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Board Diversity as a Channel for Firm Resilience and Performance During Crises: Evidence from India

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Abstract

This paper examines how the demographic diversity of directors, their educational background, nationality, and women representation above the mandated threshold improve firm resilience during economic crises. Using a set of listed firms from 2010 to 2021 on the National Stock Exchange (NSE) NIFTY 500 index, we analyze the influence of these diversity attributes on firm outcomes, measured by Return on Assets (ROA) and Tobin's Q during both stable and crisis periods with the COVID-19 pandemic as an illustrative crisis context. We find a positive and statistically significant relationship between board diversity and firm outcomes during normal times; however, during crisis periods, the relationship is insignificant, suggesting that diversity alone may not enhance firm resilience under high-pressure scenarios. The composite diversity index supports the results that show that board diversity influence diminishes during economic shocks. The study contributes to the corporate governance literature by highlighting the contextual limitations of board diversity during crises and calls for policymakers to integrate board diversity into broader risk management frameworks.

Key Words: Board Diversity, Firm Resilience, Crisis Management, Firm Performance, Gender Diversity, Demographic Diversity, Educational Background

JEL: G3, G21, G22, G31, G34

1. Introduction

In recent years, the importance of corporate governance has become more apparent as firms manage through economic and operational crises (Sitio, N., & Tatum, J. 2025). In this area, board diversity has emerged as a key factor enabling firms to respond to challenges effectively. The heterogeneity of board members in terms of age, gender, education, and nationality can enhance the quality of board deliberations, which improves strategic responses. Extending this, we examine how board diversity serves as a mechanism for firm resilience and performance during crises, with the COVID-19 pandemic serving as an illustrative example within the Indian corporate landscape.

Board diversity combines individuals with dissimilar credentials, experiences, and perspectives on the board of directors. Diversity broadly ranges from differences in gender,

education, nationality, and professional background. For example, McKinsey & Company[1] cited that diversity on the board correlates with superior performance in profitability. This would be because diversity within boards augments strategic decisions to capitalize on opportunities for enhanced performance. Board diversity is an extensively studied dimension in the literature, and many empirical studies have cited its possible benefits. Carter et al. (2003) found that higher board diversity can positively impact firm performance because more diverse views and skills enable firms to make better decisions and adapt to changed circumstances. On the other hand, Van Peteghem et al. (2018) found that the existence of sub-groups in the board defined by diversity dimensions negatively correlates with the overall firm performance. According to Masulis et al. (2012), foreign directors play a significant role in firm performance, as they bring different experiences and opinions to boards, widening the areas in which boards can make decisions. On the contrary, as per Jhunjhunwala and Mishra (2012), diversified teams often create conflicts that, if not controlled, adversely affect the firm performance. The literature, therefore, postulates that the relationship between board diversity and firm performance is not always clear-cut and that the effectiveness of boardroom diversity is essentially contingent upon the unique firm-specific internal environment. Additionally, board diversity is necessary in times of crisis since this is an area where high-pressure business situations require interaction. According to the Global Center for Corporate Governance Research[2], crises require speedy, strategic responses, and a heterogeneous board induces fresh thinking to make better decisions during adversarial conditions.

The ability of a board to integrate and leverage its diverse viewpoints plays a central role in crisis management. Creary et al. (2019) explained that the culture of inclusion and consensus plays a significant role in gaining full benefits from diversity. Thus, boards with open communication are more capable of realizing the potential strengths of their diverse board members. Age diversity in boards improves firm performance and allows firms to pass through unfavorable times (Arioglu, 2021). Farag and Mallin (2017) added that a minimum threshold of female representation on the board can reduce the banks' susceptibility to financial crises.

Legislative reforms, including the Companies Act of 2013[3] and the Securities and Exchange Board of India (SEBI) regulations have mandated board independence and gender diversity quotas in India. With the emphasis on board diversity being one of the crucial ingredients of good corporate governance, the inter-relationship of board diversity and firm performance during crises merits theoretical and empirical evidence. Extant literature discusses the general impact of board diversity on firm performance, giving mixed results across several contexts and diversity features. However, limited research has examined the role of board diversity in reducing firm vulnerability during crises, that is, the firm's preparedness to manage the crises. Additionally, most empirical studies have also focused on the gender diversity of the board compared to other attributes such as nationality, age, tenure, experience, education, and more in the context of

[1] McKinsey & Company. (2015). Why Diversity Matters. Retrieved from https://www.mckinsey.com/capabilities/people-and-organizational-performance/our-insights/why-diversity-matters

[2] Global Center for Corporate Governance. (2019). Stepping in: The board's role in crisis management. Deloitte. Retrieved from https://www2.deloitte.com/content/dam/Deloitte/us/Documents/center-for-board-effectiveness/us-risk-global-on-the-boards-agenda-crisis-management.pdf

[3] Chapter XI, The Companies Act, 2013. https://www.mca.gov.in/content/dam/mca/pdf/CompaniesAct2013.pdf

developed countries. In this paper, we bridge this gap with an empirical analysis of the relationship between board diversity and firm outcomes during crises in the Indian context. We define board diversity attributes as the ratio of post-graduate, foreign, and female directors on corporate boards exceeding the critical mass to the board size. In addition, we create a composite diversity index combining these diversity attributes to capture the overall level of board diversity. Our measures of firm performance are Return on Assets (ROA) and Tobin's Q.

