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**BOARD CHARACTERISTICS IMPACT ON THE FIRM PERFORMANCE IN THE INDIAN CONTEXT**

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PUBLISHED: 05/10/2022

Accepted: 30/09/2022

Submitted: 11/08/2022

COPYRIGHT NOTICE:© 2022 by authors. Licensee ERUDITUS®. This article is an **open access** article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).**CITE THIS PAPER:**Naim, Hamza; Aziz, Tariq (2022). "Board Characteristics impact on the Firm Performance in the Indian Context" *Journal of World Economy: Transformations & Transitions (JOWETT)* 2(05):19. DOI: <https://doi.org/10.52459/jowett25191022>**ABSTRACT**

The research aims to determine the impact of the board characteristics on the firm performance for 348 firms of the National Stock Exchange (NSE) 500 Index listed on the National Stock Exchange of India for the period 2012-2018 using (OLS) Ordinary Least Square (FEM) Fixed Effect Model and more robust (GMM) Generalized Method of Moments regression techniques. GMM regression technique also controls for the endogeneity as well as heteroscedasticity and heterogeneity in panel data. Further, the moderating effects of market capitalization are also observed considering the impact of board characteristics on the firm performance using the interaction effects technique. Lastly, the ideal board size was determined based on the classification of market capitalization including small, mid, and large market cap. Board characteristics including board size and percentage of shares held by the promoters have a positive significant impact on the firm performance while the percentage of shares pledged by the promoters has a negative significant impact on the firm performance. The results show that market capitalization moderates the relationship between board characteristics and firm performance. Findings also suggest an ideal board size of 8 for mid-cap firms and a range of 7-18 for large-cap firms which show a similar result to the Kotak Committee Report (2017) recommendations with the ideal board size being a minimum of 6 directors on the board. The results cannot be generalized as only the manufacturing and services (excluding financial) industries are considered, but the results can be applied to the abovesaid industry sectors.¹

KEYWORDS

Board Characteristics, Board Size, Firm Performance, Tobin's Q, Shares Pledged, Ownership Concentration, India.

¹ This article is an extended version of the paper presented at National Conference on Emerging Perspectives of Finance and Changing Economic Scenarios on February 29, 2020, at IMS Ghaziabad. The paper has also been presented in the International Conclave on Globalizing Indian Thought held at IIM Kozhikode, Kerala, India held from 16-18 January 2020. The published conference proceedings included only the extended abstract.

1. INTRODUCTION

Corporate governance deals with the ways in which suppliers of finance to corporations assure themselves of getting a return on their investment ([Shleifer & Vishny, 1997](#)). Corporate governance mechanisms require a multitheoretic approach which is essential for the mechanisms and structures that reasonably enhance organizational functioning ([Daily et. al., 2003](#)). In the past years, a number of scams such as Enron, MCI (Microwave Communications Inc.) (formerly WorldCom), Satyam Scandal, etc have highlighted the importance of corporate governance. Numerous measures have been adopted such as the Sarbanes-Oxley Act in 2002 the U.S. Federal Law, the Companies Act 2013 an Act of the Parliament of India, etc to promote and regulate the proceedings of the corporations in a much more systematic and refined manner. Moreover, these Acts have been passed in response to the corporate failures and scams resulting in the degradation of the economy as a whole.

On August 30, 2013, Companies Act 1956 was revised in the form of the Companies Act 2013 and certain requirements were made for the stock exchanges and listed companies. Earlier the focus was merely on the shareholder's interest but now it shifted to a somewhat stakeholder's perspective as well. The duties and code made for independent directors now have attention towards the stakeholder and community as well ([Varottil & Naniwadekar, 2018](#)). Even though the Companies Act 2013 has taken a pluralist approach for both the shareholders and stakeholders yet some challenges occur for instance the case of breach of director's duties. In due course of time, certain amendments were made to the existing clauses 35 B and 49 and the listed companies are required to submit reports on corporate governance to stock exchanges.

Typically, corporate governance research has focused on developed economies ([Dalton et. al., 2003](#); [Rajagopalan & Zhang, 2008](#)). However, studies done on developed economies have been applied to emerging economies ([Jackling & Johl, 2009](#)). Moreover, with the formulation of the Companies Act 2013, few studies have been done in order to study the relationship between corporate governance and firm performance. Although the Companies Act 2013 describes the responsibilities of firms and shareholders to stakeholders, community, creditors, environment, etc but it lacks in certain aspects such as the breach of director's duties, conflict among the interest of various stakeholders, director's busyness, etc which would result in the interest of shareholders and violates the rights of others to a great extent ([Varottil & Naniwadekar, 2018](#)). Since BSE has prepared a corporate governance scorecard but still India lags in having a corporate governance index which should be applicable for

all the firms in the country. Lastly considering the sustenance of the firm and its longevity, corporate governance measures can prove to be more fruitful and everlasting ([Pande & Ansari, 2013](#)).

In India, the central problem lies in the concentrated ownership of large shareholders as a result of which the interest of the minority shareholders and other stakeholders remain unprotected ([Pande & Ansari, 2013](#)). Secondly, corporate governance reforms in the country affect the firm's performance and in turn, increase the market value of firms. Reforms in the country affect shareholder rights, board responsibilities, transparency, disclosure, and the role of stakeholders and also there is no comprehensive tool to measure the corporate governance status of the firms in India. Due to this, firms are not able to self-assess their status nor even investors can understand the corporate governance status. However few researchers have composed a corporate governance index ([Halder & Rao, 2013](#); [Balasubramanian et. al., 2010](#); [Sarkar et. al., 2012](#); [Mohanty, 2003](#)) for India with emphasis on different dimensions of corporate governance components including board characteristics such as board size, board structure, board meeting frequency, ownership concentration, audit committee, etc.

The objective of this study is to examine the board characteristics dimension of corporate governance and its impact on firm performance in the Indian context. In our study board characteristics involving board size, board meetings frequency, percentage of independent directors, percentage of shares held by the promoters out of the total shares and percentage of shares pledged have been regressed with firm performance variables. It has been seen that board size and percentage of shares held by the promoters out of the total shares have a significant positive impact on the firm performance. However, shares pledged by the promoters have a negative significant impact on the firm performance. Board meeting frequency, percentage of independent directors, non-independent directors and grey directors remains insignificant in relation to firm performance. The results with GMM, a more robust technique confirm the earlier result and in addition, also state that board meeting frequency has a negative impact on the firm performance. Sequentially, interaction effects of board characteristics with the firm's market capitalization dummy have been carried out almost all showing significant relationships with the firm's market capitalization dummy. Lastly, specific board size has been determined for small-cap, mid-cap, and large-cap firms with respect to the firm's market capitalization dummy.

