

Bagais, Omer; Aljaaidi, Khaled Salmen; Alothman, Abdulaziz

## Article

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## Kontakt/Contact

ZBW – Leibniz-Informationszentrum Wirtschaft/Leibniz Information Centre for Economics  
Düsternbrooker Weg 120  
24105 Kiel (Germany)  
E-Mail: [rights\[at\]zbw.eu](mailto:rights[at]zbw.eu)  
<https://www.zbw.eu/>

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# An Empirical Investigation of the Associations of Short and Long Debt Policies and Economic Values of Energy Sector

Omer Bagais, Khaled Aljaaidi\*, Abdulaziz Alothman

Department of Accounting, College of Business Administration, Prince Sattam bin Abdulaziz University, Saudi Arabia.

\*Emails: [k.aljaaidi@psau.edu.sa](mailto:k.aljaaidi@psau.edu.sa)

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## ABSTRACT

The purpose of this paper is to empirically investigate the impact of short and long-term debt policies on economic values of energy sector in Saudi Arabia. Pooled OLS Regression model is utilized to analyze 8 years of energy companies' data (2012-2019) to report the association between two measures of capital structure, namely; short-term and long-term debt policies, and firm economic value after controlling for firm size and inventory management. Empirical findings suggest that the two measures of capital structure impact negatively on firm economic value in energy industry in Saudi Arabia. The results of this study have several policy implications for financial managers, banks, investors, auditors, and stock market authority to understand why capital structure impacts the firm sustainability in a negative way.

**Keywords:** Capital Structure, Firm Sustainability, Energy Industry, Saudi Arabia

**JEL Classifications:** L25, H63, 86, G51

## 1. INTRODUCTION

Capital structure is the combination of debt and equity that a company uses to fund its operations. It is generally accepted that a company's value increases as its capital costs are reduced. This makes identification of optimal capital structures one of the chief aims of contemporary management strategy (Rakhimzhanova et al., 2020; Tatibekova and Bubeyev, 2020; Zahariev et al., 2020; Laila et al., 2019; Mokhova et al., 2018; Tailab, 2014). The combination of debt and equity for the purpose of reducing the cost of capital and increase the firm's profitability is called the capital structure. The most important issue element that the firm's management considers in making different decisions (Savitri et al., 2020; Kulustayeva et al., 2020; Wójcik-Augustyniak, 2020; Wysokińska-Senkus, 2020; Nakruang et al., 2020; Tamulevičienė and Androniceanu, 2020).

Companies assume debts in order to acquire adequate funding for substantial projects, assuming that such projects will represent

sound investments. If the projects yield the anticipated returns, the company will enjoy substantial profit, enabling it to repay its debts and use the remaining balance of funds for reinvestment. If projects do not achieve their expected returns, this can have a negative impact on company performance for a considerable time (Stiglitz and Weiss, 1981; Mackevičius et al., 2018). Despite several decades of research, there is no generally accepted conclusion about the relationship between capital structure and firm performance. From a theoretical perspective, according to Weill (2008), the relationship between debt and a firm's performance has been studied using capital structure theories, from Modigliani and Miller (1958) to the agency cost theory (Jensen and Meckling, 1976; Myers, 1977), the trade-off theory (Scott, 1977) and the pecking order theory (Myers and Majluf, 1984). Thus, there is no single theory that can fully interpret the effect of capital structure on firm performance (Le and Phan, 2017).

In specific, the capital structure of the firm is explained by two dominant theories, namely; the trade-off theory (Myers, 1984;

Kraus and Litzenberger, 1973) and pecking order theory (Myers and Majluf, 1984; Ross, 1977). The trade-off theory predicts a positive association between capital structure and firm performance. In support with this, several empirical studies found a positive relationship between capital structure and firm performance (e.g., Dalci, 2018; Berger and di Patti, 2006; Abor, 2005; Ghosh et al., 2000; Hadlock and James, 2002). The pecking order theory expects that the association between capital structure and firm performance is negative. With support to this, several empirical studies reported a negative association between capital structure and firm performance (e.g., Fernández-Temprano and Tejerina-Gaite, 2020; Assenga et al., 2018; Mishra and Kapil, 2017; Yasser et al., 2017; Plalniappan, 2017; Vithessonthi and Tongurai, 2015; Sheikh and Wang, 2012; Kumar and Singh, 2013; Cai and Zhang, 2011; Ebaid, 2009; Cheng, 2009; Antoniou et al., 2008; Jermias, 2008; Tian and Zeitun, 2007; Joshua, 2007; Haniffa and Hudaib, 2006; Weir et al., 2002; Fama and French, 2002; Booth et al., 2001; Gleason et al., 2000). Past research into the correlation between company performance and capital structure has been inconsistent and contradictory; significant focus has been placed upon the context of developed countries. Thus far, little attention has been paid to the correlations between company performance and capital structure in developing nations, Saudi Arabia amongst them. Saudi Arabia represents the most substantial Middle Eastern economy, being the richest Arab nation in its region and one of the richest in the world due to its sound financial and banking sector, substantial foreign direct investment, and considerable state-funded public investment. Little research has been undertaken regarding the correlation between capital structure and company sustainability in this context.

