



The Impact of Female Directors on Board and Female CEO on Firm Performance: Empirical Evidence from Emerging Economy

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Purpose: As per agency theory prospective, board gender diversity enhances the corporate leadership structure which mitigates agency conflicts among stakeholders. Therefore, this study investigates the impact of female directors on board, and female CEOs on firm performance. We also uses board size, and board independence as board level control, while leverage, firm size, capital expenditure & tangibility as firm level control.

Design/Methodology/Approach: The study uses a panel data starting from 2005 to 2020 on annual basis. To resolve endogeneity and unobserved heterogeneity problems in panel data analysis, study uses static (fixed effect, & random effect) and dynamic (GMM) estimation techniques in Pakistan.

Findings: Result shows the positive impact of female directors on board and female CEOs on firm performance. These findings are robust under alternative measures of firm performance.

Implications/Originality/Value: The study suggests that female representation and female CEOs are the important attributes to enhance firm performance. Additionally, females are performing a significant role through monitor and control for excellent corporate leadership structure. Furthermore, this is the first study of its kind which analyzes this relationship in the emerging equity market of Pakistan.



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Introduction

The board of director performs specific functions such as appointing and remunerating of CEO (Campbell & Mínguez-Vera, 2008), deducting effective and efficient strategies for companies interests (Abdullah & Governance, 2014), monitoring and controlling the staff (Abdullah, 2004; O'connell & Cramer, 2010), provide better information to managers and linking with external corporate governance environment (Kılıç & Kuzey, 2016). These all functions make an entity of corporate governance to control all internal corporate governance responsibilities (Akbar, 2014). On the other hand, Abidin et al. (2009) documented corporate boards contributing for poor governance and declining the shareholder wealth. Researchers state different motives for poor corporate governance including, poor corporate leadership structure, ineffective monitoring, lack of check and balance by stakeholders (Kılıç & Kuzey, 2016). These all issues create agency problems between shareholders and managers. Hence, Abdullah (2004) documented when staff and managers are disciplined and accountable through the board of directors, the firm entities and performance are enhanced accordingly.

Proponents of female directors suggest that higher gender diversity on board enhances the efficiency of the board by providing a breadth of resources such as symmetric information, legitimacy, experience, knowledge, external environment linkages, and source of dependency (Upadhyay & Zeng, 2014). Furthermore, the penetration of women on board is seen to contribute a significant role to better corporate governance mechanisms by efficient monitoring and control of managers (Terjesen et al., 2016). However, the cultural and social reasons, the economic and financial arguments stirred the demand for high penetration of female directors on board worldwide. The presence of women on board as CEO capture 14% percent in European developed countries (Marinova et al., 2016). The general example of a developed country like Norway, from the year of 2006 onwards, every organization must have as a minimum 40% of women participation in board. These practices are implemented in Belgium and Italy with a 33% quota for female participation. Similarly, Spain and the Netherlands have 40%, and 30% quota for the women in board, respectively. Therefore, women as CEO and high top position in corporate board create a significant impact on firm performance (Marinova et al., 2016).

As a stated relationship, the corporate environment in Pakistan provides a background to study the relationship among women on board and firm performance (Ullah et al., 2019). This environment is dominant for male board members rather than female representation in the corporate board. Mirza et al. (2012) investigated that it does not allow women to climb the ladder on the corporate board. Therefore, it is a debatable issue since there is no mandatory requirement in the corporate board for female representation in Pakistan still. Though, without mandatory obligation for females, they perform much more expertise in Pakistani firms. The descriptive statistics of CERB showed 42% of companies have one women director on the corporate board in Pakistan. Therefore, it offers a platform to investigate the impact of women directors on board on firm performance. Besides this, Pakistani firms are significantly influenced through political power and external corporate governance which create agency conflict between minority and shareholders (Yasser, 2012). Although, Ghazali and Bilal (2017) documented that Pakistani firms have much agency conflicts among all stakeholders. Consequently, it suggested that higher corporate governance mechanisms mitigate the agency problem for enhancing firm performance. Therefore, the presence of female directors may have a significant role by having gender diversity, which may enhance firm performance in emerging economies.

