

Board Dynamics and Firm Performance: Empirical Insights from Indian Pharmaceutical Companies

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Abstract

Corporate governance plays a crucial role in shaping corporate responsibility, strategic decision-making, and performance outcomes in the present competitive market. This study seeks to evaluate the impact of board structure on the profitability of pharmaceutical companies in India. The analysis focuses on pharmaceutical businesses listed on the Bombay Stock Exchange (BSE) and covers a period of ten years, from 2016 to 2025. The study has applied panel data regression model to investigate the influence of board composition characteristics on firm performance, with board size, research and development expenditure and leverage being considered as control variables. The results indicate that having an independent board and female directors has a beneficial impact on firm performance. Emerging-market governance emphasizes that board diversity and independence improve long-term resilience and investor confidence. Contemporary studies also argue that governance structures influence not only profitability but also sustainability-oriented firm value, particularly in regulated industries.

Keywords: board composition, corporate governance, firm performance, pharmaceutical firms, CEO duality.

JEL Classification: G34, G38, L65, C33, L21

Introduction

Corporate governance plays a crucial role in shaping corporate responsibility, strategic decision-making, and performance outcomes. This interest has grown in recent years as businesses have become more complex in a competitive market, with greater scrutiny from stakeholders, more rules to follow, and higher expectations for sustainability (Alshdaifat et al., 2024). People often think that good governance systems are important for reducing conflicts between agencies, increasing

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transparency, and improving the performance of companies, especially in developing countries where institutional frameworks are still developing (Mondal & Sahu, 2024).

The board of directors plays an important role in corporate governance by continuously monitoring day-to-day activities and giving valuable advice, which affects the regular activities of the organization. Previous research based on agency theory underscores the board's function in mitigating conflicts stemming from the division of ownership and control, therefore protecting shareholder interests and enhancing business performance (Alshdaifat et al., 2024). Resource dependence and stakeholder perspectives underscore the strategic significance of boards in facilitating access to essential resources, managing external dependencies, and addressing varied stakeholder expectations, which are increasingly associated with firm value and sustainability (Treepongkaruna et al., 2024).

Recent literature has broadened the governance performance disclosure by associating board effectiveness not alone with financial results but also with sustainability-related aspects, including corporate social responsibility (CSR), ESG performance, and reputational risk. Evidence from emerging and developing economies suggests that robust governance mechanisms augment firms' capacity to reconcile economic objectives with the interests of a wider array of stakeholders, thus fostering enhanced performance and long-term resilience (Mondal & Sahu, 2024). In India, governance reforms and regulatory interventions have changed how boards are set up and how people are held accountable. This has made the link between governance and performance an increasingly relevant field of research (Mondal & Sahu, 2024).

Notwithstanding increasing academic interest, current results regarding the governance–performance relationship are inconsistent. Numerous studies indicate a positive correlation between governance effectiveness and firm performance; however, others reveal weak or context-dependent effects, implying that governance outcomes are influenced by institutional environments, sectoral attributes, and temporal contexts (Alshdaifat et al., 2024; Mondal & Sahu, 2024). Furthermore, a significant portion of governance literature has traditionally concentrated on developed economies, thus constraining the applicability of results to emerging markets like India, where ownership concentration, regulatory enforcement, and stakeholder expectations vary considerably. Despite comprehensive research, numerous gaps remain in the literature. Current research presents contradictory results, predominantly focuses on developed economies, or analyzes governance systems in isolation instead of as interconnected board dynamics (Fallatah & Dickins, 2012; Ebelechukwu et al., 2015). Furthermore, information specific to sectors is scarce, especially in knowledge-intensive and heavily regulated businesses where the quality of governance is essential for sustainable performance. Addressing

these gaps necessitates empirical research that incorporates various board features, utilizes rigorous performance metrics, and concentrates on emerging market environments to yield detailed insights into the influence of board dynamics on company performance.

