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# Hanging Trade-off at Risk and Its Implication in Ethiopian Commercial Banks

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**Abstract:** Financing mix explains the way a firm finances its asset. Decision on banks financing mix is one of the challenging and debatable issues, but it is also a vital decision for their profitability and continued survival. By considering the imperative role of banks in the economy, this study was conducted to examine the effect of financing mix on financial performance of Ethiopian commercial banks for the period of 2005-2016. Out of eighteen (18) banks operating in Ethiopia, nine (9) of them were used in the study, considering the availability of data in the study period. Three models were used based on measure of financial performance; net interest margin, return on capital employed and return on equity. Whereas, debt to asset and debt to equity are used to measure financing mix and size was used as a control variable. The study adopted explanatory research design with quantitative research approach. The data collected from secondary source (audited annual reports) of sampled firms was analyzed through multiple regression technique, specifically, generalized linear model. The study revealed that financial performance indicators were negatively and significantly affected by capital structure proxies except return on equity, which was positively and significantly affected by debt to equity. The overall results indicated that financial performance of Ethiopian commercial banks was adversely affected by their financing decision and are not at tradeoff as well, which may lead to future bankruptcy.

**Keywords:** Financing Mix, Financial Performance, Trade-off Theory, Bankruptcy

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## 1. Introduction

In today's world, capital composition matters to most firms. Capital structure refers to the way a firm finances its assets through debt, equity or hybrid securities [1]. Capital structure is an imperative corporate decision since an optimal corporate financing mix can maximize the value of the company. The connection between capital structure and firm performance has been an interesting issue for many scholars. In 1958, Modigliani and Miller stated that, in a perfect market, how a firm is financed is irrelevant to its value [2]. However, in 1963 Modigliani and Miller proposed that the firm value can be increased by incorporating more debt into the capital structure because of tax advantage [3]. After the Modigliani and Miller theory, other scholars came up with several theories, like the trade-off theory, pecking order theory and theory of agency cost, which explains the

relevancy of capital structure on shareholders wealth, through world's imperfect market.

When the relative importance of optimal financing mix on company's financial performance was recognized, it has received considerable attention in finance literatures. In financial institutions such as banks, financing mix is somehow different from other non-financial institutions, due to the role deposits and loans play in such institutions. Banks often argue that, higher capital requirements will jeopardize their performance. This could occur when banks' cost of financing was to increase significantly due to more capital holdings. On the other hand, higher capital levels will allow banks to absorb a larger shock and alleviate the incentive of shareholders to take-on excessive risk. The rationale of such capital requirement is to prevent financial instability in the economic system through social efficiency [4].

Currently, there is no clear understanding on how banks choose their capital structure and what factors influence their

corporate financing behavior [5]. The economic theory does not help to solve this debate, because no consensus on the effect of capital mix on bank performance. The issues that are related to capital structure in the banking industry had received a limited research attention [6]. Additionally, as evidenced by the recent financial crisis; higher risk may be associated with higher leverage and higher expected return, so that the analysis of shareholders return should control risk-taking [7]. Thus, proper care and attention need to be given while determining capital structure of banks.

In developing economies where capital market is underdeveloped, most of firms and individuals rely on commercial banks for financing, which gives them a crucial role in the economy [8]. By considering the imperative role of banks in the economy and the essentiality of capital to the perpetual continuity of a bank, the need to examine the relevancy of optimal capital structure on the bank performance is vital. On the contrary, the capital structure of banks is still a relatively under-explored area and no clear understanding exists on how banks choose their capital structure [9]. Therefore, this study attempts to seek the relevance of maintaining trade-off between debt and equity in determining the performance of Ethiopian commercial banks.

## 2. Literature Review

### 2.1. Theoretical Review

Capital structure theories have diverse views on the relationship between capital mix and firm's value. In 1958, Modigliani and Miller presented a framework, for which capital structure is irrelevant for firms' value in a world of perfect market [2]. Later in 1963, however, they proposed that a firm value can be increased by incorporating more debt into the capital structure and thus the optimal capital structure of a firm should be made up of hundred percent debts, by capturing the effect of tax advantage on debt [3]. This effect explains why the funding mix is neutral for firm value; despite the cost of equity being superior to the cost of debt [4]. Indeed, consideration of tax system and bankruptcy costs suggested the existence of an optimal ratio of debt.