The objective of this study is to analyze the impact of female directors on board and female CEOs on firm performance based on PSX non-financial listed firms. The study uses a panel data

sample starting from 2005 to 2020 annual basis. The board size, and board independence is using as governance level control variables, while leverage, firm size, capital expenditure, and tangible assets are using a firm's level control variables. To analyze the robust analysis, the study uses two alternative measures of firm performance i.e. return on asset, and return on equity. To resolve endogeneity and unobserved heterogeneity problems in panel data analysis, study uses GMM approach. The results of the fixed effect model, random effect model and the GMM approach shows that board gender diversity has an impact on the firm performance in emerging equity market of Pakistan. The benefits of female representation may be derived when female directors and female CEOs are hired with diverse knowledge, education, competencies, and life experience.

Next section discuss the theoretical background and hypothesis development of the study which is followed by the data and research methodology, the next section describes the empirical findings which is followed by the conclusion of the study.

Theoretical Background and Hypothesis Development

This section discusses the theoretical background and hypothesis development of the study.

Agency Theory

Corporate governance mechanism is a debatable issue in corporate world (Argyris, 1973; Jensen & Meckling, 1976; Pound, 1988). It is investigated that corporate governance theories are relevant and perform a magnificent role in firm performance (Imade, 2019) which includes the agency theory, stakeholder theory, resource-dependent theory, political cost theory, transaction cost theory, and ethical based theories. Main focus of this study is on the agency theory. Agency theory assumes an economic model of a man and agent-principal relationship. Agent normally act in a self-interest way and increases his incentives (e.g. high salary etc.), and other economic gains (Imade, 2019). Though the model is individualistic, it depends upon the idea of an in-built conflict of self-interest among principal (owners) and agents (managers) of a company's resources (Donaldson & Davis, 1991). The shareholders of the companies hire managers for their business and control all operations and govern the firm. When a manager's actions are diverted from the prime interests of shareholders, there comes the agency problem (Shleifer & Vishny, 1997).

Institutional Background

The corporate leadership structure in Pakistan is different as compared to another developed economies. As a long time, the corporate culture in Pakistan has influenced by men dominating in which female performs duties as secondary rather than in primary management. Therefore, this culture has resembled male-dominated. Therefore, it creates a disparity between the culture when males and females reaching higher echelons of any firm. Notwithstanding, in the constitution of Pakistan 1973, the article of 38 "within the source of the country providing economic opportunities irrespective of sex, caste, creed or race, by raising their standard of living". On the other hand, the Government of Pakistan planning a document vision 2025 recognizing female's penetration in organizations, it creates a new chance to perform very well in a social-economical and corporate environment (Ullah et al., 2019). So, it is very important to give an overview of the association among female directors on board and females as CEO, and firm performance while, how female directors perform a significant role in corporate board. Carter et al., (2010) examine that many countries encourage and require firms to maintain the percentage of females perform duties as top management. Some develop European countries maintain the required quota for female directors (Marinova et al., 2016) and other countries provide quite a recommendation. Hence, higher presentation of female directors enhances

corporate governance decision-making and monitoring ability (Adams & Ferreira, 2009).

Literature Review

This section discusses the related literature and hypothesis development of the study.

Gender diversity and Firm Performance

In past studies, empirical results regarding the proportion of women directors on board and firm performance have been unpredictable, time-variant, contradictory, and inconclusive. The conflict in past research may be recognized to lack of control variables (Terjesen et al., 2016) unpredictable measurement of variables (Post et al., 2011) sample selection from different institutional (regulatory) contexts (Sabatier, 2015), and different time frames (Campbell & Mínguez-Vera, 2008). Therefore, these studies examine the positive and significant relationship of female directors on firm performance (Abdullah, 2004; Mirza et al., 2012; Orazalin et al., 2020; Ullah et al., 2019). Whereas some studies investigate the negative association of gender diversity on firm performance (Adams & Ferreira, 2009; Chapple & Humphrey, 2014). While Rose (2007) claims there is no relationship exist between female representation and firm performance in Danish firms. Further, man recognizes only economic effect when making corporate decision whereas women recognize every aspect that effect of their decision (Hillman, 2015). Based on previous literature, researchers expect as compare to male, female have better corporate control and reduce agency problems Thus, researchers develop thy hypothesis:

