Boardroom diversity and firm performance: The Moderating role of Institutional Ownership

Muhammad Zubair Akhtar
Bahria University, Lahore,Pakistan

ABSTRACT

This study investigates the relationship between boardroom diversity and firm performance and the influence of institutional ownership as moderator. Distinctly, panel data fixed-effect analysis applied to examine the relationship dataset of non-financial listed firms at Pakistan Stock Exchange (PSX) covering 2010 to 2019. Boardroom diversity is measured through the BD-Index based on six diversity attributes includes gender, age, education, nationality, experience and tenure. A total score of BD-Index is calculated as a score obtained from total score of 6. The higher performance measures refer to the effective and efficient use of firm's resources to maximize shareholder's wealth. Therefore, this study employs both performance measures of a firm (market and accounting based) to validate the study findings includes Tobin's Q (TQ), return on assets (ROA) and return on equity (ROE). Institutional ownership is measured as shares hold by institutional owners to total shares outstanding. The study findings confirms that boardroom diversity is positively related to firm performance. Additionally, the study findings partially confirm that institutional ownership increases firm performance. Overall, findings suggest that internal board control and monitoring are important to drive higher firm performance and important when institutional owners' external monitoring is highly pronounced. This study offers policymakers insights to implement legislation for a diverse board placement in the boardroom and exploit the balanced board's potential benefits, which generally improves firm performance.

Keywords: Governance, BD-Index, Board of Directors, Financial performance and Institutional Ownership.

INTRODUCTION

There are two most significant approaches which is related to the maximization of firm performance which defines as shareholder and stakeholder's doctrine which was presented by two famous authors Friedman and Freeman. Friedman (1970) introduce the shareholder's theory which enable managers to increase the shareholder's wealth as primary duty on the behalf of shareholders. Directors in a boardroom are engaged for addressing the shareholders interest which are no so much focusing on performance of the firm (Al-Shaer & Zaman, 2016). Erhardt et al. (2003) stated if the

diversity dimensions are added in a boardroom, then is a result the firm can perform well. The presence of women in board can affect the financial performance (Tobin Q) of the firms (Carter et al., 2003). Gul, Hutchinson, & Lai (2013) and Fitzsimmons (2012) argues that diversity play a valuable impact on the governance and the ultimate effect show as good governance. Manzaneque et al. (2016) argues that agency problems are solved by good governance and they due to this manager perform well in order to protect shareholder's rights. Members in board with diversify backgrounds have strong decisions making capabilities by analyzing the policies and information due to this board structure have a significant important on corporate governance which lead firm towards the success. Diverse board is always considering good for their effective decision-making styles because this board consist of people who have different capabilities, expertise and attributes (Van der Walt and Ingley, 2003).

In this study we examine the diversity in a board as a main source which has an impact on firm's financial performance. The aim of this study is providing valid evidence in context of board diversity index in aggregation of diversity dimensions as ability of effective monitoring ability by female gender inclusion, diverse education, tenure, experience, age and foreign directorship can impact positively on the firm performance. The foremost purpose of this study to test the heterogeneity dimesons of board room has a source which can increases the value of listed firms. Kang et al. (2007, p2) define diversity in a board room as a "variety in the composition of a board of directors". Board diversity is always a critical issue which is associated with firm performance as an influencer (Milliken and Martins, 1996). Examining each characteristic of board of directors separately, we make cumulative effect of each diversity measure in a collective index which is used as measurement of overall board diversity which is called as BD-Index. We develop BD-Index by using the model of Li and Wahid (2017) as a proportion of gender inclusion, experience of directors, tenure in a board, foreign directorship, education level of directors as well as the diversity level of age of directors in a boardroom of listed firms. One of the most important questions which is *What factors influence the board of director's decisions*? Adams et al. (2010, p. 59). However, this study elaborates these research questions in detail as follow:

Does bored diversity is positively related to firm performance when institutional ownership restraints this relationship.

This study contributes in the two ways; First, it adopts the Blau's diversity index to calculate the BD_Index. The Blau's index is used modestly in the developed economies while this is study used this index in the emerging settings which is proposed in the literature. Second, firms' performance which is measure in the literature in two ways like, accounting measure and market measure, this study caters the both measures to confirm the proposed hypothesis in the emerging economy settings.

A fixed and random effect model is used in this study after the application of a Hausman test which explain the best fit model. It is challenging to work on causal relationship of different variables in panel data because pre-established literature stated that characteristics of board are endogenous because these are chosen by firms (Agendorff 2016; Hermalin and Weisbach 2003). In this study there are mainly two sources of endognity which bias to our estimations of how board diversity effects on the firm performance. These are reverse causality affect and omitted variable bias. First is the direction of causality relation which is unclear and ex-ante because the big firm with high profit can appoint the more diversify board of directors as compare to those companies with low profit. Second is the omitted variables bias which is present due to incompleteness of empirical measure model for financial performance because empirical model cannot address and capture all possible determinants to measure performance. To counter the possible endognity issue we are doing these steps to tackle it. First, to manage endognity which is cause by reverse causality the author used lagged value of the repressors and second to address endognity which is due to mislaid variables which can be solved by using control.

