

The Impact of Capital Structure on Profitability of Commercial Banks in Ethiopia

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Abstract

The choice of capital structure is one of the most important strategic financial decisions of firms. Since financing decisions influence profitability and hence firm's value, this study examines the impact of capital structure on profitability of core business operations of commercial banks in Ethiopia. In order to meet the objectives of this study a quantitative panel data methodology was employed. The panel data were obtained from the audited financial statements of eight commercial banks and National Bank of Ethiopia for the period of twelve years (2001/02 – 2012/13). It was observed that 89% of the total capital of commercial banks in Ethiopia in the period under study was made up of debt. Of this, 75% constitute deposit and the remaining was non-deposit liabilities. This has reaffirmed the fact that banks are highly levered institutions. 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. Therefore, banks should give due consideration to manage their debts properly, mobilize deposit sufficiently, increase loan advances, spread, and size in their financing decisions. Furthermore, banks also advised to reduce non-deposit debt financing and raise equity financing so that to keep costs of financing at minimum level and hence optimize profitability and the value of banks. Besides, the policy maker, National Bank of Ethiopia also recommended reconsidering to raise the minimum capital requirement for banks. Finally, future researchers also recommended assessing the overall performance of banks and other business sectors in the area of this research.

Keywords: Banks, Capital structure, Profitability, core business operation, and panel data.

1. Introduction

One of the major objectives of a firm is to maximize the wealth of owners or shareholders of the firm. The wealth of shareholders' in turn is defined as the current price of the firm's outstanding shares. In order to achieve this objective firm's management should take rational financing decisions regarding optimal capital structure which in turn would minimize its cost of capital (Goyal, 2013).

Capital structure refers to several alternatives that could be adopted by a firm to get the necessary funds for its investing activities in a way that is consistent with its priorities. Most of the effort of the financial decision making process is centered on the determination of the optimal capital structure; where the cost of capital is minimized and firms' value is maximized. Capital structure theory suggests that firms determine what is often referred to as a target debt ratio; which is based on various trade-off between the costs and benefits of debt versus equity. The theory of capital structure was first established by Modigliani and Miller 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 and agency cost theory.

The trade-off theory states that the optimal debt ratio is set by balancing the trade-off between the benefit and cost of debt. According to this theory, the optimal capital structure is achieved when the marginal present value of the tax shield on additional debt is equal to the marginal present value of the financial distress cost on additional debt (Myers, 1984). The pecking order theory emphasizes the information asymmetry between the firm insiders and the outside investors suggesting that firms use debt only when the internal financing is not available (Myers & Majluf, 1984). Besides, the agency cost theory predicts the capital structure choice based on the existence of agency cost. This theory investigates the relationship between the manager of the firm, and the outside equity and debt holders (Jensen & Meckling, 1976).

Commencing from Modigliani and Miller (1958), the literature on capital structure has been expanded by many theoretical and empirical contributions. For non-financial firms the empirical literature has generally focused on particular variables that have been found to be consistently correlated with leverage such as: age, size, growth, profitability, market-to-book ratio, collateral value and dividend policy. On the other hand, the capital structure of banks is still a relatively under-explored area in the banking literature. Currently, there is no clear understanding on how banks choose their capital structure and what factors influence their corporate financing behavior (Amidu, 2007). Likewise the relationship between capital structure and profitability is one that received considerable attention in finance literature. However, in the context of banking industry, the subject has received a limited research attention (Taani, 2013).

In Ethiopia, there are a few studies in relation to determinants of capital structure and determinants of profitability distinctly studied by deferent researchers such as, Ashenafi (2005) a case study in Addis Ababa Small and Medium enterprises, Amanuel (2011) evidence from manufacturing share companies of Addis Ababa city, and Bayeh (2011) evidence from Ethiopian insurance company. In addition, Weldemikael (2012) studied on determinants of capital structure of Commercial Banks in Ethiopia and Amdemikael (2012) also assessed factors affecting profitability of banks. But, no one was emphasized on the core business profitability of banks. Hence, as to the knowledge of the researcher there were no studies related to this title “The Impact of Capital Structure on Profitability of Commercial Banks in Ethiopia” with an emphasis on the profitability of core business operations of commercial banks in the country.

Therefore, given the unique features of banks’ financial structure and the environment in which they operate, there are strong grounds for a separate study on the impact of capital structure on profitability of banks in Ethiopia with due focus on the profitability of core business operations of commercial banks.

Hence, the aim of this study was to examine the impact of financing decision /capital structure on profitability of commercial banks in Ethiopia with an emphasis on core business operations profitability. This will equip financial managers with applied knowledge of the potential problems in profitability and capital structure, as well

as determining their optimal level of capital structure to achieve optimum level of firm's profitability and hence shareholders' wealth.

2. Statement of the problem

The choice of capital structure is one of the most important strategic financial decisions of firms. However, it has been the subject of substantial debate and investigation. The debate on what drives capital structure decisions and its impact on profitability is still open. Since the seminal work of Modigliani and Miller (1958), a number of theoretical literatures which led to the formulation of alternative theories were developed, such as the static trade off theory, pecking order theory and agency cost theory. These theories states about a number of specific factors that may affect the capital structure and profitability of firms such as size, tangibility, growth, risk, liquidity, age, and dividend payout, as well as how the capital structure or financing decision affect the value of firms.