H₁: Women representation on board have a significant and positive impact on firm performance

Female CEO and Firm Performance

The past researchers documented that female CEO help to confine asymmetric information and agency conflicts (Chen et al., 2018). In addition, female CEOs perform great role in the implementation of a strong leadership structure and improve corporate investment decisions (Frye et al., 2018). Adams and Ferreira (2009) advise that female CEO play a significant role in a firm's monitoring intensity. Faccio et al. (2016) investigate after hiring the female CEOs, the firm significantly reduces its idiosyncratic risk. Khan et al. (2013) claim those firms having female CEOs, are better performance in terms of lower leverage, earning quality, and higher return on assets, higher tangibility, and lower capital expenditure than male CEOs firms. However, many studies doesn't investigate any difference between female and male fund managers (Atkinson et al., 2003). Johnson and Powell, (1994) documented that males and females have identical equality of decision making and same risk propensity. Based on previous literature, researchers expect as compare to male CEOs, female CEOs have better corporate control and reduce agency problems. Thus, researchers propose a hypothesis:

H₂: Female CEOs have a positive and significant impact on firm performance

Control Variables

In the past researcher find contradictory results in support of board size and firm performance. Nonetheless, the advocate of agency theory suggests small board size is better than large board size (Khan et al., 2018). In the reference of Pakistan, Akbar (2014) claim a negative association between corporate board size and firm performance as a view of agency theory. While the literature on independent directors finds contradictory results with firm performance (Gutiérrez & Sáez, 2013) and some other investigate no relationship between independent directors and firm performance (Hermalin & Weisbach, 1991; Zahra & Pearce, 1989). Prior researchers claim that leverage has a negative association with firm performance because the

high level of the leverage ratio is closer to breaching debt covenants and exposing the firm to the risk of bankruptcy (Abdullah & Governance, 2014). The risk of a high level of bankruptcy may be associated with a high level of debt ratio. According to Leland (1998), high leverage may motivate the managers to make risky divisions so they transfer wealth from shareholders to board holders. The firm size is considered an important factor of firm performance (Isidro & Sobral, 2015). Large firm size has better performance as comparing the smaller size of firms and this can stem their higher market power (Lee, 2009). The capital expenditure used as a control variable in this study. Jiang et al. (2006) study in Taiwan and claim there is a positive and significant relationship between capital expenditure and corporate profits. The firm tangible assets are used as a factor of production, supply goods and services, and other administrative purposes (Chukwu & Egbuhuzor, 2017). The tangible assets consist of property, plant, machinery, and equipment under the IAS international accounting standards, cover more than fifty percent of total assets and perform a significant role in firm performance. Therefore, we uses board size, and board independence as board level control, while leverage, firm size, capital expenditure & tangibility as firm level control

Research Methodology

The objective of this study is to investigate the impact of female representation on board and female CEOs on firm performance. For this purpose, initially 200 non-financial firms are selected listed on PSX. Those firms selected for data analysis which have the highest market capitalization over fifteen years from 2005 to 2020 yearly basis. The study consists of panel and secondary data collected from firm's websites, annual report of firms, and PSX website. Some firms are excluded from the data based on; non-availability of corporate governance information like female directors, CEO and firm's director's profile, firms which are delisted, merged, and acquired at the end of 2020 also deleted from the sample. The overall sample size of 200 firms was taken at the start but due to the unavailability of data, and exclusion of firms, the final sample of 145 non-financial PSX listed firms is available for this study.

