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Capital Structure and Firm Profitability: An Empirical Investigation

Dr. Huda Alsayed
Affiliation 1: Faculty of Business School, King Khalid University, P.O. Box 9004, Abha,61413, Saudi Arabia

Abstract: This study looks into the relationship between capital structure and the organizational profit of organizations listed on the Saudi stock market. A cross-sectional regression analysis was conducted to achieve the research objectives. OLS, fixed-effect, and random-effect models, as well as the Hausman test, are used to analyze the data for 121 non-financial firms between 2009 and 2020. The Stata program analyzes the hypotheses by giving a sample of 1573. The sample companies are from various industries, resulting in more diverse outcomes. The dependent variables are the return on equity and the return on assets.
In contrast, independent variables are (SDA), (LDA), (TDA), and the control variables are the size and (SG). The results indicate that only short-term debt (STD) has a significant negative relationship with a firm's accomplishment, measured by ROE, consistent with Hamid et al. (2015). For ROA, total debt (TDA) has a significant negative relationship with ROA. This indicates that capital structure combining long and short debt affects ROA negatively. Finally, the results reveal that both firms' performance is significantly related to the control variable (firm size), and SG sales growth has no significant relation. For the benefit of scholars and decision-makers, the author offers a recommendation. The implementation of an improved system could lead to enhanced organizational performance and increased revenue.

Keywords – Capital structure, Firms, performance, Saudi Arabia, finance, decision.

I. Introduction

In corporate finance, capital structure and profitability are key concepts that are crucial for evaluating a company's financial health. Navigating financial decision-making processes requires investors, managers, and politicians to understand how these concepts interact.

Capital structure refers to a company's combination of financial assets, specifically the ratio of debt and equity used to fund its operations and investments. Debt typically refers to loans, bonds, and other forms of borrowing, while equity represents the ownership interests held by shareholders. Decisions regarding the proportion of debt and equity within a company's capital structure have a significant influence on its risk exposure, cost of capital, and financial flexibility.

Numerous theories have been developed to explain how firms determine their optimal capital structure. For example, Modigliani and Miller (1958) claim that, under the concept of the perfect capital market proposition—which maintains that there are no bankruptcy costs and that capital markets are frictionless and tax-free—the firm's value is independent of its capital structure. Since debt can lower the taxes owed, a 100% debt capital structure is the ideal business structure. Since then, several hypotheses, including the Agency Cost theory, the Pecking Order theory, and the Static Tradeoff theory, have been developed to explain a firm's organizational structure. The company's choice of funding source will impact its competition in the industry. As such, companies need to manage their debt-to-equity ratio carefully to maximize profitability. Conversely, profitability evaluates a firm's ability to generate earnings relative to its expenses and other related costs. It is a key metric of both financial performance and operational efficiency, indicating how successfully a company's operations generate value for its shareholders. Analysts and investors frequently utilize net profit margin, return on equity (ROE), return on assets (ROA), and earnings per share (EPS) as profitability metrics.

The corporate finance literature demonstrates a connection between capital structure and profitability, a topic that has been the subject of ongoing discussion. On the one hand, increasing leverage—a greater reliance on debt financing—can, via financial leverage, enhance returns for stock investors and possibly boost profitability. Conversely, excessive debt can significantly undermine a company's financial stability, resulting in higher interest expenses and an increased risk of bankruptcy, all of which can negatively impact profitability.y.

The relationship between profitability and capital structure is particularly crucial in Saudi Arabia, given the unique market dynamics, regulatory frameworks, and economic conditions that differ from those in other regions. This paper's goal is to address the gap by empirically analyzing the connection between profitability and capital structure

among non-financial companies listed on the Saudi Stock Exchange from 2009 to 2020, thus providing more contemporary and relevant insights. Compared to previous research, this paper covers a more comprehensive and significant number of enterprises —121 firms —and is not restricted to any particular industry. That could give a complete picture of the Capital structure's impact on business performance in Islamic countries. In addition, a panel data regression analysis is conducted using a balanced panel data set with fixed effects, Random effects, and ordinary least squares models. Finally, the Husman test is performed.

The paper is organized as follows: the introduction is presented in the first section, followed by the literature review in the second section. The methodology and results are discussed in Sections 3 and 4, respectively. The final sections, five and six, cover the discussion and conclusion.

