DOES GENDER DIVERSITY ON THE BOARD REDUCE AGENCY COST? EVIDENCE FROM PAKISTAN

**Mr. Ali Amin**

PhD Scholar, Finance

Lahore Business School, The University of Lahore, Lahore, Pakistan

**Dr. Ramiz ur Rehman**

Associate Professor of Finance

Lahore Business School, The University of Lahore, Lahore, Pakistan

**Dr. Rizwan Ali\***

Assistant Professor of Finance

Lahore Business School, The University of Lahore, Lahore, Pakistan

**Dr. Collins Gyakari Ntim**

Professor of Accounting

Southampton Business School, University of Southampton, United Kingdom

\*Corresponding author: [**Rizwan.ali@lbs.uol.edu.pk**](mailto:Rizwan.ali@lbs.uol.edu.pk)

DOES GENDER DIVERSITY ON THE BOARD REDUCE AGENCY COST? EVIDENCE FROM PAKISTAN

Abstract

Purpose: *This study examines the effects of board gender diversity on agency cost in non-financial firms listed on the Pakistan Stock Exchange (PSX).*

Design/Methodology/Approach: *Multiple regression analysis is used to determine the impact of board gender diversity on agency cost. The research employed panel data consisting of 2,062 firm-year observations of 226 non-financial firms listed on the Pakistan Stock Exchange (PSX) from 2008 to 2019 to test the proposed hypothesis. In addition, the Blau and the Shannon indices were employed to check for robustness.*

Findings: *The results indicate that female presence on the board significantly reduces the agency cost and, hence, mitigates the principal-agent conflict. Moreover, consistent with the critical mass theory, it was found that boards with three or more female directors have a stronger impact on reducing the agency cost, as compared to two or fewer female directors on the board.*

Research Limitations: *The sample was restricted to non-financial firms listed on the Pakistan Stock Exchange only; therefore, the results reflect the attributes of Pakistan’s business environment. Similar analysis in context of other countries may generate different results.*

*Practical Implications: The findings imply that female directors play an important role in reducing agency conflicts between shareholders and managers by enhancing monitoring through effective governance mechanisms. The policy makers, therefore, should focus on female career development and encourage professional training programs to generate a fair, competitive environment for senior female management.*

Originality/Value: *This study attempts to fill the literature gap in that no similar study covers the non-financial firms listed firms in Pakistan. The article supports the reforms made by the Code of Corporate Governance (CCG) by making the placement of female directors’ mandatory on Pakistani corporate boards. Overall, support is provided for the view that regulators should favour gender quotas regarding composition of the board management team of listed firms in order to reduce agency conflicts and gain shareholder confidence.*

Keywords: *Gender diversity, Agency cost, Pakistan*

1. **Introduction**

The issue of gender diversity in boardrooms and top management has gained considerable attention worldwide during the last two decades (Nguyen *et al.*, 2020). Although Kanter’s (1977) seminal work triggered a debate of gender composition on corporate boards, the phenomenon gained popularity among scholars later on (Terjesen and Sealy, 2016). The collapse of Enron in 2001 and later the formulation of the Sarbanes Oxley Act 2002 in the US turned the academic debate towards the demographics and other characteristics of the board composition. Advancing further, the composition of the gender-diverse board was made mandatory by different countries (Terjesen *et al*., 2009). For example, in Norway, federal legislation requires all boards to have at least 40% female representation on company boards of publicly listed firms. Similar laws have since been passed in Sweden, with women occupying 23% of the listed Swedish companies' board seats in 2011. Following the Nordic countries, most of the European countries support board gender quota. In France, a law was adopted in early 2011, which requires a 40% female presence in boardrooms by 2017. In the USA, the National Association of Corporate Directors Blue Ribbon Commission has recommended female directors to be fairly represented on corporate boards (Carter *et al*., 2003). While the need for women to be represented on corporate boards of directors have clearly received considerable attention in the last two decades, this study attempts to answer the question: whether the presence of women on the board mitigates agency problems and reduces agency cost.

Agency theory presents the agency relationship as a contract, where the principal (shareholder) delegates the agent's (managers) decision-making authority, and the divergence of interests between the two parties gives rise to the principal-agent conflict and agency cost (Jensen and Meckling, 1976). The theory defines agency cost as the sum of monitoring expenditures by the principal, bonding expenditures by the agent, and the residual losses. The problem, therefore, arises with this mode of corporate ownership is that managers do not always make decisions that are in the best interest of the principal, resulting in the loss of wealth for shareholders. For instance, while shareholders may prefer the maximization of wealth in a long-run by undertaking the high return seeking long-term projects, the managers, on the contrary, may focus on short-run profits (short-termism) in order to maximize their personal objectives, such as high salaries and bonuses. The solution to the agency problem, therefore, lies in the supervision and control of the company’s management (Huu Nguyen *et al.,* 2020). In this context, the existing literature considers board of directors as an important corporate governance mechanism to mitigate the agency conflict and minimize the agency cost by aligning the interest between the two parties. In addition, well designed equity-based compensation also serves as a key mechanism to be used to align the interest of shareholders and managers (Biggerstaff *et al.,* 2019). While a good stock option scheme can lead to value creation and economic benefits for shareholders, a flawed compensation scheme, on the contrary, can destroy value and detract from overall economic performance (Senbet, 2011).

Moving ahead, critical mass theory argues that woman is considered "token" or "symbol", and is affected by discriminatory behavior, and face obstacles in influencing group decision-making unless they gain critical mass in the group (Kanter, 1977). Only when they gain a majority, at least three or more, their voice is considered to be being heard, and they are more likely to positively impact corporate governance (Yang *et al*., 2019). Further, based on the resource dependence view the research claims that the presence of a female on the corporate board plays a significant role in reducing agency problems and in achieving the desired objectives of firms through advice and counsel, legitimacy, and a channel for communication (Pfeffer and Salancik 1978).

Gender diversity is considered as one of an effective board's important characteristics (Ain *et al.,* 2020). In contrast to males, females on boards are more independent, diligent, responsible, and tough monitors and their presence ensures better attendance and low agency conflicts (Li and Li, 2020). Eagly and Johannesen‐Schmidt (2001), argued that female directors are more interpersonally oriented (concerned with maintaining the interpersonal relationship by tending to the morale and welfare of others), more democratic (allowing subordinates to participate in decision-making), and transformational (setting high standards of behaviour and establishing themselves as role models by gaining the trust and confidence of their followers). Alternatively, male directors are more task-oriented (concerned with accomplishing assigned tasks by organizing task-relevant activities) and more autocratic (discouraging subordinates’ participation in decision-making). In addition, communal characteristics, such as affection, kindness, sympathy, and gentleness, which are primarily concerned with other people's welfare, are ascribed more strongly to women.

Moving ahead, Double Standard Theory (Foschi, 2000) argues that women and low-status ethnic and racial minorities are considered less competent, and judged by a stricter standard, than higher-status individuals, even when performance information is available that could contradict expectations (Kisfalusi *et al.,* 2019). The achievement of a top position in firms by females, therefore, by defying such biases, exhibits compelling evidence of their leadership capabilities in particularly challenging situations (Rosette and Tost, 2010). Further, Becker (1957) argues that people avoid working or coming into contact with members of minority ethnic groups and women. There is a 'taste' or preference against people from disadvantaged groups, and that this taste can be treated in the same way that economists analyze individual preferences between goods and services. The climbing of the corporate ladder by women leaders, against the "taste" of the majority group and male members, also displays their better planning and networking talents.