We find a positive and significant relationship between board diversity and firm outcomes during normal times; however, during crisis periods, we find an insignificant relationship with firm outcomes. Our results prove robust to controls for firm size, industry sectors, and other corporate governance measures and provide empirical evidence within the Indian context that while board diversity enhances a firm's performance, its influence during crises is minimal.

The rest of the paper is organized as follows. Section 2 provides an overview of the theoretical foundations, Section 3 reviews related literature, and Section 4 describes data and variable formation. Section 5 outlines the empirical methodologies, Section 6 presents the regression results, Section 7 discusses empirical findings, and Section 8 concludes the paper.

2. Theoretical Foundations

Three major theories, the agency, resource dependence, and stakeholder theory, provide a context for studying whether board diversity enhances firm resilience and performance. Agency Theory (Jensen & Meckling, 1976) suggests that diverse boards improve oversight and mitigate managerial self-interest (Adams & Ferreira, 2009). Resource Dependence Theory (Pfeffer & Salancik, 1978) highlights how diverse boards expand access to resources, networks, and expertise (Hillman et al., 2000). Stakeholder Theory (Freeman, 2005) emphasizes that inclusive decisions may foster trust and sustainability (Jo & Harjoto, 2011). Additionally, the Stewardship Theory (Donaldson & Davis, 1991) postulates that a diverse board promotes managerial collaboration and resilience during a crisis (Carter et al., 2003). Empirical studies confirm that diverse boards contribute to firm stability during crises (Zhang et al., 2025). We build on these theoretical foundations and examine board diversity as a driver of firm resilience and performance in the Indian corporate landscape.

3. Literature Review and Hypothesis

The composition of firms' board of directors regarding gender, age, nationality, education, and expertise is swiftly changing due to the globalized and uncertain institutional context (Alharbi et al., 2022). While considerable research from scholars and practitioners shows several perceived advantages of board diversity, empirical evidence concerning its relationship with firm outcomes remains mixed. This literature review examines the relationship between board diversity attributes such as gender, age, education, and expertise and firm outcomes, particularly during crises. It also examines the moderation effects of boards' size and independence on the relationship between boards' diversity and firm resilience during the crisis.

3.1. Gender Diversity and Firm Outcomes

Extensive literature on board diversity has been more focused on gender inclusiveness. Farag and Mallin (2017) examined the effect of gender diversity on European banks when the debt crisis hit the country and found that more the women representation on corporate boards, the less vulnerable

these banks would be to financial risks. A broader perspective on this trend indicated that gender-diverse boards improved financial transparency, followed by a lower prevalence of stock price crashing in the 2007-08 financial crisis (Harakeh et al., 2023). Zolotoy et al. (2022) also confirm this and empirically found that abnormal returns were higher for gender-diverse boards during the COVID-19 pandemic. On the other hand, Adams and Ferreira (2009) found that mandated gender quotas have a detrimental impact on firms with lesser takeover defenses. They showed that the benefits of gender diversity are context-dependent. On the other hand, in a study related to the Netherlands and Denmark, Marinova et al. (2016) showed that there is no significant relationship between board gender diversity and firm performance. Tashfeen et al. (2023) found that the presence of women on boards improves risk management and decision-making, resulting in more sustainable firm performance during crises. In contrast, Azeem et al. (2023) found that high-board gender diversity firms underperformed on stock price recovery during COVID-19, hinting that diverse perspectives need not necessarily translate into a more financially resilient firm. Additionally, a cross-country study of 27 developing nations showed that while increased board gender diversity lowers risk and enhances performance, cultural dimensions, such as individualism, reduce the risk-lowering influence of gender diversity (Mohsni et al., 2021).

3.2. Age Diversity and Firm Outcomes

Age diversity means having people of different ages on the board who bring in new ideas, and build a knowledge bank as an organization, leading to a culture of learning and better management of short-term as well as long-term challenges. Research findings support this view that age diversity positively correlates with firm performance and risk management (Arioglu, 2021). It was further found that age-diverse boards bring broader perspectives even to the Corporate Social Responsibility (CSR) sphere, positively influencing CSR performance (Gardiner, 2024).

3.3. Expertise Diversity and Firm Outcomes

Expertise diversity constitutes board members from varied education, nationality, and professional backgrounds to manage business environments better and enhance firms' financial outcomes. Prior research supports this view, and Gray and Nowland (2017) stated that a blend of legal, finance, and consulting expertise of the board members of Australian firms was found to enhance shareholder returns. Bagh et al. (2023) showed that an index made up of six diversity variables, gender, age, finance, education, and tenure, is positively associated with the firm's financial performance. Further, Elnahass et al. (2023) analyzed how board diversity (gender, education, nationality) influences bank stability across 14 countries. They found that female directors and Ph. D holders enhance stability, while foreign directors reduce it. Bhateja (2022) noted that educational diversity on Indian boards increases risk-taking and hurts stock performance, while experience diversity has no significant influence. However, Pandey et al. (2022) found that the influence of board diversity on firm performance is positive, but the extent of influence depends on ownership structure and industry type.