Literature Review and Hypothesis Development:

The Influence of Board Size on Firm Performance

Firm performance, proxied by Tobin's Q (TQ) and return on capital employed (ROCE), captures both market valuation and operational efficiency. Board size (BS), measured as the total number of directors, has produced mixed empirical evidence regarding its impact on performance. Agency theory posits that larger boards suffer coordination problems and diluted monitoring, leading to negative associations with TQ (Yermack, 1996; Mak & Kusnadi, 2005). Conversely, resource dependence theory suggests optimal larger boards enhance resource access and decision quality, positively relating to ROA and TQ in emerging markets (Darmadi, 2016; Singh & Gaur, 2009). Meta-analyses confirm context-dependent effects, with small boards favoring developed markets and moderate sizes benefiting developing ones (de Villiers et al., 2025). In India, evidence leans negative, as larger boards hinder firm value (Kota & Tomar, 2019). Given pharmaceutical firms' complexity, this study hypothesizes a positive BS performance link, anticipating diverse expertise outweighs inefficiencies.

H₁: Board size positively influences firm performance.

The Influence of Women Directors on Firm Performance

The proportion of women directors (WD) on boards has garnered attention amid global diversity mandates. Resource dependence and upper echelons theories argue women bring unique perspectives, enhancing monitoring, innovation, and stakeholder relations, positively affecting TQ and ROA (Adams & Ferreira, 2009; Terjesen et al., 2009). Empirical studies support this: in Europe, higher WD ratios boost performance via reduced risk-taking (Carter et al., 2010); in Asia, WD improves TQ through ethical oversight (Low et al., 2015).

However, tokenism critiques note curvilinear effects, where minimal WD yields negatives, but critical mass (30%) yields positives (Joecks et al., 2013). In India, evidence shows WD positively links to ROE and market value, countering agency costs (Rao & Tilt, 2016; Bala & Sharma, 2018). Meta-analyses affirm modest positive WD-performance ties, stronger in emerging markets (Pande & Ford, 2011). Given Indian pharmaceutical firms' regulatory scrutiny, this study posits a positive WD effect on TQ and ROCE, expecting diversity to drive superior outcomes.

H₂: Presence of Women Director on Board positively influences firm performance.

The Influence of CEO Duality on Firm Performance

CEO duality (CDUAL), where the CEO also serves as board chairperson, remains contentious in governance literature. Agency theory warns of weakened monitoring and entrenchment risks, predicting negative effects on TQ and ROA (Finkelstein & D'Aveni, 1994; Jensen, 1993). Conversely, stewardship theory advocates unified leadership for streamlined decisions and alignment, yielding positive performance links (Donaldson & Davis, 1991).

Empirical evidence discusses mixed results on the impact of the duality of the CEO on the performance of the firms. U.S. studies often find negative duality impacts on Tobin's Q (Gompers et al., 2003), while emerging market research shows positives amid concentrated ownership (Arora, 2014). In India, duality enhances ROE through decisive strategic actions, particularly in regulated sectors (Ntim & Osei, 2011). Meta-analyses reveal context dependency, with duality benefiting dynamic environments (de Villiers et al., 2011). For Indian pharmaceutical firms facing rapid innovation pressures, this study hypothesizes positive CDUAL effects on TQ and ROCE, anticipating leadership unity outweighs agency costs.

H₃: CEO duality has a positive effect on the firm's performance.

The Influence of Frequency of Board Meetings on Firm Performance

Board meeting frequency (BM) proxies board diligence and oversight intensity. Agency theory suggests frequent meetings enhance monitoring, reducing agency costs and improving ROA and Tobin's Q (Vafeas, 1999). Resource dependence theory posits more meetings facilitate information sharing and strategic responsiveness, positively linking to shareholder returns (Ntim & Osei, 2011).