However, the empirical evidence regarding the alternative theories is still debatable (Rajan & Zingales, 1995). For instance, static trade off-theory states that a firm's optimal debt ratio is determined by a trade-off between the tax advantage and bankruptcy cost of borrowing, holding the firm's assets and investment plans constant. This theory assumes that higher profitability lower the expected cost of distress; hence, firms increase their leverage to take advantage from tax benefits. That is, profitability is positively related with leverage. Due to the free cash flow theory of Jensen (1986) agency cost theory also supports this positive relation. However, the pecking order theory of Myers & Majluf (1984) suggests that firms use debt only when the internal financing is not available and argues against the existence of target capital structure. According to this theory profitability is expected to have negative relation with leverage.

The determinants of capital structure and firm value have been contested for many years and still represent one of the most unresolved issues in corporate finance literature. Only a few of the developed theories have been tested by empirical studies and the theories themselves lead to different, not mutually exclusive and sometimes opposed result and conclusion (Rajan & Zingales,1995). Morri & Beretta (2008) explained that numerous theoretical studies and much empirical research have addressed those issues, but there is no a fully supported and generally accepted theory; and the debate on the significance of determinant factors of capital structure and profitability/ firm value is still open.

Moreover, although earlier studies have great contributions to the theory of capital structure and profitability, they were limited to developed financial system and restricted to non-banks. Less developed countries like, Ethiopia, received little attention in the literature. According to Octavia & Brown (2008), the capital structure of banks are still a relatively under-explored area in the banking literature and the special nature of the deposit contract, the degree of leverage in banking and the regulatory constraints imposed on banks have meant that banks (and financial institutions in general) have been excluded in previous empirical studies on standard capital structure choice. However, understanding the determinants of capital structure and profitability as well as the impact of financing decision or capital structure on

profitability is as important for banks as for non-banks firms. According to Amidu (2007) currently, there is no clear understanding on how banks choose their capital structure and what factors influence their corporate financing behavior. Likewise the relationship between capital structure and profitability is one that received considerable attention in the finance literature. However, in the context of banking industry, the subject has received a limited research attention (Taani, 2013).

In the contexts of Ethiopia, there are a few studies in relation to determinants of capital structure and determinants of profitability distinctly studied by different researchers. For example, Ashenafi (2005) managed a case study in Addis Ababa Small and Medium enterprises, whereas Amanuel (2011) wrote using evidence from manufacturing share companies of Addis Ababa city. In addition, Bayeh (2011) assessed using evidence from Ethiopian insurance companies. Moreover, in the banking industry of the country, Weldemikael (2012) studied on determinants of capital structure of Commercial Banks in Ethiopia while Amdemikael (2012) assessed factors affecting profitability of banks with a focus on overall performance. However, no one was emphasized on the core business operations profitability of banks. For the purpose of this study core business operations of commercial banks was defined as ‘the banks’ operations of deposit mobilization and providing loans to customers’.

Besides, apart from some studies made outside Ethiopia, most of these studies attempted to test the determinants of capital structure and factors affecting profitability using comprehensive measures of profitability return on asset (ROA) and return on equity (ROE) as well as debt to total asset and capital adequacy as measure of leverage. Hence, didn’t take into account other measures of profitability particularly the *measure of profitability for core business operations of banking*

sector, net interest margin (NIM). In addition, in relation to explanatory variables past studies failed to investigate the impact of the *main source of banks’ external finance, deposit* and other factors such as loan to deposit, spread and growth of banks which believed to have great contribution to the core business operations of banks.

As to the knowledge of the researcher there were no studies related to this title “The Impact of Capital Structure on Profitability of Commercial Banks in Ethiopia” with an emphasis on the core business operations profitability of commercial banks in the country.

Knowledge of the impact of financing decision or capital structure on profitability of banks would help financial managers to predict and mitigate potential problems associated with their financing decision. Particularly, acquiring knowledge of the impact of capital structure on profitability of banks’ core business operations will have significant benefit to manage financing decision in a way that meets the goal of firms; shareholders’ wealth maximization.

Therefore, given the unique features of banks’ financial structure and the environment in which they operate, there are strong grounds for a separate study on the impact of capital structure on profitability of commercial banks in Ethiopia by emphasizing on banks’ core business operations profitability.

Hence, the aim of this study was to examine the impact of leverage/capital structure

on profitability of commercial banks in Ethiopia with an emphasis on banks' core business operations as it was defined as the banks' operations of deposit mobilization and providing loans to customers. The result intends to equip financial managers with applied knowledge of the potential problems in profitability and capital structure, as well as determining their optimal level of capital structure to achieve optimum level of firm's profitability so that to meet wealth maximization goal of firms. Furthermore, it intends to serve as a base for policy makers in considering the minimum capital requirement of banks operating in the country.

