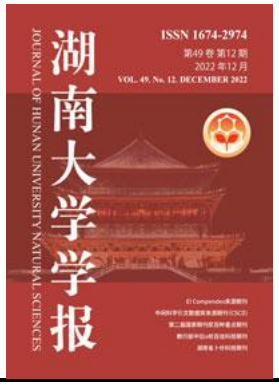

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Does the Critical Mass Assumption Change the Behavior of Female Board Members toward Dividend Payout?

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Abstract: This article aims to investigate the association between gender board diversity and the dividend payout policy of the firms listed on the Pakistan stock exchange. The study uses critical mass theoretical assumptions to explain this relationship. The study uses a sample of 300 non-financial firms listed on the Pakistan stock exchange for six years (2015–2020). The study employs regression diagnostics tests to check for Heteroscedasticity, Multicollinearity, and Serial Correlation problems. The random effects regression model was chosen using a series of steps to analyze the associations among variables. The results conclude that one woman on the corporate board is positively associated with dividend payout, while a negative relationship has been examined in firms with more than one woman on their board. The inclusion of women on the corporate board is critical to the firms, and the policymakers are suggested to restructure the regulatory codes regarding gender board diversity in Pakistan. This paper focuses precisely on critical mass theoretical lenses to observe the association between gender board diversity and dividend payout. Concluding the significant influence of women on corporate boards, the theoretical foundation is justified.

Keywords: dividend payout, gender board diversity, corporate board, critical mass assumption.

臨界質量假設是否會改變女性董事會成員對股息支付的行為？

摘要：本文旨在調查性別董事會多元化與巴基斯坦證券交易所上市公司的股息支付政策之間的關聯。該研究使用臨界質量理論假設來解釋這種關係。該研究使用了在巴基斯坦證券交易所上市六年（2015年至2020年）的300家非金融公司作為樣本。該研究採用回歸診斷測試來檢查異方差性、多重共線性和序列相關問題。使用一系列步驟選擇隨機效應回歸模型來分析變量之間的關聯。結果得出的結論是，公司董事會中的一名女性與股息支付呈正相關，而在董事會中有一名以上女性的公司中則檢驗了這種負相關關係。將女性納入公司董事會對公司至關重要，建議政策制定者重組有關巴基斯坦董事會性別多元化的監管法規。本文準確

地關注臨界質量理論鏡頭，以觀察性別董事會多樣性與股息支付之間的關聯。總結女性對公司董事會的重大影響，理論基礎是有道理的。

关键词：身体素质、职业倦怠、心理健康、体育教师.

1. Introduction

Corporate finance has extended the knowledge of scholars in the recent literature to explain the role of females on corporate boards [1, 2]. The increased number of women directors in corporate board influenced significant studies on gender-based board diversity, female directors are less presented on the board, therefore in the recent past many countries implemented the mandatory participation of women directors on corporate boards via legislation [3]. For example, "Senate Bill 826" that is approved by the governor of California declared mandatory participation of women on corporate boards of all publicly held companies that have headquarters in California. The statistics shows that women's representation in the corporate board is recorded 17.3% in 2017, enhanced from 15.8% in 2016.

Board Gender Diversity (BGD) is an appointment of women in the board of corporation. This is a contemporary issue in corporate governance that has grabbed considerable attention of policy makers, academics, government, supra-national bodies [4, 5]. The rational of increasing interest of "women on corporate board" is that women have been historically under-presented and excluded from senior corporate positions, such as chief executives and board of directors [6]. Though, insights from diverse agencies like economic, behavioral, psychological, governance, and social-based theories such as [7, 8], propose that homogeneity in the board room can lead to insignificant decision making that can negatively affect the performance and corporate governance.

Literature in the recent past suggested that gender diversity on the board enhances ethical behavior, creativity, stakeholder empathy, and innovation [9]. However, conflicting arguments are observed in [10]. They argued that less overconfidence and gender stereotypes can lead to poor women financial decisions, whilst some of them suggested no difference and superiority between male and female in managerial positions. Thus, researchers have revealed an imperative consideration of female director's contributions and corporate financial performance [7], and the border situations under which women directors are desirable and relevant on the corporate board [11].

