

Impact of Financial Leverage on Corporate Performance: Evidence from Indian Power Sector

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Abstract

This paper examines the impact of capital structure on corporate performance. The study is based on secondary data of sixteen listed large-sized power sector companies forming part of the BSEPOWER index as identified from the Capitaline database for the period 2006-2017. The corporate performance is proxied using two accounting measures viz. return on asset (ROA) and return on equity (ROE). Leverage is taken as the independent variable which is measured not only by the overall debt-equity ratio but also long-term and short-term debt ratios. The square of these leverage measures is taken to test the linearity of the relationship. The control variables include size, tangibility, liquidity and age of the firm. The study reveals a mixed result. While the impact of leverage on ROE is positive, the impact on ROA is negative. 'Size' shows a significant negative effect in all cases in contrast to positive effect in few cases only. Liquidity and operating expense ratio do not have a significant influence on corporate performance.

Keywords: Leverage; Corporate Performance; Capital Structure; ROA; ROE; Panel Data

1. Introduction

The functional area of finance is extremely important as it deals with three vital corporate decisions including financing, investing and dividend distribution. Of the three functions, one that has drawn the interest of researchers across the

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globe is leverage or capital structure. The term ‘capital structure’ implies the mixture of different long-term and short-term financing sources. The decision regarding ways to finance a firm is imperative to both the issuers and suppliers of funds. An important issue connected with the financing decision is to identify the relationship between capital structure and firm performance. This has been among the many subjects in corporate finance which still mesmerizes researchers. Selecting the right combination of debt and equity is a big challenge which Myers (1984) has remarked as the “capital structure puzzle”.

The basic point of confusion is with regard to two logical views on the effect of including debt capital as a source of fund. One view supports the addition of debt fund since it acts as a control or monitoring mechanism on managers when they apply maximum prudence to ensure not only payment of debts but also generating profits. Thus, it helps in sound governance of firms. The other view contradicts the earlier view by mentioning that with increase in debt, a firm becomes more vulnerable to bankruptcy due to higher interest costs that leads to poor credit rating thereby leading to an escalation in the cost of borrowed funds. Abor (2005) mentioned this among those issues that determine the future prospects of businesses in the long-run.

Since any firm aims to minimize the cost of capital and maximize firm’s value (Pouraghajan and Malekian, 2012), it is necessary to recognize the relationship between sources of finance and their effect on firm performance. It is very much necessary to determine a suitable capital structure that will protect the organizational interest. The discussion on this issue started with the Modigliani and Miller theorem where it is stated that in perfectly competitive capital markets, capital structure decisions are irrelevant in determining the value of a firm. In simple words, the theory says that value of a firm is not affected by the composition of the capital structure. However, with existence of asymmetric information in imperfect markets, they changed their initial view in 1984 and restated that effect of tax advantage on debt component gives an opportunity to firms in escalating their value by arriving at an optimal capital structure. Subsequently, the trade-off theory again pointed out the existence of an optimal capital structure which is possible due to the existence of an off-setting effect between tax savings on interest payments and increasing bankruptcy costs on account of increasing financial leverage. However, Warner (1977) pointed out that though such bankruptcy costs exist, the trade-off is in favour of tax savings and therefore argues a positive effect on performance. Then, Myers and Majluf (1984) developed the Pecking order theory that again proposed that firms prefer a hierarchical order while raising funds. Initially, managers prefer the utilization of reserves after which they resort to debt financing. Thus, it gives a hint about

researches during the last fifty years that have found contradictory results (Baker and Martin, 2011). The trade-off theory pointed out a positive effect of leverage on firm performance (Margaritis and Psillaki, 2010) which is contradicted by the Pecking order as found in the study of Baker and Martin (2011). Moreover, there are evidences to prove that the relationship is not universally true; instead it is conditional upon the situation. (Simerly and Li, 2000).

