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Article

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Determinants of corporate financial performance relating to board characteristics of corporate governance in Indian manufacturing industry

Corporate
financial
performance

67

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An empirical study

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Abstract

Purpose – The purpose of this paper is to examine if certain board characteristics have an impact on the financial performance of manufacturing firms in India.

Design/methodology/approach – The study draws on data from 275 firms listed in NSE during from 2011 to 2015, using a multiple regression model. The present study examines the effect of board characteristics such as board size, CEO duality, independence and board activity devoted to the effectiveness of firms performance regarding market and accounting based financial performance measures.

Findings – The finding supports an inverse association between the extent of board characteristics and the firms' performance indicators. The study also finds a statistically significant negative relationship between board size and Tobins Q , ROA and ROE. The evidence also shows that the board independence and meeting frequency moderate the relationship between return on equity and return on assets by enhancing these measures among corporate governance mechanisms.

Research limitations/implications – The present study does not include all possible board characteristics, i.e., large shareholders dominance on the board and promoter's and institutional shareholding, to support firm's performance. Further research might include the ownership structure of the board to improve firm's performance.

Originality/value – The study focuses on the corporate governance issues such as size, duality, independence and activity of the boards and their influence on firm performance. The subject analyzes the possible impact of board characteristics and firm-related features that have received much attention from academic research, which has largely focused on studying the publications of corporate governance in India and Asian context.

Keywords Corporate governance, CEO duality, Board characteristics, Firms performance, Tobins Q

Paper type Research paper

Introduction

Corporate governance has become a popular discussion topic in developed and developing countries. Corporate governance comprises several elements of the structure of the government, which includes capital, labor, market and organization along with their regulatory mechanisms. The literature widely held view to contain the interests of shareholders has led to increasing worldwide attention. Today corporate governance has become a worldwide issue, and the



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development of corporate governance practices has become a prominent issue in all countries in the world. Corporate governance is a system of structures and processes to direct and control the functions of an organization by setting up rules, procedures and formats for managing decisions within an organization. It specifies the distribution of rights and responsibilities among company's stakeholders (including shareowners, directors and managers) and articulates the rules and procedures for making decisions on corporate affairs. It thus provides the structure for defining, implementing and monitoring a company's goals and objectives and ensuring accountability to appropriate stakeholders. Hence, the corporate governance issue widely debated in the developed market economies needs to be discussed in a different vein in the Indian context. India, for example, did not share the set of factors responsible for the Asian crisis, which were largely macroeconomic and related to bank failure due to unprecedented and unchecked growth (Jaiswal and Banerjee, 2010). Similarly, structural characteristics in the Indian corporate sector are quite different from that of USA and UK leading to a different set of corporate governance issues here.

Corporate governance norms in India have evolved well over the year's post-economic liberalization, with SEBI constituting a number of committees to suggest codes of conduct for good governance of corporate organizations. This was followed by the listing agreement under Clause 49 and by the voluntary guidelines of corporate governance in 2009 laid out by the Ministry of Corporate Affairs. These norms are inherently related to the legal and institutional environment in the country. The legal framework for corporate regulations by the Ministry of Corporate Affairs and vital formulation of the Companies Act 1956 and the new companies Act 2013, also with fairly functional stock exchanges and their detailed listing requirements and corporate must be ensured that globally accepted standards. India is one of the major emerging economies in the world, and the importance in the global economy has increased in recent years as the aspects of global commerce are expected to grow in the future. The Indian approach to corporate governance, accounting and auditing, however, differs in many ways from the US model (and the Chinese model). India, as well as many other developing countries, often has the form but not the substance of governance when it comes to matters of law. Strict enforcement of laws and speedy punishment of the violators are as much a part of the rule of law as the written law itself (Narayanasamy *et al.*, 2012). After Satyam scam, lot has been said and done in India related to board mechanisms. After Clause 49 implementation, it was mandatory to comply with its recommendations. The Clause 49 listing agreement of independent director for listed companies was deferred for nine months till December 31, 2005. Finally, it was implemented from January 1, 2006. In response, many companies have done shuffling at the board level. The question arises whether these changes pertaining to internal governance structures are related to firm performance measures. In the Indian context, the term corporate governance is defined more in terms of agency problem. Managers and researchers see a corporate governance problem as a conflict between management and shareholders. The limited data available so far has confirmed that among corporates, only those companies who are going global follow strict international accounting standards and policies. Presently, Indian business system is moving toward the Anglo-American model of corporate governance. The Anglo-American model gives importance to the shareholders over other stakeholders. Here, the usefulness of this model to current Indian system can always be questioned (Gugnani, 2013).

Literature review

The effect of corporate governance on firm performance is the focus of extensive analysis in majority of the previous studies (Choi *et al.*, 2007; Donaldson and Davis, 1991; Jensen, 1993). It is indispensable to realize the corporate governance in the Indian context, a detailed critique of relevant literature explained with deliberate corporate governance practices and firm performance.

Gompers *et al.* (2003) developed a governance index from a sample of 1,500 large firms using the governance rules and investment strategy. They also found that the firm with strong shareholder's rights has higher fund value and higher growth. Black (2001) found that the governance practices are strongly related to price-earnings ratio, and similar results were found by Klapper and Love (2004). Shleifer and Vishny (1997) view corporate governance as a set of mechanisms which ensure that potential providers of external capital receive a fair return on their investment, because the ownership of firms is separated from their control. It also increases the firms' responsiveness to the need of the society and results in improving long-term performance (Gregory and Simms, 1999).

