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Debt-Performance Relation. Evidence from Jordan

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Abstract

We investigated the debt-performance relation for all 77 Jordanian industrial companies over the period between 2000 and 2011. By utilizing 2 alternative measurements of profitability ratio, as proxies of the firm's performance, that are ROA and ROE, three types of debt as proxies of the debt structure that are LTD, STD, and TD, with the existence of three control variables that are SIZE, SGR, and EFFI, six models were tested using unbalanced pooled cross-sectional time series regression method. The results of this paper show that debt structure expressed as: LTD, STD, and TD have a negative and significant relationship with ROA. Also the measures of the debt structure, except for the LTD, have the same significant relation with ROE. The finding of this study confirm the pecking order theory, and are consistent with those obtained by (Wang, 2010; Kayo, Limura, 2010; Vasiliou et al., 2009).

Keywords: Debt, Performance, Jordan

Introduction

The open-up work accomplished by Modigliani and Miller (1958) on capital structure is a basis of inspiration and encouragement. They declared that in a perfect market, the Firm's market value and its capital cost do not rely on the firm's capital structure. Since the perfect market is a theoretical situation, and cannot be reached in practice, it is still unreasonable to expand an authoritative theory of capital structure and design experimental tests.

Firms always like to elevate finance from internal sources, as an alternative of the external resources. Due to its high cost, the external equity is the last option for most companies, and the companies act to finance through borrowing is an attempt to lower its weighted average cost of capital allowing the company to have wider area for acceptance of the investment opportunities.

The low cost of capital in productive investment projects, permits firms to maximize their profits. This assumption explains the point of the financial management i.e. maximization the shareholders' wealth. O'Brien and Peters (2002) suggested that it is hard for companies that have low cash flows to obtain higher level of debt than companies that have high cash flows and profitability. Therefore, signifying that enlarge in the long-term debt is related with a decline in the profit.

Into working life, managers who can identify the ideal debt structure are rewarded by minimizing the firm's capital cost, and thus, maximizing profitability. If the profitability of the firm is influenced by its debt structure, then firm's debt structure can affect the firm's possibility of defaulting.

Even though the impact of the structure of the debt structure on profitability had been studied for many years, researchers yet cannot concur on the level and direction of the impact. In Jordan, stakeholders of the firms do not accurately sense the impact of the structure of the debt on the firms' profitability as they may think that the debt structure will not affect their firms' value. Accordingly, the issues of debt-performance relation have to be solved, and a deeper research on this field will be essential needs.

The key objective of this study is to assess the nature of the debt-performance relationship for the Jordanian manufacturing firms, and to fill the shortage of the empirical studies regarding the impact of the formation of the debt on the firm's performance for developing countries.

Literature Review

Min-Tsung Cheng (2009) tested the impact of capital structure on the firm's profitability. Spaced out the high cash flow firm, result of the study shows that debt funding has significantly inverted impact on the firm's profitability, and that it is safer for the company to finance its needs using both sources debt and equity, as the compensation of the one source offset the cons of the other.

Margaritis and Psillaki (2010), inspected the association between capital structure, ownership structure and firm profitability for French industrial companies. The productive efficiency was pointed as an index of the firm's profitability. The study's findings support the agency theory in that efficiency is directly associated with more leverage, due to the presence of an external party works as the performance control. Another finding of the study is that companies with higher concentration in the equity structure realize less agency costs, and no significant impact was found for the ownership concentration on the performance in the other industries.

David and Olorunfemi (2010) investigated the effect of capital structure on firm's performance. The study concluded a positive relation between the two measures of the firm's performance: earnings per share and dividend per share and the debt ratio a proxy of the capital structure.

Saeedi and Mahmoodi (2011) questions the association between capital structure and firm's profitability. The result shows that firm's profitability measured by Earnings per share and Tobin's Q, are positively affected by capital structure, whereas the Returns on Assets (ROA) associated negatively with the capital structure, and no significant association between Returns on Equity and capital structure.

