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Female Directors and Firm Investment Efficiency: Moderating Role of Female Duality

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Abstract

The study aims at examining the impact of female directors on firm investment efficiency of firms and investigates the moderating effect of female duality. The sample is selected from companies listed on the Pakistan Stock Exchange (PSX) from 2014 to 2023. The research employs a rigorous methodological framework and employs different estimation techniques such as pooled ordinary least square (OLS), fixed effects (FE), two steps systems generalized method of moment (GMM). Results provide evidence in favor of hypotheses that presence of female directors in board have investment efficiency consistent with resource based theory and moderating role of female duality strengthen the positive effect of female directors on firm investment efficiency consistent with resource dependence theory. The PSM (Propensity Score Matching) analysis is employed to address the endogeneity issues. The baseline findings are robust by using alternative definitions of female directors, investment efficiency and after incorporating the board level control variables. Further this study finds that the presence of three or more female directors show a more pronounced effect on investment efficiency as compared to one female director and support to the critical mass theory. To the best of researcher knowledge, this is the first study that extends literature by empirical association of the effect of board gender diversity on investment efficiency with moderating role of female duality in an underdeveloped market, Pakistan. This work additionally proposes possible directions for future researchers.

Key Words: Gender Diversity, Investment Efficiency, Duality, Robustness, Endogeneity, Pakistan

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Introduction

As business in competitive environment continuously growing, which influences the firms to globalize, introduce the latest techniques, and invest in better alternatives to be successful. It's a well-known fact that good corporate governance prevents agency issues by leaving little spare funds for management to spend. In resource based theoretical context, having women in boards is beneficial in many aspects of organization performance by bringing new ideas, discussions and different perspectives associated with a rise in the return on assets and equity (Boukattaya & Omri, 2018). According to various studies having more female board members can reduce earnings management and board conflicts as female board members are more responsible, less overconfident, and play an active role in board governance. They also monitor international markets, reduce indebtedness, play a greater role in firm performance, improve resource allocation efficiency, and increase the likelihood of firm survival (Benkraiem, Hamrouni, Lakhal, & Toumi, 2017; Mohsni & Shata, 2021). Moreover, previous studies show that gender diversity may also has negative influence on investment efficiency (Huang & Kisgen, 2013; Sun & Zhang, 2021).

The contradiction in inconclusive findings in the literature is the motivation for this study. Moreover, gap is to identify the moderating variable in the context of relationship between female directors and investment efficiency for smooth working of firms. The chief executive officer (CEO) duality function is characterized by contrasting explanations offered by two theories. According to agency theory, which stresses the need of a shared vision between shareholders and executives, it's problematic to have a chief executive officer who is also the board chair (Bebchuk, Cohen, & Hirst, 2017). Despite the fact that stewardship theory argues that having a chief executive officer and chairman of board by a single person improves a company's performance (Ahmad, Khan, & Zahid, 2020). Most studies shows companies exhibiting duality seem to positively influence corporate success (Chi, Van Can, & Duc, 2019; Zhu, Husnain, Ullah, Khan, & Ali, 2022)

Hence, this study has two objectives, i.e. to investigate the impact of female directors on firm investment efficiency and to check the moderating effect of female duality in this relationship. To accomplish the goal of the research, the Pakistani market has been selected for this work. Pakistan is one of the markets where SECP has mandated the presence of a female director. So, Pakistan presents a perfect setting in the Asian context to evaluate women's position in the board of the corporation. The sample is selected from companies listed on the PSX. The final sample of the study consists of the 366 companies with 3123 firm-year observation from 2014 to 2023.

This research employs multivariate regressions to test the hypotheses, OLS, FE, and GMM. In the first hypothesis testing, findings support hypothesis 1 consistent with resource based theory (Reguera-Alvarado, de Fuentes, & Laffarga, 2017). For second objective, results provide evidence in favor of second hypothesis and consistent with resource dependence theory (Benkraiem et al., 2017). The baseline findings are robust after employing alternative definitions of female directors, investment efficiency and inclusion of board-level control variables. This study finds that firms with more female directors exhibit a more significant impact on investment efficiency.

