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Capital Structure and Firm Value of Selected Manufacturing Firms in India

Dr.Kumar Gaurav

Visiting Professor, L.N. Mishra Institute of Economic Development and Social Change, 1, Nehru Marg,Bailey Road, Patna – 800001

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Abstract

This empirical study adds to the current literature on the impact of capital structure decisions on business value.These 92 selected Manufacturing companies database for the period 2010-2021 include Automobile & ancillaries, Chemicals, Cement, Food, sugar & beverage, Metals & Mining, Pharmaceuticals, Tyres, Paints, Paper & Plastics, Construction, Real estate & Infrastructure, Capital Goods/Machinery, Power, Electrical & Electronics, Oil & Gas industries. Tobin's Q and the Enterprise value to profit before interest, depreciation, and taxes ratio are used to approximate company value. The debt-equity ratio is used to calculate leverage. The panel data regression model is used for the research, which supports the idea that financial leverage has a negative influence on company value (as assessed by Tobin's Q). The other measure, on the other hand, is unaffected by the

Keyword-Capital Structure, Financial leverage, Manufacturing Companies, Firm Valuation, EV/EBDIT, P/B, Tobin's Q.

1. Introduction

Many unsolved mysteries remain in the realm of corporate finance. The impact of capital structure on the company is one such issue. Researchers from all around the world have been tackling this lack of unanimity, but they have not yet been able to provide specific solutions.

Over the years, a number of ideas, including the Pecking Order hypothesis, the Market Timing hypothesis, the Modigliani and Miller Hypothesis, the Trade-Off Theory, and the Net Income Approach and Net Operating Income Approach, have been the subject of several theoretical discussions. The Modigliani and Miller theorem (1958) opened the door to the field of capital structure by demonstrating the theory of capital structure's irrelevance in assessing firm value. However, Modigliani and Miller had to reconsider after taking into account symmetric information, imperfect markets, and taxes; as a result, they put out the relevance theory. Similar to this, the trade-off theory suggested that since capital structure has two components—tax savings on interest payments versus rising bankruptcy costs—it is likely to result in an optimal capital structure scenario, as noted by Kraus and Lichtenberger (1973) and Scott (1976). Thus, it implies that the business value can be maximised at a specific debt level, which will be reflected in the stock price (Fama, 1978). Similarly, Brigham and Houston et al. (2004) acknowledged the significance of capital structure choices for enhancing business operations and productivity. They do, however, include a warning, noting that having excessive debt may raise your chances of filing for bankruptcy.

Later, Myers and Majluf's Pecking Order Theory (1984) suggested that organisational administrators use funding in a hierarchical order, utilising their own funds first before turning to outside sources. The key fact is that opinions on how capital composition affects business performance are divided, regardless of the theories advanced. It is discovered that the relationship depends on the circumstances surrounding the theory's testing.

2. Literature Review

We have identified many factors utilised in the study by looking through multiple works of literature. Using capital structure concepts, we may evaluate the benefits and drawbacks of debt financing to establish suitable debt ratios. But they don't address the question of why debt ratios differ so widely among nations. The value of a corporation is

independent of its capital structure in ideal capital markets, where there is no corporate tax, no transaction and agency fees, and all verifiable information is completely stated (Modigliani and Miller 1958). The trade-off theory (TOT) states that a company's tax-free interest income and the debt burden expenses of distress can be balanced or traded-off to determine the best capital structure for maximising profit (Bhaduri 2002).

We looked at the capital structure of the nine main industrial groups and made the assumption that variables like growth, cash flow, size, uniqueness, and industry traits might be influenced by things like the best capital decisions. (Chakraborty 2010) captured the factors influencing capital structure in India by using panel combinations of 1,169 equilibrium technology panel enterprises. A capital structure necessary for profit was determined by examining the capital structures of US manufacturing and service recipients (Gill and others 2011; Abor 2005). Measurement of profitable results and factors influencing them is the subject of many publications (Doğan 2013; Mirza 2013; Al-Jafari and Al Samman 2015; Akben-Selcuk 2016; Batra and Kalia 2016). But the majority of them have had varying degrees of success.

The systematic simulation of capital structure determinants has fueled existing theoretical claims. The majority of research focuses on particular factors that influence a company's capital structure, include asset stability, size, cost of financial difficulty, profitability, growth rate, tax rates, rising debt, and interest rates. Companies (HARRIS and RAVIV 1991; Fame and French 2000, Frank and Goyal 2003, Tong and Green 2005, Psillaki and Daskalakis 2009, Cook and Tong 2010) swiftly examined and modified the macroeconomic environment. (Lemmon and others, 2008), who have rentability, starting leverage, industry duplication, competitiveness, volatility, and a sizeable, competitive, and variable cash flow (also known as current determinants of the capital structure). can be proportionately captured when fixed effects are considered. According to (Lemmon et al., 2008), the largest change in leverage is determined by a time-invariant effect (sometimes referred to as an unconfirmed permanent component). Leverage has been shown to be significantly favourable for the company's worth (Cheng and Tzeng 2011; R and Daddikar, 2013). They discovered that capital gearing had little effect on the company's worth. (Chang and Lin, 2011) Keep in mind that neither the debt ratio nor the firm's valuation causes the debt ratio to rise above 33.33%. In summary, empirical research demonstrates the complex and conflicting link between corporate interests and leverage in developing countries. Studies examining this link in developing economies such as India are particularly scarce. The study examines the relationship between financial leverage and firm value in India's manufacturing industry, which contributes to the body of knowledge on the impact of financial leverage on a company's value.

3. The objective of the Study

The objective of this study is to estimate the impact of capital structure or financial leverage on a firm valuation. For this research work we have taken the D/E ratio and debt to fixed asset ratio which is the proxy of financial leverage along with six other control variables on the valuation ratio (EV/EBDITA, P/B, Tobin’s Q) of some of the selected Indian manufacturing companies classified into 11 sectors over 12 years (FY2010 to FY2021).