The reminder of this paper is presented in this sequence. Section 2 is related to the literature review of the study; Section 3 methodology; Section 4 presents results and discussion and Section 5 concludes study.

LITERATURE REVIEW

Milliken and Martins (1996) found that there are two main dimensions of board diversity which are cognitive and demographics. Prior dimensions of board level diversity include gender, age, nationality, personality, information management styles, cultural backgrounds and values. Van Knippenberg et al. (2004) argues diversity is actually heterogeneity present in the member of boardroom and its dimension are extending in order to age, nationality, functional level, tasks skills and also religious backgrounds. In later some more dimensions are added in this which are occupation, skills, knowledge, role of family, organizational position and specialized knowledge. If there is a variation in the board members then the capability of information and knowledge management level is increased (Nielsen and Huse, 2010).

A noteworthy amount of research concentrations on gender diversity (e.g. Campbell and Mínguez-Vera, 2008; GallegoÁlvarez et al., 2010; Martín-Ugedo and Minguez-Vera, 2014), but demographic, cultural and educational features of boards are also widely investigated topic among researchers (Li and Chen, 2018; Dikolli et al., 2014; Kaczmarek et al., 2012; Horváth and Spirollari, 2012; Rose, 2007; Simsek, 2007; Kim, 2005). Many researchers argue that if there is higher level of unity and same level of attributes present in board members then there is homogeneity in the

boardroom which leads towards poor variety and debate quality in board room and also caused conformity problem (Miller et al., 2009). Researchers and corporate managers admitted the role of board diversity can have influenced the firm performance and also a source of value creation for their shareholders. Board diversity always consider as a part of better corporate governance which further relate to the high firm performance (Carter et al., 2003).

Boardroom Diversity

Gender

Female representations in corporate boardroom are regularized by regulatory bodies in many countries and they believe that female percentage in a board can be beneficial for the firms in many ways. In economics the role of gender considers significant for performance indicating values of the firm. In many studies empirical results of female on board shows positive significant effect on firm performance (Vieira, 2018; Ahmadi et al., 2018; Dako et al., 2016; Terjesen et al., 2016; Bart and McQueen, 2013; Green and Homroy, 2018; Campbell and Mı´nguez-Vera, 2008). Loukil et al. (2019) finds that return on equity relationship with equity market is significantly linked with percentage of female on board. Bennouri et al. (2018) explain that accounting performance can increased significantly with female presence in boardroom but show the significantly decrease in Tobin's Q. Pasaribu and Pananda, 2019 explains that gender in boardroom will significantly and gradually improve the firm performance. All the firms which have more females in their board composition will consistent with the critical mass effect and the marginally improve the firm performance.

Gender diversity in boardroom have significantly affect the firm performance in orders to improvement in ROA and ROE (Baker et al., 2020; Zahid et al., 2019).

Age

Boardroom with diverse age has a noteworthy influence on performance measurement of firms and age diversity among board member also highlights the collaborations in boardroom as productivity is provided by young members of board and experience is provided by elder members in a board (Mahadeo et al, 2012; Kim and Lim, 2010; Siciliano, 1996). There is very less literature is available related to the significant influence of education diversity to the firm performance. Milliken and Martins, 1996 present an approach that with diverse education such as board member with different educational backgrounds experience board matters differently and the ultimate effect of this in a shape of conflicts between board of directors.

Directors age and ethnicity equality in a board perspective have a great impact on the firm performance such as firms' accounting (ROA) and market performance (share price) countries (Anju, 2020; Carter et al., 2010; Ezeanyim, 2020).

Nationality

Johnson et al. (2013) argues that ethnic diversity such a national and foreign director's presence in a boardroom has a less attraction in literature as compare other diversity dimensions like age and gender because this is not very common in many cases. Diverse nationality board can affect the cognitive perspective, group dynamics and also effective management procedure of decision making which can influence on the firm performance and other outcomes. Delis et al. (2017) present the empirical evidence that nationality diversity in a boardroom improve the firm performance if these firms make amalgamation of directors having different nationality diversity. Diverse nationality board can perform good decision which lead towards the positive firm performance (Oxelheim and Randoy, 2003).

