

The Impact of Long-Term Solvency on the Profitability of Nifty 50 Companies

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Abstract

This paper examines the existence of the impact of long term solvency parameters on the companies' profitability listed on the NSE and forming the Nifty50 Index. While liquidity is an important and well-established factor to gauge a company's profits, it only considers the short-term consequences. In the complex VUCA world, a firm will not be able to survive perpetually if it is not sound in all financial respects. A holistic perspective of the company's financial health in the longer time frame is obtained by monitoring solvency indicators. Profitability ratios assess the survival capacity of the company. This research, thus, uses secondary data on the fundamental financials of the companies listed on the National Stock Exchange (NSE) and analyses this relation for the companies which form the Nifty 50 index. Panel data for the companies was constructed and a panel data regression experiment was applied to analyze the extent of the solvency impact on profitability. The degree to which the former explained the latter showed significant results with regards to a very few indicators.

This paper, therefore concludes that the two are mildly linked and profitability ratios might show the combined effects of liquidity and debt on operating results.

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I. INTRODUCTION

The measurement of profitability is crucial to the actuality and uninterrupted survival of business. The primary purpose of the published financial statements is to provide the necessary and relevant information for decision-making to interested parties. The published financial statements analysis of the company in the current period and prior periods is regarded as the best way to predict the future performance of the company and its situation assessment. By encompassing multiple reflectors of a company's financial performance, ratios help in gauging a company in terms of its financial performance. Ratios also represent the trend of these factors as shown in a series of financial statements at a glance. However, in the long-run, a company's financing activities are measured through its capital structure. Capital structure is defined as a combination of a firm's available funds for use. Capital structure is a

combination of an organization's long term sources of funds. This consists of debt and equity securities, which refers to a firm's permanent funding. It is made up of long-term debt, option equity, and shareholder capital. There is always a decision point with these variables as to how best to combine the various avenues to improve the firm's financial performance. Decisions surrounding the funding of a firm's properties are critical in all businesses and the finance manager is frequently trapped in the decision over the proportion of debt and equity capital in financing the firm's assets so as to achieve optimality. Capital structure is commonly structured to represent shareholder interest. Return on investment measures earnings through assets, which are calculated by dividing the firm's annual earnings by its total assets and it is shown as a percentage. Capital structure clearly represents a firm's efficiency in terms of

its assets in operation, funded by different alternatives. In general, a company with more debt compared to equity is assumed to be riskier, although some analysts do not agree that capital structure matters with regard to risk and profitability. The capital of the firm represents the amount utilized towards acquisition of the firm's fixed assets and marketable securities along with procuring and holding inventories. Every company needs to be very diligent in arriving at the optimum capital structure for the firm to achieve its pre-defined objectives. This study thus tries to establish a statistical relationship between the solvency and profitability factors of a company measured using ratios. A multiple regression is run on the panel data of Nifty50 companies for the last three years. **Solvency ratios** include the *debt-equity ratio and interest coverage ratio* whereas **profitability** is measured using the *operating profit ratio, net profit ratio, return on capital employed and return on equity*.

II. REVIEW OF LITERATURE

Subhash Chander, Priyanka Aggarwal (2008) in the article titled, "Determinants of Corporate Profitability: An Empirical Study of Indian Drugs and Pharmaceutical Industry" study the firms in the pharmaceutical industry to find out that capital efficiency is one of the major factors impacting a company's profitability. **Ondiek** (2010) aimed at 'determining the relationship between capital structure and financial performance of companies listed on Nairobi Stock Exchange' using regression analysis. **Safiuddin** et al. (2015) analyzed the effect of financial structure on the performance of 20 financial and 20 nonfinancial companies for the period 2008-2012 in Bangladesh. **Shamaileh and Khanfar** (2014) identified the 'impact of financial leverage on profitability' by sampling Jordanian tourism companies and testing their fundamentals to reveal a significant impact of financial leverage and ROI (independent variables) on the profitability of the sampled tourism companies. Capital structure and its impact on profitability is always a concern (**Rastogi**, 2011; **Rastogi**, 2016).

