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Board Gender Diversity and Firm Value: A Case of PSX

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Abstract
The effect that manager diversity has on a company's worth is examined in this study. Our research used information from 2087 observations covering 226 non-financial companies listed on the Pakistan Stock Exchange (PSX). Using panel data regression analysis and testing the results for robustness using the Blau and Shannon indices, we discovered that the presence of female directors on a business's board adds value to the company. Furthermore, our research, utilizing the critical mass theory's aspect, indicates that the impact of women's representation increases when it reaches a critical mass. This finding corroborates the critical mass theory within our sample of firms. We endorse the compulsory inclusion of women executives on the firm's boards as mandated by governance regulations. The study is consistent with legislative initiatives to improve corporate governance procedures to safeguard shareholders. Our findings also give policymakers direction by showing how crucial it is to support women's professional development and career advancement to increase their meaningful participation in business decision-making processes. To sum up, we argue that gender diversity reduces agency conflicts and increases company value, making it a helpful instrument in corporate governance.
Keywords: Gender Diversity, Firm Value, Critical Mass Theory, Female Presence on Board

1. Introduction

The separation of ownership and control within corporate structures and the resulting misalignment of interests between shareholders and managers has given rise to the well-known agency problem, a subject extensively debated in the literature (Jensen & Meckling, 1976; Ain et al., 2020). This divergence often leads to management's self-serving behaviours and information asymmetry, causing managers to prioritize short-term gains and personal benefits over the long-term interests of shareholders (Pucheta-Martínez et al., 2016). Consequently, this dynamic tends to diminish the firm value. Advocates of agency theory propose various mechanisms to bridge this gap between owners and managers, with executive compensation and governance structures receiving considerable attention (Biggerstaff et al., 2019). In this context, an independent board is viewed as an effective tool for management monitoring (Goh et al., 2016). Farooq et al. (2023) emphasize the board's responsibility to oversee management on behalf of shareholders. An independent board facilitates rigorous management oversight, curbing self-serving behaviours and enhancing firm value (Nadeem et al., 2020).

Similarly, literature underscores the economic benefits of having women on corporate boards (Amin et al., 2023). Female directors are often perceived as more independent, diligent, and vigilant monitors of management actions than their male counterparts (Adams et al., 2010). Consequently, their presence on boards is believed to be more advantageous for shareholders, correlating with increased firm value (Carter et al., 2003). In this regard, many countries, such as Norway and France, have mandated female board representation, which requires listed firms to have at least 40% female representation.

According to international standards, Pakistan's Code of Corporate Governance 2019 requires a minimum of a single female executive on the corporate board (Mirza et al., 2012). Our work adds to developing countries like Pakistan, even though previous research has examined the impact of female representation on business performance in various scenarios. Moreover, the critical mass theory posits that female directors' financial advantages are optimized when representing a sizable board share (Kanter, 1977). Our study addresses two key research questions: first, whether female board presence enhances firm value, and second, whether the critical mass theory applies to our sample firms(Hussain, 2014; Khan, Hussain, et al., 2019; Khan, Yaseen, et al., 2019).

There are two main reasons why Pakistan should care about our findings. First, obligatory female board involvement is essential for investor confidence and returns because lax shareholder protection laws and inadequate governance standards typify Pakistan's growing economy (Audi et al., 2022; (Audi et al., 20223). Pakistan is a developing market that is primarily defined by the existence of ineffective formal structures and less strict rules. The current economic situation in Pakistan is characterized by a scarcity of foreign cash and a lack of foreign investment. Second, women's involvement in decision-making defies social norms in a corporate culture that is primarily male-dominated, such as Pakistan's, and emphasizes the value of gender diversity in lowering agency conflicts (Wali, 2015).