Econometric Modeling

The study uses different econometric techniques to validate the hypothesis. The descriptive statistics provide the summary of all data. The person's correlation of coefficient is a statistical technique it provides the association, strength, and direction of two quantitative variables. Through this technique, researchers also evaluate the multicollinearity problems of the data. The choice the most suitable technique among fixed effect, random effect is decided by the Hausman specification test (Hausman, 1978). The significant value of Hausman test rejects the null hypothesis thus, the random effect is constant and show fixed effect are most appropriate model (Saleh et al., 2021). To check the robustness of results, the study uses two different proxies (ROA and ROE) to measure the firm performance. Due to unobserved heterogeneity, endogeneity, and simultaneity biasness in panel data analysis, researchers apply the generalized method of moments (GMM) (Sarwar et al., 2019; Sarwar et al., 2018). The fixed effect and random effect are inconsistent methods because they could not properly address the endogeneity issues in panel data (Ullah et al., 2019). The issue of endogeneity occurs when independent variables are correlated with an error term and this problem mostly appears in panel data analysis (Adams & Ferreira, 2009). Researchers investigate the GMM technique to provide effective results to analyze corporate governance variables by overcoming unobserved heterogeneity, autocorrelations, and endogeneity problems (Sarwar et al., 2018; Wintoki et al., 2012; MengYun et al., 2021). This assumption makes the GMM approach is superior as compare to other techniques like random effect, fixed-effect model, and OLS ordinary least square. Therefore, we also use GMM approach to identify and reduce possible unobserved heterogeneity, endogeneity, and simultaneity problems in panel data (Mubeen et al., 2020). We estimates the following

equation in our study. Furthermore, all the variables proxies and abbreviations listed in Table 1.

We estimate the below equations to examine the impact of female directors on board on return on asset and return on equity.

$$ROA_{it} = \beta_0 + \beta_1 FD_{it} + \beta_2 BSIZE_{it} + \beta_3 BIND_{it} + \beta_4 LEV_{it} + \beta_5 FSIZE_{it} + \beta_6 CAPE_{it} + \beta_7 TNG_{it} + \varepsilon_{it} \dots \dots \dots (1)$$

$$ROE_{it} = \beta_0 + \beta_1 FD_{it} + \beta_2 BSIZE_{it} + \beta_3 BIND_{it} + \beta_4 LEV_{it} + \beta_5 FSIZE_{it} + \beta_6 CAPE_{it} + \beta_7 TNG_{it} + \varepsilon_{it} \dots \dots \dots (2)$$

We estimate the below equations to examine the impact of female CEO on return on asset and return on equity.

$$ROA_{it} = \beta_0 + \beta_1 FMC_{it} + \beta_2 BSIZE_{it} + \beta_3 BIND_{it} + \beta_4 LEV_{it} + \beta_5 FSIZE_{it} + \beta_6 CAPE_{it} + \beta_7 TNG_{it} + \varepsilon_{it} \dots \dots \dots (3)$$

$$ROE_{it} = \beta_0 + \beta_1 FMC_{it} + \beta_2 BSIZE_{it} + \beta_3 BIND_{it} + \beta_4 LEV_{it} + \beta_5 FSIZE_{it} + \beta_6 CAPE_{it} + \beta_7 TNG_{it} + \varepsilon_{it} \dots \dots \dots (4)$$

Here, ROA denotes the return on asset, ROE shows the return on equity, FD shows the number of female director in board, FMC shows the female CEO, BSIZE shows the board size, BIND shows the board independence, LEV shows the leverage, FSIZE shows the firm size, CAPE shows the capital expenditure, and TNG shows the firm's tangibility.

