The Relationship between Capital Structure and Profitability

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Abstract

This study seeks to extend Abor's (2005), and Gill, et al., (2011) findings regarding the effect of capital structure on profitability by examining the effect of capital structure on profitability of the industrial companies listed on Amman Stock Exchange during a six-year period (2004-2009). The problem statement to be analyzed in this study is: Does capital structure affect the Industrial Jordanian companies? The study sample consists of 39 companies. Applying correlations and multiple regression analysis, the results reveal significantly negative relation between debt and profitability. This suggests that profitable firms depend more on equity as their main financing option. Yet recommendations based on findings are offered to improve certain factors like the firm must consider using an optimal capital structure and future research should investigate generalizations of the findings beyond the manufacturing sectors.

Keywords: Short term Liabilities, Long term liabilities, Return on Equity, Amman Stock Exchange.

1. Introduction

The capital structure is defined as the mix of debt and equity that the firm uses in its operation. The capital structure of a firm is a mixture of different securities. In general, firms can choose among many alternative capital structures. For example, firms can arrange lease financing, use warrants, issue convertible bonds, sign forward contracts or trade bond swaps. Firms can also issue dozens of distinct securities in countless combinations to maximize overall market value (Abor, 2005).

Firms can use either debt or equity capital to finance their assets. The best choice is a mix of debt and equity. In the case where interest was not tax deductible, firms' owners would be indifferent as to whether they used debt or equity, and where interest was tax deductible, they would maximize the value of their firms by using 100% debt financing (Azhagaiah and Gavoury, 2011). The use of debt in capital structure of the firm leads to agency costs. Agency costs arise as a result of the relationships between shareholders and managers, and those between debt-holders and shareholders (Jensen and Meckling, 1976).

The pecking order hypothesis suggests that firms are willing to sell equity when the market overvalues it (Myers, 1984; Chittenden et al., 1996). This is based on the assumption that managers act in favor of the interest of existing shareholders. Consequently, they refuse to issue undervalued shares unless the value transfer from "old" to new shareholders is more than offset by the net present value of the growth opportunity. It can be concluded that new shares are only issued at a higher price than that imposed by the real market value of the firm. Therefore, investors interpret the issuance of equity by a firm as signal of overpricing. If external financing is unavoidable, the firm will opt for secured debt as opposed to risky debt and firms will only issue common stocks as a last resort (Abor, 2005).

Hence, the higher the debt ratio, the greater the risk, and thus higher the interest rate will be. At the same time, rising interest rates overwhelm the tax advantages of debt. If the firm falls on hard times and if it's operating income is insufficient to cover interest charges, then stockholders will have to make up the short fall, and if they can't, the firm may be forced into bankruptcy. Good times may be just around the corner. But too much debt can keep the company wipeout shareholders in the process (Azhagaiah and Gavoury, 2011).

This study examines the relationship between capital structure and profitability of the Jordanian manufacturing firms. The literature cites a number of variables that are potentially associated with the profitability of firms. In this study, the selection of exploratory variables is based on the alternative capital structure, profitability theories and previous empirical work. The choice can be limited, however, due to data limitations. As a result, the set of proxy variables includes six factors: three ratios of short-term debt to total assets, long-term debt to total assets, total debt to total assets and, in addition, sales growth, firm size, and profitability (measured by return on equity). This study is organized as follows: First research objectives and importance are shown, and then the literature for the relevant theoretical and empirical work on capital structure and its effect on profitability are reviewed. After that, the methodology and framework which includes sample and the variables used in the empirical analysis is presented. After words, separate section portrays and discusses the data analysis, discussion and statistical results. Finally the conclusion and recommendations are presented.

2. Research Objectives

This research provides international evidence on capital structure alternative by using Jordanian data. The way in which capital structure is managed will have a significant impact on the profitability of firms.

The academic literature has documented a number of studies that attempt to detect and measure capital structure. International results are mixed in this respect most likely due to the problems in measuring the working capital management in different countries. Therefore, further evidence on this area is needed.