4. The rationale of the Study

The world economy is undergoing change.The global COVID-19 epidemic had an impact on the manufacturing climate globally, which prompted a rebuilding of the supply chain and an acceleration of corporate reorganisation. Based on an annual global manufacturing risk index that 48 nations in Asia Pacific, Europe, and America publish ('Insights | India | Cushman & Wakefield').India comes in third place globally for suitable manufacturing locations. In response to the circumstances and future prospects, India decided to proceed in spite of the difficulties and safeguard investments and interests. A large number of the companies are close to filing for bankruptcy as a result of either an inadequate capital mix or an excessive debt load. Due to an unsuitable capital mix, the JP group and the ADAG group are among the extremely important industries, along with steel, power, textiles, and jewellery. In a developing nation like India, having a suitable finance structure is essential for Indian manufacturing companies. Research is therefore necessary for the factors that significantly affect the financial leverage of Indian manufacturing companies. Throughout the whole period, China's industrial growth rate has been around 1.5 times higher than India's, the report states. The Make in India initiative, which seeks to create 100 million new jobs by 2022 by increasing manufacturing's share of Asia's third-largest economy from 18 to 25 percent, has been bolstered by the worldwide COVID-19 pandemic. Strict labour rules in India are another obstacle to the country's industrial sector (Fallon and Lucas 1993; Gupta, Hasan, and Kumar 2011). Determining the right debt-to-equity ratio combination is crucial for different types of Indian enterprises. This indicates how timely the current research works.

5. Research Methodology

5.1 Sample

The sample is made up of particular Indian manufacturing enterprises that were categorised by industry and listed between 2009–2010 and 2020–2021 on the National Stock Exchange (NSE) and the Bombay Stock Exchange (BSE). Any businesses with missing data for either the independent or dependent variables are not included in the study. A 12-year

period spanning from 2009–2010 to 2020–2021 has been considered for the analysis of the leverage impact, and 118 listed Indian manufacturing enterprises on NSE & BSE make up the sample size.

Consumer goods, chemicals, construction materials, drugs and pharmaceuticals, food and agro processing, metal, machinery, oil & gas, power, transport equipment and textiles are the eleven industries into which these 118 firms have been divided. There were 1416 patients in the current study, or a sample size. For improved reliability and lower measurement error, large samples, chosen cases, and extended time periods have been taken into consideration. Regression analysis will therefore be possible with a sample size of 118 firms and 1416 instances, allowing for meaningful results.

Industry	No. of companies	% of the total sample	No. of Selected Cases
Consumer Goods	17	14.4	204
Chemicals	7	5.9	84
Construction Materials	14	11.9	168
Drugs and Pharmaceuticals	8	6.8	96
Food and Agro Processing	17	14.4	204
Metal	10	8.5	120
Machinery	8	6.8	96
Oil & Gas	6	5.1	72
Power	5	4.2	60
Transport Equipment	20	16.9	240
Textiles	6	5.1	72
Total	118	100.0	1416

5.2 Source

The financial statements of the sample companies were sourced from their websites and were made available in their annual reports throughout a 12-year period. The Statistical Package for Social Sciences (SPSS) statistical software and the MS Excel application were used to apply the necessary statistical analysis procedures, such as descriptive statistics, correlation, regression models, and testing of numerous hypotheses.

5.3 Hypotheses of the Study

There is no significant impact of the debt-equity ratio on valuation ratio.

- There is no significant impact of the debt-equity ratio on return on enterprise value to cash operating profit ratio.
- There is no significant impact of the debt-equity ratio on price to book value ratio
- There is no significant impact of the debt-equity ratio on Tobin's Q ratio

There is no significant impact of debt to fixed assets ratio on valuation ratio.

- There is no significant impact of debt to fixed assets ratio on return on enterprise value to cash operating profit ratio.
- There is no significant impact of debt to fixed assets ratio on price to book value ratio
- There is no significant impact of debt to fixed assets ratio on Tobin's Q ratio

There is no significant impact of a firm's size on valuation ratio.

- There is no significant impact of a firm's size on return on enterprise value to cash operating profit ratio.
- There is no significant impact of a firm's size on price to book value ratio
- There is no significant impact of a firm's size on Tobin's Q ratio

There is no significant impact of asset turnover ratio on valuation ratio.

- There is no significant impact of asset turnover ratio on return on enterprise value to cash operating profit ratio.
- There is no significant impact of asset turnover ratio on price to book value ratio
- There is no significant impact of asset turnover ratio on Tobin's Q ratio

There is no significant impact of growth opportunity on valuation ratio.

- There is no significant impact of growth opportunity on return on enterprise value to cash operating profit ratio.
- There is no significant impact of growth opportunity on price to book value ratio
- There is no significant impact of growth opportunity on Tobin's Q ratio

There is no significant impact of tax to operating profit ratio on valuation ratio.

- There is no significant impact of tax to operating profit ratio on return on enterprise value to cash operating profit ratio.
- There is no significant impact of tax to operating profit ratio on price to book value ratio
- There is no significant impact of tax to operating profit ratio on Tobin's Q ratio

There is no significant impact of risk on valuation ratio.

- There is no significant impact of risk on return on enterprise value to cash operating profit ratio.

- There is no significant impact of risk on price to book value ratio
- There is no significant impact of risk on Tobin's Q ratio

There is no significant impact of a firm's age on profitability and valuation ratio.

- There is no significant impact of a firm's age on return on enterprise value to cash operating profit ratio.
- There is no significant impact of a firm's age on price to book value ratio
- There is no significant impact of a firm's age on Tobin's Q ratio

6. Theoretical Framework

6.1Panel Data Regression- Fixed & Random Effect Model

6.1.1 Fixed Effect Model (FE)

According to this concept, a distinct intercept can be used to account for individual differences. employing a dummy variable estimation strategy to represent the variations between intercept businesses in panel data from a Fixed Effects model The Least Squares Dummy Variable approach is another name for this estimate strategy (LSDV). Though different from the common effect, the Fixed effect model nonetheless adheres to the conventional least squares rule. More models are required to account for the difference since it is less reasonable to assume that modeling results in a consistent intercept for each cross-section and time.

Fixed effects assume that the various intercepts can account for individual differences (cross-section). The dummy variable strategy is used to estimate the Fixed Effects Model with various intercepts between individuals. These estimate models are sometimes referred to as the LSDV (or Least Squares Dummy Variable) technique.