The researchers are unaware of any empirical study into the correlation between company sustainability and capital structure in Saudi Arabia. Thus, the chief aim of this research is to undertake an assessment of the influence Saudi Arabian energy companies have on company sustainability in terms of three central elements of capital structure: total-debt ratio, long-term debt ratio, and short-term debt ratio. The energy industry was selected for this research as it has a great deal of influence on the Saudi Arabian economy, being a significant employer and supplier of capital. The energy sector in Saudi Arabia is essential in addressing social inequality and alleviating economic hardship. The country's development goals make it compulsory for energy sector development to take place in a way that is beneficial to society as a whole. It is intended that this will help to ease the poverty gap that is present in developing nations (Ruti and de Felice, 2103; Yergin and Gross, 2012). The findings of this research will be of assistance to policymakers both at firm and national level. More broadly, it will prove useful for any companies or individuals interested in emergent Middle Eastern markets due to the similarities in economic structure and institutional arrangements in many of the region's countries (La Porta et al., 1999). It is anticipated that this research will throw up fresh questions relating to company sustainability and capital structure.

The rest of the paper is organized in the following way: Section 2 discusses literature review and hypothesis development; Section 3 discusses the data collection and research design; Section 4 describes the results and discussions and Section 5 concludes with summary of findings.

## 2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Management often has concerns regarding the influence that debt has in relation to company value (Grossman and Hart, 1982). Management's financial decisions are central to the determination of the best capital structure for a company. Company management must establish a capital structure in ways that maximize company value, an essential decision. Nevertheless, capital structures differ between firms and managers must accept the best fit for attaining the ideal capital structure (Salim and Yadav, 2012). Companies use debt to finance capital projects on the assumption that they will enjoy success. If projects are successful, companies achieve a good return on their investment, enabling them to pay their debts and to use the remaining balance for other investment projects. If projects are unsuccessful, this can have an adverse impact on company performance for a substantial length of time (Stiglitz and Weiss, 1981). This happens if management is unable to effectively control company activities. If debt levels are too high, a firm's marketplace reputation may suffer and new business levels may decline. It has been recognized (Berezinets et al., 2017) that a high company debt level may indicate substantial investment in new products or projects; companies will generally require debt financing to fund new initiatives (Black et al., 2006).

The extant research on the association of capital structure with firm performance provided mixed and contradictory results. Several studies reported a positive relationship between capital structure and firm performance (Dalci, 2018; Berger and di Patti, 2006; Abor, 2005; Hadlock and James, 2002; Ghosh et al., 2000; Champion, 1999; Roden and Lewellen, 1995; Ross, 1977). Conversely, some studies reported a negative association between capital structure and firm performance (Fernández-Temprano and Tejerina-Gaite, 2020; Assenga et al., 2018; Mishra and Kapil, 2017; Yasser et al., 2017; Plalniappan, 2017; Vithessonthi and Tongurai, 2015; Kumar and Singh, 2013; Sheikh and Wang, 2012; Cai and Zhang, 2011; Cheng, 2009; Ebaid, 2009; Jermias, 2008; Antoniou et al., 2008; Tian and Zeitun, 2007; Joshua, 2007; Haniffa and Hudaib, 2006; Weir et al., 2002; Fama and French, 2002; Booth et al., 2001; Gleason et al., 2000; Milton and Raviv, 1991; Short and Keasey, 1999; Majumdar and Chhibber, 1999; Wald, 1999; Kinsman and Newman, 1998; McConnell and Servaes, 1995; Rajan and Zingales, 1995; Friend and Lang, 1988; Kester, 1986; Titman and Wessels, 1988). While, Surprisingly, there are some academic researches that found a non-linear relationship between capital structure and firm performance (Connelly et al., 2012; Margaritis and Psillaki, 2010; Lin and Chang, 2009; Stulz, 1990). It is notable from the direction of the previous research conducted that the studies reported a negative relationship outweigh the studies that found either a positive sign or non-linear relationship. In line with this, Le and Phan (2017) indicated the studies examined the association of capital structure with firm performance in emerging markets found a negative relationship unlike those conducted in developed countries that reported a positive association. They indicated that, in emerging or transition economies, firm management underestimates bankruptcy costs of liquidation which may lead companies to have more debt than they should. Consequently, the firm sustainability of these companies

