Capital Structure Choice and the Firm Value in The Indian Automobile Sector: An Empirical Exploration Using Panel Threshold Regression Approach

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ABSTRACT

Over the past 50 years, there have been significant studies conducted on the relationship between capital structure and firm value; however, the outcome of these studies was controversial in the subject of finance; and the findings have sparked debate in the field of finance because theories on the subject predict inconsistent results or no statistically significant relationship. Prior studies of capital structure have often relied on data from developed countries. However, those theories apply to countries other than developed countries that still need to be explored. In order to determine the impact of capital structure on a firm's value, this study identifies whether there is an optimal leverage proportion at which a firm can maximize its value. An advanced panel threshold regression model is applied to test the panel threshold effect of debt ratio on firm value among 93 listed Indian automobile and ancillary firms from 2004 to 2020. The findings indicate a double-threshold effect and show an inverted "U" association between leverage and firm's value. The empirical findings using the portent panel threshold regression model confirm the nonlinear relation and identify the exact turning point of debt effectiveness. Moreover, the findings show that debt positively relates to firm value when it has not reached the threshold value. However, it must be highlighted that increasing debt above the threshold value established in this study will reduce the firm's value. The findings of this study is consonant with the trade-off theory.

Keywords: Optimal capital structure, Panel threshold regression, Firm's value, Trade-off theory

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1. INTRODUCTION

What strategies may a company employ to get its optimal capital structure? According to capital structure theory, the primary goal of maximising capital structure is to determine the ideal combination of debt and equity that maximises firm value while minimises the average cost of capital. Hence, it is imperative to investigate the potential influence of the capital structure on the valuation of Indian automobile companies and their ancillary firms. Over the course of the past five decades, extensive research has been conducted to examine the correlation between capital structure and firm value. However, the findings of these studies have generated conflicting results within the field of finance. Various theories pertaining to the relationship between capital structure and firm value proposed either a positive, a negative, or statistically insignificant association (Modigliani & Miller, 1958; Modigliani & Miller, 1963; Jensen & Meckling, 1984). Likewise, a number of empirical investigations have yielded varying outcomes (Friend & Lang, 1988; Barton et al., 1989; Bos & Fetherston, 1993; Michaels et al., 1999; Booth et al., 2001; Abor, 2005; Mollik, 2005; Bonaccorsi di Patti, 2006; Kyerboach-Coleman, 2007), potentially attributable to two challenges: model specification and model estimation. Previous research on capital structure has frequently utilised data from developed nations, as shown by Rajan and Zingales (1995). Nevertheless, those association between capital structure and firm's value have not been extensively examined in countries beyond the industrialised ones. Prasad et al. (2001) conducted a comprehensive analysis of empirical studies pertaining to business capital structure. Their findings indicate that the majority of empirical research in this domain mostly focuses on developed countries, whereas there exists a noticeable dearth of investigations concerning developing countries such as India. Hence, this research primarily offers four avenues for further investigation in this field. The majority of empirical investigations pertaining to capital structure have been focused on developed countries. However, there has been a noticeable dearth of study undertaken on emerging economies thus far. This study aims to address a research vacuum by presenting original findings on the impact of capital structure on the company value of Indian automobile and automobile ancillary firms, which are significant players in emerging markets. Furthermore, this study contributes significantly to our comprehension of the correlation between debt ratio and business value by effectively addressing the methodological challenges inherent in utilising limited time frames for analysis. The relationship in question has been examined using cross-sectional data and different regression models. Nevertheless, the aforementioned approaches have failed to incorporate temporal considerations, resulting in diminished statistical power and biased parameter estimations. In order to address these statistical limitations, we employ a sophisticated approach that allows us to assess the influence of debt ratio and discern

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the "regimes" that signify instances of favourable and unfavourable impacts of debt ratio on company value. Additionally, the results of this objective yield significant and applicable policy implications for professionals, governing bodies, and stakeholders in their decision-making processes. In relation to leverage at the industry level, managers have the ability to determine an appropriate amount of debt based on varying debt ratios observed across different industries. This determination can be made by comparing threshold values determined from the outcome of assessing different investment opportunities. This study will provide guidance to investors in terms of the trade-off connection between the benefits and costs associated with debt.