Tenure

Tenure is an important factor in demographics attributes of directors. Directors tenure is widely studied by the Simsek (2007), McKnight and Weir (2009), McCann (2016), and Kaczmarek et al. (2012). Walters et al., 2007 explain in their study that longer tenure in the boardroom have associated with greater benefits in order to strong and experienced decision making, jobs skills and job related knowledge. Many researchers admitted that the firm related knowledge of directors can have increased with passage of time which enable them to make decision which are beneficial for firms. Knight et al. (1999) explore director's tenure diversity impact positively on the form performance. Directors who have maximum duration of tenure can influence the firm's decision by their own beliefs and experience of the firms (Barroso et al., 2011).

Long tenure in boardroom can be identify their best job specific roles but these are not necessarily affiliated with the overall goals of board or shareholders (Kaczmarek et al., 2012 citing Hillman et al., 2008). McCann (2016) elaborates in his study that directors holds dominant positions in the executive management of any company and as the tenure is increased they are less likely to manage and protect shareholders interest.

Experience

Directors having a wide experience of other firms has built a tacit knowledge which can act as an intangible asset which can help him to make the decision of competitive advantages (Barney, 1991). Carpenter et al. (2010) argues that if a firm appoint the most experience board of directors which can increase their range of interpretations, problem solving perspective and reduce the conflict of biases in a boardroom related to decision making process.

Education level

Directors' education is considering as the important dimensions of diversity because if there is heterogeneity in the board of director age then the board is able to make decision wisely in favor of shareholders. Many

studies evidence the positive influence of diverse education level on the performance values of the firm (Cheng et al., 2010 Kim and Lim, 2010), some studies show no significant effect between education diversity and firm performance (Assenga et al., 2018; Rose, 2007; Daily and Dalton, 1994), and some shows the negative influence of board education diversity along with the presence of PhDs directors to firm performance (Boadi and Osarfo, 2019; Bathula, 2008). Table 1 summarized the literature results on the relationship of board diversity attributes and firm performance.Considering the above discussion, the first hypothesis of the study as follow:

Hypothesis 1: *BD_Index is positively related to performance of the firm.*

Institutional ownership

Literature on institutional ownership is scarce, making it difficult to explain when and how institutional ownership behave. Miller and Triana, (2009) stated that there is ambiguity in theoretical and empirical finding level which are unable to explicate the complex relationship of institutional ownership with board heterogeneity dimensions and the performance of the firm and it required deeper knowledge and finding. Study further explain that the role of institutional ownership can act as external controller that tighten the management control and due to this control, it behaves as a moderator between the board diversity and form performance. Chung and Zhang (2011) define institutional ownership as financial institutions (include insurance companies, banks and pension fund etc.) that invest in any firm as collectively by using the funds of individual's investors and paid maximum return to them.

Institutional ownership can reduce the agency problems between the owners which are shareholders and managers in order to maximize the shareholder's wealth (Shleifer and Vishny, 1986). Institutional investors have significant power in order to affect the management directly because they owned large share of the form and also having the power of voting (Gillan and Stark, 2003). There are many studies ebaloretd effective monitoring and control over the management there are many studies who find the significant positive impact of institutional ownership on performance of the firms (Nashier and Gupta, 2016; Gurbuz et al., 2010). A study finds the momentous positive association between the TQ and proportion of Inst_Own (McConnell and Servaes, 1990). In contrast to the above mentions positive empirical results there are also some studies who elaborate the significant negative impact of institutional ownership. Tsouknidis (2018) explains there is negative association of institution ownership with performance indicator of firm. Institutional ownership always creates the external connection with other business and due to this it has negative impact on the performance value of the firm.On the basis of literature, the second hypothesis of the study as follow:

Hypothesis 2: *The relationship between board diversity index and performance of firms is stronger in firms with institutional ownership.*

METHODOLOGY

In this study the panel data models are used for determine the firm performance. We purpose three different performance measurement indictors for firm performance which are Tobin's Q, ROA and ROE as response variable; board diversity index (BD-Index) which use six diversity dimension such as gender, education, education, tenure, nationality and experience as explanatory variable; institutional ownership (Inst_Own) is used as moderator variable in this study. Some controlled variables such as Lev, FSize and FAge are also used as firm level control variables; board size (BS), board independence (BI) and CEO Duality (CEO_Dual) are used board level control variables. We used panel data due to this a sub-index j is used to represent t the individual and t is used for representations of time. The error term (ε) is further decomposed in two parts, one is combined effect which is varies between the period of time and individual, the second is individual effect which is the individual characteristics and it is constant over time.