The present study employs data from non-financial enterprises listed on the PSX to empirically investigate the effect of management diversity on firm value. From 2008 to 2019, we gathered 2062 firm-year observations from 226 firms, analyzed them in Stata 15 using panel data regression, and confirmed the results with the Blau and Shannon indices. Overall, our results support the critical mass hypothesis by showing that the presence of more female directors increases significant performance and shows that female board representation favorably affects company value.

By offering empirical evidence favoring required female board involvement, our work adds to the body of knowledge and supports regulatory initiatives to improve corporate governance in Pakistan(S. N. Khan & E. I. Ali, 2018; S. N. Khan & E. I. E. Ali, 2018). In addition, it offers fresh insights by extending the critical mass theory to PSX-listed firms and concentrating on the precise impact of female board membership on firm value, building on previous research. Ultimately, our study highlights the financial advantages of having a diverse pool of managers and many women on the board as valuable instruments for corporate governance that reduce agency conflicts.

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2. Literature review and hypotheses development

2.1. Agency Theory

This framework suggests that conflicts arise when ownership and control of a corporation are separated between shareholders and managers (Jensen & Meckling, 1976). This divergence of interests due to information asymmetry leads to agency problems (Fama & Jensen, 1983). Managers prioritize short-term gains and personal benefits like high salaries and bonuses, while shareholders seek long-term projects for higher returns and increased firm value (Pucheta-Martínez et al., 2016). If ownership is dispersed, managers may have an abundance of free capital, potentially resulting in overinvestment; because of this, managers may prioritize their career ambitions and short-term gains (Moin et al., 2020). To mitigate self-serving behaviour and reduce agency conflicts, shareholders implement equity-based compensation plans and governance mechanisms for monitoring management activities (Biggerstaff et al., 2019).

According to Goh et al. (2016), corporation directors are entrusted with aligning the pursuit of both parties. An impartial board can strictly oversee management decisions and strategic direction (Li et al., 2015). According to García-Sánchez et al. (2023), a board that functions well reduces agency costs by reducing management divergence. Fan and colleagues (2019) contend that having an independent board strengthens the interests of shareholders. Since women are frequently viewed as strong and effective supervisors, diverse managerial boards—especially those with female directors—are considered more effective (Adams & Ferreira, 2009). Our argument based on agency theory is that gender-diverse boards function as helpful tools for corporate governance, lowering agency conflicts because of their impartiality and efficient oversight(S. N. Khan & E. I. Ali, 2018; Khan & Ali, 2017).

2.2. Critical mass theory

Kanter's (1977) critical mass theory is also incorporated into our framework. According to this argument, until they achieve a critical mass, women serving on corporate boards are merely tokens. According to Kramer et al. (2006), women's voices get traction on boards only when they include three or more members. Similarly, Kristie (2011) observes that three women constitute a voice, two constitute a presence, and one is a token. Their performance improves as they reach a critical mass (Fan et al., 2019), which makes it possible for them to lessen principal-agent conflicts and better safeguard shareholder interests (Yang et al., 2019). We argue that under critical mass theory, an increased number of women on the board enhances performance, thus improving firm value.

2.3. Female presence on corporate boards and firm value

From the agency theory viewpoint, the separation of ownership and control within firms gives rise to agency problems. These occur due to conflicting interests between the principal (owners) and agents (managers), resulting in an agency conflict that detrimentally affects shareholders (Jensen & Meckling, 1976). Information asymmetry exacerbates the situation, allowing managers to prioritize their interests over those of shareholders (Zaid et al., 2020). Shareholders may prioritize more enormous profits by engaging in riskier and long-term projects, whereas management may prioritize increased pay and benefits and pursue short-term profit-generating endeavours (Amin et al., 2022). Consequently, this leads to a disagreement between the principal and agent. While shareholders aim for long-term value maximization and high returns, managers often pursue short-term gains and seek high salaries and bonuses, thereby diminishing shareholder wealth (Aguilera et al., 2008).