3. Objectives of the study

3.1 General objective

The general objective of this study was to examine the impact of capital structure on profitability of commercial banks listed in the National Bank of Ethiopia, with an emphasis on performance of core business operations of banks.

3.2 Specific objectives: the specific objectives of this study are:

- To investigate the relationship between capital structure variables and profitability of core business operation of commercial banks in Ethiopia.
- To examine the impact of financing decision or capital structure on profitability of core business operation of commercial banks in Ethiopia.

4. Research Hypothesis

To achieve the objectives of this study the following hypotheses were tested.

H1: There is no significant relationship between capital structure proxied by Total Debt to Asset and profitability of core business operations of commercial banks in Ethiopia.

H2: There is no significant relationship between capital structure proxied by Deposit to Asset and profitability of core business operations of commercial banks in Ethiopia.

H3: There is no significant relationship between Loan to Deposit and profitability of core business operations of commercial banks in Ethiopia.

H4: There is no significant relationship between Spread and profitability of core business operations of commercial banks in Ethiopia.

H5: There is no significant relationship between growth and profitability of core business operations of commercial banks in Ethiopia.

H6: There is no significant relationship between Asset size and profitability of core business operations of commercial banks in Ethiopia.

5. Research Design and Methodology

5.1 Research Design

As noted in Creswell (2003), in an investigative study there are three familiar types of research approaches to business and social research namely, quantitative, qualitative and mixed methods approach. Though, each approach has its own strengths and limitations, Creswell (2003) advocates that certain types of social research problems call for specific approaches. Considering the research problem and objective along

with the philosophy of the different research approaches, the quantitative nature of the data collected, quantitative research approach was found to be appropriate for this study.

Hence, to meet the objectives of this study, explanatory research design was adopted. Besides, this study used quantitative research approach to examine a stated objective because quantitative research is a systematic and scientific investigation of quantitative properties and phenomena and their relationships (Abiy, 2009).

Panel data of eight commercial banks for twelve years (2002 to 2013) was used. This is because of that panel data has the advantage of giving more informative data as it consists of both the cross-sectional information, which captures individual variability, and the time-series information, that captures dynamic natures of the data.

5.2 Source of data and collection methods

Given the research design, secondary data was used to meet the objectives of the study. As a result, the data for the banks' capital structure and profitability indicator variables was obtained from audited financial statements of the respective banks. Thus, the data were collected from National Bank of Ethiopia (NBE) and from the respective commercial banks. In order to avoid the risk of distortion in the quality of data, the data was the audited financial statements particularly balance sheet and income statement.

The study included eight commercial banks composed of two state owned and six private banks. Accordingly, this study used panel data of eight commercial banks for twelve years (2002 to 2013) resulted in 96 observations.

5.3 Sampling design

The population of the study was all commercial banks registered by National Bank of Ethiopia (NBE). Currently, as per NBE (2013/14) annual report the major financial institutions operating in Ethiopia are banks, insurance companies and micro-finance institutions. The numbers of banks operating in the country are 19, of which 16 are private banks, and the remaining 3 are state-owned. From these 19 banks only 18 banks are Commercial Banks. This is excluding the Development Bank of Ethiopia which provides banking service to the selected government priority sectors.

In line with balanced panel data approach, to meet the desired objective of this study and to make generalization from sample to population, the researcher used maximum combination of years and number of banks and achieved the maximum number of observations through purposive sampling technique. Thus, banks that operate less than twelve years were excluded from the sample. Due to this, from 18 commercial banks operating in the country this study takes sample of eight banks namely, commercial bank of Ethiopia (CBE), Construction and business bank (CBB), Dashen bank (DB), Awash international bank (AIB), Bank of Abyssinia (BOA), Wegagen bank (WB), United bank (UB) and Nib international bank (NIB) for the period of 2001/02 to 2012/13 (in which audited financial statements were available). Until the date of data collection for this study, most of banks were not finalized and submitted their audit report for the year 2013/14 to the National Bank of Ethiopia (NBE). As a result, the year 2013/14 data were excluded.

According to NBE 2013/14 report, the sample banks market share in terms of branch network and capital was 79.7 % and 75% respectively. Besides, they have good experience in the banking operation and the sample taken also 44.44 % of the total population of 18 commercial banks in the country. Hence, it is believed to make generalization from sample to population.

5.4 Data analysis method

Using statistical package EViews version 8.1 software, the collected panel data was analyzed using the descriptive statistics and multiple regressions. In the analysis of the descriptive statistics, the mean, standard deviation, maximum and minimum values were used to analyze the trends of the data.

Furthermore, diagnostic tests were managed in order to check the validity of the model based on the assumption of the Classical Linear Regression Model. Specifically, the assumption tests that were managed in this study include Heteroskedasticity Test, Autocorrelation Test, and test for Multicollinearity and Normality. Finally, the Hausman specification test was used to choose the appropriate model for this study between the random effect (RE) and fixed effect (FE) model. Thus, based on the result of this test, the fixed effects model was found to be appropriate and applied for the study.

