluded that financial decisions taken by companies have no implication on their market value, by assuming that both firms given equal cash flow (Brigham & Ehrhardt, 2010).

In substance, M&M theorize that expected cash flow is divided proportionally between company investors in compliance with the capital structure, whereas the company's value remains unaffected by this share-out (Popescu & Sorin, 2011). According to Modigliani and Miller (1958), the asset profitability and risk determine the value of the company and not the capital structure.

According to Pan (2012), the equation from M&M, theory can be denoted as follows: $\boldsymbol{VL}$=$\boldsymbol{VU}$

Where: $\boldsymbol{VL}$ is the value of a levered firm in the capital structure, and $\boldsymbol{VU}$ is the value of a unlevered firm in the capital structure. Through this equation, Modigliani and Miller (1958) have argued that financial decisions have no implication on the company's market value.

2.2.1.1. The First Proposition with the Effect of Taxes

The first proposition with taxes by Modigliani and Miller holds forth that due to the exclusion of interest from the payment of taxes, firms that have more debt in the capital structure are more valuable, or have a higher market value than firms that do not have debt in their capital structure; this known as the tax shield effect. Due to the system of taxation (which excludes the interest paid on the debt), the tax portion paid is smaller for firms with debt in the capital structure than it is for those that have no debt. This influences directly the firm's market value (Alifani & Nugroho, 2013).

According to Julio Pan (2012), the equation from M&M, theory can be denoted as follows: VL=VU+TCD

Where: $VL$is the value of a levered firm in the capital structure and, $VU$is the value of an unlevered firm in the capital structure, TCD is the tax ratio (TC) x value of the debt (D).

According to Alifani and Nugroho (2013) firms find it convenient to have the debt in their capital structure due to the tax shield effect, which consequently means that they pay less tax, due to the payment of interest and this thing influences the market value of the firm.

Many authors have argued the assumption, based on which M&M presented proposition I. It is hard to say that all conditions foreseen from M&M proposition –I– are available within a single market. As stressed by Breuer & Gürtler (2008), M&M proposition –I– does not take into consideration any kind of objections resting on the imperfections of capital markets. Authors criticize the M&M proposition I also for the fact that "same risk class" assumption used when proofing propositions (Breuer & Gürtler, 2008, p. 5). In other words, would there be any perfect

market? It is hard to believe, under the today's circumstances and turbulences, which are characterizing today's market.

The Second proposition – Rate of Return on Equity

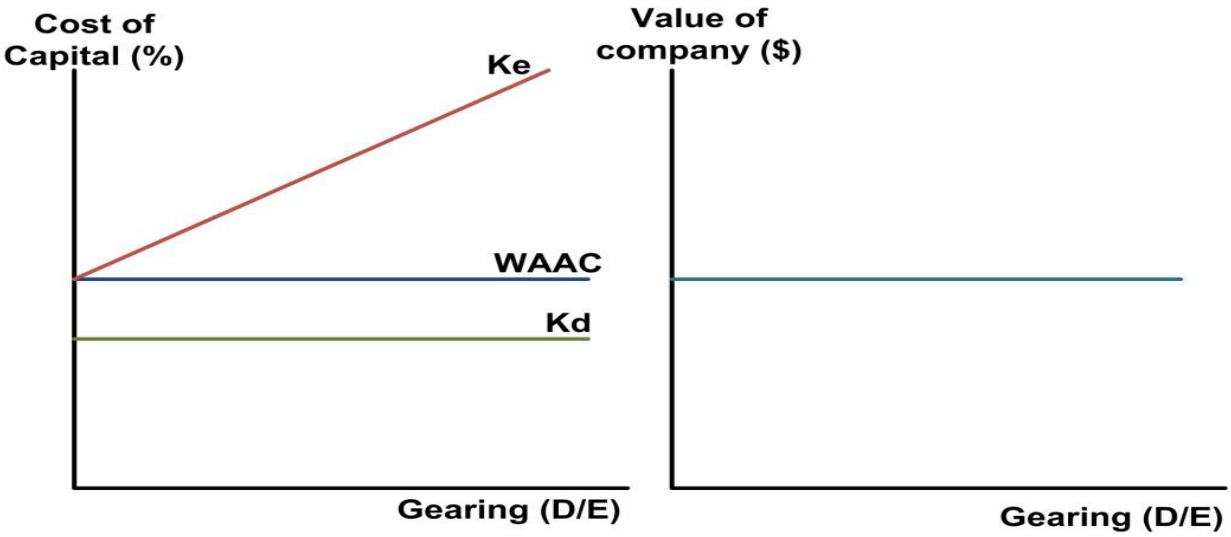
According to this proposition, "the cost of equity increases with the increment of debt-equity ratio in the capital structure of a firm".

According to Breuer & Gürtler (2008), even if all propositions are named the same from –I– to –III–, they differ significantly. The second M&M proposition, according to Villamil (2000), firm's weighted average cost of capital is not affected by its leverage. Hence, M&M proposition II specifies when the firm's debt equity ratio increases, so do the firms' cost of equity undergoes a linear increase.

The Second proposition without the effect of taxes

By way of the second proposition Modigliani and Miller (1958) argue that, since investors are rational, the expected return of equity (Ke) is directly proportional to the increase in gearing (D/E). The expected return of equity (Ke) is compensate by the benefit of cheaper debt finance, and, therefore the Weighted Average Cost of Capital (WAAC) remains unchanged (Alifani & Nugroho, 2013).

Figure 1: The Cost of Capital and Value of the Firm According to M&M Theorem (without taxes)



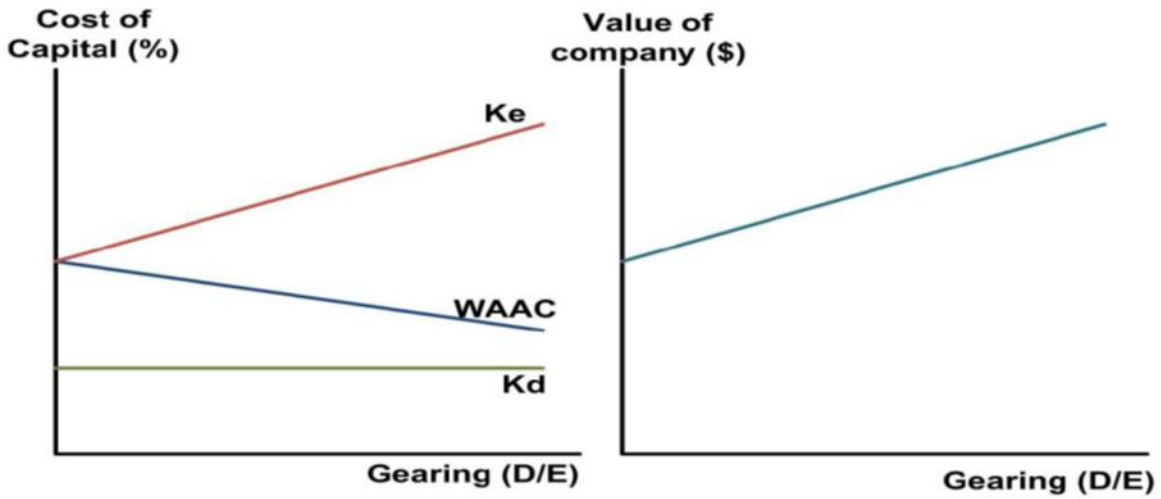
Source: Kaplan financial knowledge bank, (2012)

In the above figure, the weighted average cost of capital (WACC) not influenced by the capital structure, as a result, the firm's value remains unaffected by the capital structure, in the case when corporate taxes are not included in the model. Therefore, in this case, financial decisions are not important for the firm's value and shareholders' equity. In this model, the firm can use any sort mixture of capital structure, without effect in its value (Kaplan Financial Knowledge Bank, 2012).

2.2.1.2. The Second proposition with the effect of taxes

In 1963 M&M included also the effect of taxes in their work. M&M argue that the ratio of corporate tax is equal to the current value of savings from taxes. Therefore, the firm can decrease weighted the average cost of capital (WAAC) by increasing the debt percentage in the capital structure, since such companies pay less tax, due to the tax shield phenomenon (Brigham & Ehrhardt, 2010).

Figure 2: The Cost of Capital and Value of the Firm According to M&M Theorem (with taxes)



Source: Kaplan Financial Knowledge Bank, (2012)

When tax is included, firms can benefit from the increment of the debt percentage in the structure of capital due to the tax shield, as a result, the weighted average cost of capital (WAAC) will decrease, whereas the firm's value will increase (Pan, 2012).

Through proposition II, Modigliani and Miller have shown that the perception of the proposition I was wrong. Furthermore, irrelevant of the firm's debt level, it does not affect the amount that the firm's shareholders will receive from the firm. According to Breuer & Gürtler (2008), different countries or markets have different tax laws; hence, there are no identical conditions in all markets (states or countries). The entire proposition will lose its validity if for instance a country, changes the tax regulation or law.

The Third proposition - Irrelevance of the Dividend Policy

According to this proposition: firm total market value is not affected by its dividend policy M&M (1961), in their study published in the Journal of Business "Dividend policy, growth and valuation of shares", state that the dividend policy is not important for the firm's value.

Also as described by Villamil (2000), M & M third proposition determines that there is no dependence of the firm's market value of its dividend policy. M&M (1961) argue that the market value of a firm is determined by its earning power and the risk of its underlying assets. M&M claim that in a perfect market, the value of a firm remains unaffected by its dividend policy (Miller & Modigliani, 1961).

According to M & M proposition III, Breuer & Gürtler (2008) argues that this proposition is nothing more than net present value. Furthermore, with respect to this proposition, the authors stress the fact that there is a possibility for the firm's financiers to make independent decisions regarding to the firm's investment decisions (Breuer & Gürtler, 2008, p. 5).

2.2.2. Static Trade - off Theory

Capital structure theories have diverse 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). It states also that firms seek debt levels that balance the tax advantages of additional debt against the costs of possible financial distress. Apart from the tax advantage of debt, agency and bankruptcy costs may encourage highly profitable firms to have more debt in their capital structure. The marginal benefit of further increases in debt declines as debt increases, while the marginal cost increases, so that a firm that is optimizing its overall value will focus on this trade-off when choosing how much debt and equity to use for financing (Linus, 2013).

In addition, Trading-off theory assumes that large firms are more diversified, have lower risk, better reputation, more stable cash flows and fewer hazards to be liquidated. This gives large firms easier access to the capital markets with negligible debt costs. Thus these firms are stronger to face bankruptcy and financial distress (Mohammed, 2014).

2.2.3. Pecking order theory

The pecking order theory of Myers & Majluf (1984) argues in the contrary of static trade-off

theory. It states that companies prioritize their sources of financing (from internal financing to equity) according to the law of least effort, or of least resistance, preferring to raise equity as a financing means "of last resort". Hence: internal debt is used first; when that is depleted, then debt is issued; and when it is no longer sensible to issue any more debt, equity is issued.

The implication of this theory is that equity is a less preferred means to raise capital because when managers (who are assumed to know better about true condition of the firm than investors) issue new equity, investors believe that managers think that the firm is overvalued and managers are taking advantage of this over - valuation. As a result, investors will place a lower value to the new equity issuance. The pecking order theory of capital structure is among the most influential theories of corporate leverage (Linus M. 2013).