Following the hypothesis, we developed the following models:

$$\sum_{i=1}^{3} Firm\ Performacne_i = \alpha_1 + \beta_m BD\_Index + \beta_n Inst\_Own + \sum_{j=1}^{6} \beta_j Controls_j + \sum_{k=1}^{n} \beta_k Industrydumies_k + \sum_{l=1}^{n} \beta_l Yeardummies \quad (1)$$

$$\sum_{i=1}^{3} Firm\ Performacne_i = \alpha_1 + \beta_m BD_{Index} + \beta_n Inst_{Own} + \beta_K BD\_Index * Inst\_Own + \sum_{j=1}^{6} \beta_j Controls_j + \sum_{k=1}^{n} \beta_k Industrydumies_k + \sum_{l=1}^{n} \beta_l Yeardummies \quad (2)$$

In the above mentioned both models a Hausman test (Hausman, 1978) is used for selection the random effect or fixed effect model. A fixed effect model is used when the value of p is less than 0.05 otherwise random effect model is better choice. It is important to know that sector variables are not included in fixed effect model and these are constant for firms. Equation 1 is used for measurement of firm performance by using the board diversity index (BD-Index) and control variables. Equation 2 is also calculating the firm performance by using the institutional ownership (Inst_Own) moderator effect with board diversity index (BD-Index).

Table 1. variables and measurement

Variable Type	Variable name	Measurements
Dependent	Tobin's Q (TQ)	Sum of market value of equity and long-term debt to total assets
	Return on Assets (ROA)	Net profit book value to book value of total assets

	Return on Equity (ROE)	Net profit value to book value of total equity
Independent	Diversity Index (BD-Index)	Six board diversity dimensions' "gender, age, nationality, tenure, experience and education" used for calculation of BD-Index.
Moderator	Institutional Ownership (Inst_Own)	Shares hold by institutions to total shares outstanding
Control	Leverage (Lev)	Total liabilities to total assets
	Firm Age (FAge)	Number of years of firm incorporation as a listed firm
	Firm Size (FSize)	Natural logarithm of total assets
	Board Size (BS)	Total number of directors in a board
	Board Independence (BI)	Proportion of independent directors to total directors
	CEO Duality (CEO_Dual)	Calculated as dummy variables 1=duality and 0=no duality

Data and Sample Selection

Sample

Final sample size of this study is panel data set of 188 non-financial PSX (Pakistan Stock Exchange) listed firms and we excluding financial sector due to its different work nature and internal processes of operations. We calculate 10 years' data of BD-Index, ROA. ROE, Tobin Q, Institutional ownership (Inst_Own), FSize, FAge, Lev, CEO Duality, Board Independence and Board Size yearly observations data from 2010 to 2019. A total 1,850 yearly observations for each data are used in this study. A fixed effect regression is used as an estimation method. All variables' data is calculated by author from financial statements, official websites of listed corporates and Pakistan Stock Exchange (PSX) official website

Dependent variable

This paper used three proxies as a depend variables which is performance of the firm. There are Tobin's Q, ROA and ROE. In this study Tobin Q is also dependent variable which is calculate as company total debts and capitalization market dividing by total assets value. Tobin Q is used as the measurement of performance in many studies (Kim et al., 2018; Singh et al., 2018; Karaman et al., 2018; Kuzey and Uyar, 2017; Bhagat and Black, 1999). Tobin's Q actually tells the long-term ability performance and many researchers has argued that it is better than the ROA and ROE which are the accounting based short term performance measurement of firm. Tobin's Q

was estimated by the authors using the book value of firm's total debt and market capitalization to the book value of total assets. Return on equity (ROA) is measured as book value of net profit to book value total assets and return on equity (ROE) is measured as book value of net profit to book value of total assets. ROA and ROE are used in many studies as a source of accounting measure (Randoy et al., 2006; Muth and Donaldson,1998) but in is also criticized by many researchers to use the accounting-based measurement of performance of the firm (Devinney et al., 2005).

Independent variable

Independent variable is construct by using a diversity index, author calculate the diversity level of each attribute by using Blau's Index (Blau 1977) and then added the score of each diversity attribute to find the overall Board Diversity Index (BD-Index). We follow the Harrison and Klein (2007) diversity index model to calculate the heterogeneity of board attributes which are categorical in nature. Heterogeneity of board attributes is measure as;

$$\mathbf{BD-Index} = 1 - \sum_{1=1}^{k} P_1^{\,2} \qquad (1)$$

Where;

Pi = proportion in the 'i'th categorical attribute of board members

k = number of categorical attributes

Blau's indices is formulized for all six attributes separately by taking proportion to its maximum value as (k-1)/k. After all indices a composite Board Diversity Index (BD-Index) is calculated by adding all the Blau indices for all six attributes of board level heterogeneity (Agresti and Agresti, 1978). In this index six board categories are included which are gender, age, education, nationality, experience and tenure. Gender diversity is calculated under two categories which are male and female. Age diversity is actually the heterogeneity in the age present in a board room and it is calculated as year wise age such as 20, 30, 40, 50 and 60 years. Education diversity is actually the study level of members in a board and it is measured as years of schooling. Nationality is the heterogeneity which is the ethnic belongingness of the board of directors in a board room and it is measured in two categories as Pakistani and foreign nationals. Experience diversity is the heterogeneity in a board which is the directors experience in a boardroom of other companies and it is also measured as 0,1,2,3,4 and 5 years wise. Tenure diversity is the heterogeneity of the board of directors in company's boardroom as a year of service and it is calculated as the years such as 0,1,2,3,4 and 5. We develop final score by summarizing the all-individual index which is board diversity index (BD-Index) with ranges from 0 which is strongly homogenous and 7 which is strongly heterogeneous.