This study contributes to the existing literature in many ways. Firstly, we performed the OLS FEM technique in determining the relationship between board characteristics and firm performance which is done preferably according to the previous studies ([Guest, 2009](#); [Mak & Kusnadi, 2005](#)).

Secondly, the heterogeneity and endogeneity concerns of panel data are adjusted by a more robust technique, GMM as suggested by earlier studies ([Guest, 2009](#)). In addition to this, the interaction effects of board size, ownership concentration and shares pledged are specifically examined concerning the firm's market capitalization dummy which shows that small, mid, and large-cap firms are having a relationship with board characteristics but in different respects. Lastly, the ideal board size has been determined for the firms classified into small, mid, and large-cap firms based on the market capitalization. This study has also been acknowledged at two conferences in India ([Aziz & Naim, 2020](#)) and the suggestions were further incorporated simultaneously.

2. LITERATURE REVIEW

Many studies have been conducted on this aspect abroad and assured of small corporate board size for efficient communication and coordination ([Guest, 2009](#)). The worsening situation of larger boards due to lack of proper communication and coordination indeed affects the board's effectiveness and firm performance ([Jensen & Ruback, 1983](#); [Eisenberg et. al., 1998](#)). Moreover, many studies have shown that board size and characteristics are negatively associated with firm performance ([Cheng, 2008](#)). Most of the studies do not find a significant positive association between corporate governance and firm performance in the U.S., however, it is also believed that the significance is subjected to the different cultures prevailing country-wise ([Iwu-Egwuonwu & Chibuike, 2010](#)). Some of the studies also show that board size, the proportion of insiders and outsiders, etc have a strong and significant impact on firm performance ([Yermack, 1996](#)). Further ([Jackling & Johl, 2009](#)) reported that a powerful Chief Executive Officer (CEO duality issue) didn't have a detrimental effect on the firm performance and outside directors are also negatively associated with firm performance in response to various multiple appointments (director busyness). Considering the earlier studies, the following dimensions of board characteristics have been identified in relation to the firm performance and are discussed separately.

a. Board Size

Many studies have reported a negative association between board size and firm performance. For instance ([Mak & Kusnadi, 2005](#); [Kumar & Singh, 2013](#); [O'Connell & Cramer, 2010](#)) reported that board size has a negative relationship with firm performance. On the other hand, only a few studies have shown a positive association between board size and firm performance ([Yermack, 1996](#); [Jackling & Johl, 2009](#)). In an attempt to study the relationship between board size and firm performance, larger

boards tend to affect the firm performance and there is a decreasing trend of board size for the better performance of the firm as it is difficult and expensive for the management and the firm. This has been supported by many studies for instance ([Cheng et. al., 2008](#)) found a significant association between small board size and firm performance. Using a sample of 169 South Africa-listed firms from 2002 to 2011, it was found that board size has a positive association with firm performance as proxied by Tobin's Q. The results are robust as observed by various econometric models that control for different types of endogeneity including spontaneity as well as firm-level fixed effects model as well as different types of accounting and market-based firm-level measures ([Ntim et. al., 2015](#); [Sarhan et al., 2019](#)). This positive association is in consideration with the different ethnic as well as weak corporate governance regulations in South Africa. The results acknowledge the need to ensure empowerment of directors on the board, ethnic and demographic consideration should be one of the top priorities, and the qualifications and experience of directors should be enlarged and promoted to a higher level. In addition to this ([Zhou et. al., 2018](#)) have found a significant positive relationship between larger board size and firm performance. ([Saibaba & Ansari, 2012](#)) other studies also reported a positive impact of large board size on the firm performance. However, ([Guest, 2009](#)) in contrast to this, other studies reported a negative association between board size and firm performance and showed that the results are strongest for larger-size firms. Considering the Indian scenario, [Kotak Committee Report](#) (5th October 2017) states that for India also the board should not comprise less than 6 directors. This board size limit is also applicable in the context of the United Kingdom as suggested a board size of less than 10 in previous studies ([Guest, 2009](#)). These mixed results led to the development of our first hypotheses regarding the board size:

H₀₁: Board Size does not have a significant impact on the firm performance.

b. Board Meeting Frequency

The number of board meetings is negatively associated with firm value as the increment in board activity declines share prices ([Vafeas, 1999](#)). Board meeting frequencies have an adverse effect on firm performance in the case of Malaysian listed firms ([Johl et. al., 2015](#)). Similar negative relationships have been found between board meeting frequency and firm performance in other studies as well. On the other hand, very few studies have suggested the positive impact of board meeting frequency on firm performance. For instance, ([Ntim & Osei, 2011](#)) reported that the frequency of board meetings is found to have a significant and positive impact on firm performance. Board meeting frequency's influence on the firm performance led to the development of our next hypothesis:

H02: Board Meeting Frequency does not have a significant impact on the firm performance.

c. Percentage of Grey, Independent and Non-Independent Directors

Cho & Kim (2007) showed that the contribution of outside directors and shareholder ownership is insignificant in relation to the firm performance. Larger board independence does not necessarily improve firm performance in the long run (Bhagat & Black, 2001). Similarly, the share of independent directors is found to have an insignificant relationship with firm performance due lack of institutional reforms in Indonesia (Prabowo & Simpson, 2011). It is also seen that percentage of grey directors is found to have a marginal deteriorated effect on the firm performance while the percentage of independent directors has an insignificant effect on firm performance (Kumar & Singh, 2012). Hence, percentages of grey, independent, and non-independent directors have a deteriorated effect on firm performance and in many cases remain insignificant to the firm performance. However, in another similar study conducted on a sample of 169 publicly listed organizations from 2002 to 2007 in South Africa, it has been observed that enhancing ethnic and gender diversity within organizational boards improves their independence and monitoring power and in turn increases the overall market valuation of the firms (Ntim, 2015). In another observation drawn from five Middle Eastern countries (Egypt, Jordan, Oman, Saudi Arabia and United Arab of Emirates) with a sample including a balanced panel of 600 firm-year observations consisting of 100 individual firms, the impact of corporate board diversity on corporate performance and executive pay reveals that director's gender, ethnicity and nationality has a positive impact on the corporate performance and enhances the pay for performance sensitivity but not the actual pay (Sarhan et. al., 2019). It is also observed that the relationship between board diversity and corporate performance is stronger between better-governed firms as compared to their poorly governed counterparts. Board diversity on the basis of gender, nationality, age, tenure, experience, education, ethnicity and religion should be sustainable and this is not observed especially in financial firms due to scholarly limitations (Khatib et. al., 2021a; Khatib et. al., 2021b; Amosh & Khatib, 2021). Hence, suggestions from earlier studies led to the development of our next subsequent hypotheses respectively.