The board in the corporations is responsible for major strategic and financial decisions [12], and the efficiency of these decisions is based on the different characteristics of the board. Empirical reviews on corporate governance presented the association between board characteristics and corporate productivity [13], but provide little focus on how different characteristics of a board affect the strategic decisions of the firm like, dividend payout decision. This is considered an imperative corporate board issue [14]. According to [15], dividends are irrelevant in a perfect market, but they are used as an instrument to mitigate imperfections in imperfect markets.

Prior literature presents a nexus between board characteristics (independence of board and board compositions) on dividend decisions [16]. However, researchers in the recent literature have focused more on gender diversity [17, 18]. The idea of gender board diversity has drawn the concept that females on the corporate board can affect the performance [8]. A large set of evidence explained that gender board diversity not only leads to good governance but also promotes an effective decision process that helps maximize the wealth of shareholders [19].

Despite the significance of dividend decision, the studies on the consequences of gender diversity on dividend payout decisions are limited, emerging, and somehow conflicting in nature in the academic literature. Many researches present positive association between dividend payouts and the proportion of female directors on corporate boards in national and international markets.

Some evidence from the United States markets is in the works [11–20]. Analyzing an international sample of 22 countries, [21] reports a positive association between gender board diversity and payout policy. The work [22] presented a negative influence of gender board diversity and payout policy. However, no difference in male- and female-led boardrooms and dividend distribution is noticed by [23].

Additionally, some studies suppose that this relationship depends on CEO duality and ownership concentration [14]. The presented arguments propose inconclusive evidence between the association between gender diversity and dividend payouts across firms. Associated with this view, the critical mass theory proposes that a single woman on a corporate board does not generate a significant difference only when its proportion increases and female directors generate a critical mass that can ultimately and significantly impact strategic decisions in board meetings [5]. Adding one female to the corporate board might be implemented the requirement of the legislating body and policies of the firm to consider gender equality and

enhance its reputation in the market [8].

Since there is a lack of conclusive evidence regarding dividend policy and gender diversity, this also affects family firms [24]. In these firms, the analysis becomes further complex because female cannot be examined as a subgroup of single homogeneous. The complexity between non-family and family female directors is that female directors having family ties have common cultures and values and pattern of education [25]. Furthermore, female directors are emotionally attached to the companies that enhance their involvement level and commitment in the corporations, which distract their attitude toward payout than holding cash due to their own interest and incentives [24].

Although very little literature is available on the topic, but still this study extends the academic literature in two aspects. Firstly, it explains the association between gender board diversity and payout policy in case firm has at least one female director on the corporate board. Secondly, to explain the connection between gender board diversity and payout policy with the inclusion of the critical mass hypothesis.

Rest of the sections are organized a theoretical and empirical reviews of literature followed by a research design and methodology. The fourth section is regarding the data analysis, whilst, the last section is a combination of discussion, recommendations and policy implications.

2. Critical Literature Review

In the academic discussion of corporate governance, scholars frequently focus on agency theory. According to agency theory, dividends are used as medicine to mitigate and resolve the conflicts between owners and agents. Once dividends are distributed i.e., managers return the earning to owners (shareholders) and reduce free cash flows. Dividends activate capital markets that enforce managers to extract funds from external investors and financial institutions. Similarly, in the markets where governance is weak, investor protection is poor due to concentrated ownership; dividends could be a mitigating tool for agency conflicts between majority and minority shareholders. Nevertheless, dividend might substitute as legal protection for owners because it establishes a good reputation and could help in the future to raise external fund.

As noticed in the introduction, the empirical support and theoretical rational reflect both negative and positive associations between payout policy and female directors. Considering the agency theory perspective and using the monitoring role, the board of directors can affect the dividend payout policy of the firm. From this framework, women directors play an imperative role in offering protection to minor shareholders and reducing agency cost that enhance the board performance. [8] noticed a higher record of attendance of female directors that supports their presence in monitoring committees compared to their male counterparts. Furthermore, increased number of females in the corporate board can improve the capability of exercising strategic role and control because it accelerates creativity and innovation, expands the set of knowledge for decision making and reduces the probability of rubber stamp decisions of management [26].