3.4. Ethnic Diversity and Firm Outcomes

Ethnic diversity influences the firm's ability to serve diverse customers in global markets. Estelyi and Nisar (2016) showed that boards with diverse nationalities are positively and significantly related to a firm's international market operations and performance. In their study of Fortune 1000 firms, Carter et al. (2003) observed a positive relationship between ethnic diversity and firm value.

They found that a diverse board with members from different nations enhanced the navigation of global markets. Conversely, Guest (2019) found no evidence of ethnic diversity's influence on firm performance or board monitoring outcomes like CEO compensation. Significantly, Hsu et al. (2019) developed a composite diversity index that considers gender, age, tenure, and professional background for Chinese listed firms and found that board diversity positively influences operating performance with a rider that firms with significant strategic changes showed a negative correlation with diversity.

3.5. Board Characteristics and Firm Outcomes

Board characteristics like size and independence often interact with diversity and its relationship with firm outcomes. Firms with smaller boards will enable efficient and quick decision-making during crises and enhance financial outcomes (Yermack, 1996). However, Borlea et al. (2017) found that board characteristics, like the ratio of non-executive to executive members, had minimal association with the performance of Romanian firms. It is found in the Indian scenario that while board size positively influenced firm performance, the proportion of independent directors had a negative association (Goel et al., 2022). In contrast, Van Peteghem et al. (2018) found that one of the dangers with boards that are highly diverse is the sub-grouping of directors, which diminishes their collective effectiveness. Additionally, Croci et al. (2024) added that board independence worsens crisis performance, while larger boards and busy directors improve firm resilience during disruptions. However, the existing literature shows diverging opinions and mixed empirical support on whether board diversity is significantly related to firm outcomes (Zattoni et al., 2023).

Board diversity brings diverse perspectives to the table and, therefore, improves strategic decision-making. Kalita (2024) pointed out that a board made up of different backgrounds brings knowledge to the table in terms of problem-solving and responding. Sabaratnam et al. (2024) further mentioned that gender-diverse boards not only enhance firm adaptability and stakeholder trust but also ensure continuity and stability during turbulent times. Moreover, diversity in education and country of origin enhances the firm's capacity for managing global disruption (Nketsiah & Van der Westhuizen, 2024). While literature highlights the significance of gender diversity, little research digs into the significance of going beyond the stipulated threshold or expanding the dimensions of diversity to make crisis management more efficient. We bridge this gap in this paper and examine the influence of board diversity measures such as education, gender above the threshold, and nationality and their influence on firm resilience and performance in the Indian context.

Based on the above analysis, we posit the following hypotheses:

H 1**:** Board diversity has a positive relationship with firm performance, as measured by ROA and Tobin's Q, under normal conditions.

H 2: Board diversity is more important during the crisis.

4. Data and Variables

4.1. Data

Our sample consists of listed companies on the NSE included in the NIFTY 500 index, covering the period from 2010 to 2021. The NIFTY 500 is a comprehensive stock market index representing

approximately 92% of NSE-listed stocks' free float market capitalization as of September 30, 2024[4]. Director profile data, including age, gender, education, nationality, and board roles (e.g., executive/non-executive, independent/non-independent, promoter/non-promoter), were sourced from the Indian Boards Database maintained by Prime Infobase. This is a reliable resource for corporate governance data in India (Biswas & Kumar, 2022). Financial performance data were extracted from the Prowess database, developed by the Centre for Monitoring Indian Economy (CMIE), which has been widely used in finance and governance research (Sarkar & Selarka, 2021; Biswas, 2021; Srivastava et al., 2018). We create a dataset of 42,959 directorships (director firm-years) and 4,487 firm-year observations by integrating director profile data from Indian Boards with financial data from Prowess.

4.2. Variables Structure

We assess the association of the board diversity attributes with firm outcomes represented by ROA and Tobin's Q as dependent variables. While ROA, a profitability ratio, reflects how efficiently a company utilizes its assets to generate earnings, Tobin's Q captures the firm's market value and prospects.

We employ four board diversity attributes as explanatory variables, each representing different aspects of diversity: education, nationality, and gender, akin to Alharbi et al. (2022) and Adams and Ferreira (2009). The fourth dimension is the diversity index which we construct to capture the combined effect of the three attributes mentioned above. Several previous studies have explored diversity indices, including Haynes and Hillman (2010), who examined board capital, and Forbes and Milliken (1999), who focused on cognitive diversity. The diversity index is constructed using a structured approach.