3. Research Importance

The relationship between capital structure and profitability cannot be ignored because the improvement in the profitability is necessary for the long-term survivability of the firm. Because interest payment on debt is tax deductible, the addition of debt in the capital structure will improve the profitability of the firm. Therefore, it is important to test the relationship between capital structure and the profitability of the firm to make sound capital structure decisions.

The lack of a consensus about what would qualify as optimal capital structure in the service and manufacturing industries has motivated us to conduct this research. A better understanding of the issues at hand requires a look at the concept of capital structure and its effect on the firm's profitability.

4. Literature Review

Modigliani and Miller (1958) have a theory of "capital structure irrelevance" where argue that financial leverage does not affect the firm's market value with assumptions related to homogenous expectations, perfect capital markets and no taxes.

Sarkar and Zapatero (2003) find a positive relationship between leverage and profitability. Myers and Majluf (1984) find firms that are profitable and generate high earnings are expected to use less debt capital comparing with equity than those that do not generate high earnings.

Sheel (1994) showed that all leverage determinants factors studied, excepting firm size, are significant to explain debt behavior variations. Gleason, et al., (2000) Using data from retailers in 14 European countries, which are grouped into 4 cultural clusters, it is shown that capital structures for retailers vary by cultural clusters. This result holds in the presence of control variables. Using both financial and operational measures of performance, it is shown that capital structure influences financial performance, although not exclusively. A negative relationship between capital structure and performance suggests that agency issues may lead to use of higher than appropriate levels of debt in the capital structure, thereby producing lower performance. Graham (2000) integrates under firm-specific benefit functions to estimate that the capitalized tax benefit of debt equals 9.7% of firm value. The typical firm could double tax benefits by issuing debt until the marginal tax benefit begins to decline.

It is inferred how aggressively a firm uses debt by observing the shape of its tax benefit function. Paradoxically, large, liquid, profitable firms with low expected distress costs use debt conservatively. Product market factors, growth options, low asset collateral, and planning for future expenditures lead to conservative debt usage. Conservative debt policy is persistent.

Hennessy and Whited (2005) develop a dynamic trade-off model with endogenous choice of leverage, distributions, and real investment in the presence of a graduated corporate income tax, individual taxes on interest and corporate distributions, financial distress costs, and equity flotation costs. The study explains several empirical findings inconsistent with the static trade-off theory and show that there is no target leverage ratio, firms can be savers or heavily levered, leverage is path dependent, leverage is decreasing in lagged liquidity, and leverage varies negatively with an external finance weighted average. Using estimates of structural parameters, they find also that simulated model moments match data moments.

Chiang et al., (2002) results show that profitability and capital structure are interrelated , the study sample includes 35 companies listed in Hong Kong. Raheman et al., (2007) find a significant capital structure effect on the profitability for non-financial firms listed on Islamabad Stock Exchange.

Mendell, et al., (2006) investigates financing practices across firms in the forest products industry by studying the relationship between debt and taxes hypothesized in finance theory. In testing the theoretical relationship between taxes and capital structure for 20 publicly traded forest industry firms for the years 1994-2003, the study find a negative relationship between profitability and debt, a positive relationship between non-debt tax shields and debt, and a negative relationship between firm size and debt.

Abor (2005) seeks to investigate the relationship between capital structure and profitability of listed firms on the Ghana Stock Exchange and find a significantly positive relation between the ratio of short-term debt to total assets and ROE and negative relationship between the ratio of long-term debt to total assets and ROE.

Gill, et al., (2011) seeks to extend Abor's (2005) findings regarding the effect of capital structure on profitability by examining the effect of capital structure on profitability of the American service and manufacturing firms. A sample of 272 American firms listed on New York Stock Exchange for a period of 3 years from 2005 – 2007 was selected. The correlations and regression analyses were used to estimate the functions relating to profitability (measured by return on equity) with measures of capital structure. Empirical results show a positive relationship between short-term debt to total assets and profitability and between total debt to total assets and profitability in the service industry. The findings of this paper show also a positive relationship between short-term debt to total assets and profitability, long-term debt to total assets and profitability, and between total debt to total assets and profitability in the manufacturing industry.