Nawaz and Atif (2015) investigated the impact of financial leverage, company's growth rate, percentage of non-current assets, and firm's size on profitability using a sample of 25 Jordanian industrial companies listed on Amman Stock Exchange across 10 years. **Anup & Suman** (2010) examined sample firms over the period of 10 years for which the findings showed a positive significant 'relationship between capital structure and firm value'. **Pramit and Pramit** (2015) conducted a study to establish the significance of liquidity, efficiency and capital structure on profitability in a sample of textile companies and tried to explore the effect of various liquidity, efficiency and capital structure ratios on the profitability using panel data from 2005- 2014 of some select textile companies in India. **CA Haresh Kothari and Dr. Shankar Sodha** showed that the liquidity of the companies mirrored in the ongoing ability to pay financial obligations, impacts the firm's capital structure. However, the study concluded no significant influence of leverage on profitability and capital structure. **Khidmat and Rehman** (2014) finds that solvency which defined by debt to equity ratio, has a significantly negative impact on the profitability indicators.

Hiran (2016) aimed to study the relationship between liquidity and profitability, and between leverage and profitability of Indian automobile sector by collecting the data of 25 Indian automobile companies of CNX500 Index of NSE, for the period of five years from 2011 to 2015. **Alina** (2016) used Statistical approaches like correlation, fixed effect, random effect and Hausmann tests to analyze 15 cement sector firms financial performance from 2008 to 2014. Results showed that both, capital structure and liquidity had a significant impact on the growth and profitability of the firm. The increased volatility also impacts the performance of the companies in the long run (**Rastogi**, 2014; **Rastogi and Srivastava**, 2011; **Rastogi**, 2010).

III. OBJECTIVES

- To investigate the relation between a company's long-term financial health and consistent profitability, if any
- To understand the degree of impact on multiple profitability factors because of the company's solvency
- To determine which factors can be indicative of such a relationship, if any

IV. DATA COLLECTION AND ANALYSIS

The data for constructing the panel was collected from ProwessIQ and the financial statements of the companies which are a part of the Nifty50 index. Data for 3 years was collected starting from 2017 to 2019. The fundamental financial ratios indicative of the firm's profitability and solvency were calculated. The ratios for testing the relation between the companies' long-term solvency and profit margins in the long run were **interest coverage ratio and debt-equity ratio** and **net profit margin, operating profit margin, return on capital employed and return on equity** respectively. The solvency ratios were considered as independent variables and the indicators of profitability as dependent variables.

4.1 Descriptive Statistics

Descriptive statistics in this study were conducted to provide a description of the characteristics of observed research variables (Ghozali, 2011). Descriptive statistics provide an overview of statistical data on the minimum, maximum, average (mean), and standard deviation. To test the impact of solvency on profitability, multiple regression models were run keeping the independent variables constant and testing them against each dependent variable. Thus, four separate regression models were run to understand the detailed impact on every indicator of the companies' profitability. Before running the exact regression models, some basic tests were carried out to test the nature of the panel data. Some basic descriptive statistics for the data are as shown in Table 4.1.

Table 4.1: Descriptive Statistics

Variable	Average	S.D.	Min.	Max.
Debt-equity	0.41	0.85	0.00	4.73
Interest Coverage ratio	371.52	1415.14	-0.62	13211.00
Net profit Margin	15.38	15.34	-14.04	92.56
Operating Profit Margin	26.29	19.40	3.19	123.74
Return on Equity	18.46	16.20	-12.41	96.75
Return on Capital Employed	15.17	16.68	-5.73	92.41

4.2 Testing for Stationarity

4 in a dataset is measured to test the effect of shocks on data and whether that effect will remain permanent or is it transitory. A stationary series does not mean that the series does not change over time, but that its statistical properties do not change over time periods. In this study the **Hardi LM** test for stationarity is used on the panel data.

H_0 : Data series is stationary

H_1 : Data series is not stationary i.e. contain unit roots

Number of panels	50	
Number of periods	3	
	Statistic	p-value
z	-1.6959	0.955

As the probability statistic is more than .05, null is accepted (**that all the series are stationary**) and we therefore go ahead with the further analysis.

4.3 Panel Regression Models

After running the basic tests for the overall panel data, regression models for every

dependent variable are run separately to test its impact on the two independent variables i.e. debt-equity ratio and interest coverage ratio.

