

Capital Structure and Value of Firm: An Empirical Study of S&P BSE SENSEX-30 Companies

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Abstract : For more than sixty years, the association between capital structure and the firm's value has been an academic issue. Still, no theoretical framework on capital structure is thriving to provide a satisfactory and conclusive answer to this relationship. The present study aims to enhance the research on the impact of capital structure on the firm's value taking data of 30 financially good constituent companies of S&P BSE SENSEX over the sample period of 2013-2021. The study employs panel data analysis using Pooled ordinary least squares model, Panel fixed-effect model, and Panel random effect model to establish the relationship between capital structure and value of the firm. The results affirm the existence of Modigliani & Miller (1958) irrelevance theory indicating no significant impact of capital structure on the firm's value. The findings have important implications for investors in these firms seeking to make prudent investment choices.

Keywords: Capital structure, MM Hypothesis, Hausman Test, Random Effect Model

I. INTRODUCTION

Academics and financial professionals have long been fascinated by the link between capital structure and corporate value. The primary objective of deciding a firm's capital structure is to find an appropriate combination of debt and equity that helps maximize the firm's value. Besides, the introduction of debt in capital structure also helps in magnifying the returns of equity shareholders. Durand (1952) and Modigliani & Miller's (1958) pioneering publications set the

theoretical groundwork and instilled study into the link between capital structure and firm value. Durand (1952) proposed two extreme views on the relationship between capital structure and the firm's value. Under Net Income Approach by increasing the usage of debt in the capital structure, the cost of capital drops and the firm's value improves under the postulation of constant cost of debt and equity. The Net Operating Income approach demonstrated that when the debt-to-equity ratio is modified, the firm's value and cost of capital stay same, since the cost of equity grows with the degree of leverage and the advantages of cheaper debt capital are countered by the rising cost of equity. According to Modigliani and Miller's (1958) irrelevance theory (MM hypothesis), in a flawless and frictionless market with no corporation taxes, no trading costs, and no default risk, a firm's market value stays constant regardless of the proportion of debt and equity in its capital structure.

Due to the MM hypothesis's omission of the reality of an imperfect market with corporation taxes, bankruptcy costs, and transaction costs, other hypotheses arose to account for the influence of these market flaws on a firm's capital structure choice and value. To be more precise, the classic approach (Solomon, 1963), the trade-off theory (Kraus & Litzenberger, 1973), the agency theory (Jensen & Meckling, 1976), the Pecking order theory (Myers, 1984; Myers & Majluf, 1984), and the market timing theory (Baker & Wurglar, 2002) were established to explain the importance of capital

structure decisions to firm value. Solomon (1963) stated that a prudent balance of equity and debt in the capital structure might boost the firm's worth. According to Kraus and Litzenberger (1973), the best debt-equity ratio indicates a trade-off between the tax advantages of debt and the cost of insolvency. Greater leverage raises the chance of a business declaring bankruptcy, resulting in increased bankruptcy expenditures. This rising bankruptcy cost eventually cancels out the tax savings associated with a high debt-to-capital ratio. Jensen and Meckling (1976) suggested that managers' objectives are not fully aligned with those of shareholders, and that agency costs occur as a result of owners' monitoring expenditures and managers' imprudent use of free cash flows. Thus, the optimal capital structure can only be found by weighing the benefits of debt financing against the agency costs associated with debt financing.

Myers & Majluf (1984) and Myers (1984) developed the pecking order concept, suggesting that insiders are obliged to issue exorbitantly priced shares. They are aware, however, that selling such securities would trigger a negative market reaction, since rational investors without inside information would depreciate the firm's freshly issued shares. As a consequence, organizations often adhere to a hierarchy: they first use internal resources wherever possible; next they obtain external loans; and last, they issue external shares. This hypothesis implies that profitable organizations borrow less, whereas unprofitable enterprises rely more on external finance, generating more debt. According to Baker & Wurglar (2002), enterprises choose their funding source depending on the relative costs of debt and equity. If the cost of equity is less than the cost of debt, the corporation will issue equity. They argued that such businesses are low-leverage and received capital at a time when their market values were high. Thus, the market value of equity is crucial when determining the capital structure. With these conceptual approaches in mind, much empirical research has been performed to ascertain the link between capital structure and business