II. Literature Review:

This literature review examines various theoretical frameworks and empirical research that investigate the relationship between capital structure and financial success, with a specific emphasis on Saudi Arabia and other emerging markets. By synthesizing the results of previous research and identifying significant trends and insights, we aim to deepen our understanding of the processes that influence financial decision-making and company performance in the Saudi Arabian market.

Ebaid (2009) studied the Egyptian industry and examined the impact of capital structure on firms' performance. Gross profit margin (GM), return on assets (ROA), and return on equity (ROE) are the dependent variables. Conversely, the independent variables include the proportion of total debt to total assets (TTD), the long-term debt-to-total assets ratio (LTD), and the short-term debt-to-total assets ratio (STD). The independent and dependent variables have a significant inverse relationship.

Gill and colleagues (2011) investigated the impact of capital structure on the performance of several U.S. firms listed on the New York Stock Exchange (NYSE). The ratios of short-term debt to total assets (SDA), long-term debt to total assets (LDA), and total debt to total assets (DA) are three independent variables. The return on equity is the dependent variable. The findings of the paper present that the ratios of short-term and total debt to total assets are correlated with profit in the assistance sector. On the other hand, in the industrial sector, there is a positive correlation between profitability and all independent factors.

Twairesh (2014) conducted an empirical study to examine the relationship between the performance of Saudi Arabian non-financial enterprises and their capital structure. A panel econometric method called fixed effect regression was used from 2004 to 2012. A sample of 74 companies is provided. They use (ROA) and (ROE) as operating performance, and (STD), (LTD), and (TD) as a proxy for capital structure. Size is a control variable that has been shown to influence a company's performance. According to the study, TD, LTD, and STD all significantly affect ROA. While LTD significantly affects ROE.

Kamaruzzaman et al. (2015) investigated the effect of capital structure on the financial performance of several Malaysian companies between 2009 and 2011. The return on equity (ROE) is the dependent variable in this analysis; (TDA) and (SDA) are the independent variables. The findings show that profitability and the short-, long-, and total debt ratios are negatively correlated. Furthermore, Abeywardhana (2015) examined the effect of capital structure on the financial performance of small and medium-sized non-financial businesses in the United Kingdom between 1998 and 2008. Return on capital employed (ROCE) and return on assets (ROA) ratios are dependent variables. The independent factors include short-term debt to total debt (STD)(TD), equity debt (GERINGR), (TD), (LTD), and (STD). Two-Step Least Squares (2SLS) is the statistical approach that is applied. The results show that capital structure and performance proportions are negatively correlated.

Singh and Singh (2016) examined the top ten companies in India's cement sector. They studied the effect of capital structure on financial success over a five-year period. Gross profit, capital return, and equity return are the dependent variables, while debt-to-equity and debt-to-total funds are the independent variables. Pearson correlation was used only in their analysis, which is considered insufficient. The findings demonstrate a negative relationship between all independent and dependent variables.

Anrfo and Appiahene (2017) study the influence of profitability and capital structure on several financial institutions in African countries for the period between 2009 and 2015. They use the adjusted return on assets, adjusted return on equity, and net interest as the dependent variable, while the independent variable is the debt ratio. They use the panal regression in their analysis. Their finding demonstrates a positive relation between the independent variable and adjusted return on assets, adjusted return on equity, and net interest variables.

Rosikah et al. (2018) studied the Indonesian stock market for 32 non-financial companies from 2006 to 2010. Their principal findings demonstrate that the return on assets has a significant positive effect on Tobin's Q, while the return on equity has no impact on Tobin's Q.

Abdu Ja'afaru BambalE et al. (2019). The research assesses the effect of business portion, capital structure, and other control variables on firm performance in about 27 Nigerian Stock Exchange-listed insurance firms. Financial performance is proxied by return on equity and return on assets, while capital structure is proxied by total debt, short-term debt, and long-term debt. This investigation concludes that the explanatory variables possess a substantial influence on the value of insurance firms in Nigeria. Therefore, the research suggests that the capital structure of insurance companies in Nigeria primarily consists of short-term debt, as it enhances the company's value and avoids the use of long-term debt, which can decrease the company's value. Additionally, the administration should maintain or increase the total assets, as this enhances the company's size and value.