2. LITERATURE REVIEW

When it comes to the theoretical research, there are a total of four different competitive theories of capital structure: the irrelevance of capital structure, the relevance of capital structure, the static trade-off theory, and the pecking order theory. All of these ideas have received widespread recognition. According to the irrelevant capital structure postulated by Modigliani and Miller (1958), in a world with frictionless and flawless markets, the capital structure of a company has no bearing on the value of the company, and there is no such thing as an ideal capital structure for a particular company. However, the assumptions of perfect capital markets with no transaction costs, no taxes, and everyone having the same expectations and the same amount of information are not realistic and do not operate in real life (Modigliani & Miller, 1963; Jensen & Meckling, 1976; Myer, 1984; Myer & Majluf, 1984). (Modigliani & Miller, 1963; Jensen & Meckling, 1976; Myer, 1984; Myer & Majluf, 1984). In the later paper that Modigliani and Miller (1963) wrote, they loosened their assumption by including corporation tax benefits as determinants of the capital structure of enterprises. This was done in order to make their conclusions more broadly applicable. The ability to deduct interest payments from taxable income is the defining characteristic of the tax system. A company that is subject to taxation is eligible for a "tax shield" that results in a reduction in the total amount of taxation required to be paid. Simply put, the fact that interest payments on debt are tax-deductible contributes to an increase in the value of the company that makes it advantageous to include debt into the capital structure of the company. This is an implicit admission that the capital structure of a company influences the value of the company. Therefore, in order for businesses to optimise their value, Modigliani and Miller (1963) advise that they should use as much loan capital as is legally permissible. In a manner that was comparable to the ideas that Modigliani and Miller (1963) presented, Miller (1977) included both corporate taxes and personal taxes within his model. Miller (1977) said that the relative level of each tax rate defines business value and that the gain

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from using debt may be smaller than what was claimed by Modigliani and Miller (1963). Additionally, Miller (1977) indicated that the firm value is determined by the relative level of each tax rate.

Graham (2000) suggested in a recent study that the capitalised tax benefit of debt is roughly ten percent of business value and that personal tax penalties diminish this benefit by approximately two-thirds before the Tax Reform Act of 1986 and by slightly less than half after reform. Graham (2000) also suggested that the personal tax penalties reduce this benefit by approximately two-thirds after reform. In 1977, Myers established what is now known as the static trade-off theory. According to Myers (1977), there is an ideal form of capital structure out there somewhere. A company whose goal is to maximise shareholder value will arrive at the most effective capital structure by weighing the advantages of debt financing against its disadvantages. To the point where the marginal costs and benefits of each additional unit of finance are equalised is the point at which companies will borrow the most money. When we talk about the costs of debt, we're referring to bankruptcy expenses and the higher agency costs that come about when a company's credibility is in question. On the other hand, the benefits of debt pertain to tax advantages and the reduced agency costs of free cash flow. As a result, the worth of the business is calculated as the sum of the unlevered value of the firm, the present value of the tax advantages, and the difference between that and the present value of the costs associated with bankruptcy and agency. Models such as Modigliani and Miller's (1963), Jensen and Meckling's (1976), Myers' (1977), Bradley et al.'s (1984), Altman's (1984), and Stulz's (1990) belong to the category of static trade-off models. These models are tax-based, agency-cost-based, and bankruptcy-cost-based, respectively.