By relaxing the assumptions made by Modigliani and Miller, trade-off theory arises attempting to address imperfection. It stated that, with the incorporation of tax and bankruptcy costs into MM theorem, the tax benefit was still pertinently advantageous whereas, bankruptcy had a downsized cost. Accordingly, the firm seem to get an optimal value maximizing debt-equity ratio by trading off the advantages of debt against the disadvantages [10]. So, firms will set a target debt ratio and gradually will move towards achieving it. As the debt to equity ratio increases the bankruptcy cost will also increase because the debt holders will require higher interest rates but the shareholders will also obtain higher profits for their investments [11]. According to the trade-off theory, the manager should choose optimal capital structure that maximizes firm value. The optimal level is attained when the marginal value of the

benefits associated with debt issues exactly offsets the increase in the present value of the costs associated with issuing more debt [12].

Another school of thought is pecking order theory, which emphasize on the use of retained earnings as a first choice in the existence of information asymmetry, but when internal financing does not suffice, firms issue debt first and equity last [10, 13]. By incorporating debt in the financing mix, which creates differences in the goal of shareholders and managers, Jensen and Meckling developed the agency cost theory. The theory clarifies agency conflicts between managers and shareholders, which can be exacerbated with more bank capital [14]. Accordingly, there should be best combination of debt and equity capital that could minimize total agency costs. Banks often argue that, imposing tighter capital requirements will lead to a decrease in banking performance [15].

### 2.2. Empirical Review

Following the above-mentioned theories, researchers have devoted considerable efforts to observe the impact of capital structure on the performance of firms and they produced mixed results.

#### 2.2.1. Positive Conclusions

The impact of capital structure on performance of Jordanian banks was studied by using annual financial statements of 12 commercial banks listed on Amman Stock Exchange, which covers a period of five years from 2007-2011. By using net profit, return on capital employed, return on equity and net interest margin as profitability indicators, bank performance was significantly and positively associated with total debt; while total debt was found to be insignificant in determining return on equity in the banking industry of Jordan [6].

Another study used exponential generalized least squares approach of 100 listed firms over a period of 2006-2009. The study found that, there was a significant positive association between capital structure and performance. The measurement used were; return on asset, earning per share and net profit margin as proxies of performance and short-term debt to total asset, long-term debt to total asset and total debt to total asset as capital structure indicators [16].

The effect which capital structure have on banking performance of Pakistani banks during 2007-2011 was studied by utilizing data at Karachi stock exchange. Performance was measured by return on assets, return on equity and earnings per share and capital structure determined by long term debt to capital ratio, short term debt to capital ratio and total debt to capital ratio. Then, the study validated a positive relationship between capital structure and performance of banking industry [17].

#### 2.2.2. Negative Conclusions

The impact of capital structure on profitability of nine listed banks on the Ghana Stock Exchange was conducted using a panel data over the period 2005-2012. The study used

return on asset, return on equity, Tobin's q ratio, and economic value added to measure banks profitability; total leverage, debt to equity ratio and total liability of the banks to represent capital structure whereas, size and age of banks as a control variable. The result of this study revealed that the profitability of the listed banks was decreased significantly with an increase in their total leverage [18].

The relationship between capital structure and profitability of ten listed Sri Lankan banks over the past eight-year period from 2002 to 2009 was investigated. The study used debt to equity and debt to total fund to measure capital structure of firms whereas, net profit, return on capital employed, return on equity and net interest margin as profitability measures. Results of the investigation showed that a negative association between capital structure and profitability, except for the association of debt to equity and return on equity [19].

The impacts of capital structure on the performance of Bangladeshi banks was empirically examined by using panel data of 22 banks for the period of 2005-2014. The results revealed that capital structure inversely affected bank performance which was assessed by return on equity, return on assets and earnings per share [20].