Collectively, these studies support that due to the economic benefits of females, and their tendency to support the interests of shareholders, their inclusion on the board resolve agency problems and effectively reduce the agency cost (Ain *et al*., 2020). From another perspective, the empirical literature suggests that unlike managers and minority shareholders exhibiting short-termism behaviour, family owners are more focused on long-term wealth maximization (Miller *et al.,* 2017). Pakistan is an emerging economy with a weak governance structures and the majority of the PSX listed firms are family owned. Contextually, the researchers argue that family ownership may help to mitigate agency conflict due to less information asymmetry and effective control over management decisions (Sheikh and Wang, 2012). Conversely, some studies, for example, Morck and Yeung (2003) and Faccio *et al.* (2001) provide evidence of the adverse impact of family ownership on agency cost, highlighting that managers may act for the controlling family, rather than for the shareholders in general, thus, making the agency conflict worse. As female directors contribute to the protection of shareholder wealth by actively overseeing executive decisions (Chen *et al.,* 2016), therefore, in either case, this study argues that the gender diverse board, due to its high independence and critical monitoring, facilitate the alignment of interests between shareholders and managers, as well as, serve as a barrier against the personal preferences of family owners and act as a shelter for the minority shareholders (Ararat *et al.,* 2015).

The increasing debate for recognizing the economic significance of women and overcoming the gender discrimination barriers across the globe has spurred worldwide growth in mandatory female representation on corporate boards (Usman *et al.,* 2019). In Pakistan, the Securities and Exchange Commission of Pakistan (SECP), through Code of Corporate Governance (CCG) Regulations 2017, introduced the mandatory provision of placing at least one female director on boards of listed companies. In this context, while the extensive literature discusses board gender diversity and its impact on various dimensions such as firm performance (e.g., Adams and Ferreira, 2009; Moreno-Gómez *et al*., 2018; Ntim, 2015; Sarhan *et al.*, 2019), dividend payout (e.g., Gyapong et al., 2019; Ye *et al*., 2019) and CSR (e.g., Issa and Fang, 2019; Yang *et al*., 2019), little empirical evidence is available on-board gender diversity and agency cost. Although few studies, for example, Ain *et al.* (2020) and Jurkus *et al.* (2011) investigated this nexus in the contexts of China and the USA, respectively, this study differs in following manner: firstly, while the firms listed on the Chinese Stock Exchange are mostly state-owned, the sample of firms listed on PSX are mostly family owned; secondly, the study conducted by Jurkus *et al.* (2011) focused on a highly developed market (the USA) whereas this study explores this nexus in the context of an emerging economy (Pakistan) which has a different culture from developed countries.

The study of the stated relationships in the context of Pakistan is important for at least two reasons. Firstly, Pakistan's overall culture and corporate environment is significantly male dominated, which does not allow females to climb ladders to corporate boards and restricts their participation in decision-making. While the CCG 2017 compelled listed companies to include female directors on their corporate boards, the findings here enrich the literature by indicating that gender diversity can significantly improve shareholder confidence and minimize agency conflict in a male-dominated society. Secondly, Pakistan is an emerging economy. The effectiveness of corporate governance in emerging markets is different from that in developed markets, as emerging markets are characterized by closely held firms and lack appropriate mechanisms to enforce shareholder rights. It was considered necessary here to investigate and explore the role of female directors on boards of listed firms in reducing agency cost and mitigating principal-agent conflict in Pakistan.

This study seeks to contribute to the literature in the following manner. Firstly, while much of the literature has discussed board gender diversity and its impact on firm performance, dividend payout and CSR, this study adds to the limited literature on female representation on corporate boards and agency cost. Secondly, it supports the CCG reforms by making the placement of female directors’ mandatory on the board. The formulation of a gender-diverse boards has resulted in increased investor confidence and, hence, added to non-financial listed companies' performance (Mastella *et al.,* 2021). Thirdly, it contributes to the literature on corporate governance by showing that female directors' presence on the board mitigates principal-agent conflict and reduces agency cost. Finally, novel evidence is provided on the impact of board gender diversity – agency cost nexus in Pakistan, which is yet an unexplored area in the context of Pakistan.

The remainder of the paper will proceed as follows. Section Two will review the extant literature and develop hypothesis. Section Three will discuss the research methodology. Results will be presented and discussed in Section Four, while Section Five concludes the study.

1. Literature Review and Hypotheses Development

*2.1 Tokenism and critical mass theory*

Tokenism or symbolism is defined as a perfunctory approach to the inclusiveness of minorities and is often used to explain the difficulties women face in traditionally male occupations (Kanter, 1977). The Tokenism Theory shows that few women in the group are affected by discriminatory behaviour and face group decision-making obstacles. Contextually, the members of the minority gender (women directors) within a group (a board) are labeled "symbols" or "tokens" when only a marginal number of them are present. The empirical literature argues that the only woman on the board may experience the bias and limitations of Tokenism and gets her ideas easily rejected (Kramer *et al*., 2006). However, when the size of the minority group increases to the point that it is no longer a token minority, the perspective of its members’ changes qualitatively and, consequently, the board benefits from the resources women can bring to the organization. Moreover, boardroom dynamics change substantially and women’s voice and ideas are heard when the board of directors has 'at least three women' (Liu *et al.,* 2014). In this scenario, their opinion is not likely to be rejected by male members, and they can express their views confidently at the board’s proceedings, and as such, they are more likely to make a positive contribution to corporate governance and minimize principal-agent conflict (Yang *et al*., 2019). Similarly, Gyapong *et al*. (2016) and Ain *et al*. (2020) mentioned that when the participation of female directors on the board is high, they can significantly affect firm performance and reduce agency cost.

*2.2 Agency theory*

Agency theory focuses on the conflicts in firms due to the separation of ownership and control between the shareholders and managers. The existence of asymmetric information between both the parties results in an agency problem as managers intend to maximize their interests at the expense of shareholders (Jensen and Meckling, 1976). In this context, an independent board can protect shareholder interests and enhance firm value by monitoring senior management and by advising managers in designing and executing corporate strategy (Li *et al.,* 2015). The empirical evidence highlights that gender-diverse boards are more effective, as women directors are more independent and tough monitors than their male counterparts (Adams and Ferreira, 2009) and are in a better position to monitor the manager’s actions because diversity increases board independence (Carter *et al.,* 2010). Consequently, the presence of women on the board has a potent influence on board effectiveness by monitoring senior management actions and board strategic decisions which ultimately result in minimizing the agency conflict (Liu *et al.,* 2014). Another agency problem that arises due to short termism behavior, exhibited by the managers, is minimized by the corporate shareholders using equity-based compensations, such as stock options not immediately exercisable, to align manager’s incentives with those of shareholders (Chang *et al.,* 2015).