Therefore, the multiple regression result of the fixed effect model used to analyze the impact of capital structure on profitability of core business operation of commercial banks of Ethiopia, and to examine the relationship between the variables used in this study.

5.4.1 Variables description and model specification

5.4.1.1 Variables description

5.4.1.2 Dependent Variable: Net interest margin (NIM)

Net Interest Margin (NIM) was used as a dependent variable and it measured as the difference between the interest income and interest expense divided by total interest earning assets. Okoth (2013) states that net interest margin reflect the cost of banks intermediation services and the efficiency of the bank. And hence, the higher the net interest margin, the higher the profit earned by the bank and the more stable the bank is. Therefore, it measures the profitability core business operations of banks.

The fact that the profitability of core business operation of banks would be directly and reasonably measured by net interest margin, this study examined profitability of banks' core business operation using net interest margin (NIM) as a dependent variable. Earlier studies also employed net interest margin (NIM) as profitability measure. Some of them are Taani (2013), and Okoth (2013).

The formula used to calculate the NIM was;

$$\text{NIM} = \frac{\text{Interest Income} - \text{Interest Expense}}{\text{Interest Earning Assets}}$$

5.4.1.3 Independent Variables

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 capital structure of banks. Goyal (2013), and Arkhaviyen (1997) found statistically significant negative rela-

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 was expected. For the purpose of this study it was calculated as:

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

Deposit to Asset (DPA)

As the major source of external finance is deposits, deposit to asset ratio was used as an independent variable to examine the impact of deposit on profitability of commercial banks in Ethiopia. Since the total debt of banks composed of deposit and non-deposit liabilities, this variable intended to show the impact deposit financing and hence the non-deposit financing decision on profitability. Abbadi & Abu-Rub (2012) found Positive relationship between deposit to asset and profitability. Based on the nature of banks operation and empirical evidences, in this study a positive relationship between deposit to asset ratio and profitability of banks were expected. The formula used to calculate this variable was;

$$DPA = \frac{\text{Total Deposit}}{\text{Total Asset}}$$

Loan to Deposit (LD)

The Loan to deposit (LD) ratio serves as bank liquidity measure. It measures the funds that banks utilized into loans from the collected deposits in the period under study. It validates the association between loans and deposits. Furthermore, as it is indicated in Makri (2014), it provides a measure of income source and the liquidity of bank asset tied to loan. Eltabakh, Ngamkroekjoti, & Siad (2014) found statistically significant positive relationship between profitability and loan to deposit ratio. Since, the major source of interest income comes from loans and with reference to empirical studies, in this study it was expected to have positive relation with profitability of core business operation of banks.

Loan to deposit calculated as:

$$LD = \frac{\text{Total loan}}{\text{Deposit}}$$

Spread (SPR)

The purpose of this variable in this study was to serve as control variable. Khumaloand, Olalekan, & Okurut (2011) used the definition of spread as the difference between income received on loans (divided by total loans) and interest paid on deposits (divided by total deposits). The empirical studies of Vickery (2011) and Irun-gu (2013) revealed a positive relationship between spread and net interest margin or profitability. Due to the fact that the profitability of core operations of banks depends on interest income and expense and in line with empirical evidences, in this study a positive relationship between spread and profitability was expected. The formula used to calculate was:

$$\text{Spread} = \frac{\text{Interest Income}}{\text{Loan \& Advance}} - \frac{\text{Interest Paid}}{\text{Deposit}}$$

Growth (AGR)

This variable included in the study to serve as a control variable. Percentage change in banks' asset has been used as a proxy for growth. Assets growth was used by many scholars in their studies, for example Goyal (2013) used asset growth as a growth opportunity of banks and found a positive relationship with profitability.

Ideally, a trend of positive relationship with net interest margin expected. A positive relationship to a large extent may imply operational efficiency in the banking sector of Ethiopia. A negative relationship between the dependent variables and growth however is an indication that Commercial banks in the country do not really efficient in utilizing the growth opportunity in their core business operation. In this study a positive relationship is expected between the dependent variables NIM and Asset growth (AGR). And for the purpose of this research it is calculated by the following formula.

Assets growth= (assets of current year-assets of previous year)/assets of current year

Asset Size (Size)

Asset size of banks was considered in this study as a control variable. In addition to its role as a control variable, size was introduced to determine whether economies or diseconomies of scale exist in the banking sector of Ethiopia.

Opoku et al. (2013) used as a control variable in the study of the impact of capital structure and profitability of listed Banks on the Ghana Stock Exchange. Arkhavein (1997) found a significantly positive association between size and bank profitability. Moreover, Short (1979) suggested that that since relatively large banks tend to raise less expensive capital and hence appear more profitable, size is closely related to capital adequacy of a bank. The implication is that as bank size increases, profitability increases as well. Nevertheless, many other studies suggested that little cost saving can be achieved by increasing the size of banks. Similarly, Berger (1987) contended that ultimately very large banks could face scale inefficiencies.

For the purpose of this study, bank size has been taken as the natural logarithm of the book value of total assets of the banks. The use of logarithm enables to get the real total assets of the banks due to its capability to standardize values thus bringing them on the same platform for a more efficient analysis to be done.

