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Sector-Wise Effect of Solvency on Profitability: Evidence from Jordanian Context

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Abstract
This study is conducted to investigate the effect of solvency on profitability among Jordanian Industrial sectors. As far as this study is concerned solvency which expressed by debt ratio (DEBT), and equity ratio (EQUITY), and the profitability which expressed by variables including earnings before interest and tax (EBIT), net profit margin (NPM), return on asset (ROA), and return on equity (ROE), and. For the analysis the multiple regressions cover a period 2008-2011, used to examine the effect of solvency on profitability among sectors. The study found that table the Mining and Extraction sector has the highest earnings before interest and tax (EBIT) while the lowest the Glass and Ceramic Industries. The Mining and Extraction sector has the highest Net Profit Margin (NPM), return on asset (ROA); return on equity (ROE) while the lowest the Glass and Ceramic Industries. Also table the Electrical Industries sector has the highest debit ratio (DEBT) while the lowest the Glass and Ceramic Industries. But The Glass and Ceramic Industries have the highest equity ratio (EQUITY) and the lowest equity ratio (EQUITY) for the Electrical Industries sector.The study revealed that solvency has a significant relationship with earnings before interest and tax (EBIT), net profit margin (NPM), return on asset (ROA), and return on equity (ROE), because the test was at level 5%.
Keywords: Solvency, Profitability, Earning before Interest and Tax, Net Profit Margin, Return on Asset, Return on Equity, Debt Ratio, Equity Ratio, Amman Stock Exchange (ASE).

1. Introduction

Solvency refers to a company's ability to fulfill its long-term obligations. Assessment of a company's ability to pay its long term obligations (i.e., to make interest and principal payments) generally includes an in-depth analysis of the components of its financial structure. Solvency ratios provide information regarding the relative amount of debt in the company's capital structure and the adequacy of earnings and cash flow to cover interest expenses and other fixed charges (such as lease or rental payments) as they come due.

Analyst seeks to understand a company's use of debt for several main reasons. One reason is that the amount of debt in a company's capital structure is important for assessing the company's risk and return characteristics, specially its financial leverage. Leverage is a magnifying effect that results from the use of fixed costs that stay the same within some range of activity and can take two forms: operating leverage and financial leverage.

Operating leverage results from the use of fixed costs in conducting the company's business. Operating leverage magnifies the effect of changes in sales on operating income. Profitable companies may use operating leverage because when revenues increase, with operating leverage, their operating income increases at a faster rate. The explanation is that, although variable cost will rise proportionally with revenue, fixed costs will not.

When financing a company (i.e., raising capital for it), the use of debt constitutes financial leverage because interest payments are essentially fixed financing costs. As a result of interest payments, a given percent change in earnings before interests and taxes (EBIT) results in a large percent change in earnings before taxes (EBT). Thus, financial leverage trends to magnify the effect of changes in earnings before interests and taxes (EBIT) on returns flowing to equity holders. Assuming that a company can earn more in funds than it pays in interest, the inclusion of some level of debt in a company's capital structure may lower a company's overall cost of capital and increase returns to equity holders. However, a higher level of debt in a company's capital structure increases the risk of default and results in higher borrowing costs for the company to compensate lenders for

assuming greater credit risk. Starting with Modigliani and Miller (1958, 1963), a substantial amount of research has focused on determining a company's optimal capital structure and the subject remains an important one in corporate finance.

Profitability reflects a company's competitive position in the market, and by extension, the quality of its management. Earnings can be distributed to shareholders or reinvested in the company. Reinvested earnings enhance solvency and provide a cushion against short-term problems.

Financial leverage affects cost of capital, ultimately influencing firm's profitability and stock prices. (Higgins, 1977; Miller, 1977; Mayers, 1984; Sheel 1994). Depending on the trade-off theory for capital structure, companies can take advantage of debt to make a favorable return on equity (ROE).

2. Literature Review

The relationship between capital structure and profitability of listed companies in Ghana Stock Exchange during 5-year periods presented by Abor (2005) study which used regression analysis in the estimation of functions relating to return on equity (ROE) with measures of capital structure. The paper found a significant positive relationship between short-term debt to total assets ratio and return on equity (ROE), and a negative relationship between long-term debt to total assets and return on equity (ROE). The results showed a significant positive relationship between total debt to total assets and return on equity (ROE).