In support of the above statement, [11] present that the association of gender board diversity and payout policy is stronger for companies having a greater agency problem of FCF, this suggests that conflict between external investors and insiders can be mitigated by a diverse corporate board. The step-by-step process is summarized in Fig. 1.

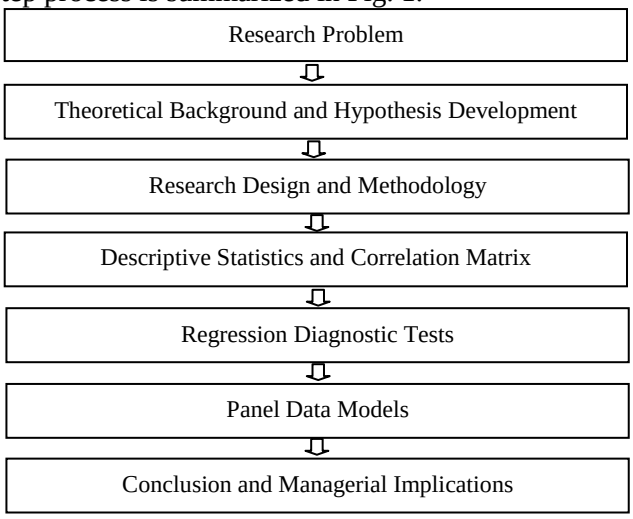

Fig. 1 Research methodology (Developed by the authors)

Gender socialization theory, which is dependent and based on psychological, cognitive, and sociological views, further focuses on the differences between women and men that could be used to explain the female director's behavior [27]. Although, these individuals' characteristics are not universally accepted, females are evaluated as more caring and participating, more receptive, and more sympathetic [28]. The leadership of women is more participative and interactive than men that could improve the ability of the corporate board to deal with uncertainty and ambiguity [29]. Woman characteristics related to ethical empathy and behavior comply with laws, universalism, and kindness that mark their leadership as stakeholder-oriented and more social [30].

The aforementioned characteristics might concentrate female directors toward stakeholder interests, it can be expected that diverse boards are more sensitive to the payout demands of minor shareholders [24]. From the above theories and perspectives, female directors might be considered signaling tools, more sensitive to stakeholder's demand, provider of legitimacy, and tougher monitors. These rationales are observed to expect a positive

influence of gender diversity in the corporate board on the dividend payout ratio of the firm. In this, negative relationships are rooted in gender socialization theory that supposes that females are considered more conservatives and risk averse while making financial decisions [31]. Females are less likely to follow extreme investment approaches and invest less in uncertain projects.

According to [32], women hold risk-averse behavior, therefore, the relationship between genders diversified board and the firm's cash holding policy is significantly positive. Following this view, firms having females on board are likely to prefer retaining and reduce distribution to facing uncertainty.

[33] shows that gender-diversified board is negatively associated with payout policy in emerging markets, they explained that female pursue profitable investment opportunities in the firm and tend to seek for internal fund raising for investments. We conclude that the association between women directors and payout is more complicated than was at initial sight, with dissimilar evidence of negative and positive influences are presented in the literature. This created a baseline for this study that this association might depend on the proportion of female directors on the corporate boards, which provided us with the possibility of gaps unfilled in the literature.

Indeed, failure to consider critical mass assumptions might be the reason of positive and negative results of gender board diversity and firm performance literature. In the view of critical mass theory, the impact of women on the corporate board is not linear but conditional. [35] empirically tested critical mass theory, who presents a U-shaped association between a gender-diversified board and the performance of the firm, at start it is negatively associated with firm performance, followed by a positive after a certain threshold. Following this theoretical underpinning, this study posits that woman director's behavior and incentives might differ, depending on the proportion of woman directors on the corporate boards. Therefore, when the proportion of women on corporate boards is low, the female may act as tokens, and they will enjoy lower status, influence, and prestige compare to numerical majority members [24].

The latest literature recommends that the female's abilities of firm's strategic vision implementation might be less due to their minimum effort within the corporation [36] and they have limited skills to promote the practices of firms not by their low-status numerical minorities but also by their structural position. The distinctive women socio-psychological and cognitive characteristics, which make them less effective in decision making is the major difference with men and might produce trouble when the proportion of females on the board is low. Consequently, less than the critical threshold, women minorities on a board means that men dominate decision-making management in the daily practices of the firm.