Moderator variable

In this study institutional ownership is used as moderator variable and many past studies define the institutional ownership as these are institutional investors own large share in different organizations and generally the institutional ownership are banks, pension management funds and insurance

companies. The value of institutional ownership is calculated as shares hold by institutions to the total shares outstanding (Nashier and Gupta, 2016; Lin and Fu, 2017; Chung and Zhang, 2011).

Controls

In this study we control some board and firms related variables which has impact on performance of the firm. In this study firm size, firm age, leverage as firm-level control variable and board size, CEO Duality and board independence as board level control variables (Adams and Ferreira, 2009). Firm size is calculated as the natural log of total assets of a firm and control this variable because performance can be fluctuated due to firm size (Vafaei et al., 2015). Leverage is measure as total liabilities to the total assets and it is control because there is significant negative relationship between the leverage and firm performance as described by pecking order theory (Bhattacharya and Graham, 2009). Firm age (Fage) is measure as years' form incorporation of firm and used as firm level control variables (Mikkelson et al., 1997; Setia-Atmaja, 2009). Board size mean the number of board of directors presented in a boardroom and many studies measure that there is negative relationship between board size and firm performance. Small board size has more effectiveness level as compare to the larger board size (Yermack 1996; Cornett et al. 2007). Board independence is calculated as the fraction of independent board of director to the total board of directors in a boardroom. A board with a large number of independent directors improves financial performance. (Brickley et al., 1994). CEO Duality mean CEO has dual positions; CEO is also a chairman as well as CEO. If there is no CEO_duality and CEO work separate as chairman due to this the power of CEO increased and making an effective decision making and in response an asymmetry information (Cornett et al., 2007). If there is less information available, then it creates a monitoring problem and firm performance may be affected. CEO_duality is measure as dummy variable and 1 value is given if CEO has dual role otherwise value is 0.

EMPIRICAL RESULTS

Descriptive Statistics

In Table 5 the values of descriptive statistics of study is elaborated. In these descriptive statistics the number (N), mean, (S.D) Standard Deviation, min (Minimum) and max (Maximum) values are calculated. All variable has 1,850 number of observations. In we see the return on assets (ROA) then we find that mean value is 0.0536, standard deviation is 0.0985, its min value due to loss is -0.5428 and max value is 0.0669. Return of equity (ROE) mean value is 0.0946, its standards deviation is 1.5770, min value is -46.4232 due

to loss and max value is 21.6772. Tobin Q mean value is 1.4449, standard deviation is 1,6716, min value is 0.12444 and max value is 25.4233. If we see the Board diversity index (BD-Index) then we find that the mean value is 3.3333, index standard deviation value is 0.3113, min value is 1.2843 and max value is 4.2119. Institutional ownership (Inst_Own) has a mean value 0.1155, stand deviation value is 0.1781, min value is 1.5672 and max value is 4.9644. Same descriptive statistics is available in table for all control variables.

Table 2. Descriptive Statistics

Variable	N	Mean	Std. Dev.	Min	Max
ROA	1,850	0.0536	0.0985	-0.5428	0.6696
ROE	1,850	0.0946	1.5770	-46.4232	21.6772
TQ	1,850	1.4449	1.6716	0.1244	25.4233
BD-Index	1,850	3.3333	0.3113	1.2843	4.2192
BD-Gender	1,850	0.1262	0.1692	0	3
BD-Foreign	1,850	0.0877	0.1587	0	2
BD-age	1,850	0.7948	0.0534	0.51695	0.9242
BD-Tenure	1,850	0.7517	0.1154	-1.2031	0.8961
BD-Education	1,850	0.8055	0.0439	0.5556	0.9233
BD-Experience	1,850	0.7672	0.0786	0.2914	0.9222
Inst_Own	1,850	0.1155	0.1781	1.5672	4.9644
Ceo_Duality	1,850	0.1394	0.3465	0	1
Board Size	1,850	8.06	1.5000	4	21
Board independence	1,850	0.1693	0.1683	0	0.9285
Firm Size	1,844	15.8975	1.4437	13.0689	20.4574
Leverage	1,850	0.5570	0.2816	0	3.1455
Firm Age	1,850	38.9691	19.5766	10	59

Correlation Matrix

Table 6 explain the Pearson correlation of Tobin's Q, ROA, ROE, BD-Index, institutional ownership, leverage, firm age, firm size, board size, CEO_duality and board independence. In this below mentioned table values of institutional ownership is negatively, leverage and firm age is positively significant at 5%, and board independence is negatively significant correlated at 1% with Tobin's Q. Institutional ownership and firm age is positively corrected at 5% significant level, leverage is negatively correlated at 5% significance level. Board diversity index, leverage, CEO_duality, board independence and firm age positively correlated with ROE at 5%

significance level. All variables correlation is mentions in below mentioned table.

