

Does Capital Structure Impact Firm Performance: An Empirical Study of Three U.S. Sectors

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The purpose of this research is to determine whether there is a relationship between capital structure and firm performance of U.S. firms in the Industrial, Healthcare, and Energy Sectors. Capital structure refers to how a firm chooses to finance their assets and future growth, while firm performance could mean a plethora of things. By determining this relationship, firms in these sectors should have a better understanding of how to select the financing for their future growth.

INTRODUCTION

The theory of capital structure and its relationship with firm performance has been a controversial issue in corporate finance for several years. Many argue that a firm should use debt as a primary source of financing because of its tax benefit. Since the interest paid on debt is tax deductible, a firm can essentially lower its tax liability for any given year; thus increasing net income. The primary issue with financing with debt is that the firm will eventually have to pay the debt back, which increases its overall risk. On the other hand, equity financing does not provide any tax benefits for the firm, as dividends are not tax deductible. However, unlike debt financing, a firm does not have to pay anything back.

There are essentially two ways in which a firm can choose to finance their current operations and growth, with debt and/or equity financing. Debt financing is generally obtained by taking out a loan in the form of corporate bonds. A firm issues these corporate bonds in hopes of obtaining the necessary funds to finance their investments. Equity financing can be obtained through one of two ways, with internal or external financing. Internal financing is obtained through retained earnings, which are defined as being the net earnings from the previous year that have been reinvested into the firms operations. External financing is obtained by issuing stock, either common or preferred. Typically, firms use a mixture of debt and equity as a way of funding current operations and the future growth of the firm. This mixture is most commonly referred to as the firm's capital structure. The higher the portion of debt in the capital structure, the more financially leveraged the firm is said to be. Firms are continuously striving to find their optimal structure, a structure in which the firm maximizes its value while minimizing its cost of capital.

At first glance, it may seem that how a firm chooses to finance its operations and future growth is independent from its actual performance. However, this initial perception fails to take into consideration the different measures that can be used as proxies to define firm performance and capital structure. Once the relationship between capital structure and firm performance is understood, firms will have a better understanding of how to finance their operations that will maximize performance, and minimize risk.

With this study, we are trying to determine the relationship between capital structure and firm performance. To define firm performance, we are using different operating and financial measures in this study. In this specific area of corporate finance, there have been minimal amount of studies done on firms that have headquarters in the United States. In addition, most of the studies done in this area randomly selected firms from a plethora of companies across the board, or within a particular industry. Therefore, this study is going to focus on U.S. companies within the Industrial, Healthcare, and Energy Sector.

The primary purpose of this research is to determine whether capital structure negatively or positively impacts the performance of the firms in the aforementioned sectors listed above. The research question being examined is two-fold; is there a significant relationship between capital structure and firm performance? If so, to what extent is that relationship?

LITERATURE REVIEW

Overview

Modigliani and Miller first introduced capital structure theory in 1958 (Abadi & Abu-Rub, 2012). They examined changes in the firm's value as a result in the change in its capital structure (Abadi & Abu-Rub, 2012). With the assumption that the capital markets are perfect, Modigliani and Miller reached the conclusion that firm value and capital structure are independent of one another (Toraman, Kihc, & Reis, 2013). In 1963, Modigliani and Miller incorporated the tax factor into their models and stated that firms should utilize as much debt as possible to reach an optimal capital structure of 100 percent debt financing (Toraman, Kihc, & Reis, 2013). This means that as the amount of debt increases, a firm's value should increase as well (Babalola, 2012). Babalola (2012), citing Robichek and Myers, argues that the negative effect of bankruptcy costs on debt prevent firms from having the desire to go out and obtain more debt.

The Pecking Order Theory was first suggested by Donaldson in 1961, but was later modified by Myers and Majluf (Muritala, 2012). This theory states that companies prioritize their sources of financing according to the principle of least effort; meaning internal funds are used first, then debt is issued, followed by equity as a last resort (Muritala, 2012). The Pecking Order theory suggest that firms tend to sell equity when the market overvalues it, which is based on the assumption that managers act in the best interest of the existing shareholders (Shubita and Alsawalhah, 2012).

The Trade-Off Theory suggest that companies choose how much to finance with debt or equity by balancing the costs and benefits (Muritala, 2012). According to Mohamad & Abdullah (2012), the Trade-Off Theory implies that financial leverage has a positive relationship with profitability, and it considers the cost of bankruptcy associated with debt financing as well as the tax advantage.

