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Corporate Board Characteristics And Market Valuation: A Study Of Indian Mid-Cap Automotive Enterprises

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Abstract
This study investigates the relationship between board governance structures and corporate market valuation by examining Tobin's Q metrics across Indian Nifty Mid Cap Auto sector companies during 2020-2024. The mid-cap automotive segment faced unique operational challenges throughout the post-pandemic recovery phase, underscoring the crucial importance of effective governance mechanisms for sustained business performance.
Our research concentrates on three primary board elements: structural composition, independent director representation, and women's board participation. Using panel data econometric methodologies—employing both fixed-effects and random-effects analytical frameworks—we evaluate the influence of these governance factors on Tobin's Q measurements.
The empirical evidence reveals that market capitalisation strongly correlates with Tobin's Q values. Conversely, board structural elements, independence metrics, and gender representation display weak or conflicting performance associations, with specific models suggesting adverse relationships for gender diversity indicators. The Hausman specification assessment confirms that the fixed-effects methodology delivers more reliable consistency relative to random-effects estimation.
Our results underscore market capitalisation's predominant influence in establishing firm valuation within India's automotive industry. They suggest that conventional board attributes necessitate a more nuanced contextual examination for mid-cap organisations. These discoveries provide meaningful insights for investment professionals, policy makers, and corporate executives pursuing optimal governance frameworks for superior organisational outcomes.

Keywords: *Corporate governance, Board composition, Firm valuation, Tobin's Q measurement, Mid-cap automotive sector, India, Women directors, Panel data analysis*

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I. Introduction

The connection between corporate governance frameworks and enterprise valuation constitutes a cornerstone of finance research, especially in developing economy settings. Governance systems—including board structure, ownership distribution, and management incentive schemes—are crucial factors in generating organisational value (Shleifer & Vishny, 1997; La Porta et al., 2000). These frameworks synchronise management actions with stakeholder interests, potentially boosting enterprise value through enhanced transparency, minimised agency expenses, and superior strategic choices (Jensen & Meckling, 1976).

Mid-cap companies function within unique risk parameters compared to large-cap firms, encountering elevated market fluctuations, resource limitations, restricted capital access, and amplified competitive challenges. In this environment, examining governance-performance connections among mid-cap automotive enterprises becomes especially significant for comprehending corporate governance patterns within India's automotive landscape.

The impact of board attributes—encompassing scale, independence, and gender balance—on Tobin's Q (a performance indicator contrasting market value with asset replacement expenses) has stimulated considerable global research, although conclusions remain mixed.

Studies focusing on Indian mid-cap automotive companies are scarce, establishing a notable research void that this investigation seeks to fill. Our analysis covers 2020-2024, incorporating the post-COVID recovery timeframe marked by technological advancement and regulatory changes within the automotive industry.

India's automotive sector represents one of the country's most substantial and rapidly expanding industries, significantly contributing to employment generation and national economic output. Contemporary industry challenges include shifting consumer behaviours, the integration of electric vehicles, and stricter environmental standards, necessitating swift organisational adjustments to maintain competitive advantages.

Corporate governance emerges as fundamental to this adaptability, as board choices direct companies through difficult circumstances. Governance arrangements influence decision-making protocols and organisational responses to market developments, technological advancements, and shifting consumer expectations.

II. Literature Examination

The board-performance connection represents an established research area within corporate governance investigations. Academic literature spanning multiple industries, geographic regions, and organisational types consistently demonstrates that board attributes have a substantial impact on firm performance.

Bathula and Gaur (2011) explored the effects of board attributes on company performance, analysing scale, independence, and diversity. Their results suggested that enhanced board independence improves decision quality, contributing to financial outcomes. The research also revealed that although larger boards might introduce administrative complexity, they can benefit firm performance through expanded conceptual diversity.

De Villiers, Naiker, and Van Staden (2011) examined the contributions of board attributes to environmental outcomes. Their investigation revealed that environmentally knowledgeable boards implement sustainable practices, leading to improved environmental outcomes. This work demonstrated the significance of sustainability in modern corporate strategy and the role of environmentally experienced boards in long-term value creation.

García-Ramos and García-Olalla (2011) concentrated on family enterprise dynamics, studying variations between founder-managed and non-founder-managed board effectiveness. They found that founder-managed enterprises showed superior performance due to founders' extended-term focus and organisational dedication.