Abdullah M. Al-Awadhi and others (2020) examined whether a company's religious surroundings impact its capital structure. They use data from Saudi Arabia, a country with a primarily Islamic religious landscape. According to the authors, firms operating within an Islamic context generally exhibit lower leverage compared to those in non-Islamic settings. Furthermore, the capital structure of firms in Islamic environments often differs notably due to the heightened risk aversion of decision-makers, who typically prefer internal financing over external debt. These findings imply that companies aiming to expand in predominantly Islamic societies, where religion plays a significant role in business practices, may encounter unique challenges.

Alwalid Mohammad Saleh A. Hajisaaid (2020) examined the relationship between capital structure and profitability for some companies in the materials industry from 2009 to 2018. They employed different statistical techniques to analyze their results. They use the Hausman test to determine which model is more appropriate, fixed effects or random effects. As a dependent variable, ROE stands for return on equity. As opposed to (DA), (LDA), and (SDA). The findings reveal a negative correlation between profitability and long-term (LDA), short term (SDA). Also, a positive correlation between profitability and total debt (DA).

Nguyen et al. (2020) argue that key factors, including a firm's age, working capital, sales growth, and size, have a significant impact on its profitability. Additionally, efficient management of working capital is crucial for enhancing overall organizational profitability. Another study by Nguyen and Nguyen (2020) found that capital structure in Vietnam has a negative impact on business performance; however, this impact is more pronounced in state-owned enterprises than in privately held companies. Other elements that affect the organization's profitability include the company's size and sales growth.

Although their findings are inconsistent, these empirical investigations shed essential light on the nonlinear relationship between capital structure and a company's financial status. In contrast, only a handful of studies have experimentally examined this connection in emerging nations through empirical analysis of the relationship between capital structure and business success, such as in Saudi Arabia. This study contributes to the existing literature by providing further insights into how capital structure influences business performance.

III. Research Methodology:

3.1 Data and sample collection:

This section presents a statistical analysis of the empirical data, focusing on the variables and their corresponding indicators. The research hypothesis is tested using multiple regression models. This research investigate the impact of leverage on the financial performance of Saudi corporations from 2009 to 2020.

It uses secondary data collected from Tadawul and the companies' websites. Based on data availability, the sample comprises 1,573 firm-year observations from various sectors. Due to their unique economic operations, financial firms were excluded from the sample because they are governed by regulations distinct from those of non-financial companies, which could result in anomalies (Ausloos et al., 2018).

3.2 Statistical methods:

Using a panel regression analysis, this study examines the relationship between profitability, as measured by ROE and ROA, and capital structure. Controlling heterogeneity, reducing variable collinearity, and increasing efficiency and degrees of freedom make this worthwhile. Additionally, it can eliminate aggregation biases over businesses or individuals and construct a more comprehensive behavioral model (Baltagi, 2005). When using a Fixed-Effect Model, the group means are fixed. While it fluctuates across organizations, the intercept remains consistent over time. Thus, it is independent of time. When no fixed effects are assumed, the Random Effect Model is frequently utilized in hierarchical or panel data analysis, allowing for individual effects. The last test for econometric model misspecification is the Hausman Test (Hausman, 1978), which compares two different estimators of model parameters.

The Pearson correlation can be used to determine the statistical relationship between independent and dependent variables, as well as the direction of this relationship.

3.3 Hypothesis development:

Several scholars studied the impact of leverage on corporate performance. Accounting metrics such as return on equity and return on assets are used in this research to measure performance (Saeedi & Mahmoodi, 2011; San & Teh, 2011). Nonetheless, a company's profitability does not guarantee that its available cash flows will be sufficient to pay off its debt or creditors. Two performance metrics based on accounting were employed in this investigation. First is the return on assets (ROA), which is determined by dividing net profit by total assets. The second metric is the return on equity (ROE), calculated by dividing the company's net profit by its total equity. Further, the independent variable used in this study, following previous literature (Ebaid, 2009; Twairesh, 2014; Hajisaaid, 2020), measured financial leverage by three ratios: the proportions of short-term debt to total assets (SDA), the proportions of long-term debt to total assets (LDA), and the ratio of total debt to total assets (TDA).