According to Ebrati, Emadi, Balasang, & Safari (2013), Jensen and Meckling's 1976 argument about the possibility of capital structure having an influence on firm performance has prompted several research to conduct numerous studies trying to capture the relationship. However, empirical evidence regarding this relationship has been mixed and contradictory (Ebrati, Emadi, Balasang, & Safari, 2013).

Positive Relationship

Saeed, Gull, & Rasheed (2013) examined the impact of capital structure on the performance of twenty-five banks in Pakistan during the period of 2007 to 2011. The authors used return on assets, return on equity, and earnings per share to measure performance, while using the long-term debt-to-capital ratio, short-term debt-to-capital ratio, and total debt-to-capital ratio to denote capital structure. A multiple linear regression was utilized to conclude that there was a positive relationship between the determinants of capital structure and firm performance, although the significance was not very large.

Nawaz, Ali, and Naseem (2011) investigated the relationship between capital structure and firm performance of one hundred and seventy three firms within the textile sector in Pakistan during the period of 2000 to 2009. The authors used the debt-to-equity ratio to denote capital structure, and used the return on asset and return on equity ratio to represent firm performance. Nawaz, Ali, & Naseem (2011) utilized a single linear regression to conclude that the debt-to-equity ratio has a positive significant relationship with return on assets and return on equity.

David and Olorunfemi (2010) aimed to find the impact of capital structure on the performance of four Nigerian firms in the petroleum industry during the period of 1999 to 2005. The debt-to-equity ratio was used to represent the capital structure, while earnings per share and dividends per share were used to represent firm performance. David & Olorunfemi (2010) utilized pooled, fixed, and random regressions to conclude that earnings per share and dividends per share had a positive relationship with the debt-to-equity ratio.

Negative Relationship

Toraman, Kihc, and Reis (2013) analyzed the relationship between capital structure and the financial performance of twenty-eight manufacturing firm in Istanbul during the period of 2005 to 2011. Short-term liabilities to total assets, long-term liabilities to total assets, and total debt-to-equity were used as measurements of the capital structure, while return on assets was used to denote firm performance. The authors utilized a multiple linear regression to conclude that overall the negative relationship between capital structure and firm performance was statistically negative, while there was no relationship found between the debt-to-equity ratio and return on assets.

Muritala (2012) examined the relationship between capital structure and performance of ten firms in Nigeria during the period of 2006 to 2010. The debt ratio was used to denote capital structure, while return on assets and return on equity were used as measures of firm performance. Muritala (2012) utilized a Panel Least Square Regression to find that there was a statistically significant negative relationship between the debt ratio and the two measures of firm performance.

Babalola (2012) explored the relationship between capital structure and the performance of ten Nigerian firms during the period of 2000 to 2009. Return on equity was used as a measurement of firm performance, while the debt-to-assets ratio was used as a measurement of the capital structure. Babalola (2012) utilized a regression analysis to conclude that there was a statistically significant negative relationship between capital structure and financial performance.

Mohamad and Abdullah (2012) explored the impact capital structure has on the one hundred and thirty Malaysian firms during the period of 2002 to 2010. Return on assets, return on equity, and return on capital are used as proxies for firm performance, while the debt-to-equity, debt-to-total assets, and long term debt-to-total capital ratios are used as proxies for capital structure. A multivariate regression found that the debt-to-total assets ratio had a statistically significant negative relationship with the three proxies for firm performance.

MODEL

The models used in this study were to determine if changes in the financial leverage impacted firm performance. The basic hypothesis was to determine if there is a statistically significant relationship between firm performances due to the changes in leverage. If so, were those impacts positive or negative? Most of the studies done up to this point have focused on foreign firms; which has yielded mixed findings. Therefore, we have based our study off U.S. firms that operate in three different sectors; namely the Industrial Sector, Healthcare Sector, and the Energy Sector.

Data and Sample Collection

The data utilized in this study were collected over a sample period of 2004 to 2013; which is a period of ten years. In this study, the data were collected using secondary sources, such as annual reports and

Yahoo Finance. The annual reports were retrieved from the U.S. Securities Exchange Commission website (www.sec.gov).

The sample firms were randomly selected from three different sectors using a stock screener. The criterion included a stock price greater than 5 dollars, and the company's headquarters had to be located in the United States. Thirty U.S. firms were selected from the Industrial, Healthcare, and Energy Sector. This gives us 300 observations per sector.