*2.3 Resource dependence theory*

The resource dependence theory postulates that organizations being an open system, depend on external environmental resources to survive (Pfeffer and Salancik 1978). The theory poses that, to reduce the dependence and to gain these resources, the firm can establish linkages with elements of the external environment through board of directors. The three benefits that the firm can acquire through board of director’s links are: advice and counsel, legitimacy, and channels for communicating information and for gaining preferential access to commitments or support from important external elements (Hillman and Dalziel, 2003). In this scenario, the board of directors sets the broad parameters for making strategic decisions, gain legitimacy for the firm through their prestigious position in the eyes of societal members, and provide channels of communication to external entities for communicating information and acquiring access to the external resources through these channels (Hillman *et al.,* 2007).

The empirical literature presents the effects of female representation on the benefits outlined by the resource development theory acquired through links of board of directors (Fan *et al.,* 2019). Contextually, Gender-diverse boards have a beneficial effect on the board of director’s advice and counsel function through higher quality board discussions and deliberations of tough issues that are considered unpalatable in all-male boards, their presence on the board offers legitimacy to an organization in the eyes of its social members, and due to different perspectives they have better abilities to provide linkages to females and minority-owned businesses and other important suppliers, such as investors, that prefer to deal with gender diverse boards (Hillman *et al.,* 2007).

*2.4 Gender diversity and agency cost*

The first hypothesis is based under the frameworks of agency theory and resource dependence theory. From agency theory perspective, a potential conflict of interest arises between the shareholder and managers, because there is a divergence in goals and desires between the two parties. While the primary goal of the shareholders is the wealth maximization, the managers, on the contrary, tend to maximize their own self-interest, such as offering themselves high salaries and bonuses (Davis et al., 1997). The agency issues arising, due to non-alignment of interest between principal and agent, are mitigated by incurring three types of agency costs: monitoring expenses incurred by the principal; bonding expenditures incurred by the agents; and finally, the residual loss, suffered by the principal which is the reduction in welfare experienced by the principal due to aberrant activities of the agent (Jensen and Meckling, 1976). In this scenario, the shareholders, resort to effective boards and stock-based compensation plans to improve the monitoring of management and reduce the agency cost leading to long-term maximization of shareholder wealth (Bhuyan *et al.,* 2020).

Gender diversity is considered an important tool to control agency problems because of the female director’s better monitoring role (Adams and Ferreira, 2009). In contrast to males, females on the board are more independent, diligent, and responsible (Li and Li, 2020) and are less engaged in unethical activities (Orazalin, 2019). Bass (2019) mentioned that female representation in the top management team expands the collective knowledge of the group by reducing systematic bias and offers distinctive social networks and cultural experiences by challenging the assumptions held by males. Under the cognitive framework, the gender socialization theory (GST) posits that since the gender roles are dictated over childhood and reinforced through social norms, therefore, men and women bring different ethical views, varying values, and attitudes to the work (Dawson, 1992). Empirical literature, therefore, provides evidence of differences found in leadership styles, communication skills and ethical values between men and women (Harris *et al.,* 2019). Based on GST, Shawver *et al.* (2006) mentions that females are less likely to involve themselves in collecting bribes and engage in unfair business practices. To the extent that females are more ethical and less involved in unfair business practices, it can be anticipated that presence of female directors on the board supports shareholder interests and minimizes the agency issues.

Moving ahead, for agency theory, Adams and Ferreira (2009) mentioned that, due to better monitoring and active participation, female directors on board are less likely to disrupt shareholder interests, thus, resulting in low agency conflicts. In a similar vein, Jurkus *et al*. (2011) found a negative association between gender diversity and agency cost. Conversely, Smith *et al*. (2006) mentioned that due to female directors' different views and characteristics, the decision-making process slows down, resulting in delayed decisions and increased agency cost. Jadiyappa *et al*. (2019) and Wellalage and Locke (2013) also concluded that a female's presence reduces firm performance and results in increased agency cost.

Moving to the resource dependence theory, Pfeffer and Salancik (1978) mentions that organizations depend on external resources for their survival which poses substantial risks for the firms and the uncertainties in this context poses significant challenges for the firm. In this scenario, consistent with their cognitive bases, a gender diverse board provide better advice and counsel function by providing diverse perspective in strategic decision making, provides legitimacy to the organization in the eyes of society’s members and provides better communication channels by linking organizations to female customers and other important suppliers (Hillman *et al.,* 2007).

Based on the above arguments, it can be argued that effective monitoring, better communication, and female directors' active participation on the corporate board results in low principal-agent conflict and decreased agency cost, therefore:

*H1*: Female directors on the board reduce agency costs

The research posits the next hypothesis in light of the critical mass theory (Kanter, 1977). The theory postulates that unless women directors gain a critical mass against their male counterparts, they are often treated as "tokens". Only when females attain a critical mass, their voice may be heard. Moving ahead, Kristie (2011) suggested that one woman is a token, two women are a presence, and three women are a voice. When there are three or more women on a board, their performance is optimized and their communication becomes productive (Fan *et al.,* 2019). Moreover, they are more likely to make positive contributions to corporate governance and are in a better position to safeguard the interests of shareholders and minimize principal-agent conflict (Yang *et al.,* 2019).

The literature provides mixed results while analyzing the impact of board gender diversity on various dimensions in the context of the critical mass theory. For example, Gyapong *et al*. (2016) mentioned that the critical mass of women on the board positively affects the firm’s performance; Singh *et al*. (2019) concluded the opposite. McGuinness *et al*. (2017), conclude that a critical mass of female directors on the board positively affects Corporate Social Responsibility performance: Yang *et al*. (2019) concluded the opposite. The study of critical mass theory in different cultures also provides varying results. For instance, while discussing the impact of gender diversity on the board on firm performance in the case of India (Singh *et al*., 2019), the assumptions of the critical mass theory were not supported, but the theory was upheld in the case of South Africa (Gyapong *et al*., 2016). Ain *et al*. (2020), studied the effect of gender diversity on agency cost in China’s context and found that the critical mass of females on the board reduces the agency cost.

It is, therefore, argued that when the female directors gain critical mass on the board, their voice becomes effective and they are more influential in board decisions, which enable them to protect shareholder interests and minimize the principal-agent conflict and, hence, reduce the agency cost. It is, therefore, hypothesized that:

*H2*: The higher number of female directors on the board reduces agency costs more than

token participation.

1. Research Methodology

*3.1 Sample*

In construction of the sample, data was gathered from different sections of the companies' published annual reports on the PSX website. The initial sample consisted of 5,952 firm-year observations from 2008 to 2019. After excluding the financial firms, due to different financial characteristics, and firms with missing information, the final sample consisted of 2,062 firm-year observations (see Appendix for details). Table I depicts the summarized information of the sample selection procedure.

[Table I]

*3.1 Variable Measurement*

Consistent with the prior literature, the study employed three proxies (Agency Cost1, Agency Cost2, and Asset Utilization) to measure the agency cost (Ain *et al*., 2020). The first two proxies include all kinds of incentives such as bonuses and stock options paid to management to perform their duties and serve as a measure to check the management's abilities in controlling these costs and, therefore, represent the agency costs paid by the firm. The third proxy, asset utilization indicates that assets are being used by management efficiently to enhance firm value and ultimately reducing the agency cost (Ain *et al.*, 2020). Consistent with the study of Nekhili *et al*. (2020), gender diversity was measured using the number of female directors on the board and the proportion of female directors to the total directors on the board. Following Fan *et al.* (2019) and Gyapong *et al.* (2019), to check for the critical mass of women and its effects on agency cost, the study employed three dummy variables: Female Dummy1, Female Dummy2 and Female Dummy3. For robustness check, as an alternative measure, the Blau Index (Blau, 1977) and the Shannon Index (Shannon, 1948) were used.