Gaur, Bathula, and Singh (2015) examined interactions between board composition and ownership concentration impacts on company performance. They determined that concentrated ownership with limited shareholders complements board independence, enhancing governance through improved oversight.

Jermias and Gani (2014) presented the "board capital" concept, highlighting board members' professional connections, expertise, and individual capabilities. They found that board capital, alongside traditional board characteristics, has a significant impact on firm performance.

Mishra and Kapil (2018) studied Indian companies to assess the effects of board characteristics on enterprise value. They discovered that board independence, scale, and female participation significantly correlated with firm value in Indian environments.

Pucheta-Martínez and Gallego-Álvarez (2019) offered global perspectives on board-firm performance relationships. Their findings showed that board characteristics of independence, competence, and diversity consistently influence firm performance internationally across various sectors.

Naim and Aziz (2022) investigated board attribute contributions to firm performance within Indian contexts. They showed that board features significantly influence firm performance outcomes, including experience, independence, and diversity.

Huang et al. (2024) approached the topic differently by applying machine learning methods to predict how board attributes impact firm performance using Chinese-listed companies. This study advanced beyond conventional statistical analysis through predictive modelling to identify underlying patterns between firm performance and board composition.

III. Research Gaps And Objectives

Identified Research Gaps

Analysis of Nifty Mid Cap Auto companies reveals multiple research gaps. First, while market capitalisation influences Tobin's Q, insufficient attention has been given to its impact on asset performance in mid-cap auto enterprises, particularly during post-pandemic recovery periods. Second, although board scale and independence receive extensive attention in large-cap company research, the impacts of board structure on mid-cap auto company financial performance remain under-investigated.

Third, despite broader corporate research, gender diversity contributions to mid-cap auto company asset performance lack a thorough examination. Fourth, while fixed-effects and random-effects models are standard in corporate governance studies, limited applications exist for mid-cap auto firms in dynamic markets. Finally, restricted research examines the relationships between governance and financial performance, specifically within mid-cap auto enterprises.

Research Objectives

1. To assess board characteristic influences on enterprise valuation
2. To examine relationships between governance factors and company performance
3. To investigate correlations between governance variables and financial outcomes

IV. Research Methodology

Methodological Framework

Our analytical approach for examining the effects of governance structure and market conditions on Tobin's Q for Nifty Mid Cap Auto companies from 2020 to 2024 utilises quantitative methods, including data

gathering, model development, and statistical analysis. The methodology investigates relationships between corporate governance elements (Board Scale, Board Independence, and Gender Diversity) and financial performance represented by Tobin's Q.

Market Capitalisation information originates from financial reports, Board Scale, and board independence as per annual disclosures, and female director proportions measure Gender Diversity. Economic data sources include the Capitaline database and NSE, while board information derives from corporate governance reports.

Panel Data Methodology

Panel data analysis proves appropriate because our dataset includes multiple companies observed across several years. Panel data permits analysis of cross-sectional (across companies) and time-series (over 2020-2024) variation. Fixed-effects and Random-effects models are employed for estimation.

Model Development

The primary model specification follows:

Tobin's Q = β_1(Market Capitalization) + β_2(Board Scale) + β_3(Board Independence) + β_4(Gender Diversity) + ε_{it}

Where:

- **Tobin's Q(i,t)**: Tobin's Q for company i at time t
- **Market Capitalisation (i,t)**: Market capitalisation for company i at time t
- **Board Scale(i,t)**: Board scale for company i at time t
- **Board Independence(i,t)**: Board independence for company i at time t
- **Gender Diversity(i,t)**: Gender diversity for company i at time t
- **β_0**: Intercept term
- **β_1, β_2, β_3, β_4**: Coefficients for estimation
- **ε(i,t)**: Error term

Tobin's Q Measurement

This investigation employs Tobin's Q as a firm performance indicator, calculated using:

Tobin's Q = (Market Value of Equity + Total Debt) ÷ Total Assets

Where the market value of equity equals share price multiplied by outstanding shares, total debt includes long-term and short-term obligations, and total assets represent asset replacement value.

Model Selection Criteria

Fixed-effects approach: This method accounts for unobserved individual heterogeneity potentially correlated with predictors and is preferred when unobserved factors are believed to influence the dependent variable.