San and Heng (2011) inspected the capital structure performance relationship before and during crisis (2007) for Malaysian construction companies. The result shows that the firm's performance significantly associated with the capital structure for the Malaysian construction companies. For big firms the results showed that the returns on capital (ROC) as a performance measure is significantly positively associated with the debt to equity market value (DEMV) as the measure of the capital structure, also the earnings per share (EPS) as one of the performance measures is positively associated with the capital structure measured by the long-term debt to capital (LDC), while EPS is significantly negatively associated with the capital structure when its measured by the DEMV. For medium firms, only the Operating Margin (OM) as a performance measure has a positive association with long-term debt to common equity (LDCE). For the small firms EPS and debt

to capital ratio (DC) has a negative association. As results, the study concluded that the capital structure affects the performance of the Malaysian construction companies in chosen proxies.

Nima et al (2012) investigate the possible relationship between current debt, non-current debt, and total debt as proxies for capital structure, and the performance of Iranian companies listed at Tehran Stock Exchange. The study concluded that the proxies of the capital structure of the Iranian firms have a negative effect on the Iranians firm's performance.

Zuraidah et al (2012) aims to explore the effect of the capital structure on firm's profitability by using the return on asset and return on equity as proxies for the performance, and short-term debt (STD), long-term debt (LTD) and total debt (TD) as proxies for the capital structure, with the existence of four control variables that is, size, asset grow, sales grow and efficiency. The study suggested that STD and TD have a significant association with ROA a proxy of the firm's performance, although all three levels of debt have a positive relation with ROE.

Methodology of Research

This paper adopts a scientific analytical approach by utilizing unbalanced pooled cross-sectional time series panel data regression model in order to achieve the study's goal of testing the debt-performance relation.

Sample

This study attempt to investigate the impact of the debt structure on the firm's performance for all 77 Jordanian industrial firms listed on Amman Stock Exchange, within the time horizon 2000 to 2011.

Variables of the Study

Table (1) represents the Variables, Definition, Measure, and Notation.

Dependent Variables

We used the two most common ratios, in previous studies, for measuring firm's performance as proxies for the firm's performance which are: the returns on asset (ROA) and the returns on equity (ROE).

Abor (2005) investigated the relation between firm's performance and debt policy for Ghanaian listed companies, the study concluded a significantly positive relationship between *STD* and firm's performance measured by the *ROE*, and a significantly negative relation between *LTD* and *ROE* as proxy of the firm's performance.

Khan (2012) tested the impact of the debt structure on the firm's performance for the Pakistanian companies, the study concluded the *STD* and *TD* as proxies of debt structure have a significantly negative effect on the firm's ROA a proxy of the firm's performance. And that the relationship between the proxies of the debt structure and the firm's ROE a proxy of the firm's performance is negative but insignificant.

Ebaid (2009) suggested a very weak relationship between the debt structure and the firm's performance for the Egyptian firms. The study concluded that the relation between the proxies of the debt structure and the ROE is insignificant. While the short term debt and total debt to total assets has a negative and statistically significant effect on the firm's ROA.

Table 1. Variables, definition, measure, and notation

Variable	Definition	Measure	Notation
Firm's Performance (Dependent variable)	Return on Asset	$\frac{\text{Net Income}}{\text{Total Assets}}$	ROA
	Return on Equity	$\frac{\text{Net Income for Common equity}}{\text{Common Equity}}$	ROE
Debt Structure (Independent variable)	Long-term Debt	$\frac{\text{Fixed liabilities}}{\text{Total Assets}}$	LTD
	Short-term Debt	$\frac{\text{Current liabilities}}{\text{Total Assets}}$	STD
	Total Debt	$\frac{\text{Total liabilities}}{\text{Total Assets}}$	TD
Control Variables	Firm's Size	In (Total Assets)	SIZE
	Sales Growth Rate	$\frac{\text{Sales}_t - \text{Sales}_{t-1}}{\text{Sales}_{t-1}}$	SGR
	Efficiency	$\frac{\text{Sales Revenue}}{\text{Total Assets}}$	EFFI

