DETERMINANTS OF OPTIMAL CAPITAL STRUCTURE OF NSE LISTED MANUFACTURING COMPANIES IN INDIA

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Abstract: The study aimed the factors determining the capital structure of firm characters and macro-economic characters of manufacturing firms in India. The study is confined 39 firms listed in NSE 50 index. The study has confined cross section and time series nature and has analyzed the dynamic panel data with GMM model. The study find a significant association between leverage changes and change in assets changes (tangibility), firm size, non-debt tax shield, growth, GDP and business risk. However, there is no significant difference in the association between leverage and liquidity and profitability throughout the sample period. For instance, the link between leverage and firms size is stronger significant factor because can availed more external funding sources with the support of firms size. The study findings also suggest that companies with firms specific characters changed their capital structures more quickly toward long-term leverage position within a short span of period. GDP growth has positive, significant influence towards capital structure; it means positive economic environment characterized by an increase in GDP allows companies to adjust their capital structure more quickly. The results show that the leverage, implying Indian corporate may face higher external financing costs and adjustment costs when they need to raise funds.

Keywords: Capital Structure, Dynamic GMM, Leverage, Profitability, Speed adjustment (SOA).

Introduction

The capital structure of a firm is the ratio of debt to equity that allows it to optimise market value. There have been many notable studies conducted over the years that have developed theories, such as the trade-off theory, agency theory, net income approach, and Modigliani and Millers irrelevant theories, to determine the ideal capital structure that aids in explaining corporate entity financing decisions. The firm's mix of debt and equity serves to enhance and achieve the goal of increasing shareholder wealth. In this regard, decisions regarding the capital structure will impact the firm's value. Numerous factors, including internal firm-specific characteristics and external macroeconomic and financial market factors, have been identified in the literature as contributing to the adjustment of capital structure (Jensen & Meckling, 1976) . While researching capital structure decisions, it became clear that internal company features play a substantial role in how corporate firms choose to finance themselves. When a company periodically modifies its leverage ratio based on how well it is performing operationally, it has a completely different capital structure than one that does not. In this regard, decisions regarding the capital structure will impact the firm's value. The corporate debt policy looks into the elements that go into increasing and maximising business value. The theoretical and empirical research on the effective modification of long-term loan capital, however, can increase shareholder wealth. Thus, the capital structure has always been a major, challenging, and central issue in corporate finance. The theories of capital structure began with Modigliani and Miller's key work (1958, 1963), which postulated that capital structure was irrelevant for valuing a company both with and without a tax benefit. According to current views, financing the owner or borrowing money both incur costs. Some businesses don't formally plan their capital structures; instead, they emerge as a result of the financial choices made by the finance management (Alhazaimeh, Palaniappan, & Almsafir, 2014; Palaniappan, 2019). The investments that boosted income, which were made with either owner or borrowed money, are what drive a company's growth. The worth of a company is determined by such long-term investments. However, in addition to the investment's anticipated future cash flows, this value is also influenced by the price paid for those funds. Decisions on financing are reactive and change as a result of operational choices. These companies may do well in the near term, but they may eventually have a lot of trouble raising money to fund their operations. With an ad hoc capital structure, these businesses frequently find it difficult to maximise the utilisation of their resources. Consequently, determining the ideal capital structure is one of the crucial responsibilities managed by the finance manager.

Literature Reviews

Serrasqueiro, Matias, & Diéguez-Soto, (2022) analyzed the family firm's capital structure decisions, focusing on the speed of adjustment (SOA) with the effect of distance from the target capital structure. Dynamic panel data estimators has been used to estimate the effects of distance on the speeds of adjustment towards those targets. As a result, family businesses avoid the target debt ratios for a longer period of time than do non-family businesses (Serrasqueiro, Matias, & Diéguez-Soto, 2022). The anti-corruption campaign's influence on capital structure decisions for Chinese listed companies is examined by Wu & Liu (2022) utilising investigations of senior officials from 2007 to 2019. The study's findings, which are in line with the knowledge that a purified political ecology aids in reducing financial resistances in the capital market, show that an anti-corruption effort has a favourable impact on the firm's speed of leverage adjustment. According to additional data, the anti-corruption campaign minimises departure from the ideal capital structure, makes it easier to obtain outside finance, and raises executive incentives (Wu & Liu,