### 2.2.3. Studies in Ethiopia

In Ethiopia, there were a few studies regarding the impact of capital structure on performance of a firm. A research conducted on the impact of capital structure on profitability of Ethiopian commercial banks by using data from 2009-2013, had used net interest margin as a proxy of profitability and debt ratio, deposit to asset ratio, and loan to deposit ratio as proxy of capital structure. The finding of the study revealed that debt ratio had negative relation to profitability, whereas deposit to asset and loan to deposit had positive effect on profitability [21].

Another study examined the impact of capital structure on financial performance of Ethiopian banks which measured profitability by ROA and ROE by using financial statement from the period of 2011-2015. The result indicated that there is a positive relationship between profitability and debt ratio, on the other hand, there was a mixed evidence on the association of profitability and debt to equity; the effect of debt to equity ratio was positive for return on equity, whereas it showed a negative effect for return on asset [22].

The above empirical studies clearly showed that, studies in Ethiopian commercial banks revealed no clear effect of capital structure on profitability. This might be due to the reason that different proxies were used to measure financial performance of banks. No single metric for performance is perfect, but overreliance in one measurement of performance was problematic on many levels.

The recent crisis has exposed that the reliance on RoE as a performance measure was a key incentive to excessive risk-taking in banks [23]. Even if RoE is the most popular and an internal performance measure of shareholders value, it does not take into account the institution's long-term strategy [24]. RoE also ignores risk and its weaknesses are even greater in

times of stress and crisis [25]. A comprehensive performance analysis framework needs to go beyond RoE, though not excluding it [26]. Return on equity may either reflect a good level of profitability or more limited equity capital, which makes it not to be sufficient alone in characterization of banks' performance.

On the other hand, net interest margin illustrates how successfully a bank manages its interest-bearing assets which make it the most appropriate criterion for evaluating the effectiveness and stability of banks' operations. As a result, it complemented returns on asset. Accordingly, net interest margin can serve as an important indicator of growing tensions or vulnerabilities in the banking sector. However, the tendency towards a declining net interest margin can be seen as a positive development as well, since it suggests greater efficiency of the banking system in redistributing resources [27].

Therefore, in order to achieve the objectives, this study utilized RoE, NIM and RoCE as bank performance indicators to get rid of one metric's limitation by the benefit of the other. Empirical studies on Ethiopian banks that could link capital structure with performance were limited and then more empirical work were required. With this respect, this study has attempted to fill the gaps in the literature.

## 3. Methodology

The study attempted to examine the relevance of capital structure choice on the performance of Ethiopian commercial banks. There are eighteen commercial banks in Ethiopia. In order to provide reliable and most updated result, the study used twelve years data from the year 2005-2016. All commercial banks which had audited financial statements from 2005 and on ward were considered under the study. Thus, only 9 banks were selected which had audited financial statement from 2005 and onwards. The nature of the data was both cross-sectional and time series, therefore panel data is considered. Based on the nature of the objective, the research design was explanatory with quantitative approach.

### 3.1. Variable Selection

Based on previous empirical studies, the study used the most common measure of profitability; return on equity, return on capital employed and net interest margin [6, 16, 18, 19]. However, because of impracticability and inconsistency in Ethiopian financial system, some variables like economic value added, Tobin's q ratio and banking system profits which can be measured by maximum lending rate were not used. Total debt to total equity and total debt to total asset were identified as measures of capital structure and size of the bank was selected as a control variable from previous studies [6, 17, 18, 19]. Therefore, the variables listed in table 1 were used in the study to examine the impact of capital mix on financial performance of banks.

Table 1. Summary of variables used and their measurement.

Variables	Measurement
Dependent Variable:	
Return on Equity (RoE)	Net profit / Equity
Return on Capital Employed (RoCE)	Earnings Before Interest and Tax/ Capital Employed
Net Interest Margin (NIM)	(Investment Return-Interest Expense)/Average Earning Asset
Independent Variable:	
Total Debt to Total Equity (DE)	Total Debt/Total Equity
Total Debt to Total Asset (DA)	Total Debt/Total Asset
Control Variable:	
Size (SIZE)	Natural Logarithm of Total Assets

3.2. Model Specification

Due to the nature of the data, panel data model was adopted, with generalized linear regression model. The following general empirical research model was developed from previous empirical studies.