value, with conflicting results. On the one hand, multiple empirical studies reveal a negative association between leverage and profitability, which is consistent with the expectations of pecking order theory (Rajan & Zingales, 1995; Wald, 1999; Huang & Song, 2006; Oino & Ukaegbu, 2015). Berger & Bonaccorsi di Patti (2006), on the other hand, establish a positive association between leverage and profitability. Additionally, Danis et al. (2014) imply a positive relationship between profitability and leverage when enterprises are at or towards their optimal level of leverage and a negative relationship when firms do not adjust their capital structures.

The present study aims to analyze the impact of capital structure on firm value using a sample of 30 constituent companies of S&P BSE SENSEX listed on the Bombay Stock Exchange (BSE) for the sample period 2013-2021. The research is divided into five portions, one of which being the current one. Section II summarizes the existing literature on the effect of capital structure on a business firm's value. Section III discusses the paper's data and methods. Section IV summarizes the empirical results, and Section V brings the research to a close.

LITERATURE REVIEW

Contradictory empirical evidence exists about the link between capital structure and corporate value.; the impact of leverage on performance has been determined to be either positive, negative, or negligible. The first classification reveals that company leverage is proportionate to and directly related to firm value, implying that leverage has a good effect on business performance and is consistent across all debt levels (Roden & Lewellen, 1995; Margaritis & Psillaki, 2010; Cheng & Tzeng, 2011; Maxwell & Kehinde, 2012; Adair & Adaskou, 2015; Jouida, 2017). Aprilyani et al. (2021), in their study, observed that a substantial impact exists between the independent factors and firm value concurrently. Leverage and profitability both have a considerable positive influence on company

value. The second group provides a linear, but indirect, the link between leverage and company value, i.e., the firm leverage coefficient is negative and constant across all debt levels (Kinsman & Newman, 1998; Krishnan & Moyer, 1997; Rao et al., 2007; Onaolapo & Kajola, 2010; Khan, 2012; Soumadi & Hayajneh, 2012; Mwangi et al., 2014, Le & Phan, 2017; Ilhan Dalci, 2018). Cai & Zhang (2011) and Vo & Ellis (2016) demonstrate that variations in financial leverage have a detrimental effect on stock returns. Additionally, they discover that only enterprises with minimal leverage likely generate value for shareholders.

Likewise, Giroud et al. (2012) demonstrated that decreasing leverage enhances performance. On the other hand, Antoniou et al. (2008) demonstrate that there is a negative correlation between financial debt and efficiency. However, Connelly et al. (2012) discover that change in leverage does not affect business performance as assessed by Tobin's q. The third category demonstrates a non-linear asymmetrical connection between financial leverage and corporate performance. According to this research, there is an ideal amount of debt beyond which increasing debt does not add value to the organization but increases the risk (Cheng et al., 2010; Lin & Chang, 2011; Ahmad & Abdul-Rahim, 2013). Coricelli et al. (2012), for example, reveal that the positive association between leverage and overall productivity growth maintains up to a crucial threshold and then reverses to a negative association.

Additionally, financial leverage is positively correlated with growth. Lang et al. (1996) discovered a negative correlation between leverage and future growth. In other words, organizations with more debt seem to have lower projected growth rates in the future. Few empirical studies identified a lack of clear evidence about the link between firm value and leverage (Ahmed & Afza, 2019). Al-Slehat (2019), in his research, discovered that

financial leverage had no influence on firm value and had an inverse relation with Tobin's q scale. Ibhagui & Olokoyo (2018) suggested that the effect and direction of the relationship between leverage and firm performance are yet unknown. Methodological problems, model misspecifications, and, most crucially, institutional inequalities contribute to empirical findings' vagueness and inconsistencies. We further the consensus-building process by examining the relationship between leverage and firm value in India. The extant research on financial leverage in economies confirms that it has an ambiguous or mixed relationship with the firm's value. As a result of these ambiguous results, the current research firm's value is a relationship between enterprises' financing strategies and the S&P BSE SENSEX firms in India. To address the study issues, we employed a panel of 30 business enterprises listed on the S&P BSE SENSEX BSE from 2013 to 2021, during which the available literature on the relationship between the two is still sparse in the context of India, which is an emerging economy.