2022).Adhegaonkar (2021) used statistical methods to examine the capital structure behaviour of BSE-listed engineered products businesses with consumer sector enterprises for the research period between 2007 and 2017. Lagged debt to total capital and tangibility were shown to be statistically significant predictors of capital structure, and these findings imply that finance managers disagree on key determinants of capital structure in both industries. (Adhegaonkar & E.B, 2021). The applicability of the trade-off, pecking order, and market timing theories of capital structure with Islamic equities in Indonesia context was examined by Narayan, Phan, Liu, and Ibrahim (2021). The study's findings, which are in line with the trade-off hypothesis, showed that the leverage speed of adjustment (SOA) was faster than for an ordinary stocks. The risk-sharing principle of Islamic investments, which significantly decreases market flaws, was also postulated by the capital market. The SOA is unaffected by the addition of variables from other capital structure theories, highlighting the significance of the trade-off theory. (Narayan, Phan, Liu, & Ibrahim, 2021). Trejo-Pech, Kyaw, & He (2021) used partial adjustment capital structure models to investigate the capital structure adjustment behaviour of publicly listed Mexican companies. In this approach, firm reverts its observed leverage towards target leverage. A firm's worth increases in direct proportion to how quickly it can reverse its leverage when startled away from objective witheconomic conditions as indicated by risk premium, GDP related market capitalization, and country's inflation position (Trejo-Pech, Kyaw, & He, 2021). Using the dimensions of the dynamic trade-off theory, Hussain, Ali, Hassan, and El-Khatib (2020) investigate the impact of equity mispricing of Malaysian enterprises from the years 1998 to 2016. The rate of adjustment is slower for businesses below target levels and when stock is underpriced than for non-compliant enterprises. The findings imply that managers have a propensity to time the stock market when it is above goal levels in order to benefit from lower equity costs when equity is overvalued. However, even in the event of stock under-pricing, those managers tend to be reluctant to turn to debt financing when leverage is below goal. (Hussain, Ali, Hassan, & El-Khatib, 2020). Yukti, Smita, & Shveta, (2020) investigate the dynamics of capital structure whether adjust the trade-off behaviour of different macro-level factors of firms in China and India. Firms listed on the National Stock Exchange and Shanghai Stock Exchange over the period of 2009-2018 are used for the study. System generalized method of moments is deployed due to the use of dynamic short panel data. Indian firms revert to their target leverage ratios at a higher rate as compared to Chinese firms. Further, the inflation rate, bond market and stock market development are significant factors impacting leverage in the case of India, whereas bond market development significantly impacts leverage in the case of China. These results are robust across various definitions of leverage and other firm and institutional control variables. (Yukti, Smita, & Shveta, 2020)