Due to the inefficiencies in the market, the trade-off theory contends that there is a direct connection between leverage and the value of a company. In order to maximise their own value, businesses work hard to maintain what they believe to be the ideal target capital structure. This structure strikes a healthy balance between the costs and benefits that are associated with increasing degrees of leverage. It should not come as a surprise, in light of these competing ideas, that the substantial body of empirical research on leverage and firm value as measured by performance has yielded contradictory findings. For instance, Kyerboach-Coleman (2007) mentioned that the performance of microfinance organisations is positively influenced by the capital structure of the organisation. Berger and Bonaccorsi di Patti (2006) proposed that increased leverage, which is defined as total loans to total assets at book value, lowers the agency cost of outside equity and, as a result, raises firm value. Leverage can be measured as the ratio of total debts to total assets at book value. These empirical results are also consistent with Abor (2005), Mollik (2005), Peterson and Rajan (1994), and Bos and Fetherston (1993), who established that there is a positive connection

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between leverage and performance. Peterson and Rajan found that leverage increases performance. Bos and Fetherston discovered that leverage increases performance. However, a number of research (Friend & Lang, 1988; Barton et al., 1989; Michaels et al., 1999; Booth et al., 2001) discovered a negative correlation between leverage and performance.

In contrast, the pecking order theory proposed by Myers (1984) and Myers and Majluf (1984), suggests that there is a hierarchy of firm preferences with regard to the financing of their investments and that there is no well-defined target debt ratio. It is so because of the existence of the asymmetric information problem between the firm and likely finance providers. Firms finance their needs, initially by using internally generated funds (that is, undistributed earnings, where there is no existence of information asymmetry), next by less risky debt if additional funds are needed and lastly by risky external equity issue to cover any remaining capital requirements. The order of preferences reflects relative costs of finance to vary between the different sources of finance. Along related strands of pecking order theory (the market timing theory) first expressed by Baker and Wurgler in 2002, posits equity market-timing attempts have at least a decade long impact on capital structure, and capital structure is the cumulative outcome of past attempts to time equity markets. Welch (2004) used inertia theory and further confirmed that firms do little to readjust their leverage caused by stock price movements: Actual debt ratios move nearly as one with stock returns and the effect is highly persistent. Under the pecking order (market-timing and inertia theories), since firms do not perceive that leverage have great impacts on firm value, firms do not actively adjust the capital structure to the target level.

According to the research that was looked over, significant studies have been conducted on the topic of the relationship between firm value and capital structure. Despite this, the findings of the studies have been called into question due to the fact that different studies have predicted that the relationship between firm value and capital structure will either have a positive, a negative, or no statistically significant relationship at all. In addition, the vast majority of empirical research on business capital structure focuses on industrialised countries, and there has been a very small amount of research conducted on developing countries like India. In addition, there is a lack of methodological discussion in the research literature about short-period samples. Data from cross-sectional studies as well as various regression models have been utilised in order to investigate this association. These investigations, however, have not taken into consideration the effects of time, which results in low statistical power and estimates of parameters. Consequently, the purpose of this study is to evaluate the association between firm value and capital structure in Indian automobile and automobile auxiliary industries by utilising modern approaches such as panel threshold regression analysis.

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3. RESEARCH METHODOLOGY

An analytical research design is applied to this research to identify the extent and nature of cause-and-effect relationships between the capital structure and value of firms in the Indian automobile and automobile ancillary industries. To investigate the impact of the capital structure of Indian automobile and automobile ancillary firms on their firm's value, balanced panel data for 17 years from 2004 to 2020 has been collected for 94 listed automobile and automobile ancillary manufacturing firms based on the availability of data. This study is based on secondary data collected from the PROWESS IQ Database and the official websites of the Indian automobile and ancillary industries. The evaluation of the association between the value of the firm and the capital structure of the Indian automobile sector is based on several statistical analyses: summary statistics, correlation analysis, assumption tests, and panel threshold regression. For the theoretical framework, an in-depth study of various capital structure theories as well as the magnitude and direction of association between capital structure and a firm's growth on the value of the firm are traced using a standard econometric model. The study does not limit its results to just statistical analysis. The observed relationships are also compared with empirical capital structure theories, and practical implications of the findings are also suggested to fulfil the study's objective.