Recent literature on critical mass assumptions argues that these underrepresented females become "out group" members of the board who usually avoid sharing their ideas and views, and keep a low profile [34]. Accordingly, women directors are called as tokens that have no significant impact in decision making due to their limited legitimacy, authority, power, and visibility. Additionally, female directors listed as a minority group might not accept the expected behavior of gender but, in contrast, imitate male oriented pattern to be part of board in male-dominated culture. [37] states that female in male-dominated board imitate instead of seeking to change and adjust themselves in the existing gender hierarchy and, rather than adding diversity, they try adjusting and fit their self-presentation into the organizational culture. In terms of payout policy, when the proportion of female directors is below this critical mass, female directors may replicate their masculine-counterparts' view.

Summarizing the above discussion, prudent and conservative financial attitude, lower overconfidence, and risk aversion only emerge and influence dividend payout policy only, when a female voice is heard and it is possible at critical mass point. Considering this point, higher number of females on the corporate board can act as a substitutive technique for dividend payouts to reduce agency conflicts.

Therefore, dividend is a less effective tool of monitoring and shareholder's interest protection offered by women directors. Moreover, female directors can be the company's substitutive tool for reputation and hold cash rather than payout as the number of women director's increases. The distinguishing association between female and dividend payouts depends on their legitimacy and visibility on the board and can explain equivocal results, and heterogeneity found in prior studies that analyzed women role without considering the relevancy of critical mass assumptions [10–22].

Observing this gap, this study proposes the following hypotheses:

H1: Diversity in the corporate board positively affects dividend payouts in Pakistan stock exchange listed firms.

H2: The dividend payout further increases as the number of women increases in corporate board in Pakistan stock exchange listed firms.

3. Methods

3.1. Data Sources

The study focuses on the association between women directors and the payout policies of firms listed in Pakistan stock exchange from 2015 to 2020. These data were extracted from the annual reports of the

companies. Annual reports are downloaded from the financial website (https://opendoors.pk/).

3.2. Sample Size

Recent statistics of the Pakistani stock exchange reports that there are 540 registered firms. Some of these firms do not issue annual reports; firms that do not issue annual reports are excluded due to unavailability of data. Around 394 firms issue annual reports, therefore the sample size for this study is all these firms that issue annual reports. The final sample becomes 16474 unbalanced panel firm-years observations for financial years.

3.3. Data Processing

Data analysis was processed using STATA 2017. The descriptive statistics are presented, followed by regression diagnostics tests. These include panel serial correlation, heteroscedasticity, and multi-co-linearity. The process of selecting the true model of regression is initially selecting between OLS and fixed-effects model using Bruch Pagan Multiplier Test. Then, fixed and random regression models are tested, using Hausman test. Finally the process recommends fixed-effects model as a true regression model for this study.

3.4. Variables of the Study

The study uses dividend payout as a dependent variable, while the number of women in corporate board as an independent variable. Besides this, the firm's characteristics that might have an impact on the dividend payout are taken as control variables. Firm's characteristics are, board size, firm size, firm's profitability, firm's financial leverage, and growth opportunities [38]. A description of the variables is given in Table 1.

Table 1 Description of the variables

Variable Name	Symbol	Measurement	Type	Source
Dividend payout	DPO	Total dividend/Net income	DV	[24]
Woman	WOMEN	It takes 1 if board contain one women and 0 otherwise	IV	[24]
Women	NWOMEN	It takes 1 if the board contains more than one woman and 0 if the board has one women	IV	*
Board size	BSZE	Log of the number of directors	CV	[38]
Firm size	FSZE	Log of the total assets	CV	[38]
Firm's profitability	ROA	Return on assets	CV	[38]
Firm's financial Leverage	FLRG	Ratio of total liabilities to total assets	CV	[38]
Firm's growth opportunity	GOP	Equity market-to-book ratio	CV	[38]

(*) The table represents the novel variables considering critical mass hypothesis

