

**Capital Structure Effect on Firms' Performance: Evidence
from Saudi Listed Companies**

by

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Abstract

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This study investigates the impact of capital structure on the performance of non-financial firms operating in Saudi Arabia for the period between 2008 and 2012. Sample data includes 67 companies from 13 different sectors. The study analyzes the relationship between capital structure proxies that include short-term debt (STD), long-term debt (LTD) and total debt (TD) with operating performance measured by earnings per share (EPS), net profit margin (NPM), return on assets (ROA) and return on equity (ROE). A firm's size that was found by the literature to have an influence on the performance of a firm is used as a control variable. The study finds that only LTD and TD have significant impacts on ROE while ROA has a statistically significant relationship with each level of debt. Both EPS and NPM are found to have positive relations with STD whereas they have inverse relations with LTD and TD.

Chapter 1: Introduction

Capital structure is defined as the mix of debt and equity used to finance the operation of a firm (Damodaran, 2001). The relationship the capital structure and its impact on the enterprise value or its performance has been debated over the past decades. The literature is rich with papers that have explained this impact see for example, Modigliani and Miller, 1958; Myers, 1977; Jensen and Meckling, 1976; Harris and Raviv, 1991 and Margiratis and Pslilaki, 2007. However, these papers did not reach a consensus of the optimal capital structure which a firm should adopt in order to maximize its profitability.

Modigliani and Miller (1958) in a seminal paper argued that in a world with perfect market conditions characterized by a capital market with no taxes, no transaction costs and homogenous expectation, capital structure is irrelevant to firm's value. However, on the contrary, many studies argue that the existence of market imperfections suggest that the capital structure decision is relevant since it affects shareholders wealth. Modigliani and Miller (1963) in a modified paper considered the existence of corporate tax and, hence, suggested that firms should use as much debt as possible in order to maximize their value by maximizing the benefit from the interest tax shield.

Since then, several theories have been developed to explain the capital structure of a firm including the Pecking Order Theory, Static Tradeoff theory, and the Agency Cost theory. The firm's decision of its source of capital will affect its competitiveness among its peers. Therefore, a firm should use the appropriate mix of debt and equity that will maximize its profitability.

The lack of consensus among the theories that try to explain the capital structure of a firm has led to many empirical studies in this topic trying to reach a conclusion about the impact of capital structure on firms' performance. Most of these studies have been carried out on developed and industrial markets and few on emerging markets. To this writer's knowledge, no such study has been carried out on the Saudi Arabia market.

This paper aims to empirically investigate the impact of the capital structure decision on firms' financial performance for firms that operate in Saudi Arabia and are listed on the capital market. Saudi Arabia has some unique features that could add some interest to this paper. Firms that operate there enjoy a free taxation environment. However, Saudi firms whether public or private, are subject to Zakat collection by a government agent called the Department of Zakat and Income Tax. Calculation of Zakat is different from the conventional tax. Moreover, the Saudi Arabia government stimulates the industrial sector by extending low cost loans relative to commercial bank loans to industrial firms. Therefore, it is mandatory to investigate the impact of financial leverage level on financial performance in Saudi Arabia.

The structure of this paper is as follows. Chapter 2 will provide a summary of related literature and Chapter 3 addresses the data and model used in this study. Chapter 4 reports the results obtained from the model with the effects of explanatory variables. Finally, Chapter 5 discusses the conclusions and recommendations from the study.

Chapter 2: Literature Review

2.1. Theoretical Literature

Modigliani and Miller (1958) were pioneers in capital structure theory. They first argued that the financing mix of debt and equity in the capital structure does not affect the value of a firm under perfect market conditions. This theory is broadly known as “Capital Structure Irrelevance”. This theory states that in a perfect world, where there is no tax and transaction cost associated with issuing debt or going bankrupt, and there is no information asymmetry, capital structure does not affect the market value of a firm. It was criticized since it assumes rational economic behavior and perfect market conditions which are applicable to few firms see Chaganti (1995).