2. Literature review

Capital structure and its influence on corporate performance has been an issue of debate over a long period of time and it still remains a mystery. The research on the subject has been taken up in different geographical arena and more dominantly in Asia, Europe, America and Africa. Some of the Asian studies include Foo et. al., 2015 (Malaysia), and Siddik et. al., 2017 (Bangladesh). Similarly, Oguna, 2014 (Nairobi), Mwangi (2010) (Kenya), Anarfo, 2015 (Sub-Saharan Africa), Dada and Ghazali, 2016 (Nigeria) are some of the recent African-based studies. The studies focusing on the relationship between capital structure and performance have covered several industries like oil and gas (Foo et. al., 2015), agriculture (Ana et. al., 2012), banking (Siddik et. al., 2017), manufacturing (Oguna, 2014), service firms (Kester, 1986) and cement companies (Seetanah et. al., 2014) among others.

The influence of capital structure on performance has always interested researchers because of lack of consensus among various studies that have been undertaken. Changes in context, industries and samples have altered results due to which investigators continue to unravel the relationship between capital structure and performance. The earlier studies show the existence of three kinds of relationships between leverage and performance including positive relationship, negative effect and a mixed effect.

2.1 Studies Showing Positive Relationship: Some of the mentionable studies in this category include Lewellen and Roden (1995), Hadlock and James (2002), Abor (2005) and Mwangi (2010). Masiega showed the influence of long-term debt on return on equity (ROE), whereas Abor (2005) revealed the effect of short-term debt. Siro (2011) asserted the influence of leverage on both ROE and ROI (return on investment). Similar findings have been reported by Javed and Akhtar (2012). The work of Salim and Yadav (2012) affirmed the positive influence of both short-term and long-term debt on Tobin' Q, a market-based measure. The same study further identified positive influence of all forms of

debt (short-term, long-term and total) on both accounting measures (ROA and ROE) and market measure (EPS).

2.2 Studies Showing Negative Relationship: Some of the relevant studies that reported negative relationship include that of Kester (1986) based on US and Japan, Wiwattanakantang (1999) on the effect of capital structure on firm performance among Thai firms. Rajan and Zingales (1995) studied the same relationship among G7 countries. Some of the recent studies include Pouraghajan and Malekian (2012), Mwangi (2014), Nassar (2016), Olapo and Kajola (2010), among similar studies. Pouraghajan et al. (2012), Mwangi (2014) and Onalapo and Kajola (2010) established the negative effect of leverage on ROA and ROE. Similar results are pointed by Adekunle (2009), Zeitun and Tian (2007) which established a negative relationship between debt ratio and ROA and ROE. However, Mumtaz et al. (2013), Phung et.al. (2013) and Ahmad et al. (2012) concluded that though leverage has a significant negative influence on ROA, gross margin and Tobin's Q, the effect on ROE is insignificant.

2.3 Studies Showing Mixed Relationship: This covers the studies that find a mixed impact of capital structure on corporate performance. San and Heng (2011) in their study of the Malaysian construction sector recognized change in effect with change in the size of companies. Salim and Yadav (2012) established negative influence of short-term debt on ROE, long-term debt on ROA and total debt on both ROA and ROE. However, Tobin's Q is seen to be positively impacted by all these three measures. Chiang et. al. (2002) found out a positive influence on ROA but negative impact on profit margin. In a study by Fosberg and Ghosh (2006), no relationship between leverage and performance is revealed. There are many such empirical papers which give similar results.

3. Materials and Methods

The review of literature shows that this area has already been explored by researchers because the issue itself creates a lot of excitement among researchers. However, it is of no doubt that the issue of relationship between leverage and performance is still a debatable one. There is a lack of consensus with regard to the findings. Hence, no conclusion can still be found between the two. Changes in settings of the research bring in change in the results. Moreover, the issue has not been of much interest to Indian academicians and therefore has not been studied much. Furthermore, there are very few studies that tested the linearity of the relationship between the two factors. Hence, to plug in these gaps, an

investigation is carried out using panel data regression which is a methodological improvement over many researches that use correlation to find the relationship.

3.1 Objective of the Study: The study aims to capture the effect of leverage on firm performance. Here, leverage implies the inclusion of debt capital in the capital structure and firm performance implies assessment from the accounting perspective and not market-point of view.