As a result, it suggests that the firm will borrow, rather than issuing equity, when internal cash flow is not sufficient to fund capital expenditures. Thus, the amount of debt will reflect the firm's cumulative need for external funds. According to Myers (1984), due to adverse selection, firms prefer internal to external financial. When outside funds are necessary, firms prefer debt to equity because of lower information costs associated with debt issues.

So, it concludes a negative association between leverage and profitability because high profitable firms will be able to generate more capitals through retained earnings and then have less leverage. Therefore, it is expected that there is negative relationship between leverage and profitability ratio.

2.2.4. Agency cost theory

Agency theory focused on the costs, which created due to conflicts of interest between shareholders, managers and debt holders. Harris & Raviv (1991) explained the three types of agency costs, which can help, explain the relevance of capital structure as follows.

Asset substitution effect: As D/E increases, management has an increased incentive to undertake risky (even negative NPV) projects. This is because if the project is successful, shareholders get all the upside, whereas if it is unsuccessful, debt holders get all the downside. If the projects are

undertaken, there is a chance of firm value decreasing and a wealth transfer from debt holders to shareholders.

Underinvestment problem: If debt is risky (e.g. in a growth company), the gain from the project will accrue to debt holders rather than shareholders. Thus, management has an incentive to reject positive NPV projects, even though they have the potential to increase firm value.

Free cash flow: unless free cash flow is given back to investors, management has an incentive to destroy firm value through empire building and perks etc. Increasing leverage imposes financial discipline. The free cash flow theory says that dangerously high debt levels will increase value, despite the threat of financial distress, when a firm's operating cash flow significantly exceeds its profitable investment opportunities. The free cash flow theory is designed for mature firms that are prone to overinvest. Due to the free cash flow theory of Jensen (1986) agency cost theory supports a positive relationship between capital structure and profitability.

2.2.5. Market Timing Theory

The theory perceives that managers issue securities depending on the time varying costs of relative equity and debt. Thus, issuance decisions have a long-term effect on capital structure because the observed capital structure at any particular date is the outcome of prior issuance decision thus firms prefer to issue equity when the relative cost is low and prefer to issue debt when equity cost is high (Kwast and Rose 1982).

Since the promised payments to bondholders are fixed, stockholders are entitled to what is left over after the fixed payments; stock prices are more sensitive than bond prices to any proprietary information about the firm's future performance. If management has favorable information that is not yet reflected in market prices, the release of such information will cause a larger increase in stock than in bond prices, and so the current stock price will appear more undervalued to managers than current bond prices (Molyneux and Thornton 1992).

Implication of this theory is that for a firm to avoid diluting the value of existing stockholders claims, the companies that are profitable uses for more capital but believe their

shares not to be undervalued will generally choose to issue debt rather than equity. Conversely, managers who think their companies are overvalued are more likely to issue equity and, what amounts to the same thing, to make stock-for-stock acquisitions. The importance for management is to recognize here is that most companies issuing new equity those that undervalued as well as those that are overvalued should expect a drop in their stock prices when they announce the offering.

2.3. Financial Leverage

Financial leverage is the composition of debt in the capital structure of a firm. A firm that uses financial leverage is said to be trading on equity. The higher the amount of debt employed by a firm the higher its financial leverage. A higher degree of financial leverage means high interest payments which negatively affect the company's bottom- line earnings per share. High financial leverage also increases financial risk to shareholders threatening the returns they expect from their investments. It affected by various factors such as company size, company age, and liquidity, tangibility of asset, non-debt tax shield, and growth opportunity among others. Financial leverage is an important area of interest since it has an effect on profitability of a business entity (IJSR: 2319-7064/2015). Thus, financial leverage is the degree to which net operating assets are financed by borrowing with Net Financial Obligation (NFO) (Stephen, 2010:364). The degree measured by taking a ratio of the debt to assets called debt ratio.

Leverage is usually measured by ratios like ratio of debt to total asset, a debt ratio to the equity and equity ratio to debt. Bierman (1999) defines financial leverage as the use of debt in the capital structure and enumerates four ways of measuring it (Koech, 2013).

The static measure of indebtedness using book values is the proportion of debt to the total capital or debt to the sum of debt and common stock, given as:

(1) **I = D/D+E**

Where: **D** represents the book value of debt and **E** is the book value of equity (or shareholders'

funds).

A second measure of indebtedness is the static measure of indebtedness using market values and defined as the proportion of debt to total capital or the sum of debt and common stock, with the debt and equity taken at market value. It expressed mathematically in the same way as the measure above.

The third measure is the flows measure of indebtedness, which uses interest and income and expressed as the ratio of the earnings before interest and tax (EBIT) to the interest for the period. It represented by:

(2) $$\mathbf{I} = EBIT / INTEREST$$

This ratio measures the firm's debt servicing capacity and shows the number of times the interest charges for the period covered by funds that are ordinarily available for the interest payment.

A fourth measure is the flows measure of leverage, using cash flows and employs the ratio of cash inflows (income including depreciation and other non-cash expenses) and cash outflows (in terms of payment of debt). It is a measure of the ability of the firm to finance its debt obligations of paying the interest and the principal debt as they fall due.

2.3.1. Profitability and Its Measurement

As cited in the research work of (Frezewd, 2016) Profit is the major motive of a business. An enterprise should earn profits to survive and grow over a long period. It provides evidence concerning the earnings potential of a company and how effectively a firm being managed. If the enterprise fails to make profit, capital invested eroded and if this situation prolongs the enterprise ultimately ceases to exist. However, profit and profitability are two different terms. Profit means as an absolute measure of earning capacity, while profitability is relative measure of earning capacity. Thus, the word profitability defined as the ability of given investment to earn a return from its use. Also, according to (Hifza Malik, 2011), profitability is one of the most important objectives of financial management since one goal of financial management is to maximize the

owners' wealth, and profitability is very important determinant of performance. A business that is not profitable cannot survive. Conversely, highly profitable business has the ability to reward its owners with a large return on their investment. Hence, the ultimate goal of a business entity is to earn profit in order to make sure the sustainability of the business in prevailing market conditions. Moreover (Pandey, 1980) defined the profitability as the ability of a business, whereas it interprets the term profit in relation to other elements. A financial benefit is realized when the amount of revenue gained from a business activity exceeds the expenses, costs and taxes needed to sustain the activity.

Profitability ratios measure the firm's ability to generate profits and central investment to security analysis, shareholders, and investors. It is often conceptualize the profitability is the primary measure of the overall success of a business.

As Nishanthini A. and Nimalathasan, (2013) pinpoints five important profitability ratios that are Gross Profit Ratio (GPR), Operating Profit Ratio (OPR), Net Profit Ratio (NPR), Return on Investment (ROI), and Return on Capital Employed (ROCE). Whereas, (Babatunde et al, 2014) explaining profitability ratios connotes return on asset and return on equity as decisive measures of profitability; since they show management's efficiency in generating profits from firm's asset and efficiency of a firm in generating profits from shareholders equity respectively. For achieving the objectives of this study, financial leverage will be consider in the degree in which the commercial banks are financed by debt expressed in terms of deposits of all types, borrowing, income tax payables and other liabilities. Leverage will depend on the type of industry, line of business and the stage of development of the company (and its products). However, it is commonly understood that low debt and high equity levels in the capitalization ratio indicates good quality of investment. In finance, equity multiplier is defined as a measure of financial leverage. Like to all debt management ratios, the equity multiplier is a method of evaluating a company's ability to use its debt for financing its assets.

2.3.2. Leverage and Return on Equity (ROE)

According to Patel (2014), operating leverage is greater for firms with a higher proportion of

fixed operating costs. Higher financial leverage increases expected earnings until the debt to asset ratio reaches the optimum level. He also noted that the financial leverage used by every firm is anticipated to earn more return on the fixed-charge funds than their costs. The surplus (or deficit) will increase (or decrease) the return on the owner's equity.

Return on equity is the amount of net income returned as a percentage of shareholders equity. ROE measures a corporation's profitability by revealing how much profit a company generates with the money shareholders have invested. Return on equity measured by dividing net income after tax to book value of owner equity (Onaolapo & Kajola, 2010; Krishnan & Moyer, 1997).

If we see this concept related to bank profitability that, according to Tan et al. (2012), that return on equity reflects the capability of a bank in utilizing its equity to generate profits . In his study of Dietrich et al. (2009), banks with a lower leverage ratio (higher equity) report a higher ROA, but a lower ROE. However, the ROE disregards the higher risk that is associated with a higher leverage. Even if ROE is commonly use in different studies, not the best measure of profitability (Ghazouani et al. 2013).

2.3.3. Return on Assets (ROA)

Return on assets is an indicator of how profitable a company is relative to its total assets. ROA calculated by dividing a company's annual earnings by its total assets, return on assets displayed in percentage. Ekwe & Daru (2012) opines that return on assets used as dependent variables, because it is an indicator of managerial efficacy. As of Tan et al. (2012) return on assets reflects the ability of a bank's management to generate profits from the bank's assets. It shows the profits earned per birr of assets and indicates how effectively the bank's assets are managed to generate revenues, although it might be biased due to off-balance-sheet activities. This is probably the most important single ratio in comparing the efficiency and operating performance of banks as it indicates the returns generated from the assets that bank owns.

2.3.4. Net Interest Margin (NIM)

Net interest margin is a measure of the difference between the interest income generated

by banks or other financial institutions and the amount of interest paid out to their lenders (for example, deposits), relative to the amount of their (interest-earning) assets. It is usually expressed as a percentage of what the financial institution earns on loans in a time period and other assets minus the interest paid on borrowed funds divided by the average amount of the assets on which is earned income in that time period (the average earning assets). HO and Saunders (1981) used net interest margin as a bank profit measure in their empirical study of bank. According to Okoth et al. (2013), NIM reflects the cost of banks intermediation services and the efficiency of the bank. The higher the net interest margin, the higher the profit earned by the bank and the more stable the bank is. However, according to Khrawish (2011) cited in Okoth et al. (2013), a higher NIM could reflect riskier lending practices associated with substantial loan loss provisions.

2.4. Commercial Banks

A bank is an organization that provides various financial services. It plays an important role in the country's money supply. According to Sufian (2009), financial institutions paly key role in economic growth as they are mobilizing savings for productive investments through facilitating role in capital flows towards various sectors of the economy.

It is also worth noting that commercial banks in most of the world economies are dominant type of financial institution that provide installment, facilitate the internal and external trade and move money and capital when compared to any other financial institution (Greuning and Bratanovic, 2003).

Banks are one of the deposit taking financial institutions that play pivotal role for financial stability and are engines for economic development of a given nation (Al-Karim and Alam, 2013). One of the principal objectives of the financial institutions, particularity the banking sector is mobilizing resources from those who have excess supply especially in the form of saving deposits and channeling these funds to those who are with financial constraints, at the same time with productive investment opportunities.

Banks play an important role in economic development through mobilization of funds from within and outside the country and channeling such funds to various sectors of the economy, it occupy a central place in the payment and settlement system of the country's economy. The business of banking has a number of attributes, which if not managed properly, has the potential to generate financial system and macroeconomic instability (FNG- PROCLAMATION NO. 592/2008**).** As we realize from the above concept, the overall operation of the economy of developed and developing countries is dependent on well-functioning of their commercial banks. If not, the entire economy will be illiquid, saving and investment will be divorced which could result in further economic stagnation.

Thus, the definition arguments shown that, those commercial banks are undertaking a business of finance. Accordingly, the two main accomplishments of a commercial bank that is collecting deposits and makes the loan using the collected finance in another side.