The relationship between accounting indicators and the form of financial structure of Jordanian manufacturing companies presented in Shalash et al. (2006) study by using multiple regression analysis. Their model included debt ratio, liquidity, profitability and growth rate as an independent variables, while the leverage ratio as a dependent variable.

The study revealed the following:

- The leverage ratio of Jordanian manufacturing companies did not exceed 36%, which means a weak ratio compared with similar companies, in USA, Germany and East Asia, where this ratio exceed 80%.
- There is a significant positive relationship between financial structure and previous debt ratio at 1% level of significance.
- There is a significant negative relationship between financial structure and profitability, liquidity and growth rate at 1% level of significance.

The determinants of financial structure of the Jordanian manufacturing companies listed in Amman Stock Exchange (ASE) which were tested during the period 2001-2005 presented by Kharawish (2008) study done by finding the relationship between the debt ratio, and long term debts to total assets as a dependent variables and company size, and total assets, profitability, long and short-term debts as an independent variables, in order to discern the best approaches used to finance these companies. The multiple linear regressions was used, and the results revealed a significant relationship between the debt ratio and long-term debts with total debts and the size and total assets, but there is a negative relationship between long-term debts to total debts and short-term debts.

Also the results showed that most of Jordanian manufacturing companies depend on equity in financing by 70%, while 30% of financing depend on short-term debts. In addition, companies of high profitability do not depend on debts in general.

Working capital management performance (WCMP) of manufacturing sectors by using different working capital management measures including cash conversion cycle (CCC), net trade cycle (NTC), receivable turnover in days (RTD), inventory turnover in days (ITID), payable turnover in days (PTD), and return on total assets (ROTA) presented by Abdul Rahman et al. (2011) study which also compares the ranking of sectors based on working capital management performance in order to identify the notable and tardy sectors. This study covers ten-year period for 204 manufacturing and trading companies listed in Karachi Stock Exchange and classified in 24 sectors. The study revealed that (CCC) and (NTC), both comprehensive measures provide almost the same results. Oil and Gas Exploration and Refinery, Cement, Fertilizer and Oil and Gas marketing sectors are on top based on both measure of working capital management (WCM). Above sectors are also among the leading sectors according to inventory turnover measure of (WCMP). Similarity sectors which are tardy in terms of (CCC) and (NTC) are due to inefficiency in (ITID) and (RTD). There are few sectors which are although among the efficient sectors in terms of working capital but still among the tardy in terms of profitability such as Cement, Sugar and Vanaspati and Allied sectors. All Textile sectors are among the tardy sectors in terms of (WCM) measures and (ROTA). The cable and electric goods, Engineering and Pharmaceutical sectors are the tardy in terms of (CCC).

The effect of capital structure on profitability in order to extend Abor's (2005) findings is presented by Gill et al. (2011) study by examining the effect of capital structure on profitability of American service and manufacturing companies. A sample of 272 companies listed on New York Stock Exchange for a period of 3 years from 2005 to 2007 was selected. The correlations and regression analysis were used to estimate the functions relating to profitability (measured by return on equity) with measures of capital structure. The results

showed a positive relationship between short-term debt to total assets and profitability and total debt to total assets and profitability in the service industry, also showed positive relationship between short-term debt to total assets and profitability, and long-term debt to total assets and profitability, and total debt to total assets and profitability in the manufacturing industry. The study offered useful insights for the owners/operators, managers, and lending institutions based on empirical evidence.

The impact of working capital management on profitability and market evaluation of the companies is presented by Pouraghajan (2012) study by examining a sample of 400 companies listed in Tehran Stock Exchange during the period from 2006 to 2010. The study used return on assets ratio and return on invested capital ratio to measure the profitability of companies , also used Tobin Q to measure the market value of companies and used cash.

3. Research Methodology

This section presents research methodology adopted in this study. It explains sample selection criteria, variables of the study and research model, and hypotheses.