3.1 Model Specification

This study uses the panel threshold regression model, which is a non-linear regression model that deals with how the dependent variable is impacted by the different thresholds of the explanatory variable. Threshold regression is a regime-switching model based on balanced panel data, in which the slope parameters vary according to a regime-switching mechanism that depends on a threshold variable. Hansen (1999) developed a non-dynamic threshold regression with individual fixed effects. The PTR model can be viewed as a heterogeneous and time-varying parameters panel data model. This study constructed the following threshold model:

$$V_{it} = \alpha_i + \beta_1 d_{it} + \pounds L_{it} + \theta c_{it} + \mu_{it}, \text{ if } d_{it} \leq \tilde{Y} \ldots\ldots\ldots\ldots (1)$$

$$V_{it} = \alpha_i + \beta_2 d_{it} + \pounds L_{it} + \theta c_{it} + \mu_{it}, \text{ if } d_{it} \geq \tilde{Y} \ldots\ldots\ldots\ldots\ldots (2)$$

$$\Theta = (\theta_1, \theta_2, \theta_3)$$

Where V_{it} represents the market firm value measured by Tobin's Q ratio; d_{it} (threshold variable i.e. Long term debt ratio) and L_{it} is the proxy for other explanatory variables which include Short term debt ratio, total debt ratio, and debt-equity ratio. $\tilde{Y}$ is the hypothesized specific threshold value. This model also incorporates three control (c_{it}) so as to isolate the

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effects of other factors that have predictable influences on the firm value. The three control variables contain firm size; growth rate in sales, and profitability. $\theta 1$, $\theta 2$ and $\theta 3$ represent the coefficient estimates of the control variables. α_i is the proxy given for fixed effect used to grasp the heterogeneity of different companies under different operating conditions; β_1 is the threshold coefficient when the threshold value is lower than $\tilde{Y}$; β_2 is the threshold coefficient when the threshold value is higher than $\tilde{Y}$; £ the proxy used for the coefficient of other capital structure variables; μ_{it} is the proxy for error term; i represents different firms and t represents different periods.

3.2 Variables of the Study

Variables of the study were categorised into three groups. i.e.

- Capital Structure Variables
- Control Variables
- Dependent Variable

Capital Structure Variables

In this study, four different measures of capital structure (leverage): Debt-Equity ratio, Long-Term debt ratio, Short-Term debt ratio, and Total debt ratio are used. These variables are more appropriate as an indicator of capital structure because these ratios provide a better indication of leverage's risk profile and give a more accurate picture of past financing (Rajan & Zingales, 1995).

Debt-to-Equity Ratio

The Debt-Equity ratio measures the degree to which a company finances its operations through debt versus wholly-owned funds. More specifically, it reflects the ability of shareholders' equity to cover all outstanding debts in the event of a business downturn. This study calculates the Debt-Equity ratio by dividing a company's total liabilities by its shareholder equity.

Long-term Debt Ratio (Threshold Variable)

This ratio measures the proportions of long-term debt over the company's total assets. It is considered an important capital structure variable because it shows a company's long-term solvency. Long-term debt ratio is used as a threshold variable because in all the leverage ratios, it is a better representative of the capital structure. Long-term leverage divided by

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total assets is used as a proxy of long-term debt ratio.

Short-Term Debt Ratio

Short-term debt is the firm's obligation to be paid off within one financial year. Short-term debt holds several risks for a company's financial and economic health. So it is important to consider short-term debt to equity as a measure of capital structure.

Total Debt Ratio

The total debt ratio is an indicator of a company's leverage. It tells us the percentage of the company's total assets financed by creditors. In other words, it is the total amount of a firm's total debt divided by the total amount of the company's assets. Most researchers take this proxy as a measure of capital structure.

Control Variables

In this study firm's growth is used as a control variable because while examining the impact of capital structure on a firm's value the outcome could influenced by the firm's growth. There are several proxy used for a firm's growth but in this study, we use firm size, growth rate in sales, and profitability as a measure of a firm's growth.

Firm size

Firm size shows the total value of the firm in terms of assets. According to trade-off theory, Firms having huge amounts of assets generally have less chance of bearing direct bankruptcy costs resulting from debt financing. It is expected to positively affect firm size and firm value since longer firms are likely to be more diversified, have a more stable cash flow, and lower bankruptcy risk. In this study, firm size is measured using the firm's natural log of total assets.