6.1.2 Random Effect Model (RE)

This model will estimate panel data in which interference variables may be related across individuals and across time. The error terms of each company in the Random Effect model account for the variation in intercepts. Heteroscedasticity is removed when the Random Effect model is used. This approach is also known as the Generalized Least Square (GLS) method or the Error Component Model (ECM).

The random effect model differs from the common effect and fixed effect models in theory, particularly because it applies the maximization or general least squares principle rather than the ordinary least squares concept.

6.1.3 Selection Method of Regression Data Panel

Hausman Test

Hausman test is a statistical test to select whether the most appropriate Fixed Effect or Random Effect model is used.

If Result:

H_0: Select RE ($p > 0.05$)

H_1: Select FE ($p < 0.05$)

Model – 1: Enterprise value to the earnings before interest, taxes, depreciation, and amortization (EV/EBDITA)

This particular model has been used as a proxy for a firm's valuation with debt–equity ratio, debt to fixed assets ratio, firm size, operational efficiency (TATOR), growth rate, tax to operating profit, risk, and age as the independent variables. EV/EBDITA compares the value of a company (Debt +Equity) to the company's cash operating income. It is a popular valuation tool that helps investors compare companies to make an investment decision.

Model – 2: A firm's market capitalization to its book value (P/B)

This particular model has been used as a proxy for a firm's valuation with debt–equity ratio, debt to fixed assets ratio, firm size, operational efficiency (TATOR) ratio, growth rate, tax to operating profit, risk, and age as the independent variables. P/B value compares the market price of a share to its book value. It is a popular valuation tool that helps investors decide what price investors should pay for a company's equity share.

Model – 3: Tobin's Q

This particular model has been used as a proxy for firm valuation with debt–equity ratio, size, age, tangibility, sales growth, asset turnover, and ownership as the independent variables. It shows the position of the firm's market value to its replacement cost. The higher the position, the better will be the firm performance. It is the ratio of market value (Market capitalization + Market or book value of debt) divided by total assets (King & Santor, 2008).

Effects of Financial Leverage & other control variables on Financial Performance of selected industrial group

Model – 1: EV/EBDITA as the proxy for the firm's valuation

In this model, enterprise value to cash operating profit (EV/EBDITA) has been used as a proxy for a firm's valuation ratio. In this panel data regression model, the variable EV/EBDITA is taken as a dependent variable and all the eight independent variables (explanatory and control variables) are the same as the earlier one.

The above relationship has been tested with the help of Panel data econometric techniques.

Method: Panel Least Squares

Estimation Equation:

==========

EV_EBDITA = C(1) + C(2)*DER + C(3)*DTFA + C(4)*SIZE + C(5)*TATOR + C(6)*GROWTH + C(7)*TAX_EBIT + C(8)*RISK + C(9)*AGE

Table 0-1 Regression Model Estimates: Impact of Capital Structure on Firm's Valuation (EV/EBDITA)

Variables	Regression Coefficient		
	Pooled OLS	Fixed effect	Random effect
C	70.65689	404.605	81.75033
	(.000)	(0.0009)	(.000)
DER	-0.663093	-1.016494	-0.412411
	(0.1535)	(0.0299)	(0.3439)
DTFA	-3.570981	-12.19064	-6.0951
	(0.1535)	(0.0003)	(0.0152)
SIZE	-0.170004	-1.164665	-0.486025
	(0.7894)	(0.8367)	(0.551)
TATOR	-11.09639	-4.759004	-10.27756
	(.000)	0.4621	(.000)
GROWTH	2.638805	3.528237	2.387693
	(.000)	(.000)	(0.5266)
TAX_EBIT	-1.248542	0.002666	-0.931385
	(0.4263)	(0.9986)	(0.5266)
RISK	-2.876434	-55.79847	-2.976511
	(0.0896)	(0.0445)	(0.1538)
AGE	-11.70176	-92.27787	-13.47691
	(.000)	(0.0036)	(0.0002)
R-Squared	0.480834	0.671408	0.493405
Adjusted R-Squared	0.447067	0.647985	0.407464
F-statistic	14.23983	7.186738	5.741249
	(.000)	(.000)	(.000)
Durbin-Watson stat	1.240432	1.603218	1.290617
Akaike info criterion	6.675363	6.536138	
Schwarz criterion	6.871917	7.19132	
Hannan-Quinn Criterion	6.755234	6.802374	
Hausman Test Chi-Sq. (χ^2)/P Value			27.01825
			0.0007
Cross-sections included	11	11	11
No. of observations	132	132	132

Table 4-19 shows the side-by-side results of the pooled OLS, Panel data fixed effects and panel data random effects estimations for financial leverage, Debt to Equity ratio (DER) and Debt to Fixed Assets Ratio (DTFA) and six control variables, firm's size, asset turnover, growth, tax to operating profit, risk, and age on valuation ratio enterprise value to cash operating profit (EV/EBDITA). First, the Hausman test is applied to determine whether to select fixed effect estimates or random effect estimates. The Hausman test results (χ^2=27.0182 and P value = .0007) reject the null hypothesis of using the panel data random effect model and supports the fixed-effect model.

From the Model Summary and ANOVA Table 4-19, The F ratio value (7.1867) shows that the multiple correlation coefficients are statistically significant at a 1 percent level of significance. Hence, it is concluded that Panel Regression Model – Fixed Effect is statistically significant.

The R^2 (Coefficient of determination) value shows in Table 4-19 is 0.6714 and the adjusted R^2 value is 0.6479, this indicates that 67.14% of the regression model is explained by all the eight predictor variables taken together. This shows that the results of the regression analysis on the impact of capital structure on valuation (EV/EBDITA) in the majority are consistent with the various research studies.

Also, the impact of multicollinearity on the regression model is not present because the difference between R^2 value and the adjusted R^2 value is negligible. Effect of multicollinearity is also obtained from the collinearity statistics test (variance inflation factor, VIF) which is evident in Table No 4-14. From the table, it is found that the VIF of all the parameters (varies from Min: 1.024 to Max: 1.815) which are well below the critical level of 5. So, the overall impact of multicollinearity on the regression model is very much insignificant.

