

**Gender Diversity and Environmental Sustainability:
Investigating Some Methodological Perspectives**
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Abstract

The current study focuses on the impact of board room gender diversity on the Environmental Sustainability (ES) of firms. The study selects a sample from the banking sector in Pakistan from 2011 to 2018. Content analysis is used for the measurement of ES. Those Boards which has enough strong combination of gender diversity probably deliver additional monitoring and are also strict implementation of ethical behavior, thus decreasing the effects of misuse of shareholder investments that can be harmful to their profits. As for their social capabilities, women in the board room are likely to be able to involve with numerous stakeholders providing a way for presenting social responsiveness, which is established by the results. Our findings are robust to alternative estimation techniques including Ordinary Least Squares (OLS), Panel Corrected Standard Errors (PCSE), and the Two-Stage Least Squares (2SLS) method. The outcomes support that a connection does exist among board Gender Diversity (GD) and ES. The outcomes suggest that firms having boards with more gender diversity are more environmentally responsible. The study offers new information on the part of female directors in encouraging ES and develops additional dimensions to the continuing debate in this area by selecting the banking sector. The study offers theoretical, methodological, and practical implications.

Keywords: board gender diversity, independent directors, board size, environmental sustainability, instrumental variables, methodology

Introduction

The term ES, particularly in the current era, has developed a major argument for the academic sector, regulators, and policymakers. The area of climate transformation is a global issue with serious allegations (D'amato et al., 2015). Several activities by the human have a harmful effect on the Earth. Enough resources are consumed as offered by the planet. To fulfill the demand for an increase of raw materials, ecosystems are damaged with intensive polluting activities (Okpara & Idowu, 2013). Banks are playing an important part in strategies intended to reduce climate variation by closing their relations with businesses associated with immense pollution (Rehman et al., 2020). Female presence in the board room provides diverse leadership styles (Mirza & Jabeen, 2020). Women are enough

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democratic, participatory, and conscious of CSR initiatives. It is claimed that women are more prospective to participate in socially responsible initiatives and act more efficiently in response to environmental problems than men as they are more anxious and aware of the hazards of climate change (Zaid et al., 2020). Therefore, female representation encourages the adoption of green practices.

To address gender equality, the latest code issued by the Securities and Exchange Commission Pakistan (SECP), for registered corporations in 2019 also discussed this area. Under the Code, every board must have one female director (Code of Corporate Governance, 2019). Earlier studies discovered that the proportion of females in upper management is very small (Imran Khan et al., 2019; Khatib et al., 2021; K. Ullah et al., 2018). Women usually have been an ignored population segment in Pakistani firms. Female's share can only be increased once the positive role of the female in top management is analyzed (Birindelli et al., 2018; Buallay et al., 2020; Yar & Ahmed, 2020). Similarly, female directors seem the viable solution to improve and accommodate ES (Zaid et al., 2020). Some authors analyzed the connection between gender diversity and ES suffers because of numerous influencing variables and also methodological problems like the problem of endogeneity and heteroscedasticity. The reason for endogeneity can be several issues, like measurement error, simultaneity, or omitted variables (Roberts & Whited, 2013). In such a situation, inconsistent results are obtained through the classical OLS method. Due to its consistency in such scenarios instrumental variables (IV) estimation is an interesting substitute (Saridakis et al., 2020). When the variance of the error term in a regression model differs it depicts the condition of heteroscedasticity (Lewbel, 2018). There are two reasons for PSCE; firstly to overcome the problem of serial correlation and heteroskedasticity that the projected outcome becomes valid, secondly, the problem of endogeneity to be avoided (Al Maqtari et al., 2020). The problem of endogeneity does exist between the corporate governance variables. Moreover, the authors further noted that these issues are rarely investigated in the literature on GD and ES (Rahman & Zahid, 2021; Zahid, Rehman, Ali, et al., 2019).