3.5. Regression Model

The regression model comprises dividend payout, DPO as a dependent variable, and is calculated as the total dividend divided by the net income of the company. At the right side of the equation, α is a constant, WOMEN is the first independent variable that is dummy in nature, and takes 1 if the company has female in the board and 0 otherwise. NWOMEN is the second independent variable that occurs if the board has more than one female in the board and 0 if the board contains only one woman. The study takes some control variables too, they are, board size as BSZE in the model and calculated as Log of the number of directors of firm, firms size is presented as FSZE, and calculated as log of total assets, firm's profitability as ROA (Return on Assets), financial leverage is shown as FLRG, and calculated is debt to total assets ratio, and lastly, growth opportunity of the company is presented as GOP, and calculated as equity market to book ratio.

The regression model is constructed as follows:

$$DPO_{i,t} = \propto_{i,t} + \beta_1 WOMEN_{i,t} + \beta_2 NWOMEN_{i,t} + \beta_3 BSZE_{i,t} + \beta_4 FSZE_{i,t} + \beta_5 ROA_{i,t} + \beta_6 FLRG_{i,t} + \beta_7 GOP_{i,t} + \square_{i,t} \quad (1)$$

4. Results and Discussion

Descriptive statistics, the Pearson correlation matrix, followed by diagnostic tests of regression (hetroscedasticity, multicolineraity, and serial panel correlation) are presented in this section. The regression model has been tested for both pooled ordinary least square (OLS) and random effect. The OLS was found inappropriate, therefore, comparison between random and fixed-effects model has taken place the Housman test, which supported random-effects model as appropriate for this study.

4.1. Descriptive Statistics

Table 2 presents the descriptive statistics of the sample companies. These statistics are finalized treating certain steps. Outliers in the data are identified using standardized residuals through ±3 standard deviation from mean. All variables are winsorized at 1st and 99th percentile. The rest of the tables is based on the winsorized variables. Summary statistics are also estimated before Winsorization and reported in the appendix section.

Table 2 Descriptive statistics (Developed by the authors)

Variable	Obs	Mean	Std. Dev.	Min	Max
DPO	1483	.189	.22	-.299	.931
WOMAN	1483	.55	.498	0	1
NWOMEN	1483	.273	.446	0	1
BSZE	1483	2.057	.156	1.946	2.639

Continuation of Table 2

FSZE	1483	8.973	1.645	5.053	12.93
FLRG	1483	.51	.217	.025	.997
ROA	1483	.044	.087	-.27	.338
GOP	1483	.455	.233	-.668	.884

DPO is the dividend payout ratio is dependent variable, calculated as the total dividend divided by net income, WOMAN is an independent dummy variable that takes 1 if the firm has only one female director on the board, and 0 if the board consists of only male directors.

NWOMEN is second independent dummy variable that takes 1 if the firm has more than one female director on the board and 0 if the board has one or less number of female in the board, remaining are control variables. BSZE is board size measured through logs of board size. FSZE, firm size measured through logs of total assets. FLRG is financial leverage calculated as total debt divided by total assets. ROA is return on assets calculated as net income divided by total assets. Lastly, GOP is a growth opportunity that is calculated as total equity divided by total assets."

The dependent variable in Table 2 is the dividend payout ratio. The sample firms averagely distribute 18.9 percent of their net income to their shareholders, having 22 percent deviation from the mean. A negative value can be observed for the minimum dividend representing losses of the firms, with none of the sample firms having distributed more than 93.1 percent of their net income. The first independent variable is WOMAN that shows that 55 percent of the firms have at least one female director on the board. The second independent variable is NWOMEN that shows 27.3% of the firms have more than one female director on their corporate board. Reporting the control variables, BSZE has a mean value of 2.057 with 15.6 percent deviation from the mean. This value ranged from 1.946 to 2.639. The mean and standard deviations of FSZE were 8.973 and 1.645 respectively. The values FSZE in the dataset fall between 5.053 and 12.933. The capital structure of these firms consisted of 51 percent debt financing with 21.7 percent deviation from the mean. Debt financing in the capital structure of the firms was between 2.5 percent with a minimum and 99.7 percent with a maximum. On average, sample companies are generating 4.4 percent return on their assets, with 8.7 percent deviation from the mean. The negative value of ROA represents the percentage losses of 20.7 percent of total assets, with a maximum profit of 33.8 percent of total assets. Lastly, growth opportunity has a mean value of 45.5 percent with 23.3 percent of deviation from mean. Finally, an average 45.5 percent of the fund is raised using shareholder equity that has 23.3 percent deviation. A negative value of the GOP represents that the firm's liabilities exceed its total assets.