H03: The percentage of grey directors does not have a significant impact on the firm performance.

H04: The percentage of independent non-executive directors does not have a significant impact on the firm performance.

H05: The percentage of non-independent executive directors does not have a significant impact on the firm performance.

d. Ownership Concentration

The effect of ownership concentration on firm performance is found to be positively significant and the study suggests that the critical ownership of about 40% is beneficial for the firm ([Kumar & Singh, 2013](#)). The effect of ownership concentration comes out to be a positive as well as a negative relationship with a firm performance at a different level of equity acquired by managers ([Haldar & Rao, 2011](#)). In Asia, concentrated ownership and firm performance show a small but significant positive relationship ([Heugens & Essen, 2009](#)). After the adjustment of heterogeneity effects, ownership concentration shows a negative relation with firm performance across different countries ([Wang & Shailer, 2015](#)). However, in China, it has been seen that ownership concentration is a strong factor in firm performance ([Wang et. al., 2012](#)). In Russia, ownership concentration follows a U-shaped curve in relation to firm performance, as it is positive for labour productivity and negative for Tobin's Q ([Kuznetsov & Muravyev, 2001](#)). Moreover, in addition to this, some studies show no significant relationship between ownership concentration and firm performance ([Sánchez-Ballesta & García-Meca, 2007](#)). Therefore, ownership concentration has a mixed effect on firm performance that is positive as well as negative also and hence it is necessary to examine its impact on the firm performance in the Indian context as well. However, we have considered the Promoters in general and have not classified them as Indian, Foreign or Corporate bodies due to the limited scope of the study. Board diversity in response to pay-out policy, cash holding, initial public offering, etc. could be further examined as constructs providing opportunities for future research directions ([Khatib et. al., 2021b](#)). Our next hypothesis is as follows:

H₀₆: The percentage of shares held by the Promoters out of the Total Shares does not have a significant impact on the firm performance.

e. Shares pledged

Pledging of shares has been used by the Promoters as a means to use shares as collateral to fulfil their financial requirements. The financial requirements of the promoters could be used to secure loans, meet working capital requirements, and personal needs or fund other ventures and acquisitions. This practice is usually common in the majority of companies and is carried out at a large scale relating to fraudulent practices. However, few studies reported a positive impact of shares pledged on the firm performance, for instance in Shanghai, China ([Li et. al., 2019](#)). In contrast to this, many studies from Taiwan, and China reported a negative impact of shares pledged on the firm performance ([Kao & Chen, 2007](#); [Chen & Hu, 2007](#); [Ouyang et. al., 2019](#)). Mixed results from earlier studies again suggest further hypothesis for Shares Pledged by the Promoters out of the Total Shares which is as follows:

H07: Percentage of Shares Pledged by the Promoters does not have a significant impact on the firm performance.

3. DATA AND METHODOLOGY

Nifty 500 Index is the sample chosen for our research purpose as it covers most of the market capitalization that is it represents about 96.1% of the free float market capitalization of the stocks listed on NSE as of 29th March 2019. The period of the study chosen is from 2012-2018, due to the amendments in the Companies Act 1956 in the form of the Companies Act 2013. Data is collected through the Prowess IQ Database provided by CMIE (Centre for Monitoring Indian Economy). Out of 500 firms in NSE 500 Index financial services and banking services firms have opted out due to the difference in laws governing them and central and state government firms have been left as there is a separate mechanism for these in respect to the social obligations and regulations influencing them ([Haldar & Rao, 2011](#)). Therefore, out of 500 firms, the final sample comprises 348 firms which were classified into the manufacturing and services sectors.

In this study, our focus will be on board characteristics and ownership concentration. Board characteristics involve certain parameters such as board size (BS) ([Barnhart et. al., 1994](#)), board meetings frequency (BMF) ([Vafeas, 1999](#)), percentage of independent non-executive directors (PINED) ([Barnhart et. al., 1994](#)), percentage of non-independent executive directors (PNIED) ([Barnhart et. al., 1994](#)), percentage of grey directors (PGD) ([Sarkar, 2009](#)) and in ownership concentration we took the percentage of promoter ownership out of total shares (PTSPTS) ([Barnhart et. al., 1994](#)) and percentage of shares pledged by promoters (PSPP) ([Li et. al., 2019](#)). Advertising/ Total sales (percentage form) (A/TS), Research and development expenses/ Total Sales (percentage form) (R &D/TS) ([Guest, 2009](#)), organizational age (OA) ([Guest, 2009](#)), market capitalization (MC) ([Guest, 2009](#)), sales growth (Current year- preceding year) (percentage form) (SG) are the other controlling variables. Performance variables include Tobin's Q ratio ([Jackling & Johl, 2009](#); [Guest, 2009](#)) as suggested by most of the studies, ROA (Return on assets) ([Guest, 2009](#)) and ROE (Return on Equity). We also introduce dummies for CEO duality (1-Yes and 0-No) and market capitalization. This is done according to the earlier studies conducted for corporate governance in MENA (the Middle East and North Africa, including 21 countries as per World Bank) region including board characteristics (board size and unitary board leadership) and shareholding structure mechanisms and the controlling variables including firm's market capitalization, sales growth, age and dummies for industrial

classification, CEO (Chief Executive Officer) Duality and Market Capitalization (Sarhan et. al., 2019). For Market Capitalization dummies (MCD) we divided the market cap into three percentile ranges (0-33.33, 33.33-66.67, 66.67-100) and allocated three dummies MCD1 (0-33.33, 1-Yes if a firm lies in the range otherwise 0-No), MCD2 (33.33-66.67, 1-Yes if a firm lies in the range otherwise 0-No), and MCD3 (66.67-100, 1-Yes if a firm lies in the range otherwise 0-No) respectively. We regressed these dummies along with the variables and this is shown in the later part of the paper.