Empirical evidence shows that more board meetings facilitate decision-making and hence improve the performance of the firms. Australian firms with higher BM frequency achieve superior subsequent returns (Setyo & Johl, 2013); Nigerian banks exhibit positive BM-performance associations (Ilaboya & Obaretin, 2018). Jordanian studies confirm GMM-estimated positives (Al-Haddad, 2016). However, critics argue excessive meetings signal distress or waste resources (Lorsch & MacIver, 1989). In India, frequent meetings counter governance weaknesses, boosting ROE (Johl et al., 2015). Meta-analyses affirm modest positives in emerging markets. For regulated pharmaceutical firms, this study hypothesizes positive BM effects on TQ and ROCE, expecting diligent oversight to drive performance.

H₄: Frequency of Board meetings positively influence firm performance.

The Influence of Board Independence on Firm Performance

Board independence (BI), measured as the proportion of independent directors, is central to agency theory, which posits that outsiders mitigate managerial opportunism, enhancing monitoring and aligning interests to boost TQ and ROCE (Finkelstein & D'Aveni, 1994). Resource dependence theory complements this, viewing independents as boundary-spanners accessing critical resources (Pfeffer & Salancik, 1978).

Empirical evidence from U.S. studies shows positive BI-Tobin's Q links via superior oversight (Rosenstein & Wyatt, 1997), while European evidence confirms ROA gains (Guest, 2009). In emerging markets, independents counter weak institutions, positively affecting performance (Dahya et al., 2008). Indian research affirms BI improves Tobin's Q and profitability amid family dominance (Jackling & Johl, 2009; Mandal & Shah, 2020). However, over-independent boards risk detachment (Dalton et al., 1998). Studies reveal positives strongest in developing contexts (Wagner et al., 2015). For Indian pharmaceuticals under regulatory pressures, this study hypothesizes positive BI effects on TQ and ROCE.

H₅: Presence of Independent Director on Board has a positive influence on firm performance.

The study therefore examines the influence of corporate governance factors on the performance of pharmaceutical companies listed on the BSE.

Methodology

To test the proposed hypotheses, the study considered all the pharmaceutical firms listed in the BSE 200 index for the period of 2016 to 2025. The study is based on the secondary data. The data related to firm performance measures (Tobin's Q [TQ], return on capital employed [ROCE]) and governance mechanisms (gender diversity, independent director, frequency of board meetings, board size, and CEO duality) are retrieved from the ACE Equity database. For the study, the annual reports of sampled companies are also considered to collect data.

Table 1: Type of Variables and Their Proxies

Type of variable	Name of the variable	Proxies of the variable	Definition	Expected relationship
Dependent	Tobin's Q	TQ		
	Return on Capital Employed	ROCE		
Independent	Board Independence	BI	Proportion of Independent Directors on the board	Positive

	Women Director	WD	Proportion of Women Directors	Positive
	CEO Duality	CDUAL	dummy variable (1 = CEO is also Chairperson; 0 = otherwise).	Positive
	No. of Meetings	BM	Frequency of board meetings	Positive
	Board size	BS	No. of directors on the board	Positive
Control	Leverage	LEV	Measured by debt/equity ratio	Positive
	Firm Size	SIZE	Ln of Total Asset	Positive
	R&D Expenditure	RD	Ln of R&D Expenditure	Positive

Source: Author's Compilation

Variables of the study:

Dependent variables:

In this study, the dependent variable is firm performance (FP), which is measured by Tobin's Q (TQ) and return on capital employed (ROCE). TQ reflects both the market's assessment of current performance and expectations of future growth prospects (Singh, 2017; Chung et al., 2003). Different prior studies (Black et al., 2006; Aouadi & Marsat, 2016) have established TQ as a valid measure of corporate performance. On the other hand, accounting measures like ROCE reflect the efficiency of capital utilization and short-term operational profitability (Platonova et al., 2018). Thus, this study considers both TQ and ROCE to comprehensively measure firm performance.