4.2. Pearson Correlation Matrix

Table 3 presents the Pearson correlation matrix. The relationship between outcome and explanatory variables is weak. This shows that WOMAN, BSZE, FSZE, FLRG, ROA, and GOP have a positive correlation, while NWOMEN is negatively correlated with the outcome variable (DPO), however the magnitude of the correlation varies across variables.

Table 3 Correlation matrix (Developed by the authors)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
DPO	1.000							
WOMAN	0.017	1.000						
NWOMEN	-.004	0.497	1.000					
BSZE	0.064	-.015	-.007	1.000				
FSZE	0.029	-0.061	-0.035	0.119	1.000			
FLRG	0.002	0.046	0.017	0.051	0.013	1.000		
ROA	0.035	0.059	0.045	0.047	0.137	0.048	1.000	
GOP	0.057	0.032	0.020	0.042	0.127	0.039	0.313	1.0

DPO is the dividend payout ratio is dependent variable, calculated as the total dividend divided by net income, WOMAN is the independent dummy variable that takes 1 if the firm has only one female director on the board, and 0 if the board consists of only male directors.

NWOMEN is second independent dummy variable that takes 1 if the firm has more than one female director in the board and 0 if the board has one or less number of female in the board, remaining are control variables. BSZE is board size measured through logs of board size. FSZE, firm size measured through logs of total assets. FLRG is financial leverage calculated as total debt divided by total assets. ROA is return on assets calculated as net income divided by total assets. Lastly, GOP is a growth opportunity that is calculated as total equity divided by total assets.

4.3. Regression Diagnostics Test

Diagnostics are used in regression to verify whether the assumptions made in the estimated model are consistent with collected data or not. Three diagnostic tests include hetroscedasticity, panel serial correlation, and multicolinearity.

4.3.1. Heteroscedasticity

This problem occurs, when independent variables are correlated with residuals (error term) in the analysis model. The null hypothesis in this case is always:

H0: There is no Heteroscedasticity in the model.

As reported in Table 4, the p-value is less than 5 percent, the null is rejected. To deal with this problem, robust command is used in the regression model.

Table 4 Model Hetero (Developed by the authors)

Items	Values
Estimated covariance	348
Number of Obs	1,483
Estimated autocorrelations	0
Number of groups	348
Estimated coefficients	4
Obs per group:	
-min	1
-avg	4.261494

-max	6
Log likelihood	480.8723
Prob > chi2	0.0000

Notes:
Cross-sectional time-series FGLS regression
Coefficients: generalized least squares
Panels: heteroskedastic
Correlation: no autocorrelation

4.3.2. Panel Serial Correlation

This problem in the regression model occurs, when a variable is correlated with its legged version. This means that the current year's data for a specific variable has a correlation with the previous year's data for the same variable. A null hypothesis in this case is always:

H0: There is no first order correlation.

The Wooldridge test was used to check for serial correlation.

Table 5 Serial correlation (Developed by the authors)

Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
F(1, 241) = 16.699
Prob > F = 0.2008

The probability value shows that the serial correlation problem does not exist in the regression model.

4.4.3. Multicolinearity

This problem exists, when one or more independent variables are highly correlated with each other's. To check multicolinearity the variance inflation factor (VIF) test is used. This problem exists, if the mean value of VIF is more than 10.

Table 6 Variance inflation factor (Developed by the authors)

Variables	**VIF**	**1/VIF**
WOMAN	1.338	.747
NWOMEN	1.329	.753
ROA	1.127	.887
GOP	1.119	.893
FSZE	1.045	.957
BSZE	1.018	.982
FLRG	1.007	.993
Mean VIF	1.141	.