As Seyoum (2018) sited, Edson, 2015, study in his research work, for efficient banking sector, the total loan (TL) demanded by the lenders is equal to the amount of total deposits (TD). This point called market equilibrium of the banking sector. At equilibrium point, the profit (spread) is zero since the lending rate and deposit rate is very close. For Market and Bank Equilibriums and Efficient Bank Intermediation which is assuming two intermediation services that are mobilizing deposit and lending.

If there are no costs of operating the bank, the market equilibrium, at which the equilibrium interest rate, represent both deposit and loan/lending rates i.e. Deposit rate (DR) equals to Lending rate (LR) also the Demand (D) and Supply (S) of loanable funds are equal. But in reality, the costs for operating a bank are there, which makes the lending rate to be high compared with the deposit rate. The commercial bank obtains the profit by giving the depositors low-interest rate and demanding higher interest rate from the borrowers called the spread (Edson, 2015).

Edson (2015), the commercial banks get profit offer by charging fee and commissions for offering respective services like safekeeping of valuables, documents and securities, acting as

agents for collection of utility bills, providing credit information or references, providing financial guidance and advice (advisory services). Commercial banks also get profit from commission on letters of credit, fee on issue of bank cards, fee on local transfers and drafts, point of sale fees , fee on international telegraphic transfers, commission on guarantees and indemnities, commission on mobile banking, salary processing fees, bills discounted and significant cash withdrawal without prior notice.

2.5. Empirical Review on the effect of leverage on profitability

This section surveyed the studies observed to examine the effect of leverage on the profitability of financial firms and non-financial. Thus, only related studies examined. Methodology, year of study and the outcome of it outlined to see their organization with the theories explained above. Contrast between the consequence of these studies and the claim of the theories established in order to see their suggestion.

2.5.1. Empirical Studies of leverage on Banks Profitability

Anarfo and Appiahene (2017) examine whether capital structure affects banks profitability in sub-Sahara Africa and examine nature of relationship between capital structure and bank profitability. The study uses eight variables as determinants of banks profitability in Sub-Sahara Africa: debt ratio, size of a bank, asset tangibility, growth rate of banks, taxes, GDP growth rate, interest rates and inflation rate. The study uses the debt ratio as a proxy for capital structure. The findings suggest that, banks capital structure is an adverse driver of their profitability. This implies that banks in Sub-Sahara Africa best served by reducing their debt ratios and resorting to equity financing to enhance their profitability since higher debt ratios reduces their profitability. The fact that stock markets in Sub-Saharan Africa are underdeveloped mean that banks in Africa do not have to be concerned about the signaling hypothesis should they employ equity finance. The negative impact of banks capital structure on their profitability may be a result of higher bankruptcy cost that outweighs the benefits of debt financing in a form of tax savings according to the trade-off theory of capital structure. Suggested government and policymakers should reduce corporate tax rate since it reduces banks profitability; when taxes reduced and banks

become more profitability, it provides them the enabling environment to create more jobs thereby reducing unemployment in Africa; Banks need to increase their interest rates a bit since it positively enhances their NIM.

Musah (2017) examined the effect of capital structure (measures as short-term debt ratio, long-term debt ratio, and total debt ratio) on profitability (measured as Return on Assets and Return on equity) of commercial banks in Ghana. The study sampled 23 banking over a six-year period from 2010 to 2015 and extracted data from the annual of these banks. The results showed that banks in Ghana are highly leveraged with debt financing constituting 84% of total capital out of which 77% is short-term debt despite the increase in minimum equity capital of these banks. The regression analysis revealed that short-term debt ratio and long-term debt ratio are negatively relate with profitability of banks in Ghana. However, total debt ratio was positively associated with profitability of Banks in Ghana. On the control variables, firm size, foreign ownership and age of the bank were positively associated with banks profitability whiles growth in customers' deposits was negatively associated with banks' profitability. The results show that commercial banks in Ghana reliance on short term financing (deposits) reduces banks profitability and as such banks should shift their financing focus from deposits to other sources. The results call for firms to choose the right mix of short term and long-term debt that will maximize profitability of bank.

Pinto & Quadras (2016) examined the impact of capital structure on financial performance Indian banks. The study covered a sample of 21 banks from both public sector and private sector. A period of five years considered for the study. Three variables, viz., Net Profit, Net Interest Margin and Return on Capital Employed considered as profitability control variables for the study. The debt to equity and debt to total assets used as proxy for capital structure. It was observe that the financial risk of the banking industry is reducing as their debt to equity ratio is decreasing year by year. The results of the hypothesis testing reveals significant impact of debt equity ratio and debt to total assets on the net profit, net interest margin as well as return on capital employed indicating that capital structure has a significant impact on the financial performance in the banking industry.

Yegon et al. (2014) examined the effect of capital structure on firms' profitability using sampled banks from Kenya. Their study found a positive relationship between short-term debt and profitability, but found a negative relationship between long-term debt and profitability. Finally, the study found no relationship between total debt and profitability. The authors argue that the implication of these findings is that the association of short-term debt and the financial performance in contrast attests the static trade-off theory. The study did not provide any practical implication of the findings other than linking it to the Static Trade–off theory. The study also used a sample size of 11, which is too small for a study is this magnitude. However, it is usually the case in studies using developing countries. The study admitted that in the light of whole debate suggested that existing theories of capital structure contribute to some extant in decision-making process though certain aspects of the theories are partially refuted. The definite reason is the fact that the capital structure decision is a complex, multi-dimensional problem; thus, capital structure decisions are likely to be the product of multifarious group processes.

Nirajini and Priya (2013) studied the capital structure and financial performance during 2006 to 2010 financial years of listed trading companies in Sri Lanka. For the purpose of this study, the data was extract from the annual reports of sample companies. Correlation and multiple regression analysis used for analysis. The results revealed a positive relationship between capital structure and financial performance. Capital structure also significantly impact on the financial performance of firms since the debt asset ratio, debt equity ratio and long-term debt correlated with gross profit margin (GPM), net profit margin (NPM), Return on Capital Employed (ROCE), Return on Asset (ROA) and Return on Equity (ROE) at significant level of 0.05 and 0.1.

Chechet and Olayowola (2014) also examined the capital structure and profitability of Nigerian listed firms using the Agency Cost Theory perspective with a sample of seventy (70) over a ten-year period (2000 – 2009) with the aid of the Nigerian Stock Exchange Fact Book covering the period under review. Two independent variables served as measure of capital structure: debt ratio (DR) and equity over the period (EQT) while profitability (PROF) as the only dependent variable. The result showed that debt ratio negatively related with profitability whilst equity over the period directly related with profitability.

Niresh (2012) investigated the impact of capital structure on profitability of ten listed Srilankan banks over the past 8-year period from 2002 to 2009. The finding shows the total debt is the determining factor of profitability in the Banking Industry of Sri Lanka. Suggest banks, loan-creditors and policy planners to formulate better policy decisions as far as the capital structure is concerned. Further, the study reinforces and refines the body of knowledge relating to capital structure and profitability in Srilankan Banks.

Bist et al., (2014) argued that leverage has a positive relationship with the return on assets while negative relationship with the return on equity of the commercial banks. Ojha et al., (2014) also supported the facts found by Bist et al., (2014). Bam et al. (2015) revealed that total debt has significant positive impact on the return on assets of the commercial banks while negative relationship with the return on equity. Shrestha et al., (2014) found that debt has a significant positive impact on the performance of the Nepalese commercial banks.

Aragawe (2015) aimed to examine the impact of capital structure on profitability of core business operations of commercial banks in Ethiopia. Using quantitative panel data methodology the findings revealed that capital structure as measured by total debt to asset had statistically significant negative impact, whereas deposit to asset had statistically significant positive impact on profitability of core business operations of commercial banks. Moreover, loan to deposit, spread and asset size also had statistically significant and positive relationship with profitability. However, growth found to have statistically insignificant impact on profitability.

Tesfaye (2018) examine the effect of leverage on Ethiopian private commercial banks' profitability. The study covered nine years' period (2008/09-2016/17). The dependent variable was the return on equity (ROE) used to measure the profitability. In addition, the independent variables were the degree of operating leverage and degree of financial leverage to measure the leverage of the institutions. To ensure the accuracy of the result of the regression model used two control variables these were operational efficiency and bank size. The regression result indicates that, the degree of operating leverage had positive and statistically insignificant impact; the

degree of financial leverage had negative and statistically significant impact on profitability of private commercial banks. Moreover, operational efficiency also had negative and statistically strongly significant relationship with profitability. Finally, bank size had statistically significant impact on profitability.

2.5.2. Empirical Studies on non-financial Firms

Osuju and Oditha (2012) conducted research in Nigeria. A sample of thirty non- financial firms listed on the Nigerian Stock Exchange was studied using data of seven year from, 2004 – 2010. Panel data for the selected firms were generate and analyzed using ordinary least squares (OLS) as a method of estimation. The result shows that Debt Ratio has a significantly negative impact on the firm's financial measures Return on Asset (ROA) and Return on Equity (ROE).

Khanfar (2014) conducted a study to identify the financial leverage ratio and the rate of return on investment on profitability for sources of the funding in tourism companies operating in Jordan. The results indicate financial leverage has statistically significant impact on profitability of the Tourism companies.

Anton (2016) also studied the impact of leverage on firm growth in periods of economic growth and economic uncertainty using data from sample of 63 Romanian listed firms on the Bucharest Stock Exchange over the period 2001-2011. Several alternative measures for firm growth such as sales growth, assets growth, and employment growth and total liabilities to total assets as a measure of leverage were used. The results of fixed effects regression model show that the leverage has a positive effect on firm growth. Furthermore, this study shows that highly leveraged firms grow faster as lower leveraged firms during the period examined.

According to Bokhari (2013) studied the non- financial sector from Pakistan using Ordinary Least Square (OLS) method using data obtained from Karachi stock exchange since 2005 to 2011 and found a negative significant relationship between return on average total assets (ROA) and return on average total equity (ROE) with total debt to total assets (DR).

Nor (2012) in their research entitled 'Reviewing Relationship between Capital Structure

and Firm's Performance in Malaysia' with multiple regression analysis using data from 2001 to 2010 and the result shown that there is a negative relationship between return on average total assets (ROA) and return on average total equity (ROE) with total debt to total assets (DR).

Asrat (2016) studied the relationship between capital structure and financial performance of cement companies in Ethiopia for the period over 2010-2014. The researcher used return on asset (ROA) and return on equity (ROE) to measure financial performance, debt to equity ratio (LTDTE) as a measure of capital structures and control variables such as: tangibility (TAN), capital adequacy (CA), liquidity (LOGLQ), size, gross domestic product (GDP) and business risk. The study applied explanatory research design. In connection to this, a sample of 8 cement companies was taken and secondary data was collected from the audited financial statement of the selected companies. The result of random effect multiple regressions showed that capital structure measured by long-term debt to equity ratio (LTDTE) has a significant positive relationship with return on asset (ROA). Beside this, capital structure measured by a logarithm of long-term debt to equity ratio (LOGLTDTE) has a significant negative relationship with return on equity (ROE) Finally the researcher concludes that an appropriate mix of the capital structure should be adopted in order to increase the financial performance of cement companies in Ethiopia.