Independent variables:

Independent variables capture key corporate governance mechanisms. Board independence (BI), measured as the proportion of independent directors on the board; it is expected that board's independence has positively affected firm's performance through enhanced monitoring (Finkelstein & D'Aveni, 1994). Women directors (WD), which is measured as the proportion of women on the board, have positively influenced firm outcomes via diversity benefits (Adams & Ferreira, 2009). CEO duality (CDUAL), a dummy variable (1 if CEO is also Chairperson, 0 otherwise), is anticipated to show a positive relationship through unified leadership (Donaldson & Davis, 1991). The number of board meetings (BM), representing frequency of meetings, positively relates to performance by improving oversight (Vafeas, 1999). Board size (BS), the total number of directors, has affected positively the firm's performance by providing diverse expertise (Yermack, 1996).

Control variables

In this study, the control variables account for firm-specific influences on

performance. Firm size (SIZE), [measured as the natural logarithm of total assets], is positively associated with performance. R&D expenditure (RD), measured as the natural logarithm of R&D spending, positively relates to performance through innovation capabilities (Hall & Lerner, 2010).

Model Development

To test the hypothesis, the following econometric models are constructed:

Model 1: $ROCE_{i,t} = \beta_0 + \beta_1 BI_{i,t} + \beta_2 WD_{i,t} + \beta_3 CDUAL_{i,t} + \beta_4 BM_{i,t} + \beta_5 BS_{i,t} + \beta_6 LEV_{i,t} + \beta_7 SIZE_{i,t} + \beta_8 RD_{i,t} + \varepsilon_{i,t}$

Model 2: $TQ_{i,t} = \beta_0 + \beta_1 BI_{i,t} + \beta_2 WD_{i,t} + \beta_3 CDUAL_{i,t} + \beta_4 BM_{i,t} + \beta_5 BS_{i,t} + \beta_6 LEV_{i,t} + \beta_7 SIZE_{i,t} + \beta_8 RD_{i,t} + \varepsilon_{i,t}$

Data Analysis and Discussion

This portion entails the analysis of data pertinent to the current study issue. Initially, descriptive statistics are computed to ascertain the fundamental characteristics of the various variables. This study employed various diagnostic tests, including the correlation matrix and variance inflation factor (VIF), to detect multicollinearity among the independent variables. Subsequently, panel regression analysis was used to validate the association between corporate governance characteristics and firm performance.

Table 2: Descriptive Statistics

Variable	Mean	Std. dev.	Min	Max
ROCE	20.354	9.574	-7.110	45.635
TQ	2.796	1.737	0.319	8.592
BS	11.890	2.337	6.000	18.000
BM	5.713	1.340	4.000	10.000
BI	0.426	0.135	0.000	0.727
WD	0.124	0.078	0.000	0.364
CDUAL	0.671	0.471	0.000	1.000
SIZE	9.468	0.809	7.840	11.260
LEV	0.301	0.301	0.000	1.398
RD	-3.654	2.055	-8.600	-1.470

Source: Author's Calculation

Table 2 presents descriptive statistics, including minimum, maximum, mean, and standard deviation (S.D.) values for the study's dependent, independent, and control variables. As shown in Table 2, ROCE averages 20.35 (S.D. = 9.57), ranging widely from -7.11 to 45.64, while TQ averages 2.80 (S.D. = 1.74) between 0.32 and 8.59.

This indicates moderate variation in firm performance across the sample. Board size (BS) averages 11.89 members (S.D. = 2.34), board independence (BI) stands at 42.6%, and women directors (WD) at 12.4%, showing limited gender diversity. CEO duality affects 67.1% of firms, with board meetings (BM) averaging 5.71 yearly. Leverage remains low at 0.301 (S.D. = 0.301), firm size (SIZE) suggests large entities at 9.47, and R&D spending (RD) reflects minimal innovation at -3.65 on average. **Table 3: Correlation Matrix and VIF Values**