The following theory will be investigated:

H01: Short-term debt and profitability are negatively correlated.

H02: Long-term debt and profitability have a negative correlation.

H03: The total amount of debt and profitability are negatively correlated.

A critical determinant of a company's profitability is its size. Larger businesses have a more comprehensive range of competencies. According to Kajola (2010) and Nguyen and Nguyen (2020), firm size is regarded as a control variable in the model, as firms can benefit from economies of scale, which may affect outcomes and conclusions. We will test the following hypothesis.

H04: The size of a company and its performance are positively correlated.

3.4 Econometric prototype:

This section present the Model that is used in the study. (Biger et al., 2011; Twairesh, 2014; Hajisaaid, 2020)

1. Model1:
2. $ROE_{it} = \beta_o + \beta 1 TDA_{it} + \beta 2 LDA_{it} + \beta 3 SDA_{it} + \beta 4 Size_{it} + \beta 5 SG_{it} + \varepsilon_{it}$
3. Model2:
4. $ROA_{it} = \beta_o + \beta 1 TDA_{it} + \beta 2 LDA_{it} + \beta 3 SDA_{it} + \beta 4 Size_{it} + \beta 5 SG_{it} + \varepsilon_{it}$
5. Where:
6. ROAi,t = return on total assets for firm I in year t
   ROEi,t = return on total equity for a firm I in year t
   β0: The intercept of the equation.
   β: Coefficients for independent variables.
   SDA: Short-term debt to total assets. For firm I in year t.
   LDA: Long-term debt to total assets for firm I in year t.
   DA: Total debt to total assets for firm I in year t.
   Size: Natural Logarithm of the firm's sales for firm I in year t.
7. SG: Current year's sales minus the previous year's sales divided by the previous year's sales. ε_{it} = Error term.

IV. Results and Interpretation of Results

This section begins with a presentation of the summary statistics, followed by an analysis of the correlations among the variables and the results of the regression analysis.

4.1 Descriptive Statistics

Table 1 presents a sample of organizations, along with descriptive statistics for the independent and dependent variables. Return on equity (ROE), a measure of profitability, yields a median of 8.1%, indicating a relatively low percentage. The ROE and ROA, at 0.7% and 4.4%, respectively, indicate that Saudi companies' performance was not as expected during the study period from 2009 to 2020, which could be attributed to the different sectors in the study.

The means of every variable are positive. According to statistics, the means for the capital structure proxies SDA, LDA, and TDA are 23%, 16.1%, and.39.5%, respectively. The variable SDA, with a median of 17.6%, calculates the ratio of short debt to total assets. According to this figure, short-term debts account for roughly 17.6% of total assets. The variable LDA measures the ratio of long-term debt. The median value of the variable is 11.0%. This means long-term debts account for roughly 11.0% of total assets. This demonstrates that short-term funding is more critical to Saudi businesses' operations than long-term debt.

The variable TDA measures the ratio of total debt to total assets. The median value of this variable is 38.4%, indicating that Saudi companies have a high level of financial leverage and a high proportion of total debt. These findings suggest that Saudi companies refrain from using large debt loads to raise money.
The sample firms' average size of 13.5, with a minimum value of 3.465 and a maximum of 19.062, indicates that their operations across various sectors vary in size. The dependent variables, ROE and ROA, as well as all the independent variables, exhibit skewness values that deviate from zero, indicating that their distributions are abnormal. This also applies to the kurtosis.

Table 1: Descriptive Statistics:

Table 1: Descriptive Statistics:

N	Min	max	skewness	kurtosis	Median	Std. Dev.	Mean	
1573	-73.001	14.433	-32.985	1228.681	0.081	1.96	.007	ROE
1573	-5.816	.471	-19.364	562.254	0.044	.192	.044	ROA
1573	0	.959	1.054	3.776	0.176	.167	.23	SDA
1573	0	.69	1.196	3.797	0.110	.154	.161	LDA
1573	.002	2.199	1.051	8.747	0.384	.232	.395	TDA
1573	3.465	19.062	-.764	6.02	13.676	1.945	13.522	size
1573	-1.792	62.356	23.448	671.561	0.018	1.974	.172	SG

4.2. Correlation Coefficient:
Table 2 presents the Pearson correlation coefficients. According to both models, the profitability of Saudi businesses is negatively correlated with their total, short-term, and long-term debt, but positively correlated with their size. The capital structure's short-term, long-term, and total debt reduces profitability, which the negative correlations can explain.