Since a statistically positive and significant association with the dependent variables will imply the existence of the scale efficiency hypothesis in the banking sector of Ethiopia, and hence, based on the above and theoretical ground, in this study a positive relationship between asset size and profitability was expected.

5.4.1.4 Model specification

As it is clearly indicated in the previous sections, panel data regression model was adopted for this study. Panel data was generated using both time series and cross-sectional data from the audited financial statements of the banks. It was also ideally used because it helps in the identification of effects that cannot be easily pointed out using purely cross- section or time series data, and other important features.

In this study and, the model used by Opoku et al. (2013) and Goyal (2013) with some modification to include relevant variable was applied. The modification was made to include net interest margin (NIM) as a dependent variable, explanatory

variables such as Deposit to asset (DPA) as a second measure of capital structure, loan to deposit (LD) as a measure of liquidity tide to loan, and spread as a control variable.

The general model;

$$Y_{it} = \alpha + \beta X_{it} + \mu_{it}$$

Where,

Y_{it} = is the dependent variable.

B_0 = 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 time periods.

The subscript i representing the cross-sectional dimension and t denote the time-series dimension.

Based on the above general model the effect of capital structure on profitability of core business operation of commercial banks were evaluated using the model outlined below;

$$NIM_{it} = \beta_0 + \beta_1 TDA_{it} + \beta_2 DPA_{it} + \beta_3 LD_{it} + \beta_4 \text{Log (SPR)}_{it} + \beta_5 AGR_{it} + B_6 \text{Log (SIZE)}_{it} + \mu_{it}$$

Where,

NIM_{it} = Net Interest Margin for bank i in year t

TDA_{it} = Total Debt to Asset ratio for bank i in year t

DPA_{it} = Total Deposit to Asset ratio for bank i in year t

LD_{it} = Loan to Deposit ratio for bank i in year t

Log (SPR)_{it} = Log of Spread for bank i in year t

AGR_{it} = Asset Growth for bank i in year t

Log (SIZE)_{it} = Log of Asset Size for bank i in year t

Summary of variables used in the Study and their expected sign/impact and associations with data source

Table 1: Summary of variables used in the Study and their expected sign/impact and associations with data source

Category	Variables	Measurement / Ratios used	Expected sign/ impact of Independent on the dependent Variable	Data source
Dependent variable	Net Interest Margin (NIM)	Net Interest Income / Interest Earning Assets		<i>sheet) of sample banks and data from National bank of Audited Statements (Income statement and Balance Ethiopia (NBE)</i>
Independent Variables	Debt to Asset	Total Debt/Total Asset	-	
	Deposit to asset	Total deposit/Total Asset	+	
	Loan to Deposit	Loan/Total Deposit	+	
	Spread	(Interest Income /Loan) - (Interest Expense / Deposit)	+	
	Growth	% Change in Asset	+	
	Size	Book Value of Total Asset	+	

6. Results and Discussion

In this study a sample of 8 commercial banks for 12 years (2001/02 – 2012/13) were considered. The audited financial statements, particularly balance sheet and income statements collected directly from the respective banks and National Banks of Ethiopia (NBE). In this study a profitability measure of the core business operation of banks, Net Interest Margin (NIM) was taken as a dependent variable. Whereas, the Total Debt to Asset (TDA), Deposit to Asset, Loan to Deposit, Spread, Growth, and Asset size were used as independent variables.

Table 2 provides a summary of the descriptive statistics of the dependent and independent variables for eight commercial banks of Ethiopia for the period of 12 years from year 2001/02-2012/03 with a total of 96 observations.

Table 2 Descriptive Statistics

	<i>NIM</i>	<i>TDA</i>	<i>DPA</i>	<i>LD</i>	<i>SPR</i>	<i>AGR</i>	<i>SIZE</i>
<i>Mean</i>	0.039370	0.887292	0.753913	0.701211	0.069144	0.270064	12,974.92
<i>Maximum</i>	0.057250	0.962570	0.871520	1.211720	0.117740	0.733210	197,104.00
<i>Minimum</i>	0.009500	0.719750	0.541460	0.296870	0.015190	-0.019100	314.00
<i>Std. Dev.</i>	0.010188	0.040360	0.071464	0.194006	0.018678	0.152710	29,382.92
<i>Observations</i>	96	96	96	96	96	96	96

Source: Financial statements of sample banks and own computation

As it is presented in the table, it includes the mean, standard deviation, number

of observations, minimum and maximum for the dependent and independent variables of the model. It shows the average indicators of variables computed from the financial statements.

The mean of Net Interest Margin (NIM) was 4% and standard deviation 1%. This means commercial banks in Ethiopia, under the period of study, earned on average 4% net interest margin from their investment in interest earning assets. This also means that on average, for each one birr investment in the interest earning asset of commercial banks there was 0.04 cent return in the form of net interest income. The highest NIM for a bank in a particular year was 6% and in the same way the minimum ratio for a bank in a year was 1%. Regarding the standard deviation, it means that the value of net interest margin can deviate from its mean to both sides by 1%.