2.6. Conclusion and knowledge gap

In line with the above theoretical as well as empirical review, financial leverage affects the profitability of the firms' weather positively or negatively. Thus, assessments of the effect of leverage on profitability are important to all business organization, especially for banking businesses. In this study, the researcher was interested in the effect of financial leverage on profitability of commercial banks in Ethiopia. This means that, this research expands the empirical literature regarding the influence of financial leverage on profitability. There are five essential theories that emphasize the influence of debit financing on commercial banks profitability, specifically: Modigliani and Miller Theory, Static Trade-off Theory, Pecking order Theory, Agency Cost Theory and Market Timing Theory. Still, the disagreement between

researchers is not only theoretically but also empirically. This research expands the empirical literature regarding the influence of leverage on profitability.

Financial leverage is the use of fixed-charge funds such as debt and preference capital along with the owners' equity in the capital structure. Perfectly, the means a firm uses to raise funds for financing purposes should be such that the profits obtained from the investment exceed the cost of funds used in financing the investment. Financial leverage therefore, aims at reducing the cost of capital so as to improve on the profitability of a firm. Financial leverage allows a potentially high return for a firm but it also comes with the potential of a great loss. Using debt finance beyond a certain level possesses a financial risk to the firm. High financial leverage also increases financial risk to shareholders threatening the returns they expect from their investments. It is affected by various factors such as debit to assets, debit to equity, capitalization ratios, degree of financial leverage and company size. From those factors the firm financing decision is the most crucial parts in a bank business activity.

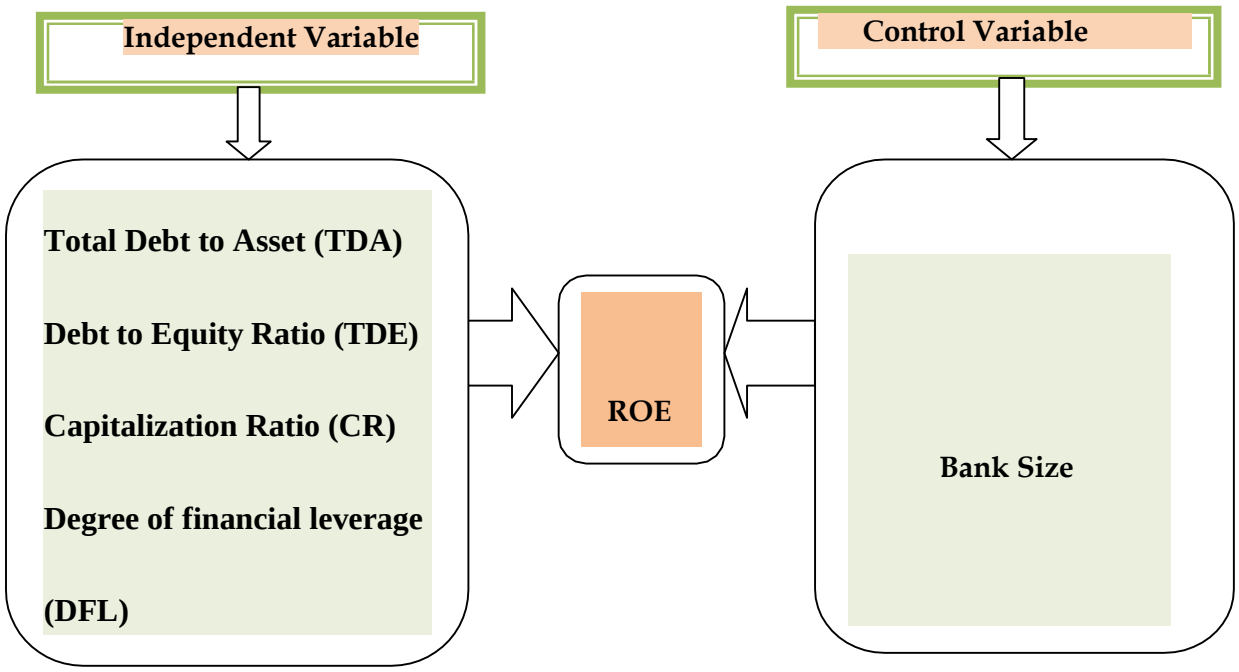
According to the knowledge of the researcher concerned that, in Ethiopia there are a few types of researches conducted about capital structure. But those researchers have only give emphasis to on investigating determinants of capital structure and the impact of capital structure on firm's performance, the effects of debt financing on profitability of Commercial Banks in Ethiopia. Even if, there were studies on capital structure and firms' profitability, focused on the effects of leverage on Ethiopian Private Commercial Banks' profitability and these are motivated on operating leverage or debit financing. However, the variables they used to measure profitability related to leverage or debt financing were differ in some research, the sample size used in some research was too small, the period of the study was short and some research lacked the analytical model. This study therefore, wanted to address those research gaps in giving insights on effect of financial leverage on profitability of commercial banks in Ethiopia.

2.7. Conceptual Framework

Subsequently carefully revised the theoretical and empirical literature those focused on financial leverage and commercials banks profitability, the following conceptual model is

formulated to investigate the relationship between financial leverage and commercial banks' profitability in Ethiopia.

Figure 2.1 Conceptual frame works



Source: researcher compilation from the literatures and related Studies.

The variables used to develop the above conceptual framework were in reference to:-

Zafar (2010); Habtamu (2012); Aregaw (2015); Tamirat (2015); Frezewd (2016); Elshada, Kenenisa and Mohamed (2017); and Seyoum (2018).

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Introduction

This chapter explains and gives the way on the research design, the population of the study, Sample and Sampling Techniques, source of data and data collection methods, data analysis techniques, variables and their measurement model specification, study variables, used in this research.

3.2. Research Design

Briefly research design was a map for carrying the research for which the problem existing was going to be solved or it is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure (Kothari, 2004).

Explanatory design used to accomplish the purpose of this study. In addition, the study used quantitative research approach to examine a stated objective. In quantitative research approach there are two strategies of reviews namely, survey design and experimental design. The chief advantage of this approach is that numbers are easy to work with data are readily collected, coded, summarized and analyzed (Dunn 1999, p. 37). Further quantitative research approach has the advantage of being able to generalize, for a broader population, based on findings from the sample. Therefore, in this study the Explanatory design with quantitative approach used since, quantitative nature of the data used.

Under this study financial leverage was measured by return on average equity (ROE). This study designed in this way because of the nature of data collected, which was quantifiable data and the purpose of relating the variables to see their causal relationships.

3.3. Population of the Study

As noted in Mugenda and Mugenda (1999), a target population is one the researcher wants to generalize the result of the study. Therefore, all commercial banks in Ethiopia used as population of the study from which samples selected. According to National Bank of Ethiopia supervision 2016/17, there are 18 licensed Banks in Ethiopia, from these 17 banks are Commercial Banks (16 private and 1 public).

3.4. Sample and Sampling Techniques

As stated by Kothari, (2004), sample as the selected respondents constitute the total population and sampling techniques is the selection process that means, sampling is defined as the selection of some part of an aggregate or totality on the basis of which a judgment or inference about the aggregate or totality is made. In other word, sampling is the process of obtaining information about an entire population by examining only a part of it. For this study, purposive sampling was use to deliberately select sample banks based on the selection criteria set by the researchers. Hence, out of sixteen private commercial banks, nine private commercial banks and one state commercial bank, totally ten commercial banks were purposively selected as a sample based on the availability of data during the years 2010 to 2017. The only public owned bank, commercial bank of Ethiopia was also included in the study. However, the Development Bank of Ethiopia provides banking service to the selected priority sectors because of this the researcher apart from his study. Therefore, the sample consisted; commercial bank of Ethiopia (state owned commercial bank), Berhan International Bank S.C (BIB), Lion International Bank S.C (LIB), Bank of Abyssinia S.C (BoA), Zemen Bank (ZB), Dashen Bank S.C (DB), Oromia International Bank S.C (OIB), Awash bank (AB), Cooperative bank of Oromia (CBO), and Buna International Bank (BuIB) were selected as the sample for this study. Secondary data collected from National Bank of Ethiopia (NBE) was mainly used to see the effect total debt to asset ratio, debt to equity ratio, capitalization ratio and degree of financial leverage, of the commercial banks related to independent on dependent variable. So, the audited financial statements were collected from national bank of Ethiopia for sampled commercial banks

within eight year's period from 2010/2011 up to 2017/2018.

Among these ten banks one bank that is, commercial bank of Ethiopia was state owned bank. Since these banks have experienced banks, it is possible to generalize from sample to population.

3.5. Source of Data and Data Collection

The study applied data from secondary sources. The data for different variables in this study was obtain from National Bank of Ethiopia within eight years for the period 2010-2017. Accordingly, data for this paper collected from the selected banks and NBE.

The researcher used panel data type. According to Gujarati (2009) since panel data has the combination of both cross-sectional and time-series it is more useful data as it captures individual variability (cross-sectional information), and captures dynamic natures of the data (time-series information). In addition, it ensures more variability, more degrees of freedom, more efficiency, and less collinearity among variables. With the purpose to collect the required data that achieves the study objectives, the researcher collected annual audited financial statements.

3.6. Data Analysis Techniques

The objective of this research is to examine the effect of financial leverage on the profitability of commercial banks in Ethiopia. To attain this objective the study used panel data of ten banks for eight years. Here, in this study both descriptive and panel econometrics method of data analysis has been employed to discover the effects of financial leverage on the profitability of commercial banks. Descriptive data analysis used to describe the profitability trend of commercial banks that used under this study and to show summary statistics for variables used under the model. For the panel econometrics part, random effect panel data analysis has been used. Because according to Gujarati (2009) by combining time series of cross section observations, panel data give more informative data, more variability, less collinearity among variables, more degrees of freedom and more efficiency.

By using eview9 software, the collected panel data was analyzed using the descriptive statistics, correlation matrix and multiple regressions. In case of the descriptive statistics used to determine the minimum, maximum, mean and standard deviation values used to analyze the trends of the data. Whereas the correlation matrix was used to show the relationship exist between the variables used in the study, and multiple regressions analysis applies to find the causal relationship between leverage measures and profitability measure.

Moreover, the diagnostic tests undertaken in order to check the validity of the model and fulfill the assumption of the Classical Linear Regression Model. Specifically, the assumption tests that managed in this study include Heteroskedasticity Test, Autocorrelation Test, Normality Test and Test for Multicollinearity. Thus, the following section discusses the nature and significance of the model misspecification tests.

3.6.1. Test for Heteroscedasticity

As discussed in (Brooks, 2014), important assumption for classical linear regression model is that the disturbances appearing in the population regression are homoscedastic that means the variance of the error term is consistent. If errors do not have a constant variance (not homoscedastic), they are said to be Heteroskedastic. Whereas, Haq (2013) explains Heteroskedasticity is not a problem in panel data because panel data itself is a solution for heteroskedasticity. It is really convincing since panel data have a pull-in effect even without log-transformed variables, which rescales the data. What does more, Brooks (2014), notice, it has assumed that the variance of the error term is constant (homoscedastic). To test the presence of heteroscedasticity, the study used the popular test white's (1980), general test method.

3.6.2. Test for Autocorrelation

There is an assumption that the errors are linearly independent of one another. If the errors correlated with one another, it would be state that they are auto correlated. To test the existence of autocorrelation, the Breusch–Godfrey test is a more general test for autocorrelation. Because, it allows examination of the relationship between error and several lagged values at the same

time. If the test statistic exceeds the critical value from the chi-squared statistical tables, reject the null hypothesis of no autocorrelation.