First, a dummy variable is assigned for each of the three diversity attributes to quantify the presence or absence of it. This variable equals one if that attribute is present on board and zero otherwise. Secondly, the sum of these dummies for a firm in a particular year is calculated as the diversity score, with a value from zero to three, where three indicates that all three diversity attributes are present. The diversity index is obtained by dividing the diversity score by the maximum possible value of three, varying between zero, representing no diversity, and one, indicating maximum diversity. We employ the diversity index, which is a quantified measure of composite board diversity, as an explanatory variable in the regression analysis to explore how it relates to firm outcomes.

We include COVID-19 as a dummy variable, coded as one during 2020 and 2021 and zero otherwise, to capture the impact of the pandemic in our regression analysis. We include four interaction variables to explore the relationship between board diversity and firm outcomes during crises. These include the interactions between the board share of postgraduate, foreign, and women directors above the critical mass and the diversity index with the crisis dummy.

Akin to the existing literature, we incorporate several control variables potentially influencing firm outcomes. These include the ratio of independent and promoter directors (Sarkar

[4] https://www.nseindia.com/products-services/indices-nifty500-index

& Sarkar, 2009), board size (Yermack, 1996), directors' average age (Li & Wahid, 2018), the logarithm of total assets (firm size) (Sarkar & Sarkar, 2018), and the logarithm of firm age. Additionally, year-specific dummy variables are included to control for unobserved time effects. Finally, a set of dummy variables is created based on the National Industry Classification Code, provided in the Prowess database, to account for industry-specific differences and included in the analysis. Table 1 provides the list and the description of the variables used in the regression analysis.

Table 1: Variable Names and Description.

Variable Name	Description	Data Source
Post-Graduate Directors Board Share	Fraction of Post-Graduate Directors to Board Size.	Indian Boards
Foreign Directors Board Share	Fraction of Foreign Directors to Board Size.	Indian Boards
Women Directors above critical mass	A dummy variable that equals one if the number of Women Directors is above the threshold minimum norm of 1 and 0 otherwise.	Indian Boards
Diversity Index	This index is calculated as a ratio of the sum of the dummy variable values for three diversity attributes: Postgraduate directors, Foreign Directors, and Women directors above the threshold minimum norm of one on the Board for each firm year to the maximum possible value of 3. It takes a value between 0 and 1.	Indian Boards
Independent Directors Board Share	Fraction of Independent Directors to Board Size.	Indian Boards
Promoter Directors Board Share	Fraction of Promoter Directors to Board Size.	Indian Boards
Directors Average Age	The average age of directors on board as of the last day of the financial year.	Indian Boards
Board Size	Number of directors on board as of the last day of the financial year.	Indian Boards
Crisis Dummy	A dummy variable that equals one if the year is 2020, 2021, and zero otherwise	Computed
ROA	The ratio of profits after taxes to the average total assets.	Prowess
Tobin's Q	Tobin's Q is the ratio of the sum of the book value of debt and the market value of equity to the book value of total assets.	Prowess
Firm Size	Logarithm of total assets as reflected in the Firm's balance sheet.	Prowess
Firm Age	The logarithm of the age of the Firm is computed as the difference between the respective financial year and the incorporation year of the Firm.	Prowess
Industry Category	This variable indicates the firm's industry classification based on the National Industrial Classification Code provided in the Prowess database.	Prowess

This Table presents the names of the variables used in the empirical analysis and their description.

5. Empirical Methodology

We estimate the following equation to understand the relationship between board diversity and firm outcomes:

$$\textit{firm outcomes}_{(it)} = \alpha + \beta * \textit{diversity attributes}_{(it)} + \gamma * \textit{interaction variables}_{(it)} + \theta * \textit{control variables}_{(it)} + \delta_{(it)} + \eta_{(it)} + \varepsilon_{(it)} \quad (1)$$

Here, firm and year are indicated by the indices i and t. At the same time, $\delta_{(it)}$ controls for macroeconomic changes and time trends, $\eta_{(it)}$ covers industry sector-specific fluctuations, and $\varepsilon_{(it)}$ consists of random shocks affecting firm i in year t, adding robustness to the estimations.

6. Empirical Findings

6.1. Descriptive Statistics

The descriptive statistics are presented in Table 2.

Table 2: Descriptive Statistics.

	N	Minimum	Maximum	Mean	Std. Deviation
Post-Graduate Directors' Board Share	4487	0.00	1.00	0.71	0.20
Foreign Directors' Board Share	4487	0.00	0.78	0.05	0.11
Women Directors above critical mass	4487	0.00	1.00	0.23	0.42
Diversity Index (Ratio)	4487	0.00	1.00	0.50	0.21
Independent Directors' Board Share	4487	0.00	1.00	0.51	0.14
Promoter Directors' Board Share	4487	0.00	1.00	0.15	0.16
Directors Average Age	4487	31.74	78.11	60.65	4.78
Board Size	4487	3.00	23.00	9.57	2.53
Return on_ Assets (Ratio)	4487	-1.21	1.16	0.07	0.09
Tobin's Q (Ratio)	4487	0.08	69.99	2.93	3.15
Log Total Assets	4487	2.94	7.66	4.77	0.77
Log Firm Age	4487	0.00	2.20	1.53	0.29

This Table gives means, standard deviations, and minimum and maximum values of variables used in the regression analysis.