3.1. The Research Sample

The study examines industrial sectors companies listed on the Amman Stock Exchange (ASE) for the period from 2008-2011

3.2. Variables of the Study

3.2.1. Dependent Variable-Profitability

In the regression, our main proxies for profitability:

Earnings before Interest and Tax (EBIT) is the ratio of operating profit (gross profit less selling, general, and administrative expenses) to sales.

$$\textbf{Earnings before Interest and Tax} = \frac{\textbf{Operating Profit}}{\textbf{Revenue}}$$

Net Profit Margin (NPM) is the ratio of net income to revenue

$$\textbf{Net Profit Margin} = \frac{\textbf{Net Income}}{\textbf{Revenue}}$$

Return on Asset (ROA) measures the firm's ability to utilize its assets to create profits by comparing profits with the assets that generate the profits.

$$\textbf{Return on Asset} = \frac{\textbf{Net Income}}{\textbf{Average Total Assets}}$$

Return on Equity (ROE) measures the return earned by a company on its equity capital, including minority equity, preferred equity, and common equity. As noted, return is measured as net income (i.e., interest on debt capital is not included in the return on equity capital). A variation of ROE is return on common equity, which measures the return earned by a company only on its common equity.

$$\textbf{Return on Equity} = \frac{\textbf{Net Income}}{\textbf{Average Total Equity}}$$

3.2.2. Independent variables-Solvency

Debt Ratio this ratio indicates the firm's long-term debt-paying ability.

$$\textbf{Debt Ratio} = \frac{\textbf{Total Debt}}{\textbf{Total Assets}}$$

Equity Ratio determines the entity's long-term debt-paying ability.

$$\textbf{Debt Ratio} = \frac{\textbf{Total Debt}}{\textbf{Total Shareholders' Equity}}$$

Major Hypothesis

The first hypothesis Ho: There is no significant effect of independent variables debt ratio (DEBT), equity ratio (EQUITY) on earnings before interest and tax (EBIT)

The second hypothesis Ho There is no significant effect for the independent variables debt ratio (DEBT), equity ratio (EQUITY) on net profit margin (NPM)

The third hypothesis Ho: There is no significant effect for the independent variables debt ratio (DEBT), equity ratio (EQUITY) return on asset (ROA)

The fourth hypothesis Ho: There is no significant effect for the independent variables debt ratio (DEBT), equity ratio (EQUITY) on return on equity (ROE)

3.3. Research Model

In order to test the study hypotheses, the research models can be designed as follows:

EBIT = -301.13+2.7 Debt+3.25Equity+e
NPM = -387.575+3.514 Debt+4.09Equity+e
ROA = -86.33+.799 Debt+.958Equity+e
ROE = -176.907+1.573 Debt+1.935Equity+e

4. Statistical Analysis

This section presents the results of descriptive, univariate and multivariate analyses for the study variables.

4.1. Descriptive analysis

The overall the effect of profitability for 11 sectors is presented in table (1).

Table (1) Raking of Sectors on Profitability (2008-2011)

SEC. NO.	Sector Name	EBIT	NPM	ROA	ROE
1	CHEMICALS	6	7	6	7
2	GLASS AND CERAMIC INDUSTRIES	11	11	11	11
3	PAPER AND CARD POARD INDUSTRIES	10	10	10	10
4	PHARMACEUTICAL AND MEDICAL INDUSTREIS	5	5	4	4
5	TOBACCO AND CIGARETTES	2	2	2	2
6	ENGINEERING AND CONSTRUCTION	8	8	8	8
7	PRINTING AND PACKAGING SECTOR	4	4	3	3
8	ELECTRICAL INDUSTREIS SECTORS	9	9	9	9
9	FOOD AND BEVERAGE	7	6	7	6
10	TEXTILES LEATHER AND CLOTHINGS SECTOR	3	3	5	5
11	MINING AND EXTRACTION	1	1	1	1

Number 1 in ranking indicates the highest rank while 11 is the lowest rank.

As can be seen from table the Mining and Extraction sector has the highest earnings before interest and tax (EBIT) while the lowest the Glass and Ceramic Industries. The Mining and Extraction sector has the highest Net Profit Margin (NPM), return on asset (ROA); return on equity (ROE) while the lowest the Glass and Ceramic Industries.