Table 1: Variable Description

Variable	Variable Description
Firm performance variables	
Tobin's Q	$\text{Tobin's Q} = \frac{\text{Equity Market Value (Market Cap)}}{\text{Book Value of Equity (Book value per share * No. of outstanding shares)}} * 100$
ROA	Return on assets (Obtained from Prowess IQ.)
ROE	Return on equity (Obtained from Prowess IQ.)
Board characteristics	
BMF	Board meeting frequency
BS	Board size
PGD	Percentage of grey directors
PINED	Percentage of independent non-executive directors
PNIED	Percentage of non-independent executive directors
Ownership concentration	
PSPP	Percentage of shares pledged by the promoters
PTSPTS	Percentage of total shares held by the promoters out of total shares
Controlling variables	
OA	Organizational age (Present year- Year of incorporation of the firm.)
MC	Market capitalization
A/TS	Advertising expenses/Total sales*100
R&D/TS	Research and development expenses/ total sales*100
SG	$\text{Sales growth} = \frac{\text{Sales growth in the current year} - \text{Sales growth in the previous year}}{\text{Sales growth in the previous year}} * 100$

Table 1 made by the authors is based on the review of earlier studies and data available from the NSE 500 Index included in the Prowess IQ database and clearly shows the description of the various variables taken in our study. Tobin's Q, A/TS, OA, PGD, PINED, PNIED, PSPP, PTSPTS, R&D/TS and SG are the calculated variables in our study. ROA, ROE, BS, and MC are directly obtained from Prowess IQ Database. PGD, PINED and PNIED are calculated out of the total board size in the company. The various data tabulated above were obtained from the Prowess IQ Database for the period 2012-2018. The data was chosen for this period because of the revision of the Companies Act 1956 in the form of the Companies Act 2013 and more rules and regulations were designed for the board structure and processes. The panel was constructed in order to determine the properties of longitudinal data. The data is winsorized at the 1st and the 99th percentile to eliminate the outliers.

Table 2: Descriptive statistics for the variables used in the study

Variable	Mean	Median	Max.	Mini.	Std.Dev.	Skewness	Kurtosis	Obs.
Tobin's Q (ratio)	4.86	3.18	229.60	0.16	8.25	13.98	319.96	1937
ROA (ratio)	7.45	6.52	56.88	-142.70	9.56	-3.29	51.94	2218
ROE (ratio)	15.85	14.98	3818.01	-1109.1	89.59	33.81	1501.29	2183
A/TS (%)	1.82	0.68	28.20	0.00	3.02	3.47	19.91	1076
BMF (no.)	5.88	5	20	0	2.11	1.81	7.82	2006
BS (no.)	11.84	11	31	2	3.18	0.80	4.63	2029
OA (years)	34.41	28	116	0	23.67	1.05	3.65	2386
MC (Rs million)	185557	44880	5833473	232	470586	6.05	50.34	1772
PGD (%)	26.86	25	100	0	16.86	1.01	5.07	2029
PINED (%)	45.60	45.80	85.71	0	11.73	-0.70	5.52	2026
PNIED (%)	27.70	27.27	83.33	0	14.01	0.19	2.61	2029
PSPP (%)	25.36	14.67	100	0	27.25	1.22	3.56	670
PTSPTS (%)	54.88	54.75	90	8.20	15.23	-0.32	2.45	2084
R&D/TS (%)	2.08	0.34	341.46	0	12.23	23.33	630.96	947
SG (%)	2261.45	11.21	2335783	-99.99	59515.95	34.26	1241.25	2201

Table 2 is made based on the data of the NSE 500 Index from Prowess IQ shows the descriptive statistics for various variables used in the study. Board size has a minimum number of 2 and a maximum of 31 which is a diverse range. Organizational age is in years which depicts the present age of the organization from the year of incorporation. The market cap is in million (INR). A/TS, PGD, PINED, PNIED, PSPP, PTSPTS, R&D/TS and SG are in percentage form and Tobin's Q, ROA and ROE are the ratios.

Table 3 calculated by the authors based on the data obtained from NSE 500 Index Prowess IQ shows that all the correlations are within the acceptable range of 0.01-0.775 (Kumar & Singh, 2013) with the highest correlation between the PGD and PNIED (-0.73). BS is found to be positively correlated with firm size (MC) which shows that the larger the market cap is larger will be the board size. BS is also found to be positively correlated with PGD and negatively correlated with PINED and PNIED which shows that as the board size increases the number of grey directors tends to increase while the number of independent and executive directors tends to decrease. PTSPTS is found to be negatively correlated in the case of PGD and PINED whereas positively correlated in the case of PNIED. It implies that as the percentage of executive directors increases in the firm, the shareholdings of the promoter also increase. PSPP is also found to be negatively correlated with firm size (MC) and firm age (OA) in our study indicating that the larger the market capitalization and organizational age, the percentage of shares pledged by promoters decreases which is beneficial for the firm as it implies that fewer shareholdings are used as collateral to obtain loans and other financial requirements.

Table 3: Pearson Correlation matrix for the explanatory variables

Correlation	A/TS	BMF	BS	MC	OA	PGD	PINED	PNIED	PSPP	PTSPTS	R&D/TS	SG
A/TS	1.00 (--)											
BMF	-0.03 (0.721)	1.00 (--)										
BS	0.16 (0.059)	0.04 (0.674)	1.00 (--)									
MC	0.03 (0.707)	0.08 (0.348)	0.51 (0.000)	1.00 (--)								
OA	-0.03 (0.739)	0.04 (0.642)	0.02 (0.820)	-0.06 (0.444)	1.00 (--)							
PGD	-0.02 (0.810)	0.11 (0.196)	0.20 (0.016)	0.16 (0.057)	0.11 (0.173)	1.00 (--)						
PINED	-0.14 (0.087)	-0.04 (0.644)	-0.04 (0.605)	0.03 (0.730)	0.09 (0.291)	-0.36 (0.000)	1.00 (--)					
PNIED	0.15 (0.080)	-0.06 (0.464)	-0.21 (0.010)	-0.23 (0.005)	-0.17 (0.043)	-0.73 (0.000)	-0.28 (0.000)	1.00 (--)				
PSPP	-0.03 (0.728)	-0.03 (0.738)	-0.17 (0.040)	-0.25 (0.003)	-0.18 (0.031)	0.01 (0.868)	0.042 (0.615)	-0.06 (0.458)	1.00 (--)			
PTSPTS	0.39 (0.000)	-0.09 (0.292)	-0.05 (0.563)	-0.07 (0.422)	-0.13 (0.108)	-0.17 (0.046)	-0.29 (0.000)	0.42 (0.000)	-0.16 (0.052)	1.00 (--)		
R&D/TS	-0.09 (0.305)	-0.01 (0.949)	-0.13 (0.116)	0.08 (0.316)	-0.04 (0.637)	-0.23 (0.005)	-0.03 (0.717)	0.26 (0.001)	-0.10 (0.220)	0.22 (0.007)	1.00 (--)	
SG	-0.05 (0.517)	-0.05 (0.569)	0.08 (0.351)	0.16 (0.054)	-0.16 (0.052)	0.01 (0.939)	0.08 (0.373)	-0.07 (0.440)	0.04 (0.669)	-0.01 (0.915)	-0.02 (0.817)	1.00 (--)