Since the mean value of VIF is less than 10, it is concluded that multicolinearity problem does not exist in the analysis.

4.5. Panel Data Models

The quantitative investigators used three models for panel data analysis. They are, ordinary least square (pooled OLS), random effects, and fixed effects models. A series of steps are followed to choose an appropriate model among them for analysis. First, choosing between random effects, and pooled OLS models using the Breusch and Pagan Lagrangian multiplier test. If pooled OLS is found inappropriate, then the model will be chosen between fixed and random effects using the Hausman test.

4.5.1. Pooled (OLS) vs. Random Effects Models

Proceeding to choose a true model, Breusch, and Pagan Lagrangian multiplier test is used to compare OLS and random effects models. The null hypothesis in this test is always:

H0: There are no random effects in the model.

Table 7 Breusch and Pagan Lagrangian multiplier (Developed by the authors)

Breusch and Pagan Lagrangian multiplier test for random effects

DPO_w[id,t] = Xb + u[id] + e[id,t]

Estimated results:

	Var	sd = sqrt(Var)
DPO_w	.0482192	.2195886
e	.0310688	.1762636
u	.0185539	.1362127

Test: Var(u) = 0

chibar2(01) = 320.92
Prob > chibar2 = 0.0000

Table 7 shows that p-value is less than 5%, the null hypothesis is rejected. A random effects model was chosen between them. The next step is to choose between the fixed and random effects models.

4.5.2. Fixed vs. Random Effects Models

To choose between fixed and random effects models, the "Hausman test" is used. The null hypothesis in this test is always:

H0: There are no fixed effects in the model.

Table 8 Hausman's (1978) specification test (Developed by the authors)

Values	**Coefficients**
Chi-square test value	5.237
P-value	.631

The null hypothesis is accepted because the p-value is greater than 5%. This concludes that effects vary randomly across firms, and the random-effects model is considered true and appropriate model for this study.

4.6. Random Effect Model

The result of the random effects model is shown in Table 9. The study regressed to examine the effect of gender board diversity on payout policies of the firms listed in Pakistan stock exchange for 6 year time span from 2015 to 2020. Table 8 presents the results of the random effects regression model. *, **, and *** represent the significance level at 10%, 5%, and 1% respectively. The overall r-squared value shows that 40% variation in the dividend payout ratio is explained by variations in the independent variables, while, unobserved variables explain the rest of the variation.

Regression in Table 8 reports weak, positive, and

significant estimate of the WOMAN coefficient that confirms accept the first hypothesis; this concludes that gender diversity in the corporate board increases the dividend payout ratio. Similar results are reported in [12–21]. However, a negative relationship can be found in [22–33]. The reason of weak positive and negative relationship between WOMAN and DPO might be due to aloneness of woman directors on the corporate board. According to [8], one woman on the board cannot bring substantial impact on decision making. This argument diverts the focus toward the second hypothesis. The estimated coefficient of WOMEN is negative, which indicates that increasing the number of women on the board is negatively associated with DPO; hence, the second hypothesis cannot be accepted. As the number of women increases in the board, their influence on board meetings and decision making also increases. [32] showed a positive association between gender diversity and the cash holding policy of the firm. Following this view, firms having females on the board are more likely to prefer retaining cash and reduce payout to face future uncertainty. Therefore, the study does not find enough evidence to justify the critical mass assumptions in Pakistan stock exchange.

Table 9 Random effects regression results (Developed by the authors)

DPO	Coef.	St.Err.	t-value	p-value	[95% Conf.	Interval]	Sig
WOMAN	.006	.014	0.48	.034	-.02	.033	**
NWOMEN	-.016	.015	-1.07	.006	-.046	.013	***
BSZE	.103	.053	1.92	.005	-.002	.207	***
FSZE	.891	.005	-0.03	.074	-.009	.009	*
ROA	-.033	.069	-0.48	.035	-.169	.103	**
GOP	.048	.03	1.59	.512	-.011	.107	
FLRG	-.024	.037	0.64	.023	-.049	.096	**
Constant	-.048	.116	-0.41	.079	-.276	.18	*

