
Testing the demand for monitoring and advisory roles of independent directors: a case of Indian corporate boards

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Abstract: Research on Indian corporate governance has been largely relied on the monitoring role of corporate boards and thus, is devoid of another important role, i.e., advisory role performed by them. The present analysis makes an endeavour to fill the research gap of testing simultaneously the relevance of monitoring and advisory roles of corporate boards by specifically focusing on investigating the linkages between several firm specific factors (firm complexity, monitoring and advising costs, private benefits, CEO influence) and board independence. Overall the analysis maintains that board independence is significantly determined by the level of firm complexity and private benefits in the directions consistent with the past literature. However, the findings of monitoring and advising costs, and CEO influence hypotheses are opposite to the expectations derived from the concerned literature. These variations can be attributed to unique environment and different institutional contexts under which the firms are operated.

Keywords: board independence; firm complexity; costs of monitoring and advising; private benefits; CEO influence; firm size; corporate governance; Indian context; small firms; large firms.

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1 Theoretical framework and hypotheses development

The credibility and rectitude of monitoring effectiveness of non-executive (outside) directors has been established in the past empirical academia (Mura, 2007). The agency theory explanations have primarily concentrated upon the monitoring role of outside directors (Fama, 1980; Fama and Jensen, 1983). It holds that the controls between the

board and inside management can be effectively established by independent board members and thus, act as a strong internal corporate governance mechanism (Bozec, 2013). This significance of outside (in particular, independent directors) has also been empirically recognised in firms experiencing such type of agency problems (Mak and Roush, 2000; Wang and Lee, 2012) due to the benefits of diminishing agency costs (McKnight and Weir, 2009). Outside directors must perform their roles in the best interests of the shareholders (Rosenstein and Wyatt, 1990; Zou et al., 2012), more specifically, the minority shareholders in situations wherein controlling shareholders are more dominant. In this sense, the role effectiveness of independent directors, depends to a greater extent, on the nature of corporate ownership structures, due to the predomination of the controlling/dominant shareholders (Anand et al., 2010; Yu and Zheng, 2014). All in all, the relevance of monitoring benefits offered by board structures has been especially recognised in the settings wherein the investor protection is less prevalent (Campa and Donnelly, 2013).

It is to be noted that research on Indian corporate governance has largely relied on the monitoring role of corporate boards and thus, is devoid of another important role, i.e., advisory role, performed by them. This study presents the empirical evidence on the factors determining the board independence by taking into consideration both the monitoring as well as advisory role of corporate boards. More specifically, it examines a specific strand of literature which argues that factors such as firm complexity, costs of monitoring and advising, private benefits and CEO influence can determine the level of board independence. The present analysis belongs to such an area of corporate governance research literature that has been gaining considerable attention from the researchers worldwide. In particular, this study is based upon the insights developed from the theoretical (Raheja, 2005; Adams and Ferreira, 2007; Harris and Raviv, 2008) as well as empirical (Denis and Sarin, 1999; Boone et al., 2007; Guest, 2008; Linck et al., 2008; Monem, 2013) work done in this area. To date, studies from different countries such as the USA (Boone et al., 2007; Linck et al., 2008), the UK (Guest, 2008), Japan (Aman and Nguyen, 2012), Malaysia (Germain et al., 2012), Taiwan (Ting, 2011) and also from continents such as Australia (Monem, 2013) and Europe (Kim et al., 2007), have contributed to this core aspect of governance. However, relative to these countries, this aspect has been almost unexplored in India and thus, still is at inception stage. Therefore, the basic aim of the present study is to uncover this gap by procuring deeper insights into the make-up of corporate boards, more particularly, the association between board independence and the variables that have been used as proxies for firm complexity, costs relating to monitoring and advising, private benefits and CEO influence. The brief explanation of the variables covered in this study is given hereunder:

1.1 Dependent variable of the study

1.1.1 Board independence

This variable is taken as dependent variable in the study. Following the study by Boone et al. (2007), board independence has been measured in terms of the proportion of independent directors on the board. Several studies have attempted to estimate the determinants of board independence in the recent past (Boone et al., 2007; Guest, 2008; Linck et al., 2008; Aman and Nguyen, 2012; Monem, 2013). In line with the above strand of enquiry, the present study also attempts to test whether board independence is

significantly affected by the level of firm complexity, monitoring and advising costs, private benefits and CEO influence. The academic as well as empirical support of the aforesaid argument has been delineated as follows:

1.2 Independent variables of the study

Broadly, this line of research contends that board independence is significantly determined by several factors namely firm complexity, monitoring and advising costs, private benefits and CEO influence. Based on the previous research, several independent variables have been taken for the purpose of empirical analysis which is further categorised into four categories, i.e., firm complexity, costs of monitoring and advising, private benefits and CEO influence. Firm complexity is represented by three variables, firm size, age, and leverage. Monitoring costs have been proxied by three variables, market-to-book ratio (or Tobin's Q), R&D expenditure and stock return volatility. Measures such as free cash flow (FCF) and dividend payment have been taken to reflect managers' private benefits. Variables namely, return on assets (ROA) and CEO tenure have been employed in order to measure CEO's influence. The brief explanation of these variables is as follows:

1.2.1 Firm complexity and advising benefits

Fama and Jensen (1983) had referred the outside directors as decision experts who possess knowledge and expertise in varied areas relating to finance and law. The reasoning behind firm complexity as one of the factors explaining board independence suggests that complex firms having greater advisory needs require larger proportion of outside/independent board members (Boone et al., 2007; Coles et al., 2008; Guest, 2008; Linck et al., 2008). Some of the studies, for example, Boone et al. (2007), Coles et al. (2008) and Germain et al. (2012) have labelled the extent of firm complexity under the heading 'scope of operations'. Thus, following the usual practice in this strand of literature, the present study has covered three proxies to reflect the level of firm complexity, i.e., firm size (Boone et al., 2007; Coles et al., 2008; Guest, 2008; Linck et al., 2008; Ting, 2011; Monem, 2013), firm age (Boone et al., 2007; Guest, 2008; Linck et al., 2008; Ting, 2011; Germain et al., 2012; Monem, 2013) and leverage (Coles et al., 2008; Guest, 2008; Linck et al., 2008; Germain et al., 2012; Monem, 2013). Further, it is to be noted that the advisory needs of the firm tends to increase with the level of complexity in the firm (Coles et al., 2008). Following the same, the present analysis has also viewed advisory needs of firms to capture the firm complexity. In this regard, the null hypothesis has been framed as follows:

Hypothesis 1 Firm complexity and advising benefits are not related to board independence.

The explanation of the variables reflecting firm complexity and advising benefits is given below:

1.2.1.1 Firm size

The frame of reference for including firm size, as proxy for complexity, maintains that outside directors having wealth of expertise fulfil the advisory needs which too increases

with the complexity level of firms operations (Coles et al., 2008). It suggests that independent (outside) directors' representation on the board increases with the size of the firm. The aforesaid contention has also received empirical support, for example, there are studies on the determinants of board composition/independence that have delineated the significant positive impact of firm size (Guest, 2008; Linck et al., 2008; Ting, 2011; Monem, 2013). The another argument holds the view that since larger firms are subject to greater agency problems, therefore, are more likely to seek the monitoring services of outside directors (Lehn et al., 2009). In light of the above, it is hypothesised that there is positive relationship between firm size and board independence. In this study, firm size has been taken as the natural logarithm of market value of equity of a firm.

1.2.1.2 Firm age

It has been argued in the literature that age maturity adds to the level of complexity in the firm operations (Boone et al., 2007; Guest, 2008; Linck et al., 2008). In line with the above argument, firm age has been taken to proxy for the level of firm complexity. Moreover, the squared term of firm age has also been added to identify the nonlinear effect (if any) on the board independence. Like firm size, age of the firm is also expected to have positive relationship with board independence. Herein, firm age has been measured as numbers of years since a firm has been listed on the Bombay Stock Exchange (BSE).

1.2.1.3 Leverage

Besides age, the level of complexity in firm operations also steps-up with firm leverage (Guest, 2008; Linck et al., 2008; Monem, 2013). The literature contends that the requirements for approaching the external capital markets and seeking high quality advice increases with the level of leverage in firms (Pfeffer, 1972). Therefore, the presence of experts (as outside board members) on the corporate boards can be recognised as an importance source of high-quality expertise (Fama and Jensen, 1983). The present study has measured leverage in terms of ratio of book value of long-term/total debt to book value of total assets.

1.2.2 Monitoring and advising costs

It is highlighted that outside directors can effectively perform monitoring role, however, insiders cannot, as their careers are linked with the CEO (Weisbach, 1988; Hermalin and Weisbach, 1998). Moreover, in the event of greater information asymmetry between insiders and outsiders the functioning of monitoring role of outside directors becomes quite tough (Aman and Nguyen, 2012). Raheja (2005) also argues for having greater representation of insiders on the boards where outsiders experience difficulties in verifying the projects of the firm. This is because of the costs associated with securing and processing the information which are usually experienced by the outside directors (Linck et al., 2008). Joh and Jung (2012) has also highlighted the lower monitoring role effectiveness of independent directors in the firms having costly transfer of information. Thus, it can be stated that higher costs of monitoring are associated with lesser outsiders on the board (Raheja, 2005). Following the governance literature (Boone et al., 2007; Guest, 2008; Linck et al., 2008; Aman and Nguyen, 2012; Monem, 2013), three

variables, market to book ratio/Tobin's Q, research and development expenditure (R&D) and volatility in stock returns (STDDEV) have been considered to represent the costs of monitoring. The first two measures, i.e., market to book ratio and research and development expenditures have been used as proxies for the growth opportunities whilst the stock return volatility represents the level of information asymmetry in the firm. In this regard, the following null hypothesis has been tested:

Hypothesis 2 Monitoring and advising costs are not related to board independence.

The explanation of the variables reflecting firm monitoring and advising costs is given below:

1.2.2.1 Market-to-book ratio

Market-to-book ratio reflects the extent of growth opportunities in a firm (Gaver and Gaver, 1993; Goyal et al., 2002; Adam and Goyal, 2008; Linck et al., 2008; Subramaniam et al., 2014). The above argument has also been guided by the studies namely Chen and Zhao (2006) and Billett et al. (2007). More specifically, it has been argued that high-growth (with higher growth opportunities) firms should have higher representation of insiders on their boards due to the costs associated with asymmetries in delivering the information (Lehn et al., 2009). Therefore, in line with Linck et al. (2008), Ting (2011) and others, the present study has also used market-to-book ratio as a proxy for growth opportunity in determining the board independence in the firm.

1.2.2.2 Research and development expenditure

Another measure of firm's growth opportunities is the level of research and development expenditure in the firm (Linck et al., 2008). In terms of board composition, Coles et al. (2008) had however, found on the contrary, greater outside directors' representation in R&D-intensive firms. The intensity of research and development measure has been tested as one of the factors of monitoring costs by following the studies such as Guest (2008), Aman and Nguyen (2012), Monem (2013) and others. Herein, the ratio of research and development expenditure to total assets/net sales has been used as a measure in the analysis.