Growth Rate in Sales

The Growth rate is used as a proxy for percentage change in sales, which many researchers take (Nha et al., 2016; Malinic et al., 2013; Raza et al., 2021; Kasthury & Anandasayanan, 2019). This study predicts a positive association between growth and value because a higher growth rate in sales generates higher profitability which is directly linked with the value of the firm.

Profitability

A firm's profitability assures the efficiency with which the company turns the business activity into profit. This study predicted a positive impact of profitability on value of the firm because highly profitable firms normally have higher market value. This study measures

profitability by return on assets (ROA) which measures the ability to use assets to produce income. This proxy is used by many researchers (Doan, 2019; Hossain &Ali, 2012; Li & Islam, 2019; Khasnobis & Bhaduri, 2002; Psillaki & Daskalakis, 2009) as a determinant of capital. The profitability of a firm is calculated by dividing the earnings before interest and tax (EBIT) by total assets.

Dependent Variable

In this study, firm value is used as a dependent variable. As the proxy for firm value, we adopt Tobin's Q ratio rather than accounting-based measures (e.g., the return on assets) because it takes risk into account and is not as likely to distort the results as other measures, such as the return on assets (Lindenberg and Ross, 1981). Tobin's Q is defined as the ratio of the market value of a firm divided by the book value of its assets.

4. RESULTS

The evaluation of the association between the value of the firm and the capital structure of the Indian automobile and automobile ancillaries sector is based on several statistical analyses: Summary Statistics, Correlation Analysis, Unit root test, and Panel Threshold Regression.

4.1 Descriptive Statistics

Before going into rigorous statistical analysis it is important to know about the summary of the key variables. For this purpose, Table 1 presents several descriptive statistics like maximum, minimum, mean, and standard deviation are used. Along with this Jarque-Bera test is used to check the normality of key variables. Tobin's Q ratio indicates a minimum negative market value of -0.146 and a maximum of 7.465 with a mean and standard deviation of 1.274 and 1.471 respectively. Similarly, in capital structure variables, there is a higher volatility in the variables which is depicted by the standard deviation. The average value of control variables i.e. g. rate, profitability, and size are 0.116, 0.077, and 2.490 respectively. The outcome of the Jarque-Bera test indicates that all the variables are normally distributed with a p-value of 0.000.

Table 1 Descriptive Statistics of Key Variables

	Market Value (Tabin's Q)	L. T. Debt Ratio	S. T. Debt Ratio	T. D. Ratio	D-E Ratio	G. Rate	Profitability	Size
Minimum	-0.146	0.000	0.000	0.000	-94.444	-2.274	-1.852	0.505
maximum	7.465	0.453	0.334	0.689	1.509	2.291	0.403	4.282
mean	1.274	0.135	0.118	0.252	0.720	0.116	0.077	2.490
standard deviation	1.471	0.167	0.217	0.275	10.928	0.377	0.121	0.783

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J-B Test	762780.4	34353	1057044	1715421	3214839	2127297	133621	47.59
(P-Value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.00)

Source: Author's own calculation by using e-views software

4.2 Correlation Matrix

Table 2 presents the correlation matrix of all key variables of the model which includes the value of correlation and probability value. The correlation dependent variable i.e. Tobin's Q and long-term debt ratio is found significant and negative with a p value of 0.000. Whereas with all other capital structure variables the correlation is found to be insignificant. The result of the correlation indicates the importance of the long-term debt ratio and the reason for taking it as a threshold variable. The correlation between Tobin's Q with profitability and size is significantly positive but with the growth rate in sales, the correlation is found to be statistically insignificant.