Following the first presentation of this theory, Modigliani and Miller (1963) revised the theory by incorporating the tax benefit as a determinant of capital structure. Debt interest is tax deductible and it is called the tax shield. M&M stated that a firm can offset part of its interest expense through the tax shield in a form of lower tax payment. Therefore, firms will be able to maximize their value by employing more debt in their capital structure. Miller (1977) stated that the value of a firm depends on the tax bracket that will determine the amount of the tax shield.

Although the M&M theory has been criticized by my researchers for its irrelevant assumption of perfect market and lack of information asymmetric, the theory has been considered as the foundation for the upcoming expanded capital structure theories (Ahmad, Abdullah & Roslan, 2012). Myers and Majluf (1984) suggested that profitable firms will rely more on the internally generated fund more than external debt. In addition

to expanding the M&M theory, Jensen and Meckling (1976) developed agency theory. Agency cost is defined as the monitoring cost by the principal and a residual loss. According to Jensen and Meckling (1976), the agency problem exists due to a conflict of interest between shareholders and managers (agency cost of equity) or between shareholders and debt holders (agency cost of debt). Thus, the use of debt capital will minimize the agency cost since the payment of debt interest reduces the surplus cash.

2.2. Empirical Literature

The lack of consensus of the impact of the capital structure decision on the performance of a firm, led to many empirical studies trying to explain this puzzle. Most of these studies did not reach rigorous conclusion to rely on. In addition, some studies were devoted to specific sectors. This section will summarize the most important previous empirical studies that are related to the subject of this paper.

Kinsman and Newman (1998) studied the relationship between debt level and firms' performance by including three measures of debt level. This study suggested an inverse relation between the debt level and firms performance and found that earnings are negatively correlated with short-term debt, but are positive with long-term debt. The same result was found by Majumdar and Chibber (1999) in addition to the size effect to be positively related to firms' performance.

A study by Gleason (2000) tested the relation between performance and leverage using return on assets as performance proxy. The result from the study indicates a significant negative relation between total debt and firms' performance. The significant negative influence could infer that retailers use more debt than appropriate. Thus,

overleveraging negatively affects firms' performance. The Gleason study also showed that firm size influences the performance with larger retailers earning higher returns on assets compared to small size retailers. The same results were found by Hammes and Chen (2004) with debt ratio negatively related to return on assets and firm's size positively related to performance.

Another study by Mesquita and Lara (2003) showed that short-term debt is positively related to firms' performance while long-term debt showed an inverse relationship, but not significant result. This result suggests that short-term financing becomes more common among firms included in the sample. Furthermore, a study by Philips and Sipahioglu (2004) inferred no significant relation between capital structure and firms' financial performance. Analysis from this study suggests that firms with high leverage do not outperform firms with low level of debt.

Abor (2005) studied the relation between return on equity, firm's size, sales growth and capital structure in a sample of twenty two firms listed in Ghana. The results showed that short-term debt has a significant and positive relation to ROE while long-term debt showed the opposite. Total debt also had significant positive relation to ROE implying that the higher debt will increase the profitability of a firm. This study also emphasized the significant positive relationship between firm's size and sales growth. Abor's study supported other research done by Hadlock and James (2002) who found the same result.

However, on the contrary, Carpentier (2006) found no significant evidence of the relationship between the change in debt and change on firm's value. However, Carpentier did detect a significant positive coefficient between firm's size and profitability.

Zeitun and Tian (2007) supported the argument by Myers (1977) indicating that capital structure has a significant impact on firm's performance as measured by ROA and ROE. Myers argument is that firms with high short-term debt to total assets have higher growth rates and better performance. The Zeitun and Tian study showed that the high performance of a firm is associated with higher tax rates which implies a greater tax benefit from the tax shield.

Furthermore, Cheng (2009) studied the effect of financing mix in capital structure on operating performance. Findings from the study indicate that firms should not solely rely on a single source of financing either debt or equity while firms are advised to incorporate both two sources to raise capital. These findings are consistent with the Ebaid (2009) study where it showed significant negative impact of short-term debt and total debt to firms' performance measured by ROA with no evidence of a significant impact of debt level to ROE.