1.2.2.3 Stock return volatility

Information asymmetry emanates from to the separation of ownership, management and control. The conceptual explanation for information asymmetries has been offered in the past academic literature (Fama and Jensen, 1983). It has also been argued earlier that the monitoring costs become higher in case of asymmetric information between the insiders and outsiders. Therefore, the present study has deployed volatility in stock returns as a proxy for information asymmetry by following the past empirical research (Boone et al., 2007; Guest, 2008; Linck et al., 2008; Monem, 2013). However, some studies have measured the volatility in terms of daily returns (Hillier and McColgan, 2006; Coles et al., 2008), while there are studies those have tested the volatility of monthly returns (Guest, 2008; Linck et al., 2008; Monem, 2013). More specifically, the stock return volatility in the present study has been calculated as the standard deviation of monthly stock returns over the 12 months in the preceding financial year.

1.2.3 Private benefits to insiders

The argument herein follows that although insiders provide valuable firm-specific information, yet because of private benefits and inadequate independence from the CEO, they can indulge in misleading or iniquitous activities (Raheja, 2005). In such cases, outside directors are expected to be better monitors (Fama, 1980), and thus, represent an important source for board monitoring. Therefore, in line with Raheja (2005), private benefits have been incorporated in the present analysis with the view that board independence increases with the private benefits to the insiders. This view has also received empirical support in the prior empirical research work (Linck et al., 2008; Germain et al., 2012). In this regard, the null hypothesis has been stated as below:

Hypothesis 3 Private benefits are not related to board independence.

The explanation of the variables reflecting private benefits to insiders is given below:

1.2.3.1 Free cash flow

Conceptually, Jensen (1986) states that FCF is cash flow in excess of that required to fund all projects that have positive net present values when discounted at the relevant cost of capital. This study has also mentioned that FCFs give rise to the agency costs as they are more susceptible to the managers' discretion for use in unproductive activities. Given the above set of arguments, it is hypothesised that FCF is positively related to the board independence. However, the definitions of FCF tested in the past empirical literature are widely varied in nature and thus, far from consistent (Boone et al., 2007; Coles et al., 2008; Guest, 2008; Linck et al., 2008; Ting, 2011; Germain et al., 2012; Monem, 2013). In line with studies such as Ting (2011) and Monem (2013), FCF has been measured as net cash flow from operating activities minus capital expenditure made during the year divided by book value of total assets. Herein, capital expenditure is taken as the sum total of changes in the values of capital work-in-progress and gross fixed assets from that of the previous year.

1.2.3.2 Dividend payments

In line with Aman and Nguyen (2012), dividend payments have been used as a proxy to measure the level of private benefits. This study argues that managers tend to hold surplus cash reserves due to the lower dividend payments which lead to their entrenchment. In the present study, the level of dividend payments divided by the net worth determines the extent of private benefits.

1.2.4 CEO influence

In addition to firm complexity, private benefits and monitoring costs, literature has also strongly adduced the CEO influence on the board independence by way of characteristics such as firm operating performance (ROA), CEO tenure and CEO duality which is linked with CEO's power and Influence. In this context, the null hypothesis has been framed as follows:

Hypothesis 4 CEO influence is not related to board independence.

The explanation of the variables reflecting CEO influence is given below:

1.2.4.1 Firm performance

In addition to the above, studies including Guest (2008) and Ting (2011) have estimated CEO influence in terms of firm operating performance, i.e., ROA, and reported negative relationship between performance and board composition. The line of reasoning herein rests upon Hermalin and Weisbach (1988) argument that poor firm performance causes the removal of more insiders and welcomes the outside directors into the board for better monitoring of management. In other words, poor firm performance compels the CEO to invite more board monitoring in the form of greater representation of outside directors. Moreover, boards having preponderance of outside directors tend to enhance the firm value by way of the changes in CEO position, more specifically, after the phase of poor performance (Weisbach, 1988). In addition, Linck et al. (2008) has measured perceived ability of CEO with the past operating performance of the firm by using ROA accounting measure. In line with the studies such as Guest (2008), Linck et al. (2008) and Aman and Nguyen (2012) which had identified negative effect of firm performance on board composition/independence, this study has also used ROA as a measure to proxy for firm operating performance.

1.2.4.2 CEO tenure

CEO tenure has been also taken as one of independent variable influencing CEO power (Baker and Gompers, 2003; Aman and Nguyen, 2012) or influence (Boone et al., 2007). It has been argued that the likelihood of CEO entrenchment tends to increase with his tenure (Hill and Phan, 1991). A number of past studies have tested the impact of CEO tenure to determine the proportion of independent directors (or outsiders) on the board, for example, Denis and Sarin (1999), Boone et al. (2007), Kyereboah-Coleman and Biekpe (2007), Coles et al. (2008) and Chouchene (2010). The empirical support for the CEO power can be drawn from the study by Hermalin and Weisbach (1998) which has stated that CEOs with their bargaining power have tendency to choose relatively weaker boards by influencing their composition with more insiders (rather than outsiders) which ultimately decreases the level of board independence. The bargaining power of the CEO is derived from his/her perceived ability. This study also predicted that increasing CEO tenure leads to declining board independence. This strand of empirical literature suggests the negative impact of CEO tenure on the board independence/outside board proportion (Baker and Gompers, 2003; Boone et al., 2007; Coles et al., 2008; Aman and Nguyen, 2012) which prepares the ground for developing an understanding that CEOs serving for longer tenure dissuade the appointment of independent (outside) directors on the board. Some other studies have also indicated an inverse association between CEO tenure and proportion of outside (or independent) directors including Bathala and Rao (1995), Denis and Sarin (1999) and Arthur (2001).