Table 1 Measurement of the variables

Variables	Label	Measurement and Definitions
<i>Dependent Variables</i>		
Return on Assets	ROA	ROA = Net Income/Total Assets (Jaafar et al., 2019; Sarwar et al., 2020)
Return on Equity	ROE	ROE = Net Income/Total Shareholder Equity (Shafique et al., 2014)
<i>Independent Variables</i>		
Female Directors	FD	FD = number of female directors on board/number of board members (Ullah et al., 2019)
Female CEO	FMC	An indicating variable having value 1 if female as CEO, 0 otherwise (Frye et al., 2018)
<i>Control Variables</i>		
Board Size	BSIZE	BSIZE = Total number of board members (Wang et al., 2019)
Board Independence	BIND	BIND = Number of outside directors/number of board members (Chen et al., 2018)
Leverage	LEV	LEV = Long Term Debt / Total Assets (Khan et al., 2021)
Firm Size	FSIZE	FSIZE = Log (Total Assets) (Yasser et al., 2015)
Capital Expenditure	CAPE	CAPE = Total Capital Expenditure / Total Assets (Borghesi et al., 2016)
Tangibility	TNG	TNG = Total Tangible Assets / Total Assets (Chukwu & Egbuhuzor, 2017)

Empirical Findings

This section discusses the empirical findings of the study.

Descriptive Statistics

Table 2 shows the descriptive summary of accounting-based performance measures with independent and control variables. The mean and standard deviation values of ROA (ROE) are 0.0394(0.0486) and 0.0785(0.0909) respectively. The maximum and minimum value of ROA is 0.1919 (-0.0506) and ROE 0.3220 (-0.0711) which are consistent with (Wang et al., 2019). About female directors, the obtain value of mean is 1.744. The highest value of female directors is 6 and the lowest is 0. It means female directors cover 1.744 percent of the total board size which indicates male board members are dominated in the corporate board. The value of standard deviation is 1.802 which indicates mediate variability in female directors between PSX listed firms. Studies find women on board perform duties as CEO with 0.403 percent of PSX

listed firms. The results comprised of corporate governance control variables, the range of board size is 3 to 15 with a mean value of 7.99 and the standard deviation is 1.834. It shows average board size consists of 8 members which is consistent with past study (Yasser, 2012). The average value of board independence is 1.485, which means on average outside directors contain 1.48 percent of the total board size. Results comprised as firm's level control variables, the mean and standard deviation value of leverage, firm size, capital expenditure, and tangible assets are approximately 0.244(0.172), 6.732(0.613), 0.446(0.194), and 0.454(0.182) respectively. All results are aliens with previous studies (Shafique et al., 2014).

Table No 2. Descriptive Statistics

	Mean	Standard Deviation	Minimum	Maximum
ROA	0.0394	0.0486	-0.0506	0.1919
ROE	0.0785	0.0909	-0.0711	0.3220
FD	1.7446	1.8026	0.0000	6.0000
FMC	0.4034	0.5002	0.0000	1.0000
BSIZE	7.9997	1.8346	3.0000	15.000
BIND	1.4855	1.4812	0.0000	6.0000
LEV	0.2449	0.1720	0.0000	0.7561
FSIZE	6.7321	0.6135	5.2059	8.2391
CAPE	0.4467	0.1946	0.0583	0.8966
TNG	0.4546	0.1820	-0.0011	0.8352

Correlation Matrix

It's a statistical technique that shows the association between variables and displays the strength and direction of variables. The value of the Person coefficient is +1 to -1 respectively. Table 3 demonstrates the result of the Pearson coefficient correlation matrix for all dependent, independent, controls related to corporate governance and firm-level. Results show that there is no perfect correlation between all variables however, multicollinearity is not there in all regression models Table 3 results show the measures of firm performance are positive and significant relationship with female directors, female CEO, the board size, board independence, firm size, and tangible assets while ROA and ROE are negatively associated with leverage and capital expenditure.

Table No 3 Coefficient Correlation Matrix

	ROA	ROE	FD	FMC	BSIZE	BIND	LEV	FSIZE	CAPE	TNG
ROA	1									
ROE	0.710	1								
FD	0.076	0.060	1							
FMC	0.101	0.101	-0.297	1						
BSIZE	0.090	0.131	0.213	-0.122	1					
BIND	0.142	0.124	0.074	0.149	-0.174	1				
LEV	-0.329	-0.149	0.063	0.131	0.039	0.091	1			
FSIZE	0.270	0.312	0.066	-0.094	0.167	-0.123	0.112	1		
CAPE	-0.240	-0.235	0.031	-0.007	-0.092	0.038	0.122	-0.119	1	
TNG	0.312	0.064	-0.036	-0.079	-0.029	-0.080	-0.629	-0.052	-0.128	1