Durbin-Watson test from the above table 4-19 shows that the effect of autocorrelation on the regression is very insignificant (the value of the Durbin-Watson test is 1.6032 which indicates that serial correlation is not present).

The empirical analysis of Model – 1,

The empirical analysis using three estimation techniques (pooled, fixed effect, and random effect) is depicted in Table 4-19, and it has been found that the regression coefficient of variable debt equity ratio (DER) has negative values of -.6631, -1.016 and -.4124 under the above three estimation techniques respectively. It can also be seen that the Probability value of the t-statistic under fixed effect estimation is .0299 which is less than 0.05 at a 95 percent confidence level. Therefore, the null hypothesis stating that there is no significant impact of debt-equity ratio on return on EV/EVDITA has not been accepted. However, the p-value is not significant under pooled regression and the random effect method. Since the Hausman test supports the fixed-effect model, it is clear that the valuation ratio (EV/EBDITA) is inversely and significantly proportional to the debt-equity ratio.

The regression coefficient of variable debt to fixed asset ratio (DTFA) has negative values of -3.571, -12.191, and -6.095 shown in Tables 4-19 under the above three estimation techniques respectively. It can also be seen that the Probability value of t-statistic under fixed effect and random effect estimation is .0003, and .0152 respectively which is less than 0.05 at a 95 percent confidence level. Therefore, the null hypothesis stating that there is no significant impact of debt-equity ratio on EV/ebdita has not been accepted. However, the p-value is not significant under pooled regression method. Since the Hausman test supports the fixed-effect model, it is clear that the valuation ratio (EV/EBDITA) is inversely and significantly proportional to the debt to fixed asset ratio.

Control variables like the total asset turnover ratio are inversely related to EV/ EVDITA under all three estimation techniques. It is found to be statistically significant for pooled and random effect estimation. However, it is not statistically significant under the fixed effect panel regression method.

Control variables growth is positively and significantly associated with EV/ EVDITA under pooled and fixed effect regression estimation techniques. However, it is not significantly associated with EV/ EVDITA under all random effect estimations.

Control variable firm's size and tax to ebdita is negatively but not significantly associated with EV/ EVDITA under all the three regression estimation techniques used here.

Control variable Risk is negatively but not significantly associated with EV/ EVDITA under all the three estimation techniques.

However, the control variable firm's age is negatively and significantly associated with EV/ EVDITA under all the three regression estimation techniques used here.

Substituted Coefficients:

==========

EV_EBDITA = 404.604978983 - 1.01649366404*DER - 12.1906417578*DTFA - 1.16466532711*SIZE - 4.75900418515*TATOR + 3.52823695695*GROWTH + 0.00266642153256*TAX_EBIT - 55.798472837*RISK 92.2778693905*AGE

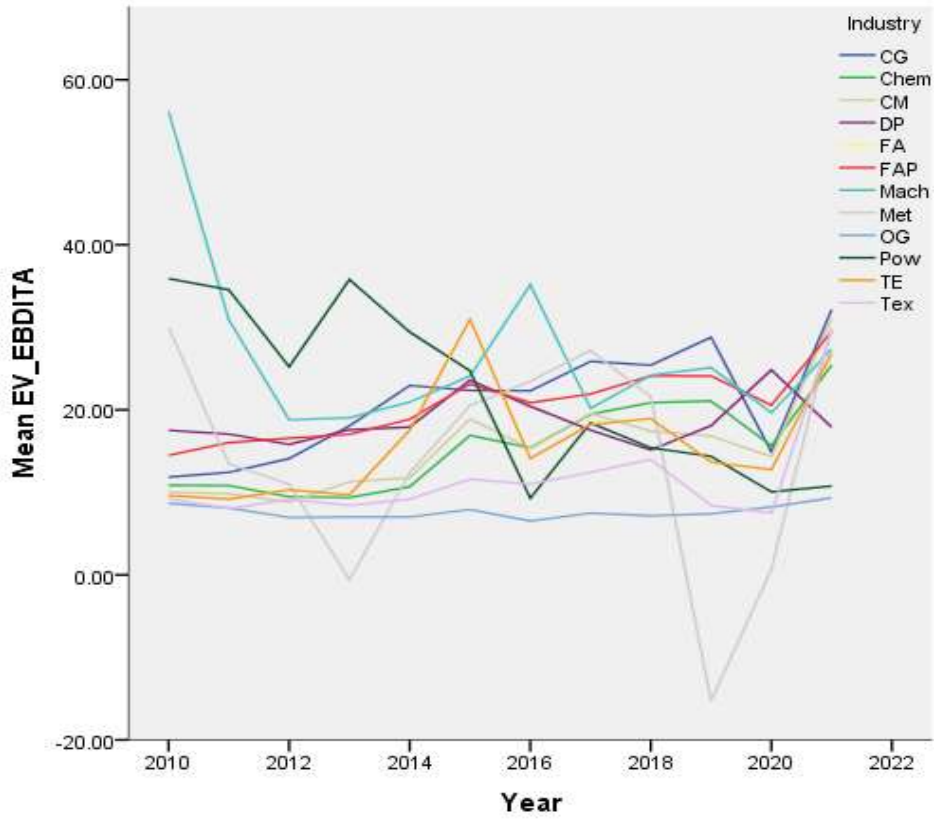

Figure 0:1 Year-wise Chart of profitability ratio (*EV/EBDITA*)

Model – 2: Price to book value (P/B) as the proxy for the firm's valuation

In this model, price to book value (P/B) has been used as a proxy for a firm's valuation ratio. In this panel data regression model, variable P/B is taken as a dependent variable and all the eight independent variables (explanatory and control variables) are the same as the earlier one.

The above relationship has been tested with the help of Panel data econometric techniques.