On the contrary, CEO tenure was also found to have positive and significant relationship with the proportion of outside board members in studies namely Kyereboah-Coleman and Biekpe (2007). The reason cited therein stated that since the

outside directors do not compete for the CEO title, therefore, they have lesser tendency to remove the CEO.

1.2.4.3 CEO duality

Another CEO characteristic which can influence the level of board independence is the existence of CEO duality in the board leadership structure, i.e., where CEO is also the chairman of the board. Linck et al. (2008) has also employed this characteristic to represent the level of CEO influence. Daily and Johnson (1997), Combs et al. (2007) and Joseph et al. (2014) has indicated the duality status as reflection of CEO (structural) power. Agency theory does not prefer CEO duality as it constrains the monitoring ability of the board and thus, make them less independent. Agency costs can increase in cases where CEO gains more power through duality in the boards which ultimately leads to his entrenchment in the firm (Kang and Zardkoohi, 2005). On the contrary, advocates of stewardship theory refute agency theory by favouring the existence of duality in the board leadership structures as it leads to the unification of structural power in the hands of single individual (CEO). The impact of CEO duality on the board composition/independence has been tested in the concerning empirical literature in the backdrop of the idea that CEO duality adversely affects the level of board independence. In this light, a large number of studies have proved the above notion including Prevost et al. (2002), Setia-Atmaja (2009a) and Chen and Al-Najjar (2012). In contrast, some other studies have reported positive relationship between CEO duality and board independence (Monem, 2013). Finkelstein and D'Aveni (1994) has also stated the concept of duality for vigilant boards in order to balance the concerns for strong leadership and entrenchment avoidance. In the present analysis, it has been taken as a binary variable which is coded as 'one' if the CEO is also the chairman of the board and 'zero' otherwise.

Apart from the above, industry and year dummies have also been incorporated in the analysis to control for industry and year effects respectively. Moreover, past literature has also offered evidences of negative impact of inside ownership on the board independence (Denis and Sarin, 1999; Mak and Roush, 2000; Prevost et al., 2002).

Table 1 Operationalisation of the variables/factors

<i>S. no.</i>	<i>Variables</i>	<i>Definition</i>	<i>Acronym</i>
1	Board independence	Proportion of independent directors on the board	BIND
2	Firm complexity	Firm size = natural logarithm of the market capitalisation of the firm/ natural logarithm of total assets of the firm	LMCAP/LSIZE
3		Firm age = the number of years since the firm has been listed on Bombay Stock Exchange/square of LISTAGE	LISTAGE/LISTAGESQ
4		Firm leverage = ratio of book value of long-term debt to book value of total assets/ratio of book value of total debt to book value of total assets	LEVERAGE1/ LEVERAGE2

Source: Definitions developed from the past corporate governance literature

Table 1 Operationalisation of the variables/factors (continued)

<i>S. no.</i>	<i>Variables</i>	<i>Definition</i>	<i>Acronym</i>
5	Monitoring and advising costs	Growth opportunity (a) = market to book ratio of equity/ natural logarithm of market to book ratio of equity Tobin's Q ratio	MTB/LMTB/TOBINQ
6		Growth opportunity (b) = ratio of research and development (R&D) expenditure to book value of total assets/ratio of research and development (R&D) expenditure to net sales	R&D1/R&D2
7		Information asymmetry = standard deviation of monthly stock returns over the 12 months preceding the financial-year end (stock return volatility)	STDDEV
8	Private benefits	Free cash flow = net cash flow from operating activities minus capital expenditure made during the year divided by book value of total assets	FCF
9		Dividend payout = 1 – (payment of equity dividend divided by net worth of the firm)	DIV
10	CEO influence	Performance = earnings before interest and taxes (EBIT) divided by book value of total assets for the current year/previous year/average performance of the current and previous year	ROA _(t) /ROA _(t-1) / AVGROA
11		A binary variable that takes the value of '1' when the CEO is also the chairman of the board, and '0' otherwise/a binary variable that takes the value of '1' when the CEO is also the chairman of the board in at least three of the five-year time period, and '0' otherwise	DUALITY1/DUALITY2
12		CEO tenure = the number of years CEO has served in the same capacity in the firm	CEOTEN
13	Inside ownership	Natural logarithm of percentage of shares held by the promoters of the firm	LINSOWN

Source: Definitions developed from the past corporate governance literature

Therefore, the variable, i.e., natural logarithm of inside shareholding (LINSOWN) has also been included as an additional variable influencing the level of board independence.

Table 1 exhibits the operationalisation of all variables covered in the study which have been guided by the past literature. It also covers the measures of additional proxies (such as LEVERAGE2, TOBINQ, R&D2, ROA_(t) and ROA_(t-1), etc.) which have been

employed for the purpose of robustness testing. A bird's eye view of all these variables is presented in Table 1.

2 Research design

2.1 Sample selection

The sample for the study has been derived after sorting the market capitalisation of all companies that have been listed on BSE in India as on 31st March 2010. The estimated values of market capitalisation of the companies have been taken from Prowess Database maintained by Centre for Monitoring Indian Economy (CMIE). A total of five-year period, i.e., 2005–2006 to 2009–2010, has been covered for the empirical analysis. This time period has been selected in light of inadequate compliance with regard to the stipulated (minimum) requirements of corporate governance under Revised Clause 49 of the Listing Agreement in the year 2004, due to which the date for its compliance had been extended for the companies from 1 April 2005 to 31 December 2005 by SEBI vide circular number SEBI/CFD/DIL/CG/1/2005/29/3. Therefore, the year 2005–2006 has been selected as a beginning point of this study which ends up with the year 2009–2010.