5. Methodology

The purpose of this research is to contribute towards a very important aspect of financial management known as capital structure with reference to Jordan. Here the relationship between capital structure practices and its effects on profitability of (39) Industrial Jordanian firms listed on Amman stock Exchange for a period of six years from 2004 – 2009 will be examined. This section discusses the firms and variables included in the study, the distribution patterns of data and applied statistical techniques in investigating the relationship between capital structure and profitability.

5.1 Population

The population will consist of the Industrial Jordanian shareholding companies listed in the first and second markets in Amman Stock Exchange for the study period (2004-2009). There are (86) companies listed from these two sectors in Amman Stock Exchange in year 2004; 38 companies listed in the first market (44% from the population) and 48 companies listed in the second market (56% from the population).

5.2 Research Sample

All industrial shareholding companies that satisfy the following conditions will be included in the study sample:

1- Share prices data are available during the study period (2004-2009), and there is an availability of data required to calculate study variables[1].
2- The company didn't enter in a consolidation process or allocated free shares because these events affect the company figures such as earnings[2].

(39) Companies will represent the study sample (45% from the population). Appendix (1) shows the study sample.

5.3 Study Period

The study covers the period from 2004 to 2009, various data required for years 2003 to computing study variables. The reason for restricting to this period was that the latest data for investigation was available for this period. The required data include the following:-

1. Total Assets from 2004 to 2009.
2. Total Liabilities from 2004 to 2009.
3. Current Liabilities from 2004 to 2009.
4. Long term Liabilities from 2004 to 2009
5. Net Income before interest and tax from 2004 to 2009.
6. Sales from 2003 to 2009.
7. Total Shareholders' Equity from 2003 to 2009.

5.4 Research Hypotheses

H_{01}: There is no relationship between short-term debt to total assets and profitability.
$H_{02:}$ There is no relationship between long-term debt to total assets and profitability.
H_{03}: There is no relationship between total debt to total assets and profitability.

5.5 Research Variables and Models

The following regression models are estimated:- (Abor 2005), (Gill, et al., 2011).

1. $ROE_{it} = \beta_0 + \beta_1 SDA_{it} + \beta_2 Size_{it} + \beta_3 SG_{it} + e_1$
2. $ROE_{it} = \alpha_{0+} \alpha_1 LDA_{it+} \alpha_2 Size_{it} + \alpha_3 SG_{it} + e_2$
3. $ROE_{it} = \lambda_{0+} \lambda_1 DA_{it+} \lambda_2 Size_{it} + \lambda_3 SG_{it+} e_3$

Where:
$\beta_0, \alpha_0, \lambda_{0:}$ The intercept of equation.
β, α, λ: Coefficients for independent variables.
ROE: Net Income/ average equity
SDA: Short-term debt/total assets.
LDA: Long-term debt/total assets.
DA: Total debt/total assets
Size: Natural Logarithm of firm's sales, lagged one year period.
SG: Current year's sales minus previous year's sales divided by previous year's sales.
i: firm
t: time = 1, 2,……,6 years.
e_{it} = Error term.

[1] After applying this condition, many companies will be excluded; for example: ATTANQEEB CONSTRUCTION MATERIAL MANUFACTURING, JORDAN KUWAIT FOR AGR. & FOOD PROD, KAWTHER INVESTMENT and LIVESTOCK AND POULTRY.

[2] After applying this condition, many companies will be excluded because making a consolidation process; for example: JORDAN PAPER & CARDBOARD FACTORIES and RUM ALADDIN INDUSTRIES. And other companies will be excluded because allocated free shares; for example: ARAB ALUMINIUM INDUSTRY /ARAL, UNION CHEMICAL & VEGETABLE OIL INDUSTRIES and UNION TOBACCO & CIGARETTE INDUSTRIES.