Method: Panel Least Squares

Estimation Equation:

==========

PBV = C(1) + C(2)*DER + C(3)*DTFA + C(4)*SIZE + C(5)*TATOR + C(6)*GROWTH + C(7)*TAX_EBIT + C(8)*RISK + C(9)*AGE

Table 0-2 Regression Model Estimates: Impact of Capital Structure on Firm's Valuation (P/B) Variable, Price to Book Value (P/B)

Variables	Regression Coefficient		
	Pooled OLS	Fixed effect	Random effect
C	1.704888	9.718961	2.11857
	(0.1907)	(0.342)	(0.1247)
DER	0.181586	0.194306	0.167425
	(0.0004)	(.000)	(.000)
DTFA	0.801161	-0.038668	0.177871
	(0.0023)	(0.8919)	(0.4594)
SIZE	-0.175846	1.598661	-0.199545

Variables	Regression Coefficient		
	Pooled OLS	**Fixed effect**	**Random effect**
	(0.0109)	(0.0014)	(0.0092)
TATOR	0.654415	0.385391	0.599017
	(0.0013)	(0.0425)	(0.0052)
GROWTH	1.530481	1.08565	1.379561
	(.000)	(.000)	(.000)
TAX_EBIT	-0.014902	-0.197169	-0.023859
	(0.9292)	(0.142)	(0.8519)
RISK	-0.506076	-5.216316	-0.561082
	(0.0057)	(0.03)	(0.0164)
AGE	-0.40103	-5.267004	-0.185463
	(0.1442)	(0.0518)	(0.5659)
R-Squared	0.924767	0.96896	0.86567
Adjusted R-Squared	0.919874	0.960135	0.856933
F-statistic	188.9903	109.7971	99.08214
	(.000)	(.000)	(.000)
Durbin-Watson stat	1.330796	1.896796	1.456577
Akaike info criterion	2.206155	1.639015	
Schwarz criterion	2.40271	2.294197	
Hannan-Quinn Criterion	2.286026	1.905251	
Hausman Test Chi-Sq. (χ^2)/P Value			61.55584
			(.000)
Cross-sections included	11	11	11
No. of observations	132	132	132

random effects estimations for financial leverage, Debt to Equity ratio (DER) and Debt to Fixed Assets Ratio (DTFA) and six control variables, firm's size, asset turnover, growth, tax to operating profit, risk, and age on valuation ratio market price to book value (P/B). First, the Hausman test is applied to determine whether to select fixed effect estimates or random effect estimates. The Hausman test results (χ^2=61.556 and P value = .000) reject the null hypothesis of using the panel data random effect model and supports the fixed-effect model.

From the Model Summary and ANOVA Table 4-20, The F ratio value (109.797) shows that the multiple correlation coefficients are statistically significant at a 1 percent level of significance. Hence, it is concluded that Panel Regression Model – Fixed Effect is statistically significant.

The R^2 (Coefficient of determination) value is 0.969 and the adjusted R^2 value is 0.9601 shown in Table 4-20, this indicates that 96.9% of the regression model is explained by all the eight predictor variables taken together. This shows that the results of the regression analysis on the impact of capital structure on valuation ratio (P/B) in the majority are consistent with the various research studies.

Also, the impact of multicollinearity on the regression model is not present because the difference between R^2 value and the adjusted R^2 value is negligible. Effect of multicollinearity is also obtained from the collinearity statistics test (variance inflation factor, VIF) which is evident in Table No 4-14. From the table, it is found that the VIF of all the parameters (varies from Min: 1.024 to Max: 1.815) which are well below the critical level of 5. So, the overall impact of multicollinearity on the regression model is very much insignificant.

Durbin-Watson test from the above table 4-20 shows that the effect of autocorrelation on the regression is very insignificant (the value of the Durbin-Watson test is 1.8968 which indicates that serial correlation is not present).

The empirical analysis of Model – 2,

The empirical analysis using three estimation techniques (pooled, fixed effect, and random effect) is depicted in Table 4-20, and it has been found that the regression coefficient of variable debt equity ratio (DER) has positive values of .1816, .1943 and .1674 under the above three estimation techniques respectively. It can also be seen that the Probability value of the t-statistic under all three estimation methods is less than 0.05. Therefore, the null hypothesis stating that there is no

significant impact of debt-equity ratio on return on price to book value has not been accepted and hence we concluded that the debt-equity ratio is significantly and positively impacting the price to book valuation ratio.

The regression coefficient of variable debt to fixed asset ratio (DTFA) has positive values depicted in Table 4-20 of 0.8012, a negative value of -0.0386, and a positive value of 0.1778 under pooled, fixed effect, and random effect respectively. It can also be seen that the Probability value of t-statistic under fixed effect and random effect estimation is more than 0.05; therefore, it is not statistically significant. The probability value of the t-statistic under pooled regression is less than 0.05 and is statistically significant. Since the Hausman test supports the fixed-effect model, it is clear that the valuation ratio (P/B) is inversely and not significantly proportional to the debt to fixed asset ratio.

Control variables like total asset turnover ratio and growth are positively and significantly related to price to book value (P/B) under all three estimation techniques.

Control variable firm's size is negatively and significantly associated with the price to book value ratio under pooled and random effect. However, it is positively and significantly associated with a price to book value under the fixed effect technique. Since the Hausman test supports the fixed-effect model, it is clear that the valuation ratio (P/B) is directly and significantly proportional to the firm's size.

Control variable Risk is negatively and significantly associated with the price to book value under all three estimation techniques.

However, the control variable firm's age and tax to operating profit ratio is negatively but not significantly associated with the price to book value under all the three regression estimation techniques used here.

Substituted Coefficients:

==========

PBV = 9.71896065738 + 0.194306174795*DER - 0.038667645481*DTFA + 1.59866127939*SIZE + 0.385391498933*TATOR + 1.08565012576*GROWTH - 0.197168744857*TAX_EBIT - 5.21631593774*RISK - 5.26700401554*AGE

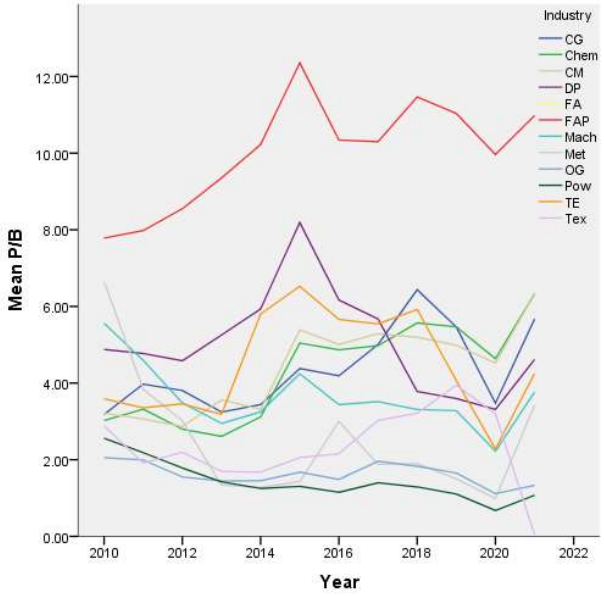

Figure 0:2 Year-wise Chart of profitability ratio *(P/B)*

Model – 3: Tobin's Q as the proxy for the firm's valuation

In this model, Tobin's Q ratio has been used as a proxy for a firm's valuation ratio. In this panel data regression model, variable Tobin's Q is taken as a dependent variable and all the eight independent variables (explanatory and control variables) are the same as the earlier one.