CEO duality is an important issue in corporate governance because the status of the CEO and chairperson may have an influence on firm performance. There are arguments in favor of CEO duality, meaning CEO duality has a positive impact on firm performance, and the result is consistent in favor of the stewardship theory. Likewise, there are arguments against CEO duality, asserting that it has a negative impact on firm performance and these support the agency theory (Huining, 2014). The monitoring role of the board and its effectiveness on the behalf of shareholders depend upon its size and composition while carrying out the functional areas of the corporate governance (John and Senbet, 1998). The board characteristics like size, independence and meetings have an impact on current or prior performance, and a weak association was found between the two in the case of Indian firms (Arora and Sharma, 2015). Another study by Brick and Chidambaran (2010) also stated the intensity of board activity as an important dimension of oversight function performed by the board. Furthermore, it had used number of "director-days" to proxy for the level of board monitoring activity. Some studies were used the board composition and board size to represent the board's monitoring ability; it is the outside directors who have the ability to provide more effective than internal monitoring, more specifically, appointment of the independent directors leads to effective monitoring (Mak and Li, 2001; Choi *et al.*, 2007; Agarwal and Knoeber, 1996). The board index which consist of composition and meetings has been found to have a negative and significant association on firm performance of selected IT companies in India (Palaniappan and Rao, 2015). Kathuria and Dash (1999) observed that size of the board increased with the size of the corporation. Using a sample of top Indian Bombay Stock Exchange (BSE)-listed companies, Jackling and Johl (2009) had also showed significant positive correlation between firm size and size of the board (Kumar and Singh, 2013). The average board size was significantly different between small and large firms. However, in contrast, Lange and Sahu (2008) in their study on Nifty-listed Indian companies found an insignificant (but negative) effect of firm size (measure for scale) on board size. Substantiating the same, Linck *et al.* (2008) found that small firms had the smallest boards, with greatest proportion of insiders. In addition to the frequency, board meeting attendance also acts as a proxy for supervising quality of the board (Lin *et al.*, 2013). The measures of board attendance have been determined the participation of directors in meetings, also called board diligence that have been tested in supplement to the governance measures which was conducted on the firms listed on the NSE in India (Ghosh, 2007).

As far as the relationship between board characteristics and firm-specific characteristics is concerned, the past literature has established that large firms need more number of directors due to the complexity involved in their operations (Boone *et al.*, 2007; Chen and Al-Najjar, 2012; Coles *et al.*, 2008; Monem, 2013). However, in those studies, the percentage of non-executive directors (NEDs) on the board and firm performance was found to be statistically insignificant. Connell and Cramer (2010) also noticed a significant difference between the average board size of small and large firms listed on Irish stock markets.

Indeed, previous studies in several other countries also found a negative relationship between board size and firm performance. A positive relationship between the variables of corporate governance and firm's performance was found in Sri Lankan companies (Velnampy and Pratheepkanth, 2012). According to the studies of Black *et al.* (2006), Drobetz *et al.* (2004), Ong *et al.* (2003) and Gedajlovic and Shapiro (2002), there was a positive significant relationship between corporate governance practices and firm performance in various countries; in contrast, based on the studies of Gugler *et al.* (2001), Hovey *et al.* (2003) and Alba *et al.* (1998), there was no significant relationship between corporate governance and firm performance. The primary contribution of the study is that it examines the determinants of firm performance on board characteristics for which existing literature is limited, especially in the Indian context. This study further contributes to the literature by providing a comprehensive analysis of the relationship between board characteristics and firm performance. The empirical analysis focuses on a large number of companies (around 275 firms) covering 18 important industries from the manufacturing sector in India; moreover, instead of considering just a single measure of firm performance, the study considers three alternate measures of performance covering both accounting (ROA and ROE) and market-based (Tobin's *Q*) measures. Finally, this study also proposes another governance measure, board meeting, which is also related to firm performance (Table I).

Conceptual model and research hypothesis

Based on the previous section, extensive literature shows that corporate board characteristics affect firms' financial performance.

In this sense, the current research makes the contributions of empirically testing the effect of board characteristics on firm's performance. In line with the extant literature, the current study hypothesizes directional relationships between the measures of corporate governance on firm's performance. Figure 1 summarized the relational paths among

Sl. no.	Statement	Previous studies
1	The larger boards tend to have a negative influence on firm performance, judged in terms of either accounting- or market-based measures of performance. CEO duality has a significant effect on the firm performance	Ghosh (2006), Kathuria and Dash (1999), Lipton and Lorsch (1992)
2	Clause 49 along with other recommendations has emphasized the role of independent directors over executive directors for better governance structure. So board composition is a natural variable of interest in relation to firm's performance	Kumar and Singh (2012), Gugnani (2013)
3	A greater proportion of outside directors on boards was associated with improved firm performance	Jackling and Johl (2009), Fama (1980)
4	The study measure the independence of a board as percentage of independent directors on a board and is expected to have a positive relationship with firm performance	Hermalin and Weisbach (1991), Bhagat and Black (2002)
5	A positive relation between CEO duality and performance of a firm. Knowledge of the fact that the influence of CEO duality on firm performance can be a great benefit	Sanda <i>et al.</i> (2005), Huining (2014)
6	The board index, which consist of composition and meetings, has been found to have a negative and significant association on firm performance	Palaniappan and Rao (2015), Shivdasani (2004)
7	A positive significant relationship between corporate governance practices and firm performance was found in various countries	Ong <i>et al.</i> (2003), Gedajlovic and Shapiro (2002), Velnampy and Pratheepkanth (2012)

Table I.
Summary of literature review

governance-related board characteristics and the firm's performance regarding both accounting- and market-based measures. The following subsections discuss in depth the hypotheses related to each selected board characteristics.