The latest study for the Malaysian market with sample limited to consumer products and industrial products was carried out by Ahmad, et al (2012). This paper tested the effect of debt level on firms' performance. Findings from the study showed that only ROA has positive significant relation to short-term debt and total debt, while ROE has no significant relation to all capital structure indicators. This result implies that shareholders should not be concerned to the level and source of debt used to raise capital.

In summary, the argument of capital structure decision and its effect on performance did not reach consensus amongst most researchers leaving the doors open for upcoming studies and empirical tests. Moreover, not all the previous studies use the same parameters either as capital structure or financial performance proxies. Thus, this paper intends to cover the most debatable variables to further clarify the relationship between variables of the study.

Chapter 3: Methodology

3.1. Variables Definitions and Calculations

The purpose of this study is to examine the effect of capital structure choice on financial performance. Indicators of financial performance are dependent variables of the model. Four financial performance indicators are used as proxies of firms' performance. Financial performance indicators are defined by earning per share (EPS), return on assets (ROA), return on equity (ROE) and net profit margin.

Earnings per share (EPS) are calculated by dividing net income over the average number of common shares outstanding. Return on assets, which indicates the efficiency in employing the firm's assets to generate profit, is calculated by dividing the net income plus interest expense over the total assets. Return on equity indicates the profitability of a firm in maximizing the shareholders' wealth and calculated by dividing the net income over the equity. Net profit margin is another profitability measure which is calculated by dividing the net income over total revenue.

Furthermore, three of the capital structure measures are employed as independent variables. These measures are the ratio of short-term debt to total assets (STD), the ratio of long-term debt to total assets (LTD) and total debt to total assets (TD).

In addition, the size of the firm, which is measured by the logarithm of total assets, could influence its financial performance and, hence, is considered a control variable in the model (Ramaswamy, 2001; Frank & Goyal, 2003; Jermias, 2008).

3.2. Data and Sample

In order to conduct this empirical study, a sample of Saudi listed companies from the Saudi Stock Exchange (TADAWUL) has been used. Due to the fact that banks and financial institution are subject to certain regulations not applicable to other companies operating in other sector, they have been excluded from the sample. Moreover, the sample has been reduced further due to lack of some companies' data.

Due to some difficulties in collecting the required data using computerized databases, the sample data were retrieved manually from firms' annual reports posted in Saudi Stock Exchange (Tadawul) official website, www.tadawul.com.sa. The sample includes 67 firms from 13 different sectors as shown in Table 3.1. The sample data covers the period from 2008 to 2012 with 335 observations. Details of companies in each sector are included in the Appendix 1.

Table 3.1 Sector wise Division

No	Sector Name	Number of Firms
1	Petrochemical Industries	8
2	Cement	8
3	Retail	5
4	Energy & Utilities	2
5	Agriculture & Food Industries	13
6	Telecommunication & Information Technology	2
7	Multi-Investment	6
8	Industrial Investment	6

9	Building & Construction	7
10	Real Estate Development	4
11	Transport	3
12	Media and Publishing	1
13	Hotel & Tourism	2
	Total	67

3.3. The Model

The sample represents panel data; hence, panel data procedures will be used to test the relation between firm's performance and leverage level. The following regression models will investigate the effect of capital structure choice on firms' performance:

$$EPS_{i,t} = \alpha_{i,t} + \beta_{0i,t} STD_{i,t} + \beta_{1i,t} SIZE_{i,t} + \varepsilon_{i,t} \quad 3.1$$

$$EPS_{i,t} = \alpha_{i,t} + \beta_{0i,t} LTD_{i,t} + \beta_{1i,t} SIZE_{i,t} + \varepsilon_{i,t} \quad 3.2$$

$$EPS_{i,t} = \alpha_{i,t} + \beta_{0i,t} TD_{i,t} + \beta_{1i,t} SIZE_{i,t} + \varepsilon_{i,t} \quad 3.3$$

$$ROA_{i,t} = \alpha_{i,t} + \beta_{0i,t} STD_{i,t} + \beta_{1i,t} SIZE_{i,t} + \varepsilon_{i,t} \quad 3.4$$