Rani, Yadav, & Tripathy, (2020) examined the capital structure determinants and speed of adjustment (SOA) toward the target capital structure of firms. The empirical results provide evidence, which supports trade-off theory, agency theory and pecking order of capital structure. The study concluded that variability in SOA could be the macroeconomic ambiance, tax systems, corporate governance practices and institutional differences on decisions related to adjustments in the capital structure. (Rani, Yadav, & Tripathy, 2020) By taking into account pricing-kernel ambiguity brought on by market incompleteness, Ban & Chen (2019) investigated how uncertainty aversion influences businesses' capital structure adjustment strategy. In the model, managers have a pessimistic view of the risk-adjusted projected EBIT growth rate, which affects default (restructuring) likelihood in an upward (downward) manner. The leverage inertia conundrum is solved by this crucial characteristic, which causes enterprises to exhibit a weaker propensity to correct leverage while opting for a slower speed and smaller magnitude of adjustment. Leverage decision is only little impacted by dynamic restructurings under ambiguity aversion. In comparison to dynamic restructurings, ambiguity aversion is a better explanation for the low-leverage dilemma. (Ban & Chen, 2019) Coldbeck & Ozkan, (2018) investigated the dynamics of target research and development and capital investment using a large sample of US firms during the period 2002–2016. A partial adjustment approach is employed with a specific focus on the impact of the financial crisis on target adjustment speed. Evidence suggests that firms have a target in both types of investment and adjust to it at varying speeds. The results, however, show that the higher adjustment speeds for R&D firms during and after the crisis period are observed in firms with the ability to issue equity capital and those with greater cash balances. (Coldbeck & Ozkan, 2018). The asymmetries in capital structure adjustment speed depending on firms' affili ation to business groups. Using partial adjustment framework on a dataset of 2001 listed Indian non- financial firms over the period of 2005–2013, it was found that Indian firms annually adjusted about 37 percent of their deviation from target leverage. The study results are persistent irrespective of firms' extent of deviation from their target leverage. However, the net benefits of adjustment and consequently the adjustment speed for both the groups of firms, irrespective of their extent of deviation from target leverage, seem to be alike, when they are over-levered and lower for group firms than the stand-alone firms, when they are under-levered. These findings helpful for financial managers in designing their capital structure based on ownership structure, and the nature and extent of deviation from the target leverage. (Ghose & Kabra, 2018). The debt and equity issuance and capital structure adjustment speed of Korean firms. The trade-off hypothesis states that enterprises must alter their capital structures in order to reach their ideal capital structures and maximise value. In addition, several financial measures and book and market-based debt ratios were utilised in the study.(Lew & Lim, 2018). The optimal capital structure in financial markets, demonstrating that the market's degree of development is crucial for reducing transaction costs. Additionally, tangibility of assets, non-debt tax shelter, growth potential, business size, profitability, and inflation have a big impact on the ideal capital structure of Nigerian enterprises.(Ahmad & Etudaiye-Muhtar, 2017)

Baum, Caglayan, & Rashid, (2017) demonstrated the study also shows that businesses with financial surpluses and leverage that is over target may change their leverage more quickly in macroeconomic circumstances with both low and high risk. Firms with financial deficits and below-target leverage quickly alter their capital structures when both risk categories are at a minimum. (Baum, Caglayan, & Rashid, 2017). Brisker & Wang, (2017) demonstrated the agency problem provides some insight into relationship between managerial inside debt and firm leverage in risk preference between the CEO and shareholders that in turn affects the firm's capital structure decisions.(Brisker & Wang, 2017). Buvanendra, Sridharan, & Thiyagarajan, (2017) This explored the most important determinants of speed of adjustment (SOA) towards optimum / target capital structure of listed firms in Sri Lanka and India for the period 2004 to 2013. Ten independent variables comprising both firm specific and corporate governance factors have been tested using dynamic adjustment model. Furthermore, there are international differences existing in the significant

determinants of capital structure adjustments between Sri Lanka and India. (Buvanendra, Sridharan, & Thiyagarajan, 2017). Ghose, (2017) explored firms' capital structure dynamics and ownership structure are two extensively studied subjects of research in corporate finance in recent years. It specifies a partial adjustment model and uses the generalized method of moments (GMM) technique to estimate the adjustment speed. The results show that Indian manufacturing firms close about 30 percent of their leverage gap every year. The relationship between target capital structure and its determinants remains the same irrespective of firms' affiliation status to business groups. (Ghose, 2017) . Sardo & Serrasqueiro, (2017) analysed the capital structure decisions of small- and medium-sized Portuguese firms are in accordance with the predictions of dynamic trade-off theory, more precisely, the speed of adjustment of short-term debt (STD) and long-term debt (LTD) towards the respective target debt ratios. Small- and medium-sized firms present a high-speed adjustment towards the target STD ratio suggesting that both types of firm face costs of deviating from the target capital structure, which are, probably, greater than the costs of adjustment associated with STD. However, considering the distance from the target ratio as a determinant of the adjustment speed, the results show the predominance of the negative effect of the costs of adjustment on capital structure adjustment speeds. (Sardo & Serrasqueiro, 2017)

The capital structure studies examined the various aspects of financing decisions and contradictory testimony about financing behaviour exist in the literature. The lack of consensus about capital structure theory necessitates to investigate capital structure behaviour and capital structure studies with respect to optimum capital structure are very limited available in Indian context.