For reshaping the economy of a country banks are playing an important part by circulating required funds for trades which result in the provision of employment, developing corporate governance, and therefore nurturing economic expansion. Consequently, businesses flourish through the well-governed banking sector while poorly governed banking zones would reduce progress (Bagh et al., 2017). One of the largest service sectors in Pakistan is the banking system. It is considered a major social force. Significant environmental, social, and economic challenges are faced by the banking community

(Shabbir, 2019). The role of the board has always been defining and versatile in the business community. Recently the Board's gender diversity has become a widely discussed topic in Pakistan (Siddiqui & Atique, 2020). Increasing female directors on corporate boards have raised a new discussion about a firm's performance. The scholar plans to study the role of the Board's gender diversity on ES in Pakistan's banking sector regarding the above discussion. To show their entrepreneurial potential businesswomen don't enjoy similar opportunities as men do in Pakistan's corporate sector (Amin et al., 2021). All companies registered on the KSE 100 index between 2008 and 2010 show 25% of the companies have one woman in the boardroom, and also the percentage of women CEOs was 3.33% (I. Ullah et al., 2019). The role of GD has not specifically been studied in Pakistan's banking sector, which provides a clear gap in the body of knowledge. The current study focused to fill this gap by examining the relationship between GD on ES. A sample of 23 registered banks in Pakistan has been chosen and collected an 8-year panel dataset. The findings of the study add numerous additions to the literature.

Literature Review

Diversity plays a vibrant role in better strategic decision-making (Díaz-García et al., 2013), a superior knowledge base, novelty, and creativity which results in improved performance. Diversity offers companies an improved knowledge of the market by comparing their diversity with that of customers and suppliers (Moreno-Gómez et al., 2018). Previous literature on the composition of the board concerning gender and its impact on financial performance has described mixed empirical outcomes (Mirza & Jabeen, 2020). The current study concentrates on the impact of board gender composition over ES.

GD is the individual part of board diversity. The role of women is traditionally, culturally, and socially diverse from men. Women are enough polite, nurturing, compassionate, trusting, and interested to uphold social and emotional relations (Endraswati, 2018). The presence of female directors creates an open environment for novel business ideas and is having good preparation for board meetings (Midavaine et al., 2016). Ibrahim and Hanefah (2016) found that female directors are enough philanthropically determined and lesser economically oriented. Nielsen et al. (2017) recommend female directors because of their interpersonal skills like they are better expected to have involvement with numerous stakeholders and also respond to their requirements.

To accomplish better corporate governance of banks GD can be considered as an important dimension. In case of not appointing women in the boardroom may be a sign of discrimination attitudes in

the bank that will affect the decision-making process (Cook & Glass, 2018). Consequently, a transparent and more open directorship appointment procedure would be an important factor for proper corporate governance, and it will allow the access of women to the bank's boardroom (Thams et al., 2018). Women's implicit quality to involve with numerous stakeholders and their interest in environmental and social comfort would generate a broad culture that encourages organizational, social, and environmental paths for ES. Nation, gender, and tenure diversity are areas bringing improvement in CSR disclosure described in the study of supported resource-based theory. Though, a negative impact was shown on CSR disclosure in Pakistan-based firms by studying the educational background (Ismail Khan et al., 2019). A content analysis of 50 Non-financial firm's environmental reporting practices revealed that the higher proportion of female directors, independent directors, and also board size is connected with better environmental reporting (Naseer & Rashid, 2018). As per the above arguments, it can be projected that female's presence on board would improve environmental performance.

Theoretical framework and Hypothesis development

According to Stakeholder the connection among management and further stakeholders, which includes employees, creditors, suppliers, auditors, investors, the government, customers, donor agencies, and shareholders (Freeman, 1984). Numerous stakeholders expect firms to improve in ES-related issues, presence of female directors in the board room can bring improvement in this area (Masud et al., 2018). Khan and Imran (2019) advise that GD increases corporate transparency which results in the reputation and confidence of the stakeholders. Environmental activist associations reassure firms to spend on pollution, eco-friendly technology transfer, environmental administration schemes, and the appropriate consumption of natural capital (Zahid, 2019). Stronger boards assure these steps by safeguarding ES in their correspondence among stakeholders through annual or combined reports, CSR reports, and websites. Because of emerging top commercial environmental performance, the presence of female directors becomes even more important because women show advanced levels of environmental concerns (Yarram & Adapa, 2021). Furthermore, women in politics continue further than men to support pro-environmental legislation (Al Fadli et al., 2019).