II. DATA AND METHODOLOGY

To examine the relationship between the capital structure and value of the firm, the study extracted financial data of the 30 largest and financially sound companies listed on the Bombay Stock Exchange (BSE) constituting the S&P BSE SENSEX index from the Centre for Monitoring Indian Economy (CMIE) - Prowess financial database - for the sample period 2013-2021.

The financial variables considered for regression in the present study are defined as follows:

i. Dependent Variable

- a. *Value of the Firm*: The value of the firm is associated with operating profitability; therefore, the value is taken as the ratio of profits from operations to total assets

ii. Explanatory Variable:

- a. *Capital Structure*: As a proxy of capital structure, the present study employs the firm's Debt/Equity Ratio, defined as the amount of debt used to finance its assets, to the amount of shareholders' equity in total capitalization.

iii. Control Variables:

- a. *Profitability*: Return on Capital Employed (ROCE) is taken to measure profitability.
- b. *Liquidity*: The current ratio of companies is taken as a measure of liquidity—the companies having good liquidity position use more internal funds external debts.
- c. *Sales*: The operating profitability depends on the sales, and rising sales indicates that the firm may generate internal funds requiring less debt financing. Therefore, sales are also considered a control variable.
- d. *Size*: The natural logarithm of total assets is taken to measure firm size.

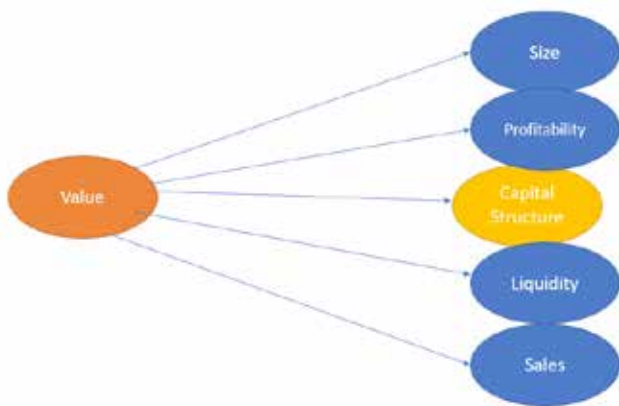


Figure 1: Financial Variables of Panel Regression Equation

Based on dependent variables, explanatory variables and control variables, the panel regression equation with intercept can be specified as follows:

$$Value_{it} = \alpha + \beta_1(Debt - Equity Ratio)_{it} + \beta_2(Liquidity)_{it} + \beta_3(Profitability)_{it} + \beta_4(Sales)_{it} + \beta_5(Size)_{it} + \epsilon_{it}$$

In the above equation, 'i' is used for cross-section units, 't' for the time-series element, 'α' is a constant term representing intercept 'β' is the coefficient.

In the present study, the longitudinal data of various financial variables of 30 companies of S&P BSE SENSEX across time (2013-2021) is taken for adopting the panel data analysis. A panel least square regression is run to establish a causal relationship between the capital structure and the firm's value and four control variables, namely, Liquidity, Profitability, Sales and Size. First of all, all the observations are pooled together to run the Panel Ordinary Least Square (Pooled OLS) model neglecting the heterogeneity of companies belonging to different sectors of the economy and denying the time-series nature of data. However, the homogeneity assumption for all the 30 companies is not valid. Therefore, the Breusch-Pagan (1979) Lagrange Multiplier test (BP-LM test) is applied to the results of Pooled OLS to check the validity of results, i.e., to check the need to move Random Effect Model (REM)/ Fixed Effect Model (FEM)? When the results of the BP-LM test reject the null of no random effect, the Random Effect Model and Fixed Effect Model are applied separately on data to run panel regression. FEM accommodates for variability across 30 firms by requiring that each firm have an intercept value, which does not fluctuate over time. In REM, the 30 firms evaluated will have a common mean intercept value. Finally, the Hausman Test (1978) is used to compare the null hypothesis "Random Effect model is acceptable" to the alternative hypothesis "Fixed Effect model is appropriate." The paper discusses the outcomes of all three models (Pooled OLS, REM, and FEM).]