$$Y = \alpha + \beta_1 X_{it} + e_{it}$$

Where; Y= profitability of banks  
 X<sub>it</sub>= the control and independent variables  
 β<sub>1</sub> = the coefficients of the explanatory and controllable variables  
 e<sub>it</sub> = the error term. It has zero means, constant variance and non-auto correlated

Therefore, by adopting the above general model, the following three models were outlined.

$$NIM_{it} = \beta_0 + \beta_1(DA_{it}) + \beta_2(DE_{it}) + \beta_3(SIZE_{it}) + \epsilon_{it} \quad (1)$$

$$RoCE_{it} = \beta_0 + \beta_1(DA_{it}) + \beta_2(DE_{it}) + \beta_3(SIZE_{it}) + \epsilon_{it} \quad (2)$$

$$RoE_{it} = \beta_0 + \beta_1(DA_{it}) + \beta_2(DE_{it}) + \beta_3(SIZE_{it}) + \epsilon_{it} \quad (3)$$

Where;  
 RoCE<sub>it</sub> = Profitability of Bank i at time t as expressed by Return on Capital Employed  
 NIM<sub>it</sub> = Profitability of Bank i at time t as expressed by Net Interest Margin  
 RoE<sub>it</sub> = Profitability of Bank i at time t as expressed by Return on Equity  
 DA<sub>it</sub>= Total Debt to Total Asset of bank i at time t  
 DE<sub>it</sub> = Total Debt to Total Equity of bank i at time t  
 SIZE<sub>it</sub> = log of Total Asset of Bank i at time t  
 ε<sub>it</sub> = Error term where i is cross sectional and t time

Table 2. Descriptive statistics.

	NIM	RoCE	RoE	DA	DE	SIZE
Mean	0.045331	0.133009	0.481875	0.877446	16.56329	8.927028
Median	0.045502	0.136447	0.367470	0.887771	12.72791	8.902609
Maximum	0.083333	0.278752	2.948711	1.082126	91.75674	12.57066
Minimum	0.017325	-0.45580	-0.034628	0.131783	0.150442	4.859812
Std. Dev.	0.011467	0.085564	0.395824	0.098355	14.06757	1.342093
Observations	107	107	107	107	107	107

4.2. Unit Root Test

A unit-root test was computed on the panel data in order to avoid spurious regression. The method applied was

identifier  
 β<sub>0</sub> = Intercept

4. Results and Discussion

4.1. Descriptive Statistics

Table 2 shows descriptive statistics for all variables used in the analysis to overview their overall nature. The mean of performance indicators, measured by NIM, RoCE and RoE, were 4.53%, 13.3% and 48.19% respectively. This showed that Ethiopian banks were generating positive return and the highest value was scored by earning on equity. However, the standard deviation of return on equity was 0.39 which relatively revealed the existence of highest deviation than the other performance indicators. The lowest mean value of performance indicator was attained from NIM, which could be seen in two dimensions: first, it might indicate high efficiency of banks operation through balancing deposit with loan and second, it might indicate a limited loan was provided. The later might be true for Ethiopian commercial banks because their mean value of loan to deposit was 59% over the specified periods. Furthermore, the minimum value of RoE and RoCE had a negative sign which implied that there were banks that generates loss through their operation.

The debt to asset ratio and debt to equity ratio had a mean value of 0.88 and 16.56 and standard deviation of 0.09 and 14.06 respectively. This showed that banks in Ethiopia were operating in a significant level of debt. However, there exists high level of standard deviation and also substantial gap between the maximum and minimum values of debt to equity ratio among the Ethiopian banks, which indicates the existence of high variation in their debt to equity composition.

Augmented Dickey-Fuller test (table 3) to check whether the findings can hold in the long run. The hypothesis tested is that all panels contain unit-root and it was rejected, showing that all variables considered have a stationary trend.

Table 3. Augmented Dickey-Fuller test.