6. Analysis and results

Table (1) provides a summary of the descriptive statistics of the dependent and independent variables for the sample of firms. The profitability measured by return on equity (ROE) reveals an average of 8 percent with median of 9 percent. This picture may suggest a good performance during the period under the study if we put in consideration the financial crises effect and the poor economic indicators in Jordan. In other hand, it suggests a bad picture for Jordanian companies when comparing with Abor, (2005) study on Ghana companies; ROE average was 37 percent with median 28 percent, and with Gill, et al., (2011) study on United States manufacturing and service companies; ROE average was 26 percent. The ROE measures the contribution of net income per Jordanian Dinner invested by the firms' stockholders; a measure of the efficiency of the owners' invested capital.

The variable LDA measures the ratio of short debt to total assets. The average value of this variable is 25 percent with median of 21 percent. This value indicates that approximately 25 percent of total assets are represented by short-term debts, attesting the fact that Jordanian firms largely depend on short-term financing their operations comparing with long-term debts due to the difficulty in accessing long-term credit from banks.

The variable DA measures the ratio of total debt to total assets. The average value of this variable is 30 percent with median of 26 percent. This position reveals that the companies are financially leveraged with a large percentage of total debt being short-term. The average sales growth is 12% and the average firm size measured by logarithm of sales, lagged by one-year period, came to 7.02.

Table (2) provides the Pearson correlation for the variables that we used in the regression model. Pearson's correlation analysis is used for data to find the relationship between capital structure and profitability. We found that the firm's profitability (measured by return on equity) is positively correlated with the short-term debt and total debt in the manufacturing industries. The positive correlations explain that short-term debt and total debt in the capital structure improve the profitability of the firm in the service and manufacturing industries because interest payments are tax deductible.

6.1. Multicollinearity Problem

As shown in table (2), there is a relationship among the main variables which may lead to multicollinearity problem which will affect the model power and its ability in explaining the results. Variance Inflation Factor (VIF) has been used which refers to actual disparity percentage to total disparity, and if this factor is less than (5) this means that there is no multicollinearity problem (Fox, 1991).

As shown from table (3), all (VIF) factors are less than (5), so there is no multicollinearity problem in the regression models.

6.2. Autocorrelation problem

The autocorrelation among regression model residuals have been tested using Durbin-Watson factors, if Durbin-Watson factors are between (1) and (3) there is no autocorrelation problem (Alsaeed, 2005).

As shown in table (4), all Durbin-Watson factors are between (1) and (3), so there is no autocorrelation problem in the regression models.

6.3. Regression Analysis

Regression analysis is used to investigate the relationship between capital structure and profitability measured by ROE. Ordinary least squares (OLS) regression results are presented in table (5). The results from the regression models (1), (2), and (3) denote that the independent variables explain the debt ratio determinations of the firms at 26.3, 32.9, and 32.7 percent, respectively.

The results in regression (1) indicate a significantly negative relationship between short-term debt and profitability. The results also show that profitability increases with control variables; size and sales growth. Regression (2) shows a significantly negative association between LDA and profitability. This implies that an increase in the short-term and long-term debt position is associated with a decrease in profitability.

This is explained by the fact that debts are relatively more expensive than equity, and therefore employing high proportions of them could lead to low profitability. The results support part of earlier findings by Fama and French (1998), Graham (2000), and Booth et al. (2001).

The results from regression (3) indicate also a significantly negative association between total debt and profitability. The significantly negative regression coefficient for total debt implies that an increase in the debt position is associated with a decrease in profitability: thus, the higher the debt, the lower the profitability. Again, this suggests that profitable firms depend more on equity as their main financing option.