Agency theorists propose various corporate governance mechanisms to counteract the self-serving behaviour of managers. Among these, an independent board is crucial in aligning shareholder and managerial interests through vigilant oversight and autonomous decision-making (Daspit et al., 2021). Stiles and Taylor (1993) state that the board of directors serves four primary functions: providing direction, executive management, accountability, and supervision. Laique et al. (2023) emphasize the board's responsibility to offer strategic direction in line with shareholder interests. Additionally, the board brings external resources to the firm and enhances decision-making quality (Dutordoir et al., 2024). However, board effectiveness is contingent upon independence and impartial advice (Liu et al., 2015).

Furthermore, gender diversity is recognized as a vital attribute of a solid and efficient board. According to the agency literature, gender diversity is crucial to a successful board. It helps to mitigate agency conflicts by enabling rigorous and impartial oversight of management (Amin et al., 2023). Women are generally regarded as more self-reliant and hardworking than men, and their involvement is linked to fewer conflicts of interest. The presence of women on boards fosters discussion and idea exchange among members. Saona et al. (2024) note that women directors reduce agency costs through rigorous management oversight. Their presence enhances transparency and corporate disclosures (Eliwa et al., 2023) and provides diverse perspectives to the board (Abdelkader et al., 2024). Zampone et al. (2024) argue that women directors bring expertise and unique skills that enhance firm performance. Farooq et al. (2023) contended that a gender-diverse board promotes efficient firm decisions by fostering open debate and idea exchange among directors, mainly due to the involvement of female directors. In this circumstance, we should expect greater investment efficiency when there is a gender-diverse board for several reasons.

Furthermore, women's participation in business operations diminishes information asymmetry. Consequently, their presence on the board fosters a more transparent and equitable understanding of financial facts among board members(Gulzar et al., 2021; Khan et al., 2020). Therefore, the board may make more informed decisions due to having access to reliable information. Female directors are perceived as effective management monitors, and their presence is linked to reduced agency conflict (Ain et al., 2021). In this situation, they can limit the varied actions of management and compel the managers to spend on feasible and lucrative endeavours rather than focusing on expanding their influence.

Similarly, Issa (2023) contends that female directors have a stronger focus on stakeholders, boosting the company's legitimacy. They are considered more responsible, industrious, and independent than men (Li and Li, 2020). Their presence in upper management broadens social networks and lessens prejudices (Bass, 2019). As strict observers of CEOs, they guarantee increased attendance and decreased agency conflicts (Carter et al., 2003). According to Almarayeh (2023), having female directors enhances the company's performance by providing wise guidance and suggestions. Thus, reducing agency conflict and boosting shareholder confidence are achieved through the efficient oversight of gender-diverse boards.

There has been much discussion on the board's diverse influence on corporate value, with varying degrees of success (Nadeem, 2020). On the other hand, Almazan and Suarez (2003) note a detrimental effect and attribute it to the overzealous supervision of female directors. According to Usman et al. (2019), having female decision-makers may result in inefficiency.

We contend that having women on corporate boards lowers agency conflicts and increases firm value because of their independence and decision-making ability. Therefore, we hypothesize:

Hypothesis 1: The presence of female directors on the corporate board has a positive influence on firm value.

In the context of critical mass theory, we put up the following hypothesis. According to this hypothesis, women are treated like tokens until they surpass a certain number of males in the workforce. They don't become significant until they attain critical mass, three or more. They achieve optimal performance (Fan et al., 2019), increasing their likelihood of favourably influencing the protection of shareholder interests and mitigating agency conflicts.

The research results on how gender diversity on boards affects firm performance concerning critical mass theory are different. In South Africa, Gyapong et al. (2016) found positive effects of critical mass on listed firm's boards; Liu et al. (2014) reported comparable results in China. On the other hand, Singh et al. (2019) and Yang et al. (2019) reported minimal effects of critical mass on firm performance in China and India, respectively.