will be negatively affected. Further, there is a weak role of debt as a monitoring mechanism to enhance firm sustainability. Therefore, managers may undertake discretionary behavior because of the large cash flow available from debt which, in turn, affects firm sustainability negatively. This discussion leads us to hypothesize a negative impact of the capital structure on firm sustainability in Saudi Arabia as an emerging market. The hypothesis is stated in a direct form as follows:

H1: There is a negative relationship between capital structure and firm sustainability in Saudi energy firms.

### 3. DATA COLLECTION AND RESEARCH DESIGN

#### 3.1. Sample Selection and Data Collection

The sample of this study consists of energy listed companies on Saudi Stock Exchange (Tadawul) for the years ranging from 2012 to 2019. We conduct a cross-sectional review of financial reports of the sample companies as depicted in Table 1.

#### 3.2. Regression Model and Definition of Variables

Ordinary-least square (OLS) regression is used to estimate the associations of capital structure and with firm sustainability of energy listed companies in Saudi Arabia for the period ranging from 2012 to 2019. The utilizing of the OLS regression is because the dependent variable in this study is a continuous measure. The functional equation of the OLS model is as follows:

$$FS = \beta_0 + \beta_1 STD + \beta_2 LTD + \text{Control variables} + e \quad (1)$$

Where the dependent variable is:

- Dependent variable
- FS = Return on assets

Where the independent variables are:

- Key explanatory variables
- STD = Total short-term liabilities divided by total assets  
LTD = Total long-term liabilities divided by total assets.

- Control variables
- FSIZE = log10 of total assets  
IM = sales/inventory  
e = error term.

We also control for the effect of two agency-related variables found by the related literature for their potential confounding effect on the FS. It is expected that FS to be positively associated with firm size and inventory management (Pfeffer and Salancik, 1978; Haniffa and Hudaib, 2006; Aljifri and Moustafa, 2007; Stiglitz and Weiss, 1981; Bhatt and Bhattacharya, 2017; Mishra and Kapil, 2017; Saleh et al., 2007; Jonsson and Mattsson, 2008; Capkun et al., 2009; Kesavan and Gaur, 2010; Pong and Mitchell, 2012; Sahari et al., 2012; Ahmad and Zabri, 2018; Huang et al., 2018).

### 4. RESULTS AND DISCUSSIONS

#### 4.1. Summary Statistics

Table 2 predicts the mean, standard deviation, minimum and maximum of each variable in the sample data set.

Table 2; Panel A shows that the mean of the short-term liabilities STD is 0.219, and the range is between 0.01 and .55 with a standard deviation of .173. Further, the average of the long-term liabilities LTD is 0.267 and it ranges from 0.00 to 0.68 with a standard deviation 0.226. The mean of the firm size FSIZE is S.R 18,872,179,084 and it ranges from S.R 309,984,124 to S.R 74,029,648,000 with a standard deviation of S.R 23,262,872,572. The mean of inventory management IM is 38.479 and it ranges from 10.01 to 88.63 with a standard deviation of 32.058. Further, Table 2; panel B illustrates that the mean of firm sustainability FS is 0.0417 and it ranges from 0.000 to 0.11 with a standard deviation of 0.0336.

#### 4.2. Regression Results and Discussions

Ordinary-least square (OLS) was used to evaluate the level of association of capital structure and with firm sustainability. As shown by Table 3, the  $R^2$  is .848, indicating that the Model has explained 84.8% of the total variance in the firm sustainability.

Tables 4 depicts that the F-value for the model is statistically significant at the 1% level which means that the overall model can be interpreted.

Table 5 illustrates the Pooled OLS regression results. Table 5 shows that there is a significantly negative association between STD and FS ( $\beta = -0.797$ ,  $t = -4.156$ ,  $P = 0.001$ , one-tailed

**Table 1: Sample Selection from 2012 to 2019**

Sample	Totals
Total listed energy companies	5 firms
Number of years observed	8 years
Total observation	40
Missing data	8
Final sample	32

**Table 2: Descriptive statistics**

Panel A: Independent variables				
Continuous variables	Mean	Std.Deviation	Minimum	Maximum
STD	0.219	0.173	0.01	0.55
LTD	0.267	0.226	0.00	0.68
FSIZE	18,872,179,084	23,262,872,572	309,984,124	74,029,648,000
IM	38.479	32.058	10.01	88.63
Panel B: Dependent variable				
FS	0.0417	0.0336	0.000	0.11