3.6.3. Test for Normality Test

In order to say the model is good the residual should normally distributed to satisfy the classical assumptions regression model. To test this normality the researcher uses Jarque-Bera statistics. If the residuals are normally distributed, the Jarque- Bera statistic should not be significant and the researcher do not reject the null hypothesis of the error term is normally distributed. Brooks,(2008), as states that, if the residuals are normally distributed, the histogram should be bell-shaped and the Bera-Jarque statistic would not be significant at 5% significant level. The hypothesis of normality test presented as follows:-

H0: the residuals are normally distributed

H1: the residuals are not normally distributed

3.6.4. Test for Multicollinearity

As, (Gujarati, 2004), notice that multicollinearity, assumption that refers to the situation in which the independent variables are highly correlated. When independent variables are multicollinear, there is overlap or sharing of predictive power. This may lead to the paradoxical effect, whereby the regression model fit the data well, but none of the explanatory variables (individually) has a significant impact in predicting the dependent variable. Also as noted by Gujatati, (2014) and Hair (2006) inter-correlation among the independents variables is a threat above from 0.9 but correlation coefficient below 0.9 not cause serious multicollinearity problem. Thus, to detect any multicollinearity problem in regression model the study used a correlation matrix of independent variables.

3.7. Variables and Measurement Procedures

3.7.1 Dependent Variable

The dependent variable is a variable which is affected by other factors. In this study examined the effect of financial leverage on commercial banks profitability by using return on equity (ROE) as dependent variable or measure of profitability, because return on equity has an important indicator to measure the profitability of the banks. The return on equity ratio (ROE) is a profitability ratio that measures the ability of firms to generate profits from its shareholders investments in the company. In other words, the return on equity ratio shows how much profit each dollar of common stockholders' equity generates. The data used to calculate the measures of profitability are obtained from the audited financial statements were collected from national bank of Ethiopia for sampled commercial banks within eight year's period from 2010 up to 2017. Therefore, the study used one profitability measures, which are return on average equity (ROE) which focus on shareholder's funds.

3.7.2. Independent Variables

For the purpose of this study, the independent variables are total debt to asset ratio (TDA), debt to equity ratio (DTE), capitalization ratio (CR) and degree of financial leverage (DFL). These factors assuming that they best explain for the effect of financial leverage on the profitability of commercial banks.

3.7.2.1. Total Debt to Asset (TDA)

The total debt to asset variable used to represent the proportion of banks asset/operation financed by debt, hence used as one measure of the profitability of banks. It means debt to asset ratio shows how much the company depends on debt to finance the firm's asset. The debt to asset ratio gives users a quick measure of the amount of debt that the company has on its balance sheets compared to its assets. The higher the ratio, the greater the risk associated with the firm's operation. A low debt ratio indicates conservative financing with an opportunity to borrow in the future at no significant risk. According to Goyal (2013) found statistically significant negative

relationship between profitability and leverage. This is also consistent with the pecking order theory of capital structure. Hence taking into account the earlier empirical studies and the nature of financing structure of banking industry in Ethiopia, negative relationship with profitability expected. For the purpose of this research, it was calculated as:-

$$TDA = \frac{\text{Total Debt}}{\text{Total Asset}}$$

3.7.2.2. Debt to Equity Ratio

Debt to equity ratio is a measure of the proportion of debt to shareholders funds (i.e. net worth) in the total financing of a business. The ratio indicates how much money raised as debt. Profitability is negatively correlated to debt to equity (leverage) ratio (Shah and Hijazi, 2004) and was further documented by Shah and Adom (2015). Also it known as gearing ratio; which frequently used to gauge the extent to which a company is taking on debts as a means of leveraging. The debt to equity ratio is a common measure used to assess a firm's leverage, or in other words the extent to which it relies on debt as a source of financing (Berk & DeMarzo, 2007).

Debt to equity ratio employed in this study calculated by using the following formula**:-**

$$\textbf{Debt to equity ratio (DTER)} = \frac{\textbf{Total debt}}{\textbf{Total equity}}$$

3.7.2.3. Capitalization Ratio (CR)

As explained in the study work of (Linus M. Muchugia, 2013), the capitalization ratio compares total debt to total capitalization (capital structure). The capitalization ratio reflects the extent to which a company is operating on its equity. Capitalization ratio is also known as the financial leverage ratio. It tells the investors about the extent to which the company is using its equity to support its operations and growth. This ratio helps in the assessment of risk. The companies with

high capitalization ratio considered risky because they are at a risk of insolvency if they fail to repay their debt on time. Companies with a high capitalization ratio may also find it difficult to get more loans in the future. A high capitalization ratio is not always bad; however, higher financial leverage can increase the return on a shareholder's investment because usually there is tax advantages associated with the borrowings.

The capitalization ratio is a very meaningful debt ratio because it gives an important insight into the use of financial leverage by a company. It focuses on the relationship of long-term debt as a component of the company's total capital base. The total capital is the capital raised by the shareholders and the lenders. Capitalization also known as capital structure. The company's capitalization explains the make-up of the long-term capital of the company. A company's long-term capital consists of long-term borrowings and shareholder's equity. There is no standard or benchmark for setting the right or optimum amount of debt. Leverage will depend on the type of industry, line of business and the stage of development of the company (and its products). However, it is commonly understood that low debt and high equity levels in the capitalization ratio indicates good quality of investment.

For this research, the capitalization ratio calculated by dividing the long-term debt by the total shareholder's equity and long–term debt. This can be stated as:-

Capitalization Ratio (CR) = Long-Term Debt / (Long-Term Debt + Shareholder's Equity)

3.7.2.4. Degree of financial leverage

As notice, Koech (2013) Business enterprises use debt in their businesses, because it offers them potential to increase the volume of their operations and increase the average return on their equity funds. The borrowing firm takes a chance to use debt in the hope that it will elevate the firm to a more valuable level, by increasing the turnover and therefore increase the profits. The financial leverage chance will arise if the rate of interest charged to the firm is lower than the internal rate of return (IRR) for the company, in which case the firm will be making enough to pay the interest charged and the principal repayment and retain the surplus for the shareholders.

According to Gatsi, (2013), a company described as levered if it financed partly through debt simply because of the tax shield element of debt. However, debt carries a fixed financing cost, which means that if the company increases its debt the degree of financial leverage also increases. The degree of financial leverage (DFL) is defined as the percentage change in earnings after interest and before taxes (EBT), that results from a given percentage change in earnings before interest and taxes (EBIT).

On the grounded of foregoing literature, the degree of financial leverage of a firm's computed in different methods. However, this research implemented the ratio of earnings before interest and taxes (EBIT) to earnings before taxes (EBT). So, it was calculated as:-

$$DFL = \%\Delta EBIT / \%\Delta \text{ Total Income}$$

3.8. Control Variables

There are a number of factors that affect the commercial bank's profitability rather than financial leverage; Because of this control variable is included in the model. In this study, the researcher employed the bank size as a control variable.

3.8.1. Bank Size

Total assets defined as the sum of net fixed assets, total intangibles, total investments, net current assets and other assets. It assesses whether the size of the firm related to performance. Sufian et al., (2009) found a positive impact of firm size on performance. The study concluded that a large firm size reduced costs due to economies of scale that this entails; large firms can also raise capital at a lower cost. Jonsson (2008) showed that bigger firms have higher profitability as compared to smaller firms.

Also as Belayneh (2011) indicated in his study, work that larger banks enjoy the higher profit than smaller banks in Ethiopia banking sector because they are exploiting the benefit of economies of scale. In most previous studies, firm size expressed by the logarithm of total assets. According to various researchers in their studies employed firms' size as a control

variable. Therefore, by assuming this, the study used bank size as a control variable.

Bank Size = natural logarithm of total asset

3.9. Summary of Variables, their Measures and Expected Sign

Table 3.1 Summery of Variables, their Measures and expected sign

Variable		Definition	Mathematical Expiration	Exp. sign
Dependent variable	Return on Equity (ROE)	Net income dividing by book value of owner equity	ROE = Net Income / Total Equity	NA
Independent Variables	Total Debt to Asset (TDA)	The total debt divided by total asset	TDA = Total Debt / Total Asset	-
	Debt to equity ratio (DTER)	The total debt divided by total equity	DTER = Total debt / Total Equity	-
	Capitalization Ratio (CR)	Dividing the long-term debt by the total shareholder's equity and long– debt	CR = LTD / LTD + SHE	-
	degree of financial leverage (DFL)	Percentage change in earnings after interest and before taxes (EBIT), that results	DFL= %ΔEBIT / %Δ Total Income	-

Control variable	**The Firm Size**	Natural Logarithm of Total asset	FSIZE = Ln(Total Asset)	+

(Source: Compiled from the literature by researcher)

Note: (+) when the independent variable increases (decreases), the dependent variable will increase (decrease).

(-) When the independent variable decreases (increases), the dependent variable will increase (decrease)

3.10. Model Specification

According to obviously point out in the foregoing sections panel regression model adopted for this study. Panel data generated using both time series and cross-sectional data from the audited financial statements of selected commercial banks of Ethiopia. As mentioned in Brooks (2014) a panel keeps the same individuals or objects and measures some quantity about them overtime.

To attain the objective of this study and to examine the effect of financial leverage on the profitability of commercial banks in Ethiopia, the model used by (Gatsi, 2013) and (Patel, 2014) with some modification to include relevant variable was applied. The modification made to return on Equity (ROE) as a dependent variable, explanatory variables such as Total Debt to Asset (TDA), Total Debt to Equity (TDE), Capitalization Ratio (CR) and Degree of Financial Leverage (DFL), and bank size was as a control variable. The general model;

Where,

Y it = is the dependent variable

α = constant term

β = is the intercept

X it = is the independent variable.

μ it = are the error terms.

i = is the number of firms and

t = is the number of times.

The subscript i representing the cross-sectional dimension and t denote the time series dimension. Based on the above general model the effects of financial leverage on profitability of commercial banks were evaluated using the model outlined below;

$$ROE = \alpha + \beta_1(TDA) + \beta_2(TDE) + \beta_3(CR) + \beta_4(DFL) + \beta_5 Log(SZ) + \mu it$$

Where,

ROE it = Return On Equity for Bank i in year t

α = constant term

TDA it = Total Debt to Asset ratio for Bank i in year t

TDE it = Total Debt to Equity ratio for Bank i in year t

CR it = Capitalization Ratio for Bank i in year t

DFL it = Degree of Financial Leverage for Bank i in year t

Log_(Size) = Log of Total Asset for Bank i in year t

μ it = are the error terms.

As it is stated in chapter one, the major objective of this study was to examine the effect of financial leverage on the profitability of commercial banks in Ethiopia and to search the

relationship between financial leverage variables and profitability. To achieve this objective, this study employed Ramsey RESE test used to see whether the developed model is correctly regressing. To analysis, this following hypothesis formulated:

H0: the model correctly specified

H1: the model not correctly specified

$\alpha = 0.05$

Decision Rule: Reject H0 if p-value is less than significance level. If not, do not reject HO. It means finally, the study presented the summary of variables used in the study and their expected sign and associations with data source as well as the null hypothesis tested in the study.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION

Introduction

This chapter presents the data findings and analysis procedure and presentation of the output from analysis. The collected data presented, interpreted and analyzed using E-views 9. The current chapter has three sections. In section, 4.1 descriptive statistics of the dependent and independent variable presented, followed by the diagnostic test for the classical linear regression model (CLRM) under section 4.2. The results of the regression analysis under section 4.3 and finally, discussion on regression output of dependent and independent variables in the models presented in section 4.4.