Hypothesis Development

The relationship between profitability and its drivers can be seen via the examination of genuine studies that have been conducted all around the world. The literature typically contains information on the elements that influence a company's profitability. All of these elements are equally prevalent among researchers. Furthermore, an effort is made to build a model that takes into account both variable adjustment and the elements that influence the desired capital structure. By evaluating the benefits of debt, such as tax sheltering, against the potential drawbacks of debt, such as financial trouble, the appropriate capital structure for the company can be determined. A higher debt level should be used to control management behaviour because rising free cash flows for the company must also lead to higher profitability and agency costs of equity. Different arguments in support of the dominant capital structure theories are represented by a number of significant determinants that have been identified in the literature as having an impact on capital structure decisions. These have been recognized as the primary drivers of leverage and include non-debt tax shield (NDTS), tangible assets, liquid assets, firm size, growth, and gross domestic product. These variables are among those that are regularly used into empirical capital structure studies.

Table.1 Variable Construction

Sl.No	Variable	Symbol	Computation
1	Capital structure	LDTR	It is measured by long-term debts to total assets
2	Profitability	PROFIT	The ratio between Earnings Before Interest and Tax by the book value of Total assets
3	Firm Size	SIZE	Natural logarithm of total assets
4	Tangibility	TAN	The ratio of fixed assets to book value of Total assets
5	Growth opportunities	GROWTH	Growth is defined as the natural logarithm of sales turnover
6	Business Risk	RISK	It measures the volatility of profitability (standard deviation of EBIT)
7	Non-debt tax shield	NDTS	The ratio of depreciation by the book value of total assets
8.	Liquidity	LIQ	It is measured by current assets divided by current liabilities
	Gross Domestic Product	GDP	It is measured by the economic indicators of India's overall growth.

Methodology

Companies that are listed on the National Stock Exchange are limited (NSE). The National Stock Exchange of India Limited, headquartered in Mumbai, is India's leading stock exchange. The NSE is India's first demutualized electronic exchange, with a total market value of more than US$3 trillion, ranking it among the top ten largest stock exchanges in the world. The NSE NIFTY 50 index, which is the National Stock Exchange of India's benchmark broad-based stock market index for the Indian equity market, is used as the study's sample frame. A total of 39 listed companies were chosen using a random sample procedure. Banking and financial companies were restricted and omitted from the study because their obligations and control over the firms differed significantly from those of other corporate entities. Period of the study from 2010-2011 TO 2019-2020 (10 Years). The generalised method of moments (hereafter "GMM") estimate approach developed by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond has been used in the study (1998).

Descriptive and Diagnostics Analysis

Table 1 provides the descriptive statistics for explanatory variables used in the target estimation model separately for the sample firms. Table 2 presents the descriptive statistics of variables used in the determinants of capital structure 39 non-financial firms in NSE listed firms in India during the study period from 2010-2011 to 2019-20. The analysis shows that the capital structure determinates predicted through the mean value of profitability (Return on Assets) is 0.122 times, median of 0.072 times which is ranged from -13.068 to 7.056 with the standard deviation of 1.020. The analysis shows that the capital structure determinates

predicted through the mean value of profitability (Return on Equity) is 0.189 times, median of 0.137 times which is ranged from -13.068 to 6.800 with the standard deviation of 1.261.