Current study adds to the existing knowledge by investigating the potential impact of female directors on the firm investment efficiency in an underdeveloped market. Moreover, this study, being the first attempt to investigate the moderating role of female duality in the relationship between female directors and firm investment efficiency.

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Literature Review and Development of Hypothesis

Female Directors and Firm Investment Efficiency

It is reported that a company's investment efficiency is increased by good corporate governance framework. The protection of shareholders' money from mismanagement and the subsequent improvement of investment decisions that guarantee long-term success are two outcomes of good corporate governance. According to a hazard model, companies that have strong corporate governance are much less likely to undertake large expenditures over the long term. Companies with strong corporate governance outperformed their competitors in the long run for initial public offerings (Hartzell, Kallberg, & Liu, 2008).

One of the characteristic, women on board improves investment efficiency and firm value in numerous ways. Adams and Ferreira (2009) find that companies with female directors had better profitability and less earnings management. They are also seen as more security-oriented. Post and Byron (2015) find that improved accounting returns, monitoring, and strategy development is related to the female presence in boards. Post and Byron (2015) find a 10% increase in female representation on corporate boards is associated with a 1% increase in return on assets (ROA) with investment efficiency.

Female directors are seen as being more careful and thoughtful when making decisions. Female directors are less inclined to back aggressive acquisition plans (Levi, Li, & Zhang, 2014). The participation of female board members is associated with improved disclosure quality, which in turn boosts investor confidence and decreases financing frictions (Gul, Srinidhi, & Ng, 2011). Bogan, Just, and Dev (2013) find that teamwork had a greater influence on work than a single individual. Excessive male presence leads to riskier judgments and an increased chance of hazardous investment. Females, on the other hand, are not the most courageous and take less risky investment decisions.

Mirza, Majeed, and Ahsan (2020) examine female directors (FDs) in China's competitive market to see how they affected investment efficiency. Results show that female directors are better at investing because they are more powerful monitors, more disciplined managers, more efficient with resources, less prone to agency risks, and have equal access to all relevant information. Song, Yoon, and Kang (2020) find that the positive role of women in tracking international markets. For corporate boards, having women on the panel improves their ability to keep an eye on social, environmental, and ethical concerns.

In contrast to above studies, Huang and Kisgen (2013) find that men are better than women as females are less confident when it comes to make investment decisions . Rose (2007) find that the quality of a company's investment efficiency is not related to the number of women on a board. Randøy, Thomsen, and Oxelheim (2006) find that gender diversity on boards did not significantly impact the stock performance and investment efficiency.

Therefore, based on above discussion the following relationship can be expected:

H1. *Female directors are positively associated with firm investment efficiency*

The Role of Female Duality

There has been a limited work on the relationship between female CEO duality and firm investment efficiency. Ullah, Majeed, and Fang (2021) find a high correlation between investment efficiency and CEO duality. Firms with CEO duality are less likely to be damaged by corporate scandals like bribery and fraud. This suggests that these businesses have a better chance of survival. Using data from the Australian Securities Exchange and

Vol. 3 No. 8 (2025)

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relying on the upper echelons theory, Luanglath, Ali, and Mohannak (2019) discover that a more diverse top management team (TMT) is linked to increased productivity and efficiency. While Kubo and Nguyen (2021) find a significant association between the number of female chairman of board serving as chief executive officers and the increase in Tobin's Q. Kim and Oh (2017) explore that having female CEOs has a beneficial effect on profitability. Wang, Deng, and Alon (2021) indicate that female chief executive officers in duality make better financial decisions.

Faccio, Marchica, and Mura (2016) find that female CEO are connected with low corporate risk-taking. Because they are less likely to take risks. Therefore, when FCEOs are in charge of companies, there is less of a chance that they would make poor investment judgments. In addition to lowering agency difficulties. Jurkus, Park, and Woodard (2011) find that FCEOs have a negative correlation with agency conflict and improves company performance. Consequently, CEO duality aid in making the best possible investment decisions by reducing agency cost and management opportunism. That is why CEO duality are great at deciding where to put their money. Investment efficiency is increased as a consequence of better governance and effective monitoring by CEO duality.