Initially top 200 companies had been drawn from which following exclusions have been made:

- banking and finance companies as they belong to highly regulated industries
- the companies that had not been listed on BSE even for one of the five-year period covered in the study
- the companies whose financial year ended on other than that of 31st March for each of the five-year study period
- the companies on which data on board characteristics were not available
- apart from the above, one company, i.e., Satyam Computer Services Ltd. was also dropped for its well-known reasons.

Thus, the final sample constitutes 114 non-financial companies listed on BSE which has resulted into a total of 570 (114 * 5) firm-year observations.

2.2 Research justification

Indian corporate governance regulatory framework [i.e., Revised Clause 49 (2004)] has presented an attractive platform for examining the issues surrounding the independence of board members. Moreover, selection of Indian listed corporates in the sample has also been justified on the following grounds:

2.2.1 Prevalence of concentrated corporate ownership patterns in India

Predicting the demand for monitoring functioning by independent directors holds great importance for the Indian corporates which are predominantly owned by the controlling shareholders, influential CEOs and promoters. This monitoring functioning will be better

able to take into account the minority shareholders' interests by counterweighing the effect of promoters' and CEOs' dominance.

2.2.2 Impact of corporate scams in India

The global financial crisis occurred in 2008 and the concatenation of many corporate frauds and scandals, including Satyam and Reebok, happened in India have triggered the need for better corporate governance (Arora and Bhandari, 2017), which in turn raises demand for auxiliary expertise and supervision by the independent directors. The regulatory action taken by the authorities respecting the mandatory requirement for the independent directors' proportion in the corporate boards is a turning point in this direction. Still the question persists about whether increasing the independent directors' proportion, beyond the prescribed one, would prove to be beneficial to the corporates and if yes, then in what type of situation the monitoring and advisory roles of independent directors will guide the firms to tackle numerous challenges.

2.2.3 Lack of empirical research

The testing of demand for monitoring and advisory functions of board members as well as the impact of firm complexity, monitoring and advising costs, private benefits, etc., in India has received very little academic research attention. Till now, the research concerning this issue has not been carried out on an extensive scale in India.

2.2.4 Situational context

The situational context denotes different firm-specific circumstances as to whether the firms are more complex in nature; or having multifarious growth opportunities or are subject to CEO influence etc. Thus, it becomes imperative to examine this issue in detail, especially after the mandatory requirement stated under Revised Clause 49 of the Listing Agreement (2004) for Indian corporate governance. This would enhance the understanding of board of directors' roles and their importance for specific firm oriented situational context to which a particular firm is subjected to.

2.2.5 Different Indian firm sizes

Analogous to other countries, the firms operating in Indian corporate environment are not of same sizes and capital structures. Thus, 'one-size-fits-all' approach cannot be applicable for Indian corporates as some of them are of large sizes, whilst others are small. Similarly, the financial indicators like level of financial leverage (or capital structures), the extent of growth opportunities, profitability ratios, and the inside management, i.e., CEO characteristics, do tends to vary from firm to firm. Hence, to estimate the relevance of independent directors' roles, it is important to analyse this issue according to different firm-sizes so as to offer appropriate board level implications for both large as well as small firms.

The above stated factors have provided enough motivation to conduct an empirical investigation on this issue and to make incremental contribution to the existing corporate governance literature in India.

2.3 Model development

The above described variables have been modelled into the following equation (1):

$$Y_{it} = \alpha + \beta FC_{it} + \beta MAC_{it} + \beta PB_{it} + \beta CI_{it} + \text{Industry Dummies} + \text{Year Dummies} + \mu_{it} \quad (1)$$

where Y_{it} = value of a dependent variable which reflects proportion of independent directors on the board of a firm i in a specific year t (i and t denotes individual and time dimension respectively).

α constant term

β regression coefficient

FC_{it} reflects a set of variables representing firm complexity, i.e., firm size, age and leverage

MAC_{it} reflects a set of variables representing monitoring and advising costs, i.e., market-to-book ratio, research and development expenditure and stock return volatility

PB_{it} reflects a set of variables representing private benefits, i.e., FCF and dividend payments

CI_{it} reflects a set of variables representing CEO influence, i.e., firm performance, CEO tenure or CEO duality

μ_{it} disturbance term/error term.

The analysis for determining the variables affecting board independence has been performed using Pooled OLS regression. In this regression, several model specifications have been estimated by using different proxies and employing additional variables. The assumptions of homoskedasticity and no serial correlation have also been checked while deriving OLS estimates from the pooled OLS regression [Wooldridge, (2002), p.171]. In order to make accurate statistical inferences, the analysis has estimated the robust standard errors of the parameters after taking into account the concerns for heteroskedasticity and serial correlation, if any [Wooldridge, (2002), p.178]. Moreover, the robust standard errors (reported in the parentheses) are clustered at the firm-level and each model specification also encompasses the effect of year and industry dummies.

In addition to the pooled OLS, a number of alternative regression methodologies have been adopted to check the authenticity of the OLS results. These methodologies include robust regression, median regression and Tobit regression. Robust regression is based upon iteratively reweighted least squares whereby weights have been allotted to each observation and the observations carrying better behaviour are assigned quite higher weights. Moreover, zero weights are assigned to the observations carrying Cook distances of more than one in order to prevent the effects of bad leverage points (Verardi and Croux, 2009). Median regression is basically the variant of quantile regression wherein the deviations from the median are brought down to estimate the parameters of the coefficients. To be more specific, it is the regression, upon which the effect of the presence of severe outliers is not serious in nature (John, 2015). In addition, Tobit regression is a censored regression model, also called limited dependent variable

regression model, wherein the observations of the dependent variable (regressand) are confined by introducing either right or left censoring [Gujarati et al., (2012), p.602].