$$ROA_{i,t} = \alpha_{i,t} + \beta_{0i,t} LTD_{i,t} + \beta_{1i,t} SIZE_{i,t} + \varepsilon_{i,t} \quad 3.5$$

$$ROA_{i,t} = \alpha_{i,t} + \beta_{0i,t} TD_{i,t} + \beta_{1i,t} SIZE_{i,t} + \varepsilon_{i,t} \quad 3.6$$

$$ROE_{i,t} = \alpha_{i,t} + \beta_{0i,t} STD_{i,t} + \beta_{1i,t} SIZE_{i,t} + \varepsilon_{i,t} \quad 3.7$$

$$ROE_{i,t} = \alpha_{i,t} + \beta_{0i,t} LTD_{i,t} + \beta_{1i,t} SIZE_{i,t} + \varepsilon_{i,t} \quad 3.8$$

$$ROE_{i,t} = \alpha_{i,t} + \beta_{0i,t} TD_{i,t} + \beta_{1i,t} SIZE_{i,t} + \varepsilon_{i,t} \quad 3.9$$

$$NPM_{i,t} = \alpha_{i,t} + \beta_{0i,t} STD_{i,t} + \beta_{1i,t} SIZE_{i,t} + \varepsilon_{i,t} \quad 3.10$$

$$NPM_{i,t} = \alpha_{i,t} + \beta_{0i,t} LTD_{i,t} + \beta_{1i,t} SIZE_{i,t} + \varepsilon_{i,t} \quad 3.11$$

$$NPM_{i,t} = \alpha_{i,t} + \beta_{0i,t} TD_{i,t} + \beta_{1i,t} SIZE_{i,t} + \varepsilon_{i,t} \quad 3.12$$

Where $EPS_{i,t}$ (Earning per share), $ROA_{i,t}$ (Return on assets), $ROE_{i,t}$ (Return on equity) and $NPM_{i,t}$ (Net profit margin) are financial performance indicators for firm i in year t . $STD_{i,t}$, $LTD_{i,t}$ and $TD_{i,t}$ indicate short-term debt, long-term debt and total debt ratios for firm i in year t , respectively. Finally, α , β_0 and β_1 are regression coefficients and $\varepsilon_{i,t}$ is the error term.

Chapter 4: Results and Findings

4.1. Descriptive Statistics

Descriptive statistics for the study dependent and independent variables are tabulated below in Table 4.1. From the table, all the variables have positive means. Statistics for capital structure proxies (i.e. STD, LTD and TD) show means of 3.56, 16.70 and 20.27 percent for short-term, long-term and total debts, respectively, which indicates that Saudi firms do not employ high levels of debt in order to raise capital. Furthermore, Saudi firms on average use long-term debt as a mean of capital financing more than short-term loans. The means of 12.39, 10.15 and 14.65 percent for net profit margin, ROA and ROE, respectively, show that the performance of Saudi companies is poor during the study period from 2008 to 2012. Finally, the average size of 15.23 for the sample firms with minimum value of 10.99 and maximum of 19.62 indicates that most of the sample firms are close in term of size despite the fact that they are operating in 13 different sectors.

Table 4.1: Descriptive Statistics

	STD	LTD	TD	Size	EPS	NPM	ROA (%)	ROE (%)
Mean	0.0357	0.1670	0.2027	15.23	3.366	0.1239	10.15	14.65
Maximum	0.2073	0.6483	0.6917	19.62	17.12	0.8535	43.98	56.59
Minimum	0.00	0.00	0.00	10.99	-1.92	-9.904	-30.21	-53.68
Std. Deviation	0.0443	0.1855	0.1993	1.823	3.731	1.004	11.996	16.542
Skewness	1.665	0.930	0.704	0.523	1.257	-8.975	0.4458	-0.030
Kurtosis	5.936	2.723	2.406	3.655	4.737	89.54	3.922	5.236

Pearson correlation analysis in Table 4.2 shows the correlation between all variables of this study. The result indicates that LTD and TD are significantly inversely correlated to both ROA and ROE.

The analysis also shows there is a significant and positive correlation between dependent variables which are LTD and TD with size in which the p-value is zero indicating possible multicollinearity problem.