(Note: Pearson Correlation Matrix shows the probabilities in the brackets above and is held for 1%, 5% and 10% confidence intervals respectively.)

Table 3 demonstrates that all the correlations are within the acceptable range of 0.01-0.775 (Kumar & Singh, 2013) with the highest correlation between the PGD and PNIED (-0.73). BS is found to be positively correlated with firm size (MC) which shows that the larger the market cap is larger will be the board size. BS is also found to be positively correlated with PGD and negatively correlated with PINED and PNIED which shows that as the board size increases the number of grey directors tends to increase while the number of independent and executive directors tends to decrease. PTSPTS is found to be negatively correlated in the case of PGD and PINED whereas positively correlated in the case of PNIED. It implies that as the percentage of executive directors increases in the firm, the shareholdings of the promoter also increase. PSPP is also found to be negatively correlated with firm size (MC) and firm age (OA) in our study indicating that the larger the market capitalization and organizational age, the percentage of shares pledged by promoters decreases which is beneficial for the firm as it implies that fewer shareholdings are used as collateral to obtain loans and other financial requirements.

4. EMPIRICAL RESULTS

4.1.Fixed Effects Model estimation

A regression of the following form and its nested versions are estimated:

$$Tobin's Q_{it} = \alpha + \beta_1 * A/TS_{it} + \beta_2 * BMF_{it} + \beta_3 * BS_{it} + \beta_4 * LogOA_{it} + \beta_5 * PGD_{it} + \beta_6 * PNIED_{it} + \beta_7 * PINED_{it} + \beta_8 * PSPP_{it} + \beta_9 * PTSPTS_{it} + \beta_{10} * R\&D/TS_{it} + \beta_{11} * SG_{it} + CEO Duality dummy + Size (Market cap) dummy + \varepsilon \text{ (error term)}. \quad \text{----- (1)}$$

Table 4: OLS Fixed Effect estimates of board characteristics on firm performance measured by Tobin's Q

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
BS	0.25 (0.015) (2.44)							0.54 (0.009) (2.67)
BMF		0.08 (0.244) (1.16)						-0.19 (0.217) (-1.24)
PGD			-0.02 (0.167) (-1.38)					-0.01 (0.725) (-0.35)
PINED				0.01 (0.478) (0.71)				-0.04 (0.372) (-0.89)
PNIED					0.02 (0.272) (1.09)			0.09 (0.179) (1.35)
PTSPTS						0.30 (0.000) (6.94)		0.12 (0.090) (1.71)
PSPP							-0.13 (0.000) (-6.07)	-0.10 (0.000) (-3.69)
A/TS	0.01 (0.899) (0.13)	-0.01 (0.973) (-0.03)	0.01 (0.875) (0.16)	0.00 (0.951) (0.06)	0.03 (0.775) (0.29)	0.02 (0.831) (0.21)	0.08 (0.554) (0.59)	0.17 (0.280) (1.09)
LogOA	4.28 (0.148) (1.45)	6.05 (0.039) (2.07)	5.21 (0.076) (1.77)	6.09 (0.036) (2.09)	4.89 (0.107) (1.61)	4.63 (0.109) (1.60)	16.34 (0.080) (1.77)	0.23 (0.982) (0.02)
R&D/TS	0.00 (0.987) (-0.02)	0.01 (0.956) (0.05)	0.00 (0.883) (0.15)	0.01 (0.975) (0.25)	-0.00 (0.975) (-0.03)	0.00 (0.972) (0.03)	0.33 (0.138) (1.49)	0.25 (0.300) (1.04)
SG	0.00 (0.867) (-0.17)	0.00 (0.960) (-7.19)	0.00 (0.946) (-0.06)	0.00 (0.932) (-0.08)	0.00 (0.922) (-0.09)	0.00 (0.792) (0.26)	0.00 (0.687) (0.40)	0.00 (0.817) (-0.23)
Intercept	-2.09 (0.651) (-0.45)	-1.94 (0.680) (-0.41)	0.27 (0.955) (0.06)	-2.21 (0.647) (-0.46)	-0.35 (0.940) (-0.07)	-15.07 (0.002) (-3.00)	-17.36 (0.237) (-1.18)	-4.88 (0.760) (-0.31)
CEO Duality Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0.77	0.76	0.76	0.76	0.76	0.79	0.74	0.76

(Note: The probabilities are shown in the brackets above and held for 1%, 5% and 10% confidence intervals respectively.)

Our study follows the approach of (Wintoki et al., 2012; Guest, 2009) in determining the regression equation for the dependent variable firm performance. Further Ordinary Least Square (OLS) Fixed Effects Model and Generalized Method of Moments (GMM) regression types were iterated with Tobin's Q to a count of 500 at a convergence level of 0.0001. In this, we also took two dummies

including CEO duality and size dummy to study whether they moderate the firm performance measured by Tobin's Q. Table 4 made by the authors and based on NSE 500 Index data from Prowess IQ shows the impact of board characteristics on firm performance measured by Tobin's Q. In this we have used log (base 10) of organizational age to make the data more symmetric.