Table 3**.** Correlation matrix

TOBIN Q	1										
ROA	0.475	1									
ROE	0.106	0.110	1								
BD-Index	0.225	0.170	0.020**	1							
Inst_Own	0.069**	0.017**	0.005*	-0.040**	1						
Leverage	0.024**	-0.48**	0.028**	-0.059*	-0.025*	1					
CEO-Dual	-0.089	-0.108	0.014**	-0.074*	-0.003*	0.048**	1				
Board size	0.109	0.125	0.026**	0.426	0.095	-0.003*	-0.141	1			
Board_IND	0.006*	0.054	0.018**	0.0105*	0.052	-0.060*	-0.046**	0.107	1		
Firm Age	0.048**	0.013**	0.002*	0.009*	0.020**	-0.155	-0.042**	0.147	0.148	1	
Firm Size	0.062	0.115	0.022**	0.131	0.127	0.026**	-0.086	0.358	0.095	0.1028	1

*Sig level (2-tailed) is 0.01.

**Sig level (2-tailed) is 0.05.

Main findings.

In this study we estimated the influence of board diversity index (BD-Index) on firm's performance and also the moderator effect of institutional ownership by using the two-way fixed effect regression model. There are 3 main tables (Table 4-6) of empirical estimation of the results which can elaborate as Tobin Q, ROA and ROE and all tables are divided in four sub model which are model1, model 2, model 3 and model 4. Model 1 is used for overall model by adding only years fixed affects and firms fixed effect is not include in this model , model 2 is for control variables only, model 3 is used for the testing the hypothesis (H1) which check the impact of board diversity index (BD-Index) and Institutional ownership (Inst_Own) on main dependent variable and model 4 is used for the empirical estimation of moderator variable hypothesis (H2) by using the BD-Index*Inst_Own to test the moderation impact over the firm performance and board diversity. In table 7 the fixed effect regression estimations are analyzed for Tobin's Q which is our dependent variable of performance. In model 1 all variables effect is checked on Tobin Q. Independent variable which is board diversity index (BD-Index), the effect of moderator also added in model 1 which is institutional ownership, control variables such as firm size, firm age,

leverage, ECO duality, board size and board independence also added in model 1. Model 1 shows that board diversity (BD-Index) has a beta coefficient value of 1,6984 at significance level p< .01, institutional ownership (Inst_Own) also significant (ß=14.75713 and p< .01) and moderator which is BD-Index*Inst_Own is also positively significant (ß=4.72025 and p< .01). Further firm age, leverage and CEO duality is also significant at p< .1. Model 2 is used for check the control variable effect on Tobin's Q and table shows that firm size and CEO duality is significant at p< .1 and leverage is significant is at p< .05 level. Model 3 is used for testing the main effect of board diversity on Tobin's Q which is our hypothesis 1 (H1). Results shows that board diversity is a significant positive effect on Tobin's Q (ß=0.40731 and p< .01) and we accept the H1 for which is Tobin's Q. Values of CEO duality, firm size and leverage is also significant at 10%, 5% and 1% respectively. Model 4 is used for the check the moderation effect on Tobin's Q and results are shocking for us because of negative value of coefficient beta (ß=-1.03059= and p< .1) due to this we can also accept hypothesis (H2) because negative sign elaborates the impact of institutional owners as adverse for Tobin Q and as the level of institutional investment increase the firm performance was decreed which is also proved by the many studies as explained in literature earlier. In moderation model the value of BD-Index also significant (ß=0.52139 and p< .01) and Institutional ownership also significant (ß=3.25721 and p< .1) and control variables such as firm size and leverage also significant at 5% and 10%. The values of R-Squared (R-Sq) also explain in table.

Table 3. Regression Estimates for Tobin's Q

Variables	**All Variables Effect**	**Control Effect Only**	**Main Effect for H1**	**Moderation Effect for H2**
	Model 1	**Model 2**	**Model 3**	**Model 4**
BD-Index	1.6984***		0.40731***	0.52139***
	(10.99)		(3.4)	(3.82)
InstOwn	14.75713***		-0.13633	3.25721*
	(5.95)		(-0.9)	(1.76)
BD-Index*InstOwn	-4.72025***			-1.03059*
	(-6.2)			(-1.85)
FSize	0.0337018	-0.1531972*	-0.16286**	-.172015**
	(1.2)	(-1.86)	(-2.02)	(-2.09)
Fage	0.00318*	0.35925	0.25649	0.23052