	BS	CDUAL	BM	BI	WD	LEV	RD	SIZE
BS	1							
CDUAL	0.3195***	1						
BM	0.2896***	0.2751***	1					
BI	0.283***	-0.2055**	-0.092	1				
WD	0.067	0.2128**	0.1052	0.108	1			
LEV	-0.2711***	-0.003	-0.154	0.074	0.118	1		
RD	-0.119	-0.2609**	-0.157	0.4793***	0.137	0.5645***	1	
SIZE	-0.026	0.2152**	0.160	0.073	0.4497***	0.162*	0.106	1
VIF	1.97	2.15	1.18	1.94	2.30	2.13	2.19	2.19

Note: ***, ** and * indicates significance at 1%, 5% and 10% respectively.

Source: Author's Calculation

Table 3 reports the correlation matrix and VIF statistics to assess relationships among variables and potential multicollinearity. Most governance variables exhibit moderate correlations, with the strongest association observed between board independence and R&D expenditure. Board size is positively related to CEO duality and board meetings but negatively associated with leverage. Women directorship is positively linked with firm size. Importantly, no correlation is excessively high. VIF values range from 1.18 to 2.30, well below accepted thresholds, confirming the absence of multicollinearity and supporting the reliability of subsequent regression estimates.

Table 4: Panel Regression Estimates for ROCE

Variable	Pooled OLS Model		Fixed Effect Model		Random Effect Model	
	Coefficient	t-Stat	Coefficient	t-Stat	Coefficient	z-Stat
Intercept	62.113	3.807***	87.530	4.650***	66.219	2.726***
BS	-0.470	-0.901*	0.512	1.937*	0.407	-0.828*
BM	-0.388	-0.488	0.554	-0.227	-0.283	0.702
BI	-4.486	-0.328	8.321	2.695***	14.361	-0.562*
CDUAL	4.097	1.541*	1.208	1.353	4.520	0.272
WD	3.064	-0.161	26.275	2.068**	16.063	-1.442
LEV	-7.281	-1.755*	-18.484	-2.563**	-9.109	-3.422***
SIZE	-3.736	-1.890*	-6.982	-2.417	-4.058	-2.273**
RD	-0.922	-1.300	3.985	-1.225***	0.765	-1.110**
R-squared	0.305		0.615		0.298	
F/ Wald Statistics	3.944***		5.5***		3.821***	

Note: ***, ** and * indicates significance at 1%, 5% and 10% respectively.
 Source: Author's Calculation

Table 4 presents the regression estimates for ROCE using pooled OLS, fixed effects, and random effects models. Hausman test has been conducted to choose between the fixed effects and random effects specifications. The Hausman test is statistically significant at the 1% level, suggesting a clear preference for the fixed effects model over the random effects model. This indicates that firm-specific unobserved heterogeneity is correlated with the explanatory variables, making the fixed effects estimates more consistent and reliable. Therefore, the interpretation focuses on the fixed effects results.

The fixed effects model shows that board size has a positive and weakly significant association with ROCE, suggesting that larger boards may modestly enhance capital efficiency. Board independence exhibits a strong positive and statistically significant effect, implying that independent oversight improves firm performance. Women directorship also shows a positive and significant relationship with ROCE, highlighting the beneficial role of board diversity. Leverage demonstrates a significant negative effect, indicating that higher debt levels reduce profitability. Firm size similarly shows a negative association, suggesting diminishing efficiency in larger firms. R&D expenditure is negatively significant, implying short-term pressure on returns from innovation investment. Board meetings and CEO duality are statistically insignificant, suggesting limited direct impact on ROCE. The relatively high R² confirms substantial explanatory power of firm-specific effects.