Table 4.2: Pearson Correlation Matrix between Variables (Correlation and P-value)

	STD	LTD	TD	Size	EPS	NPM	ROA	ROE
STD	1.00							
LTD	0.2022 * (0.0317)	1.00						
TD	0.4107 ** (0.0000)	0.9760 ** (0.0000)	1.00					
Size	0.0307 (0.7465)	0.5641 ** (0.000)	0.5320 ** (0.000)	1.00				
EPS	-0.0350 (0.7127)	-0.2733 ** (0.0034)	-0.2623 ** (0.0050)	0.1889 * (0.0451)	1.00			
NPM	-0.0490 (0.6063)	-0.3453 ** (0.0002)	-0.3324 ** (0.0003)	0.0208 (0.8268)	0.2766 ** (0.0030)	1.00		
ROA	-0.0964 (0.3098)	-0.4243 ** (0.0000)	-0.4164 ** (0.0000)	0.0117 (0.9023)	0.8746 ** (0.0000)	0.2901 ** (0.0018)	1.00	
ROE	0.0106 (0.9112)	-0.2879 ** (0.0020)	-0.2657 ** (0.0044)	0.1196 (0.2071)	0.8761** (0.0000)	0.3191 ** (0.0006)	0.9431 ** (0.0000)	1.00

* Correlation is significant at 0.05 level

** Correlation is significant at 0.01 level

4.2. Regression Result

The relationship between capital structure and firms' performance is tested in this paper using 12 regression models (Equations 3.1-3.12) as listed in chapter 3. The regression models use a combination of financial performance indicators including EPS, ROA, ROE and NPM and capital structure proxies which are STD, LTD and TD. Since

the sample represents panel data which means the regression model could be done using fixed effects or random effect, Hausman test is considered to determine which model gives efficient and consistent result. This section summarizes the results of the twelve regression models mentioned above.

Results for Models 1 to 3 are shown in Table 4.3 which test the relationship between EPS and capital structure ratios. According to the result from the Hausman test, the random effect is the suitable model for all three models. The results show insignificant positive relationships between EPS and STD, while it is insignificantly negative with LTD. EPS is significantly inversely related to TD. In all three models, EPS has positive and significant relationship to size. This infers that big size firms tend to give higher EPS for their shareholders. R-square, which indicates the power of the model in explaining the variation of dependent variable due to independent variable variation, is very low for Model 1 with 3.32 percent while R-square for Models 2 and 3 is 23.06 and 20.08 percent, respectively.

Table 4.3: Relation between EPS and debt levels

Models		Fixed Effects Model	Random Effects Model	Hausman Test
Model 1	STD	3.2221	2.8502	Random Effect
	size	1.3255 **	0.5359 **	
	R-square	0.0347	0.0332	
Model 2	LTD	-7.9185 **	-8.7017	Random Effect
	size	2.0881 **	1.0582 **	
	R-square	0.1214	0.2306	

Model 3	TD	-6.5943 **	-7.1935 **	Random Effect
	size	2.0810 **	0.9896 **	
	R-square	0.1041	0.2008	

The above finding for STD is consistent with Champion (1999), Ghosh (2000), Hadlock and James (2002), Frank and Goyal (2003), Berger and Bonaccors (2006) and Saeedi and Mahmoodi (2011) who all indicated positive relationships between capital structure and firm performance. Results for LTD and TD are consistent with those found by Rajan and Zingales (1995), Karadenize (2009) and Chakraborty (2010) who showed a negative relation between capital structure and firms' performance.

Results for Models 4-6 are tabulated below in Table 4.4. These models test the relationship between ROA and capital structure proxies. According to the Hausman test, the random effect model suits all the regression models. The findings for STD and TD which are found to be significantly negative related to ROA are consistent with previous results found by Ebaid (2009) who reported that only STD and TD of capital structure proxies have significant relation with firms' performance measured by ROA. Moreover, LTD also has significant negative relation with ROA. Firms' size is found to have a significant and positive relation with firms' performance for all debt levels.