4.1. Descriptive statistics

As clearly mentioned in the earlier chapter, in this study descriptive statistic used to determine minimum, maximum, mean and standard deviation. The following table 4.1 provides a summary of the descriptive statistics of the dependent and independent variables for ten Ethiopian commercial banks for the period of 8 years from year 2009/10-2016/2017 with a total of 80 but after adjustment of 79 observations. This generated to give an overall description of data used in the model.

Table 4.1 Summary of descriptive statistics of dependent and independent variables

	ROE	TDE	TDA	CR	DFL	LOG_SIZE
Mean	0.223141	7.373056	0.873021	0.088529	1.336753	9.044477
Median	0.198468	6.711179	0.873757	0.062203	0.949667	9.001990
Maximum	0.703521	21.90164	1.057823	0.598636	41.43755	13.09335
Minimum	-0.058657	1.114250	0.651929	0.000000	-11.09331	5.938894
Std. Dev.	0.134236	3.955858	0.061446	0.112265	4.962355	1.502607
Sum	17.62818	582.4714	68.96865	6.993820	105.6035	714.5137
Sum Sq. Dev.	1.405515	1220.607	0.294496	0.983073	1920.748	176.1106
Observations	79	79	79	79	79	79

Source: E-views 9 output

As shown in chapter three, return on equity used as a profitability measure for this study. Which in turn calculated profit after tax divided by total equity. For the total sample, the mean value of return on equity was 22.3% with a minimum of - 0.05% and a maximum of 70.35%. This indicates that sampled commercial banks generate the average return on equity of 22.3% during the study period. The most profitable banks earned 0.70 cents return from each unit of invested shareholder fund. On the other hand, the maximum loss incurred by sampled banks is -0.05 cents for each unit of invested shareholder fund. The standard deviation of return on equity (ROE) was 0.134236 this statistical measurement implies that the volatility of return on equity (ROE) from the mean value is 0.134236.ca

Regarding the explanatory variables, the descriptive statistics indicates that commercial banks under the study period have a mean degree of financial leverage of 133.67 % showing the ratio of percentage change in earnings before interest and tax (EBIT) to percentage change in total income, thus indicating on average a one unit change in total income produced 1.33 unit change in EBIT.

On the variable total debt to total asset ratio (TDA) as an indicators of banks' performance, the study found out that it had a mean of 0.87. This indicates that on average; about 87% of total assets financed by debt capital.

The study further tested for the variable CR that measures the ratio of long-term debt to total capital and found its mean score to be 0.088529. This indicates that averagely, 9 % of total capitals are, represented by long-term debts attesting to the fact that the capital structures of banks have low proportion of long-term liability/debts.

On the other hand, Debt to equity ratio is a measure of the proportion of debt to shareholders funds (i.e. net worth) in the total financing of a business. The ratio indicates how much money raised as debt. It has higher mean value (7.373056).

Likewise, bank size that measured by the natural log of total asset had the average growth of 9.04%. The total assets growth for the sample banks in the study period were range from 5.9 % to 13.09 % with a standard deviation of 1.5%.

4.2. CLRM Assumptions and Diagnostic Test

In this study as mentioned in chapter three diagnostic tests carried out to ensure that the data fits the basic assumptions of the classical linear regression model. Hence, the following subsections discuss the results of the diagnostic tests (i.e., heteroscedasticity, autocorrelation, multicollinearity, and normality test) and model specification test and Hausman test that ensure whether the data fits the basic assumptions of classical linear regression model or not (see appendix I to IV).

4.2.1. Zero mean: {E (ut) = 0}

The regression model used in this study included a constant term. As clearly stated in Brooks (2014), if a constant term is included in the regression equation, this assumption will not violated. Hence, this assumption not violated in the study.

4.2.2. Test for Heteroskedasticity {E (ui^2) = σi^2}

According to this assumption, if the errors do not have a constant variance, it said to be the assumption of homoscedasticity violated. The violation of this assumption called heteroscedasticity. In this study Heteroskedasticity, white test used to test for existence of heteroscedasticity across the range of explanatory variables.

Table 4.2 Test for Heteroskedasticity

Heteroskedasticity Test: White

F-statistic	1.329437	Prob. F(20,58)	0.1983
Obs*R-squared	24.83204	Prob. Chi-Square(20)	0.2079
Scaled explained SS	24.34414	Prob. Chi-Square(20)	0.2277

Source: E-views 9 output

As it is indicated in table 2 the result shows that the F-, X 2, and scaled explained SS versions of the test statistic give the same conclusion that the p-values were greater than 0.05. Therefore, the absence of heteroscedasticity confirmed.

4.2.3. Test for Autocorrelation

This is an assumption that the errors are linearly independent of one another (uncorrelated with one another). Breusch – Godfrey tests allow examination of the relationship between error term and several of its lagged values at the same time. Therefore, to check the presence of autocorrelation in this study, the researcher used Breusch – Godfrey test.

The Breusch - Godfrey Serial Correlation LM Test result as indicated in the below Table 3 shows that the P-values of F-statistic and Obs*R-squared are greater than 5% and hence, the null hypothesis is not rejected and no significant residual autocorrelation is presumed.

Table 4.3 Test for Autocorrelation

Breusch-Godfrey Serial Correlation LM Test:

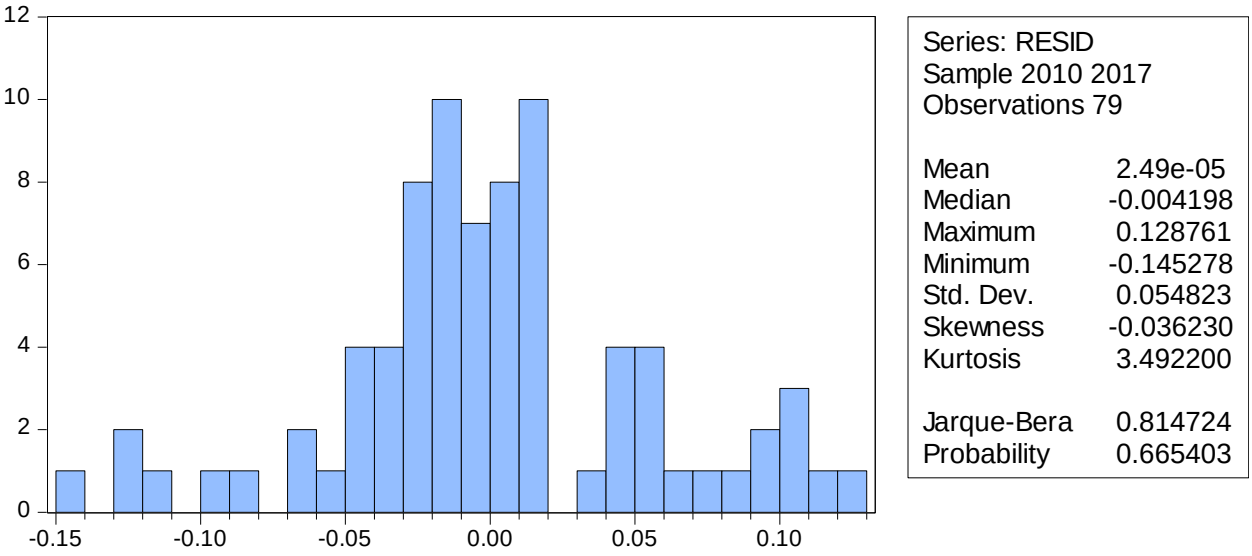
F-statistic	1.857419	Prob. F(4,69)	0.1278
Obs*R-squared	7.679537	Prob. Chi-Square(4)	0.1040

Source: E-views 9 output

4.2.4. Assumption of normality (errors are normally distributed (ut ~ N (0,σ2))

Brooks (2014) stated also that if the residuals are normally distributed, the histogram should be bell-shaped and the Bera-Jarque statistic would not be significant. That is, the p-value given at the bottom of the normality test screen should be greater than 0.05 to do not reject the null hypothesis normality at the 5% significant level.

Figure 4.1 Assumption of normality



From the above figure, we can conclude that there is no problem of normality. That is, the coefficient of kurtosis was close to 3, and the Bera-Jarque statistic has a P-value of 0.665403

implying that the data were consistent with a normal distribution assumption. Furthermore, it indicates that the inferences made about the population parameters from the sample parameters tend to be valid.

4.2.5. Assumption of Multicollinearity

Brooks (2014), states that an implicit assumption that made when using the OLS estimation method is that the explanatory variables are not correlate with one another. If there were no relationship between the explanatory variables, they said to be orthogonal to one another. If the explanatory variables were orthogonal to one another, adding or removing a variable from a regression equation would not cause the values of the coefficients on the other variables to change. However, in any practical context, the correlation between explanatory variables will be non-zero, although this will generally be relatively benign in the sense that a small degree of association between explanatory variables will usually occur but will not cause too much loss of precision. However, a problem occurs when the explanatory variables are very highly correlated with each other, and this problem known as multicollinearity. There are two classes of multicollinearity: perfect multicollinearity and near multicollinearity. Perfect multicollinearity occurs when there is an exact relationship between two or more variables. In this case, it is not possible to estimate all of the coefficients in the model. Usually observe perfect multicollinearity only when the same explanatory variable inadvertently used twice in a regression. Whereas, near multicollinearity is much more likely to occur in practice, and would arise when there was a non-negligible, but not perfect, relationship between two or more of the explanatory variables.

Multicollinearity introduces a problem because the estimates of the sample parameters become inefficient and cause large standard errors, which makes the coefficient values and signs unreliable. Furthermore, multiple independent variables with high correlation add no additional information to the model. It also conceals the real impact of each variable on the dependent variable. Cooper & Schindler (2009) suggested that a correlation above 0.8 should considered as a problem of multicollinearity. In addition, Hair (2006) concluded that correlation coefficient below 0.9 may not cause serious multicollinearity problem.

Table 4.4 Correlation Matrix between independent variables

	TDE	TDA	CR	DFL	LOGSIZE
TDE	1				
TDA	0.59475	1			
CR	0.760298	0.449445	1		
DFL	0.014583	0.017042	-0.08862	1	
LOGSIZE	0.622921	0.71881	0.622903	-0.00229	1

Source: E-views 9 output

The above Table 4.4 shows the correlation matrix between independent variables was the method used in this study to test the existence of multicollinearity problem. Since, all correlation results are below 0.80, it indicates that multicollinearity is not potential problem for this study.

4.2.6. Model Specification test

The assumption of the CLRM that the econometric model used in the analysis was correctly specify has two meanings. One, there are no equation specification errors, and two; there are no model specification errors. The equation specification error is due to the omission of an important variable(s), the inclusion of unnecessary variable(s), adoption of the wrong function form, incorrect specification of the error term, errors of measurement in the regress and regressors (Gujarati, D. 2009). Therefore, in order to select a correct estimated model, the researcher had carry out the Ramsey- RESET Test to check on the model specification.