To address the endogeneity problem, consistent with Haris *et al.* (2019), this study employed three control variables (Board Size, Board Independence, and CEO duality) for board characteristics and five variables (Market to Book Ratio, Sales, Tobin’Q, Leverage, and Firm Age) to control for firm characteristics. Table II depicts the nature, symbol, and measurement of all variables used in the study.

[Table II]

*3.3 Econometric Model*

Following the hypotheses, we developed the following models:

The proxies for agency costs are Agency Cost1, Agency Cost2, and Asset Utilization; proxies for Gender Diversity, are the number of female directors on the board and the proportion of female directors on the board; control variables include: Board Size, Board Independence, CEO Duality, Market To Book Ratio of equity, Sales, Tobin's Q, Leverage, and Firm Age; α represents intercept of the model; βm, βj, βk and βl represents coefficients of independent variable, control variables, industry dummy and year dummy, respectively; i and t represents the firm i at time t; and ε represents error term. In order to decide the appropriateness between fixed effects and random effects models, Hausman (1978) test was conducted. In all the cases the p-value was significant (p<0.05), therefore, fixed effects model was used.

1. Empirical Results

*4.1 Descriptive Statistics*

Table III shows the descriptive statistics of all the variables. The table depicts that the mean of Agency Cost1 is 0.117, whereas Agency Cost2 is 0.075. The Asset Utilization has a maximum value of 6.486 with a mean of 1.143. The number of female directors on the board ranges between 0 and 3, which shows that some companies do not have any females on their boards. Since the sample includes the firms' data before the introduction of the mandatory provision of the placement of female directors on the board by CCG 2017, therefore, non-availability of even a single female director on the corporate board is not surprising. The proportion of female directors on the board is up to 0.38. The means for Female Dummy1, Female Dummy2 and Female Dummy3 are 0.343, 0.067 and 0.046, respectively. This shows that only 4.6% of the sample firms have three directors. The Board Size fluctuates between 7 and 13, with a mean of 8. The Board Independence shows a mean of 0.115. CEO Duality has a mean of 0.016, which shows that the same person serves as CEO and chair simultaneously in about 2% of companies in our sample. The Market to Book equity ratio has a mean of 2.411. The Sales has a mean of 21.739. The average Tobin’s Q is 0.546, Leverage 1.713, and Firm\_Age 26.389.

[Table III]

*4.2 Correlation Matrix*

Table IV shows the Pearson correlation analysis for all the variables. In line with the hypotheses, a statistically significant negative correlation was found between Agency Cost1, Agency Cost2 and both measures of gender diversity. Although the correlation in case of third measure, Asset Utilization, was not significant, a positive correlation was obtained in conformity with the hypotheses.

[Table IV]

*4.3 Regression Analysis*

Table V depicts the regression results for hypothesis H1. Results indicate that, in line with the hypothesis, gender diversity is negatively related to Agency Cost1 and Agency Cost2, and positively related to Asset Utilization. All the results were significant at the 1%, 5% and 10% levels of significance, which shows that hypothesis H1 is supported. These results confirm that female director’s presence on the board reduces agency cost and increases asset utilization, and supports the postulations of agency theory and resource dependence theory in our sample firms. Empirically, the results are in accordance with Ain *et al*. (2020) and Jurkus *et al.* (2011), who find that the gender-diverse boards are effective in reducing agency cost.

[Table V]

The second hypothesis H2 was based on critical mass theory and it was hypothesized that the higher number of female directors reduces agency costs more than token participation. The results of OLS estimation are presented in table VI. Consistent with the hypothesis, a significant negative association at the 10% level of significance was found in case of Female Dummy1 and Female Dummy2. However, the most considerable influence was observed, with 1% level of significance (Agency Cost1) and 5% level of significance (Agency Cost2; Asset Utilization), in case of Female Dummy3. The findings indicate that, although the results were significant in case of one and two female directors, the greatest impact occurs when there are three or more women on the board. Moreover, the highest regression coefficients obtained in case of Female Dummy3 and all proxies of agency cost, indicate that the maximum benefits of women were achieved when three or more women appeared in the boardroom. Overall, our findings report that hypothesis H2 is supported and, therefore, the critical mass theory is upheld in the sample of firms. Empirically, our results support the findings of Ain *et al*. (2020), Gyapong *et al*. (2019) and Fan *et al.* (2019) in this context.

[Table VI]

*4.4 Robustness Tests*

For the robustness test, the Blau index (Blau, 1977) and Shannon index (Shannon, 1948) were employed as alternative measures to female directors on the board and the proportion of female directors on the board. The results are reported in Table VI. As expected, we found results similar to the earlier reported regression results.

[Table VII]

1. Conclusion and Implications

This study examines the impact of board gender diversity on agency cost in Pakistan using a sample of non-financial firms listed on the Pakistan Stock Exchange from 2008 to 2019. The study seeks to extend as well as make several new contributions to the extant literature. Although most studies have investigated the impact of board diversity on firm performance, dividend payout, and CSR, amongst others, our study adds to the limited literature on female representation on the board and agency cost. Secondly, different from previous studies, using the framework of agency theory, resource dependence theory, and critical mass theory, this research provides new empirical evidence on the impact of board gender diversity and agency cost in Pakistan. Thirdly, the results contribute to the literature by showing that female directors play an important role in reducing agency conflicts between shareholders and managers by enhancing monitoring through effective governance mechanisms. Finally, this study supports the CCG reforms by making the placement of female director’s mandatory on the board.

The results suggest that gender-diverse boards have a significant effect on the alignment of shareholders’ and managers’ interests. The mandatory presence of females on the board, therefore, increases shareholder’s interest on managerial effectiveness and reduce agency cost.

Using the framework of agency cost and Resource Development Theory, it is argued that due to tough monitoring and better communication skills of females, and by offering beneficial links to the firm, female directors' presence on the board mitigates agency conflict and reduces agency cost. The argument was supported. A significant association for our hypothesis H1 in the expected direction was found. The results are consistent with Ain *et al.* (2020) and Jurkus *et al.* (2011) in this context. The research further argues that, based on the critical mass theory, women, when they gain critical mass on the board, they are more influential in board decisions, which enables them to protect shareholder interests and minimize the principal-agent conflict and, hence, reduce agency cost.

Hypothesis H2 was supported as a greater impact of a higher number of female directors and agency cost in the expected direction was found. The results were consistent with Ain *et al*. (2020), Gyapong *et al*. (2016) and Fan *et al.* (2019), who mentioned that the economic benefits of women can only be attained when there are three or more women on the board. The Blau index and the Shannon index were used for a robustness check, which confirmed our earlier obtained results. Overall, we report that the presence of female directors in supports the reforms made by CCG 2017, by making the placement of female director’s mandatory on the board, and supports the agency theory and resource dependence theory in this context.