Board size

The corporate governance literature is highly contradictory on board size being linked with corporate performance. The number of directors on board is an important variable, though literature does not have a consensus on the influence of board size toward increasing in firm's performance. Some studies describe a positive association between firm performance and board size due to lag in decision making owing to lack of harmony. Valenti *et al.* (2011) pointed out that when there is some dispute regarding the effect of board size on performance in general (Alexander *et al.*, 1993; Yermack, 1996), the evidence suggests that larger boards are preferable than smaller boards (Dalton *et al.*, 1999). This consistency results were in-line with a study by Coles *et al.* (2008) which states the board size should increase with the optimal board size to achieve higher financial performance. In the previous literature, both smaller boards and larger boards have been favored on different grounds. For instance, larger boards have been favored on the grounds of greater monitoring and effective decision making. According to Shivdasani (2004), board composition of a firm is affected by the fall in financial performance because companies react to performance downturns by adding outside directors to the board for corrective actions and effective decision making. Bradbury *et al.* (2006) report no association. Board size is known to be correlated with observable and unobservable firm characteristics that potentially correlated with firm financial performance (Bennedsen *et al.*, 2007). This endogenous effect is in-line with significant relationship of a firm's financial performance and board size (Black *et al.*, 2003). Therefore, the study hypothesizes the subsequent based on inconclusive evidence of the association without predicting its direction:

H1. There is no significant association between board size and firm's performance.

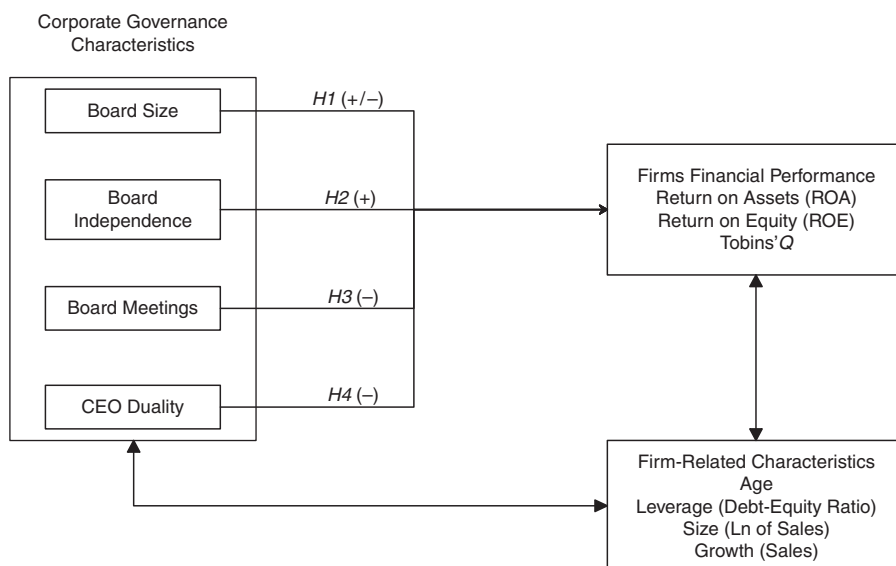


Figure 1.
Proposed conceptual
model

Board independence

The number of independent director on the board is often used as proxy for good governance. The role of board of directors as effective monitoring mechanism for management is dependent upon them being non-executive and independent. Furthermore, the inclusion of independent directors on corporate boards is an effective mechanism to reduce the potential divergence between management and shareholders. Fama (1980) argued that more NEDs on the board act as professional referees and work for value maximization of shareholders. The independent directors are invited onto the board for oversight on behalf of shareholders (Baysinger and Butler, 1985). Rosenstein and Wyatt (1990) also suggested that higher proportion of independent directors is positively associated with excess returns. Similarly, Mak and Kusnadi (2005) revealed that a higher fraction of independent directors on the board is linked to greater firm value. Outsider-dominated on the boards in terms of percentage of independent directors which will enhance the reputation of the firm, as the firm is viewed as follows good corporate governance, improving the reliability of its financial disclosures. These shortcomings can be taken care of by choosing efficient board members. Bhagat and Black (2002) in their studies found that there is no significant relationship between number of independent directors and performance of a firm. These conflicting results on the association between board independence and firm's performance, with studies by Beasley (1996), Klein (2002) and Davidson *et al.* (2005), find significant negative association between the two. On the other hand, Park and Shin (2004), Peasnell *et al.* (2005) and Bradbury *et al.* (2006) fail to report any association between earnings management and independence of the board. Board independence is measured by the number of non-executive independent directors working on the board. The study measure the independence of a board as percentage of independent directors on a board and is expected to have a positive relationship with firm performance. Thus, the study examines the following hypothesis:

- H2. There is a positive and significant association between firm's performance and board independence.