Postgraduate directors' board share is 0.71, implying that 71% of the board is highly educated, while foreign directors' board share is 0.05 or 5%, which is comparatively on the lower side. The mean of women directors exceeding the threshold is 0.23, which infers that 23% of firms exceed the critical mass for gender diversity. The overall average of the diversity index is 0.50, meaning a board diversity of 50%. With respect to firm performance, the average ROA is 0.07, indicating a 7% return on assets of firms and an average Tobin's Q, which is at 2.93, revealing that firms are valued nearly three times their book value. Moreover, the average share of independent directors on board is 0.51, and that of promoter directors is 0.15. This means that 51% of the board members are independent and can ensure strong oversight, and the promoters held 15% of the board seats.

Table 3 summarizes trends in board diversity from 2010 to 2021. The share of directors with postgraduate qualifications rose from 65% to 73%, indicating increased education among board members. The proportion of foreign directors increased slightly from 4% to 5% in 2019. The percentage of women directors above critical mass went up from 9% in 2010 to 45% in 2021.

Table 3: Year-wise Trend of Average Board Diversity Attributes.

Year	N	Post-Graduate Directors Board Share	Foreign Directors Board Share	Women Directors above Critical Mass	Diversity Index	Independent Directors Board Share	Promoter Directors Board Share	Directors' Average Age
2010	313	0.65	0.04	0.09	0.45	0.51	0.11	59.39
2011	327	0.67	0.05	0.08	0.45	0.50	0.11	59.66
2012	336	0.68	0.06	0.10	0.46	0.50	0.11	60.07
2013	342	0.71	0.06	0.11	0.46	0.52	0.18	60.29
2014	346	0.72	0.06	0.10	0.46	0.52	0.18	60.53
2015	350	0.72	0.06	0.13	0.47	0.50	0.16	60.34
2016	365	0.72	0.06	0.19	0.49	0.49	0.15	60.65
2017	384	0.72	0.05	0.22	0.50	0.51	0.15	61.04
2018	405	0.73	0.05	0.27	0.51	0.52	0.16	61.41
2019	421	0.73	0.05	0.37	0.54	0.52	0.16	61.34
2020	438	0.74	0.04	0.42	0.56	0.50	0.15	61.05
2021	460	0.73	0.04	0.45	0.56	0.48	0.15	61.19

This table presents the number of observations (N) and the average value for each year of the Board's diversity measures from 2010 to 2021.

The diversity index, an equally steady upward slant, moved from 0.45 to 0.56, indicating a greater overall diversity of 56% in 2021. The share of independent directors remained consistent between 50% and 52%, showing a stable independent oversight. Lastly, promoter directors' board share gradually increased from 11% to 16%, indicating a moderate rise in promoter presence on the board.

6.2. Correlation Matrix

Table 4 reports the correlation matrix for the variables included in the regression analysis. The board diversity attribute of postgraduate directors' board share negatively correlates with ROA. However, the other diversity measures, such as foreign directors' board share, women directors above critical mass, and the diversity index, positively correlate with ROA. Further, all four board diversity variables positively correlate with Tobin's Q. This shows that more inclusive boards contribute to higher market valuations. Several correlations significantly differ from zero, underpinning the need to include these variables as controls in the regression analysis. Furthermore, none of the correlations are unduly high, suggesting that multicollinearity is unlikely to be an issue in the regression analysis.

Table 4: Correlation Matrix.

		1	2	3	4	5	6	7	8	9	10	11	12
1	Post-Graduate Directors' Board Share	1.											
2	Foreign Directors' Board Share	0.09**	1.										
3	Women Directors above critical mass Dummy	0.08**	0.07**	1.									
4	Diversity Index	0.14**	0.61**	0.70**	1.								
5	Independent Directors' Board Share	0.11**	0.03	-0.01	0.05**	1.							
6	Promoter Directors' Board Share	-0.14**	-0.01	0.03*	-0.01	0.14**	1.						
7	Return on Assets (Ratio)	-0.07**	0.09**	0.02	0.07**	0.09**	0.09**	1.					
8	Tobin's Q (Ratio)	0.04**	0.08**	0.05**	0.08**	0.03	0.10**	0.28**	1.				
9	Board Size	0.06**	0.00	0.19**	0.16**	-0.05**	-0.07**	0.03*	-0.07**	1.			
10	Directors Average Age	0.07**	-0.03*	0.01	0.01	0.27**	0.12**	0.03*	0.03	0.16**	1.		
11	Log Total Assets	0.21**	-0.01	0.15**	0.10**	-0.23**	-0.28**	-0.23**	-0.27**	0.38**	0.07**	1.	
12	Log Firm Age	0.01	-0.03*	0.07**	0.04*	-0.15**	-0.07**	-0.01	-0.08**	0.20**	0.19**	0.21**	1.

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

This table presents the correlation matrix for all variables used for the sample firms. Variables definitions are provided in Table 1.