According to the theory of gender socialization, as socialization increases it compensate both genders for diverse behaviors, competitive and individualistic behaviors in men over supportive and altruistic behaviors in women (Zahid, Rehman, Ali, et al., 2019). These diverse communal roles and opportunities create

career routes and administrative styles having dependence on the gender of top management. Consequently, women are having enough cooperative and relationship-building tactics and likely to follow widespread strategies and stakeholder-focused results, which supports environmental practices (Glass & Cook, 2018). Furthermore, not only GD in the board room counts for sustainability but also diversity all over the organization. Some of the authors likewise founded these results in a sample of registered Chinese nonfinancial companies (Campbell & Mínguez-Vera, 2008).

As the number of female directors increases, environmental investments provide better results in a cross-country sample of Chinese firms for several industries (Zhang et al., 2018). The result depicts the existence of even a single woman on the board certainly boosts organizations towards ES. Several other studies reveal that the affiliation between environmental strength and the existence of female directors is not substantial (Conyon & He, 2017). Likewise, the heterogeneity in gender at the upper management decreases the strength of agency problems among shareholders and management. Furthermore, the heterogeneous boards reply better to the difficulties regarding the environment by taking non-routine decisions. Also, these boards improve firms' financial performance and also rises their optimistic picture in the overall market (Zahid, Rahman, Ali, et al., 2020). To find student's observations towards nature and level of CSR actions performed by universities in Pakistan a detailed survey is conducted to gather data, results depict that greater attention is paid by students to socially responsible steps taken by universities (Ali & Ali, 2016).

Homoscedasticity of errors is one of the assumptions of multiple regression analysis. In the psychological or behavioral data, Heteroscedasticity is often found which may result from misspecification due to overlooked nonlinear predictor terms. To test statistically that an endogenous variable is directly correlated with an error term is not possible because endogeneity bias is unobservable. Likewise, exogenous variables are perhaps never exogenous specifically. It becomes difficult to statistically confirm that the problem of endogeneity can be completely solved. Therefore, such dilemmas do not require solutions, they opt for improved choices. Regarding choices, scholars should know the reasons for the problem and take proper steps to decrease its negative impact to tackle endogeneity properly (Torres-Barreto, 2018). Nonetheless, as mentioned above, studies argued that the link between GD and ES suffers due to methodological issues such as the problem of endogeneity and heteroscedasticity (Rahman & Zahid, 2021; Zahid, Rahman, Khan, et al., 2020; Zahid, Rehman, Ali, et al., 2019). Thus,

the study supposes that the relationship between GD and ES might be suffering from the issues of endogeneity and heteroscedasticity and could be correctly estimated after addressing these issues. Keeping in view the above discussion it is hypothesized that:

H1a: Gender diversity has a positive relationship with environmental sustainability.

H1b: The impact of gender diversity on Environmental Sustainability will be more pronounced after controlling heteroscedasticity.

H1c: The impact of gender diversity on Environmental Sustainability will be more pronounced after controlling for endogeneity.

Methodology

The population for the current study is the number of registered banks with the State bank of Pakistan. The duration specified for data selection is from 2011 to 2018, as numerous modifications concerning the environment, society, and guidelines for governance were presented along this period. The total number of banks operating in the country is 35, because of data availability 23 banks were considered as the sample. Content analysis is adopted for data gathering.

Clarity regarding the bank's sustainability activities is of excessive interest to a widespread of stakeholders. Global Reporting Initiative (GRI) is a global non-governmental organization that produces a complete sustainability reporting framework. The Study will examine bank disclosures in each dimension of ES. This is designed from a detailed index of 76 essential variables combined in 21 basic indicators. These indicators measures comprise the quality of water, air, biodiversity, sustainable use of land, restraints on ecosystems, waste and natural resource management, etc. ES denotes the capability to attain the highest levels of performance in environmental arrangements. (Michalczuk & Konarzewska, 2020). Table 1 provides the operationalization of variables with the support of previous literature.

Table 1: Operationalization of Variables

S.no	Variables	Measurement	Source
1	ES	GRI Index	(Nadeem et al., 2017)
2	GD	Total Female Directors	(Nadeem et al., 2017)
3	BS	Total Board of directors	(Cucari et al., 2018)

4 BI Total independent directors (Okpara & Idowu, 2013)

To avoid misspecification in the model and control for further factors that might affect environmental disclosure, board room size and independence are used as control variables. Prior literature documents the company size, profitability, and industry affiliation may affect the level of environmental disclosure (Hussain et al., 2018).