The above relationship has been tested with the help of Panel data econometric techniques.

Method: Panel Least Squares

Estimation Equation:

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TOBIN_S_Q = C(1) + C(2)*DER + C(3)*DTFA + C(4)*SIZE + C(5)*TATOR + C(6)*GROWTH + C(7)*TAX_EBIT + C(8)*RISK + C(9)*AGE

Table 0-3 Regression Model Estimates: Impact of Capital Structure on Firm's Valuation (Tobin's Q)

Valuation (Tobin's Q)

Variables	Regression Coefficient		
	Pooled OLS	Fixed effect	Random effect
C	-0.935981	-32.82809	1.1918
	(0.7139)	(0.2168)	(0.6678)
DER	0.201549	0.269451	0.22114
	(0.0401)	(0.0106)	(0.0218)
DTFA	1.799698	1.322842	1.7964
	(0.0005)	(0.0755)	(0.0003)
SIZE	-0.260156	3.522643	-0.35975
	(0.0538)	(0.0063)	(0.0124)
TATOR	0.744761	-1.075982	1.1397
	(0.0598)	(0.4583)	(0.0088)
GROWTH	1.601029	1.268417	1.5282
	(.000)	(.000)	(.000)
TAX_EBIT	0.611141	0.29216	0.65164
	(0.0656)	(0.4)	(0.0469)
RISK	-1.455611	-4.909831	-1.37881
	(0.0001)	(0.4265)	(0.0001)
AGE	0.289348	1.324049	-0.11071
	(0.5905)	(0.8492)	(0.8443)
R-Squared	0.782026	0.843261	0.812786
Adjusted R-Squared	0.767849	0.798698	0.781026
F-statistic	55.16087	18.9229	25.59185
	(.000)	(.000)	(.000)
Durbin-Watson stat	2.02364	2.073238	2.012395
Akaike info criterion	3.557504	3.54589	
Schwarz criterion	3.754059	4.201073	
Hannan-Quinn Criterion	3.637375	3.812126	
Hausman Test Chi-Sq. (χ^2)/P Value			15.29171
			(0.0537)
Cross-sections included	11	11	11
No. of observations	132	132	132

Table 4-21 shows the side-by-side results of the pooled OLS, Panel data fixed effects and panel data random effects estimations for financial leverage, Debt to Equity ratio (DER) and Debt to Fixed Assets Ratio (DTFA) and six control variables, firm's size, asset turnover, growth, tax to operating profit, risk, and age on valuation ratio 'Tobin's Q'. First, the Hausman test is applied to determine whether to select fixed effect estimates or random effect estimates. The Hausman test results (χ^2=15.2917 and P value = .0537) accept the null hypothesis of using the panel data random effect model and supports the random-effect model.

From the Model Summary and ANOVA table 4-21, The F ratio value (25.592) shows that the multiple correlation coefficients are statistically significant at a 1 percent level of significance. Hence, it is concluded that Panel Regression Model – Random Effect is statistically significant and perfectly fit.

The R^2 (Coefficient of determination) value is 0.813 and the adjusted R^2 value is 0.781, as shown in Table 4-21 this indicates that 81.3% of the regression model is explained by all the eight predictor variables taken together. This shows

that the results of the regression analysis on the impact of capital structure on valuation ratio (Tobin's Q) in the majority are consistent with the various research studies.

Also, the impact of multicollinearity on the regression model is not present because the difference between R^2 value and the adjusted R^2 value is negligible. Effect of multicollinearity is also obtained from the collinearity statistics test (variance inflation factor, VIF) which is evident in Table No 4-14. From the table, it is found that the VIF of all the parameters (varies from Min: 1.024 to Max: 1.815) which are well below the critical level of 5. So, the overall impact of multicollinearity on the regression model is very much insignificant.

Durbin-Watson test from the above Table 4-21 shows that the effect of autocorrelation on the regression is very insignificant (the value of the Durbin-Watson test is 2.0124 which indicates that serial correlation is not present.

The empirical analysis of Model – 6,

The empirical analysis using three estimation techniques (pooled, fixed effect, and random effect) is depicted in Table 4-21, and it has been found that the regression coefficient of variable debt equity ratio (DER) has positive values of .2015, .2694 and .2211 under the above three estimation techniques respectively. It can also be seen that the Probability value of the t-statistic under all three estimation methods is less than 0.05. Therefore, the null hypothesis stating that there is no significant impact of debt-equity ratio on return on Tobin's Q has not been accepted and hence we concluded that the debt-equity ratio is significantly and positively impacting Tobin's Q valuation ratio.

The regression coefficient of variable debt to fixed asset ratio (DTFA) has positive values showed in Table 4-21 is 1.7997, 1.3228, and 1.7964 under pooled, fixed effect, and random effect respectively. It can also be seen that the Probability value of the t-statistic under all three methods is less than 0.05; therefore, it is also statistically significant.

Control variables' growth opportunity is positively and significantly related to Tobin's Q value under all three estimation techniques.

Control variable firm's size is negatively and significantly associated with Tobin's Q ratio under pooled and random effect. However, it is positively and significantly associated with Tobin's Q value under the fixed effect technique. Since the Hausman test supports the random-effect model, it is clear that the valuation ratio (Tobin's Q) is inversely and significantly related to the firm's size.