Table (2) Raking of Sectors on solvency (2008-2011)

Table (2) Raking of Sectors on financial leverage (2008-2011)

SEC. NO.	sector name	DEBT	EQUITY
1	Chemicals	4	8
2	Glass And Ceramic Industries	1	11
3	Paper And Card Pored Industries	10	2
4	Pharmaceutical And Medical Industries	6	6
5	Tobacco And Cigarettes	9	3
6	Engineering And Construction	8	4
7	Printing And Packaging Sector	5	7
8	Electrical Industries Sectors	11	1
9	Food And Beverage	7	5
10	Textiles Leather And Clothing Sector	2	10
11	Mining And Extraction	3	9

Number 11 in ranking indicates the highest rank while1 is the lowest rank.

The overall the effect of solvency and profitability for 11 sectors is presented in table (2). As can be seen from table the Electrical Industries sector has the highest debit ratio debt ratio (DEBT) while the lowest the Glass and Ceramic Industries. But The Glass and Ceramic Industries have the highest equity ratio (EQUITY) and the lowest equity ratio (EQUITY) for the Electrical Industries sector

The study was conducted according to multiple liner regression, as statistical model to measure the effect of many independent variables on many dependent variables.

To test the research hypotheses SPSS program was used to prepare the table of analysis of variance (ANOVA table) as shown in table (3) below:

	Sum of Squares	df	Mean Square	F	Sig.
Regression	1834.104	2	917.052	2.163	.129
Residual	17382.215	41	423.956		
Total	19216.319	43			

a Predictors: (Constant), EQUITY, DEBT
b Dependent Variable: EBIT
By reviewing the table above we find that the P value= (.129) <.5% it is highly significant, and this supports the reject of the null hypothesis.
EBIT = -301.13+2.7 Debt+3.25Equity+e
There is significant impact of independent variables debt ratio (DEBT), equity ratio (EQUITY) on dependent variable (EBIT)
(ANOVA table) as shown in table below:

	Sum of Squares	df	Mean Square	F	Sig.
Regression	2180.667	2	1090.334	2.556	.090
Residual	17488.565	41	426.550		
Total	19669.232	43			

a Predictors: (Constant), EQUITY, DEBT
b Dependent Variable: NPM
By reviewing the table above we find that the P value= (.090) <.5% is highly significant, and this supports the reject of the main null hypothesis.

There is significant effect of independent variables debt ratio (DEBT), equity ratio (EQUITY) on dependent variable net profit margin (NPM)
NPM = -387.575+3.514 Debt+4.09Equity+e
(ANOVA table) as shown in table below:

	Sum of Squares	df	Mean Square	F	Sig.
Regression	150.579	2	75.289	1.020	.370
Residual	3027.024	41	73.830		
Total	3177.603	43			

a Predictors: (Constant), EQUITY, DEBT
b Dependent Variable: ROA
By reviewing the table above we find that the P value= (.370) <.5%is highly significant, and this supports the reject of the null hypothesis.
There is significant effect of independent variables debt ratio (DEBT), equity ratio (EQUITY) on dependent variable return on asset (ROA)
ROA = -86.33+.799 Debt+.958Equity+e
(ANOVA table) as shown in table below:

	Sum of Squares	df	Mean Square	F	Sig.
Regression	740.102	2	370.051	2.037	.143
Residual	7448.578	41	181.673		
Total	8188.681	43			

a Predictors: (Constant), EQUITY, DEBT
b Dependent Variable: ROE
By reviewing the table above we find that the P value= (.129) <.5% is highly significant, and this supports the reject of the null hypothesis.
There is significant effect of independent variables debt ratio (DEBT), equity ratio (EQUITY) on dependent variable return on equity (ROE)
ROE = -176.907+1.573 Debt+1.935Equity+e

5. Summary and Conclusion
This study is carried out by considering the Industrial sectors in Jordan that is one of the most important sectors in Jordan. For the analysis the multiple regressions cover a period 2008-2011, used to examine the effect of solvency on profitability among different industrial sectors. Among sectors the study found that Mining and Extraction sector has the highest earnings before interest and tax (EBIT) while the lowest the Glass and Ceramic Industries. The Mining and Extraction sector has the highest Net Profit Margin (NPM), return on asset (ROA); return on equity (ROE) while the lowest the Glass and Ceramic Industries. Also table the Electrical Industries

sector has the highest debit ratio (DEBT) while the lowest the Glass and Ceramic Industries. But The Glass and Ceramic Industries have the highest equity ratio (EQUITY) and the lowest equity ratio (EQUITY) for the Electrical Industries sector.