Female Directors on Board and Firm Performance

Table 4 demonstrates the result of the impact of female representation on ROA and ROE i.e. accounting-based measures of firm performance. The first three-column consists of random effects, fixed effect, and GMM for ROA while the other three are for ROE respectively. The coefficients of female directors FD of three techniques are positive 0.017, 0.002, 0.011 and significant with ROA besides coefficients of FD for ROE are 0.003, 0.002, 0.033 also positive and significant. However, it supports the H1. It means a higher percentage of female directors on board is beneficial to the improvement of the firm performance. These findings are consistent with Malik and Zahoor (2016), Yasser (2012), and Shafique et al. (2014) but have a contradiction with past studies (Kastlunger et al., 2010).

Female CEO and Firm Performance

Table 5 demonstrate the results of female CEO and firm performance. It includes three statistical techniques random effect, fixed effect, and GMM approach. The coefficient of female CEO for ROA is 0.009, 0.019, 0.005 positive, and significant. While female CEO for ROE is 0.005, 0.007, and 0.006 respectively. All coefficient is positive and significant of FMC to ROE. Therefore, H2 is acceptable. It indicates women on board as CEO will produce better results for firm performance while increasing productivity through the firm's assets and shareholder's equity (Benkraiem et al., 2017; Borghesi et al., 2016).

Robust Analysis and Endogeneity Problems

To check the robustness, researchers apply alternative measures and replace ROA with ROE which is another accounting-based measurement. The overall finding is similar to ROA. It means all results are robust through applying alternative proxies for the measurement of firm performance. To address the endogeneity problem and contour check the robustness of results, researchers apply the GMM approach. In earlier results, female directors and female CEO are positively associated with firm performance. Though, these results may suffer from endogeneity problems. Therefore, fixed effect and random effect may fail to address possible endogeneity problems of regressors but it's successful to identify the error term correlation issue. Therefore, the study re-estimates the model by using the generalized method of the moments GMM approach.

Table. No 4. Female Directors on Board and Firm Performance

Variable	ROA			ROE		
	Random Effect	Fixed Effect	GMM	Random Effect	Fixed Effect	GMM
Lag	0.291	0.025	0.045*	0.309	0.019	0.077*
FD	0.017*	0.002***	0.011***	0.003**	0.002**	0.033***
BSIZE	0.007*	0.023*	0.014***	0.002**	0.005*	0.015***
BIND	0.002**	0.002**	0.006***	0.004**	0.004**	0.007**
LEV	-0.079*	-0.093**	-0.125**	-0.123*	-0.161**	-0.207**
FSIZE	0.013**	0.010	0.048**	0.027**	0.008**	0.029**
CAPE	-0.041	-0.052*	-0.059*	-0.078	-0.064	-0.118**
TNG	0.023***	0.024	0.122***	0.076	0.095*	0.017**
Constant	-0.023*	0.142*	-0.240	-0.020***	0.239***	0.204
Hausman Test	0.0210			0.0001		
Wald Stat		0.001			0.000	
Sargan Test			0.124			0.182
AR (2)			0.2310			0.1254

In this table, ROA denotes the return on asset, ROE shows the return on equity, FD shows the number of female director in board, FMC shows the female CEO, BSIZE shows the board size, BIND shows the board independence, LEV shows the leverage, FSIZE shows the firm size, CAPE shows the capital expenditure, and TNG shows the firm's tangibility. Furthermore, AR (2) shows the second order correlation. We estimate the below equations to examine the impact of female directors on board on return on asset and return on equity. *, **, *** shows the significance level at 90%, 95% and 99% respectively.