Table.2 Descriptive Statistics

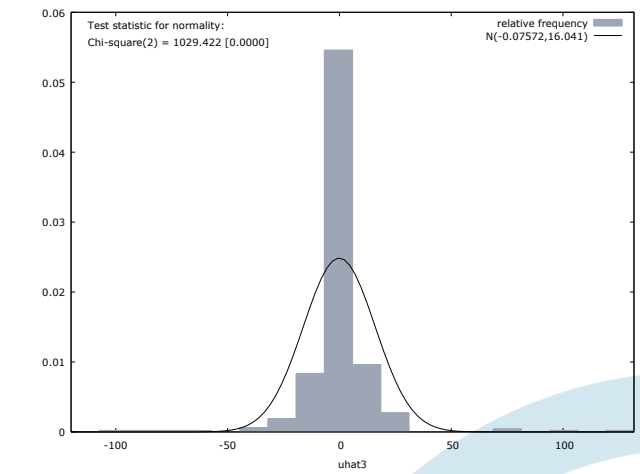
Variable	Mean	Median	Min	Maxi	Std. Dev.	C.V.	Skewness	Ex. kurtosis
Return on Assets	0.122	0.072	-13.068	7.256	1.020	8.383	-5.545	92.976
Return on Equity	0.186	0.137	-21.049	6.800	1.261	6.766	-11.701	205.620
Tangibility	0.432	0.284	0.022	3.258	0.454	1.053	2.971	12.152
Liquidity	1.691	0.742	0.018	16.119	2.481	1.468	2.693	7.950
Firm Size	4.642	4.356	2.536	8.916	1.156	0.249	0.838	0.530
Growth	0.045	0.026	0.001	0.977	0.071	1.570	7.468	80.503
NDTS	4.579	4.381	2.204	7.383	0.999	0.218	0.570	-0.141
Business Risk	0.129	0.020	0.001	13.223	0.816	6.320	13.561	196.900
GDP	6.078	6.458	4.398	7.926	0.159	2.618	0.896	72.384
LT DEBT RATIO	2.574	2.150	0.000	140.560	12.170	4.727	7.937	70.926
ST DEBT RATIO	0.381	0.322	0.000	3.384	0.278	0.730	4.084	35.819
Book Leverage	2.384	0.144	0.000	104.280	10.233	4.293	7.378	62.757
Market Leverag	0.612	0.483	0.000	3.203	0.462	0.755	2.101	6.400

The mean and median value of Tangibility is 0.432 and 0.284 times respectively, it's ranging from 0.022 to 3.252 with a standard deviation of 0.454. The liquidity which explains the mean value is 1.691 times, the median of 0.742 times, the minimum is 0.018, and the maximum of 16.119 with the standard deviation is 2.481. The mean and median value of Firm size is 4.642 and 4.356 respectively, its ranges from 2.536 to 8.916 with a standard deviation of 1.156. The mean and median values of growth of the firm are 0.045 times and 0.026 times respectively, its ranges from 0.001 times and 0.977 times with a standard deviation of 0.071 times. The mean and median value of NDTS is 4.579 times and 4.381 times respectively, its ranges from 2.204 times to 7.38 times with a standard deviation of 0.999 times. The mean and median value of the Business risk is 0.129 times and 0.020 times respectively, its ranges from 0.001 times to 13.233 times with a standard deviation of 0.816 times. Finally, the mean and median value of the Gross Domestic Product (GDP) is 6.078 times and 6.458 times respectively, its ranges from 4.398 times to 7.926 times with a standard deviation of 0.159 times.

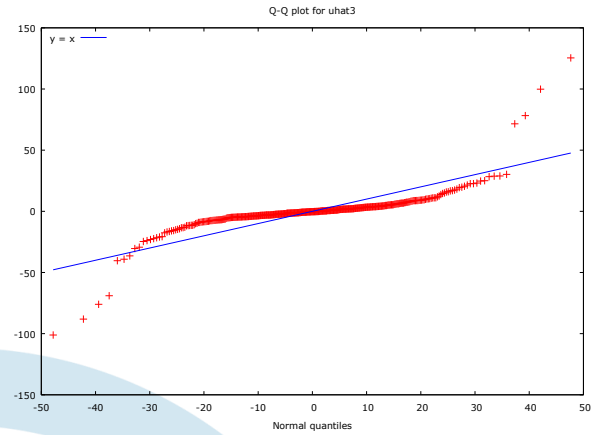
The long-term debt ratios mean and median values are 2.574 times and 2.150 times respectively, its ranges from 0.000 times and 140.560 times with a standard deviation of 12.170 times. The short-term debt ratios mean and median values are 0.381 times and 0.322 times respectively, its ranges from 0.0001 times and 3.384 times with a standard deviation of 0.278 times. The book leverage ratios mean and median values are 2.384 times and 0.144 times respectively, its ranges from 0.000 times and 104.208 times with a standard deviation of 4.293 times. Finally, the market leverage ratios mean and median values are 0.612 times and 0.483 times respectively, its ranges from 0.000 times and 3.203 times with a standard deviation of 0.462 times.

Histogram: The study needs and accesses the normality with the help of the histogram and the standardized residues. Histogram indicated that the standardized residuals are approximately a normal distribution of the selected regression models which are shown in the chart.

Normal P-P plot: Using standardized residuals Q-Q plot of the variable to test the homoscedasticity and normality assumptions. The diagram shows that it is not a trend concerning the error of this multiple regression analysis.