6.3. Board Diversity and ROA

This section analyses board diversity variables' association with firm outcomes, as measured by ROA, under normal conditions and crisis periods. The results are summarized in Table 5. In column 1, we find a non-significant association between postgraduate directors' share of the board and ROA. This is consistent with evidence that practical experience and diverse perspectives are more useful for improving board effectiveness than degrees alone (Bhagat et al., 2010). Moreover, the interaction term with the crisis dummy variable does not show any significant relationship either, implying that advanced education rather helps in strategic decision-making during stable times but does not help in crisis management. Crises require hands-on experience or specialized knowledge in a domain to make speedy decisions, which can far outweigh formal education, explaining why the relationship is not stronger.

In column 2, we extend the analysis by adding foreign directors' board share. Postgraduate directors' board share results remain consistent with column 1. We find a statistically significant and positive relationship between the foreign directors' board share and ROA. The literature finds that foreign directors on the board can provide diverse perspectives, international experience, and networks that can improve decision-making and global competitiveness (Alharbi et al., 2022). However, the interaction term with the crisis dummy is insignificant, suggesting that while their global expertise and diverse perspectives may be valuable in stable periods, they may not directly contribute to crisis management, where localized knowledge, quick adaptability, and industry-specific experience are often more critical.

Table 5: Relationship between Board Diversity and ROA.

Dependent Variable	*ROA*					
Board Diversity Variables	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Intercept	0.113***	0.112***	0.116***	0.117***	0.117***	0.107***
	(0.024)	(0.024)	(0.023)	(0.023)	(0.023)	(0.022)
Post-Graduate Directors Board Share	-0.004	-0.007	-0.007	-0.005		
	(0.007)	(0.007)	(0.007)	(0.007)		
Post-Graduate Directors Board Share * Crisis Dummy	-0.023	-0.022	-0.021	-0.022		
	(0.015)	(0.016)	(0.015)	(0.015)		
Foreign Directors' Board Share		0.045***	0.042***		0.040***	
		(0.012)	(0.012)		(0.012)	
Foreign Directors' Board Share * Crisis Dummy		-0.006	-0.003		-0.006	
		(0.030)	(0.029)		(0.029)	
Women Directors' above Critical Mass Board Share			0.011***	0.012***	0.011***	
			(0.004)	(0.004)	(0.004)	
Women Directors' above critical mass' Board Share * Crisis Dummy			-0.007	-0.008	-0.007	
			(0.007)	(0.007)	(0.007)	
Diversity Index						0.036***
						(0.007)
Diversity Index * Crisis Dummy						-0.015
						(0.016)
Directors' Average Age	<0.001	<0.001*	0.001**	<0.001*	0.001*	0.001*
	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)
Independent Directors Board Share	0.003	0.003	0.002	0.002	<0.001	-0.002
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Promoter Directors Board Share	0.007	0.006	0.008	0.006	0.007	0.008
	(0.008)	(0.008)	(0.006)	(0.008)	(0.008)	(0.008)
Crisis Dummy	0.013	0.013	0.014	0.014	-0.001	0.003
	(0.011)	(0.011)	(0.011)	(0.011)	(0.006)	(0.01)
Board size	0.004***	0.004***	0.004***	0.004***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Log Total Assets	-0.026***	-0.027***	-0.027***	-0.027***	-0.028***	-0.027***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Log Firm Age	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Category Effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	4487	4487	4487	4487	4487	4487
Adjusted R^2	0.258	0.260	0.261	0.259	0.261	0.262
Pr. > F	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

This Table reports the regression results of the Board Diversity variables on ROA. *** indicates the coefficient is significant at 1% level, ** at 5% and * at 10% significance level. Robust standard errors with the Breusch-Pagan and Koenkar test and White's correction for heteroskedasticity are reported in parentheses.

In column 3, we add women directors above critical mass to the analysis. We find the results for the board share of postgraduate and foreign directors are consistent with columns 1 and

2. The board share of women directors above critical mass is significantly related to ROA, consistent with prior research showing that gender-diverse boards mitigate reputation risk and make better quality decisions (Alharbi et al., 2022). Further, we find that the interaction term with the crisis dummy is insignificant, suggesting that gender diversity does not influence firm performance during crises. One of the possible reasons is that crises often demand rapid responses and specialized expertise, which may dilute the direct influence of gender diversity on firm resilience.

In column 4, we analyze a combination of postgraduate directors' board share and women directors' above critical mass and their influence on ROA. Similarly, in column 5, we examine the relationship of a combination of foreign directors' board share and women directors above critical mass with ROA. In both cases, we find results consistent with columns 1 to 3 discussed above. Finally, in column 6, we find that the diversity index as a composite measure is significantly related to ROA. The interaction term with the crisis dummy is insignificant, implying that crisis management requires rapid decision-making, specialized expertise, and industry-specific adaptability, which may diminish the direct benefits of board diversity observed in stable periods.