Independent Variables

Short-term debt (STD)

Short-term debt is a part of company's balance sheet within the current liabilities, and it is typically payable in one year. If the company has more short-term debt than cash or current assets to cover the debt's payments, the company could be required to take on more liability and could be in bad financial situation. Rehman et al., (2012) concluded that when the firms have small volume of sales, the short-term debt is a very useful tool, where it is significantly positively affect the profitability. Zuraidah et al (2012) found that the ROA has a significant relation with the short-term debt for the Malaysian firms. Abor (2005) found that the ROE as a proxy of the performance is associated positively with the short-term debt for the listed firms in Ghana. Mesquita and Lara (2003) concluded a positive relation between the profitability of the Brazilian firms and the short-term debt. Short-term debt can be expressed as the ratio of the current liabilities to total assets.

Long-term debt (LTD)

Long-term debts are loans and financial liabilities which are due after one year. Such obligations could include bank loans, debentures, bonds, and pension liabilities. Firms with high amount of long term debt could finds itself mired with high interest payments, a risk of having low working capital, and in the long run, bankruptcy. Philips and Sipahioglu (2004) suggested a positive association between the long-term debt and the profitability, this relationship can be understood through the role of the long-term debt in easing the agency costs, and its tax advantage which comes through the tax shield. Long-term debt can be expressed as the ratio of the fixed liabilities to total assets.

Total Debt

Total debt is the pooled amount of short-term debt and long-term debt. Various studies (Hadlock and James, 2002, Berger and Bonaccorsi, 2006, Kyereboah, 2007) concluded a positive association between the leverage and the profitability; other studies (Zeitun and Tian, 2007, Ibrahim, 2009) concluded a negative relation between the total debt and the performance. Total debt can be expressed as the ratio of the total liabilities to total assets.

Control Variables

Three control variables had been used to investigate the debt-performance relationships that are firm's size, sales growth, and efficiency. Following Ramadan (2012) the firm's size is measured by the log of the firm's total assets. As for the sales growth, following Zuraidah et al (2012) the sales growth is measured by the annual growth rate of the sales. Total asset turnover measured by the ratio of the total sales revenue to total assets is the proxy for the efficiency.

Econometric Models

To evaluate the debt-performance relation, the common model used in our study was as follow:

$$Prof_{it} = f(\text{debt}_{it}, \text{Firm's Characteristics}_{it}) \quad (1)$$

Where i, t are the company i at the period t ; $Prof$ is the firm's profitability with two alternative measures: ROA and ROE. $Debt$ vector of the company's debt structure, $Firm's characteristics$, are the control variables that are; SIZE, SGR, and EFFI.

To achieve the objectives of this study and test its hypotheses, the study utilized unbalanced pooled cross-sectional time series panel data regression, with 77 cross sections and 12 time periods resulting in 892 company year observations. So the three econometric models were estimated by converting equation 1 as follows:

$$prof_{it} = \beta_0 + \beta_1 LTD_{it} + \gamma_1 SIZE_{it} + \gamma_2 SGR_{it} + \gamma_3 EFFI_{it} + \varepsilon_{it} \quad (2)$$

$$prof_{it} = \beta_0 + \beta_1 STD_{it} + \gamma_1 SIZE_{it} + \gamma_2 SGR_{it} + \gamma_3 EFFI_{it} + \varepsilon_{it} \quad (3)$$

$$prof_{it} = \beta_0 + \beta_1 TD_{it} + \gamma_1 SIZE_{it} + \gamma_2 SGR_{it} + \gamma_3 EFFI_{it} + \varepsilon_{it} \quad (4)$$

Where; $prof$ is the two alternative profitability measures for i^{th} cross-sectional company for the t^{th} period, as $i = 1, 2, 3, \dots, 77$, $t = 1, 2, 3, \dots, 12$. β_0 is constant. β_1 unknown parameters of the firm's debt structure, which take one of the three alternative measures: LTD , STD , and TD , to be estimated. γ 's parameters of control variables included in the econometric models to be estimated. $SIZE$ the firm's size measured by the log of the total assets. SGR the sales growth is measured by the annual growth rate of the sales. $EFFI$ is the proxy of the efficiency, measured by the total assets turnover. ε_{it} is the random error.