Histogram



Q-Q Plot Residual

1.1 Dynamic Panel GMM Regression Analysis

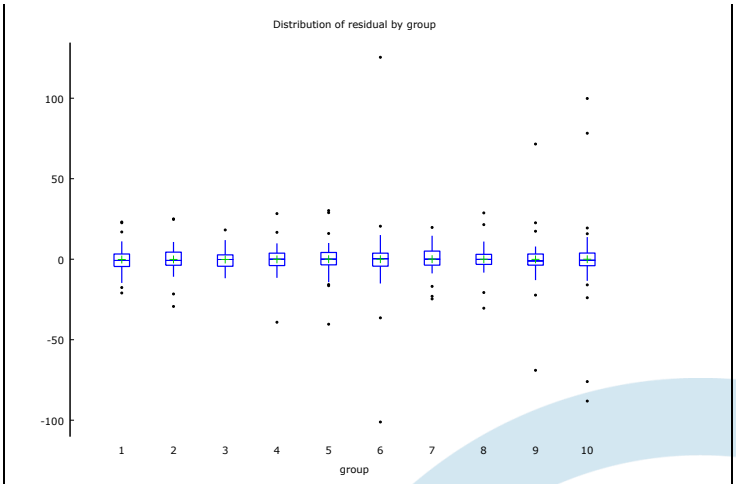
This method allows for dynamic specification and is applied as the explanatory variables (Liquidity, Profitability, Tangibility, Firm size, NDTS, Growth, Risk and GDP) are likely to have an unobserved lagged effect on the dependent variable (LTDR, STDR, BLEV, MLEV). Each of these models is estimated using the GMM proposed by Arellano and Bond (1991). Sargan test applied on these models confirms that the diagnostics were satisfactory and accepted. The dynamic panel regression analysis of the long-term debt ratio with the explanatory variables is shown in Table 2. To check for potential misspecification of the models, tested for lack of second-order serial correlation in first-difference residuals. The results obtained did not allow to rejection of the null hypothesis [Test for AR (2) errors: z is -0.9439 [0.3452] - Not significant – H0 Accepted] of the absence of second-order serial correlation between the errors. However, because of the transformation, there was no lack of first-order serial correlation (LTDR_1) [Test for AR (1) errors: z is -2.07107 [0.0000] - Significant – H0 Rejected] in the differenced residual, although the errors in the model in levels were not serially correlated.

Hence, the study rejected the null hypothesis of the absence of correlation between the instruments and the error term of Sargan's test of over-identifying restrictions (347.709 [0.1292] – Significant). The study also shows the two contrasts of Wald's test. The former null hypothesis checks the joint significance of the explanatory variables 404.002 [0.0000]– Significant], whereas the second one checks the joint significance of the time dummies. Both results of Wald's test validated the proposed partial adjustment model using has no-time dummies.

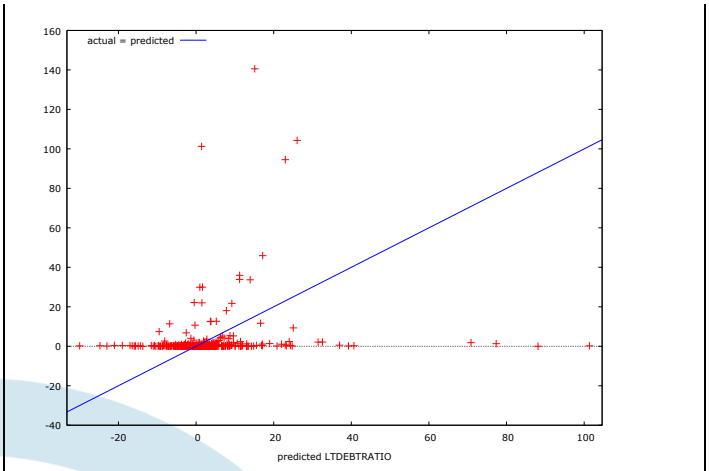
Table 2: Determinants of Long-Term Debt Ratio- Dynamic Panel System Regression Analysis