In this scenario, we argue that an increased number of women directors has more effect on the board's performance than single women. As a result, we hypothesize:

Hypothesis 2: Having a higher number of female directors on the corporate board influences firm value more significantly than token participation.

3. Methodology

3.1. Sample

Non-financial companies listed on the Pakistan Stock Exchange between 2008 and 2019 comprise the research sample. We use financial reports of these companies, which are available on websites. Initially, the sample included 5952 observations spanning multiple years. However, after filtering out financial companies and those having absent data, the overall dataset comprised 2087 observations across 226 non-financial listed companies. The selection process is outlined in Table 1.

Table 1: Sample depiction

Sample Selection method	
Preliminary observations	5952
Less: banking and other financial firms' observations	1344
Less: Missing observations	2521
Final sample	2087

3.2. Variable measurement

Aligned with existing literature (Papangkorn et al., 2019), we gauged firm value, the dependent variable, using two proxies: Tobin's Q (TOBIN_Q) and the Market-to-book equity ratio (MTB). TOBIN_Q was computed by dividing the asset's market value by the asset's book value. Similarly, MTB was derived by dividing the asset's market value with the asset's book value. Both TOBIN_Q and MTB are metrics based on stock performance, reflecting shareholders' expectations of a firm's performance and being less susceptible to management manipulation, as noted by Hutchinson and Gul (2004).

Table 2: Variable measurement

Type	Description	Symbols	Measurement
Dependent variables	Tobin's Q	TOBIN_Q	Market value of assets/Book value of assets
	Market to book ratio	MTB	Market value of equity/Book value of equity
Independent Variable	Proportion of female directors on the board	PFD_BD	Number of female directors on board /Total board size
Control Variable	Board size	BS	Number of directors on the board
	Proportion of Independent Directors on the Board	PID_BD	Independent director on board divided/Total directors on board
	Firm Size	FS	Log of Total assets
	Fixed Asset	FA	Fixed assets of the firm
	Leverage	LEV	Total debt/Total assets
	Investment	INV	Investment
	Dividend Payout	DP	1 if the company has paid a dividend during the year, otherwise 0
	Cash holding	CH	Net operating cash flows/Total assets

Hence, they are deemed reliable measures of firm value. Accordingly, diversity was determined in accordance with empirical literature (Adams & Ferreira, 2009; Campbell & Mínguez-Vera, 2008). The research used female directors' proportion as a measure of gender diversity. Three dummy variables were utilized to examine our second hypothesis, H2: Female Dummy 1 (FD1), Female Dummy 2 (FD2), and Female Dummy 3 (FD3). If a company has one female director on the board, FD1 shows 1; if not, it shows 0. In a similar vein, FD2 denotes 1 and 0, respectively, when a company has two female directors on the board. In contrast, FD3 denotes 1 and 0, respectively, when a company has three or more female directors on the board.

Consistent with research practices (Nekhili et al., 2020), we incorporated eight control variables: Board size (BS), the proportion of independent directors on the board (PID_BD), firm size (FS), fixed assets (FA), leverage (LEV), investment (INV), dividend payout (DP), and cash holding (CH). PID_BD was calculated by dividing the count of independent directors by the total board size. FS logarithmically transformed total assets, FA represented total fixed assets, and INV signified total investment. DP was depicted as a dummy variable, assigned 1 if a firm disbursed dividends and 0 otherwise, whereas CH was determined by dividing net operating cash flows by total assets. Table 2 shows the details of the variables.