After the OLS estimation Fixed or Random effects testing was carried out in which the regression equation was tested with Random Effects. Hausman test specification showing the cross-section random effects were found to be significant. Therefore, we preferred the Fixed Effect Model. The results in Table 4 show that board size, percentage of shares pledged, and percentage of shares held by the promoters were found to be significant in association with firm performance measured by Tobin's Q and the rest of the variables were found to be insignificant in relation to firm performance. This has been seen in earlier studies that board size is found to be significant ([Zhou et. al., 2018](#)) and the percentage of shares pledged was also found to be significant ([Li et. al., 2019](#)). The percentage of shares held by the promoters is also found to be positively significant which is in accordance with the earlier results ([Kumar & Singh, 2013](#)).

4.2.GMM estimation

It was suggested by the earlier researchers that the estimation of the Fixed effects is similar to the generalized method of moments (GMM) estimates, but we performed GMM lagged estimates which gave a different result in reference to prior studies. ([Guest, 2009](#)) also accounted for endogeneity concerns as well as heteroskedasticity and heterogeneity in the dynamic panel data model by the GMM method of regression. Endogeneity concerns occur in the event of dynamic panel data modelling and must be resolved in an appropriate manner ([Wintoki et. al., 2012](#)). ([Wooldridge, 2001](#); [Guest, 2009](#)) defined the application of the GMM estimator in order to account for unobserved heterogeneity, and simultaneous and dynamic endogeneity by observing the past and present effects and not the future ones. Mostly a mixed relation between board characteristics and firm performance has been seen overall in different regions. Similarly mixed results have been observed in India, but these can't be generalized for all as different sectors such as the banking sector involve different measures in measuring governance and firm performance. Hence, the results obtained appear to be industry specific.

Equation (2) shows the GMM estimates of board characteristics on firm performance measured by Tobin's Q, ROA and ROE.

$$Tobin's Q_{it} = Tobin's Q_{it-1} + Tobin's Q_{it-2} + \beta_1*BS_{it} + \beta_2*BMF_{it} + \beta_3*PGD_{it} + \beta_4*PNIED_{it} + \beta_5*PINED_{it} + \beta_6*PSPP_{it} + \beta_7*PTSPTS_{it} + \varepsilon \quad \text{----- (2)}$$

In this approach, the independent variables were BS, BMF, PGD, PINED, PNIED, PTSPTS and PSPP. The instrumental variables were A/TS, R&D/TS, LogOA, SG, LogMC and BS. In general panel data suffers from heterogeneity and endogeneity effects. Therefore, we performed the GMM estimation technique for determining the impact of board characteristics on firm performance. The various controlling variables were chosen as instruments in determining the lagged effect on Tobin's Q with lags up to 2 levels (as this was found to be significant) with Sargan p value=0.421 (insignificant) and the second order serial correlation (Arellano-Bond estimator) p value=0.517 (insignificant) showing that the effects of unobserved heterogeneity and endogeneity are absent (Guest, 2009). Similarly, was observed with ROA and ROE. Therefore, the simultaneous and dynamic endogeneity and heterogeneity were considered by the GMM approach. The results are shown in Table 5 made by the authors and are based on the panel data of the NSE 500 Index from Prowess IQ taken for the study.

Table 5: GMM estimates of board characteristics on firm performance

Variables	GMM (Tobin's Q) (Probability) (t-statistic)	GMM (ROA) (Probability)(t-statistic)	GMM (ROE) (Probability)(t-statistic)
BS	0.33 (0.034) (2.17)	0.15 (0.555) (0.59)	-6.44 (0.028) (-4.28)
BMF	-0.61 (0.060) (-1.92)	-0.46 (0.293) (-1.06)	2.86 (0.167) (0.56)
PGD	0.03 (0.656) (0.45)	0.00 (0.097) (-0.03)	-1.86 (0.253) (-0.84)
PINED	-0.04 (0.291) (-1.06)	-0.13 (0.316) (-1.01)	-2.25 (0.191) (-1.65)
PNIED	0.10 (0.288) (1.07)	0.18 (0.126) (1.55)	-1.52 (0.338) (-0.56)
PTSPTS	0.46 (0.073) (1.82)	-0.38 (0.066) (-1.87)	2.98 (0.467) (0.84)
PSPP	-0.21 (0.000) (-7.50)	-0.15 (0.082) (-1.77)	0.01 (0.990) (-4.32)
Lagged (-1)	-0.35 (0.006) (-2.85)	0.48 (0.057) (1.94)	1.48 (0.030) (-0.42)
Lagged (-2)	0.28 (0.017) (2.46)	-2.80 (0.007) (-2.80)	-0.31 (0.003) (-1.18)
Sargan (P-value)	0.421	0.074	0.227
Serial Correlation (P-value)	0.517	0.339	0.279
J-Statistics	7.08	12.92	9.37

(Note: The probabilities are shown in the brackets above and held for 1%, 5% and 10% confidence intervals respectively.)

It was found that with Tobin's Q as the firm performance variable board size, percentage of shares held by the Promoters out of the total shares, board meeting frequency and percentage of shares pledged by the promoters were found to be significant while the rest of the variables were found to be

insignificant. Board size is found to be positively significant as was seen in Fixed Effects Model. The significance of board size clearly depicts that board size plays a crucial role in the Indian context for proper communication and coordination in contrast to previous studies conducted outside the country (Guest, 2009). Board meeting frequency is found to have a negative significant impact on the firm performance as the range is from 0-20 with a mean of 5, though indicating close to industry norms of 4 but not productive. The percentage of shares held by the Promoters out of the total shares is also found to have a positive impact on the firm performance while the percentage of shares pledged by the Promoters was found to negatively associate with firm performance as shares pledged by the Promoters would increase the risk for the firm in terms of collateral loans but in contrast, this was found to be positively associated with firm performance in China (Li et. al., 2019). In the case of ROA percentage of grey directors, percentage of the total shares held by the Promoters out of the total shares and percentage of shares pledged by the Promoters were found to be negatively significant indicating whereas in the case of ROE only board size was found to be negatively significant which supports the results obtained by Tobin’s Q and ROA. The hypotheses in Table 6 are based on the panel data constructed for NSE 500 Index.