3.2 Research Design: The study focused on the power sector of the country. The details of the research design are given below:

3.3 Sample: The sample is chosen from BSEPOWER index available in the Capitaline database. This sector is deliberately looked at because from news and reports it is evident that the debt liability of the power sector is huge which surged after the 2008 financial crisis. In fact, the burden of interest has been so high that it is creating problems in the sector, as is evident from the rise in level of non-performing assets. Thus, the study looked into the power sector to see the impact of leverage on financial performance. There are eighteen companies in total in BSEPOWER index, of which two are not considered due to non-availability of data for few years. Hence, the work is based on sixteen companies.

3.4 Nature of Data and Period: The study used secondary data for the period 2006 to 2017. Since the data is in the form of a panel and the number of cross-sectional units remains the same in all the years, balanced panel regression is applied to analyse the data. Data were analysed with the help of SPSS and STATA.

3.5 Variables Used: Dependent variables include two popular accounting measures viz. return on equity (ROE) and return on asset (ROA) which have been frequently used by researchers (Nadeem and Ahmed, 2015, Raza and Bhutto, 2013, Adekunle and Sunday, 2010, Yoon and Jang, 2005) and many others. The former ratio looks at the overall return whereas the latter looks at the return to the equity shareholders who are the 'owners' of the company, both of which are important for the company. The independent variable, capital structure, is proxied by the debt-equity ratio (DER), long-term debt-equity ratio (LTDER) and short-term debt equity ratio (STDER) in three cases separately. There are several control variables chosen on the basis of review of literature including tangibility (TANG) measured as a ratio of fixed assets to total assets, Liquidity measured as the ratio of current assets and current liabilities, size

(SZ) proxied by the natural logarithm of total assets, cost management (OETI) measured as the ratio of operating expenses to total income and age (AGE) measured by natural logarithm of years in business. Size is considered relevant in the studies of Abor (2005, 2007), Kyereboah-Coleman (2007), Ehikioya (2007) and Ebaid (2009).

3.6 Model Specification

The panel data model used in the study is:

$$PERF_{it} = \alpha + \beta_1 LEV_{it} + \beta_2 LEV_{it}^2 + \beta_3 TANG_{it} + \beta_4 SZ_{it} + \beta_5 CR_{it} + \beta_6 OETI_{it} + \beta_7 AGE_{it}$$

where i is the cross-sectional unit and t is the time, LEV is the leverage, TANG is tangibility, SZ is size, CR is current ratio, OETI is operating expense to total income and AGE is the age of the firm in years. The proxies of leverage are debt-equity ratio (DER), short-term debt-equity ratio (STDER) and long-term debt equity ratio (LTDER). The variable leverage squared (LEV^2) is considered to capture the non-linearity of the relationship. In this empirical research, corporate performance is proxied using two accounting measures, namely ROA and ROE. The former is used as it is a very important input in fundamental analysis and it indicates the productive use of assets. The latter, on the other hand, indicates the productive use of the funds of equity shareholders and is an important information for the market.

Since the researcher applies panel regression model, a series of steps are employed to finalize the applicable model as given below.

- (i) Compare Pooled OLS with the Random Effect Model (REM) using Restricted F test. If the null hypothesis is rejected, REM is better.
- (ii) Compare Pooled OLS with the Fixed Effect Model (FEM) using Breusch Pagan test that computes LM statistic. If the null hypothesis is rejected, FEM is better.
- (iii) Apply the Hausman test to conclude. If the null hypothesis in the test gets rejected, apply FEM, else choose REM.

The results of Restricted-F test, Breusch Pagan test and Hausman test are given below.

Table 1: Selection of Appropriate Model for Panel Regression

Tests in panel data	Explanatory Variables		
	Debt-Equity Ratio	Long-term Debt-equity Ratio	Short-term Debt-equity Ratio
Dependent Variable: ROE			
Restricted F-test (F-value)	5.225 ***	3.870***	5.740***
Breusch-Pagan test (LM value)	18.685***	16.906***	12.566***
Hausman test (H-value)	29.357***	19.557***	38.693***
Dependent Variable: ROA			
Restricted F-test (F-value)	74.445***	47.376***	9.982***
Breusch-Pagan test (LM value)	116.634***	100.3***	142.053***
Hausman test (H-value)	5.983	5.992	8.350

Source: Panel Regression Results, STATA 11.