3.3. Econometric model

$$\sum_{x=1}^{2} FV_{i,t} = \alpha_{i,t} + \beta_1 PFD\_BD_{i,t} + \sum_{k=1}^{8} \beta_2 Controls_{i,t} + \sum_{l=1}^{p} \beta_3 Industrydummy_{i,t} + \sum_{m=1}^{q} \beta_4 yeardummy_{i,t} + \varepsilon_{i,t} \quad (Equation\ 1)$$

The dependent variable in our study, Firm Value (FV), is measured using two proxies: TOBIN_Q and MTB. The independent variable, Gender Diversity (GD), is proxied by PFD_BD, with its regression coefficient denoted as β1. Additionally, the model incorporates several control variables. In order to the mitigation of time-invariant factors, industry and year dummies are included in the equation. The error term is represented by ε. The firm at time t is denoted as I. Panel data regression with fixed effects was conducted using Stata 15 to derive the results.

4. Empirical results

4.1. Descriptive statistics

The descriptive statistics for each variable used in the study are shown in Table 3. For every variable, the table presents the mean, standard deviation (SD), minimum (Min), and maximum (Max) values. The means for MTB and TOBIN_Q are 1.84 and 3.58, respectively. PFD_BD has an average of 14%, ranging from a minimum of 0 to a maximum of 38%. This range indicates that some companies in our sample have no female representation on their board, while others have up to 38% female representation. It's worth noting that, given the data spanned periods before the mandatory requirement of female directors by CCG 2019, the absence of female directors on some corporate boards is not unexpected. Regarding the control variables, the average BS is 8.01%, PID_BD stands at 11.10%, FS averages 22.87, and FA averages 21.40. LEV is recorded at 21.10%, investment averages 13.92, DP has a mean of 0.63, and CH has an average of 9.57.

Table 3: Descriptive statistics

Variable	Count	Mean	SD	Min	Max
TOBIN_Q (Ratio)	2087	3.58	0.09	0.62	12.65
MTB (Ratio)	2087	1.84	0.07	-0.49	23.85
PFD_BD (%)	2087	14.01	2.11	0	38.10
BS (number of directors)	2087	8.01	1.24	7	13
PID_BD (%)	2087	11.10	3.15	0	36.02
FS (log of total assets)	2087	22.87	0.08	19.03	26.56
FA (log of fixed assets)	2087	21.40	0.04	0.00	26.36
LEV (%)	2087	21.10	3.89	3.21	58.91
INV (log of total investment)	2087	13.92	0.04	0.00	24.74
DP (dummy variable)	2087	0.63	0.48	0.00	1.00
CH (Ratio)	2087	9.57	0.08	0.00	24.59

4.2. Correlation

The Pearson correlation analysis of all variables is presented in Table 4. In accordance with our hypotheses, we observed a positive correlation between TOBIN_Q (0.049) and MTB (0.077) with PFD_BD. This correlation was statistically significant at a 10% level. According to Damodar (2004), multicollinearity should be considered when the correlation coefficient is more than 0.8. Nevertheless, none of the correlation coefficients between the independent variables were more significant than 0.8, as indicated in Table 4.

Table 4: Pearson correlation matrix

Variable	TOBIN_Q	MTB	PFD_BD	BS	PID_BD	FS	FA	LEV	INV	DP	CH
TOBIN_Q	1										
MTB	0.038*	1									
PFD_BD	0.049*	0.077*	1								
BS	-0.006	0.104***	0.125***	1							
PID_BD	0.039	0.015	0.277***	0.144***	1						
FS	0.149***	0.056*	0.135***	0.072**	0.035	1					
FA	0.223***	0.031	0.041	-0.041	0.038	0.593***	1				
LEV	0.167***	0.015	0.139***	0.000	-0.004	0.114***	0.200***	1			
INV	0.197***	0.087***	0.101***	0.012	0.031	0.311***	0.049*	-0.173***	1		
DP	-0.282***	0.145***	0.264***	-0.011	0.071**	0.161***	0.089***	-0.328***	0.189***	1	
CH	0.126***	0.141***	0.099***	0.031	0.051*	0.175***	0.200***	-0.168***	0.087***	0.310***	1