Table 2 Correlation Matrix of Key Variables

	Market Value (Tabin's Q)	**L. T. Debt Ratio**	**S. T. Debt Ratio**	**T. D. Ratio**	**D-E Ratio**	**G. Rate**	**Profitability**	**Size**
Market Value (Tabin's Q)	1.000							
L. T. Debt Ratio	-0.090 (0.000)	1.000						
S. T. Debt Ratio	0.035 (0.133)	0.020 (0.382)	1.000					
T. D. Ratio	-0.025 (0.293)	0.598 (0.000)	0.813 (0.000)	1.000				
D-E Ratio	-0.027 (0.246)	-0.002 (0.903)	0.018 (0.448)	0.012 (0.591)	1.000			
G. Rate	0.030 (0.199)	0.077 (0.000)	-0.098 (0.000)	-0.033 (0.152)	-0.045 (0.053)	1.000		
Profitability	0.286 (0.000)	-0.258 (0.000)	-0.390 (0.000)	-0.463 (0.000)	-0.046 (0.049)	0.205 (0.000)	1.000	
Size	0.232 (0.000)	-0.143 (0.000)	-0.213 (0.000)	-0.255 (0.000)	-0.015 (0.522)	-0.013 (0.571)	0.179 (0.000)	1.000

Source: Author's own calculation by using e-views software

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4.3 Panel Unit-Root Test

Before using the panel data model it is important to determine whether the variables in the model are stationary or not. If this condition of stationarity is not met, the spurious regression problem might arise and the estimated parameters could be biased. Therefore, three different panel-based unit root tests i.e. Levin- Lin-Chu test, Augmented Dickey-Fuller test, and Phillip-Peron test were used to test the group mean panel unit root with the null hypothesis of non-stationary versus the alternative stationary of the variable. Table 3 reports panel unit root test results. As shown in Table 3, the null hypothesis of the non-stationary for all the variables is rejected at 1% level of significance, which indicates that all the variables are stationary at the level that is at I (0).

Table 3 Panel Unit-root test

Variable Name	Levin, Lin & Chu test		Augmented Dickey-Fuller Test		Phillips- Perron Test	
	Statistic	P-Value	Statistic	P-Value	Statistic	P-Value
Market Value (Tabin's Q)	-4.16	0.000	346.77	0.000	371.4	0.000
L. T. Debt Ratio	-732.35	0.000	385.65	0.000	700.76	0.000
S. T. Debt Ratio	-6.30	0.000	377.24	0.000	749.84	0.000
T. D. Ratio	-9.94	0.000	381.34	0.000	584.29	0.000
D-E Ratio	-627.41	0.000	494.36	0.000	1421.09	0.000
G. Rate	-12.71	0.000	499.65	0.000	892.75	0.000
Profitability	-11.34	0.000	382.08	0.000	414.49	0.000
Size	13.42	0.000	356.28	0.000	946.93	0.000

Note: Author's own calculation by using e-views software

4.4 Test of Threshold Effect

This study uses the bootstrap method to obtain an approximation of the F-statistics to test the threshold effect of the model. The F statistics contain F_1, F_2, and F_3 to assess the null hypotheses of none, one, and two thresholds, respectively. Table 4 provides the tests for the single-threshold, double-threshold, and triple-threshold effects. Firstly the single-threshold effect is tested by using bootstrap 300 times, F-statistics of 1508.62 and p-value of 1.0000 are respectively yielded. Which is insignificance at a 1% significant level and accepts the null hypothesis of no threshold effect; then the double threshold effect test is executed to see if it exists or not. Likewise, bootstrap is used to make 300 times and respectively yields F-statistics of 2116.77 and p-value of 0.0167; they show significance under a 1% significant level and reject the null hypothesis of one threshold. Finally, the triple-threshold effect is tested to see if it exists. Similarly, bootstrap is used to make 300 times and respective yields

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F-statistics of 220.28 and p-value of 0.3767. The results accepted the null hypothesis of two thresholds. In conclusion, the aforementioned statistical analysis articulately shows that an asymmetric relationship of two thresholds in three regimes is significantly formed. Table 4 also presents the estimated values of three thresholds, which are 0.30, 0.396, and 0.405, respectively. All observations are objectively and passively split into three regimes depending on whether the threshold variable long-term debt ratio is smaller or larger than the threshold value ($\tilde{Y}_1$, $\tilde{Y}_2$, and $\tilde{Y}_3$). Accordingly, the study defines three regimes formed by threshold value to be low long-term debt, medium long-term debt, and high long-term debt if their debt ratio is within the ranges 0-0.30 and 0.30-0.396 and exceeds 0.396.