Therefore, based on above discussion the following relationship can be expected:

H2: *Female CEO duality strengthen the positive effect of female directors on firm investment efficiency*

Methodology

The sample of this study is selected from listed companies of Pakistan. The total number of companies listed on the Pakistan Stock Exchange in 2023 is 530. After that, 88 companies are excluded whose annual reports are not available for at least three consecutive years. 237 companies have not female directors before 2017 and reducing observations. 76 companies are also excluded because still they don't have female directors in board. Therefore, the final sample of the study consists of the 366 companies with 3123 firm-year observation covering the period from 2014 to 2023. Moreover, duality observations are 1,068 as CEO females are less in firms.

To evaluate the study's hypothesis, we formulate the subsequent two models in Equation (1) and Equation (2).

$$\text{InvEff}_{it} = \alpha_0 + \beta_1 \text{FD\_DUM}_{it} + \beta_2 \text{Firm Leverage}_{it} + \beta_3 \text{ Firm Size}_{it} + \beta_4 \text{Sales Growth}_{it} + \beta_5 \text{CFO}_{it} + \beta_6 \text{Cash}_{it} + \beta_7 \text{DIV\_DUM}_{it_{it}} + \Sigma \text{ Industry} - \text{Year} + \mathcal{E}_{it} \quad (1)$$

$$\text{InvEff}_{it} = \alpha_0 + \beta_1 \text{ FD\_DUM}_{it} + \beta_2 \text{Duality\_DUM}_{it} + \beta_3 (\text{FD\_DUM} \times \text{Duality\_DUM})_{it} + \beta_4 \text{Firm Leverage}_{it} + \beta_5 \text{ Firm Size}_{it} + \beta_6 \text{Sales Growth}_{it} + \beta_7 \text{CFO}_{it} + \beta_8 \text{Cash}_{it} + \beta_9 \text{DIV\_DUM}_{it} + \Sigma \text{ Industry} - \text{Year} + \mathcal{E}_{it} \quad (2)$$

The study's dependent variable is the investment efficiency, quantified by the absolute values of the residuals from the investment model, referred to as IE (Chen, Hope, Li, & Wang, 2011). The independent variable female director is measured with dummy variable with a value of 1 denotes the presence otherwise 0. Female duality is a moderating variable, If the company's female chief executive officer is also the chairman of the board, the dummy variable is set to one otherwise it is zero (Zhu et al., 2022). In this research work, firm leverage is measured when total debt in book value is divided by total assets (Nadeem, Suleman, & Ahmed, 2019). Firm size is defined as natural logarithm of total assets (Shahid & Abbas, 2019). The percentage increase or decrease from one year's sales to another is the sales growth rate. Income before depreciation and interest payments are subtracted from

Vol. 3 No. 8 (2025)

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operating income to determine cash flow (Shahid & Abbas, 2019). Cash is measured as when cash and short term investment is divided to total assets (Lee, Wang, Chiu, & Tien, 2018). The dividend payout dummy variable is set to 1 for companies that pay dividends and 0 for those that do not (Triani & Tarmidi, 2019).

This research employs three models: OLS, FE, and GMM to test the hypothesis. Ordinary Least Square (OLS) regression relies on the assumption of robust standard errors with industry and year fixed effects (Hao, Chen, & Chen, 2022). Fixed effect regression is a potent tool for improving detection and removing the time-invariant omitted variable bias, which is the primary cause of endogeneity in panel data. Simultaneity and dynamic endogeneity are two additional biases that the GMM technique attempts to solve (Dehaan, 2021). Functional misspecification, observable biases, and sample selection are biases of endogeneity that are addressed by PSM approach (Roberts & Whited, 2013).