The control variable results are consistent with previous literature. The direct and significant relationship between board size and ROA indicates that larger boards can add diverse experience, monitor management more carefully, and enhance operational effectiveness reflected in ROA (Coles et al., 2008). Such a relationship is not significant in the case of independent directors' board share and ROA, which is consistent with the assertion of Sarkar and Sarkar (2009) that independent directors do not always have a positive association with the performance of the firms in India owing to governance constraints in the country. Likewise, the board share of the promoter directors is not significantly related to ROA, and this is reflective of the findings in Khanna and Palepu (2000), which state that the promoters might have an inclination for control rather than for firm performance maximization. The crisis dummy is not statistically significant either, indicating that the COVID-19 pandemic is not related to short-term operations as measured by ROA. Notably, the inverse and significant relation between firm size and ROA indicates operational inefficiencies as firms grow larger relative to smaller and focused firms. We do not find any significant link between ROA and firm age.

H 1 is supported by the empirical results, which revealed that foreign directors' board share and women directors above the critical mass and the diversity index are positively related to ROA under normal conditions. However, our findings do not corroborate hypothesis H 2. This indicates that while board diversity contributes positively to firm performance during stable times, it may not offer an additional advantage in terms of resilience or crisis management during economic downturns.

6.4 Board Diversity and Tobin's Q

We, next evaluate the firms' outcomes measured through Tobin's Q under normal and crisis periods when associating with the board diversity variables. The results are summarized in Table 6. In column 1, we find that postgraduate directors' board share is significantly related to Tobin's Q, indicating that a greater board share of directors with higher degrees has a positive influence on firm valuation. However, we find no significant relationship with firm valuation during crisis

periods, indicating that crisis management requires practical experience and rapid decision-making rather than formal education.

Table 6: Relationship between Board Diversity and Tobin's Q.

Dependent Variable	*Tobin's Q*					
Board Diversity Variables	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Intercept	4.516***	4.495***	4.566***	4.608***	4.645***	4.348***
	(0.566)	(0.564)	(0.550)	(0.555)	(0.568)	(0.560)
Post-Graduate Directors Board Share	0.934***	0.800***	0.793***	0.922***		
	(0.209)	(0.207)	(0.205)	(0.207)		
Post-Graduate Directors Board Share * Crisis Dummy	0.300	0.300	0.326	0.334		
	(0.640)	(0.638)	(0.627)	(0.629)		
Foreign Directors' Board Share		2.663***	2.618***		2.745***	
		(0.381)	(0.377)		(0.384)	
Foreign Directors' Board Share * Crisis Dummy		1.410	1.407		1.408	
		(2.083)	(1.919)		(2.059)	
Women Directors' above critical-mass Board Share			0.158	0.219*	0.160	
			(0.116)	(0.117)	(0.117)	
Women Directors' above critical mass' Board Share * Crisis Dummy			0.064	0.036	0.060	
			(0.251)	(0.258)	(0.256)	
Diversity Index						1.449***
						(0.214)
Diversity Index * Crisis Dummy						-0.337
						(0.571)
Directors' Average Age	0.014	0.018*	0.019**	0.016	0.021**	0.020**
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Independent Directors Board Share	-1.115***	-1.129***	-1.154***	-1.144***	-0.980***	-1.075***
	(0.301)	(0.298)	(0.296)	(0.299)	(0.289)	(0.288)
Promoter Directors Board Share	0.346	0.346	0.327	0.323	0.233	0.231
	(0.311)	(0.311)	(0.311)	(0.311)	(0.308)	(0.303)
Crisis Dummy	-0.805*	-0.844*	-0.906**	-0.867**	-0.677***	-0.453
	(0.461)	(0.456)	(0.433)	(0.438)	(0.208)	(0.356)
Board size	0.092***	0.093***	0.087***	0.085***	0.088***	0.074***
	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
Log Total Assets	-1.100***	-1.133***	-1.141***	-1.111***	-1.103***	-1.085***
	(0.097)	(0.098)	(0.097)	(0.096)	(0.095)	(0.093)
Log Firm Age	-0.306**	-0.306*	-0.306**	-0.306**	-0.315**	-0.329**
	(0.155)	(0.157)	(0.155)	(0.154)	(0.158)	(0.156)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Category Effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	4487	4487	4487	4487	4487	4487
Adjusted R^2	0.271	0.279	0.279	0.271	0.277	0.275
Pr. > F	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

This Table reports the regression results of the explanatory Board Diversity variables on Tobin's Q. *** indicates the coefficient is significant at 1% level, ** at 5% and * at 10% significance level. Robust standard errors with the Breusch-Pagan and Koenkar test and White's correction for heteroskedasticity are reported in parentheses.

In column 2, we include foreign directors' board share; the results for the postgraduate directors hold. The share of foreign directors on the board is significant and positively related to the firm's Tobin's Q. However, the interaction with the crisis dummy is non-significant, implying that the global perspective of foreign directors does not improve the valuation of the firm during a crisis necessarily.

We add women directors above critical mass in column 3. We find that the results with postgraduate and foreign directors are consistent with the findings in columns 1 and 2. We find no significant association of gender diversity with firm valuation both in stable times and crises.