Table 4.5 Model Specification Test Result

Ramsey RESET Test
Equation: UNTITLED
Specification: ROE C TDE TDA CR DFL SIZE LOG(SIZE)
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	1.174147	71	0.2443
F-statistic	1.378622	(1, 71)	0.2443
Likelihood ratio	1.519257	1	0.2177

Source: E-views 9 output

4.2.7. Model Selection (Random Effect versus Fixed Effect Model)

As stated in Brooks (2014), in financial research, there are two major classes of panel estimator approaches. Namely, the fixed effects model and random effects model. In order to select the appropriate model which provide consistent estimates for this study, Hausman test employed. Table 4.6, presents the Hausman specification test which suggests the random effects model was better than fixed effects model as the p-value (0.3328), is more than 0.05 for dependent variables which imply that the fixed effects model should be rejected and thus, the analysis is based on the random effects estimates.

Table 4.6 Model Selection

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

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	5.735178	5	0.3328

Source: E-views 9 output

As it is clearly indicate above, all assumption tests results indicated that the employed model for this study was not sensitive to the problems of violation of the CLRM assumption.

4.3. Results of the regression analysis

To test the effect of financial leverage on Ethiopian commercial banks profitability the following linear regression model was developed.

$ROE = \alpha + \beta 1(TDA) + \beta 2(TDE) + \beta 3(CR) + \beta 4(DFL) + \beta 5Log(SZ) + \mu it$

Table 4.7 Regression output

Dependent Variable: ROE
Method: Panel EGLS (Cross-section random effects)
Date: 03/18/19 Time: 00:35
Sample: 2010 2017
Periods included: 8
Cross-sections included: 10
Total panel (unbalanced) observations: 79
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.06429	0.121003	-0.53127	0.5968
TDE	-0.13683	0.190086	-0.71982	0.4746
TDA	-0.012814	0.003859	-3.320875	0.0014
CR	0.738145	0.144394	5.112012	0.0000
DFL	-0.00307	0.001166	-2.63563	0.0103
LOGSIZE	0.093563	0.026159	3.576656	0.0007
	Effects Specification			
			S.D.	Rho
Cross-section random			0.033882	0.3376
Idiosyncratic random			0.047458	0.6624
	Weighted Statistics			
R-squared	0.815654	Mean dependent var		0.09938

Adjusted R-squared	0.803028	S.D. dependent var	0.107302
S.E. of regression	0.04767	Sum squared resid	0.165887
F-statistic	64.59902	Durbin-Watson stat	1.55419
Prob(F-statistic)	0.00000		
	Unweighted Statistics		
R-squared	0.833204	Mean dependent var	0.223141
Sum squared resid	0.234435	Durbin-Watson stat	1.997520

Source: E-views 9 output

Note: at 5% Significant level

The developed model by Ordinary Least Square (OLS) model:

ROE = -0.0642854938161 -0.136838501372*TDE + -0.0128141492431*TDA + 0.738145094096*CR -0.00307203607806*DFL + 0.09356347332913*LOGSIZE

The panel random effect estimation regression result in the above table 4.7 shows coefficient intercept (α) is -0.064285. This means, when all explanatory variables took a value of zero, the average value ROE would take -0.064285unit and statistically insignificant at 5% of significance level.

The degree of financial leverage had a negative and statistically significant relationship with profitability (p-value = 0.0103) at 5% significance level. Whereas, that capital structure as measured by total debt to asset had a negative and statistically significant relationship with profitability with a p-value of 0.0014 at 1% significance level. In addition, debt to equity had negative and insignificant relationship with profitability with a p-value of 0.4746 and capital

accumulation ratio had positive and statistically significant relationship with profitability with a p-value of 0.0000. Moreover, regarding the control variables, the result shows that banks size as measured by the logarithm of total asset statistically significant (p-value = 0.0007) at 5% significance level and had a positive relationship with profitability.

Furthermore, the result shows that the adjusted R square was 0.803028 which indicates that about 80.30 % of the variability in profitability (as measured by return on equity) is explained by the selected explanatory variables (Total Debt to Asset, total debt to equity, capitalization ratio, degree of financial leverage, and Size). In addition, the Prob (F-statistic) 0.000000 indicates that the explanatory variables jointly have significant impact on profitability of core business operations of commercial banks in Ethiopia.

4.4. Discussion of Findings

This section also presents a discussion of the detail analyses of the results for each explanatory variables and their impact on commercial banks profitability.

Total Debt to Asset (TDA)

Capital structure/Leverage as measured by debt to asset ratio had statistically significant negative relationship with profitability, which was in line with prior expectation. The result of this study is consistent with the pecking order theory that suggests profitable firms prefer internal financing to external financing and hence profitability is expected to have negative relation with leverage (Myers & Majluf, 1984). The result also consistence with Nirajini and Priya (2013): Pinto & Quadras (2016) the debt asset ratio correlated with Return on Equity (ROE) at significant level of 0.05.

Total Debt to Equity (TDE)

On the variable on total debt to total equity ratio (TDE) as an indicators of banks' performance, the study found out that it had negative and insignificant relationship with profitability. This indicates that on average; about 13 % of total assets financed by debt capital. The above position

reveals that the banks were financially leveraged with a large percentage of total debt being short-term that is a large percentage of the capital banks liability consists of short-term debts. The result consistent with Chechet and Olayowola (2014) that debt ratio is negatively related with profitability whilst equity over the period is directly related with profitability.

Capitalization Ratio (CR)

The ratio of total long-term debt to shareholders equity (CR) also had positive and significant relationship with profitability. This shows that on average 73 % of the bank's assets covered by long-terms debts attesting to the fact that the capital structures of banks have high proportion of long-term liability/debts.

The degree of financial leverage (DFL)

The empirical result shows that listed sampled commercial banks' return on equity is negative and significantly associated with the degree of financial leverage. This implies that holding other things remain constant, a 1 percent increase in the degree of financial leverage leads to about 0.031 percent decline in profitability, as the estimated coefficient of the degree of financial leverage is about -0.003072. The result of this study is consistent with the pecking order theory that postulates a negative correlation between the profitability and the degree of the financial leverage Myers (1984) and Myers and Majluf (1984). Also, the result of this study is consistent with the previous empirical studies, for instance, Taani ,(2013). Aragaw,(2015) and (Seyoum Tesfaye 2018).

Total asset (Log Size)

The result reveals that banks size had a positive relationship with profitability, and statistically insignificant (p-value = 0.5235) at 5 percent significance level, and it was in accordance with the expected sign. This implies that holding other things remain constant; every 1 percent increase in the bank's size had a resulted 0.05 percent decrease in profitability. It consistent with Belayneh (2011) but contrast with Tesfaye (2018).

Table 4.8 The Summary of expected and actual signs of explanatory variable

Hypothesis	**Expected sign**	**Actual result**
There will be a significant Negative effect of debt to asset ratio (TDA) on profitability	–	–
There will be significant Negative effect of debt to equity ratio (TDE) on profitability	–	–
There will be a significant Negative effect of capitalization ratio (CR) on profitability	–	+
There will be a significant Negative effect of degree of financial leverage (DFL) on Profitability	–	–
Bank size will have positive and significant effect on return on equity	+	+

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

The previous chapter presented the analysis of the findings and discussions of the study. The purpose of this chapter is to discuss the conclusions and recommendations. Accordingly, this chapter organized into two sub-sections. Section 5.1 presents the conclusions and section 5.2 presents the recommendations.

5.1. Conclusions

The broad objective of this study was to find the effect of financial leverage on Ethiopian commercial banks profitability. The degree of financial leverage measures the extent to which debt finance which forms a component of the capital structure, contribute to the debt obligation of the commercial banks. Based on the review of previous empirical studies and theories, this study investigated the effect of financial leverage on the profitability of Ethiopian commercial Banks over the period of 2009/10 to 2016/17 with a sample size of ten Ethiopian commercial Banks. The major explanatory variables that were used in this study are - degree of financial leverage and debt ratios. On the other hand, the study used one control variable namely: natural log of a total asset from bank size. To comply with the objective of this research, the study used quantitative research method. The quantitative data mainly obtained from National Bank of Ethiopia. Regression analysis (OLS) is adopted in order to identify and measure the effect of financial leverage on banks profitability.

The Panel EGLS (Cross-section random effects) regression analyses was in line with the specific research objectives and stated hypotheses formulated in the study. Consequently, the empirical findings of this particular study suggested the following conclusions.

Capital structure/Leverage as measured by debt to asset ratio had statistically significant negative relationship with profitability, 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. On the

other hand, debt to equity ratio had statistically insignificant negative effect while degree of financial leverage had significant negative relationship with profitability, which was also in line with prior expectation. This shows that unfavorable or negative leverage is said to occur when the firm uses funds obtained by issuing debt at a fixed interest rate less than the fixed financing costs paid. On the other hand, capitalization ratio had a positive and statistically significant relationship with profitability, which was not in line the expected sign. Furthermore, the effect of control variables on profitability of banks in this study, the result shows that, as there was positive and statistically significant relationship between spread and profitability, which is in line with prior expectation.

5.2. Recommendations

Based on the findings of the study the student researcher forwarded the following possible recommendations:

Based on the finding result, that financial leverage significantly affects the profitability of commercial banks by reducing taxable income via interest payments. Hence, advised to give due consideration to manage their debts in a way that reduce its negative impact on profitability and increase loan keeping the profitability of their loan portfolio in line with prescribed objectives and hence generate more interest income from the loan.

The managements of banks should also place greater emphasis on rising equity capital through retain earnings and /or issuing shares of stocks in order to obtain sufficient capital in financing their business operations. Hence, advised to reduce non-deposit source of debt financing.

Besides, the Ethiopian commercial banks also recommended developing strategies that will increase bank size like increase branch expansion and manage efficiently taking in to account the economics of scale benefit of bank size.

Future research direction

This study examined the effect of financial leverage on profitability of commercial banks in Ethiopian using Return on Equity as dependent variable and some of the measures of financial leverage such as debit to asset ratio, debt to equity ratio, capitalization ratio and degree of financial leverage as independent variables. Thus, further research is required to develop new hypotheses and design new variables by using internal variables (like asset structure and interest charges), as well as external variable (like exchanges rate, inflation and cost and financial decisions of bank's) as control variables to reproduce the effect of financial leverage on banks profitability.