Variables

In total, there are four dependent variables and one independent variable that were selected for this portion of the study. Market value per share, return on assets, operating return, and profit margin were used to represent firm performance, while the long term liabilities to total assets ratio was used to represent capital structure. The definitions of the dependent and independent variables are as follows:

Dependent Variables

- Market Value per Share: Stock Price
- Return on Assets: Net Income/Total Assets
- Operating Return: EBIT/Total Assets
- Profit Margin: Net Income/Total Sales

Independent Variables

- Long-Term Liabilities to Total Assets Ratio: Long-Term Liabilities/Total Assets

METHODOLOGY

In deriving our results, we pooled the data from each sector to give us a sample of 300 observations. In each sector, we treated each performance variable as a single dependent variable and the capital structure variable as a single independent variable. For this study, we utilized simple regressions to determine the extent of the relationships between capital structure and firm performance, and whether the relationships were statistically significant. We were able to derive four regression equations per sector.

RESULTS AND ANALYSIS

TABLE 1
REGRESSION RESULTS-INDUSTRIAL SECTOR

Dependent Variables	Intercept Coefficient	LTL Coefficient	Adj. R ²
MVPS	32.6854**	-6.9390	-.002
OPR	.1279**	-.1179**	.055****
ROA	.0838**	-.0903**	.059****
PM	.0430**	.0501*	.020***

*t-stat significant at 5%

**t-stat significant at 1%

***f-stat significant at 5%

****f-stat significant at 1%

Table 1 shows the regression equations for each variable in the Industrial Sector. Overall, we can see that capital structure and firm performance has a relatively mixed relationship, depending on which variable you use to define firm performance.

Capital structure appears to have a negative relationship with return on assets and operating return; and it is statistically significant. This suggests that taking on more debt will result in a negative impact on return on assets and operating return. Therefore, firms in the Industrial Sector should seek out alternative financing if they do not wish to reduce these ratios.

Capital structure appears to have a positive relationship with profit margin; and it is statically significant. This suggests that taking on more debt will have a positive impact on profit margin; resulting in a higher profitability measure. This is consist with the theory of financing with debt to take advantage of the tax benefits. Therefore, firms in the Industrial Sector should seek debt as their primary financing source if they wish to increase their profitability.

Capital structure appears to have no relationship with stock price, as it is statistically insignificant. This suggests that taking on more debt will have no impact on the firm's stock price. Therefore, firms in the Industrial Sector can seek debt or equity financing without having to worry about reducing shareholder wealth.

TABLE 2
REGRESSION RESULTS-HEALTHCARE SECTOR

Dependent Variable	Intercept Coefficient	LTL Coefficient	Adj. R ²
MVPS	43.0515**	-9.621	.000
OPR	.0794**	-.1698**	.021****
ROA	.0548*	-.1872**	.032****
PM	-3.6142	1.9232	-.003

*t-stat significant at 5%

**t-stat significant at 1%

***f-stat significant at 5%

****f-stat significant at 1%

Table 2 shows the regression equations for each variable in the Healthcare Sector. Overall, we can see that capital structure and firm performance has a relatively mixed relationship, depending on which variable you use to define firm performance.

Capital structure appears to have a negative relationship with return on assets and operating return; and it is statistically significant. This suggests that taking on more debt will result in a negative impact on return on assets and operating return. Therefore, firms in the Healthcare Sector should seek out alternative financing if they do not wish to reduce these ratios.

Capital structure appears to have no relationship with profit margin and stock price, as it is statistically insignificant. This suggests that taking on more debt will have no impact on profit margin or the firm's stock price. Therefore, firms in the Healthcare Sector can seek debt or equity financing without negatively affecting their profitability, or having to worry about reducing shareholder wealth.

TABLE 3
REGRESSION RESULTS-ENERGY SECTOR

Dependent Variable	Intercept Coefficient	LTL Coefficient	Adj. R ²
MVPS	42.9585**	1.4428	-.003
OPR	.1691**	.2042**	.115****
ROA	.1268**	-.1891**	.193****
PM	8.3201**	-27.1812**	.079***

*t-stat significant at 5%

**t-stat significant at 1%

***f-stat significant at 5%

****f-stat significant at 1%

Table 3 shows the regression equations for each variable in the Energy Sector. Overall, we can see that capital structure and firm performance has a primarily negative relationship, depending on which variable you use to define firm performance.

Capital structure appears to have a negative relationship with return on assets, operating return, and profit margin; and it is statistically significant. This suggests that taking on more debt will result in a

negative impact on return on assets, operating return, and profit margin. Therefore, firms in the Energy Sector should seek out alternative financing if they do not wish to reduce these ratios.

Capital structure appears to have no relationship with stock price, as it is statistically insignificant. This suggests that taking on more debt will have no impact on the firm's stock price. Therefore, firms in the Energy Sector can seek debt or equity financing without having to worry about reducing shareholder wealth.