In this study, when ROE is the dependent variable, FEM is applied. But, when ROA is ***significant at 1% the explained variable, REM is chosen.

4. Results and Discussion

Results and discussion is presented in two sections such as descriptive statistics and regression analysis.

4.1 Descriptive Statistics: Table 2 shows the nature of data on the basis of descriptive statistics of the sample. From the table, it is obvious that the mean of debt-equity ratio is 87 per cent of which 66 per cent is the long-term debt component and remaining is short-term debt. The mean of ROE far exceeds the mean of ROA. ‘Tangibility’ variable shows that, of the total assets deployed, fixed assets form a substantial portion. The expense ratio of the sample is reasonably good. The skewness and kurtosis shows variety in the data characteristics.

Table 2: Summary Statistics of the Variables

Variable	Mean	Standard Deviation	Skewness	Kurtosis
Return on Equity	24.426	27.914	4.420	37.424
Return on Assets	14.552	15.806	1.561	7.958
Size	9.017	2.092	-2.600	11.576
Tangibility	3.104	47.664	-13.746	186.985
Operating Expense to Total Income	0.069	0.088	2.690	8.106
Debt Equity Ratio	0.871	1.882	8.291	86.459
Long-term Debt Equity Ratio	0.665	1.230	6.605	56.931
Short-term Debt Equity Ratio	0.205	0.759	9.497	105.701
Current Ratio	2.630	13.549	13.123	174.981
Age	3.419	0.635	-0.165	1.676

Source: Descriptive Statistics, SPSS 14.

4.2 Regression Analysis: In this empirical research, as already mentioned, corporate performance is proxied by two accounting measures, namely ROE and ROA. The value of coefficients of the explanatory variables in the six different models is given below:

Table 3: Coefficient of Explanatory Variables based on Random Effect Model

Dependent Variable: Return on Equity

Independent Variable	Model 1 (Using Debt Equity Ratio)	Model 2 (Using Long-term Debt Equity Ratio)	Model 3 (Using Short-term Debt Equity Ratio)
Leverage	31.236***	39.183***	77.460**
Leverage Square	-1.078***	-2.134**	-6.479***
Tangibility	-26.141	-34.813	11.651
Size	-9.299***	-9.695**	-7.856***
Current Ratio	0.049**	0.035*	0.070
Operating Expense to Total Income	14.288	14.753	7.317
Age	11.158	20.448**	-0.213

Source: Panel regression Results, STATA 11.

***significant at 1%, **significant at 5%, *significant at 10%

The results are found to be extremely relevant. In all the models (model 1, 2 and 3), it is observed that there is a positive effect of leverage on the performance as evident from the coefficient of leverage. However, it is interesting to note that the quadratic term as observed in its squared term has a negative coefficient which is significant at 1% level, thus making it an important variable. This can be interpreted as follows - with the inclusion of debt capital, initially there is an improvement in the return on equity, most possibly due to the relatively lower cost of capital for debt fund. However, with increase in the quantum of debt in the capital structure, after a certain level of debt, there is a down-pulling effect due to the increasing risk of bankruptcy arising from the higher amount of debt capital thereby resulting in lower ROE. The other significant variable 'size' affects performance negatively. Though the 'current ratio' shows a positive effect, the level of significance is more than 5 per cent, thus making it an insignificant predictor variable. 'Age' as a variable has a relatively lesser importance which is clear from the result of model 2; it is significant only in the case where LTDER is the measure for leverage.

Table 4: Coefficient of Explanatory Variables based on Random Effect Model

Independent variable	Dependent Variable: Return on Asset		
	Model 4 (Using Debt Equity Ratio)	Model 5 (Using Long-term Debt Equity Ratio)	Model 6 (Using Short-term Debt Equity Ratio)
Leverage	-8.290***	-10.933***	-20.006***
Leverage Square	0.357***	0.814***	2.074***
Tangibility	22.086***	24.800***	11.918**
Size	-4.383***	-4.383***	-4.759***
Current Ratio	0.001	0.005	-0.002
Operating Expense to Total Income	-4.464	-4.901	-1.714
Age	5.376*	4.542	7.015**

Source: Panel regression Results, STATA 11.