In a country with weak regulatory environment, the internal monitoring becomes essential for the protection of investors. Our findings, in this context, provide the importance of gender diversity on corporate boards for the protection of shareholders in Pakistan. Besides, our findings have important implications for regulators, policymakers, shareholders, and companies. Firstly, the results show that board gender diversity significantly reduces agency cost, which indicates that, within corporate governance mechanisms, the placement of female directors on the corporate board is fruitful for the listed firms. The development of good corporate governance practices and legal or regulatory changes is intended to increase transparency concerning women's representation on boards and their appointment at senior management positions. In line with the developed countries, the regulators in emerging economies should also seriously consider implementing corporate governance mechanisms in listed firms. Secondly, as gender-diverse boards are more inclined to provide a wide range of perspectives on different challenges to solving firms’ agency problems through corporate governance, therefore, to enhance females' career development, policymakers should encourage professional training programs to generate fair, competitive environments for senior female management. Thirdly, shareholders need to know the size of the minority group of women on the corporate board necessary for the formulation of effective shareholder protection policies. Finally, the gender-diverse boards could benefit companies through superior performance and a better image and reputation, resulting in a better firm value.

The study is not without limitations. Firstly, the study was restricted to the gender diversity of board members due to data limitations. As more data become available, future studies may offer new insights by examining how other aspects of board diversity, such as educational background, age, experience, and professional qualifications, may affect agency costs. Secondly, while we used secondary data, future studies may offer new insights by conducting in‐depth case studies based on interviews and other qualitative research approaches. Finally, the study considers a sample of a single developing country that restricts its generalizability to other developed countries and some developing countries because of the different characteristics of the Pakistan stock market. One of the most important aspects of this difference is ownership structure, as most of the PSX firms are family-owned and closely held. Future studies, therefore, can replicate this research in other developed and developing countries to determine its generalizability.

**References**

Adams, R. B. and Ferreira, D. (2009), “Women in the boardroom and their impact on governance and performance”, *Journal of financial economics*, Vol. 94 No.2, pp. 291-309.

Ain, Q. U., Yuan, X., Javaid, H. M., Usman, M. and Haris, M. (2020), “Female directors and agency costs: evidence from Chinese listed firms”, *International Journal of Emerging Markets*.

Ararat, M., Aksu, M. and Tansel Cetin, A. (2015), “How board diversity affects firm performance in emerging markets: Evidence on channels in controlled firms”, *Corporate Governance: An International Review*, Vol. 23 No. 2, pp.83-103.

Bass, A. E. (2019), “Top management team diversity, equality, and innovation: a multilevel investigation of the health care industry”, *Journal of Leadership and Organizational Studies*, Vol. 26 No. 3, pp. 339-351.

Becker, G. S. (1957), “The Economics of Discrimination”. 2nd ed. Chicago: Univ. Chicago Press.

Bhuyan, R., Butchey, D., Haar, J. and Talukdar, B. (2020), “CEO compensation and firm performance in the insurance industry”, *Managerial Finance*.

Biggerstaff, L., Blank, B., and Goldie, B. (2019), “Do incentives work? Option-based compensation and corporate innovation”, *Journal of Corporate Finance*, Vol. 58, 415-430.

Blau, P. M. (1977), “*Inequality and heterogeneity: A primitive theory of social structure”,* Vol. 7. New York: Free Press.

Carter, D. A., D'Souza, F., Simkins, B. J. and Simpson, W. G. (2010), “The gender and ethnic diversity of US boards and board committees and firm financial performance”, *Corporate Governance: An International Review*, Vol. 18 No. 5, pp. 396-414.

Carter, D. A., Simkins, B. J. and Simpson, W. G. (2003), “Corporate governance, board diversity, and firm value”, *Financial review*, Vol. 38 No. 1, pp. 33-53.

Chang, X., Fu, K., Low, A., and Zhang, W. (2015), “Non-executive employee stock options and corporate innovation”, *Journal of financial economics*, Vol. 115 No. 1, pp. 168-188.

Chen, G., Crossland, C., and Huang, S. (2016), “Female board representation and corporate acquisition intensity”, *Strategic management journal*, Vol. 37 No. 2, pp. 303-313.

Davis, J. H., Schoorman, F. D., & Donaldson, L. (1997), “Toward a stewardship theory of management”, *Academy of Management Review*, Vol. 22 No. 1, pp. 20–47.

Dawson, L. M. (1992), “Will feminization change the ethics of the sales profession?”, *Journal of Personal Selling & Sales Management*, Vol. 12 No. 1, pp. 21-32.

Eagly, A.H. and Johannesen‐Schmidt, M.C. (2001), “The leadership styles of women and men”, *Journal of social issues*, Vol. 57 No. 4, pp. 781-797.

Faccio, M., Lang, L. H., and Young, L. (2001), “Dividends and expropriation”, *American economic review*, Vol. 91 No. 1, pp. 54-78.

Fan, Y., Jiang, Y., Zhang, X. and Zhou, Y. (2019), “Women on boards and bank earnings management: From zero to hero”, *Journal of Banking and Finance*, Vol. 107, pp. 105607.

Foschi, M. (2000), “Double standards for competence: Theory and research”, *Annual review of Sociology*, Vol. 26 No. 1, pp. 21-42.

Gyapong, E., Ahmed, A., Ntim, C.G. and Nadeem, M. (2019), “Board gender diversity and dividend policy in Australian listed firms: the effect of ownership concentration”, *Asia Pacific Journal of Management*, pp.1-41.

Gyapong, E., Monem, R. M. and Hu, F. (2016), “Do women and ethnic minority directors influence firm value? Evidence from post‐apartheid South Africa”, *Journal of Business Finance and Accounting*, Vol. *43 No.* 3-4, pp. 370-413.

Haris, M., Yao, H., Tariq, G., Javaid, H. M. and Ain, Q. U. (2019), “Corporate governance, political connections and bank performance”, *International Journal of Financial Studies*, Vol. 7 No. 4, p. 62.

Harris, O., Karl, J. B., and Lawrence, E. (2019), “CEO compensation and earnings management: Does gender really matters?”, *Journal of Business Research*, Vol. 98, pp.1-14.

Hausman, J.A. (1978), “Specification tests in econometrics”, *Econometrica: Journal of the econometric society*, pp.1251-1271.

Hillman, A. J., Shropshire, C. and Cannella Jr, A. A. (2007), “Organizational predictors of women on corporate boards”, *Academy of Management Journal*, Vol. 50 No. 4, pp. 941-952.

Hillman, A.J. and Dalziel, T. (2003), “Boards of directors and firm performance: Integrating agency and resource dependence perspectives”, *Academy of Management review*, Vol. 28 No. 3, pp.383-396.

Huu Nguyen, A., Thuy Doan, D., & Ha Nguyen, L. (2020), “Corporate governance and agency cost: Empirical evidence from Vietnam”, *Journal of Risk and Financial Management*, Vol. 13 No. 5, pp. 1-15.

Issa, A. and Fang, H.X. (2019), “The impact of board gender diversity on corporate social responsibility in the Arab Gulf states”, *Gender in Management: An International Journal,* Vol. 34 No. 7, pp. 577-605.