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Appendices

Appendix I: Heteroskedasticity Test: White

Heteroskedasticity Test: White

F-statistic	1.329437	Prob. F(20,58)	0.1983
Obs*R-squared	24.83204	Prob. Chi-Square(20)	0.2079
Scaled explained SS	24.34414	Prob. Chi-Square(20)	0.2277

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 03/19/19 Time: 09:08
Sample: 1 80
Included observations: 79
White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.065612	0.129499	0.506660	0.6143
TDE^2	0.000200	0.000105	1.905544	0.0617
TDE*TDA	-0.003985	0.010122	-0.393739	0.6952
TDE*CR	-0.016498	0.005889	-2.801513	0.0069
TDE*DFL	-0.000802	0.000494	-1.623173	0.1100
TDE*LOGSIZE	0.000357	0.000227	1.577460	0.1201
TDE	-0.000993	0.009039	-0.109804	0.9129
TDA^2	0.004078	0.236048	0.017275	0.9863
TDA*CR	-0.234985	0.371525	-0.632489	0.5296
TDA*DFL	0.048393	0.024382	1.984745	0.0519
TDA*LOGSIZE	0.000196	0.028455	0.006893	0.9945
TDA	-0.015521	0.303091	-0.051209	0.9593
CR^2	0.224992	0.104996	2.142863	0.0363
CR*DFL	0.024526	0.010472	2.341929	0.0226
CR*LOGSIZE	0.001320	0.009403	0.140344	0.8889
CR	0.290949	0.280847	1.035970	0.3045
DFL^2	2.69E-05	1.57E-05	1.707093	0.0932
DFL*LOGSIZE	-0.000892	0.001261	-0.707688	0.4820
DFL	-0.029437	0.018641	-1.579111	0.1197
LOGSIZE^2	0.000472	0.000594	0.795219	0.4297
LOGSIZE	-0.010571	0.023945	-0.441478	0.6605

R-squared	0.314330	Mean dependent var	0.002768
Adjusted R-squared	0.077892	S.D. dependent var	0.004221
S.E. of regression	0.004054	Akaike info criterion	-7.955705
Sum squared resid	0.000953	Schwarz criterion	-7.325852
Log likelihood	335.2504	Hannan-Quinn criter.	-7.703367
F-statistic	1.329437	Durbin-Watson stat	1.998510
Prob(F-statistic)	0.198275		

Appendix II: Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.857419	Prob. F(4,69)	0.1278
Obs*R-squared	7.679537	Prob. Chi-Square(4)	0.1040

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 03/19/19 Time: 09:12
Sample: 1 80
Included observations: 79
Presample and interior missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.002619	0.103551	0.025296	0.9799
TDE	-0.000193	0.003715	-0.052016	0.9587
TDA	-0.000933	0.158666	-0.005880	0.9953
CR	6.73E-05	0.126401	0.000532	0.9996
DFL	0.000430	0.001287	0.333924	0.7394
LOGSIZE	-0.000109	0.006714	-0.016245	0.9871
RESID(-1)	0.321764	0.121983	2.637767	0.0103
RESID(-2)	-0.149018	0.132594	-1.123872	0.2650
RESID(-3)	0.105603	0.130984	0.806232	0.4229
RESID(-4)	0.001789	0.128333	0.013943	0.9889

R-squared	0.097209	Mean dependent var	-9.70E-17
Adjusted R-squared	-0.020546	S.D. dependent var	0.052949
S.E. of regression	0.053491	Akaike info criterion	-2.900798
Sum squared resid	0.197426	Schwarz criterion	-2.600868
Log likelihood	124.5815	Hannan-Quinn criter.	-2.780637
F-statistic	0.825520	Durbin-Watson stat	2.003487
Prob(F-statistic)	0.594865		

APPENDIX III: Ramsey RESET Test

Ramsey RESET Test
Equation: UNTITLED
Specification: ROE C TDE TDA CR DFL SIZE LOG(SIZE)
Omitted Variables: Squares of fitted values

	Value	df	Probability

t-statistic	1.174147	71	0.2443
F-statistic	1.378622	(1, 71)	0.2443
Likelihood ratio	1.519257	1	0.2177

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.003603	1	0.003603
Restricted SSR	0.189163	72	0.002627
Unrestricted SSR	0.185560	71	0.002614

LR test summary:

	Value	df
Restricted LogL	126.2702	72
Unrestricted LogL	127.0299	71

Unrestricted Test Equation:
Dependent Variable: ROE
Method: Least Squares
Date: 03/19/19 Time: 11:06
Sample: 1 80
Included observations: 79

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.171002	0.104161	-1.641718	0.1051
TDE	0.013872	0.006792	2.042348	0.0448
TDA	0.246158	0.155794	1.580019	0.1185
CR	1.208865	0.332781	3.632614	0.0005
DFL	-0.003294	0.001232	-2.673059	0.0093
SIZE	-3.45E-07	1.40E-07	-2.464292	0.0162
LOG(SIZE)	0.003393	0.008952	0.379010	0.7058
FITTED^2	-0.687634	0.585646	-1.174147	0.2443

R-squared	0.867977	Mean dependent var	0.223141
Adjusted R-squared	0.854961	S.D. dependent var	0.134236
S.E. of regression	0.051123	Akaike info criterion	-3.013414
Sum squared resid	0.185560	Schwarz criterion	-2.773470
Log likelihood	127.0299	Hannan-Quinn criter.	-2.917285
F-statistic	66.68359	Durbin-Watson stat	1.771387
Prob(F-statistic)	0.000000		

APPENDIX IV: Test cross-section random effects

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

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	5.735178	5	0.3328

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
TDE	0.010957	0.012814	0.000002	0.2248
TDA	0.145843	0.198299	0.004614	0.4400
CR	0.883637	0.738145	0.006705	0.0756
DFL	-0.003129	-0.003072	0.000000	0.7705
LOGSIZE	0.004244	-0.004581	0.000018	0.0367

Cross-section random effects test equation:
Dependent Variable: ROE
Method: Panel Least Squares
Date: 03/18/19 Time: 04:59
Sample: 2010 2017
Periods included: 8
Cross-sections included: 10
Total panel (unbalanced) observations: 79

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.097395	0.138432	-0.703561	0.4843
TDE	0.010957	0.004151	2.639447	0.0104
TDA	0.145843	0.184339	0.791166	0.4318
CR	0.883637	0.165996	5.323256	0.0000
DFL	-0.003129	0.001182	-2.647460	0.0102
LOGSIZE	0.004244	0.008302	0.511216	0.6110

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.897445	Mean dependent var	0.223141
Adjusted R-squared	0.875011	S.D. dependent var	0.134236
S.E. of regression	0.047458	Akaike info criterion	-3.088776
Sum squared resid	0.144143	Schwarz criterion	-2.638881
Log likelihood	137.0067	Hannan-Quinn criter.	-2.908534
F-statistic	40.00396	Durbin-Watson stat	1.793194
Prob(F-statistic)	0.000000		

APPENDIX V: RATIO DATA

ROE	TDA	TDE	CR	DFL	SIZE
0.263270	1.015006	8.575758	0.098963	1.290751	7944.78
0.275672	0.867901	6.711179	0.099433	1.177061	10115.78
0.244933	0.961287	7.125630	0.077971	0.368837	11936.68
0.252374	1.057823	7.815452	0.066994	0.698252	14858.82
0.244711	0.974068	7.725124	0.076952	0.963938	20028.79
0.208822	0.922741	7.127119	0.065296	0.291275	23869.61
0.194931	0.919071	7.132250	0.059691	0.679854	29609.6
0.215194	0.956527	8.610987	0.069279	0.952553	41974.86
0.288459	0.909082	9.997121	0.106727	1.032898	12353.38
0.322726	0.904746	9.498261	0.113747	1.082888	14659.79
0.356703	0.895684	8.584975	0.116709	1.082535	17520.04
0.296617	0.896406	8.653024	0.091558	-11.09331	19747.17
0.274283	0.881723	7.454725	0.086222	0.969367	21962.2
0.249371	0.881929	7.469492	0.074298	0.043188	24763.88
0.216525	0.882497	7.510399	0.062423	-0.191461	28576.43
0.189359	0.884678	7.671361	0.053041	0.147992	34624.6
0.240110	0.906762	9.725283	0.086863	1.809491	6279.536
0.273820	0.909157	10.013992	0.104875	0.968035	7277.959
0.238604	0.889996	8.088686	0.076671	0.893212	8239.509
0.195296	0.893686	8.172825	0.074527	0.000000	10129.37
0.292630	0.864410	6.375175	0.056938	1.100881	11276.39
0.161134	0.867530	6.548849	0.052969	10.259066	13667.55
0.169726	0.873757	6.921241	0.058682	0.686373	16828.06
0.185771	0.885298	7.718225	0.062871	0.998082	25324.8
0.321523	0.849764	5.656193	0.102662	0.949667	1055.619
0.351928	0.851296	5.706084	0.132368	1.074578	1613.423
0.307816	0.882802	7.532571	0.116329	0.161424	2394.237
0.190784	0.848272	5.583925	0.056703	0.241766	3248.475
0.280059	0.832598	4.976883	0.052718	4.653321	3924.765
0.200509	0.843087	5.375877	0.058117	-2.981459	4874.335
0.202356	0.864140	6.359261	0.062883	0.922813	7373.928
0.271023	0.864027	6.355330	0.065182	1.654114	9669.246
0.090680	0.810857	4.278120	0.000000	0.883032	1118.57
0.150209	0.849161	5.628093	0.038959	1.347221	1961.937
0.113133	0.843083	5.369207	0.035267	0.423737	2787.389
0.122217	0.860088	6.143159	0.043660	0.812196	3911.227

0.205567	0.878323	7.218441	0.064467	1.411990	6151.656
0.218805	0.813372	7.871642	0.000000	0.174629	9534.843
0.168225	0.883222	7.561092	0.052942	0.086688	11281.58
0.173131	0.897768	8.781664	0.051339	1.323521	16292.9
0.165263	0.822818	4.640256	0.000000	1.575309	1363.606
0.123963	0.804708	4.122747	0.048528	1.141248	1808.109
0.170711	0.820657	4.575941	0.062203	1.120988	2463.029
0.205571	D55/E55	4.428510	0.067132	0.363893	2942.429
0.153836	0.818779	4.712377	0.046489	-1.847931	3613.333
0.183155	0.859651	6.126850	0.083601	0.877793	5859.354
0.183347	0.868232	6.589077	0.076106	0.778803	8119.227
0.185285	0.868068	6.575985	0.053852	1.983801	10975.92
0.000296	0.651929	1.850954	0.000000	0.000000	480.114
0.083780	0.702860	2.361690	0.000000	1.422889	780.995
0.097014	0.789741	3.756029	0.037828	1.037395	1365.027
0.123497	0.824074	4.686181	0.053125	1.223912	2128.45
0.154726	0.828430	4.828508	0.050806	0.827246	3011.94
0.198468	0.849385	5.639486	0.065356	1.057547	4499.692
0.195036	0.859177	6.097160	0.061871	0.914840	6820.956
0.148840	0.862223	6.258089	0.045095	0.330195	9820.008
0.132793	0.893504	8.359744	0.000000	1.600879	1768.319
0.192296	0.901786	9.172856	0.000000	1.460754	2500.592
0.244524	0.886201	7.796960	0.000000	1.311416	3670.726
0.293781	0.893295	8.392374	0.100777	1.049745	6538.717
0.314719	0.851568	5.741142	0.108025	1.023651	7351.132
0.221445	0.876896	7.123804	0.107022	0.044336	11462.06
0.028645	0.882686	7.682243	0.000000	41.437549	10626.2
0.169108	0.914408	10.683390	0.000000	3.563539	17724.23
-0.05865	0.724609	2.686649	0.000000	0.000000	379.515
0.141522	0.835857	5.094038	0.031132	0.884332	913.799
0.142362	0.816236	4.441739	0.051817	1.131502	1285.033
0.138822	0.826465	4.759583	0.046044	0.568818	2197.31
0.081188	0.803217	4.075853	0.052944	0.675531	2813.456
0.142675	0.825788	4.740142	0.044707	1.236965	4171.94
0.250685	0.852670	5.787445	0.075901	1.128733	7196.297
0.250077	0.820280	4.564197	0.061155	0.825456	10488.88
0.354334	0.925123	12.354995	0.293257	0.238127	74186.91
0.457233	0.945198	17.248618	0.356308	0.932332	114264.9
0.703521	0.951299	19.559282	0.458756	1.146531	158814.4

0.675152	0.954348	20.796145	0.438576	0.677791	197104.2
0.623766	0.950750	21.658942	0.536276	0.578404	244128.4
0.659105	0.956335	21.901645	0.598636	1.716038	305075.1
0.058006	0.958135	2.289365	0.120331	0.411466	384693.1
0.024856	0.917644	1.114250	0.000000	0.164594	485700.1