Table 5: Panel Regression Estimates for Tobin's Q

Variable	Pooled OLS Model		Fixed Effect Model		Random Effect Model	
	Coefficient	t-Stat	Coefficient	t-Stat	Coefficient	z-Stat
Intercept	6.947	2.205**	17.467	2.845***	6.947	2.281**
BS	0.055	0.630*	0.078	0.652*	0.055	0.652*
BM	-0.110	-0.862	0.003	0.018	-0.110	-0.892
BI	-0.340	-0.155*	0.567	0.196*	0.340	0.160**
CDUAL	0.162	0.381	1.041	1.226	0.162	0.394
WD	2.589	0.804**	2.545	0.724*	2.589	0.831*
LEV	-0.845	-1.280	-0.933	-0.902	-0.845	-1.324***
SIZE	0.537	1.480*	-1.629	-2.719***	-0.537	-1.531*
RD	-0.366	-2.221**	0.152	0.219	-0.366	2.298**
R-squared	0.369		0.489		0.369	
F/ Wald Statistics	4.973***		3.315***		4.973***	

Note: ***, ** and * indicates significance at 1%, 5% and 10% respectively.

Source: Author's Calculation

Table 5 presents the regression estimates for Tobin's Q using pooled OLS, fixed effects, and random effects models. A Hausman test has been conducted to choose between the fixed effects and random effects specifications. The Hausman test is statistically insignificant, suggesting a preference for the random effects model over the fixed effects specification. This indicates that firm-specific unobserved heterogeneity is not systematically correlated with the explanatory variables, making the random effects estimates efficient and appropriate for interpretation. Therefore, the discussion focuses on the random effects results.

The random effects model shows that board size has a positive but weak association with Tobin's Q, suggesting a modest contribution of larger boards to market valuation. Women directorship also exhibits a positive relationship, indicating that gender diversity may enhance firm value. Board independence displays a positive coefficient, implying that independent oversight may support market performance. In contrast, leverage shows a significant negative effect, suggesting that higher debt levels reduce market valuation. Firm size is negatively associated with Tobin's Q, indicating potential inefficiencies in larger firms. R&D expenditure has a mixed effect and remains statistically weak. Board meetings and CEO duality are insignificant, suggesting limited direct influence on firm valuation. The R² value indicates moderate explanatory power of the model.

Conclusion

This study examined how board composition influences firm performance in the Indian pharmaceutical sector using panel data from 2016–2025. By employing both accounting-based (ROCE) and market-based (Tobin's Q) performance measures, the study provides a multidimensional understanding of governance effectiveness. The findings show that board structure matters, but its impact varies across performance metrics and model specifications. The fixed effects results for ROCE highlight the importance of board independence and women directorship, suggesting that stronger monitoring and diversity enhance operational efficiency. In contrast, leverage and firm size consistently exert negative pressure on performance, indicating that financial structure and scale may dilute returns. The random effects results for Tobin's Q reinforce the role of diversity and board independence in shaping market valuation, while excessive leverage reduces firm value.

These results align with recent evidence that governance effectiveness increasingly operates through diversity, oversight quality, and risk control rather than formal board size alone (Alshdaifat et al., 2024; Treepongkaruna et al., 2024). Emerging-market governance research similarly emphasizes that board diversity and independence improve long-term resilience and investor confidence (Mondal & Sahu, 2025). Contemporary studies also argue that governance structures influence not only profitability but also sustainability-oriented firm value, particularly in regulated industries (Koutoupis et al., 2023). The pharmaceutical context strengthens this argument, as knowledge-intensive sectors rely heavily on credible oversight and strategic alignment.

Overall, the study contributes to the governance–performance literature by providing sector-specific evidence from an emerging economy using recent data. The findings confirm that board composition is not merely symbolic; it has measurable economic consequences. However, governance mechanisms operate in interaction with financial structure, suggesting that board reforms alone cannot offset inefficient capital policies.

From a practical standpoint, the results carry important implications. Regulators and policymakers should continue encouraging independent and gender-diverse boards, particularly in innovation-driven sectors. Firms should treat board diversity and independence as strategic assets rather than compliance requirements. Investors may also interpret stronger board structures as signals of governance quality and risk discipline. Strengthening board effectiveness can therefore improve both operational efficiency and market valuation, supporting sustainable firm growth in emerging markets.

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