Jadiyappa, N., Jyothi, P., Sireesha, B. and Hickman, L. E. (2019), “CEO gender, firm performance and agency costs: evidence from India”, *Journal of Economic Studies*, Vol. 46 No. 2, pp. 482-495.

Jensen, M. C. and Meckling, W. H. (1976), “Theory of the firm: Managerial behavior, agency costs and ownership structure”, *Journal of financial economics*, Vol. 3 No. 4, pp. 305-360.

Jurkus, A. F., Park, J. C., and Woodard, L. S. (2011), “Women in top management and agency costs”, *Journal of Business Research*, Vol. 64 No. 2, pp. 180-186.

Kanter, R. M. (1977), “Men and women of the corporation”, New York: Basic Books.

Kisfalusi, D., Janky, B., and Takács, K. (2019), “Double standards or social identity? The role of gender and ethnicity in ability perceptions in the classroom”, *The Journal of Early Adolescence*, Vol. *39 No.* 5, pp. 745-780.

Kramer, V. W., Konrad, A. M., Erkut, S. and Hooper, M. J. (2006), “*Critical mass on corporate boards: Why three or more women enhance governance* (pp. 2-4)”, Wellesley, MA: Wellesley Centers for Women.

Kristie, J. (2011), “The power of three”, *Directors & Boards*, Vol. 35 No. 5, pp. 22–32.

Li, K., Lu, L., Mittoo, U.R. and Zhang, Z. (2015), “Board independence, ownership concentration and corporate performance-Chinese evidence”, *International Review of Financial Analysis*, Vol. 41, pp.162-175.

Li, X. and Li, Y. (2020), “Female independent directors and financial irregularities in chinese listed firms: From the perspective of audit committee chairpersons”, *Finance Research Letters*, Vol. 32, p. 101320.

Liu, Y., Wei, Z. and Xie, F. (2014), “Do women directors improve firm performance in China?”, *Journal of corporate finance*, Vol. 28, pp. 169-184.

Mastella, M., Vancin, D., Perlin, M. and Kirch, G. (2021), “Board gender diversity: performance and risk of Brazilian firms”, *Gender in Management: An International Journal*.

McGuinness, P. B., Vieito, P. and Wang, M. (2017), “CSR performance in China: The role of board gender and foreign ownership”, *Journal of Corporate Finance*, Vol. 42, p. 7299.

Miller, D., Le Breton-Miller, I., Amore, M.D., Minichilli, A. and Corbetta, G. (2017), “Institutional logics, family firm governance and performance”, *Journal of Business Venturing*, Vol. 32 No. 6, pp.674-693.

Morck, R., and Yeung, B. (2003), “Agency problems in large family business groups”, *Entrepreneurship theory and practice*, Vol. 27 No. 4, pp. 367-382.

Moreno-Gómez, J., Lafuente, E. and Vaillant, Y. (2018), “Gender diversity in the board, women’s leadership and business performance”. *Gender in Management: An International Journal*, Vol. 33 No. 2, pp. 104-122.

Nekhili, M., Gull, A. A., Chtioui, T. and Radhouane, I. (2020), “Gender‐diverse boards and audit fees: What difference does gender quota legislation make?”, *Journal of Business Finance and Accounting*, Vol. 47 No.1-2, pp. 52-99.

Nguyen, T. H. H., Ntim, C. G. and Malagila, J. K. (2020), “Women on corporate boards and corporate financial and non-financial performance: A systematic literature review and future research agenda”, *International Review of Financial Analysis*, Vol. 71, pp. 1-24.

Ntim, C. G. (2015), “Board diversity and organizational valuation: Unravelling the effects of ethnicity and gender”, *Journal of Management & Governance*, Vol. 19 No. 1, pp.167-195.

Orazalin, N. (2019), “Board gender diversity, corporate governance, and earnings management”, *Gender in Management: An International Journal,* Vol. 35 No. 1, pp. 37-60.

Pfeffer, J. and Salancik, G. R. (1978). Social control of organizations. *The external control of organizations: A resource dependence perspective*.

Rosette, A. S., and Tost, L. P. (2010), “Agentic women and communal leadership: How role prescriptions confer advantage to top women leaders”, *Journal of Applied Psychology*, Vol. 95 No. 2, p. 221.

Sarhan, A. A., Ntim, C. G. and Al‐Najjar, B. (2019), “Board diversity, corporate governance, corporate performance, and executive pay”, *International Journal of Finance & Economics*, Vol. 24 No. 2, pp. 761-786.

Senbet, L. (2011), “The Rise of Equity-Based Compensation: The Bright and The Dark. *25 for 25: Observations on the Past, Present, and Future of Corporate Governance”*.

Shannon, C. E. (1948), “A mathematical theory of communication”, *The Bell system technical journal*, Vol. 27 No. 3, pp. 379-423.

Shawver, T. J., Bancroft, P. C., and Sennetti, J. (2006), “Can the ‘clan effect’ reduce the gender sensitivity to fraud? The case of the IPO environment”, *Journal of Forensic Accounting*, Vol. 7 No. 1, pp. 185-208.

Sheikh, N. A., and Wang, Z. (2012), “Effects of corporate governance on capital structure: empirical evidence from Pakistan”, *Corporate Governance: The international journal of business in society*, Vol. 12 No. 5, pp. 629-641.

Singh, A. K., Singhania, S. and Sardana, V. (2019)’ “Do Women on Boards affect Firm's Financial Performance? Evidence from Indian IPO Firms”, *Australasian Accounting, Business and Finance Journal*, Vol. 13 No. 2, pp. 53-68.

Smith, N., Smith, V. and Verner, M. (2006), “Do women in top management affect firm performance? A panel study of 2,500 Danish firms”, *International Journal of productivity and Performance management*, Vol. 55 No. 7, pp. 569-593.

Terjesen, S. and Sealy, R. (2016), “Board gender quotas: Exploring ethical tensions from a multi-theoretical perspective”, *Business Ethics Quarterly*, Vol. 26 No. 1, pp. 23-65.

Terjesen, S., Sealy, R. and Singh, V. (2009), “Women directors on corporate boards: A review and research agenda”, *Corporate governance: an international review*, Vol. 17 No. 3, pp. 320-337.

Usman, M., Farooq, M.U., Zhang, J., Makki, M.A.M. and Khan, M.K. (2019), “Female directors and the cost of debt: does gender diversity in the boardroom matter to lenders?”, *Managerial Auditing Journal,* Vol. 34 No. 4, pp. 374-392.

Wellalage, N. H. and Locke, S. (2013), “Women on board, firm financial performance and agency costs”, *Asian Journal of Business Ethics*, Vol. 2 No. 2, pp. 113-127.

Yang, W., Yang, J. and Gao, Z. (2019), “Do Female Board Directors Promote Corporate Social Responsibility? An Empirical Study Based on the Critical Mass Theory”, *Emerging Markets Finance and Trade*, Vol. 55 No. 15, pp. 3452-3471.

Ye, D., Deng, J., Liu, Y., Szewczyk, S. H. and Chen, X. (2019), “Does board gender diversity increase dividend payouts? Analysis of global evidence”, *Journal of corporate finance*, Vol. *58*, pp. 1-26.