Column 4 tests for the combined influence of the board share of postgraduate directors and women directors above critical mass on Tobin's Q. Similarly, in column 5, we examine the combined influence of women directors above critical mass and foreign directors on Tobin's Q. The results are consistent, as discussed in columns 1 to 3 and reaffirm the findings.

Finally, in column 6, we add the diversity index as a composite measure of board diversity and find a positive and significant association, indicating that overall board diversity increases Tobin's Q through improved governance and decision-making under normal conditions akin to the findings of Carter et al. (2003) and Alharbi et al. (2022). Nonetheless, the interaction term with the crisis dummy is not significant, indicating that the diversified board need not necessarily influence firms' resilience or their ability to manage the crisis when the economy is stressed (Adams & Ferreira, 2009).

The control variables match the prior research results. The positive association of board size with Tobin's Q is attributed to the greater expertise that larger boards bring to the table, thereby enhancing decision-making and bolstering market confidence (Coles et al., 2008). The negative association between independent directors' board share and Tobin's Q may be due to independent directors' lack of firm-specific knowledge (Agrawal & Knoeber, 1996; Bhagat et al., 2001). The board share of promoter directors shows no significant relationship with Tobin's Q; this is consistent with Khanna and Palepu (2000), who argue that control may be more important to promoters than firm performance. Lastly, the crisis dummy has negative and statistically significant values, suggesting that market valuations generally drop during periods of crisis (Jin et al., 2021). The relationship between firm size and Tobin's Q is negative because firm size can bring decreasing returns (Lang et al., 1994), while firm age does not show a significant relationship with Tobin's Q.

Overall, our findings imply that market valuation under normal conditions is improved by board diversity in terms of higher representation of directors with advanced degrees, and foreign directors' presence, thus supporting hypothesis H 1. However, our results do not support hypothesis H 2 indicating that board diversity is not significantly conducive to a firm's crisis management.

7. Discussion of Empirical Findings

Our results show that board diversity is associated with firm performance positively in normal periods, yet this positive relationship does not translate to crisis periods. One may be that crises require rapid, decisive action, and therefore, persisting skill sets are different during a crisis. As an example, risk management capabilities were extremely valuable during the global financial

crisis and knowledge of health-related risks and operational efficiencies were necessary during the COVID-19 pandemic. Moreover, conflicting styles of decision-making and ways of responding between different board members, in terms of their experiences, may also pose difficulties, reducing the influence of board diversity on firm outcomes in situations of crisis. These potential reasons align with previous research findings that gender diversity leads to better governance and results, albeit the influence may weaken in times of crisis (Adams & Ferreira, 2009). Moreover, the nature of crisis response demands rapid decision-making at the local level that foreign directors may be ill-equipped to facilitate (Masulis et al., 2012).

8. Conclusions

We find that board diversity attributes have no significant relationship with firms' outcomes, measured by ROA and Tobin's Q, during the crisis. In the wake of the recent COVID-19 pandemic, this study extends the existing literature on how board diversity can stimulate firm resilience and performance during times of crisis, with specific reference to the Indian setting. We further contrast board diversity effects in stable versus crisis periods and compare firm outcome determinants.

There are several limitations to this study. It focuses on a limited set of diversity variables on the board, which may miss broader aspects of diversity, such as cultural background or industry sector expertise. Second, the research is limited to the NIFTY 500 stock index of NSE (listed companies), restricting the application of the findings in other contexts. This limitation stems from the fact that the study focuses on measuring firm performance during the COVID-19 pandemic, an unprecedented global crisis, and therefore, the applicability of findings beyond this type of crisis is limited.

Although this study contributes to the literature on how board diversity is associated with firm outcomes during crises, many avenues for future research remain. First, further research may address diversity attributes other than gender, education, and nationality; cultural, linguistic, and cognitive diversity, for instance, could be explored. These dimensions are likely to elaborate on how multi-faceted points of view add value to strategic decision-making and crisis management. Further, studies examining the relationship between board diversity and leadership styles could show how boardroom dynamics translate into resilience in firms. Second, future studies can help to identify whether there are industry-specific influences on board diversity. Sector comparisons can be drawn, for instance, technology, healthcare, and manufacturing may show different degrees of crisis sensitivity to board composition. In addition, longitudinal studies investigating the influence of board diversity on firm recovery, subsequent growth, and risk-reducing strategies can generate useful findings on the sustainability of boards with diversity. Third, broadening the geographic scope by examining board diversity in emerging and developed markets would allow for comparisons across countries. Research like this can assist policymakers and corporate executives in understanding the cultural and institutional conditions that mediate diversity's effects on firm performance. Finally, future research can consider qualitative research methods, such as interviews with board members and executives to understand how different backgrounds manifest into a practical strategy in facing crises. These findings will also pave the way for building a more comprehensive understanding of how board diversity facilitates firm resilience and performance.

Our findings provide input for regulators and policymakers. Although diversity is important for corporate governance, simply mandating diversity quotas is not enough to enhance the resilience of firms during crises. Instead, the authorities must urge firms to integrate board diversity attributes into their risk management frameworks.

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