$$ROA_{it} = \beta_0 + \beta_1 FD_{it} + \beta_2 BSIZE_{it} + \beta_3 BIND_{it} + \beta_4 LEV_{it} + \beta_5 FSIZE_{it} + \beta_6 CAPE_{it} + \beta_7 TNG_{it} + \varepsilon_{it}$$

$$ROE_{it} = \beta_0 + \beta_1 FD_{it} + \beta_2 BSIZE_{it} + \beta_3 BIND_{it} + \beta_4 LEV_{it} + \beta_5 FSIZE_{it} + \beta_6 CAPE_{it} + \beta_7 TNG_{it} + \varepsilon_{it}$$

Table. No 5 Female CEO and Firm Performance

Variable	ROA			ROE		
	Random Effect	Fixed Effect	GMM	Random Effect	Fixed Effect	GMM
Lag	0.295**	0.026**	0.037**	0.311***	0.018***	0.052**
FMC	0.009**	0.019***	0.005***	0.005**	0.007***	0.006***
BSIZE	0.037**	0.024***	0.004***	0.001**	0.006**	0.014***
BIND	0.002**	0.002**	0.008***	0.004**	0.004**	0.009**
LEV	-0.080	-0.093*	-0.129**	-0.125**	-0.161**	-0.234**
FSIZE	0.012**	0.011**	0.051**	0.027	0.008*	0.037**
CAPE	-0.041*	-0.052**	-0.078**	-0.080	-0.062**	-0.157***
TNG	0.022	0.024**	0.135**	0.078**	0.094**	0.014**
Constant	-0.019	0.142	-0.289*	-0.009*	0.231	0.112*
Hausman Test	0.0321			0.000		
Wald Stat		0.000			0.023	
Sargan Test			0.182			0.1920
AR (2)			0.125			0.210

In this table, ROA denotes the return on asset, ROE shows the return on equity, FD shows the number of female director in board, FMC shows the female CEO, BSIZE shows the board size, BIND shows the board independence, LEV shows the leverage, FSIZE shows the firm size, CAPE shows the capital expenditure, and TNG shows the firm's tangibility. Furthermore, AR (2) shows the second order correlation. We estimate the below equations to examine the impact of female CEO on board on return on asset and return on equity. *, **, *** shows the significance level at 90%, 95% and 99% respectively.

$$ROA_{it} = \beta_0 + \beta_1 FMC_{it} + \beta_2 BSIZE_{it} + \beta_3 BIND_{it} + \beta_4 LEV_{it} + \beta_5 FSIZE_{it} + \beta_6 CAPE_{it} + \beta_7 TNG_{it} + \varepsilon_{it}$$

$$ROE_{it} = \beta_0 + \beta_1 FMC_{it} + \beta_2 BSIZE_{it} + \beta_3 BIND_{it} + \beta_4 LEV_{it} + \beta_5 FSIZE_{it} + \beta_6 CAPE_{it} + \beta_7 TNG_{it} + \varepsilon_{it}$$

Conclusion of study

This study contributes to the literature regarding the impact of female directors on corporate boards and female CEOs on firm performance. For this purpose, we use a sample of PSX 150 listed firms for the period of fifteen years from 2005 to 2020 on annual basis. To the best of the researcher's knowledge, this study is first to investigate the impact of gender diversity and female as CEO on firm performance with corporate board level and firm specific control for PSX listed firms.

The study finds evidence that female representation on corporate boards has a positive impact on firm performance. A study documented that a higher representation of female directors can enhance the firm performance by effective communication with potential clients (Rose, 2007). Besides, female CEOs also have a significant positive impact on firm performance. Female also improve the brand image (Lückerath-Rovers & Governance, 2013), improve board effectiveness via bringing new ideas through diverse perspective (Carter et al., 2010). Finally, it also encourage middle-level management women through social and diversity beneficial information from top-level management (Dezsö & Ross, 2012). There are several limitations of this study. Study restricted due to data limitations of corporate governance variables, and it also limited to Pakistan only. The study suggests some future recommendations for new researchers and practitioners. This study depends on panel secondary data analysis. It is possible other corporate governance control variables likewise CEO characteristics, board meetings, audit committee, board member tenure and internal control systems that are not investigate in this study might be influence the firm performance. Therefore, future researchers and practitioners investigate these aspects as well with firm performance.

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