Empirical Findings

Descriptive Analysis

Table 1 shows descriptive statistics (means, medians, and standard deviations) for all variables (dependent, independent, moderating and controls). The average IE holds 7.6% of lagging assets. From 3123 data, the median (mean) value of FD_DUM is 0.4258 (0.4872) and the standard deviation is 0.4946. The data also reveals that out of 1068 observations, the mean value of Duality_DUM is 0.4258 with a standard deviation of 0.4946.

The average firm leverage is 0.1054 (0.0665) with a standard deviation of 0.1234. The average firm size is 15.8323 with a median value of 15.7234 and a standard deviation of 1.532. The average firm sales growth is about 10.18% with a median value of 0.0923 and a standard deviation of 0.3167. The average cash flow is 0.0702 (0.0545) with a standard deviation of 0.1254. On average, firms hold 9.7% cash and short-term investments, with a median value of 0.0217 and a standard deviation of 0.1732. Nearly 48.99% of firms pay a cash dividend with a standard deviation of 0.5 across all 3123 observations.

Table 1: Descriptive Statistics

	N	Mean	Median	Std. Dev.	Min	Max
IE_Chen	3123	0.076	0.045	0.098	0.021	0.866
FD _DUM	3123	0.4258	0.4872	0.4946	0.000	1
Duality_DUM	1068	0.4612	0.4109	0.4362	0.000	1
Firm Lev	3123	0.1054	0.0665	0.1234	0.000	0.6126
Firm Size	3123	15.8323	15.7234	1.532	11.8272	19.6513
Sales Growth	3123	0.1018	0.0923	0.3167	-0.6862	1.9345
CFO	3123	0.0702	0.0545	0.1234	-0.2469	0.5726
Cash	3123	0.0974	0.0217	0.1732	0.0004	0.9352
DIV_DUM	3123	0.4899	0.0000	0.5	0.000	1

Correlation Analysis

Table 2 shows correlation between variables. IE has a significant positive correlation with FD_DUM and Duality_DUM with value 0.098 and 0.06 respectively. Firm size, sales growth, cash flow, cash on hand, and dividend payment are all control variables that correlate positively with firm performance with values 0.08, 0.04, 0.36, 0.25 and 0.22 respectively except firm leverage with negative value -0.19.

Vol. 3 No. 8 (2025)

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Table 2: Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1)IE_Chen	1.0000								
(2)FD _DUM	0.098*	1.0000							
(3) Duality_DUM	0.06*	0.054*	1.0000						
(4) Firm Lev	-0.19*	0.0300	0.076	1.0000					
(5) Firm Size	0.08*	-0.08*	0.16*	0.65*	1.0000				
(6) CFO	0.36*	-0.020	-0.09*	0.12*	0.065*	1.0000			
(7) Cash	0.25*	-0.05*	-0.25*	0.17*	0.33*	0.346*	1.0000		
(8) Sales Growth	0.04*	-0.040	0.08*	0.09*	0.08*	0.030*	0.456*	1.0000	
(9) DIV_DUM	0.22*	-0.11*	-0.10*	0.25*	0.25*	0.24*	0.13*	0.214*	1.0000

*p<0.10

Regression Analysis

Effect of Female Directors on Investment Efficiency

Table 3 shows result of a regression analysis of the effect of female directors on investment efficiency. The estimated coefficients of FD_DUM in models 1, 2 are 0.319, 0.024 at 10% level of significance respectively and in model 3 it is 0.073 at 5% level of significance. These results provide evidence in favor of hypothesis consistent with resource based theory (Reguera-Alvarado et al., 2017).

Moderating Effect of Female duality on Female directors and Firm Investment Efficiency

Table 4 show significant relationship of female duality as moderating variable between female directors and firm investment efficiency with all regression analysis model of OLS estimation with values 0.107 (at 10% level of significance) and fixed-effect and GMM estimation with values 0.044 and 0.037 respectively (at 5% level of significance). These results provide evidence in favor of hypothesis. As firms with both roles of females as monitoring and decision have more effective effect on firm investment efficiency consistent with resource dependence theory (Benkraiem et al., 2017).