4.3.1 Model with Dependent Variable: Return on Equity

The panel data needs to be assessed for random effect, fixed effect or pooled effect. The table shows the process to find whether to consider fixed effect, random effect or pooled effect.

Table 4.2: Process of assessing the impact of fixed effect, random effect & pooled effect.

Sr. No.	Start Point	Result	Check Point	Result	Conclusion
1.	Run the Fixed Effect test	Null hypothesis is rejected	Run Hausman test	Null hypothesis is rejected	There is Fixed Effect
2.	Run the Fixed Effect test	Null hypothesis is rejected	Run Hausman test	Null hypothesis is accepted	There is Random Effect
3.	Run the Fixed Effect test	Null hypothesis is accepted	Run Hausman test	Null hypothesis is rejected	There is Pooled Effect

4.3.1a: Fixed Effect test

H_0 : Data shows no Fixed Effect

H_1 : There is Fixed Effect in the data

Table 4.3: Statistics of fixed effect test for DV: Return on Equity

Fixed-effects (within) regression

Group Variable Company

	Co-efficient	Std. Error	p-values
Debt-Equity	-1.11480	0.69955	0.11400
Interest Coverage Ratio	-0.00050	0.00050	0.31400
Constant	19.11932	0.51492	0.00000

P > F **0.1737**

As the F-stat of Fixed Effect Test is significant, H_0 is rejected i.e. **there is Fixed Effect**

4.3.1b: Random Effect Test

H_0 : There is no Random Effect

H_1 : There is Random Effect

Table 4.4: Statistics of random effect test for DV: Return on Equity

Random-effects GLS regression

Group Variable Company

	Co-efficient	Std. Error	z	p-values
Debt-Equity	-1.2706	0.6926	-1.83	0.0670
Interest Coverage Ratio	-0.0002	0.0005	-0.44	0.6570
Constant	19.0675	2.216	8.60	0.0000

P > F **0.0000**

Test: Var (u) = 0

	Variance	Std. Dev
Return on equity	264.2456	16.2556
e	22.0248	4.6931
u	226.8988	15.0632

Random Effect test is also significant as P-value is less than .05. Thus, H_0 is rejected. i.e. **random effect exists**.

4.3.1c: Hausmann test

Now, as per the previous tests, both Fixed Effect and Random Effect exist in the data, thus, the next check point is the Hausmann Test. If H_0 is rejected (or significant) it is Fixed Effect, else Random Effect.

H_0 : Data has random effect

H_1 : Data has fixed effect

As the Hausman test is significant, the null hypothesis is rejected. Thus, **Fixed Effect** is to be applied to this panel.

4.3.1d: Final Estimation of using Fixed Effect

Once the type of effect applicable to this panel was established, a panel data regression was created with *return on equity* as the dependent variable and the debt-equity ratio and interest coverage ratio as the independent ones. The results of the model are interpreted like any other regression model i.e. using p-values of all independent variables and the R-square of the model as a whole.

Table 4.5: Results of Model 1

Variable	p- values
Debt- equity ratio	0.114
Interest coverage ratio	0.314
R- Square: 3.54%	

As we seen from table that both the independent variables are individually not significant and model is also not significant.

4.3.2 Model with Dependent Variable: *Return on Capital Employed*

The panel data needs to be assessed for random effect, fixed effect or pooled effect. The table shows the process to find whether to consider fixed effect, random effect or pooled effect. Refer table 4.1.

4.3.2a: Fixed Effect test

H_0 : Data shows no Fixed Effect

H_1 : There is Fixed Effect in the data

Table 4.6: Statistics of fixed effect test for DV: *Return on Capital Employed*

Fixed-effects (within) regression
Group Variable **Company**

	Co-efficient	Std. Error	P-values
Debt-Equity	-0.441	0.545	0.421
Interest Coverage Ratio	0.000	3969.000	0.23
Constant	15.540	4014582.000	0.000

P > F **0.3336**

Here, since the p value is significant, H_0 is rejected. Thus, ***there is fixed effect in the data.***