III. EMPIRICAL FINDINGS

The descriptive statistics in Table 1 summarize the main financial factors examined for panel data regression. It displays the mean, median, maximum, minimum, standard deviation, skewness, and kurtosis values for the variables. None of the financial variables exhibit

normal distribution features. By and large, the mean value of all variables is different than zero, the standard deviation is much away from one, and positive skewness and fat tails are visible. As a result, the Jarque-Bera test ($p\text{-value} < 0.05$) rejects the null hypothesis that all variables are normally distributed.

Table 1: Descriptive Statistics of Panel data

	VALUE	D_E_RATIO	LIQUIDITY	PROFIDABLITY	SALES	SIZE
Mean	0.093740	19.39843	2.477154	15.14773	455177.8	5.825016
Median	0.060655	0.335710	1.376449	10.38337	292574.0	5.802038
Maximum	0.338066	472.2948	68.96328	132.1518	4013020.	7.596750
Minimum	-0.193074	0.000000	0.000000	-13.65643	55.30000	4.177767
Std. Dev.	0.090952	65.25416	6.208592	18.82389	678038.9	0.704862
Skewness	0.728068	4.963156	7.450374	3.257751	3.709294	0.159766
Kurtosis	3.078954	28.46979	68.38523	16.92510	17.58497	2.520017
Jarque-Bera	23.92386	8406.468	50594.18	2659.051	2354.029	3.740451
Probablity	0.000006	0.000000	0.000000	0.000000	0.000000	0.154089
Observation	270	270	270	270	270	270

Table 2 presents the Pearson's correlations between various financial variables. The results reveal that

correlation between various variables to be below 0.5. Therefore, multicollinearity is not a matter of concern.

Table 2: Correlation Matrix

	VALUE	D_E_RATIO	LIQUIDITY	PROFIDABLITY	SALES	SIZE
VALUE	1.000000					
D_E_RATIO	-0.261328	1.000000				
LIQUIDITY	0.035252	-0.106876	1.000000			
PROFIDABLITY	0.545809	5.23E-25	0.012899	1.000000		
SALES	-0.062551	-0.047145	-0.101504	0.075681	1.000000	
SIZE	-0.382022	0.312186	-0.333072	0.055046	0.422341	1.000000

The results of Panel Ordinary Least Squares regression done on the data of 30 firms are given in Table 3. The findings indicate that capital structure, as measured by the debt/equity ratio, has a negative and substantial effect on the firm's value. Additionally, the data indicate that liquidity and size have a negative and minor

influence on the firm's worth. Other control factors, such as profitability and sales, have a considerable positive effect on the firm's value. The reported F-statistic (43.17369) with a p-value (0.0000) indicate the model is fitted well. The adjusted R-squared value is moderate (0.512912), implying only about fifty-

one per cent variance in the firm's value is explained by the model. These results indicate that if we ignore the heterogeneity across companies and time, the firm's value is negatively associated with the degree of leverage and liquidity and positively associated with

profitability, sales and size. However, the assumption of homogeneity is not realistic. Therefore, the Breusch-Pagan LM test will be conducted to determine the validity of Pooled OLS results.