Table 3: Effect of Female Directors on Firm Investment Efficiency

	(Model 1: OLS)	(Model 2: Fixed Effects)	(Model 3: System GMM)
VARIABLES	IE	IE	IE
Lag (IE)	---	---	0.869***
	(--)	(--)	(3.689)
FD_ DUM	0.319*	0.024*	0.073**
	(4.420)	(0.191)	(3.958)
Firm Leverage	-1.203***	-0.164	-0.049
	(-6.532)	(0.826)	(-1.152)
Firm Size	0.064***	0.030	0.006**
	(3.437)	(0.513)	(2.298)
Sales Growth	0.012	0.107**	0.120***

Vol. 3 No. 8 (2025)

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	(0.207)	(2.262)	(14.608)
CFO	3.048***	0.829***	0.289***
	(8.571)	(5.742)	(13.474)
Cash	0.524**	0.053	0.023
	(2.369)	(0.359)	(1.002)
DIV_DUM	0.307***	0.078*	0.064***
	(6.529)	(1.891)	(10.988)
Industry Effects	NO	YES	YES
Year Effects	YES	YES	YES
Constant	-0.478	0.384	-0.233***
	(-1.580)	(0.437)	(-6.023)
Observations	3,123	3,123	3,123
R-squared	0.291	0.159	---
AR (1) (z, p-value)	---	---	-3.19 (0.001)
AR (2) (z, p-value)	---	---	-1.21 (0.227)
Sargan Test (chi square, p-value)	---	---	351.1 (0.000)
Hansen Test (chi square, p-value)	---	---	186.1 (0.174)

*** p<0.01, ** p<0.05, * p<0.1

Table 4: Moderating Effect of Female duality

	(Model 1: OLS)	**(Model 2: Fixed Effects)**	**(Model 3: System GMM)**
VARIABLES	**IE_Chen**	**IE_Chen**	**IE_Chen**
Lag. IE_Chen	---	---	0.768***
	(--)	(--)	(13.89)
FD_ DUM	0.245*	0.054*	0.153**
	(4.420)	(0.191)	(3.958)
Duality_DUM	-0.135**	0.057	-0.076**
	(-2.271)	(1.077)	(-6.866)
FD_ DUM × Duality_DUM	0.107*	0.044**	0.037**
	(0.935)	(0.357)	(1.086)
Control Variables	Included	Included	Included
Industry Effects	YES	NO	YES
Year Effects	YES	YES	YES
Constant	-0.478	0.384	0.233***
	(-1.580)	(0.437)	(-6.023)
Observations	1068	1068	1068
R-squared	0.165	0.134	---
AR (1) (z, p-value)	---	---	-2.19 (0.001)
AR (2) (z, p-value)	---	---	-0.21 (0.227)
Sargan Test (chi square, p-value)	---	---	241.1 (0.000)
Hansen Test (chi square, p-value)	---	---	156.1 (0.137)

*** p<0.01, ** p<0.05, * p<0.1

Vol. 3 No. 8 (2025)

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Endogeneity Concerns

Propensity Score Matching (PSM) Approach

Table 5 (Panel A) displays the results of companies in the treatment group (Female_Duality = dummy 1) and companies in the control group (No Female_Duality = dummy 0). The results of the t-test (p-value) are 1.45 (0.127), insignificant t-statistics indicate that, qualitatively, no statistical differences exist between the treatment and control groups for firm investment efficiency.

When we re-run the baseline regression using a matched sample of treatment firms (with female_Duality). This information is presented in Table 5 (Panel B). Taken together, these results provide robust evidence to baseline findings.