4.3.2b: Random Effect Test

H_0 : There is no Random Effect

H_1 : Random Effect exists

Table 4.7: Statistics of random effect test for DV: *Return on Capital Employed*

Random-effects GLS regression
Group Variable: **Company**

	Co-efficient	Std. Error	z	p-values
Debt-Equity	-0.7149	0.56	-1.28	0.201
Interest Coverage Ratio	-0.0003	.0004	-0.65	0.5170
Constant	15.5663	2.194	7.10	0.0000

P > F **0.000**

Breusch and Pagan Lagrangian test for random effects

Test: $\text{Var}(u) = 0$

Estimated Results

	Variance	Std. Dev
Return on Capital Employed	280 0912	16. 73593
e	13. 38785	3. 65894

u	214 1666	14.6344
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Random Effect test is also significant as P-value is less than .05. Thus, H_0 is rejected. i.e. **random effect exists**.

4.3.2c: Hausmann test

Hausman is **not deterministic** for the data. Therefore, we will go for **Pooled OLS** as the tool to estimate model for such panel.

4.3.2d: Final Estimation of using Pooled Effect

Once the type of effect applicable to this panel was established, a panel data regression was created with *return on capital employed* as the dependent variable and the debt-equity ratio and interest coverage ratio as the independent ones. The results of the model are interpreted like any other regression model i.e. using p-values of all independent variables and the R-square of the model as a whole.

Table 4.8: Results of Model 2

Variable	p- values
Debt- equity ratio	0.000
Interest coverage ratio	0.003
R- Square: 14.95%	

The Pooled OLS shows that for Return on Capital Employed, both the independent variables are significant. R-square is 14% and thus, the model is also significant.

4.3.3 Model with Dependent Variable: Operating Profit Margin

The panel data needs to be assessed for random effect, fixed effect or pooled effect. The table shows the process to find whether to consider fixed effect, random effect or pooled effect. Refer table

4.3.3a: Fixed Effect test

H_0 : Data shows no Fixed Effect

H_1 : There is Fixed Effect in the data

Table 4.9: Statistics of fixed effect test for DV: Operating Profit Margin

Fixed-effects (within) regression

Group Variable Company

Operating Profit Margin	Co-efficient	Std. Error	p-values
Debt-Equity	-0.8514	0.5257	0.1090
Interest Coverage Ratio	0.0003	0.0004	0.4570
Constant	26.5855	0.3869	0.0000
P> F	0.2091		

Here, since the p value is significant, H_0 is rejected. Thus, **fixed effect is existent in the data**.

4.3.3b: Random Effect Test

H_0 : There is no Random Effect

Table 4.10: Statistics of random effect test for DV: Operating Profit Margin

Random-effects GLS regression
Group Variable Company

	Co-efficient	Std. Error	z	p-values
Debt-Equity	-0.69	0.53	-1.31	0.19
Interest Coverage Ratio	0.0002	0.0004	0.57	0.566
Constant	26.51	2.70	9.81	0.00
P> F	0.000			

Breusch and Pagan Lagrangian test for random effects

Test: $\text{Var}(u) = 0$

Estimated Results

	Variance	Std. Dev
Return on equity	378.78	19.46
e	12.44	3.53
u	347.96	18. 65365

H_1 : There is Random Effect

Random Effect test is also significant as P-value is less than .05. Thus, H_0 is rejected. i.e. **there is random effect**

4.3.3c: Hausmann test

Now, as per the previous tests, both Fixed Effect and Random Effect are prevalent in the data, thus, the next check point is the Hausman Test. If Hausman test is rejected (or significant) it is Fixed Effect, else Random Effect.

H_0 : There is random effect

H_1 : There is fixed effect

Table 4.11: Statistics of Hausmann test for DV: Operating Profit Margin

	Co-efficient		
	Fixed (b)	Random (B)	Difference (b-B)
Debt-equity ratio	-0.85	-0.69	-0.16
Interest Coverage ratio	0.0003	0.0002	0.00

As the Hausman test is significant, the null hypothesis is rejected. Thus, **Fixed Effect** is to be applied to this panel.