Board meetings

Next, the study estimated the impact of firm performance on board meetings, which is measured by the frequency of meetings annually. According to Vafeas (1999), board meeting is an important board attribute, but the relationship between firm performance and board meetings is not clearly established. There are several costs associated with board meetings such as managerial time, travel expenses and directors' remuneration. If a firm is not performing well, it might be possible that it may reduce the number of board meetings to avoid the costs associated with them. Jensen (1993) also pointed out that the meeting time might not be utilized for a significant dialogue among directors. Hence, the company might try to save upon the meeting costs by reducing the number of board meets. On the contrary, the firms have poor performance may try to conduct more meetings to discuss crucial issues like the reasons for their poor performance and setting strategies for improvement in performance. When directors meet frequently, they are more prone to discuss the concerned issues and monitor the management effectively, thereby performing their duties with better coordination (Lipton and Lorsch, 1992). If a firm is reasonably efficient in setting the frequency of its board meetings, it will also likely to attain high efficiency in agency costs. Thus, the impact of firm performance on board meetings is a valid research question, which should be examined empirically by following hypothesis:

- H3. There is a significant negative association between attendance of directors in board meetings and firm's performance.

CEO duality

The literature argues that the status of CEO has direct impact on governance of firms. CEO position should be independent of the chairperson of the board to enable balance and check on misuse of power by the same. Agency theory supports the same to avoid conflict of interest for the board chairman to formulate the strategies and be responsible for implementing the same. This in turn would check firms' performance through better monitoring. Jensen (1993) argued that lack of independent leadership creates a difficulty for boards to respond to any failure. Fama and Jensen (1983) also argued that concentration of decision making makes it difficult for the board in independent decision making, and it affects the performance of a firm. Contrary to this view, Rechner and Dalton (1991) argued for role CEO duality as it would provide better incentives by linking CEO pay which will affect the firms' performance. Klein (2002) shows that role duality leads to unchecked powers and finds significant positive association with firm performance. Sanda *et al.* (2005) found a positive relation between CEO duality and performance of a firm, while Dalton *et al.* (1998) could find no significant relationship between CEO duality and firm performance. A number of studies report no significant relationship. Berg and Smith (1978) and Brickley *et al.* (1997) stated that it increases the conflict of interest, and the agency cost increases when CEO and the board chair is the same person. However, in another study, Rechner and Dalton (1991) argued that it is good if the board chair and the CEO is the same person as it reduces the bureaucracy in decision making. The study used CEO duality as a dummy variable and used a score of 1 when a person holds both position and 0 otherwise. This proposes that firms segregating the role of the chairperson of the CEO positively and significantly contributes to the firm's performance:

H4. There is a significant negative association between CEO duality and firms' performance.

Methodology

With the aim of analyzing the proposed model to explore the effect of board characteristics on firms performance and to empirically test the proposed hypothesis, the study conducted a content analysis among Indian manufacturing firms during 2011-2015 using firms' annual reports. Indian has become one of the most attractive destinations for investments in the manufacturing sector because of strong integrations of governance and control mechanism. The Government of India has taken several initiatives to promote a healthy environment for growth of manufacturing sector in the country (Media Reports, 2016). The data were collected with consist of detailed governance-related and financial performance information and indicators about the most actively traded and listed companies on the BSE of India during 2011-2015.

Sample selection and data collection

The data for empirical analysis are extracted from PROWESS (Release 4.0), a research database widely used in India, and from the corporate governance and annual reports of companies. The firms in our sample are chosen from important firms in the manufacturing sector. Banking and finance sector and government companies are completely excluded for the purpose of analysis because these firms have different type of structure and governance (Faccio and Lasfer, 2000). The firm classification of these 18 sectors is given in Table II. The total number of manufacturing firms listed under BSE in these sectors are 3,230 firms. The firms with missing data are excluded from the sample, which left with the final sample size of 275 firms. This study covers the time period of 2011-2015.

Table II.
Sample companies
for various sectors

S. no.	Sectors	No. of samples
1	Apparels	9
2	Automobile and auto parts	5
3	Cement	11
4	Chemical and paint	36
5	Commercial trading	7
6	Consumer electronics	11
7	Diversified range of products	6
8	Engineering products	23
9	Fertilizers and agro-chemicals	15
10	Fibers and plastic products	9
11	Coal mining, and gas and oil exploration	13
12	Iron and steel	27
13	Packed foods and personal products	19
14	Sugar and paper	13
15	Pharmaceuticals	12
16	Power	16
17	Textiles	25
18	Miscellaneous industries	16
	Total	275

Variables construction

For the estimation purposes, the study use both accounting-based (ROA and ROE) and market-based (TQ) performance measures with respect to board characteristics such as size, independence, board meetings and CEO duality as the dependent variables in the analysis (Gompers *et al.*, 2003). The calculation of these variables has been shown in detail in Table III.