4.3. Regression Analysis

To assess hypothesis H1, we utilized TOBIN_Q and MTB as proxies to measure firm performance, while PFD_BD represented gender diversity. Our results support the hypothesis through panel data regression analysis, which shows a strong positive association between gender diversity proxy factors and business performance. Our hypothesis was validated by the statistical significance of these data at the 10% level. We argue that multiple female directors enhance the firm value with impartial, thorough oversight and sending a positive signal to investors. This assertion supports our empirical findings, which demonstrated a significant association between the variables in line with our hypothesis. Our results are consistent with previous studies conducted by Erhardt et al. (2003), García-Meca et al. (2015), and Hutchinson et al. (2015), which similarly emphasized the positive influence of female presence on firm value.

Table 5: Gender Diversity and Firm Performance

Variables	TOBIN_Q	MTB
PFD_BD	0.106*	0.208*
	(0.029)	(0.056)
B_S	-0.006**	0.109**
	(0.003)	(0.085)
PIDBD	0.011	0.015
	(0.024)	(0.071)
FS	0.005	0.055***
	(0.003)	(0.095)
FA	0.001	-0.035
	(0.001)	(0.036)
LEV	0.908***	0.201
	(0.011)	(0.056)
INV	-0.001**	-0.015
	(0.000)	(0.010)
DP	-0.001	0.059**
	(0.005)	(0.069)
CH	0.000	0.017**
	(0.000)	(0.007)
Constant	-0.034	-1.407***
	(0.070)	(1.043)
Year effect	Yes	Yes
firm effect	Yes	Yes
Observations	2087	2087
Adjusted R Square	0.31	0.27
F-statistics	24.36	31.24
Hausman Chi^2	16.66	28.09

To investigate our hypothesis H2, which aligns with critical mass theory, we employed three dummy variables: FD1, FD2, and FD3. These variables denote the presence of at least 1, 2, and 3 or more females on the board, respectively, with zero otherwise in all cases. We postulated that having a more significant number of females on the board would mitigate agency conflicts and enhance the firm's value more effectively than token participation. Together with FD1, we found a strong positive association between TOBIN_Q and MTB, which supports our hypothesis. Using FD2 and FD3, similar results were obtained, supporting our hypothesis H2. In particular, we found that FD1 and TOBIN_Q (0.024) had a significant positive correlation at the 10% level of significance. This coefficient increased for FD2 (0.029) and notably peaked for FD3 (0.036), signifying significance at a 1% level.

Similarly, for MTB, positive coefficients were observed for FD1 (0.016) and FD2 (0.019), which were significant at a 10% level. The most pronounced effect was observed for FD3, with a coefficient of 0.024 and significance at a 5% level. These results imply that in order for female directors to properly carry out their duties in reducing agency conflicts and overseeing the board, a critical mass of three is required. To sum up, our research validates the positive influence of having more female directors on the value of the company. It offers empirical backing for the critical mass hypothesis in the enterprises we studied. These outcomes are consistent with earlier research by Liu et al. (2014), which highlighted the advantages of reaching a critical mass of women on board performance.

4.4. Robustness tests

The research utilized Blau (Blau, 1977) and Shannon (Shannon, 1948) indices to ensure our results were reliable and in line with the body of research on gender diversity. Once more, our analysis yielded a noteworthy positive correlation between TOBIN_Q and MTB and gender diversity, affirming the outcomes of our previous regression analysis. These outcomes are detailed in Table 7.