7. Conclusion and Recommendations

The capital structure decision is crucial for any business organization. The decision is important because of the need to maximize returns to various organizational constituencies, and also because of the impact such a decision has an organization's ability to deal with its competitive environment.

This study results reveal significantly negative relation between debt and profitability. These findings imply that an increase in debt position is associated with a decrease in profitability; thus, the higher the debt, the lower the profitability of the firm. The results also show that profitability increases with control variables; size and sales growth. The findings of this paper contradict with prior empirical studies like Abor (2005). This may be because of the economic downturn in Jordan. During the economic downturn, sales level tends to go down which cause cash inflow problems for the corporations. Consequently, firms start defaulting liability payments. Therefore, it is important for lenders to understand and review cash flows, the level of assets and liabilities, market value and volatility of the company assets, liquidity of assets, etc., on a yearly basis to control the companies. This, in turn, will reduce the default risk and will minimize losses for the lending institutions (Gill, et al., 2011).

Although the financial leverage provides tax benefits to the corporations, it increases default risk for the lending institutions such as banks, credit unions, and other private lenders. Default risk is defined as the uncertainty surrounding a firm's ability to service its debts and obligations within specified time periods (e.g., less than one year for current liabilities, more than one year for long-term liabilities). As leverage increases, not only does potential return in Jordan decrease, but a firm's ability to service its debt usually erodes, and the risk of credit default rises. The debt also increases the danger of corporate illiquidity when the economy next experiences a recession (Hale, 1988). To improve the efficiency, it is important for the lending institutions to understand default risk of a firm in different industries such as service and manufacturing.

Based on these results the following recommendations are suggested:-

1. The firm must consider using an optimal capital structure. The optimal capital structure includes some debt, but not 100% debt. In other words, it is a "best" debt/equity ratio for the firm, which in turn, will minimize the cost of capital, i.e., the cost of financing the company's operations. In addition, it will reduce the chances of bankruptcy.
2. This study is limited to the sample of Jordanian manufacturing industry firms. Future research should investigate generalizations of the findings beyond the manufacturing sectors.
3. The Industrial Jordanian Companies have to run feasibility study for the new projects before taking the investment decision.

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Table (1)
Descriptive Measures

Variable	ROE	SDA	LDA	DA	Size	SG
Mean	0.08	0.25	0.05	0.30	7.02	0.12
Median	0.09	0.21	0	0.26	6.94	0.07
Std. Deviation	0.20	0.18	0.11	0.22	0.80	0.43
Minimum	-0.98	0	0	0	4.43	-1
Maximum	0.93	0.86	0.68	0.94	9.33	3.27

Table (2)
Correlation matrix

Variable	SDA	LDA	DA	Size	SG
ROE	0.084	(-0.138)*	0.004	(0.433)**	(0.252)**
SDA		0.078	(0.878)**	(0.434)**	0.123
LDA			(0.545)**	(0.319)**	0.021
DA				(0.518)**	(0.113)
Size					(0.006)

* Correlation is significant at the 0.05 level.
** Correlation is significant at the 0.01 level.

Table (3)
Regression Model Variance Inflation Factors (VIF)

Regression Model	**VIF factor***
1. $ROE_{it}= \beta_0 + \beta_1 SDA_{it}+ \beta_2 Size_{it} + \beta_3 SG_{it}+e_1$	1.254
2. $ROE_{it} = \alpha_{0+} \alpha_1 LDA_{it+} \alpha_2 Size_{it} + \alpha_3 SG_{it} + e_2$	1.114
3. $ROE_{it} = \lambda_{0+} \lambda_1 DA_{it+} \lambda_2 Size_{it} + \lambda_3 SG_{it+} e_3$	1.390