Table 3: Pooled OLS Results

Dependent Variable: VALUE				
Method: Pooled Ordinary Least Squares				
Variable	Coefficient	Std. Error	T-Statistic	Prob.
C	0.504391	0.055596	9.072482	0.0000
D_E_Ratio	-0.000192	8.75E-05	-2.191294	0.0296
LIQUIDITY	-0.001784	0.000689	-2.587893	0.0103
PROFITABILITY	0.002518	0.000218	11.54234	0.0000
SALES	1.77E-08	8.02E-09	2.212737	0.0280
SIZE	-0.076111	0.010175	-7.479865	0.0000
R-Squared	0.512912	F-Statistic		43.17369
Adjusted R-Squared	0.501032	Prob.(F-Statistic)		0.000000

The results of Breusch-Pagan LM are reported in Table 4. The test results demonstrate strong signals of one-sided cross-section random effects as reported LM statistics (461.5344) is significant with a p-value of 0.0000. However, one-sided time-specific random

effects could not be established. Therefore, the null hypothesis of the null of no panel effect is rejected, implying the Pooled OLS is not valid. Therefore, the empirical analysis applies the Random Effect and Fixed Effect models.

Table 4: Breusch-Pagan LM Test Results

BP Langrange multiplier (LM) test for panel date			
Null (no rand. effect)	Cross section	Period	Both
Alternative	One-sided	One-sided	
Breusch-Pagan	461.5344	2.771614	464.3060
	(0.0000)	(0.0959)	(0.0000)

The findings of the cross-section Fixed Effect Model are shown in Table 5. The positive insignificant coefficient of the debt/equity ratio implies that there is no link between capital structure and company value. Similarly, insignificant coefficient of sales shows no effect on firm value, and liquidity to have a negligible negative influence on firm value. Profitability has a large

positive effect on the value of a business, but size has a considerable negative effect on value. The F-statistic (57.29701) with a p-value (0.0000) indicate the model is appropriate with panel data of S&P BSE SENSEX-30 companies. The significant value (0.882440) of adjusted R-squared suggests the model explicates approximately eighty-eight per cent variation in the firm's value.

Table 5: Fixed Effect Model Results

Dependent Variable: VALUE				
Method: Panel Least Squares (Cross section fixed effects)				
Variable	Coefficient	Std. Error	T-Statistic	Prob.
C	0.462246	0.089721	5.152023	0.0000
D_E_Ratio	1.53E-05	6.40E-05	0.239449	0.8110
LIQUIDITY	-0.000780	0.000435	-1.791226	0.0749
PROFITABILITY	0.001942	0.000291	6.6823273	0.0000
SALES	8.00E-09	1.68E-08	0.475246	0.6352
SIZE	-0.067381	0.016539	-4.074164	0.0001
R-Squared	0.898114	F-Statistic		57.29701
Adjusted R-Squared	0.882440	Prob.(F-Statistic)		0.000000

Table 6 gives the results of the cross-section Random Effect Model. The results disclose a positive insignificant coefficient of debt/equity ratio, inferring that the firm's value is independent of capital structure. The control variables liquidity and size were found to negatively correlate with the firm's value at 10% and 5% levels, respectively. The positive and significant

impact of profitability and positive and insignificant impact of sales on the value is apparent from the results. The adjusted R-squared value (0.259978) describes that about twenty-five per cent variance in the firm's value is explained by the model, and reported F-statistic (15.75509) at a p-value of 0.000 suggests that Random Effect Model is fitted well.

Table 6: Random Effect Model Results

Dependent Variable: VALUE				
Method: Panel EGLS (Cross section random effects)				
Variable	Coefficient	Std. Error	T-Statistic	Prob.
C	0.0486230	0.076994	6.315196	0.0000
D_E_Ratio	3.13E-06	6.22E-05	0.050243	0.9600
LIQUIDITY	-0.000830	0.000431	-1.925041	0.0556
PROFITABILITY	0.002036	0.000266	7.650474	0.0000
SALES	1.32E-08	1.34E-08	0.978581	0.3289
SIZE	-0.072330	0.013937	-5.189801	0.0000
R-Squared	0.277598	F-Statistic		15.75509
Adjusted R-Squared	0.259978	Prob.(F-Statistic)		0.000000

Lastly, to check which model is a more appropriate model for panel data under consideration, the Hausman test is conducted to check that the null hypothesis of "REM is appropriate" contradicts the alternative hypothesis of "FEM is appropriate.". The results of the Hausman test are shown in Table 7. The results of the

test accept the null hypothesis "REM is appropriate" since the observed Chi-Square Statistic (2.932529) is insignificant with a p-value (2.932529) more than 0.05. Therefore, Random Effect Model turned out to be the most appropriate model for the panel data under consideration.