Findings and Discussions

Descriptive statistics

As per Skewness and Kurtosis few variables were not spread normally, the reason may be due to outliers. By using the Vander Warden data distribution method the data were normalized (Luepsen, 2018). The Kurtosis statistics remain in a bracket of ±3 and the Skewness ±1.96. Additionally, the minimum, maximum, and mean statistics are also described with the mean and standard deviation.

Table 2: Descriptive Statistics

	Mini Stat	Max Stat	Mean Stat	Std. Dev. Stat	Skewness		Kurtosis	
					Stat	S.E	Stat	S.E
ES	0	5	1.03	1.066	1.031	.183	.820	.364
GD	0	2	.19	.424	2.013	.183	3.222	.364
BS	6	14	9.06	1.752	.840	.183	.192	.364
BI	0	6	2.05	1.583	.002	.183	-1.041	.364
ROA	-2.533	2.5333	-.000007	.9775425	.000	.183	-.244	.364
NLA	13.903	30.000	26.32802	1.740704	-2.89	.183	16.441	.364
ND/E	-2.388	2.5333	.000216	.9769780	.005	.183	-.258	.364

ES=Environmental Quality, GD=Number of females, NLA=Net log of Assets, ND/E=Net Debt to Equity

The lowermost value is -2.533 and the uppermost is 2.533, and the standard deviation is 0.9775 for ROA, which shows its stability. The mean value for the Female number is 0.19, which specifies that GD at the specified period continued stable. As per the ES index, the lowest statistic is 0, the highest value is 5, with a mean of 1.03. Banks have increased their disclosures, which depicts their confidence in ES practices.

According to Table 3, no multicollinearity was found, i.e., above 0.8 among the two predictors thus, the predictors are to be verified for regression and are not highly correlated and as such, appropriate for additional analysis.

Table 3: Pearson’s Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ES	1						

GD	0.127	1					
BS	.342**	-0.076	1				
BI	-0.069	-0.049	.168*	1			
Net ROA	.164*	0.030	.247**	-.149*	1		
Net log Assets	0.090	0.090	.284**	.178*	.238**	1	
Net D/E	-0.075	-.176*	.226**	.303**	-.193*	.233**	1

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

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

OLS is considered important regression estimators (Lin & Benjamin, 2018). Though due to the existence of endogeneity, the OLS estimator is potentially biased and inconsistent (Bound et al., 1995). The statistics for heteroscedasticity show that data is heteroscedastic ($\chi^2(1) = 11.57$, $\text{Prob} > \chi^2 = 0.000$). The study employed Prais Winsten Regression that corrects for heteroscedasticity panels. The estimator is efficient in controlling the major deviations of homoscedasticity (Zahid, Rahman, Khan, et al., 2020). Moreover, the data also suffers from the problem of endogeneity and omitted variable bias after applying the *ovtest* ($F(3,158) = 2.58$, $\text{Prob} > F = 0.0056$). To use IV and control for endogeneity factor as well as to acquire asymptotically impartial results, a 2SLS estimator is used for the models having the problem of endogeneity. 2SLS is an estimator introduced by Bollen (1996) that properly calculates the models which have IV. 2SLS is an expansion of OLS using the maximum likelihood method for the estimation of path coefficient. Consequently, together the OLS and 2SLS estimators are used in this study. As per the overall debate and the supporting essence of stakeholder theory in Equation 1 and OLS regression in Equation 2, 2SLS estimators are used as described.

$$ESit = \alpha_1 + \beta_1 GDit + \chi_{it} + \delta_t + \eta_i + \epsilon_{it} \quad (1)$$

ES is considered dependent variable; it, with I describing the firm and t specifying year; α_1 , is a constant; $\beta_1 GDit$ is independent variables; χ_{it} shows control variables; δ_t representing dummies; η_i indicates industry dummies, and ϵ_{it} shows error terms;

$$ESit = \alpha_1 + \beta_1 GDit + \gamma_1 \chi_{it} + \delta_t + \eta_i + \epsilon_{1it} \quad (2)$$

$$GDit = \alpha_2 + \lambda ESit + \theta Zit + \gamma_2 \chi_{it} + \delta_t + \eta_i + \epsilon_{2it}$$