Table I: Sample selection procedure

|  |  |  |
| --- | --- | --- |
| Initial observations of all listed firms for the period 2008 to 2019 | | 5952 |
| Less: Firm observations of financial firms |  | 1344 |
| Less: number of firm-year with missing observations |  | 2546 |
| Final sample |  | 2062 |
|  |  |  |

Table II: Variable measurements

|  |  |  |  |
| --- | --- | --- | --- |
| Nature | Variable | Symbol | Measure |
| Dependent variable | Agency cost1 | AC1 | Selling expenses plus administrative expenses divided by revenue |
|  | Agency cost2 | AC2 | administrative expenses divided by revenue |
|  | Asset utilization ratio | AU | Annual sales divided by total assets |
| Independent variable | Number of Female Director on the Board | FD\_BD | Number of female Directors on the Board |
|  | Proportion of female director on board | FD\_PBD | Number of female Directors on the Board divided by Total Board Size |
|  | Female Dummy 1 | FD1 | Dummy variable, 1 if a firm has only one female director on the board, 0 otherwise |
|  | Female Dummy 2 | FD2 | Dummy variable, 1 if a firm has only two female directors on the board, 0 otherwise |
|  | Female Dummy 3 | FD3 | Dummy variable, 1 if a firm has three or more female directors on the board, 0 otherwise |
|  | Blau index | FD\_Blau |  |
|  | Shannon index | FD\_Shan |  |
| Control variable | Board Size | BS | Number of Directors on the Board |
|  | Board Independence | PID\_BD | Independent Directors on the Board divided by Total Directors on the Board |
|  | CEO Duality | CEO\_DUAL | Dummy variable, 1 if CEO is also a chairman, 0 otherwise |
|  | Market to Book ratio of Equity | MTB | MV of Equity/BV of Equity |
|  | Sales | Sales | Log of annual sales |
|  | Tobin’s Q | Tobin’Q | Market value of assets/Book value of assets |
|  | Leverage | Lev | Total Debt/Total Assets |
|  | Firm Age | Firm\_Age | Number of years since the firm is listed on Stock Exchange |

Table III: Descriptive statistics

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | N | Mean | SD | Min | Max |
| AC1 | 2062 | 0.117 | 0.195 | 0.012 | 0.993 |
| AC2 | 2062 | 0.075 | 0.163 | 0.015 | 0.990 |
| AU | 2062 | 1.143 | 0.888 | 0.008 | 6.486 |
| FD\_BD | 2062 | 0.613 | 0.803 | 0 | 3 |
| FD\_PBD | 2062 | 0.075 | 0.095 | 0.000 | 0.380 |
| FD1 | 2062 | 0.343 | 0.475 | 0 | 1 |
| FD2 | 2062 | 0.067 | 0.250 | 0 | 1 |
| FD3 | 2062 | 0.046 | 0.209 | 0 | 1 |
| BS | 2062 | 8.000 | 1.279 | 7 | 13 |
| PID\_BD | 2062 | 0.115 | 0.146 | 0.000 | 0.560 |
| CEO\_DUAL | 2062 | 0.016 | 0.126 | 0 | 1 |
| MTB | 2062 | 2.411 | 3.939 | 0.001 | 41.706 |
| Sales | 2062 | 21.739 | 4.755 | 0.003 | 27.803 |
| Tobin\_Q | 2062 | 0.546 | 0.817 | 0.002 | 34.650 |
| Lev | 2062 | 1.713 | 0.888 | 0.010 | 5.910 |
| Firm\_age | 2062 | 26.389 | 15.967 | 1.000 | 70.000 |

Table IV: Pearson correlation matrix

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AC1** | **AC2** | **AU** | **FD\_BD** | **FD\_PBD** | **FD1** | **FD2** | **FD3** | **BS** | **PID\_BD** | **CEO\_DUAL** | **MTB** | **Sales** | **Tobin\_Q** | **Lev** | **Firm\_age** |
| AC1 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| AC2 | 0.265 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| AU | -0.204 | -0.239 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FD\_BD | -0.109\*\*\* | -0.121\*\*\* | 0.027 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |
| FD\_PBD | -0.116\*\*\* | -0.127\*\*\* | 0.038 | 0.977\*\*\* | 1 |  |  |  |  |  |  |  |  |  |  |  |
| FD1 | -0.069\*\* | -0.070\*\* | 0.066\*\* | 0.348\*\*\* | 0.425\*\*\* | 1 |  |  |  |  |  |  |  |  |  |  |
| FD2 | -0.025 | -0.028 | 0.089\*\*\* | 0.463\*\*\* | 0.432\*\*\* | -0.193\*\*\* | 1 |  |  |  |  |  |  |  |  |  |
| FD3 | -0.067\*\* | -0.079\*\*\* | 0.056\* | 0.650\*\*\* | 0.586\*\*\* | -0.158\*\*\* | -0.058\*\* | 1 |  |  |  |  |  |  |  |  |
| BS | -0.017 | 0.017 | 0.004 | 0.181\*\*\* | 0.070\*\* | -0.167\*\*\* | 0.147\*\*\* | 0.242\*\*\* | 1 |  |  |  |  |  |  |  |
| PID\_BD | -0.048\* | -0.073\*\*\* | -0.052\* | 0.264\*\*\* | 0.250\*\*\* | 0.327\*\*\* | -0.164\*\*\* | 0.222\*\*\* | 0.135\*\*\* | 1 |  |  |  |  |  |  |
| CEO\_DUAL | -0.022 | -0.026 | 0.012 | 0.023 | 0.014 | 0.079\*\*\* | -0.003 | -0.028 | -0.091\*\*\* | 0.026 | 1 |  |  |  |  |  |
| MTB | -0.064\*\* | -0.042 | 0.001 | -0.033 | -0.025 | 0.025 | -0.016 | -0.048\* | -0.041 | -0.062\*\* | 0.019 | 1 |  |  |  |  |
| Sales | -0.016 | -0.069\*\* | 0.180\*\*\* | -0.004 | -0.002 | 0.104\*\*\* | -0.066\*\* | -0.032 | -0.015 | 0.070\*\* | -0.041 | -0.037 | 1 |  |  |  |
| Tobin\_Q | -0.036 | -0.008 | -0.001 | -0.007 | -0.006 | -0.061\*\* | 0.083\*\*\* | -0.029 | -0.008 | -0.029 | -0.001 | -0.001 | 0.012 | 1 |  |  |
| Lev | -0.043\* | -0.035 | -0.046\* | -0.004 | -0.001 | -0.033 | 0.039 | -0.012 | 0.023 | 0.038 | -0.036 | 0.020 | 0.037 | 0.036 | 1 |  |
| Firm\_age | -0.044\* | -0.050\* | 0.135\*\*\* | -0.131\*\*\* | -0.129\*\*\* | -0.049\* | -0.072\*\* | -0.073\*\*\* | 0.001 | -0.062\*\* | -0.058\*\* | 0.001 | -0.015 | -0.031 | -0.021 | 1 |

Note: \*, \*\*, \*\*\* indicate significance at 10%, 5%, and 1% level, respectively.