CONCLUSIONS

Overall, there seems to be some consistency regarding the relationship between capital structure and firm performance. Capital structure appears to have a negative relationship with return on assets and operating return in all three sectors, suggesting that firms seek alternative financing, as they sacrifice potential performance by financing with debt. The relationship between profit margin and capital structure differs from sector to sector; as capital structure positively affects profit margin in the Industrial Sector, negative affects profit margin in the Energy Sector, and has no relationship in the Healthcare Sector. This suggests firms should finance with debt in the Industrial and Healthcare Sector, but should seek alternative financing in the Energy Sector. Additionally, capital structure had no relationship with stock price in all three sectors; suggesting that firms wanting to finance with debt can do so without sacrificing future stock market performance.

As you can see, the relationship between capital structure and firm performance can vary from sector to sector, as well as variable-to-variable. An important thing to remember is that we have not definitively concluded that capital structure negatively impacts firm performance all around. What we have found though is that capital structure negatively impacts return on assets and operating margin in all three of the sectors used in this study. In addition, this study seems to support the capital structure theory first introduced by Modigliani and Miller, as we have found that capital structure and stock price are independent from each other in all three sectors.

In the past, firms have used debt to purchase treasury stock, make acquisitions, pay dividends, and fund current assets. However, our data clearly shows that firm performance could suffer as a company increases its financial leverage in the Industrial, Healthcare, and Energy Sector. So, if capital structure appears to negatively impact firm performance, why would firms choose to finance with debt? For one thing, debt is relatively cheap, especially if you take into account the tax benefits. In addition, using debt as opposed to issuing equity leads to a non-dilution of shareholder equity, preventing shareholders from becoming antagonistic.

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APPENDIX A

Industrial Companies

1. AGCO Corporation
2. Caterpillar Inc.
3. The Middleby Corporation
4. Granite Construction Inc.
5. Willis Lease Financing Corp.
6. LSI Industries Inc.
7. Lindsay Corp.
8. CBIZ Inc.
9. Team Inc.
10. Tennant Co.
11. Briggs & Stratton Corp.
12. ABM Industries Inc.
13. The Eastern Co.
14. Grainger Inc.
15. Insteel Industries
16. Raven Industries
17. Con-way Inc.
18. NN Inc.
19. Parker-Hannifin Corp.
20. Twin Disc Inc.
21. Crane Co.
22. Hurco Companies Inc.
23. Supreme Industries Inc.
24. Trex Co Inc.
25. Danaher Corp.
26. ITT Corp
27. CSX Corp
28. Encore Wire Corp
29. U.S. Ecology Inc.
30. Allied Motion Technologies Inc.

APPENDIX B

Healthcare Companies

1. Johnson & Johnson
2. Becton, Dickinson & Co.
3. Landauer Inc.
4. Baxter International Inc.
5. Eli Lilly & Co.
6. Merck & Co. Inc.
7. Vascular Solutions Inc.
8. Bio Reference Laboratories Inc.
9. Arrowhead Research Corp
10. Angiodynamics Inc.
11. Isis Pharmaceuticals Inc.
12. Healthways Inc.
13. Genomic Health Inc.
14. Edwards Lifesciences Corp
15. Regneron Pharmaceuticals Inc.
16. National Healthcare Corp
17. Biogen
18. Abiomed Inc.
19. VCA Inc.
20. Cigna Corp
21. Community Health Systems Inc.
22. Teleflex Inc.
23. Greatbatch Inc.
24. Owens & Minor Inc.
25. Psychemedics Corp
26. Depomed Inc.
27. Actavix
28. Cerner Corp
29. Incyte Corp
30. The Cooper Companies

APPENDIX C

Energy Companies

1. Whiting Petroleum Corp.
2. Devon Energy Corp.
3. Energen Corp.
4. Exxon Mobil Corp.
5. Cabot Oil & Gas Corp.
6. Range Resources Corp.
7. Panhandle Oil & Gas Inc.
8. Cimarex Energy Corp.
9. HollyFrontier Corp.
10. Apache Corp.

11. Schlumberger Ltd.
12. Baker Hughes Inc.
13. SM Energy Co.
14. Seacro Holdings Inc.
15. FMC Technologies Inc.
16. Tesoro Corp.
17. Helix Energy Solutions Group Inc.
18. Iramco Inc.
19. Stone Energy Corp.
20. Gulf Island Fabrication Inc.
21. Steel Excek Inc.
22. Halliburton Co.
23. Oil States International Inc.
24. Patterson-UTI Energy
25. Geospace Technologies
26. Cheniere Energy Inc.
27. Superior Energy Services Inc.
28. Valero Energy Corp.
29. Southwestern Energy Co.
30. Diamond Offshore Drilling Inc.