Table 2 Matrix of correlations:

(7)	(6)	(5)	(4)	(3)	(2)	(1)	Variables
						1.000	(1) ROE
					1.000	0.195	(2) ROA
				1.000	-0.109	-0.134	(3) SDA
			1.000	-0.081	-0.084	-0.019	(4) LDA
		1.000	0.603	0.673	-0.260	-0.120	(5) TDA
	1.000	0.390	0.411	0.179	0.192	0.074	(6) Size
1.000	-0.131	0.027	0.092	-0.040	-0.060	-0.009	(7) SG

4.3: Regression analysis:
The capital structure analysis of firms' performance is presented in Tables 3 and 4. Table 3 presents the results of testing the firm's performance measured by ROA and other independent variables. The results of all three tests (FE, RE, and OLS) show a strong positive relationship between SDA, LDA, Size, and ROA. Additionally, model 1's STD coefficient is positive and statistically significant, indicating that an increase in STD is linked to an increase in ROA. The findings also show a strong positive correlation between LDA and ROA. Model 1's positive and statistically significant LDA coefficient implies that rising ROA is correlated with rising LDA. However, there is a considerable negative correlation between ROA and TDA. Lastly, the findings demonstrate a substantial relationship between the control variable (firm size) and the firm's (ROA) performance.

Table 3: Regression analysis for ROA as dependent variable for OLS, FE, RE
(FE) (RE) (OLS)

	(FE)	(RE)	(OLS)
VARIABLES	ROA	ROA	ROA
Size	0.0412***	0.0321***	0.0297***

	(0.00582)	(0.00338)	(0.00251)
SDA	0.541***	0.659***	0.694***
	(0.0748)	(0.0648)	(0.0610)
LDA	0.680***	0.650***	0.620***
	(0.0722)	(0.0663)	(0.0634)
TDA	-0.936***	-0.918***	-0.898***
	(0.0586)	(0.0555)	(0.0546)
SG	0.00181	0.000114	-0.00121
	(0.00221)	(0.00213)	(0.00220)
Constant	-0.378***	-0.284***	-0.263***
	(0.0776)	(0.0436)	(0.0316)
Observations	1,573	1,573	1,573
R-squared	0.203		0.233
Number of firms	121	121	

Standard errors in parentheses
*** p<0.01, **p<0.05, * p<0.1

As displayed in Table 4, the findings suggest no significant correlation between LDA and TDA and a firm's ROE performance. Mahmoodi et al (2011) and Ebaid (2009) indicate no indication of a substantial association between ROE and capital structure, which is consistent with our results. The results of Ahmad et al. (2012), who discovered a strong positive correlation between ROE and all capital structure proxies, conflict with these findings. Moreover, a firm's success, as determined by ROE, has a substantial negative correlation with STD, indicating that a rise in STD is linked to a fall in ROE. This supports the research of Abeywardhana (2015) and Hamid (2015). Finally, the findings demonstrate that, across all tests, there is a substantial relationship between the control variable (firm size) and businesses' performance (ROE). Sales growth (SG) is insignificant in both models, indicating that sales growth does not significantly affect profitability for Saudi Arabian companies.

The probability value is significant when checking for the Husman test in Table 5. As a result, we reject the null hypothesis and accept the alternative hypothesis. This indicates that models 1 and 2 can benefit from the fixed-effect model.