3 Empirical analysis and findings

Before proceeding with the identification of determinants of board independence, the preliminary testing of data has been conducted in order to check the required assumptions regarding multicollinearity, heteroscedasticity and autocorrelation. The testing of multicollinearity between the independent variables has been performed by way of variance inflation factor (VIF) whose maximum acceptable value (against which VIF values of independent variables to be compared) is limited to 10 as well as through tolerance whose minimum value (against which tolerance values of independent variables to be compared) is taken as 0.10. Results of Table 2 could not detect the severe presence of multicollinearity between the independent variables. Table 3 provides the results of Breusch-Pagan/Cook-Weisberg and Wooldridge tests for testing the presence of heteroscedasticity and autocorrelation respectively. The application of Breusch-Pagan/Cook-Weisberg test involves the testing of null hypothesis of constant variance whereas Wooldridge test deals with testing the null of no first-order autocorrelation. Findings of Table 3 reflect the acute presence of heteroscedasticity in all developed modelling structures of the study. Furthermore, results also reject the null hypothesis of no first-order correlation in all the specified cases, and thus confirm the presence of autocorrelation.

The following section presents the results of determinants of board independence using OLS regression. Table 4 demonstrates the empirical testing of first two hypotheses – ‘firm complexity and advising benefits hypothesis’ and ‘monitoring and advising costs hypothesis’. Findings revealed that the estimated coefficient of firm size (LMCAP) was positive but insignificant at all the conventional significance levels. This result implies that proportion of independent directors on the board does not significantly influenced by the size of the firm (LMCAP). Thus, it could not connote the inference that large firms demand more independent directors on the boards. As far as firm age (LISTAGE) is concerned, OLS regression estimates revealed a significantly positive coefficient which suggests that the proportion of independent directors on the board tends to increase as the firm becomes mature in terms of age. This finding indicates that matured firms demand more outside (independent) directors on their boards due to their widened level of expertise. In some models (model 3, 5, 7, 8 and model 9), the squared term of firm age was inserted to identify whether firm age is related to the board independence in a nonlinear fashion. Outcomes of these models have indicated the presence of nonlinear relationship between firm age and board independence as the estimated coefficients of LISTAGE and LISTAGESQ were found to be significant in the positive and negative direction respectively. The positive (negative) direction of LISTAGE (LISTAGESQ) variable suggests that board independence is influenced by the firm age at increasing (decreasing) rate meaning thereby that the level of complexity grows at varying rates for mature and young firms (Linck et al., 2008). This evidence remained unaltered even after considering the effect of variables proxying ‘monitoring and advising costs’ hypothesis. Thus, the argument of nonlinearity made in this study gets statistically proved. However, it stands contrast with the observation of Linck et al. (2008) and Monem (2013) which, although argued, but could not locate the nonlinear association between the two.

Table 4 shows that model 1 employed LEVERAGE2 (ratio of total debt to total assets) variable, the coefficient of which was insignificant and thus, replaced with LEVERAGE1 (ratio of long-term debt to total assets) variable. In contrast to LEVERAGE2 (insignificant), the estimated coefficient on firm leverage (LEVERAGE1) has been found to be significant in the positive direction which explains that the higher the level of leverage in firms, the greater will be the proportion of independent directors in the boards and thereby, yields intended consequences for corporate board independence (Linck et al., 2008). Thus, the significant positive influence of firm age and leverage clearly suggests that board independence is significantly determined by the level of complexity as well as the advisory needs of the firms, hence, supports ‘complexity and advising benefits hypothesis’. In other words, these results tend to corroborate the complexity argument that firms having more complex operations require more independent outside directors on the boards (Coles et al., 2008; Guest, 2008, Linck et al., 2008).

Thereafter, the impact of ‘monitoring and advising costs’ (along with the firm complexity) on the corporate board independence has been tested by means of three proxies, i.e., market-to-book ratio (MTB), research and development expenditure (R&D1) and stock market volatility (STDDEV). The choice of these proxies is based upon the argument that the effectiveness (or proportion) of outside directors decreases with the increase in the monitoring and advising costs and the same has been guided by the empirical studies conducted in the recent past (Linck et al., 2008; Aman and Nguyen, 2012). Result of Table 4 provides that the coefficient for market-to-book ratio (MTB) was statistically significant but in the positive direction. The similar result is observed when market-to-book ratio (MTB) was replaced with Tobin’s Q (TOBINQ) (model 6 and 7) which is also in contrast to the expectations derived from Linck et al. (2008), Aman and Nguyen (2012) and others. Results remained unchanged even after employing the logarithmic term of market-to-book ratio variable (model 9). Analogously, the impact of research and development expenditure (R&D1) on board independence had also been observed as significantly positive (model 4 to 7), which although unexpected, has also been noticed in Linck et al. (2008) but opposite to the results of Aman and Nguyen (2012). Even after replacing R&D1 with R&D2 measure, the positive coefficient of research and development expenditure remained intact (model 8). The positive directions of the variables representing firm growth suggest that increase in the growth opportunities for the firm creates more demand for expert advice by the independent directors. This runs parallel to the Coles et al. (2008) observation which had also stated positive relationship between R&D expenditures and proportion of outsiders on the boards. These deviations in directions from the predicted ones might be due to the changing institutional context which implies that the arguments for monitoring and advising costs in developed countries might not be applicable to the developing countries like India.