The mean of debt ratio of the sampled banks in the study period was 89%. It reveals that debt represents nearly 89% of the capital of commercial banks in Ethiopia. The highest debt ratio for a bank in a particular year was 96% and in the same way the minimum ratio for a bank in a year was 72%. The value of debt to asset ratio can deviate from its mean to both sides by 4%. From the summary of statistics it was observed that 89% of the total capital of commercial banks in Ethiopia in the period under study was made up of debt. Of this, 75% constitute deposit and the remaining was non-deposit liabilities. This has reaffirmed the fact that banks are highly levered institutions.

Similarly, the mean of deposit to asset ratio of the sample banks in the study period was 75%. It reveals that total deposit represents on average nearly 75% of assets of commercial banks in Ethiopia. The highest deposit to asset ratio for a bank in a particular year was 87% and in the same way the minimum ratio for a bank in a year was 54%. The value of deposit to asset ratio can deviate from its mean to both sides by 7%. Furthermore, the loan to deposit ratio was used as a proxy for bank liquidity tide to loan. The mean of loan to deposit ratio of the sample banks in the study period was 70%. It reveals that loan represents on average nearly 70% of deposit of commercial banks in Ethiopia. The highest loan to deposit ratio for a bank in a particular year was 121% and this reveals that banks loan advances to customers from deposit and non-deposit sources of finance. This 121% was observed due to the highest loan to deposit ratio of Construction and Business Bank (CBB) in the year 2006. In the same way the minimum ratio for a bank in a year was 30%. The value of loan to deposit ratio can deviate from its mean to both sides by 19%.

Moreover, the descriptive statistics shows that the average value of the growth variable which represented by percentage change in asset was 27%. This implies that on average the commercial banks' asset increased by 27% over the study period. The maximum value of growth for the study period was 73% and the minimum value was -2%. The value of asset growth can deviate from its mean to both sides by 15%. Likewise, the mean of the firms' size which was represented by the book value of total assets was Birr 12,974.92 (in million) with a standard deviation of Birr 29,382.92 (in million). Total assets for the sample banks in the study period were ranged from Birr 314.00 (in million) to Birr 197,104.00 (in million). And this highest asset size was observed in the balance sheet of Commercial Bank of Ethiopia (CBE) in the

year 2013, and the possible reason for this also the aggressive branch expansion throughout the country and its investment in different assets such loan advances and other Investments/ bonds etc. Similarly, the minimum asset size was observed in the balance sheet of United Bank (UB) in the year 2002. The possible reason could be the year 2002 was its infant stage in the banking business operation.

Besides, summary of test statistic shows that the mean of spread was 6.9% with the standard deviation of 2%. Moreover, the study sample spread was ranged in between 2% to 12%.

6.1 Tests for the Classical Linear Regression Model (CLRM) assumptions

6.1.1 Assumption one: the errors have zero mean ($E(\epsilon) = 0$)

The regression model used in this study included a constant term. As clearly stated in Brooks (2008), if a constant term is included in the regression equation, this assumption will not be violated. Hence, this assumption was not violated in the study.

6.1.2 Assumption two: homoscedasticity (variance of the errors is constant ($Var(u_t) = \sigma^2 < \infty$))

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

Table 3 Heteroskedasticity Test: White

F-statistic 1.525723 Obs*R-squared 8.953416 Scaled explained SS 6.420028

	Prob. F(6,89)	0.1789
F-statistic 1.525723 Obs*R-	Prob. Chi-Square(6)	0.1762
squared 8.953416 Scaled	Prob. Chi-Square(6)	0.3778
explained SS 6.420028		

Source: Financial statements of sample banks and own computation

As it is indicated in table 3 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.

6.1.3 Assumption three: covariance between the error terms over time is zero ($cov(u_t, u_j) = 0$)

This is an assumption that the errors are linearly independent of one another (uncorrelated with one another). If the errors are correlated with one another, it would be stated that they are autocorrelated.

According to Brooks (2008), the null hypothesis is rejected and the existence of positive autocorrelation presumed if DW is less than the lower critical value; the null hypothesis is rejected and the existence of negative autocorrelation presumed if DW is greater than 4 minus the lower critical value; the null hypothesis is not rejected and no significant residual autocorrelation is presumed if DW is between the

upper and 4 minus the upper limits; the null hypothesis is neither rejected nor not rejected if DW is between the lower and the upper limits, and between 4 minus the upper and 4 minus the lower limits.

The DW test statistic value of the regression result of this study was 2.188048. There is 96 observations in the regression and 6 regressors excluding the intercept. As per the DW statistics significance table, at 5% significance level the relevant critical values for the test were $dL = 1.535$ and $dU = 1.802$, and the related calculated figures of $4 - dU = 2.198$ and $4 - dL = 2.465$. The test statistic (2.188048) fall between the upper ($dU = 1.802$) and 4 minus the upper limits ($4 - dU = 2.198$). Therefore, the null hypothesis is not rejected and no significant residual autocorrelation is presumed.