Table 6: Hypotheses (Support/ Reject) table for board characteristics

Hypotheses	OLS (FEM)	GMM (Tobin’s Q)	GMM (ROA)	GMM (ROE)
H01: Board Size does not have a significant impact on the firm performance.	Rejected	Rejected	Supported	Rejected
H02: Board meeting frequency does not have a significant impact on the firm performance.	Supported	Rejected	Supported	Supported
H03: Percentage of grey directors does not have a significant impact on the firm performance.	Supported	Supported	Rejected	Supported
H04: Percentage of independent non-executive directors do not have a significant impact on the firm performance.	Supported	Supported	Supported	Supported
H05: Percentage of non-independent executive directors do not have a significant impact on the firm performance.	Supported	Supported	Supported	Supported
H06: Percentage of Shares held by the Promoters out of the Total Shares does not have a significant impact on the firm performance.	Rejected	Rejected	Rejected	Rejected
H07: Percentage of shares pledged by the Promoters does not have a significant impact on the firm performance.	Rejected	Rejected	Rejected	Rejected

Table 6 considers the impact of board characteristics on the firm performance using both OLS FEM and GMM regression techniques and is presented below.

4.3. Interaction effect with firm size dummy

Further, the interaction effects of board size, percentage of shares pledged, and percentage of shares held by the promoters were determined with the firm's market capitalization dummy because the rest of the variables including board meeting frequency, percentage of grey directors, independent non-executive as well as non-independent executive directors were found to be insignificant with the market capitalization dummy in the interaction effects regression carried out. In a similar study considering United Kingdom premium leagues including profit and non-profit organizations, it is also observed that larger boards exhibit more non-financial performance as compared to financial performance which is insignificant ([Malagila et. al., 2021](#)). The hypothesis for the above interaction effects is stated below and the hypotheses support/reject is provided in Table 8:

H₀₈: The interaction effects of board size with market capitalization dummies don't have a significant impact on the firm performance.

H₀₉: The interaction effects of the percentage of shares pledged by the promoters with market capitalization dummies don't have a significant impact on the firm performance.

H₁₀: The interaction effects of the percentage of shares held by the promoters out of the total shares with market capitalization dummies don't have a significant impact on the firm performance.

Equation (3) shows the relationship of the interaction effects:

$$\text{Tobin's } Q_{it} = \alpha + \beta (\text{Variable} * \text{Firm Size Dummy}) + \varepsilon \text{--- (3)}$$

Where Variable= BS-board size, PSPP-percentage of shares pledged by the promoters and PTSPTS-percentage of shares held by the promoters.

Firm size dummy= MCD1-small cap firms, MCD2- mid cap firms and MCD3-large cap firms.

Table 7 made by the authors considering the interaction effects of variables is based on the panel data of the NSE 500 Index from Prowess IQ and shows that all the variables are found to be significant except PTSPTS with MCD2. As compared to earlier results since board size is overall positively related to firm performance measured by Tobin's Q, here interaction term yields that board size is negatively associated for small and mid-cap firms whereas positively associated with large-cap firms. Similar is the case with the percentage of shares pledged by the promoters. The percentage of shares held by the promoters is found to be negatively significant with small-cap firms but positively significant with large-cap firms.

Table 7: Interaction of variables with size dummy

Interaction term	Coefficient (Probability)(t-statistic)
BS*MCD1	-0.26 (0.000) (-10.89)
BS*MCD2	-0.03 (0.003) (-2.97)
BS*MCD3	0.07 (0.000) (11.99)
PSPP*MCD1	-0.05 (0.000) (-3.40)
PSPP*MCD2	-0.02 (0.003) (-3.01)
PSPP*MCD3	0.03 (0.000) (5.04)
PTSPTS*MCD1	-0.05 (0.000) (-10.14)
PTSPTS*MCD2	-0.01 (0.127) (-1.52)
PTSPTS*MCD3	0.02 (0.000) (15.72)

(Note: The probabilities are shown in the brackets above and held for 1%, 5% and 10% confidence intervals respectively.)

The negative impact of board size on firm performance is particularly significant for small and mid-cap firms. As seen from the percentage of shares pledged by the promoters, the market penalizes small and mid-cap stocks if their promoters pledge their holdings. Higher promoter holdings increase for large-cap firms but decrease for small-cap firms. Moreover, the percentage of shares pledged by promoters has a detrimental effect overall but not in the case of large-cap firms as observed in previous studies ([Li et. al., 2019](#)). In the case of large-cap firm’s percentage of shares held by the promoters also has a significant positive impact which is also seen in earlier studies ([Kumar & Singh, 2013](#)). Table 8 made by the authors is the hypotheses table for the interaction effects of board characteristics with market capitalization classified into small-cap, mid-cap, and large-cap stocks.

Table 8: Hypotheses table for interaction effects of board characteristics with market capitalization.

Hypotheses (Support/Reject)	Small-Cap	Mid-Cap	Large-Cap
H ₀₈ : The interaction effects of board size with market capitalization dummies don’t have a significant impact on the firm performance.	Rejected	Rejected	Rejected
H ₀₉ : The interaction effects of the percentage of shares pledged by the promoters with market capitalization dummies don’t have a significant impact on the firm performance.	Rejected	Rejected	Rejected
H ₁₀ : The interaction effects of the percentage of shares held by the promoters out of the total shares with market capitalization dummies don’t have a significant impact on the firm performance.	Rejected	Supported	Rejected

4.4. Ideal board size

Further examining in Table 9, the question arises as to what would be the ideal board size and for that purpose, we created dummies for board sizes ranging from 5 to 25. Previous studies suggest

an optimal board size of 10 or below (Guest, 2009). Equation (4) represents the determination of ideal board size from market cap dummies.

$$Tobin's Q_{it} = \alpha + \beta @ expand (board\ size\ dummy, market\ cap\ dummy) \text{ ----- (4)}$$

Where board size dummy=dummy for different board sizes from 5-25 and market cap dummy=mcd1, mcd2 and mcd3.