**Table 3: Model summary**

Model	R	R square	Adjusted R square	Std. Error of the estimate
1	0.921	0.848	0.816	0.423

**Table 4: ANOVA analysis**

1	Model	Sum of squares	df	Mean square	F	Sig.
	Regression	19.016	4	4.754	26.520	0.000
	Residual	3.406	19	0.179		
	Total	22.422	23			

**Table 5: Pooled OLS regression**

Variables	Expected sign	Coeff.	t	P-value	Tolerance	VIF
Constant		0.691	5.251	0.000		
Test variable						
STD	-	-0.797	-4.156	0.001	0.218	4.597
LTD	-	-0.714	-2.927	0.009	0.134	7.453
Control variables						
FSIZE		0.115	0.435	0.668	0.114	8.799
IM		0.732	3.188	0.005	0.152	6.585

significance). As shown by Table 5 that there is a significantly negative association between LTD and FS ( $\beta = -0.714$ ,  $t = -2.927$ ,  $P = 0.009$ , one-tailed significance). This result is consistent with prediction of the pecking order theory and the supported empirical studies (Fernández-Temprano and Tejerina-Gaite, 2020; Assenga et al., 2018; Mishra and Kapil, 2017; Yasser et al., 2017; Plalniappan, 2017; Vithessonthi and Tongurai, 2015; Kumar and Singh, 2012; Sheikh and Wang, 2013; Cai and Zhang, 2011; Cheng, 2009; Ebaid, 2009; Jermias, 2008; Antoniou et al., 2008; Tian and Zeitun, 2007; Joshua, 2007; Haniffa and Hudaib, 2006; Weir et al., 2002; Fama and French, 2002; Booth et al., 2001; Gleason et al., 2000; Milton and Raviv, 1991; Short and Keasey, 1999; Majumdar and Chhibber, 1999; Wald, 1999; Kinsman and Newman, 1998; McConnell and Servaes, 1995; Rajan and Zingales, 1995; Friend and Lang, 1988; Kester, 1986; Titman and Wessels, 1988).

The negative association reported between capital structure and firm sustainability indicates that there is a material effect of capital structure on firm sustainability. In addition, this result reveals that agency issues impose into the manager backs to borrow money more than they should do which, consequently, gives lenders a right to influence the companies' decisions. As a result, the managers are restricted to effectively manage the companies' operations.

## 5. CONCLUSIONS AND IMPLICATIONS

There is a substantial amount of research examined the association of capital structure with firm sustainability since the seminal work of Modigliani and Miller (1958) in either developed or developing countries. The majority of this work reported a positive association between capital structure and firm sustainability in developed countries. On the other hand, this association is reported as having a negative sign in the emerging or transition economies. The Saudi setting is not an exceptional as an emerging market. We investigated the association of capital

structure measures, namely; short-term liabilities and long-term liabilities, with firm sustainability among energy companies in Saudi Arabia for the period 2012-2019. The selected sample for this research comprises 32 firm-year observations. The results of the Pooled OLS Regression indicate that both measures of capital structure are associated negatively with firm sustainability. The negative association reported between capital structure and firm sustainability indicates that there is a material effect of capital structure on firm sustainability. In addition, this result reveals that agency issues impose into the manager backs to borrow money more than they should do which, consequently, gives lenders a right to influence the companies' decisions. As a result, the managers are restricted to effectively manage the companies' operations.

This study has several policy implications for financial managers. This research makes it clear that energy companies' financial managers should have an awareness about the influence that debts can have a negative impact on their profits. Furthermore, these companies should enhance their internal control systems as more effective internal control leads to greater profit. In addition, the results of this study can have policy implications for lenders and investors. The lenders should adhere to debt covenants taking into their consideration that their increased intervention in the management's decisions may cause a negative impact on the company's performance. This, in the future, will influence negatively the lenders' businesses as well. As for the investors, they should carefully analyze the company's capital structure before involving into investment decisions with such business. This will assist them in gaining a good future financial returns. This research can offer financial analysts, auditors, account/audit regulators, stock markets, researchers, and academics fresh understanding of the correlations of capital structure and firm sustainability. This study provides a groundwork for future research to examine the association of capital structure with firm sustainability. A number of factors influencing capital structure could be researched in future, e.g. corporate governance

(ownership structures, quality of audits, audit committee, and board of directors). This research model could be reproduced for other GCC nations and in other Middle Eastern (Arab) markets to check for validity.

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