In addition, another test called Serial Correlation LM Test also managed to validate the result of the DW test result. The 4 lag and 5 lag Breusch-Godfrey Serial Correlation LM Test result as indicated in the below Table 4 and 5 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 Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.030354	Prob. F(4,85)	0.0974
Obs*R-squared	8.372465	Prob. Chi-Square(4)	0.0788

Source: Financial statements of sample banks and own computation

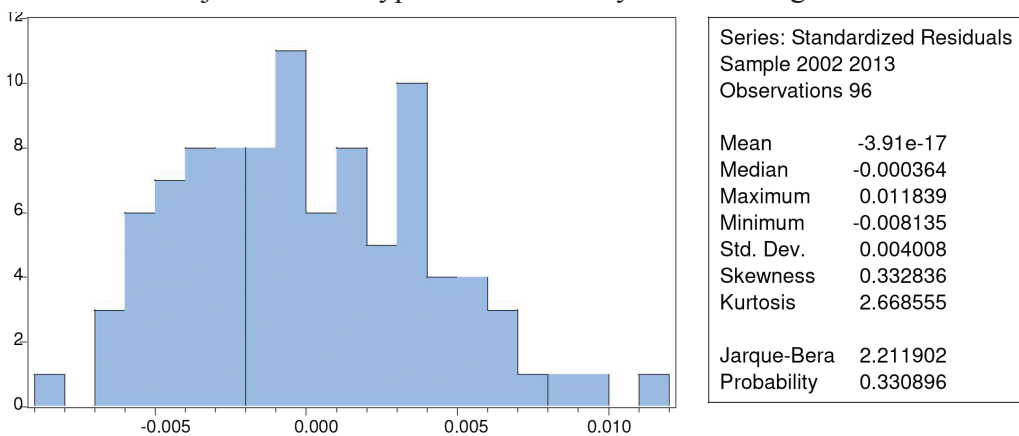
Table 5 Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.616500	Prob. F(5,84)	0.1645
Obs*R-squared	8.426357	Prob. Chi-Square(5)	0.1343

Source: Financial statements of sample banks and own computation

6.1.4 Assumption four: normality (errors are normally distributed ($ut \sim N(0, \sigma^2)$))

Brooks (2008) 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 not reject the null hypothesis normality at the 5% significant level.



Source: Financial statements of sample banks and own computation

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-val-

ue of 0.330896 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.

6.1.5 Assumption five: Multicollinearity Test

Brooks (2008), states that an implicit assumption that is made when using the OLS estimation method is that the explanatory variables are not correlated with one another. If there is no relationship between the explanatory variables, they would be 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 almost always occur but will not cause too much loss of precision.

But, a problem occurs when the explanatory variables are very highly correlated with each other, and this problem is 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. Perfect multicollinearity will usually be observed only when the same explanatory variable is 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 be considered as a problem of multicollinearity. In addition, Hair (2006) concluded that correlation coefficient below 0.9 may not cause serious multicollinearity problem.

The first test for multicollinearity shows the existence of Multicollinearity problem between the independent variables equity to asset ratio (EQA), total debt to asset ratio (TDA) and total debt to equity ratio (TDEQ). Hence, EQA and TDEQ dropped from the model, and hence the remaining TDA and deposit to asset ratio (DPA) used to represent banks' capital structure. After excluding the correlated variables multicollinearity test was made for the remaining independent variables.

The result of the final test for multicollinearity of this study is presented in Table 6 below.

Table 6 Correlation Matrix between independent variables

	<i>TDA</i>	<i>DPA</i>	<i>LD</i>	<i>LOG(SPR)</i>	<i>AGR</i>	<i>LOG(-SIZE)</i>
<i>TDA</i>	1.000000					
<i>DPA</i>	0.347989	1.000000				
<i>LD</i>	-0.265604	-0.441533	1.000000			
<i>LOG(SPR)</i>	-0.199782	0.172433	-0.649451	1.000000		
<i>AGR</i>	-0.167635	-0.108237	0.080373	-0.050093	1.000000	
<i>LOG(SIZE)</i>	0.423015	0.227919	-0.761712	0.604749	-0.251109	1.000000

Source: Financial statements of sample banks and own computation

Table 6, 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.

As it is clearly stated 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.

6.2 Results of the regression analysis

As stated in Brooks (2008), in financial research, there are two major classes of panel estimator approaches that can be employed. 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 was employed.

Table 7, presents the Hausman specification test which suggests the fixed effects model was better than random effects model as the p-value (0.0194), is less than 0.05 for dependent variables which imply that the random effects model should be rejected and thus, the analysis is based on the fixed effects estimates.