***significant at 1%, **significant at 5%, *significant at 10%

It is observed that there is a negative effect of leverage on corporate performance as is evident from the coefficient of leverage. However, it is interesting to note that the quadratic term as observed in its squared term has a positive coefficient which is significant at 1% level, thus making it an

important variable. This can be interpreted as follows - with the inclusion of debt capital, initially there is deterioration in the return on asset. However, with increase in the quantum of debt in the capital structure, after a certain level of debt, there is a rising effect due to the effect of benefits from interest as an item of expense that generates tax savings. Moreover, the other possible reason is the greater monitoring of activities of managers so that they do not take risky decisions in the already leveraged firm. The other significant variable 'size' affects performance negatively. On the contrary, 'current ratio' has a significantly positive effect as observed in models 1 and 2. 'Age' as a variable has a relatively lesser importance which is clear from the result of model 2; it is significant only in the case where LTDER is the measure for leverage.

6. Conclusion

The study is very relevant in Indian context as it focuses on the power sector that plays a big role in bringing about infrastructural development in the country. The sample includes only those companies which are engaged in the generation and / or transmission of electricity. This empirical study is also an attempt to establish a relationship between capital structure and corporate performance, which has been a debatable issue for a long time across the world. On the basis of earlier studies, two accounting-based measures of performance are considered in this study viz. return on asset (ROA) and return on equity (ROE). Since, this investigation is based on a balanced data panel, OLS regression is not applied. Instead the necessary tests like the Restricted-F test, Breusch Pagan test and Hausman tests are applied to determine the appropriate model. As the results show, the FE model and RE models are used when the dependent variables are ROE and ROA respectively.

When return on equity is the explained variable, the employment of leverage at the lower levels shows a positive effect on ROE which however tends to decline at higher levels of all forms of debt (total debt, long-term debt and short-term debt). Hence, the quadratic model is found to be a proper fit in contrast to the linear model that is used by earlier researchers. The effect of size on performance is negative. The liquidity and age variables are not found to have a significantly positive effect on ROE in all the models. It is noteworthy to see that tangibility and operating expense ratios do not hold an important role in determining performance. Similar interesting results are obtained when ROA is considered as the dependent variable. The important point that is noticed here also is that initially the load of leverage has a pull down effect on the return on asset. However, the curve takes a U-shape and beyond a certain debt-level, there is an increasing effect on performance. Thus, the result can be interpreted as follows. When the level of debt is low, the financial obligation of interest payments shows a negative effect on ROA. However, with increasing leverage, there is a positive

outcome arising from the tax saving from the interest payments and the shape of the curve is U-shaped. With regard to the other variables under study, size has a significantly negative effect. This conclusion is in line with the findings of Seetanah (2014) and Amato and Burson (2007) but contradicts the inferences drawn by Ozgulbas et al. (2006), Jónsson (2007) and Vijayakumar and Tamizhselvan (2010). The 'liquidity' variable shows an inconsistency in the sign of its effect though insignificant in most of the cases. The 'age' variable has a positive significant effect when debt-equity ratio and short-term debt-equity ratios are considered as the independent variable in the case where ROA is the dependent variable. Thus, the study does not give a concluding remark on the basis of the obtained results. When ROE is considered as the dependent variable, the pecking order theory does not hold true as there is a positive relationship between debt and performance. However, the impact does not remain the same. In fact, after including more of debt in the capital structure, there is a negative impact on ROE as found from the quadratic term of leverage. On the contrary, when ROA is the dependent variable, the pecking order theory does not hold true initially as there is a negative effect on the explained variable. However, after a certain point, the relationship takes a U-turn and then there is a positive impact. Thus, the findings give scope for further research as there is an inconsistent effect. Thus, attempts may be carried out in this area to identify the cut-off point of leverage which shall help decision makers to decide accordingly.

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