(Model 1: 1-step dynamic panel, using 390 observations - Dependent variable: LTDR)					
	Coefficient	**Std. Error**	**z**	**p-value**	**Sig.**
LTDR (-1)	−0.05462	0.0180	−3.032	0.0024	***
const	0.0425	0.0253	1.681	0.0928	*
Liquidity	0.0456	0.1422	0.317	0.7509	NS
Profitability	0.2501	0.2155	1.160	0.2459	NS
Tangibility	9.4545	3.9422	2.398	0.0165	**
Firm size	4.9317	1.4670	3.361	0.0008	***
NDTS	−23.2576	9.1089	−2.553	0.0107	**
Growth	−4.5228	1.2113	−3.732	0.0002	***
Risk	0.2138	0.2402	0.887	0.3748	***
GDP	0.3795	0.3097	1.9879	0.0361	**

Test for AR(1) errors: z	-2.07107 [0.0384]	Sargan over-identification test: Chi-square (43)	347.709 [0.1292]
Test for AR(2) errors: z	-0.943942 [0.3452]	Wald (joint) test: Chi-square(8)	404.002 [0.0000]



Box Plot



Actual and Fitted Observations

Source: Computed

This coefficient (0.0922) measures the LTDR (-1), thus implying an adjustment the coefficient of the long-term debt ratio delayed 1 year (1 − α) is significant [z=-3.032, p value <0.0024 – Significant at 1 percent]. The coefficient of liquidity is (0.0456) which shows that direct relationship with capital structure (LTDR) and the test result (z = 0.317, p-value = 0.7509) is statistically not significant. The coefficient of profitability is (0.2501) which indicates that positively related to capital structure and the result (z=1.160, p-value = 0.2459) proved that statistically not significant. The tangibility coefficient is (9.4545) which predicts that a positive relationship with leverage (LTDR) and the test result (z=2.398, p-value = 0.0165) proved that statistically significant at 0.05 level.

The coefficient of firm size value is (4.9317) positively associated with long-term debt ratio but the result (z=3.361, p-value = 0.0008) proved that statistically significant at 0.01 level. The NDTS coefficient is (-23.2576) which predicts that a negative relationship with capital structure and the test result (z=-2.553, p-value <0.0107) is statistically significant at 0.05 level. The coefficient of growth value is (-4.5228) negatively associated with long-term debt ratio but the result (z=-3.732, p-value = 0.0002) proved that statistically significant at 0.01 level. The Risk coefficient value is (0.2138) found direct association with capital structure but the result is [z=0.877, p-value = 0.3748] proved statistically not significant. Finally, the coefficient of a GDP is (0.3795) which indicates that a positive relationship with capital structure but the result (z=1.9879, p value=0.0361) is statistically significant at 5% level.

Conclusion

The study aimed the factors determining the capital structure of firm characters and macro-economic characters of manufacturing firms in India. The study is confined 39 firms listed in NSE 50 index. The study has confined cross section and time series nature and has analyzed the dynamic panel data with GMM model. The study find a significant association between leverage changes and change in assets changes (tangibility), firm size, non-debt tax shield, growth, GDP and business risk. However, there is no significant difference in the association between leverage and liquidity and profitability throughout the sample period. For instance, the link between leverage and firms size is stronger significant factor because can availed more external funding sources with the support of firm size. The study findings also suggest that companies with firm's specific characters changed their capital structures more quickly toward long-term leverage position within a short span of period. GDP growth has positive, significant influence towards capital structure; it means positive economic environment characterized by an increase in GDP allows companies to adjust their capital structure more quickly. The results show that the leverage, implying Indian corporate may face higher external financing costs and adjustment costs when they need to raise funds.

Implications

This study has implications for various stakeholders. The research has a practical implication for regulators, policymakers, and corporate policy makers who need to understand the different capital structure behaviors of Indian firms. The study highlights that development in financial markets and economy impact the financing decisions and should be a cause for concern for the financial managers and policymakers. Thus, managers can use the findings of the study if they desire to maintain their target capital structures for better firm valuation and the policymakers can support them in achieving the same. Even, the investors can make informed investment decisions considering macro-level factors impacting firms' financing choices. The high financing capital costs of situations, need the support of regulators to expand the financing sources by establishing robust financial systems, with the help of enhance debt instruments reduce the financing costs.

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