Empirical research results

In the analysis of the relationship between board characteristics and firm performance, the below regression equation will be used to test the main hypothesizes. To test the hypotheses, this study adopts the following empirical model:

$$\text{ROA} = a + b_1\text{BS} + b_2\text{BI} + b_3\text{BM} + b_4\text{CEODUAL} + b_5\text{AGE} + b_6\text{LEV} \\ + b_7\text{SIZE} + b_8\text{GROWTH} + e$$

$$\text{ROE} = a + b_1\text{BS} + b_2\text{BI} + b_3\text{BM} + b_4\text{CEODUAL} + b_5\text{AGE} \\ + b_6\text{LEV} + b_7\text{SIZE} + b_8\text{GROWTH} + e$$

$$\text{TQ} = a + b_1\text{BS} + b_2\text{BI} + b_3\text{BM} + b_4\text{CEODUAL} + b_5\text{AGE} \\ + b_6\text{LEV} + b_7\text{SIZE} + b_8\text{GROWTH} + e$$

where ROA, ROE and TQ are firm performance indicators of a company and $b_1, b_2, b_3, b_4, b_5, b_6, b_7$ and b_8 are the parameters for the explanatory variables. a is the constant number of the formula and e is the standard error.

This section presents the analysis and discussion of the empirical results.

Assumption of normality test

The normality assumption assumes that the errors of prediction are normally distributed. The Jarque-Berra statistics was used to check the null hypothesis that the sample is drawn

Table III.
Constructs, items
and description
of variables

S. no.	Variables	Full form	Description	Expected outcome
<i>Panel A: corporate governance measures</i>				
1	BS	Board size	Number of directors serving on the board	Positive/Negative
2	BI	Board independence	Number of non-executive independent directors on the board	Positive
3	BM	Board meetings	Number of annual meetings	Negative
4	CEODUAL	Duality	A binary variable which equals 1 if a chairperson of the board is also the CEO of the firm and "zero" otherwise	Negative
<i>Panel B: firm performance variables</i>				
	ROA	Return on assets	PBDIT/Total assets	-
	ROE	Return on equity	PBDIT/Paid-up equity capital + reserves funds	-
	TQ	Adjusted Tobin's Q	Total assets + market capitalization – book value of equity – deferred tax liability/total assets	-
<i>Panel C: control variables</i>				
	Age	Firm age	No. of years of a firm since its incorporation	Positive
	Lev	Leverage	Borrowings/Total assets	Negative
	Size	Natural log of sales	Sales is deflated using WPI, then natural log is taken and related to accounting performance of the firm	Negative
	Growth		Growth rate in net sales over that of the previous year	Positive

from a normally distributed population (Park, 2002). The Jarque-Bera statistics has an asymptotic χ^2 distribution with two degrees of freedom and was used to test the null hypothesis that the data follow a normal distribution. The Jarque-Bea statistic would not be significant, and p -value should be greater than 5 percent if the residuals are normally distributed (Brooks, 2008). The results in Table IV report a p -value of 0.4166, higher than 0.5, suggesting that normality assumption holds.

Assumption of homoscedasticity test

To test for homoscedasticity, the Breusch-Pagan test and the White test were used, and the results reported in Table V indicate that the null hypothesis cannot be rejected since the p -values of both tests are considerably greater than 0.05. The results conclude that there is homoscedasticity, so no further corrections for the sample are required.

Assumption of autocorrelation test

Owing to the presence of auto correlation in the residuals, statistical inferences can be misleading. Since the Durbin-Watson test is only applicable to test autocorrelation in time

Table IV.
Jarque-Berra test
for normality

Test value	10.8771
(Prob. > χ^2) p -value	0.4166

Table V.
Breusch-pagan test
for homoscedasticity

Breusch-Pagan test – H_0 : constant variance		White test – H_0 : homoscedasticity	
Test value	0.691	Test value	17.521
p -value	0.4016	p -value	0.3809

series, this study also uses Wooldridge (2002) test appropriate in panel-data models where a significant test statistic indicates the presence of serial correlation. The p -value of the test is greater than 5 percent as shown in Table VI, suggesting the presence of no autocorrelation of errors. Drukker (2003) and Maladjian and Khoury (2014) used simulation results to show that the test has good size and power proprieties in reasonably sized samples.

Assumption for the multicollinearity test

Multicollinearity is the undesirable situation where the correlations among the independent variables are strong. Hence, if multicollinearity problem exists among the independent variables, then the regression results will not provide correct results. Lewis-Beck and Michael in their book *Applied Regression: An Introduction* have stated that if the correlation among the independent variables is greater than or equal to 0.80, then multicollinearity problem is assumed to exist. The same logic has been applied in this paper to define high correlation among the independent variables to give rise to multicollinearity problem. The multicollinearity problem is checked through correlation matrix. Correlation matrix is developed through SPSS between “firms’ performance” and other independent variables. It is observed from Table VII (correlation matrix) that none of the independent variables have correlation greater than 0.8, hence we can safely deduce that multicollinearity does not exist among the independent variables.

From Table VII, Pearson correlation for selected explanatory variables shows that the Pearson correlation coefficient between board size and ROA is -0.733 , ROE is -0.764 and Tobin Q is -0.752 , which is found to be significant at 0.05 level. This indicates that board size and firm performance measures have a strong negative and significant association among the manufacturing firms in India. The results are consistent with Alexander *et al.* (1993) and Yermack (1996). The factor of board independence has been found to have a weak negative association among the firms’ performance factors of ROA (-0.110), ROE (-0.101) and Tobins Q (-0.034), and the results are statistically insignificant and consistent with Lipton and Lorsch (1992). It is evident that board meeting has been found to have a moderate negative and significant relationship with firms’ performance indicators such as ROA (-0.491), ROE (-0.551) and Tobins Q (-0.638), and the results are found to be significant at 0.05 level. The factor of CEO duality has been found to have a weak positive relationship among the firms’ performance factors of ROA (0.061), ROE (0.086) and Tobins Q (0.183), and the results are statistically insignificant except for Tobins Q (at 0.05 level). This indicates that market-based performance (TQ) is increased if the positions of the CEO and chairperson are combined. The age of the firm and ROA have a positive and significant relationship at 0.481, and the result is significant at the 0.01 level. The size of the firm and Tobins Q has been found to be positively associated and significant at 0.01 level. The growth of the firm and ROE have a positive and significant association, and the results are statistically significant at 0.01 level. The remaining factors have insignificant association with the firms’ performance factors.