Table V: Regression Results-gender diversity and agency cost

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Variables** | **AC1** | | |  | **AC2** | | | |  | | **AU** | | |
|  | | (1) | (2) | | |  | (3) | (4) | |  | | (5) | (6) |
| FD\_BD | | -0.015\*\*\* |  | | |  | -0.007\* |  | |  | | 0.077\*\*\* |  |
|  | | (0.005) |  | | |  | (0.004) |  | |  | | (0.017) |  |
| FD\_PBD | |  | -0.141\*\*\* | | |  |  | -0.070\*\* | |  | |  | 0.113\*\*\* |
|  | |  | (0.040) | | |  |  | (0.033) | |  | |  | (0.140) |
| Constant | | 0.123\*\*\* | 0.132\*\*\* | | |  | 0.085\*\*\* | 0.090\*\*\* | |  | | 1.183\*\*\* | 1.148\*\*\* |
|  | | (0.037) | (0.037) | | |  | (0.030) | (0.030) | |  | | (0.133) | (0.133) |
| Controls | | Yes | Yes | | |  | Yes | Yes | |  | | Yes | Yes |
| Firm fixed effects | | Yes | Yes | | |  | Yes | Yes | |  | | Yes | Yes |
| Year effect | | Yes | Yes | | |  | Yes | Yes | |  | | Yes | Yes |
| Industry effect | | Yes | Yes | | |  | Yes | Yes | |  | | Yes | Yes |
| Observations | | 2062 | 2062 | | |  | 2062 | 2062 | |  | | 2062 | 2062 |
| Adjusted R2 | | 0.012 | 0.017 | | |  | 0.012 | 0.124 | |  | | 0.043 | 0.039 |
| F-statistics | | 21.71 | 31.08 | | |  | 19.42 | 20.30 | |  | | 73.59 | 65.33 |
| Hausman Chi**2** | | 16.24 | 13.35 | | |  | 24.36 | 19.68 | |  | | 27.82 | 24.68 |

Note: \*, \*\*, \*\*\* indicate significance at 10%, 5%, and 1% level, respectively. Robust standard errors in parenthesis.

Table VI: Regression Results-critical mass of women and agency cost

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Variables** | **AC1** | | |  | **AC2** | | |  | **AU** | | |
| (1) | (2) | (3) |  | (4) | (5) | (6) |  | (7) | (8) | (9) |
| FD1 | -0.035\* |  |  |  | -0.011\* |  |  |  | 0.019\* |  |  |
|  | (0.008) |  |  |  | (0.007) |  |  |  | (0.029) |  |  |
| FD2 |  | -0.041\* |  |  |  | -0.014\* |  |  |  | 0.024\* |  |
|  |  | (0.015) |  |  |  | (0.013) |  |  |  | (0.052) |  |
| FD3 |  |  | -0.046\*\*\* |  |  |  | -0.019\*\* |  |  |  | 0.033\*\* |
|  |  |  | (0.019) |  |  |  | (0.016) |  |  |  | (0.067) |
| Constant | 0.150\*\*\* | 0.124\*\*\* | 0.123\*\*\* |  | 0.094\*\*\* | 0.086\*\*\* | 0.083\*\*\* |  | 1.198\*\*\* | 1.197\*\*\* | 1.165\*\*\* |
|  | (0.037) | (0.037) | (0.037) |  | (0.031) | (0.031) | (0.031) |  | (0.136) | (0.131) | (0.135) |
| Controls | Yes | Yes | Yes |  | Yes | Yes | Yes |  | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes |  | Yes | Yes | Yes |  | Yes | Yes | Yes |
| Year effect | Yes | Yes | Yes |  | Yes | Yes | Yes |  | Yes | Yes | Yes |
| Industry effect | Yes | Yes | Yes |  | Yes | Yes | Yes |  | Yes | Yes | Yes |
| Observations | 2062 | 2062 | 2062 |  | 2062 | 2062 | 2062 |  | 2062 | 2062 | 2062 |
| Adjusted R2 | 0.017 | 0.011 | 0.011 |  | 0.017 | 0.016 | 0.016 |  | 0.03 | 0.082 | 0.037 |
| F-statistics | 4.18 | 2.35 | 2.32 |  | 3.49 | 3.26 | 3.3 |  | 7.81 | 8.17 | 7.86 |
| Hausman Chi**2** | 13.56 | 14.46 | 18.43 |  | 17.68 | 19.88 | 23.47 |  | 23.22 | 28.66 | 72.69 |

Note: \*, \*\*, \*\*\* indicate significance at 10%, 5%, and 1% level, respectively. Robust standard errors in parenthesis.

Table VII: Alternative measure of gender diversity (Blau and Shannon index)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Variables** | **AC1** | **AC1** | **AC2** | **AC2** | **AU** | **AU** |
| FD\_Blau | -0.141\*\*\* |  | -0.081\*\* |  | 0.122\*\*\* |  |
|  | (0.040) |  | (0.033) |  | (0.135) |  |
| FD\_Shan |  | -0.170\*\*\* |  | -0.096\*\* |  | 0.129\*\*\* |
|  |  | (0.046) |  | (0.038) |  | (0.157) |
| Constant | 0.136\*\*\* | 0.137\*\*\* | 0.088\*\*\* | 0.088\*\*\* | 1.059\*\*\* | 1.056\*\*\* |
|  | (0.012) | (0.012) | (0.010) | (0.010) | (0.052) | (0.052) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Year effect | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry effect | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 2062 | 2062 | 2062 | 2062 | 2062 | 2062 |
| Adjusted R2 | 0.005 | 0.006 | 0.002 | 0.002 | 0.010 | 0.010 |

Note: \*, \*\*, \*\*\* indicate significance at 10%, 5%, and 1% level, respectively. Robust standard errors in parenthesis.

Appendix

|  |  |  |
| --- | --- | --- |
| Industry-wise Composition | Number | Percentage |
| Automobile assembler | 125 | 6.06 |
| Automobile parts & accessories | 67 | 3.25 |
| Cable & Electrical goods | 57 | 2.76 |
| Cement | 184 | 8.92 |
| Chemical | 208 | 10.09 |
| Engineering | 100 | 4.85 |
| Fertilizer | 64 | 3.10 |
| Food & Personal care products | 161 | 7.81 |
| Glass & Ceramics | 37 | 1.79 |
| Leather & Tanneries | 20 | 0.97 |
| Miscellaneous | 98 | 4.75 |
| Oil & Gas exploration companies | 44 | 2.13 |
| Oil & Gas marketing companies | 80 | 3.88 |
| Paper & Board | 65 | 3.15 |
| Pharmaceuticals | 81 | 3.93 |
| Power Generation & Distribution | 116 | 5.63 |
| Real Estate investment trust | 4 | 0.19 |
| Refinery | 48 | 2.33 |
| Sugar & Allied industries | 148 | 7.18 |
| Synthetic & Rayon | 32 | 1.55 |
| Technology & Communication | 114 | 5.53 |
| Textile Composite | 92 | 4.46 |
| Textile Spinning | 28 | 1.36 |
| Textile Weaving | 8 | 0.39 |
| Tobacco | 23 | 1.12 |
| Transport | 41 | 1.99 |
| Vanaspati & Allied industries | 10 | 0.48 |
| Woollen | 7 | 0.34 |
| Total | 2062 | 100 |