Table 4 Test of Threshold Effect

Threshold Effect	F-Statistic	P-Value	Threshold Value
One Threshold Effect	1508.62	1.000	0.3000
Two Threshold Effect	2116.77	0.0167	0.3000 and 0.3960
Three Threshold Effect	220.28	0.3767	0.3000, 0.3960 and 0.4050

Source: Author's own calculation by using STATA-14 software

Table 5 reports the regression slope coefficients, conventional OLS standard errors, t-Statistic, and P-Value of threshold variable long-term debt ratio for three regimes. The estimated model from the empirical findings can be expressed as in the first regime (low debt), where the long-term debt ratio is less than 0.30, the estimated coefficient β_0 is 2.588 and is significant at the 1% level, indicating that the market value of the firm (Tobin's Q) increases by 2.588% with an increase of 1% in long-term debt ratio. In the second regime (medium debt), where the long-term debt ratio is between 0.30 and 0.39, the estimated coefficient β_1 is still positive and significant at the 1% level, but the effect of debt on firm value decreases to 0.741. This means that there is a decreasing trend, and Market Value only increases by 0.741% with an increase of 1% in the long-term debt ratio. The significant positive effects of long-term debt on firm value are found in the third regime (high long-term debt) where the long-term debt ratio is above 0.390. The estimated coefficient β_2 is 0.486 and significant at a 1% level, which means that the market value of the firm increased by 0.486% with an increase of 1% in the long-term debt ratio. The decreasing effects on firm value increase gradually along with the increase in the long-term debt ratio. The regression slope coefficients of the panel threshold do not have a fixed value; in the low-debt regime (it is 2.588), whereas, in the medium-debt, and high-debt regimes, the slopes are 0.741 and 0.486, respectively. Table 6 presents the impact of other capital structure variables including short-term debt ratio, total debt ratio, and debt-equity ratio on the market value of the firm.

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The outcome of t-statistic indicate that the impact of other capital structure variables are statistically insignificant on firm's market value.

Table 7 presents the estimated coefficients of three control variables. As shown in Table 7, the estimated coefficient of firm size and Profitability are 0.0306 and 3.120 respectively, and have a significantly positive impact on the firm's value. The estimated coefficient of growth rate on sales is 0.034 but found statistically insignificant impact on the firm's value. A firm's growth which includes profitability and size of the firm has a significantly positive effect on firm value, implying that the greater the growth rate, that a firm has, the higher its firm value. The overall model is found robust with F value and P value of 21.42 and 0.000 respectively. The R Square value of the model is 0.2117 i.e. the degree of determination is 21.17%.

Table 5 Estimation of Threshold Coefficients for Long Term Debt Ratio

Threshold	Coefficient Value	t-statistic	P-Value	Standard Error
β_0 (No Threshold)	2.588	2.98	0.005	0.0996
β_1 (Single Threshold)	0.741	6.02	0.000	0.0807
β_2 (Double Threshold)	0.486	4.54	0.000	0.1631

Source: Author's own calculation by using STATA-14 software

Table 6 Estimation of Coefficients for Capital Structure Variables

Variables	Coefficient	t-statistic	P-Value	Standard Error
Short Term Debt Ratio	5.029	1.01	0.314	4.989
Total Debt Ratio	-3.465	-0.70	0.487	4.985
Debt Equity Ratio	-0.001	-0.29	0.768	0.002

Source: Author's own calculation by using STATA-14 software

Table 7 Estimation of Coefficients for Control Variables

Variables	Coefficient	t-statistic	P-Value	Standard Error
Profitability	3.120	10.27	0.000	0.303
Size	0.306	3.15	0.002	0.097
Growth Rate	0.034	0.41	0.684	0.082