The models are estimated using the Ordinary Least Square Method (OLS), with the two alternatives of the performance, six models will be estimated as shown in Table 4 and 5.

This paper aims to investigate the debt-performance relation, and to attain this aim, the subsequent null hypothesis will be tested:

H_0 : There is no significant impact of the debt structure on the firm's performance.

$$H_0 : \beta_1 = 0, \quad |sig < 0.05| \quad (5)$$

Whereas, β_1 the effect of the debt structure regardless it term on the firm's performance in the econometric models, if $Sig. \leq 5\%$, H_0 will be rejected.

Data Analysis

Descriptive Analysis

Table 2 shows the descriptive statistics for all variables in the study.

Table 2. Descriptive statistics

Variables	Mean	Min.	Max.	Std Dev.
ROA	1.428	-20.00	28.78	8.2375
ROE	2.645	-30.19	42.77	13.257
LTD	29.967	13.49	45.00	7.634
STD	7.138	1.63	21.87	5.142
TD	37.105	18.85	56.39	10.133
SIZE	18.740	16.42	21.74	1.310
SGR	-0.0371	-0.43	0.30	0.185
EFFI	0.525	0.14	1.01	0.216

Variables' definition, measure, and notation are available at Table 1.

Table 2 shows that the mean values of *ROA* and *ROE* are 1.458 and 2.645 respectively, The highest *ROA* and *ROE* values for the sample companies were 28.78 and 42.77 respectively, and the lowest values of *ROA* and *ROE* were -20.00 and -30.19 respectively.

Also the table shows that the mean values of *LTD*, *STD*, and *TD* are 29.967, 7.138, and 37.105 respectively. The minimum values of *LTD*, *STD*, and *TD* are 13.49, 1.63, and 18.85 respectively, while the Maximum values were 45.00, 21.87, and 56.39.

As for the *SIZE* the table shows a mean value of 18.740 with a standard deviation of 1.310, a minimum value of 16.42, and a maximum value of 21.74. For the *SGR* and *EFFI* the table shows mean values of -0.0371 and 0.525 respectively, with a standard deviation of 0.1854 and 0.2161 respectively.

Correlation Analysis

Table 3 shows the Pearson correlation matrix among all variables in the study.

Table 3. Pearson Correlation Matrix

	ROA	ROE	LTD	STD	TD	SIZE	SGR	EFFI
ROA	1							
ROE	.985**	1						
LTD	-.321*	-.088	1					
STD	-.621**	-.353*	.230	1				
TD	-.423*	-.238*	.872**	.677**	1			
SIZE	.543**	.504**	.122	.016	.100	1		
SGR	.378*	.383*	-.210	-.301*	-.310*	.181	1	
EFFI	.670**	.668**	.232	-.243	.053	.342*	.314*	1
	.000	.000	.129	.111	.731	.023	.038	

* , **. Correlation is significant at 0.05 and 0.01 level (2-tailed) respectively.

Variables' definition, measure, and notation are available at Table 1

Table 2 shows that ROA is negatively significantly correlated to LTD and TD at a level of significant 0.05. Also ROA is negatively significantly correlated to STD at a level of significant 0.01. The results also reveal that ROE significantly and negatively associated only with STD and TD at level of significant 0.05.

The correlation analysis result shows a negative and significant impact of all three different measures of the debt on the two alternative proxies of the performance except for the impact of LTD on ROE as the negative impact was not statistically significant. This result indicates that debt affect performance negatively where an increase in the debt, regardless it term, leads to a reduction in the company's profits.