Table 7: Correlated Random Effects - Hausman Test

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	15.118808	6	0.0194

Source: Financial statements of sample banks and own computation

Table 8: Fixed effect model estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
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C	0.056808	0.014669	3.872756	0.0002*
TDA	-0.049924	0.021200	-2.354904	0.0209**
DPA	0.055023	0.012888	4.269174	0.0001*
LD	0.052479	0.003787	13.85696	0.0000*
LOG(SPR)	0.025600	0.002244	11.40700	0.0000*
AGR	0.002974	0.003001	0.990847	0.3247
LOG(SIZE)	0.002043	0.000735	2.779197	0.0068*

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.891708	Mean dependent var	0.039370
Adjusted R-squared	0.874540	S.D. dependent var	0.010188
S.E. of regression	0.003608		
Sum squared resid	0.001068		
Log likelihood	411.2974		
F-statistic	51.93942	Durbin-Watson stat	2.188048
Prob (F-statistic)	0.000000		

* Significant at 1% and ** significant at 5%

Source: Financial statements of sample banks and own computation

The fixed effect result in table 8 indicates that capital structure as measured by total debt to asset was statistically significant (p-value = 0.0209) at 5% level and had negative relation with profitability. Whereas, deposit to asset was strongly statistically significant (p-value = 0.0001) at 1% level and had positive relation with profitability, net interest margin.

Similarly, liquidity measured by loan to deposit was strongly statistically significant (p-value = 0.000) at 1% level and had positive relation with profitability, net interest margin. Likewise, spread was also strongly statistically significant (p-value = 0.000) at 1% level and had positive relation with profitability, net interest margin.

Besides, the fixed effect table 7 reveals that banks size as measured by legalism of book value total asset strongly statistically significant (p-value = 0.0068) at 1% level and had positive relation with profitability. However, growth had positive and statistically insignificant relationship with profitability with a p-value of 0.3247.

Moreover, the result shows that the adjusted R square was 0.874540 which indicates that about 87.45 % of the variability in profitability is explained by the selected explanatory variables (Total Debt to Asset, Deposit to asset, liquidity (Loan to deposit), Spread, Growth, 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.

7. Conclusion

The main objective of this study was to examine the impact of capital structure on profitability of core business operation of commercial banks in Ethiopia, and the relationship between leverage and profitability of commercial banks in Ethiopian. In order to conduct the empirical analysis, one dependent variable and six independent variables were selected from prominent previous research works on the impact of capital structure on profitability and by taking in to account the nature of banks operation. Net interest margin was taken as dependent variable, while the independent variables were debt to asset ratio, deposit to asset ratio, loan to deposit ratio, spread, growth and size.

It was observed that 89% of the total capital of commercial banks in Ethiopia in the period under study was made up of debt. Of this, 75% constitute deposit and the remaining was non-deposit liabilities. This has reaffirmed the fact that banks are highly levered institutions.

The results of the fixed effect estimation model showed the existence of the following relationship between profitability and six independent variables.

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, deposit to asset ratio had statistically significant positive relationship with profitability, which was also in line with prior expectation. Similarly, liquidity (loan to deposit) had a positive and statistically significant relationship with profitability, which was also 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. Besides, the results of the study indicated that bank size had statistically significant positive relationship with profitability, which was consistent with prior empirical evidences and the expected sign. The result also implies that the bigger the bank, the more economics of scale and hence more profitability. However, Growth had statistically insignificant relationship with profitability of core business operations of commercial banks.

In conclusion, the finding of the study suggests that capital structure had significant impact on profitability of core business operations of commercial banks. And implies managers need to consider this impact in their financing or capital structure decision.

8. Recommendations

Based on the findings obtained from the results, the following recommendations were made.

In line with the results of this study banks management should pay greater attention to those significant variables in determining their optimal capital structure and optimize level of profitability of their core business operations and hence, wealth of shareholders.

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 suffi-

cient capital in financing their core business operations and to expand their branch network which in turn creates greater market share and profitability. And hence, advised to reduce non-deposit source of debt financing.

In addition, taking in to account the effect of equity capital on profitability and stability of banks in the country, the policy maker, National Bank of Ethiopia also recommended reconsidering to raise the minimum capital requirement for banks. This also supported due to the fact that, while Ethiopia's new minimum capital requirement is higher than that of East African neighbors such as Kenya, Tanzania, and Uganda, it is lower than the minimum capital requirement for banks in Ghana, Zambia (foreign banks), and Nigeria (Ecobank, 2014)

Moreover, the management of banks should give due attention on deposit mobilization strategies so that to mobilize more fund in financing its core business operations and assets.

Furthermore, banks management should give due consideration to manage their debts in a way that reduce its negative impact on profitability of core business operations, and increase loan advances keeping the profitability of their loan portfolio in line with prescribed objectives and hence generate more interest income from loan advances.

Besides, the commercial banks also recommended developing strategies that will increase spread without affecting their competitive base in the banking business industry. Similarly, increase bank size and manage efficiently taking in to account the economics of scale benefit of bank size.

Finally, this study examined the impact of capital structure on profitability of core business operations of banks in Ethiopia using net interest margin as dependent variable and some of the measures of capital structure as independent variables. Thus, future researcher may address limitations by including internal variables such as equity to asset ratio and debt to equity ratio as well as external variable like inflation and GDP as control variables, so that to demonstrate the impact of other measure of capital structure and capital adequacy as well as external variables on the profitability of banks. Furthermore, future researcher may assess the impact of capital structure on the overall performance of banking industry and other sectors of the economy too.

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