Table 5: PSM Analysis

Endogeneity Analysis using Propensity Score Matching

Panel A: Description statistics of matched sample and their comparison

Variables	Mean		t-test	p-value
	Female_Duality=1	No Female_Duality =0		
IE	1.672	1.205	1.45	0.127
FD_ DUM	0.175	0.133	1.39	0.165
Firm Lev	0.107	0.119	-1.04	0.300
Firm Size	15.87	15.867	0.02	0.983
Sale Growth	0.125	0.108	0.70	0.468
CFO	0.074	0.076	-0.25	0.801
Cash	0.092	0.099	-0.52	0.604
DIV_DUM	0.486	0.507	-0.50	0.617

Panel B: PSM Regressions

VARIABLES	(1) Duality_DUM	(2) IE
FD_ DUM	0.009	0.402**
	(0.12)	(2.590)
Duality_DUM	---	0.140
	---	(1.312)
FD_ DUM × Duality_DUM	---	0.222***
	---	(1.005)
Control Variables	Included	Included
Industry Fixed Effects	YES	YES
Year Fixed Effects	YES	YES
Constant	0.800*	-0.387
	(2.25)	(-0.609)
Observations	1,068	1,068
R-squared	---	0.339

*** p<0.01, ** p<0.05, * p<0.1

Vol. 3 No. 8 (2025)

Journal of Social Signs Review

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Robustness Checks

Alternative proxy of Female Directors as (FD_Proportion)

The test used an alternative proxy for the percentage of female directors on the board, which is calculated as the number of female directors divided by the total board size (FD_Proportion). The results in Table 6 reinforces and shows robustness to our conclusions.

Table 6: Alternative proxy of Female Directors as (FD_Proportion)

	(Model 1: OLS)	(Model 2: Fixed Effects)	(Model 3: System GMM)
VARIABLES	**IE_Chen**	**IE_Chen**	**IE_Chen**
Lag IE_Chen	---	---	0.912***
	(--)	(--)	(78.385)
FD_ Proportion	0.922*	2.803*	0.259**
	(0.917)	(3.035)	(1.087)
Duality_DUM	-0.425*	0.299	-0.081*
	(-5.449)	(5.574)	(-4.276)
FD_ DUM × Duality_DUM	5.380**	1.745**	0.561**
	(1.850)	(1.249)	(0.957)
Control Variables	Included	Included	Included
Industry Effects	YES	NO	YES
Year Effects	YES	YES	YES
Constant	-0.150	-0.389	-0.215*
	(-0.539)	(-0.462)	(-1.673)
Observations	1,068	1,068	1,068
R-squared	0.299	0.183	---

*** p<0.01, ** p<0.05, * p<0.1

Alternative proxy of investment efficiency as (IE_Biddle)

For more robustness test, alternative proxy of firm investment efficiency is used, i.e., IE_Biddle as measured in (Biddle, Hilary, & Verdi, 2009). The regression results in Table 7 align with the baseline data, demonstrating the robustness of our conclusions.

Table 7: Alternative proxy of Firm Investment Efficiency (IE_Biddle)

	(Model 1: OLS)	(Model 2: Fixed Effects)	(Model 3: System GMM)
VARIABLES	**IE_Biddle**	**IE_Biddle**	**IE_Biddle**
Lag (IE_Biddle)	---	---	0.238***
			(3.288)
FD_ DUM	0.197*	0.073**	0.252**
	(7.380)	(1.586)	(2.278)
Duality_DUM	0.198	0.120	-0.001*
	(5.614)	(4.325)	(-0.005)
FD_ DUM × Duality_DUM	0.005**	0.026**	0.054***
	(0.124)	(1.693)	(1.586)
Control Variables	Included	Included	Included
Constant	-0.112	2.007***	-0.155
	(-0.749)	(4.898)	(-0.143)

Vol. 3 No. 8 (2025)

Journal of Social Signs Review

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Observations	1,068	1,068	1,068
R-squared	0.366	0.240	---
AR (1) (z, p-Value)	---	---	-2.450 (0.0143)
AR (2) (z, p-Value)	---	---	-0.681 (0.496)
Sargan Test (chi square, p-value)	---	---	88.52 (1)
Hansen Test (chi square, p-value)	---	---	146.0 (0.899)

*** p<0.01, ** p<0.05, * p<0.1

Additional Board Level Control Variables

Table 8 reports additional board level control variables for robustness of results, i.e., board size and board independence. Board size is defined as the number of directors on a board expressed in the natural logarithm. The ratio of non-executive to total directors is an important measure for board independence (Shahid & Abbas, 2019). Table 8 confirms the results observed in the baseline models.