	(1.62)	(0.51)	0.36	0.33
Lev	.33745*	0.53773***	0.56985***	.56325 ***
	(2.5)	(3.29)	(3.45)	(3.47)
CEO_Dual	-0.27656*	0.13752*	0.13449*	0.12685
	(-2.48)	(1.68)	(1.65)	(1.55)
Bs	0.02221	-0.01855	-0.47295	-0.04825
	(0.74)	(-0.62)	(-1.55)	(-1.58)
Bi	0.00397	-0.21293	-0.20767	-0.20642
	(0.02)	(-1.32)	(-1.3)	(-1.29)
Firm Fixed-Effects	No	Yes	Yes	Yes
Year Fixed-Effects	Yes	Yes	Yes	Yes
R-Sq	0.1107	0.0016	0.0615	0.072
N	1850	1850	1850	1850

Notes: Value of t-statistics are also mention in parentheses ()
If * p < .1. , ** p < .05 and *** p < .01.

In table 4 the fixed effect regression estimations are analyzed for ROA which is our dependent variable of performance. In model 1 all variables effect is checked on ROA. Independent variable which is board diversity index (BD-Index), the effect of moderator also added in model 1 which is institutional ownership, control variables such as firm size, firm age, leverage, ECO duality, board size and board independence also added in model 1. Model 1 shows that board diversity (BD-Index) is significant (ß=0.04717 and p< .01), institutional ownership (Inst_Own) also positively significant (ß=.38037 and p< .01) and moderator which is BD-Index*Inst_Own is also significant with negative sign (ß=-0.11892 and p< .01). Further firm size, firm age, leverage and CEO duality is also significant at p< .01. and board size is significant at p< .05. Model 2 is used for check the control variable effect on Tobin's Q and table shows that firm size, firm age, leverage p< .01. Model 3 is used for testing the main effect of board diversity on Tobin's Q which is our hypothesis 1 (H1). Results shows that board diversity is an insignificant effect on ROA and we reject the H1 but the values of control variables such as firm size, firm age, leverage and board size is significant 1% respectively. Model 4 is used for the check the moderation effect on ROA and results shows that moderation effect of institutional ownership is an insignificant effect on ROA and we also reject the H2 for ROA. Values of control variables such as firm size, firm age, leverage and board size is significant because p< .01. The values of R-Squared (R-Sq) also explain in table.

Table 4. Regression Estimates for ROA

Variables	**All Variables Effect**	**Control Effect Only**	**Main Effect for H1**	**Moderation Effect for H2**

	Model 1	**Model 2**	**Model 3**	**Model 4**
BD-Index	0.04717***		-0.00894	-0.00988
	(5.79)		(-1.07)	(-1.05)
Inst_Own	.38037***		-0.00284	-0.02841
	(2.91)		(-0.28)	(-0.22)
BD-Index*InstOwn	-0.11892***			0.00771
	(-2.96)			(0.19)
Fsize	0.00774***	-0.02765***	-0.02739***	-0.02738***
	(5.21)	(-4.97)	(-4.9)	(-4.89)
Fage	-0.00040***	-0.06249***	-0.06160***	-0.06157***
	(-3.93)	-(1.3)	-(1.28)	(-1.28)
Lev	-0.16879***	-0.13979***	-0.14001***	-0.14001***
	(-23.69)	(-12.68)	(-12.69)	(-12.68)
CEO_Dual	-0.02295***	0.00090	0.00093	0.00093
	(-3.9)	(0.16)	(0.17)	(0.17)
BS	0.00299**	-0.00771***	-0.00751***	-0.00751***
	1.88	-3.84	-3.63	-3.63
BI	0.01772	0.00559	0.00555	0.00555
	(1.47)	(0.52)	(0.51)	(0.51)
Firm Fixed-Effects	No	Yes	Yes	Yes
Year Fixed-Effects	Yes	Yes	Yes	Yes
R-Sq	0.2859	0.0010	0.0007	0.0006
N	1850	1850	1850	1850

Notes: Value of t-statistics are also mention in parentheses ()
If * p < .1. , ** p < .05 and *** p < .01.

In table 5 the fixed effect regression estimations are analyzed for ROE which is our dependent variable of performance. In model 1 all variables effect is checked on ROE. Independent variable which is board diversity index (BD-Index), the effect of moderator also added in model 1 which is institutional ownership, control variables such as firm size, firm age, leverage, ECO duality, board size and board independence also added in model 1. Model 1, model 2, model 3 and model 4 shows that all the values of Board Diversity Index (BD-Index), Institutional ownership (Inst_Own), moderation effect (BD-Index*Inst_Own) and control variables are

insignificant and these values has no impact on Return on Equity (ROE) due to this we reject the hypothesis 1 (H1) from model 3 and moderation hypothesis 2 (H2) from model 4. The values of R-Squared (R-Sq) also explain in table.