However, the coefficient for stock market volatility (STDDEV) had been found to be insignificant as in Linck et al. (2008). Overall the results demonstrate that monitoring costs in terms of Tobin’s Q (TOBINQ) and research and development expenditure (R&D1) do significantly determine the level of board independence but in the positive direction which infers that firms with higher growth opportunities value the monitoring effectiveness and expertise level of independent outside board members. These significant outcomes are, however, also found to be in stark contrast to the studies such as

Ting (2011) wherein costs and benefits of monitoring and advising have been unable to explain the variation in board independence.

Table 5 presents the findings of the extended analysis by incorporating the effect of private benefits (extent of FCF and dividend payments) and CEO influence (ROA), in addition to the variables representing firm complexity and monitoring and advising costs on the board independence. Model 1 includes only FCF as proxy for private benefits whilst model 2 onwards employs two measures of private benefits, i.e., FCF and dividend payments (DIV). Result of all models indicates that FCF was insignificantly related to the board independence, thus unable to provide any statistical evidence that board independence is influenced by the extent of private benefits available to the managers. The impact of FCF has also found to be insignificant in some of the concerning past studies namely Boone et al. (2007), Coles et al. (2008), Guest (2008) and Monem (2013). Result of another proxy of the private benefits, DIV, have also not exhibited any variation in board independence as the coefficient of DIV variable also comes out to be statistically insignificant. These findings remained consistent when logarithmic term of market-to-book ratio variable is used in the model testing (model 3).

Model 4 incorporates the effect of CEO influence by adding the variable (ROA) (ROA_t). The estimated coefficient of ROA (ROA_t) was statistically significant, but in the positive direction opposite to the predicted direction (i.e., negative) as suggested by Guest (2008), Linck et al. (2008) and Aman and Nguyen (2012). The inference from the positive coefficient of ROA, i.e., CEO influence, suggests that increase in CEO influence, in turn, instigates the demand for higher board monitoring in terms of greater board independence. Thus, higher representation of independent directors is required to combat the increasing control of the CEO in the firm. Hence, monitoring role of independent board members is much acknowledged in firms having greater CEO control. Moreover, this result is in line with the studies such as Berry et al. (2006) which had reported positive effect of industry – adjusted ROA on board independence. The variation in the results from that of Guest (2008), Linck et al. (2008) and others can be attributed to extent of diversity prevailing in different institutional contexts. In line with Linck et al. (2008) and Ting (2011), model 5 includes the lagged performance variable (ROA_{t-1}) to proxy for CEO influence by replacing the current firm performance (ROA_t) variable whilst model 6 covers the average values of ROA of the current and previous year (AVGROA) by substituting ROA as well as ROA_{t-1} variables. The results of CEO influence ($ROA_{t-1}/AVGROA$) remained unchanged and also even after employing the logarithmic term of market-to-book ratio variable (model 7) and thus, indicates the positive effect of CEO influence on the board independence. Interestingly, after adding lagged performance variable (ROA_{t-1}) and average return on assets (AVGROA), the DIV variable comes out to be statistically significant in the positive direction which reflects that board independence, to some extent, is too determined by the private benefits available to the managers. This finding is in line with Aman and Nguyen (2012) that lower dividend payments provide opportunities to the managers to maintain greater cash balances at their disposal. It is to be noted that the coefficient of firm size (LMCAP) could not reach at conventional significance levels in any of the model specifications. In order to check whether the use of alternate proxy of firm size could bring any variation in the results, the variable LSIZE (natural logarithm of firm's total assets) had been included in the last model of Table 5. Results showed that the coefficient of firm size (LSIZE)

again became insignificant and thus, proved to be immaterial for determining the extent of board independence.

3.1 Robustness testing using different regression methodologies

In order to verify the robustness of the afore-stated findings, several regression methodologies (other than OLS) have been employed which include robust regression, median regression and Tobit regression. Robust and median regressions have been applied to account for the heteroskedasticity and non-normality of residuals respectively. In Tobit regression, both left (lower level) and right (upper level) censoring limits have been employed. More particularly, the model specification of present study has been estimated with the help of Tobit regression by setting the lower limit at 25%. Similarly, the upper limit under the Tobit regression analysis has been confined to 75%. Herein, models 1, 3 and 5 have employed market-to-book ratio variable and models 2, 4 and 6 have incorporated the natural logarithmic term of market-to-book ratio as proxy for growth opportunity.

Results of robust, median and Tobit regressions have been reported in Table 6. The findings of all the variables remains same (rather improved) in terms of their statistical significance levels. In other words, LISTAGE and LEVERAGE are positive and significant, thus again provide support for ‘firm complexity and advising benefits’ hypothesis. As regards the ‘monitoring and advising costs’, the variables MTB/LMTB and R&D also comes out to be statistically significant in the positive direction, whilst STDDEV remains insignificant. The same has been observed for the proxy representing CEO influence, i.e., ROA. As far as the impact of private benefits on board independence is concerned, all the regressions (robust, median and Tobit regressions) have produced insignificant coefficient of FCF variable, and positive and significant coefficient of DIV variable, thus, remain consistent with the results of OLS. To be very specific, results of Tobit regression in models 5 and 6 have also showed no variation in the main findings and thus, in this way, the present study yields robust statistical evidences of the above-stated relationships.