Furthermore, the existence of multicollinearity is tested by calculating the variance inflation factor (VIF), where a VIF coefficient greater than ten indicates the presence of multicollinearity (Chetterjee and Price, 1977). Moreover, the mean of all VIFs is considerably larger than 1. The VIFs for individual variables were also very low, supporting the

Wooldridge test for autocorrelation in panel data
 H_0 : no first-order autocorrelation

Table VI.
Wooldridge test for
autocorrelation

Test value	2.037
Prob. > F	0.2521

	BS	BI	BM	CEO duality	Age	Leverage	Size	Growth
<i>Board size</i>								
R	1							
Sig.								
<i>Board independence</i>								
R	0.801**	1						
Sig.	0.000							
<i>Board meetings</i>								
R	0.785**	0.590**	1					
Sig.	0.000	0.000						
<i>CEO duality</i>								
R	-0.028	-0.072	-0.030	1				
Sig.	0.652	0.238	0.625					
<i>Age</i>								
R	-0.088	-0.083	-0.016	0.124*	1			
Sig.	0.149	0.173	0.791	0.041				
<i>Leverage</i>								
R	0.097	0.106	0.023	-0.183**	-0.059	1		
Sig.	0.111	0.081	0.713	0.003	0.332			
<i>Size</i>								
R	0.079	0.033	0.074	0.045	0.011	0.093	1	
Sig.	0.194	0.593	0.225	0.459	0.858	0.127		
<i>Growth</i>								
R	-0.018	-0.010	-0.019	0.020	-0.004	-0.017	-0.065	1
Sig.	0.768	0.866	0.754	0.748	0.952	0.780	0.288	
<i>Return on assets (ROA)</i>								
R	-0.733*	-0.110	-0.491*	0.061	0.481**	-0.025	0.073	-0.021
Sig.	0.029	0.072	0.034	0.320	0.000	0.683	0.229	0.735
<i>Return on equity (ROE)</i>								
R	-0.764	-0.101	-0.551*	0.086	-0.035	-0.063	0.094	0.449**
Sig.	0.031*	0.098	0.047	0.161	0.569	0.300	0.123	0.000
<i>Tobins Q</i>								
R	-0.752	-0.025	-0.638*	0.183**	0.010	-0.080	0.568**	0.016
Sig.	0.019*	0.685	0.031	0.002	0.868	0.192	0.000	0.799

Note: **, *Significance at 5 and 1 percent levels, respectively

Table VII.
Correlation matrix

previous conclusion that the explanatory variables included in the model are not substantially correlated with each other. The results of VIF among all the cases are shown in Table VIII.

Test to check whether the data are stationary or time series

Before going on with the subject, has to find out if the data have time series influence or are stationary. Durbin-Watson test has been conducted using SPSS to check the nature of the data. Computation of Durbin-Watson test was done taking the dependent variables (ROA, ROE and Tobins Q) and all the independent variables together. The result observed from Table IV reflects that Durbin-Watson test results are 1.946, 1.772 and 1.689 for ROA, ROE and Tobins Q, respectively, which fall within the acceptable range of 1.50-2.00 and satisfy

the assumption of independence of errors. The Durbin-Watson test result is out of the range of -1.5 to $+1.5$, which proves that the data are time series one and are stationary. Moreover, by checking the Durbin-Watson table, it is observed that $d_u < d < 4-d_u$ (d_u is derived from the table and d is the Durbin-Watson test result). The results become closer to 2, which is in acceptable range, which proves that the data are not a time series one and are stationary. Thus, there is no autocorrelation between the dependent and independent variables. It is concluded from the above analysis that the data do not have time series influence and are stationary. Hence, we can utilize regression for the present study.

Regression results

The correlation analysis indicates that there exists a negative relationship between board characteristics such as board size, board independence and board meetings with firms' performance indicators of ROA, ROE and Tobins Q . So as to further analyze these relationships and to test the hypothesis, the OLS regression was run, and to be find out the predictors of firms' performance factors as dependent variables and board characteristics as independent variables, controlling for other variables was also done.

Tables IX and X sum up the results of regression analysis. It can be seen from Table IX that in model 1, board variables with ROA is fitted the regression equation and explains 44.6 percent variance in firms performance as shown by R square. The F ratio is 10.653 and is highly significant at less than 1 percent level. The R^2 value of model 2 is 0.438, which means that 43.8 percent of the dependent variable (ROE) is explained by independent variables. The R^2 value of model 3 is 0.570, which means that 57.0 percent of the dependent variable (ROE) is explained by independent variables. It can be observed from it that F statistics of the respective models are 10.653, 10.183 and 19.170, respectively, and the results are highly significant at 0.000. Hence, as the p -value is less 0.05, there can be a linear relationship between the dependent variables (ROA, ROE and Tobins Q) and selected independent variables.