Variable	Statistics	P-Value	Decision
NIM	62.2786	0.0000	Stationary**
RoE	38.4793	0.0033	Stationary*
RoCE	35.1610	0.0090	Stationary*
DA	45.7534	0.0003	Stationary*
DE	43.9272	0.0006	Stationary*
SIZE	58.9346	0.0000	Stationary*

\* indicates rejection of the null hypothesis at level

\*\*indicates rejection of the null hypothesis at first difference

#### 4.3. Correlations

Correlation matrix was prepared to determine the degree of relationship between variables and to check whether multicollinearity exist among the independent variables. Table 4 below showed that the NIM was negatively correlated with DA and DE; RoE was positively correlated with DA and DE; and RoCE was correlated positively with DA and negatively with DE. The correlation coefficients between independent variables were below 0.7 which implied multicollinearity was not a serious problem [28].

Table 4. Correlation matrix.

	NIM	RoE	RoCE	DA	DE	SIZE
NIM	1					
RoE	-0.325261	1				
RoCE	-0.255501	0.105114	1			
DA	-0.594737	0.329432	0.214273	1		
DE	-0.446869	0.896248	-0.115928	0.399573	1	
SIZE	-0.436175	0.295518	0.490960	0.529020	0.267655	1

#### 4.4. Regression Analysis

Before running the regression analysis, the study undertook white's test for checking the existence of Heteroskedasticity and the result revealed that there was no evidence of Heteroskedasticity, because the p-values for NIM, RoE and RoCE were above 0.05. Bera Jarque test was employed for testing normality and the result showed that the disturbances were normally distributed, because the p-values were greater than 0.05 for all models. Durbin-Watson test was computed for testing autocorrelation and the result revealed that there was autocorrelation problem. Therefore, to mitigate this problem generalized linear model was used to run the regression. Furthermore, to select the most important explanatory variables for each model stepwise regression procedure was employed (table 5).

The residual sum of square indicated that how well the models were fitted the data by measuring the amount of error remained between the regression function and the data set, then the lower its value, the better the model describes the response. Sum of square residual was 0.0080, 0.5371 and 3.13 for the first, second and third models respectively (table 5). The stepwise regression model resulted that, DA, DE and SIZE as explanatory variables for the first model; DE and SIZE as explanatory variables for the second model and DE, DA and SIZE for the third model (table 6).

Table 5. Regression Result.

Explanatory variable	Dependent variables											
	NIM (Model 1)				RoCE (Model 2)				RoE (Model 3)			
	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.
C	0.102959	0.008305	12.39670	0.0000	-0.177264	0.067816	-2.613914	0.0090	0.097404	0.163888	0.594331	0.5523
DE	-0.000195***	6.68E-05	-2.916012	0.0035	-0.001681***	0.000545	-3.082594	0.0021	0.025418***	0.001318	19.28536	0.0000
DA	-0.048951***	0.010846	-4.513082	0.0000	0.031227	0.088564	0.352589	0.7244	-0.335000	0.214032	1.565190	0.1175
SIZE	-0.001283*	0.000756	-1.695975	0.0899	0.034806***	0.006175	5.636572	0.0000	0.028836*	0.014923	1.932270	0.0533
	Sum squared resid		0.008057		Sum squared resid		0.537198		Sum squared resid		3.137408	
	Pearson SSR		0.008057		Pearson SSR		0.537198		Pearson SSR		3.137408	
	Pearson statistics		7.82E-05		Pearson statistics		0.005216		Pearson statistics		0.030460	
	LR statistic		75.18468		LR statistic		45.79504		LR statistic		442.2254	
	Prob (LR statistic)		0.000000		Prob (LR statistic)		0.000000		Prob (LR statistic)		0.000000	

\*\*\*Significant at 1%; \*\*Significant at 5%; \*Significant at 10%

Table 6. Stepwise Regression.

NIM (Model 1)				RoCE (Model 2)				RoE (Model 3)			
Variable	Coefficient	t-Statistic	Prob.*	Variable	Coefficient	t-Statistic	Prob.*	Variable	Coefficient	t-Statistic	Prob.*
C	0.102959	12.3967	0.0000	C	-0.160157	-3.394546	0.0010	DE	0.025193	20.01744	0.0000
DA	-0.048951	-4.5130	0.0000	DE	-0.00162	-3.144556	0.0022	DA	-0.243991	-1.636742	0.1047
DE	-0.000195	-2.9160	0.0044	SIZE	0.035847	6.636404	0.0000	SIZE	0.031103	2.162588	0.0329
SIZE	-0.001283	-1.6959	0.0929								
R-squared		0.421948		R-squared		0.306937		R-squared		0.810439	
Adjusted R-squared		0.405112		Adjusted R-squared		0.293609		Adjusted R-squared		0.806794	