Table 6: Critical Mass and Firm Performance

VARIABLES	TOBIN_Q			MTB		
	(1)	(2)	(3)	(4)	(5)	(6)
FD1	0.024*			0.016*		
	(0.008)			(0.007)		
FD2		0.029*			0.019*	
		(0.015)			(0.013)	
FD3			0.036***			0.024**
			(0.019)			(0.016)
BS	-0.004	-0.003	-0.003	0.001	0.001	0.002
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
PID_BD	0.020	0.017	0.014	0.035	0.047**	0.044*
	(0.030)	(0.029)	(0.029)	(0.024)	(0.024)	(0.024)
FS	-0.026	-0.027	-0.028	-0.028	-0.028	-0.028
	(0.028)	(0.029)	(0.029)	(0.024)	(0.024)	(0.024)
FA	0.000	0.000	0.000	0.000	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
LEV	0.001	0.001	0.001	-0.001*	-0.001*	-0.001*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
INV	-0.004	-0.003	-0.003	0.001	0.001	0.001
	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)
DP	-0.009**	-0.008**	-0.008**	-0.003	-0.002	-0.002
	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)
CH	0.001	0.001*	0.001*	0.001**	0.001**	0.001**
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
Constant	0.251***	0.224***	0.223***	0.194***	0.186***	0.183***
	(0.030)	(0.030)	(0.030)	(0.029)	(0.028)	(0.029)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,087	2,087	2,087	2,087	2,087	2,087
Adjusted R2	0.22	0.24	0.25	0.29	0.27	0.27
F-statistics	24.18	20.35	20.32	30.49	31.26	31.30
Hausman Chi^2	13.56	14.46	18.43	27.68	29.88	27.47

Table 7: Alternative measure of gender diversity

VARIABLES	TOBIN_Q	MTB
FD_Blau	0.141***	
	(0.040)	
FD_Shan		0.170***
		(0.046)
Constant	0.136***	0.137***
	(0.012)	(0.012)
Controls	Yes	Yes
Firm fixed effects	Yes	Yes
Year effect	Yes	Yes
Industry effect	Yes	Yes
Observations	2087	2087
Adjusted R2	0.19	0.17

5. Conclusion and Implications

The study investigates how the presence of female directors affects the value of non-financial enterprises. We discovered a positive correlation between the number of female directors on the corporate board and firm valuation by looking at 2087 firm-year observations from 2008 to 2019. Furthermore, in keeping with the critical mass hypothesis, we found that having more women on boards enhances corporate performance as compared to single women. Our research makes multiple contributions to the body of literature. First, it highlights the benefits of gender diversity and enriches the expanding research's body over female representation on firm value. Second, it confirms the good results of the CCG 2019-mandated mandatory appointment of female

directors and the steps taken by Pakistani authorities to strengthen corporate governance standards. Finally, it highlights how critical female directors are to boosting investor trust.

We contend that agency conflict is lessened by an independent board based on agency theory. Because of this, having more female directors increases board independence and minimizes agency conflict by keeping a close eye on management's self-serving actions. Our initial hypothesis, which contends that having female directors increases firm value, was based on this concept. Our results supported our hypothesis by showing a substantial positive correlation between the percentage of female directors on the board and TOBIN_Q and MTB, two measures of business value. These findings highlight the positive effect of female presence on company value and are consistent with earlier empirical research by Erhardt et al. (2003), García-Meca et al. (2015), and Hutchinson et al. (2015).

Furthermore, our study posits that in accordance with Kanter's theory, firm value is higher when there are multiple female directors. This idea holds that the influence of female directors increases to a critical mass. We found more firm value in case of more gender diversity on the board. Our results, which showed a more significant coefficient in situations where three or more female directors were present on the board, validated our hypothesis and supported hypothesis H2. In this context, our findings were empirically in line with earlier research by Gyapong et al. (2016).

Our findings have significant real-world ramifications for both investors and legislators. Investors interpret the presence of female directors as an indicator of superior and consistent results. Policymakers should be aware that Pakistan is a developing country with many obstacles to overcome and that foreign investment is essential to the country's economic progress. Therefore, strengthening corporate governance procedures is crucial to increase shareholder confidence. Similar to earlier investigations, our work is subject to some constraints that may guide future researchers. Additional study routes could involve examining the effects of other board diversity characteristics, such as ethnicity and culture, on company value. Additionally, different aspects of corporate governance, like board size and CEO duality, may be investigated.

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