The regression results as shown in Table X indicate that there is a statistically significant correlation between firms' performance and board effectiveness. It is also observed from the regression analysis (Model 1) in Table X that "leverage" has a p -value of 0.960 and the corresponding t -value of 0.150. It signifies that this particular variable is not important in

Table VIII.
Variance inflation factor (VIF) of the explanatory variables

Variable	ROA		ROE		ROA	
	VIF	Toler.	VIF	Toler.	VIF	Toler.
Board size	1.205	0.830	0.339	2.953	1.456	0.687
Board independence	1.651	0.606	0.580	1.725	1.995	0.501
Board meetings	0.374	2.674	0.618	1.618	0.452	2.213
CEO duality	2.942	0.340	1.556	0.643	3.555	0.281
Age	0.969	1.032	1.601	0.625	1.171	0.854
Leverage	1.941	0.515	1.553	0.644	2.345	0.426
Size	0.975	1.026	1.611	0.621	1.178	0.849
Growth	0.995	1.005	1.644	0.608	1.202	0.832
Mean VIF	1.382		1.188		1.669	

Table IX.
Regression model summary

Sl. no.	Dependent variables	Multiple R	R^2	Adjusted R^2	SE of the estimate	Durbin-Watson	F -value	p -value
1	ROA	0.696	0.446	0.493	1.685	1.946	10.653	0.000
2	ROE	0.588	0.438	0.495	3.172	1.772	10.183	0.000
3	Tobins Q	0.608	0.570	0.551	4.170	1.689	19.170	0.000

Model and dependent variable	Independent variables	Unstandardized coefficients		Standardized coefficients		
		<i>B</i>	SE	β	<i>t</i>	Sig.
1 – return on assets	(Constant)	-8.695	7.061		-4.241	0.000
	Board size	-1.371	0.055	-0.081	-2.082	0.046
	Board independence	0.176	0.546	0.010	3.115	0.021
	Board meetings	-1.245	0.372	-0.032	-2.369	0.047
	CEO duality	-4.346	1.311	-0.003	-2.058	0.049
	Age	4.856	0.559	0.474	8.680	0.000
	Leverage	1.191	23.943	0.003	0.150	0.960
	Size	3.683	2.805	0.076	1.389	0.166
	Growth	-1.157	1.727	-0.016	-0.295	0.768
2 – return on equity	(Constant)	-9.930	4.024		-2.468	0.014
	Board size	-2.474	0.099	-0.095	-2.791	0.010
	Board independence	-2.355	0.012	-0.053	-4.580	0.000
	Board meetings	1.047	0.075	0.056	0.631	0.529
	CEO duality	1.923	1.652	0.065	4.164	0.003
	Age	-0.013	0.012	-0.057	-1.041	0.299
	Leverage	-0.436	0.532	-0.046	-0.819	0.413
	Size	1.209	0.507	0.131	2.385	0.018
	Growth	13.363	1.594	0.454	8.383	0.000
3 – Tobins <i>Q</i>	(Constant)	-27.030	17.308		-7.322	0.000
	Board size	-1.071	0.765	-0.199	-2.833	0.045
	Board independence	-4.269	1.012	-0.063	-3.763	0.031
	Board meetings	-2.689	0.101	-0.121	-3.505	0.003
	CEO duality	4.413	1.496	0.145	2.859	0.025
	Age	-0.711	1.178	-0.030	-0.603	0.547
	Leverage	-7.545	4.423	-0.098	-1.935	0.054
	Size	5.485	3.027	0.579	11.629	0.000
	Growth	146.754	151.054	0.048	0.972	0.332

Note: $p < 0.05$

Table X.
Regression result

the model. Similarly, “growth of the firm” (p -value of 0.768 and the corresponding t -value of -0.295) and “size of the firm” (p -value of 0.166 and the corresponding t -value of 1.389) have p -value more than 0.05 and t -values within the range of -2 to $+2$. These variables also seem not to be important enough in the model, so they need to be removed. While it is also observed that “board size,” having a p -value of 0.046 and a t -value of -2.082 ; “board independence,” having a p -value of 0.021 and a t -value of 3.115; “board meetings” having a p -value of 0.047 and a t -value of -2.369 ; “CEO duality,” having a p -value of 0.049 and a t -value of -2.058 ; and “age,” having a p -value of 0.000 and a t -value of 8.680, are highly significant variables in determining the firms performance (ROA) of manufacturing firms in India.

It is also observed from the regression analysis (Model 2) in Table X that “leverage” has a p -value of 0.413 and the corresponding t -value of -0.819 . It signifies that this particular variable is not important in the model. Similarly, “board meetings” (p -value of 0.529 and the corresponding t -value of 0.631) and “age” (p -value of 0.299 and the corresponding t -value of -1.104) have p -values more than 0.05 and t -values within the range of -2 to $+2$. These variables also seem not to be important enough in the model, so they need to be removed. While it is also observed that “board size,” having a p -value of 0.010 and a t -value of -2.791 ; “board independence,” having a p -value of 0.000 and a t -value of -4.580 ; “CEO duality,” having a p -value of 0.003 and a t -value of 4.164; “size,” having a p -value of 0.018 and a t -value of 2.385; and “growth,” having a p -value of 0.000 and a t -value of 8.383 are significant variables in determining the firms’ performance (ROE) of manufacturing firms in India.