Source: Author's own calculation by using STATA-14 software

5. DISCUSSION

The research evident that the link between the long-term debt ratio and the value of the company shifts in response to various modifications in debt structure, and that debt structure has a nonlinear relationship (in the shape of an inverted "U") with the market value of the company. In conclusion, the empirical findings provide support for the

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hypothesis of a nonlinear relationship and pinpoint the precise tipping point at which debt becomes ineffective through the application of a robust panel threshold regression model. The empirical data indicate that there is a positive correlation between debt levels and company's value before debt levels exceed the threshold value. However, it is important to keep in mind that raising debt beyond its optimal level, which is the threshold number established by this research, would have a negative impact on the value of the company. The empirical findings are consistent with the trade-off theory, which implies that higher leverage may provide a tax shield and reduce agency costs. However, the opposite impact may also occur in some cases. When the leverage reaches a relatively high level, future rises in it may generate significant agency costs for outside debt as a result of risk shifting. These costs may ultimately result in greater estimated expenses of bankruptcy or liquidation. The advantage of a tax shield is nullified by the additional expenses of debt financing, which cancel out the beneficial impact that debt financing has on business value. For this reason, sensible managers have an obligation to locate a "balance" in which the added cost of debt financing is equivalent to the interest tax shield.

The effect on the market value of the firm of additional capital structure factors, such as the ratio of short-term debt to equity, the ratio of total debt to equity, and the ratio of debt to equity According to the results of the t statistic, the influence of other variables related to a company's capital structure has no statistically significant bearing on the market value of the company. In addition, the chosen control variables—profitability, size, and growth rate in sales—have a constructive effect on the value of the company. This is evidenced by the fact that the value of the company increases. This observation is compatible with different theories concerning capital structure. On the other hand, it was discovered that the correlation of control variables with the value of the companies was statistically significant for profitability and size, but that it was not significant at all for growth rate. When a company sees a rise in its profitability, it typically attempts to reinvest some of those gains in order to boost both the wealth of its shareholders and the value of the company.

5.1 Conclusions and Implications

Any corporate entity should make it a priority to have the best possible capital structure and locate financing options that have the lowest possible cost of capital. In this study, an advanced panel threshold regression model is used to investigate the panel threshold effect of long-term leverage on firm value across 92 Indian listed automobile and automobile ancillary firms from 2004 to 2020. As a proxy for the worth of the company, we make use of Tobin's Q ratio. The empirical findings point decisively to the existence of a double-threshold effect between the long-term debt ratio and business value. Additionally, the coefficient is

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positive when the debt ratio is smaller than 0.30, which indicates that business value can be improved through the utilisation of borrowed funding. When the debt ratio is between 0.30 and 0.39, the coefficient is still positive but begins to fall, this indicates that the debt is getting worse. When the debt ratio is more than 0.39, the coefficient is positive and indicates a further downward tendency in the amount of debt. Indicating that, under those conditions, a further rise in debt financing will result in a decline in the value of the company. As a result of this, we have no choice but to draw the conclusion that the relationship between leverage and company value resembles an in inverted "U". The use of debt financing should be regulated; however, there is an optimum level above which additional debt does not result in a greater proportional business value. This level should not be exceeded. These findings are in agreement with Myers's (1977) static trade-off hypothesis, which proposes that businesses aim to maintain debt levels that strike a healthy balance between the benefits and drawbacks of debt financing. Our research reveals a number of important and actionable implications for public policy, and businesses stand to gain a great deal by implementing these recommendations. First, managers can use the models that have been created here in order to set a target level and then progressively work their way towards it in order to maximise firm value. This is possible due to the fact that the threshold values for long-term debt ratios vary depending on the different industries and market scenarios that the company is operating in. Second, the knowledge of these principles of capital structure that emerge from our research will assist the financial manager in making the most of the opportunities presented by the market conditions for the benefit of the company. In conclusion, the findings of our research can provide investors with a solid comprehension of the ideal capital structure for Indian automobile companies.

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