Table 7: Hausman Test Results

Correlated Random Effects-Hauman Test			
Equation: Untitled			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	2.932529	5	0.7104

The above empirical data indicate evidences matching with Modigliani and Miller (1958) irrelevance hypothesis i.e., the value of a corporation is not reliant on its capital structure. The control variables are connected with the firm's value in diverse ways. The firm's value is positively related to the profitability (i.e., returns on capital employed) of a company means that as profitability increases, the value of the firm increases. Further, the firm's value is also having a negative association with firm size, i.e., as the firm size increases, the value of the firm decreases and vice versa. The firms' sales are having an insignificant impact on the firm's value. Finally, there is evidence of some significant but negative impact of liquidity on a firm's value.

IV. CONCLUSION

The current research examines the link between capital structure and firm value. The sample consists of the 30 largest and financially healthy firms listed on the Bombay Stock Exchange, constituting the S&P BSE SENSEX index between 2013 and 2021. We utilized Pooled OLS, random effect model and fixed effect model in the study. The Hausman test established that the "random effect model" is the most suitable for data under consideration. The study's central premise is that capital structure choices are perplexing, convoluted, and difficult to assess without considering the interplay of their key drivers (profitability and debt/equity ratio). Numerous theoretical and empirical research has produced inconsistent conclusions. Thus, it is required to investigate the interaction impact of profitability and debt/equity ratio on company value as a combined factor

to capture the probable concurrent influence of both variables on firm value. The empirical findings indicate that the deb/equity ratio as a metric of capital structure combination does not affect the firm value of Indian enterprises (Modigliani and Miller, 1958). The study's results give practitioners crucial financial insights and policy consequences. The debt and equity combination in capital structure is a crucial problem that must be taken carefully in a company's accounts. Even though results could not establish a significant relationship between capital structure and the firm's value yet, financial managers should seek momentum and consistent profitability, liquidity, sales, size, and growth patterns to impact business value favourably. Present and potential investors may evaluate a company's entire financial situation without concentrating only on debt-equity combination in capital structure.

Despite its importance, the study has significant shortcomings that must be addressed in further research. To begin, empirical research on the impact of financial leverage on firm profitability has been undertaken up to the current day using secondary sources of data. To have a better understanding of the relationship between the two in India, the emphasis must be shifted away from secondary sources and toward survey data. This may aid in better understanding managers' perspectives on debt financing and give insight into managerial decisions. The questionnaire research may not only add to an academic concept of leverage-profitability, but it may also assist management in developing an ideal capital framework that supports more accurate information to possible stakeholders in the area. The questionnaire survey will help to confirm the present study's conclusions.

Second, a significant proportion of private-owned firms and small- to medium-sized enterprises are not listed on the BSE. Their funding pattern is distinct from that of publicly traded companies. As a result, it is critical to investigate such firms for future study, as they have been mainly overlooked in capital structure-firm performance studies. Additionally, a comparative analysis of publicly traded and unlisted enterprises may provide intriguing data. Third, this research is primarily concerned with determining the effect of capital structure proxied through debt/equity ratio with certain other financial variables as control variables on a firm's value. Additional variables such as macroeconomic factors (inflation, currency rates), intensity of competition, corporate reporting considerations, and business strategy may all influence the link between capital structure and firm value (Jermias, 2008), and alternative financing sources (Parthiban et al., 2008), their impact on interconnection of capital structure and firm value may be considered.

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