Table 4.4: Relation between ROA and debt levels

Models		Fixed Effects Model	Random Effects Model	Hausman Test
Model 4	STD	-24.8499	-24.2395 **	Random Effect
	size	1.5227	0.3179 **	
	R-square	0.0022	0.0084	
Model 5	LTD	-29.6965**	-33.0175 **	Random Effect
	size	3.7593 **	2.2369 **	
	R-square	0.1683	0.2697	
Model 6	TD	-30.9720 **	-31.8307 **	Random Effect
	size	4.3963	2.27564 **	
	R-square	0.1427	0.2457	

As for the impact of capital structure on ROE which is tested in Models 7-9, the results are presented in Table 4.5. The Hausman test shows that the fixed effect is appropriate for Model 7 while the random effect is suitable for Models 8 and 9. Results indicate that ROE has a negative impact to all levels of debt. Moreover, the findings show a significant relationship between ROE and LTD and TD only, while it is statistically insignificant with STD with a low R-square of 1.43 percent. These findings contradict those reported by Saeedi and Mahmoodi (2011) and Ebaid (2009) who found no evidence of a significant relationship between ROE and capital structure. Moreover, the results of Mesquita and Lara (2003), found long-term debt to be insignificant with ROE, and Ahmad, et al (2012), found a significant positive relationship between all capital structure proxies and ROE. This is not consistent with the findings of this paper.

ROE is found to be influenced by firm size as the results show statistically significant positive relationships between them. This result is consistent with that reported by Abor (2005).

Table 4.5: Relation between ROE and debt levels

Models		Fixed Effects Model	Random Effects Model	Hausman Test
Model 7	STD	-8.2077	-1.6556	Fixed Effect
	size	8.3249 **	1.8914	
	R-square	0.0143	0.0313	
Model 8	LTD	-45.3130 **	-44.1996 **	Random Effect
	size	12.2392 **	4.4683 **	
	R-square	0.0725	0.1910	
Model 9	TD	-42.2384**	-38.375 **	Random Effect
	size	12.6773 **	4.2471 **	
	R-square	0.0628	0.1578	

Finally, the final three models (Models 10-12) explain the relationship between NPM and capital structure. To the author's knowledge, NPM has not been used as an indicator for firm's performance in previous studies about capital structure and its effect on firms' performance. Table 4.6 presents the result for Models 10-12. The findings indicate a significant impact of all debt levels on NPM. NPM has positive relation with STD whereas it has an inverse relationship with LTD and TD. Firms' size has a positive impact on NPM. R-square of 32.95, 18.74 and 16.50 percent, respectively, for the three

models are considered appropriate to conclude that the choice of capital structure has a significant influence on the profitability of a firm as measured by NPM.

Table 4.6: Relation between NPM and debt levels

Models		Fixed Effects Model	Random Effects Model	Hausman Test
Model 10	STD	3.4073 **	-0.1416	Fixed Effect
	size	0.16098	0.01314	
	R-square	0.3295	0.1511	
Model 11	LTD	-3.2719 **	-2.8399 **	Random Effect
	size	0.5111**	0.17487**	
	R-square	0.0876	0.1874	
Model 12	TD	-2.3739 **	-2.4082**	Random Effect
	size	0.4709 **	0.15208**	
	R-square	0.0580	0.1650	

Chapter 5: Conclusion and Recommendations

This research paper investigates the impact of capital structure choice on firms' performance for firms operating in Saudi Arabia and listed on the Saudi Arabia Stock Exchange (TADAWUL). Theoretical literature of capital structure was highlighted to provide sufficient understanding of its role and effect on firms' performance. Empirical studies covering different markets were reviewed to provide a framework for how firms respond to the choice of capital structure.

In order to conduct this study, four indicator variables were used as a measure of firms performance (NPM, EPS, ROA and ROE) and three variables were used as proxies for capital structure (STD, LTD and TD). Size was used as a control variable for firms.