4.3.3d: Final Estimation of using Fixed Effect

Once the type of effect applicable to this panel was established, a panel data regression was created with *operating profit margin* as the dependent variable and the debt-equity ratio and interest coverage ratio as the independent ones. The results of the model are interpreted like any other regression model i.e. using p-values of all independent variables and the R-square of the model as a whole.

Table 4.12: Results of Model 3

Variable	p- values
Debt- equity ratio	0.109
Interest coverage ratio	0.457
R- Square: 3.18%	

4.3.4 Model with Net Profit Margin as Dependent Variable

The panel data needs to be assessed for random effect, fixed effect or pooled effect. The table shows the process to find whether to consider fixed effect, random effect or pooled effect. Refer table

4.3.4a: Fixed Effect test

H_0 : Data shows no Fixed Effect

H_1 : There is Fixed Effect in the data

Table 4.13: Statistics of fixed effect test for DV: Net Profit Margin

Fixed-effects (within) regression
Group Variable **Company**

Net Profit Margin	Co-efficient	Std. Error	p-values
Debt-Equity	-1.1570	0.6181	0.0640
Interest Coverage Ratio	0.0001	.0004385	0.6570
Constant	15.8379	.4549891	0.0000

P> F 0.1761

Here, since the p value is significant, H_0 is rejected. Thus, there is fixed effect in the data.

4.3.4b: Random Effect Test

H_0 : There is no Random Effect

H_1 : There is Random Effect

Table 4.14: Statistics of random effect test for DV: Net Profit Margin

Random-effects GLS regression
Group Variable **Company**

	Co-efficient	Std. Error	z	p-values
Debt-Equity	-1.13	0.60	-1.88	0.06
Interest Coverage Ratio	0.0001	0.0004	0.16	0.8740
Constant	15.83	2.18	9.81	0.000

P> F 0.000

Breuseh and Pagan Lagrangian test for random effects

Test: $\text{Var}(u) = 0$

Estimated Results

	Variance	Std. Dev
Return on equity	236.98	15.39
e	17.20	4.15
u	230.61	15.19

Random Effect test is also significant as P-value is less than .05. Thus, H_0 is rejected. i.e. **random effect exists.**

4.3.4c: Hausmann test

Now, as per the previous tests, both Fixed Effect and Random Effect are evident, thus, the next check point is the Hausman Test. If Hausman test is rejected (or significant) it is Fixed Effect, else Random Effect.

H_0 : There is random effect

H_1 : There is fixed effect

Table 4.15: Statistics of Hausmann test for DV: Net Profit Margin

	Co-efficient			
	Fixed (b)	Random (B)	Difference (b-B)	Standard Error
Debt-equity ratio	-1.16	-1.13	-0.02	0.13
Interest Coverage ratio	0.0001	0.0001	0.000012	0.0001

As the Hausman test is not significant, the null hypothesis is accepted. Thus, **Random Effect** is to be applied to this panel.

4.3.4d: Final Estimation of using Random Effect

Once the type of effect applicable to this panel was established, a panel data regression was created with *net profit margin* as the dependent variable and the debt-equity ratio and interest coverage ratio as the independent ones. The

results of the model are interpreted like any other regression model i.e. using p-values of all independent variables and the R-square of the model as a whole.

Table 4.16: Results of Model 3

Variable	p- values
Debt- equity ratio	0.061
Interest coverage ratio	0.874
R- Square: 3.52%	

V. FINDINGS

After running the panel data regression models for all indicators of profitability with **the debt-equity ratio and interest coverage ratio**, the findings revealed that the two independent variables do not reflect any significant impact on the companies' operating profit, net profit, return on equity and return on capital employed.

However among all the indicators of profit, relatively, the impact of solvency was seen the most on companies' return on capital employed. A fit of 15% was seen between the companies' solvency indicators and its return on capital employed.

VI. CONCLUSION

The main purpose of the study was to investigate the impact of solvency on companies' profitability. It can therefore be concluded for the purpose of this objective that there was no significant impact of a company's solvency on its profitability indicators.

However, it is observed that among the chosen indicators of profit, i.e. operating profit margins, net profit margins, return on equity and return on capital employed, the most impact of solvency on profits was seen via the return on capital employed. Thus, there is scope for further research in case of this indicator.

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