Random-effects approach: Assumes individual-specific effects are uncorrelated with predictors. Included for comparison with the Fixed-effects model, with the Hausman test determining appropriate model selection.

V. Sample Selection

Table 1: Selected Companies

Sl No	Company Name	Tobin's Q Ranking
1	Apollo Tyres Ltd.	1
2	Balkrishna Industries Ltd.	3
3	Endurance Technologies Ltd.	4
4	MRF Ltd.	2
5	Schaeffler India Ltd.	7
6	Sundram Fasteners Ltd.	4
7	Tube Investments of India Ltd.	8
8	UNO Minda Ltd.	5
9	ZF Commercial Vehicle Control Systems India Ltd.	6
10	Bharat Forge Ltd.	3

VI. Empirical Results And Analysis

Descriptive Analysis

Table 2: Descriptive Statistics Summary

Variable	Mean	Std Error	Median	Std Dev	Min	Max	Sum	Count
Market Cap	26655.79	2122.88	25217.53	15011.04	4539.22	72164.17	1332789.46	50
Tobin's Q	4.33	0.38	3.73	2.69	0.53	13.15	216.57	50
Board Scale	10.24	0.44	9	3.09	6	20	512	50
Board Independence	5.44	0.32	5	2.3	2	13	272	50
% Board Diversity	52.07	1.26	50	8.9	33.33	78.57	2603.52	50
Gender Diversity	1.5	0.1	1	0.74	1	3	75	50

The descriptive examination reveals that market capitalisation averages approximately $ 26,655.79, with considerable variation (standard deviation: $ 15,011.04), indicating substantial diversity in company size. Tobin's Q shows a mean of 4.33 with a median of 3.73, suggesting moderate average performance with values spanning from 0.53 to 13.15, reflecting varying asset performance levels.

Fixed-Effects Model Analysis

Table 3: Fixed-Effects Model Results

Variable	Coefficient	Std Error	t-ratio	p-value	Significance
Constant	-4.42	0.62	-7.11	<0.0001	***
log(Board Scale)	-0.09	0.24	-0.36	0.73	
log(Board Independence)	-0.13	0.11	-1.13	0.29	
log(Gender Diversity)	-0.08	0.04	-1.81	0.1	
log(Market Cap)	0.61	0.04	17.29	<0.0001	***

Model Statistics:

- LSDV R-squared: 0.984168
- Within R-squared: 0.932146
- Durbin-Watson: 1.227666
- Joint test F-statistic: 110.6 ($p < 0.0001$)

This fixed-effects regression model shows that market capitalization is the only statistically significant predictor of firm performance, with a coefficient of 0.61 ($p < 0.0001$), indicating that larger firms tend to have better performance outcomes. The board governance variables - board scale, board independence, and gender diversity - all show negative coefficients but are not statistically significant, suggesting these factors don't have a meaningful impact on performance in this model specification. The constant term is significantly negative (-4.42), which serves as the baseline intercept for the model. The model demonstrates strong explanatory power with an R-squared of 0.984, meaning it explains about 98% of the variance in the dependent variable, though the high within R-squared (0.932) suggests most variation is explained by firm-specific factors. The Durbin-Watson statistic of 1.23 indicates some potential autocorrelation in the residuals, while the significant F-statistic (110.6) confirms the overall model is statistically meaningful despite most individual governance variables being insignificant.

Random-Effects Model Analysis

Table 4: Random-Effects Model Results

Variable	Coefficient	Std Error	z-statistic	p-value	Significance
Constant	-4.04	0.56	-7.25	<0.0001	***
log(Board Scale)	-0.3	0.25	-1.2	0.23	
log(Board Independence)	-0.11	0.11	-0.94	0.35	
log(Gender Diversity)	-0.12	0.05	-2.28	0.02	**
log(Market Cap)	0.62	0.04	15.75	<0.0001	***

Model Statistics:

- Breusch-Pagan test: Chi-square (1) = 58.5572 ($p < 0.0001$)
- Hausman test: Chi-square (4) = 45.5987 ($p < 0.0001$)

The random-effects model reveals that market capitalisation remains the strongest predictor of firm performance with a coefficient of 0.62 ($p < 0.0001$), confirming that larger companies consistently outperform smaller ones. Interestingly, gender diversity now emerges as statistically significant with a negative coefficient of -0.12 ($p = 0.02$), suggesting that higher levels of board gender diversity are associated with lower firm performance in this specification. Board scale and board independence continue to show negative but non-significant relationships with performance, indicating these governance mechanisms don't meaningfully impact firm outcomes. The significant constant term (-4.04) establishes the model's baseline, while the board scale and independence variables remain statistically insignificant in predicting performance. The Breusch-Pagan test ($p < 0.0001$) and Hausman test ($p < 0.0001$) both reject their null hypotheses, confirming that random effects are present and that there are systematic differences between the fixed and random effects models, which helps validate the appropriateness of using panel data methods for this analysis.