Table 4: Regression analysis for ROE as dependent variable for OLS, FE, RE:

	(FE)	(RE)	(OLS)
VARIABLES	ROE	ROE	ROE
Size	0.174**	0.144***	0.143***
	(0.0700)	(0.0318)	(0.0287)
SDA	-3.136***	-1.443**	-1.351*
	(0.900)	(0.719)	(0.698)
LDA	0.280	-0.445	-0.579
	(0.869)	(0.745)	(0.725)
TDA	-1.075	-0.666	-0.593
	(0.705)	(0.636)	(0.625)
SG	0.0244	0.0129	0.0106
	(0.0266)	(0.0252)	(0.0252)
Constant	-1.246	-1.274***	-1.287***
	(0.934)	(0.403)	(0.361)
Observations	1,573	1,573	1,573
R-squared	0.034		0.035
Number of firms	121	121	

Table 5: Husman test:

	ROE	ROA
Cofe	21.62	22.68
p-value	.0006	.0004

V. Discussion:

Table 5 presents the results of the hypothesis testing. The third null hypothesis is accepted for ROA, which indicates that an increase in debt will decrease profitability. The first null hypotheses for Short-Term debt are accepted for ROE. Further, the first null hypothesis is accepted for both ROA and ROE, indicating that an increase in size will result in a broader range of capabilities and could affect the findings, consistent with Twairesh's (2014), Nguyen et al. (2020), and Nguyen and Nguyen (2020).

Table 6: Hypothesis testing:

NO	Hypotheses	Null	
		ROA	ROE
H1	Short-term debt and profitability are negatively correlated.	reject	accept
H2	Long-term debt and profitability have a negative correlation.	reject	reject
H3	The total amount of debt and profitability are negatively correlated.	accept	reject
H4	The size of a company and its performance are positively correlated.	Accept	Accept

VI. Conclusion:

Everyone knows that capital structure is an essential tool for funding, combining external (debt) and internal (equity) funds. Some research examines the consequences in Saudi Arabia's particular industries or limited sample sizes. This study examines the relationship between the capital structure and profitability of 121 Saudi Arabian enterprises between 2009 and 2020. The study employs the panel econometrics technique. The firm's performance is measured by two dependent variables (ROA and ROE), and the independent variables are SDA, LDA, and TDA. Firm control variables included sales size and the percentage change. According to the study, ROA is significantly improved by SDA and LDA. At the same time, ROA is impacted dramatically by TDA.

Furthermore, the return on equity ratio (ROE) and short-term debt (SDA) have a negative association, which supports research by Abeywardhana (2015) and Hamid et al. (2015). The performance of firms is significantly improved by firm size, as indicated by both ROA and ROE. The correlation model reveals a negative association between the return on equity ratio (ROE) and the return on assets (ROA), as well as SDA, LDA, and TDA. The control variables, which show a positive correlation between the firm's size and ROE and ROA, are added to the research of Nguyen and Nguyen (2020). However, SG has a negative correlation with return on equity (ROE) (ROA) and the percentage change in sales (SG).

Whether long-term or short-term, relying solely on one source of finance will reduce profitability and lead to investments in companies with fewer incentives. On the other hand, when business managers combine short-term and long-term debt, they can enhance financial success and achieve greater liquidity and solvency to fulfill their obligations both now and in the future. Additionally, increasing a company's appeal to investors results in operations expansion and wealth maximization for shareholders. This complements the study by Abdullah M. Al-Awadhi and others (2020), who note that companies in Islamic countries have lower leverage levels compared to those in non-Islamic countries. Islamic civilizations also tend to make their decision-makers more risk-averse. The fixed effects model is a suitable choice, as the Hausman Test indicates that the p-value is less than 0.05, indicating that the alternative hypothesis is accepted and the null hypothesis is rejected.

The author provides a recommendation for scholars and policymakers, suggesting that the findings of this study could have a significant impact. Implementing an improved system would enhance the company's performance and lead to increased profitability.

Future research could examine the firm's decisions, debt maturity structure, and the combined impact of its ownership and capital structures on its performance.

Research constraints:

This study has many limitations. The Saudi market is home to over 200 businesses, most of which have been in operation for less than ten years. Furthermore, several variables were unavailable due to limitations in data collection. Therefore, we included organizations with available data in the study.

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Author contributions

Huda Alsayed (HA): Conceptualization, Data curation, Formal analysis, Methodology, Software, Writing—original draft, Writing— review & editing, Investigation, Resources. Huda Alsayed (HA): Investigation, Resources, Visualization, Writing—review & editing.

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Availability of data and materials

All data generated or analyzed during this study are available for sharing when the appropriate request is directed to the corresponding author.

Declarations of Competing Interests

The authors declare no competing interests.

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