Table 9: Ideal board size

Variable (Interaction term)	Tobin's Q(MCD1) (Probability)(t-statistic)	Tobin's Q(MCD2) (Probability) (t-statistic)	Tobin's Q(MCD3) (Probability) (t-statistic)
Board Size 7	-2.78 (0.005) (-2.80)	0.08 (0.967) (0.97)	3.10 (0.031) (2.15)
Board Size 8	-3.01 (0.000) (-4.20)	2.06 (0.030) (2.17)	7.03 (0.000) (6.02)
Board Size 9	-2.96 (0.000) (-4.51)	-0.76 (0.370) (-0.89)	4.23 (0.000) (4.68)
Board Size 10	-3.10 (0.000) (-4.72)	-0.39 (0.547) (-0.60)	6.09 (0.000) (7.21)
Board Size 11	-2.77 (0.000) (-5.19)	-0.67 (-0.190) (-1.19)	7.65 (0.000) (9.43)
Board Size 12	-3.15 (0.000) (-4.79)	-1.09 (0.109) (-1.60)	2.55 (0.000) (3.79)
Board Size 13	-3.48 (0.000) (-4.50)	-0.97 (0.132) (-1.50)	3.15 (0.006) (4.87)
Board Size 14	-3.08 (0.000) (-3.62)	-0.77 (0.350) (-0.93)	3.87 (0.000) (6.07)
Board Size 15	-4.23 (0.005) (-2.76)	-1.31 (0.192) (0.19)	3.12 (0.000) (4.53)
Board Size 16	-4.00 (0.023) (-2.26)	-1.79 (0.179) (-1.34)	1.49 (0.034) (2.11)
Board Size 17	-3.53 (0.045) (-1.99)	-2.04 (0.962) (0.13)	3.70 (0.003) (3.87)
Board Size 18	-3.51 (0.079) (-1.75)	-0.10 (0.962) (0.96)	3.71 (0.003) (2.92)
Board Size 19	-	-	2.65 (0.056) (1.91)

(Note: The probabilities are shown in the brackets above and held for 1%, 5% and 10% confidence intervals respectively.)

In this study out of the dummies created dummies below 7 and above 19 were found to be insignificant and the values were found to be significant between 7 and 19 including them. We further performed OLS with the interaction effect of these dummies with the market capitalization dummies and found that the small-cap firms have board sizes in the range of 7-17 which is negatively significant. Mid-cap firms have only a positive significant board size of 8 and for large-cap firms, board size lies in the range of 7-18 and is positively significant. This clearly shows that in the case of large firm board size plays a crucial role and we classified board size for the market cap in terms of small, mid, and large-cap firms so as to differentiate between the different segments of sizes. Hence, the ideal board size for mid-cap firms comes out to be 8 and for large-cap firms comes out to be in the range of 7-18

in respect of market capitalization whereas for small-cap firms there is no ideal board size as the results are negatively significant and the results may vary too in case of different industrial sectors.

5. CONCLUSION

This study examined the impact of board characteristics on the firm performance measured by Tobin's Q, ROA, and ROE in presence of the controlling variables. OLS Fixed Effects Model and GMM regression techniques were carried out in estimating the relationship of board characteristics with firm performance. In section 4.1 we determined the impact of board characteristics on the firm performance using the OLS Fixed Effects Model. Board size and percentage of shares held by the promoters have a positive significance on the firm performance as observed in previous studies ([Ntim et. al., 2015](#); [Sarhan et al., 2019](#); [Zhou et. al., 2018](#); [Saibaba & Ansari, 2012](#)) while this contrasts with most of the earlier studies acknowledged ([Mak & Kusnadi, 2005](#); [Kumar & Singh, 2013](#); [O'Connell & Cramer, 2010](#); [Cheng et. al., 2008](#); [Guest, 2009](#)). Moreover, the percentage of shares pledged by the promoters has a negative significant impact on the firm performance and supports earlier studies ([Kao & Chen, 2007](#); [Chen & Hu, 2007](#); [Ouyang et. al., 2019](#)). The other variables didn't have a significant impact on the firm performance including board meeting frequency, percentage of non-independent executive directors, percentage of independent non-executive directors as well as the percentage of grey directors. This contrasts with the earlier studies observed ([Ntim, 2015](#); [Sarhan et. al., 2019](#)).

Secondly, GMM determines the estimates of board characteristics on firm performance. The impact of board size is again found to be positively significant on the firm performance. Board meeting frequency was found to be insignificant overall. The percentage of shares pledged by the promoters again has a negative significant impact on the firm performance as this would increase the risk to the firm. Percentage of shares held by the promoters, and percentage of grey, independent, and non-independent directors were found to be insignificant with firm performance and this impact is mainly due to the noncompliance with the board diversity demographics opting for sustainable development ([Khatib et. al., 2021a](#); [Amosh & Khatib, 2021](#)). Moreover, cognitive board diversity as measured through pay-out policy, initial public offerings, cash holding including director remuneration, etc. remains unexplored ([Khatib et. al., 2021b](#)).

Thirdly the results of the interaction effect showed that there is a positive impact of board size on firm performance, especially for large firms ([Yermack, 1996](#); [Jackling & Johl, 2009](#)) but this is in

contrast to the earlier studies ([Mak & Kusnadi, 2005](#); [Kumar & Singh, 2013](#); [O'Connell & Cramer, 2010](#); [Malagila et. al., 2021](#)). The interaction effect for the percentage of shares pledged by the promoters came out to be positively significant in the case of large-cap firms whereas negatively significant in the case of small and mid-cap firms. This implies that the market penalizes small and mid-cap firms if their promoters pledge their holdings. Similarly, interaction effects for the percentage of shares held by the promoters have a positive significance on the firm performance in the case of large-cap firms whereas a negative significant impact on the firm performance in the case of small-cap firms.

Lastly, we attempted to determine the ideal board size in the case of small, mid, and large-cap firms by creating individual board size dummies ranging from 5-25 and found the interaction effect of board size dummies with the market capitalization dummies. This analogy is done as earlier studies state that one size doesn't fit all ([Haldar & Rao, 2011](#); [Guest, 2009](#)). The impact of board size is found to be positively significant on the firm performance with a mean of 12 in our study and it shows this is prevalent in the Indian context as compared to less than 10 in other studies ([Guest, 2009](#)). The approach of one size fits all need not be applicable in all conditions but there should be a standard which could identify the situation of board size clearly for small, mid, and large-cap firms. The standard identified for board size clearly states that a board size of 8 for mid-cap firms and board size in the range of 7-18 for large-cap firms is considered to be ideal for the given sample (NSE 500) whereas no ideal board size was found for small-cap firms as the results are negatively significant in our study. Moreover, Kotak Committee Report, 2017 on corporate governance also stated that listed companies should have a minimum board size of 6 applicable to all companies but doesn't state the range for different classes of the companies i.e., small, mid, and large-cap firms.

DATA AVAILABILITY: Data is provided in the supplementary file.

AUTHORS' CONTRIBUTIONS: The research has been prepared by Naim H. with the assistance and supervision of Aziz T.

FUNDING: The authors did not receive any external funding.

CONFLICT OF INTEREST: The authors declare no conflicts of interest.

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