Correlation Analysis

Table 5: Correlation Matrix

Variable	Tobin's Q	% BD	% WID	Market Cap	Board Scale	Board Independence
% BD	-0.369	-				
% WID	-0.037	0.101	-			
Market Cap	0.491***	-0.102	0.151	-		
Board Scale	-0.578***	0.4**	0.184	0.156	-	
Board Independence	-0.574***	0.732***	0.197	0.075	0.907***	-
Gender Diversity	-0.41**	0.344**	0.772***	0.188	0.753***	0.713***

Tobin's Q exhibits a strong positive correlation with Market Cap (0.491***), Board Scale (0.578***), and Board Independence (0.574***), indicating that larger firms with larger and more independent boards tend to have higher market valuations. There's a notable negative relationship between Tobin's Q and both % BD (-0.369) and Gender Diversity (-0.41**), indicating that higher proportions of busy directors and gender diversity may be associated with lower firm performance. Board Independence demonstrates very strong positive correlations with both Board Scale (0.907***) and Gender Diversity (0.713***), implying that larger boards tend to be more independent and diverse. The correlation between % BD and % WID is relatively weak (0.101), suggesting that the proportion of busy directors and women independent directors don't necessarily move together. Overall, the matrix reveals that board structure characteristics are interconnected, with independence, scale, and diversity showing strong relationships that may collectively influence firm performance.

VII. Key Findings And Discussion

Market Capitalisation as Primary Performance Driver

The analysis consistently reveals Market Capitalisation as the strongest Tobin's Q predictor, showing highly significant positive relationships across both analytical models. High coefficients and statistical significance (t-statistics of 17.29 and 15.75, respectively, $p < 0.0001$) demonstrate that larger firms (by market value) achieve superior asset performance through elevated Tobin's Q levels.

Limited Impact of Traditional Board Characteristics

Both analytical models conclude that Board Scale and Board Independence have no significant effects on Tobin's Q. Non-significant coefficients with elevated p-values suggest that these board characteristics do not substantially influence firm performance, as measured by Tobin's Q.

Marginal Gender Diversity Effects

Gender Diversity demonstrates a marginally significant negative relationship with Tobin's Q in random-effects modelling ($p = 0.0225$), suggesting that increased female board representation may slightly reduce Tobin's Q, although the effects remain minimal.

Model Selection Validation

The Hausman test comparison between Fixed-effects and Random-effects models produces significant results ($p < 0.0001$), confirming the appropriateness of the Fixed-effects model.

VIII. Implications And Future Research Directions

These findings suggest substantial opportunities for additional research exploring factors beyond Market Capitalisation that may influence Tobin's Q. While Market Capitalisation demonstrates considerable impact, the

absence of significant effects from Board Scale, Board Independence, and Gender Diversity indicates that other governance factors may play more significant roles.

Future research could benefit from more diverse datasets, including firms across various industries or regions, for broader insights. Longitudinal studies could provide a valuable understanding of governance structure evolution and long-term firm performance impacts.

IX. Conclusion

Results support the hypothesis that Market Capitalisation significantly influences Tobin's Q, indicating that larger firms tend to exhibit higher asset value performance. The Hausman test confirmed the superiority of the Fixed-effects model for consistent and accurate estimates compared to Random-effects modelling.

Although market capitalisation proved a clear and significant predictor, board scale and independence showed no significant Tobin's Q effects. Gender Diversity exhibited weak and inconsistent effects across models, implying a limited Tobin's Q impact.

Findings indicate that Market Capitalisation is critical in enhancing Tobin's Q, while board-related characteristics and gender diversity demonstrate a lesser impact. Companies might benefit more from market-focused strategies. Future research should explore additional Tobin's Q factors, including management practices and external market influences.

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