*** p < .01, ** p < .05, * p < .1

Table 9a Explanation

Mean-dependent variables	0.189	SD-dependent variables	0.220
Overall r-squared	0.401	Number of obs	1483
Chi-square	8.583	Prob > chi2	0.284
R-squared within	0.401	R-squared between	0.119

DPO is the dividend payout ratio is dependent variable, calculated as the total dividend divided by net income. WOMAN is an independent dummy variable that takes 1 if the firm has only one female director on the board and 0 if the board consists of only male directors. NWOMEN is the second independent dummy variable that takes 1 if the firm has more than one female director in the board and 0 if the board has one or less number of female in the board, remaining are control variables. BSZE is board size measured through logs of board size. FSZE, firm size measured through logs of total assets. FLRG is financial leverage calculated as total debt divided by total assets. ROA is return on assets calculated as net income divided by total assets. Lastly, GOP is a growth opportunity that is calculated as total equity divided by total assets.

Further proceeding to control variables, BSZE positively correlated with DPO with 10% confidence level. Its coefficient shows that for each one unit increase in BSZE, the dependent variable increases by 10%. These results are consistent with [12–24]. The FSZE increases the dividend payout by 9% at 10% significant level. This indicates that large firm's distribute more as compare to small firms. While, the performance of the firms, (ROA)'s efficient is statistically significant at the 5% significant level. It shows 3.3% deduction in the dividend payout, when the firms generate 1 unit return on their assets. The coefficient of the GOP is statistically insignificant. This suggests that growth opportunities have no imperative role in explaining the relationship between board gender diversity and dividend payout policy of the firm. However, the contradiction is reported in [24]. Lastly, the negative coefficient significant at 10% shows that the dividend payout is inversely correlated with the firm's financial leverage. For each unit increase in FLRG, the DPO decreases by 2.4%. This means that externally funds generated firms pay less dividends to enhance the confidence of debt holders.

5. Conclusion

Despite the vast literature on the role of female characteristics in corporate decisions, this study concludes that there is lack of unifying theoretical lenses to address this role and reconciles the clear conflicting empirical result. The socio-emotional wealth theory, gender socialization theory, and agency theory provide varying evidence to support female representation in the corporate decision making. This paper investigates the association between gender board diversity and dividend payout policy of the firms listed in Pakistan stock exchange for 6 years (2015-2020). The study takes dividend policy as the dependent variable, while WOMAN (one female in the board), and NWOMEN (more than one woman in the board) as explanatory variables. The study also controls for board size, firm size, return on assets, growth opportunity, and financial leverage. However, this research investigated this relationship on the basis of

critical mass theory.

The literature shows mixed results, while our results conclude that one woman on the corporate board is positively associated with dividend payout, while a negative relationship has been examined in the firms with more than one woman on their board. This indicates the participation of women at fulfilling the regulatory requirements is unobjectionable, but increasing the number of women in the firm's board might cause the agency problem. The literature suggests that one woman alone cannot influence meeting and corporate decision making, but as their number increases, their voice influences the decision making in board meeting. [31] suggests females are considered more conservatives and risk averse while making financial decisions. Therefore, negative impact is observed in Pakistan stock exchange.

Firms having female in board are more likely to prefer retaining cash and reduce payout to face future uncertainty. [32] supports risk aversion behavior of females that shows a positive association between women on the board and the cash holding policy of the firm. In support of our results, [33] reported a negative association between board diversity and dividend payout policy in emerging markets, they suppose that female bring profitable investment opportunities to the firm and tend to seek for internal fund raising instead of external investments. This study further justified the critical mass foundation in the sample firms that is addition to academic literature.

The results of this study may be helpful for practitioners, investors, and policy makers. Investors who prefer payout rather than capital gain should focus on firms that have male dominated board. Policy makers are suggested to restructure the regulatory codes regarding gender board diversity in Pakistan. Lastly, for academia, results of this study challenge previous evidence and propose testing a new theoretical approach for explaining women role in corporate board.

This study created a dummy variable to explain the dominance of females on the corporate board. Testing for increasing the number of women, for example, if the board has one woman, two women, three women and so on, can further explain the relationship. Additionally, this study focuses on a single country; multiple countries can be examined to explain this relationship.

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