Regression Analysis

We investigated the debt-performance relation for all 77 Jordanian industrial companies over the period between 2000 and 2011. By utilizing 2 alternative measurements of profitability ratio, as proxies of the firm's performance, that are ROA and ROE, three types of debt as proxies of the debt structure that are LTD, STD, and TD, with the existence of three control variables that are SIZE, SGR, and EFFI, six models were tested using unbalanced pooled cross-sectional time series regression method. In models 1 to 3 ROA used as the dependent variable with each of the debt structure variables which are LTD, STD, and TD, results of the estimations are displayed in table 4. While for models 4 to 6 ROE pointed as the dependent variables with LTD, STD, and TD as the proxies of the debt structure, and the results of the estimations are displayed in table 5.

Table 4. Regression analysis results

Dependent variable: ROA

	Model 1	Model 2	Model 3
LTD	-.200** .001	-	-
STD	-	-.180* .037	-
TD	-	-	.159** .002
SIZE	2.240** .002	2.246** .002	2.304** .001
SGR	4.403 .380	5.773 .254	2.824 .451
EFFI	21.332** .000	18.290** .000	20.110** .000
Adjusted R-Square	0.572	.552	.576
df Regression	4	4	4
Residual	887	887	887
Total	891	891	891
F.	.000	.000	.000
Sig.	15.372	14.221	15.586

Dependent variable: ROA a proxy of the performance, First line regression coefficient, Second line sig. (2-tail). **, *; significant at 0.01, 0.05 level respectively. Variables definitions are listed at Table 1.

For models 1, Table 4 shows that LTD found to be negatively associated with ROA at a level of significant less than 0.01, while model 2 shows that STD is negatively related to ROA at significant level less than 0.05. TD found to have significant negative relationship with ROA in model 3 at significant level less than 0.01.

Another finding in Table 1 is that the performance of the firm measured by ROA is significantly positively associated with the size of the firm and the management efficiency in all three models. Also the study concluded no statistically evidence of the impact of the sales growth rate on the ROA for the Jordanian industrial companies.

Also table 4 shows that the F-test, which is used to test the hypothesis that the variation in the LTD, STD, and TD in models 1, 2, and 3 respectively explained significantly the variation in the firm's performance measured by the ROA ratio, for all three models is significant in explaining the firm's performance, and the explanatory power of all three models displayed by the adjusted R-square were relatively high with a value ranging from 55.2% to 57.6%.

For models 4, 5, and 6, Table 5 shows that only STD and TD have a significant and negative association with the firm's performance when measured by ROE, while LTD found to be insignificantly related to ROE. As in Table 4, Table 5 shows that the ROE associated positively and significantly with

the *SIZE* and *EFFI*, with no statistically evidence of the impact of the *SGR* on the *ROE* for the Jordanian industrial companies.

Table 5. Regression analysis results

Dependent variable: ROE

	Model 4	Model 5	Model 6
LTD	-.410 .136	-	-
STD	-	-.547* .032	-
TD	-	-	-.370* .011
SIZE	3.176** .006	3.280** .005	3.349** .003
SGR	6.633 .414	8.162 .313	4.524 .572
EFFI	36.040** .000	28.946** .000	33.809** .000
Adjusted R-Square	.567	.556	.590
df Regression	4	4	4
Residual	887	887	887
Total	891	891	891
F.	.000	.000	.000
Sig.	15.057	14.476	16.462

Dependent variable: ROE a proxy of the performance, First line regression coefficient, Second line sig. (2-tail). **, *, significant at 0.01, 0.05 level respectively. Variables definitions are listed at Table 1.

Conclusions and Recommendations

The results of this paper show that debt structure expressed as: long-term debt, short-term debt, and total debt have a significantly negative relationship with Return on Assets. Also the measures of the debt structure, except for the long-term debt, have the same significant relation with Return on Equity.

The results of this study support the pecking order theory. According to the pecking order theory, and in the existence of asymmetric information, firms will prefer internal funding; the final choice would be the equity, while the second best choice of funding is the debt. More profit firms are expected to have more retained profit, and thus, do not need to depend heavily on external funding, which explains the inverse relationship between profitability and debt.

The empirical evidences of this study are consistent with those obtained by (Wang, 2010; Kayo, and Limura, 2010; Vasiliou et al., 2009).

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