Table 8: Additional Board Level Control Variables

	(Model 1: OLS)	**(Model 2: Fixed Effects)**	**(Model 3: System GMM)**
VARIABLES	**IE_Chen**	**IE_Chen**	**IE_Chen**
Lag IE_Chen	---	---	0.866*** (329.089)
FD_ DUM	0.307* (4.223)	0.008** (0.067)	0.065** (3.652)
Duality_DUM	-0.121** (-2.036)	0.077 (1.448)	-0.064* (-5.917)
FD_ DUM × Duality_DUM	0.077** (0.673)	0.016** (0.134)	0.043*** (1.313)
Control Variables	Included	Included	Included
Board Size	0.437** (2.231)	0.296 (1.393)	0.182*** (9.700)
Board Independence	-0.069 (-0.290)	-0.540** (-2.376)	0.031 (1.111)
Constant	-1.194** (-2.440)	0.439 (0.438)	-0.544*** (-10.583)
Observations	1,068	1,068	1,068
R-squared	0.294	0.169	---
AR (1) (z, p-value)	---	---	-3.117 (0.00183)
AR (2) (z, p-value)	---	---	-0.839 (0.402)
Sargan Test (chi square, p-value)	---	---	348.3 (0.000)
Hansen Test (chi square, p-value)	---	---	187.8 (0.153)

*** p<0.01, ** p<0.05, * p<0.1

Role of Low and High Representation of Women

Studies have shown that increasing the number of women on corporate boards enhances investment efficiency. Table 9 provides the results consistent to the baseline findings and the hypotheses that are tested. Findings are in line with the literature that the benefit of

Vol. 3 No. 8 (2025)

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gender diversity would be more positive and significant for firms with more number of female directors on board based on critical mass theory (Saggese, Sarto, & Viganò, 2021).

Table 9: High/Low Representation of Women

VARIABLES	High Women (Voice) (N=More than 3) IE_Chen	Medium Women (Presence) (N=2 or 3) IE_Chen	Low Women (Token) (N=1) IE_Chen
FD (H)_DUM	0.368**	---	
	(5.882)		
FD (M)_DUM	---	0.358*	---
		(5.686)	
FD (L)_DUM	---		0.362*
			(6.434)
Duality_DUM	0.212**	-0.030*	3.048
	(1.714)	(-0.678)	(8.546)
FD (H)_DUM × Duality_DUM	0.081***		
	(3.457)		
FD (M)_DUM × Duality_DUM		0.155*	
		(1.446)	
FD (L)_DUM × Duality_DUM			0.303
			(6.467)
Control Variables	Included	Included	Included
Constant	-0.366	-0.362	-0.380
	(-1.210)	(-1.220)	(-1.274)
Observations	434	302	332
R-squared	0.290	0.289	0.289

*** p<0.01, ** p<0.05, * p<0.1

Conclusion

The purpose of this study is to examine the effect of female directors on the firm investments efficiency and moderating role of female duality in this relationship. To accomplish the goal of the research, the Pakistani market has been selected for this work. The sample is selected from companies listed on the PSX. The hypotheses are tested by using multivariate regressions methods. We hypothesize that investment efficiency is significantly higher for the firms having females in board and the results also provide evidence in favor of hypothesis that presence of female directors in board have efficient investment decisions consistent with resource based theory. For second objective, regression analysis results provide evidence in favor of hypothesis that presence of female duality strengthens the positive relationship between female directors and firm investment efficiency. As firms with both roles of females as monitoring and decision have more effective effect on firm investment efficiency consistent with resource dependence theory. Baseline findings are robust by using alternative definitions of female directors, investment efficiency and after include board-level control variables. This study further strengthens to have more female directors in board. This research's findings could help policymakers and practitioners to introduce female directors on corporate boards with female CEO duality for firm performance.

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