Table 5. Regression Estimates for ROE

Variables	All Variables Effect	Control Effect Only	Main Effect for H1	Moderation Effect for H2
	Model 1	Model 2	Model 3	Model 4
BD-Index	0.03457		-0.14056	-0.15642
	(0.22)		(-0.68)	(-0.65)
Inst_Own	-0.24168		-0.01196	-1.663875
	(-0.1)		(-0.04)	(-0.51)
BD-Index*InstOwn	0.08415			0.51430
	(0.11)			(0.51)
FSize	0.0095682	-0.12700	-0.12251	-0.11980
	(0.34)	(-0.88)	(-0.84)	(-0.82)
Fage	-0.00115	-0.44617	-0.42350	-0.41121
	(-0.59)	-0.36	(-0.34)	(-0.33)
Lev	-0.1835505	0.3564096	0.350893	0.35029
	(-1.37)	(1.24)	(1.22)	(1.22)
CEO_Dual	0.15778	0.29563	0.29632	0.29993
	(1.42)	(2.05)	(2.05)	(2.07)
BS	0.02524	-0.02205	-0.01613	-0.01568
	(0.84)	(-0.42)	(-0.3)	(-0.01568)
BI	0.13263	0.07220	0.07105	0.07046
	(0.58)	(0.26)	(0.25)	(0.25)
Firm Fixed-Effects	No	Yes	Yes	Yes
Year Fixed-Effects	Yes	Yes	Yes	Yes
R-SQ	0.0083	0.0004	0.0036	0.0037
N	1850	1850	1850	1850

Note: Value of t-statistics also mention in parenthsis ()
If * p < .1. , ** p < .05 and *** p < .01.

Conclusion and Implications

In corporate governance the diverse board with several dimensions of heterogeneity such as gender, age, experience, tenure, education and nationality play an important role in order to effective management and

information processing due to this the firms decisions can increase the performance of firms. Many studies such as agency theory and resource dependence view of the firm can make strong arguments on board diversity because managers are working as an agent on the behalf of shareholder and the ultimate purpose of these managers is wealth maximization of shareholders. This happened only if there is diverse board present in firm because these diverse board can work for reducing the agency problems, make informative decision by using the tacit knowledge and experience and more importantly females as a part of diverse board can increase the monitoring of the firm and in results the financial performance of the firm increased.

The above results show that firm performance is measured by Tobin's Q, ROA and ROE, and results are shocking that only Tobin's has a significant result as a measurement of firm performance by using the board diversity index (BD-Index) and moderation effect of institution ownership (Inst_Own), ROA and ROE has no significant at all. In Tobin Q model only hypothesis 1 (H1) is accepted and hypothesis (H2) is also accepted and it is negatively significant which shows that institutional ownership negatively influenced firm performance (Tobin's Q). Its show if the institutional ownership increased then firm performance will be decreased. This negative effect also discusses in literature as a reference (Bhattacharya and Graham, 2007; Tsouknidis, 2018). This is relatively surprising for us and we explore the literature to answer this question then we find that only few studies argue that board diversity which is measure by using the proportion of women and minorities has a positive impact on return on assets (Erhardt et al.,2003). Randoy et al. (2006) also argues that board diversity has an insignificant effect on the ROA in three Scandinavian countries such an as Norway, Sweden and Denmark. Devinney et al. (2005) stated that the accounting measures is not treated as the accurate measure of firm performance and called them as "distortable" because the accounting policies, rules and procedures are manipulated by human error or deception.

This study has had some theoretical as well as practical implications. First, we discuss the theoretical implications, in this study we use two-way fixed effect model which elaborate the significant effect of board diversity and institution ownership moderator effect on Tobin's Q significantly but fails to draw a logical relation with return on equity (ROE) and return on assets (ROA) in emerging market context. This approach presents that market based firm performance measurement are better than the accounting-based performance measurements. The practical implications of this study are that work place diversity especially heterogeneity in board room coined as a term board diversity index (BD-Index) can beneficial for the market based firm performance (Tobin's Q) and institutional investment negatively influenced firm performance which is not beneficial for the shareholders as a context of agency theory. So, these results are beneficial for the policy makers of firms, Pakistan Stock Exchange and Security and Exchange Commission of Pakistan (SECP) for making policies regarding the board diversity, institutional ownership and firm performance perspective.

This study has some limitations which are important to address. Some demographic dimensions such as marital status, religion belongingness and politics also act as an influencer which is unfortunately not addressed in this. Findings from one emerging market is taken, which limits its empirical rationality of generalization of the results. Some future research should also consider in this study which incorporating institutional ownership categories such as low, moderate and high concentration of ownership and institutional ownership type of institutional ownership which may have an impact on the direction and size of the effect found in this investigation.

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