It is also observed from the regression analysis (Model 3) in Table X that “leverage” has a *p*-value of 0.054 and the corresponding *t*-value of -1.935. It signifies that this particular variable is not important in the model. Similarly, “age” (*p*-value of 0.547 and the corresponding *t*-value of -0.603) and “growth” (*p*-value of 0.332 and the corresponding *t*-value of 0.972) have *p*-values more than 0.05 and *t*-values within the range of -2 to +2. These variables also seem not to be important enough in the model, so they need to be removed. While it is also observed that “board size,” having a *p*-value of 0.045 and a *t*-value of -2.833; “board independence,” having a *p*-value of 0.031 and a *t*-value of -3.763; “board meetings,” having a *p*-value of 0.003 and a *t*-value of -3.505; “CEO duality,” having a *p*-value of 0.035 and a *t*-value of 2.859; and “size,” having a *p*-value of 0.000 and a *t*-value of 11.629, are significant variables in determining firms’ performance (Tobin’s *Q*) of manufacturing firms in India. This positive sign is a consistent signal of stewardship theory which explain CEO duality positively influences firm performance (Huining, 2014) (Table XI).

Discussion, conclusion and implications

This study has investigated the influence the board characteristics of corporate governance measures has on the financial performance of Indian manufacturing industries. A sample of 275 industries across 18 different sectors was cross-sectionally analyzed with the help of OLS regression method. From the study, it can be said that “leverage,” “age,” “growth” and “board meetings” seem not to be statistically important and they do not influence the profitability of the manufacturing firms in India, whereas “board size, board independence, CEO duality and size of the firm” are important variables for determining the manufacturing firms’ performance (ROA, ROE and Tobins *Q*) in India. It can be inferred from the results derived above that board characteristics and firms’ performance of manufacturing firms in India. Theoretically, the effectiveness of board of directors, a central governance mechanism, is expected to be positively related to corporate governance quality. The study explored this relationship empirically with the use of board size, board independence and board meeting and found contradictory results regarding firms’ performance parameters. These results were consistent and similar to previous studies (Arora and Sharma, 2015; Palaniappan and Rao, 2015; Sarpal and Singh, 2013). The study found that board size of a firm has emerged as an important determinant of firm’s performance but the interesting part is that it is negatively related with firm performance (Gugnani, 2013). The results indicate that among the various factors affecting the corporate governance, board characteristics are strongly and negatively related to firms’ performance

Sl. no.	Hypothesis	Proposed Sign	Hypothesis test result			
			ROA	ROE	Tobins Q	Tools
H1	There is no significant association between board size and firm performance	±	Negative and significant	Negative and significant	Negative and significant	Regression
H2	There is a positive and significant association between firm’s performance and board independence	+	Positive and significant	Negative and significant	Negative and significant	Regression
H3	There is a significant and negative association between attendance of directors in board meetings and firm performance	-	Negative and significant	Positive and insignificant	Negative and significant	Regression
H4	There is a significant negative association between CEO duality and firm performance	-	Negative and significant	Positive and significant	Positive and significant	Regression

Table XI.
Summary of hypothesis testing results

measured with both accounting and market-based performance indicators. This result is as expected and supports the hypothesis that the optimum size of the board leads to the improvement of firm's performance. The use of ROA and ROE as proxies for financial performance has its own limitations. The results suggest that the marketing-based measures of financial performance (Tobin' Q, P/E and P/B) were not able to establish any relationship with corporate governance. It shows that the stock market performance of a firm is not related with its corporate governance measures and indicators (Gugnani, 2013).

The results of the study do indicate that the influence that board characteristics of corporate governance has on firm performance is significant. Hence, this study recommends that corporate entities should promote corporate governance measures effectively to send a positive signal to potential investors. In addition, the regulatory agencies including government should promote and socialize corporate governance regulatory measures and its relationships to firm performance across industries. So when policy makers of a nation within the Indian context decide that manufacturing firms should have the attention of board characteristics on the basis of an improvement in firm performance. The contribution of this study has been to find that board characteristic does have an influence on manufacturing firms' performance in India. The outcome of the study has been learned about the relevance and in line with regards to other developing countries, the board characteristics have strongly influenced in the performance of the firms. Despite these benefits, much can still be said about the ongoing debate between the agency theory and stewardship theory.

Limitations and further research

As with all empirical studies, the current research has several limitations, and overcoming these can be a guide for future research. First, the data are based on board characteristics; therefore, the research is exempt from the board composition, that is, the presence of women director on the board, board meeting attendance of especially by independent directors concern, Annual General Meeting and number of meetings conducted by the firms with beyond the required statutory level. Future research could combine measures of presence of women directors, meeting of independent directors and AGM attendance, which have some effect on firms' performance. Second, the current research explores the effect of some board elements such as audit committee and other committees on overall firm's performance. Further research could extend the model to include additional dimensions of the audit committee-based measures in order to better understand the firms' financial performance. Third, the current study does not include all possible board characteristics such as large shareholders' dominance on the board, promoter's shareholding and institutional shareholding to support their firm's performance. Further research might include the ownership structure on board to improve the firm's performance. Finally, this research is limited to Indian manufacturing firms. Future research should consider different countries, inter-differences with medium- and large-scale firms and private and public undertaking firms. There are certain limitations of this study because it focuses on internal governance mechanisms, ignoring external factors, which can have a more significant impact on corporate financial performance.

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