ES is taken as the dependent variable; it, with *i*, shows the firm and *t* denotes year; α_1 and also α_2 represent constants of the first and second stages correspondingly; $GDit$ represents endogenous independent variables; χ_{it} are considered as control variables in the first and second stages correspondingly; δ_t are dummies of the year; η_i shows industry dummies; Zit is IV; and ϵ_{1it} and ϵ_{2it} represent error terms of the first and second stages, correspondingly. As per the 2nd Equation by using the 2SLS model, the initial stage of the equation is accomplished by estimating the second stage and receiving fitted values of the

endogenous independent variable(s). The fitted values are then utilized for assessing the first stage of the equation. The projected coefficient β_1 it can be understood as the marginal effect of a change of 1 in the independent variable on the dependent variable of the model (W. Liu et al., 2020).

Table 4 reports that there exists a positive impact of GD on ES practices together in OLS and 2SLS estimations. Moreover, the results of 2SLS are more pronounced than the OLS after addressing the problem of endogeneity. The findings support H1 of the study and explain that female directors have importance for the ES of the firm. These findings endorsed the postulation of stakeholder theory that firms are responsible to fulfill the demand of multiple stakeholders. The findings of the study are consistent with previous studies (Alazzani et al., 2017; Ben-Amar et al., 2017; Naveed et al., 2021). The statistics of OLS and 2SLS showed in Table 4 further reveals that there is a positive impact of GD on ES and also on firm financial performance using ROA as a proxy. Similarly, the results are more noticeable in the 2SLS estimator than OLS after addressing the problem of endogeneity.

Table 4: Regression Results (OLS, PCSE, and 2SLS)

Variables	OLS	PCSE	2SLS
GD	.324* (.186)	.265* (.152)	.516* (.309)
BI	-.058 (.05)	-.036 (.041)	-.128 (.092)
BS	.241*** (.045)	.212*** (.047)	.851 (.524)
Net ROA	-.512 (1.141)	-1.217* (.676)	.068 (1.681)
Net Log Assets	-.018 (.046)	0 (.028)	-.159 (.136)
Debt to Equity	-1.037 (1.339)	-1.253 (.973)	-2.7 (2.36)
Constant	1.301 (1.53)	1.094 (1.104)	-.541 (2.667)
Observations	176	176	176
R-squared	.225	.408	
Years Dummies	Yes	Yes	Yes

Standard errors are in parentheses, *** p<.01, ** p<.05, * p<.1

Conclusion, limitation and future directions

This study examined the impact of GD on ES in the banking sector of Pakistan. The unique findings of the current study reveal that GD has a significant positive impact on ES. Also, the findings explain that GD boosts the green attitude and behaviors of the employees and

the firm achieves ES. The findings endorse that firms involved in ES practices may improve employee's productivity, environmental behavior, and overall financial performance. Therefore, the firms may satisfy internal and external stakeholders which may create reputational benefits. The study has many contributions Firstly, this study used GD and ES practices instead of perceptual aspects of the stakeholders as used in prior studies (Zahid, Rehman, & Khan, 2019). Besides the use of 2SLS, proposing novel instrumental variables (ES) in using 2SLS, IV approaches are also methodological contributions of the study (Bollen, 1996). Further, the study revealed that the results are more pronounced after controlling for the endogeneity factor. The arguments suggest that the estimates received through traditional OLS regressions are biased by the endogeneity factor. IV estimations, such as 2SLS regressions, are one possible solution to the endogeneity problem after experimental manipulations are impossible. Finally, the findings motivate developing and emerging economies like Pakistan to ensure the implementation and development of the workplace, mitigate climate change, economic sustainability, and achieve cleaner and sustainable industrialization.

Alongside the implications, the current study is not free from limitations. First, the results of the current study are based on eight years of data and hence, in the future, the data set may be extended for further enriching the findings. Second, the study is based on the overall analysis of the banking sector, separate industrial analysis i.e., environment-friendly and non-friendly industries for the workplace and ES practices may add worth to the studies in future. Third, future studies may consider corporate governance variables in the relationship between GD and ES. Most importantly, the aspects of qualitative and mixed methods may also be considered for further refinement of the findings or alternative explanations in the future.

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