Control variable total asset turnover ratio is positively and significantly associated with Tobin's Q ratio under random effect; positively but not significantly associated with Tobin's Q ratio under pooled regression technique. However, it is negative but not significantly associated with Tobin's Q value under the fixed effect technique. Since the Hausman test supports the random-effect model, it is clear that the valuation ratio (Tobin's Q) is directly and significantly related to the asset turnover ratio.

The tax to operating profit ratio is positively associated with Tobin's Q value under all three estimation techniques. However, it is statistically significant under the random effect model.

Control variable Risk is negatively and significantly associated with a price to Tobin's Q ratio under all the estimation techniques barring fixed effect where it is not found to be significant.

However, the control variable firm's age is positively but not significantly associated with Tobin's Q value under all the three regression estimation techniques used here barring random effect where it is negatively associated but not found to be statistically significant.

Substituted Coefficients:

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TOBIN'S Q = 1.1918 + 0.22114*DER + 1.7964*DTFA – 0.35975*SIZE + 1.1397*TATOR + 1.5282*GROWTH + 0.65164*TAX_EBIT – 1.37881*RISK – 0.11071*AGE

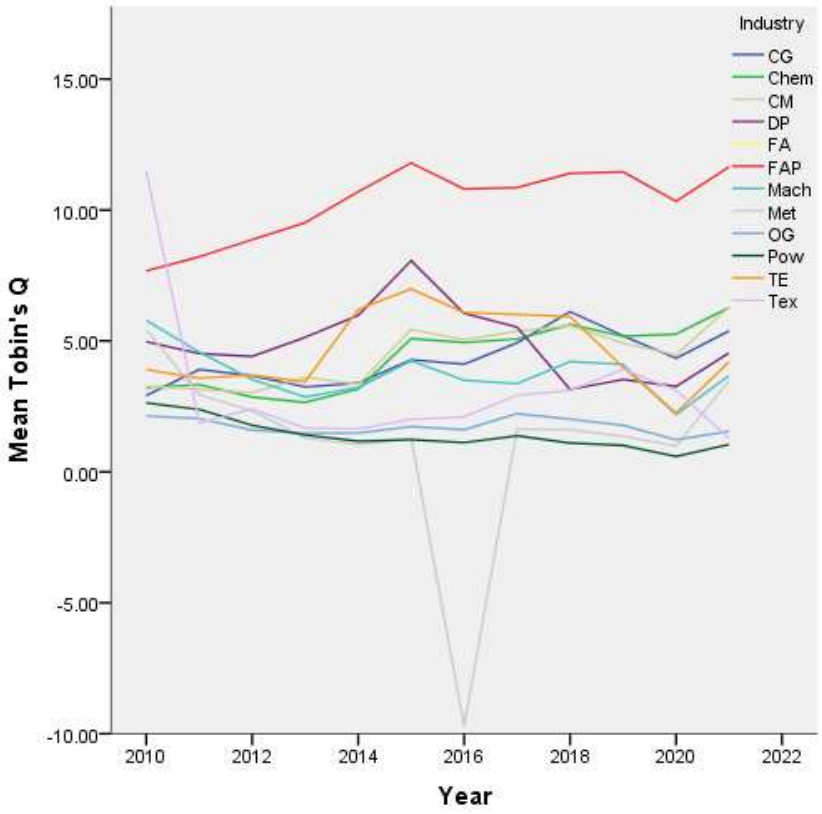

Figure 0:3 Year-wise Chart of profitability ratio (*Tobin's Q*)

7. Summary and Conclusion

7.1 Summary and Findings

The study sought to examine the determinant of capital structure and the effect of capital structure on the financial performance of selected manufacturing companies listed on NSE/BSE. The period of the study comprises twelve years from 2010 to 2021 and the data of a total of 118 manufacturing companies have been analyzed. The collected data was entered into the SPSS/E-views and the multiple regression analysis methods were used for analyzing and testing hypotheses. Enterprise value to cash operating profit ratio, price to book value ratio, and Tobin's Q have been used for evaluating the valuation of selected manufacturing companies.

In addition to this, another six regression models have been developed to analyze empirically the relationship between the firm's performance and leverage level. These models are based on the result of the Hausman test, panel data fixed effect regression methods. This, three regression models have been developed to analyze empirically the relationship between the firm's valuations and leverage level. These models are based on the result of the Hausman test, panel data fixed effect regression methods.

A summary of the key findings is as follows:

7.2 Descriptive Statistics

1. EV to EBDITA ratio is found to be highest for machinery (26.79 times) and lowest for the oil & gas industry (7.65 times).
2. The price-to-book value ratio (P/B) is found to be highest for food and Agro-processing (9.98 times) and lowest for the power (1.43 times) sector.
3. Tobin's Q is very high in the case of food and Agro-processing (10.22), and very low in the case of the power (1.4) industry.

7.3 Correlation

1. The firm's size, Altman Z score, and Liquidity are not significantly, negatively, and very weakly correlated (-0.011, -0.025, and -0.032 respectively) to BLEV;
2. Tangibility and firm size are positively, significantly, and weakly correlated (0.188).
3. Profitability and NDTS are positively, significantly, and weakly correlated (.370).

4. Growth and profitability are positively, significantly, and moderately correlated (0.430).
5. Growth is positively, significantly, and very weakly correlated with NDTS (0.055).
6. Growth is negatively, significantly, and weakly correlated with tangibility (-0.138).
7. Altman Z score is negatively, significantly, and weakly correlated with the firm's size (-.103) and tangibility (-0.082).
8. Altman z score is positively, significantly, and weakly correlated with growth opportunity (0.202).
9. Liquidity is positively, significantly, and strongly correlated with distance from bankruptcy i.e., Altman z score (0.878).
10. Liquidity is negatively, significantly, and weakly correlated with a firm's size (-.135) and tangibility (-.111).