Table (4)
Regression Model Durbin-Watson Factors

Regression Model	**Durbin-Watson Factors**
1. $ROE_{it}= \beta_0 + \beta_1 SDA_{it}+ \beta_2 Size_{it} + \beta_3 SG_{it}+e_1$	1.238
2. $ROE_{it} = \alpha_{0+} \alpha_1 LDA_{it+} \alpha_2 Size_{it} + \alpha_3 SG_{it} + e_2$	1.388
3. $ROE_{it} = \lambda_{0+} \lambda_1 DA_{it+} \lambda_2 Size_{it} + \lambda_3 SG_{it+} e_3$	1.313

Table (5)
Regression Analysis

Dependent Variable	Return on Equity (ROE_{it})		
Regression Model	(1)	(2)	(3)
SDA_{it}	-0.186 (-2.686)*		
LDA_{it}		-0.599 (-5.531)*	
DA_{it}			-0.320 (-5.464)*
$Size_{it}$	0.127 (8.051)*	0.134 (9.361)*	0.154 (9.687)*
SG_{it}	0.128 (4.747)*	0.121 (4.755)*	0.137 (5.3)*
F-Test	(28.566)*	(38.946)*	(38.620)*
Adjusted R^2	0.263	0.329	0.327

* Correlation is significant at the 0.01 level.

Appendix (1)

Study Sample

NO.	Company Name	Foundation Year
1	THE JORDAN PIPES MANUFACTURING	**1974**
2	THE JORDAN WORSTED MILLS	**1964**
3	UNION ADVANCED INDUSTRIES	**1996**
4	ARAB CENTER FOR PHARM.& CHEMICALS	**1983**
5	UNIVERSAL CHEMICAL INDUSTRIES	**1981**
6	UNIVERSAL MODERN INDUSTRIES	**1989**
7	ARAB ELECTRICAL INDUSTRIES	**1993**
8	THE ARAB POTASH	**1958**
9	ARABIAN STEEL PIPES MANUFACTURING	**1983**
10	DAR AL DAWA DEVELOPMENT & INVESTMENT	**1975**
11	GENERAL INVESTMENT	**1955**
12	INDUSTRIAL INDUSTRIES & MATCH/JIMCO	**1982**
13	JORDAN INDUSTRIAL RESOURCES	**1992**
14	INTERNATIONAL SILICA INDUSTRIAL	**1999**
15	AL-EKBAL PRINTING AND PACKAGING	**1996**
16	JORDAN CERAMIC INDUSTRIES	**1966**
17	JORDAN CHEMICAL INDUSTRIES	**1980**
18	JORDAN DAIRY	**1968**
19	JORDAN NEW CABLE	**1994**
20	JORDAN PETROLEUM REFINERY	**1956**
21	JORDAN PHOSPHATE MINES	**1953**
22	JORDAN ROCK WOOL INDUSTRIES	**1984**
23	JORDAN STEEL	**1993**
24	JORDAN SULPHO-CHEMICALS	**1983**
25	JORDAN TANNING	**1957**
26	JORDAN VEGETABLE OIL INDUSTRIES	**1953**
27	JORDAN WOOD INDUSTRIES / JWICO	**1983**
NO.	**Company Name**	**Foundation Year**
28	MIDDLE EAST COMPLEX FOR ENG., ELECTRONICS & HEAVY INDUSTRIES	**1995**
29	MIDDLE EAST PHARMA. & CHMICAL IND. & MEDICAL APPLIANCES	**1996**
30	NATIONAL ALUMINIUM INDUSTRIAL	**1998**
31	NATIONAL CABLE & WIRE MANUFACTURING	**1983**
32	NATIONAL CHLORINE INDUSTRIES	**1992**
33	NATIONAL POULTRY	**1995**
34	NATIONAL STEEL INDUSTRY	**1979**
35	JORDAN POULTRY PROCESSING & MARKETING	**1987**
36	READY MIX CONCRTE AND CONSTRUCTION SUPPLIES	**1995**
37	THE ARAB INTERNATIONAL FOOD FACTORIES	**1995**
38	THE INDUSTRIAL COMMERCIAL & AGRICULTURAL	**1961**
39	THE JORDAN CEMENT FACTORIES	**1951**