The data indicate a low average level of debt employed by Saudi firms which implies a tendency of Saudi firms to use low levels of debt to raise capital, despite the stimulus of the government by extending very low cost loans to industrial companies. Apart from the short-term debt relationship with net profit margin, a low level of debt incorporated by Saudi firms in their financing mix is supported by the results found in this paper. They indicate an inverse relationship between all levels of debt and firms' performance measured by the return on assets, return on equity and net profit margin.

The findings also show that earnings per share (EPS) increase with short-term debt, but unfavorably react to high levels of long-term debt. The results also indicate that firm's size plays a significant role in determining capital structure and has significantly positive impact on the performance of the firm. This means the larger the size of a firm, the higher return to the firm and shareholders.

This study suggests that investors who are concerned about return on equity (ROE) and earnings per share (EPS) should be cautious about the level of debt that a company uses. Generally, this study proves that high leverage has a negative impact on firms' performance which recommends managers not to incorporate excessive amounts of debt in the capital structure of a firm while relying more on internally generated funds and shareholders' injected money. Managers should extensively investigate the type of debt to use to achieve an optimal capital structure.

This study leads to the conclusion that capital structure plays an important role in determining firms' performance and its impacts are still controversial and puzzling particularly in the emerging market like Saudi Arabia which has some unique characteristics and regulations as being an investment environment free of conventional tax.

This paper could be enhanced by considering more data either by taking more sample firms or by using longer time series or both. For more reliable results, a future study may use quarterly financial data instead of the annual data used in this study. Future studies should include more control variables in the model such as sales growth and age of a firm. Furthermore, a study of the impact of capital structure on individual sectors could lead to more informed conclusions on how each sector responds to the choice of financing mix since each sector is subject to different regulations and investment requirements.

Appendix 1: Companies included in the sample

Sector	Company
Petrochemical Industries	
	Saudi Basic Industries Corp
	Alujain Corp
	Yanbu National Petrochemicals Co
	Saudi Arabian Fertilizer Co
	National Industrialization Co
	Nama Chemicals Co
	Saudi Industrial Investment Group
	Sahara Petrochemical Co
Cement	
	Arabian Cement
	Yamamah Saudi Cement Co
	Saudi Cement
	Qassim Cement/The
	Southern Province Cement Co
	Yanbu Cement
	Eastern Cement
	Tabuk Cement
Retail	
	Thimar
	SASCO
	Jarir Marketing Co
	Fitaihi Holding Group
	Aldrees Petroleum and Transport Services
Energy & Utilities	
	National Gas & Industrialization Co
	Saudi Electricity Co
Agriculture & Food Industries	
	SAVOLA
	Al Qassim Agricultural Development Co
	Bishah Agriculture
	Ash-Sharqiyah Development Co
	Jazan Development Co
	Food Products Co
	Tabuk Agriculture
	Saudi Fisheries
	National Agriculture Development Co
	Anaam International Holding Group Co
	Saudi Dairy & Foodstuff Co
	Almarai Co Ltd
	Al Jouf Agricultural Development Co

Telecommunication & Information Technology	
	Saudi Telecom Co
	Etihad Etisalat Co
Multi-Investment	
	Refineries Co
	Saudi Advanced Industries Co
	Al-Baha Development & Investment Co
	Saudi Industrial Services Co
	Aseer
	AL-AHSA
Industrial Investment	
	Saudi Pharmaceutical Indust.& Med Applia
	Filing & Packing Materials Manufacturing
	National Co for Glass Manufacturing/The
	Saudi Industrial Export Co
	National Metal Manufacturing & Casting Co
	Saudi Chemical Co
Building & Construction	
	Saudi Cable Co
	Arabian Pipes Co
	SIDC
	Saudi Arabian Amiantit Co
	Saudi Ceramic
	National Gypsum
	Zamil Industrial Investment Co
Real Estate Development	
	Saudi Real Estate Co
	Taiba Holding Co
	Makkah Construction and Development Co
	Arriyadh Development Co
Transport	
	Saudi Public Transport Co
	National Shipping Co of Saudi Arabia/The
	Saudi Transport and Investment Co
Media and Publishing	
	Tihama
Hotel & Tourism	
SHARCO AB Equity	Saudi Hotels & Resort Areas Co
TECO AB Equity	Shams

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