7.4 Valuation Models

1. Enterprise value to cash operating profit ratio (EV/ EVDITA) is positively associated with debt to total fixed asset ratio, growth opportunity, and risk, and EV/EVDITA is negatively associated with, debt equity ratio, asset size, asset turnover, tax to operating profit (TAX/EBIT) ratio, and age.
2. Market price to book value ratio (P/B) is positively associated with firm size, asset turnover, growth opportunity, risk, tax to operating profit (TAX/EBIT) ratio, and age, and it is negatively associated with, debt equity ratio, and debt to fixed asset ratio.
3. Tobin's Q ratio is also positively associated with firm size, asset turnover, growth opportunity, risk, tax to operating profit (TAX/EBIT) ratio, and age, and it is negatively associated with, debt equity ratio, and debt to fixed asset ratio.
4. It is also evident that there is a strong positive and significant association between portfolio parameters and valuation parameters.
5. It has been observed that older & larger firm sizes having higher asset composition (more fixed assets), and larger ownership structure are well equipped to handle greater business risk and are more comfortable with financial leverage.
6. The valuation ratio (EV/EBDITA) is inversely and significantly proportional to the debt-equity ratio
7. The valuation ratio (EV/EBDITA) is inversely and significantly proportional to the debt to fixed asset ratio.
8. The total asset turnover ratio is inversely related to ev/ebdita under all three estimation techniques.
9. Growth is positively and significantly associated with EV/ EVDITA
10. The firm's size and tax to EVDITA are negatively but not significantly associated with EV/ EVDITA
11. Risk is negatively but not significantly associated with EV/ EVDITA
12. A firm's age is negatively and significantly associated with EV/ EVDITA
13. The debt-equity ratio is significantly and positively impacting the price-to-book valuation ratio.
14. The valuation ratio (P/B) is inversely and not significantly proportional to the debt to fixed asset ratio.
15. Total asset turnover ratio and growth are positively and significantly related to price to book value (P/B)
16. The valuation ratio (P/B) is directly and significantly proportional to the firm's size.
17. Risk is negatively and significantly associated with the price to book value
18. A firm's age and tax operating profit ratio is negatively but not significantly associated with the price to book value
19. The debt-equity ratio is significantly and positively impacting Tobin's Q valuation ratio.
20. Growth opportunity is positively and significantly related to Tobin's Q value
21. The valuation ratio (Tobin's Q) is inversely and significantly related to the firm's size.
22. The valuation ratio (Tobin's Q) is directly and significantly related to the asset turnover ratio.
23. Tax to operating profit ratio is positively associated with Tobin's Q value
24. Risk is negatively and significantly associated with the price to Tobin's Q ratio

7.5 Summary, Conclusion, and Policy Recommendation

This study is a further attempt by the researcher to empirically investigate the impact of leveraging decisions on the firm value of some chosen manufacturing businesses. The influence of variance in capital structure on the variation in the performance of the firms in terms of some valuation ratios was also estimated in this case using balanced panel regression. The model's significance was examined using the F test, whilst the significance of the association between the dependent and independent variables was examined using the t-test. To distinguish between the fixed and random effects in the models, Hausman's specification test was also applied.

Various proxy measures were used as a measure of financial performance in terms of the Firm's valuation namely EV/EBDITA, P/B, and Tobin's Q. While debt equity ratio (DER) and debt to fixed assets ratio (DTFA) were used as measures of capital structure along with six control variables. The result depicts that there exists a relationship between

firms' capital structure and the valuation of selected manufacturing firms. However, the two measures of capital structure (DER & DTFA) had a different impact on different measures of valuation.

Enterprise value to cash operating profit ratio (EV/EBDITA) is positively associated with debt to total fixed asset ratio, growth opportunity, and risk, and EV/ EVDITA is negatively associated with, debt equity ratio, asset size, asset turnover, tax to operating profit (TAX/EBIT) ratio, and age. Adjusted R-Squared = 0.64799, F-statistic = 7.1867, p-value = .000; this indicates that 64.80% of regression model is explained by all the eight predictor variables taken together.

Market price to book value ratio (P/B) is positively associated with firm size, asset turnover, growth opportunity, risk, tax to operating profit (TAX/EBIT) ratio, and age, and it is negatively associated with, debt equity ratio, and debt to fixed asset ratio. Adjusted R-Squared = 0.96014, F-statistic = 109.797, p-value = .000; this indicates that 96.01% of regression model is explained by all the eight predictor variables taken together.

Tobin's Q ratio is also positively associated with firm size, asset turnover, growth opportunity, risk, tax to operating profit (TAX/EBIT) ratio, and age, and it is negatively associated with, debt equity ratio, and debt to fixed asset ratio. Adjusted R-Squared = 0.7987, F-statistic = 18.9229, p-value = .000; this indicates that 79.87% of regression model is explained by all the eight predictor variables taken together.

Lastly, it has been concluded that capital structure makes a significant impact on the business valuation of Indian manufacturing firms. Thus, every corporate should make superior financing, investment, and capital structure decision to enhance the firm's economic and market value.

7.6 Recommendation and Scope of Future Research

During the study period, the profitability of some of the firms was found to be very very volatile and, in some cases, and for some years it is negative. Therefore, it is suggested that the firms must try to earn profit in the subsequent years otherwise there may arise a condition of financial distress which may, ultimately, lead to bankruptcy.

It is also evident from the empirical findings that there is a strong positive and significant association between portfolio parameters (ROA, ROE, and ROCE) and valuation parameters (EV/EBDITA, P/B, and Tobin's Q). That is higher profitability will ultimately lead to a higher valuation for the company and thereby leads to amassing more wealth for their shareholders.

It has also been observed that older & larger firm sizes having higher asset composition (more fixed assets), and larger ownership structures are well equipped to handle greater business risk and are more comfortable with financial leverage.

This study is useful for managers in the corporate world. The managers have to consider the above factors before making any decisions for improving the operating and financial performance of the company.

7.7 Limitations of the study

This study may be said to be constrained by the following limitations:

(1) The findings of this study could only be generalized to Indian manufacturing firms similar to those firms and industries that were included in this research. Therefore, the results may not represent the impact on other sectors of the Indian economy.

(2) This study is limited only to a period of 12 years ranging from the year 2010 to the year 2021. To get a more convincing and precise result, the time-series data collected should cover a longer period.

(3) This study has used only a limited number of statistical parameters. So, a few more new variables for company performance and capital structure can be captured in the model to obtain all-inclusive results.

(4) Few companies included in the selected sample sets have followed different accounting policies, thereby influencing the accuracy of the results to some extent.

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