The regression result revealed that both capital structure indicators (DA and DE) had a significant negative impact on NIM which means that with an increase in debt to asset and

debt to equity ratio adversely affected net interest margin of Ethiopian banks. The core business of banks is to accept deposits and lend advances. Thus, this could make the net

interest margin very important in measuring banks performance. Whereas, the result implied that financing mix of Ethiopian banks adversely affected the effectiveness of banks' interest-bearing assets. This result was consistent with previous studies, which showed a significant negative impacts of capital structure variables on net interest margin [6, 29].

The effect of DE on RoCE was negative and significant, which implied that Ethiopian banks' efficiency on using their employed capital in generating profit was unfavorably affected by an increase in debt to equity ratio. The literature showed mixed result on this aspect, where some findings are in line with the study's result, others documented a contrary insignificant relation [6, 19, 29]. The effect of DE on RoE was positive and significant. This impact revealed that, as debt to equity ratio increases, return on equity will also increase. This was because, when banks used more debt, they were required to invest less of their own funds. Such a limited equity capital might result a good level of return on equity. Thus, increasing debt might improve RoE, but its impact was not limitless. This might be noted when company's debt is progressing on the cost of equity, it will push the company to high financial risk and high debt cost. In spite of this, return on equity did not create a long-term value for shareholders. This result was also in agreement with the previous literatures [17, 22].

## 5. Conclusion

The study was empirically investigated the relevance of capital structure in determining performance of nine commercial banks for the period of 2005-2016. Further, this study identified which capital structure theory can be applied for Ethiopian banks. The result of the study showed that, the financing mix of Ethiopian banks were inversely affected their performance as measured by RoCE and NIM; positively affected by RoE. Ethiopian banks were highly leveraged institutions; as debt to equity showed an average value of 16.56 which was very high. The reason of using more debt was primarily for lowering the effect of cost of debt by taking the advantage of tax deductibility, but at the same time it might harm when the debt equity ratio increases where the cost of debt was more than the advantage of tax deductibility. The negative impact of financing mix on performance indicators depicted the aggressive leveraging practices of Ethiopian banks which cause high interest expenses. This negative relationship was created by not holding optimal capital structure where the marginal value of tax shields on additional debt was offset by the cost of financial distress which was an implication of hanging trade-off at risk.

In fact, the ultimate purpose of any profit-seeking organization was to preserve and create wealth for their owners; the positive impact of financing mix on RoE might be seemed as favorable for shareholders however, this performance measurement ignores the debt effect and not risk sensitive. Bearing in mind that, RoE was a snapshot of the current health of the institutions and a short-term indicator; the increment of debt might put the firm in financial difficulties and the positive leverage effect of debt financing on RoE turns into negative in

the long run. These could signal red flag for bankruptcy.

Therefore, the study concluded that, there was a significant negative impact of financing decision on performance of Ethiopian banks. However, the underdeveloped stage of financial market in Ethiopia with severe restrictions on financial resources might have an effect on financing decision. This study also suggested that financial analysts should try to identify the optimal mix of debt and equity in Ethiopian banks and should attempt to up hold it as much as possible which in turn favorably affect their performance. Accordingly, Banks in Ethiopia should not only be interested in mobilizing deposits, but they must also be concerned with utilizing their deposit through providing loan that would assist availability of credit for business at competitive lending rate, which in turn contribute important role in the country's economic development.

Although this study examines the impact of capital structure on Ethiopian commercial banks performance and relates its result with trade-off theory, some of its result opens an indication of agency problem which makes it to be seen from agency theory perspective which tries to explain the impact of shareholder, managers and creditors behavior and cost on financial structure. Therefore, future research should examine the impact of financing mix on commercial banks performance through agency theory by incorporating behavioral indicators into the study. Furthermore, for a better understanding, future research is suggested to incorporate various performance indicators as control variables to confirm the findings of this study and to generalize the findings beyond the banking sector.

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