Through the analysis of main hypothesis, we can conclude that the studied variables (DEBT, EQUITY), have significant relationship with profitability, because the test was at level 5% where the relationship was positive for the variables (EBIT, NPM, ROA, ROE).

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Sector wise solvency (2008-2011)

SEC NO	sector name	DEBT	EQUITY
1	CHEMICALS	32.48	67.52
2	GLASS AND CERAMIC INDUSTRIES	23.1275	76.8725
3	PAPER AND CARD POARD INDUSTRIES	48.68	49.125
4	PHARMACEUTICAL AND MEDICAL INDUSTREIS	37.255	62.4525
5	TOBACCO AND CIGARETTES	43.025	56.94
6	ENGINEERING AND CONSTRUCTION	42.6075	57.335
7	PRINTING AND PACKAGING SECTOR	34.85	65.15
8	ELECTRICAL INDUSTREIS SECTORS	54.0425	45.9575
9	FOOD AND BEVERAGE	37.57	62.43
10	TEXTILES LEATHER AND CLOTHINGS SECTOR	24.59	73.2925
11	MINING AND EXTRACTION	29.045	70.4975

Sector wise Profitability (2008-2011)

SEC NO	Sector Name	EBIT	NPM	ROA	ROE
1	CHEMICALS	3.95	0.125	1.695	-0.1575
2	GLASS AND CERAMIC INDUSTRIES	-32.3	-35.885	-10.55	-15.4925
3	PAPER AND CARD POARD INDUSTRIES	-26.9225	-33.025	-3.7025	-11.07
4	PHARMACEUTICAL AND MEDICAL INDUSTREIS	8.28	4.1125	3.2	2.66
5	TOBACCO AND CIGARETTES	14.64	12.3175	12.615	19.0475
6	ENGINEERING AND CONSTRUCTION	1.235	-3.22	0.46	-2.6375
7	PRINTING AND PACKAGING SECTOR	12.5675	7.425	6.535	6.8875
8	ELECTRICAL INDUSTREIS SECTORS	-4.275	-8.55	-2.4475	-9.8275
9	FOOD AND BEVERAGE	2.6425	0.7625	1.58	0.6875
10	TEXTILES LEATHER AND CLOTHINGS SECTOR	13.1375	7.5075	2.665	1.985
11	MINING AND EXTRACTION	26.49	22.04	17.465	24.49

SEC. NO.	sector name	DEBT	EQUITY
1	Chemicals	4	8
2	Glass And Ceramic Industries	1	11
3	Paper And Card Pored Industries	10	2
4	Pharmaceutical And Medical Industries	6	6
5	Tobacco And Cigarettes	9	3
6	Engineering And Construction	8	4
7	Printing And Packaging Sector	5	7
8	Electrical Industries Sectors	11	1
9	Food And Beverage	7	5
10	Textiles Leather And Clothing Sector	2	10
11	Mining And Extraction	3	9

Number 11 in ranking indicates the highest rank while1 is the lowest rank.

Raking of Sectors on Profitability (2008-2011)

SEC NO	Sector Name	EBIT	NPM	ROA	ROE
1	CHEMICALS	6	7	6	7
2	GLASS AND CERAMIC INDUSTRIES	11	11	11	11
3	PAPER AND CARD POARD INDUSTRIES	10	10	10	10
4	PHARMACEUTICAL AND MEDICAL INDUSTREIS	5	5	4	4
5	TOBACCO AND CIGARETTES	2	2	2	2
6	ENGINEERING AND CONSTRUCTION	8	8	8	8
7	PRINTING AND PACKAGING SECTOR	4	4	3	3
8	ELECTRICAL INDUSTREIS SECTORS	9	9	9	9
9	FOOD AND BEVERAGE	7	6	7	6
10	TEXTILES LEATHER AND CLOTHINGS SECTOR	3	3	5	5
11	MINING AND EXTRACTION	1	1	1	1

Number 1 in ranking indicates the highest rank while 11 is the lowest rank.

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