3.2 Sub-sample analysis

In this section, the sample period was changed from five-year (2005–2006 to 2009–2010) to the separate three sets of three-year time-frame each, i.e., 2005–2006 to 2007–2008, 2006–2007 to 2008–2009 and 2007–2008 to 2009–2010. Results of the sub-sample analyses have been reported in Table 7. Findings of the analyses pertaining to firm complexity, monitoring and advising costs, private benefits and CEO influence are same and consistent across the three sets except the changes with respect to FCF (becomes significant) and dividend (becomes insignificant) in the period during 2005–2006 to 2007–2008 time set. However, the results have not exhibited any variation between the results of 2006–2007 to 2008–2009 and 2007–2008 to 2009–2010 time sets and thus, remained robust in nature. Moreover, the nonlinearity between firm age and board independence has also been empirically established in all the time sets developed in the study.

Table 2 Results of VIF and tolerance level: testing of multicollinearity

Independent variables	Case 1		Case 2		Case 3		Case 4		Case 5	
	VIF	Tolerance (1/VIF)	VIF	Tolerance (1/VIF)	VIF	Tolerance (1/VIF)	VIF	Tolerance (1/VIF)	VIF	Tolerance (1/VIF)
LMCAP	1.27	0.7879	1.32	0.7548	1.32	0.7554	1.20	0.8346	1.24	0.8088
LSTAGE	6.41	0.1559	6.57	0.1521	6.56	0.1525	9.30	0.1074	6.77	0.1476
LSTAGESQ	6.40	0.1562	6.44	0.1551	6.44	0.1553	9.33	0.1071	6.49	0.1540
LEVERAGE1	1.40	0.7147	1.46	0.6850	1.47	0.6812	1.54	0.6514	1.40	0.7148
LMTB	1.34	0.7456	1.34	0.7450	1.34	0.7448	1.54	0.6510	1.35	0.7419
R&D1	1.07	0.9303	1.08	0.9298	1.08	0.9284	1.14	0.8809	1.08	0.9272
STDDEV	1.12	0.8962	1.12	0.8956	1.12	0.8962	1.19	0.8391	1.13	0.8871
FCF	1.51	0.6634	1.51	0.6602	1.52	0.6586	1.75	0.5702	1.51	0.6600
DIV	1.55	0.6451	1.55	0.6431	1.56	0.6417	1.73	0.5772	1.55	0.6468
AVGROA	1.73	0.5782	1.76	0.5674	1.76	0.5690	1.89	0.5289	1.72	0.5799
DUALITY1			1.15	0.8720						
DUALITY2					1.15	0.8698				
CEOTEN							1.25	0.8000		
LNSOWN									1.18	0.8471

Source: Computed from STATA 11.0 software

Table 3 Results of likelihood-ratio (Wooldridge) test: testing of heteroskedasticity (autocorrelation)

<i>Cases</i>	<i>Testing of heteroskedasticity</i>		<i>Testing of autocorrelation</i>	
Case 1	Chi2	29.04	F	33.031
	Prob. > chi2	0.0000	Prob. > F	0.0000
	Present/absent	Present	Present/absent	Present
Case 2	Chi2	26.36	F	33.039
	Prob. > chi2	0.0000	Prob. > F	0.0000
	Present/absent	Present	Present/absent	Present
Case 3	Chi2	26.01	F	33.031
	Prob. > chi2	0.0000	Prob. > F	0.0000
	Present/absent	Present	Present/absent	Present
Case 4	Chi2	25.85	F	30.842
	Prob. > chi2	0.0010	Prob. > F	0.0002
	Present/absent	Present	Present/absent	Present
Case 5	Chi2	29.27	F	32.764
	Prob. > chi2	0.0000	Prob. > F	0.0000
	Present/absent	Present	Present/absent	Present

Source: Computed from STATA 11.0 software

3.3 Additional analyses

3.3.1 Impact of CEO duality

The above analysis has been extended by including the impact of CEO duality as additional proxy for CEO influence. As directed from the studies such as Linck et al. (2008) and Monem (2013), the analysis had also incorporated the effect of CEO duality on the board independence as another proxy for CEO influence. Results of Table 8 reveal that the coefficient of CEO duality was not significantly related to the board independence in model 1. This insignificance had been also observed when the definition of duality has been changed in model 2, i.e., value '1' is assigned to the firm if the firm has a single individual occupying the positions of both CEO and chairman in at least three financial years of the five-year study period. Similarly, a firm is assigned a code '0' if the firm has no CEO duality in the board leadership structure in at least three years of the five-year study period. Even after employing logarithmic term of market to book ratio (LMTB) in the model 3 and model 4, the insignificance of CEO duality remained intact. However, the results pertaining to the firm complexity, costs of monitoring and advising, private benefits and CEO influence remained same.

3.3.2 Impact of CEO tenure

Model 5 and Model 6 of Table 8 reports the effect of CEO tenure along with the testing of other hypotheses in relation to board independence. Overall findings of the analysis remained same [except dividends (DIV) and average performance (AVGROA)] after adding CEO tenure variable, the coefficient of which was found to be significant in the positive direction. This indicates that firms having long-entrenched CEOs are required to have greater representation of independent directors on the board, thus rejects the entrenchment argument that long tenured CEOs limits the outsider representation on their boards. This result is in contrast to the negative finding reported by Bathala and Rao (1995) and Aman and Nguyen (2012) but is in line with positive effect demonstrated by Kyereboah-Coleman and Biekpe (2007).

3.3.3 Impact of inside shareholding

Model 7 and Model 8 of Table 8 report the results of determinants of board independence after considering the impact of inside shareholding (shareholdings of promoters) on the board independence keeping in view the Indian corporate context where, in general, ownership is concentrated in the hands of promoters. Analysis of model 7 and model 8 shows that the coefficient of the inside shareholding was negative and significant in both the models. This indicates that the increase in inside shareholding leads to decrease in board independence. The findings as regards firm complexity, costs of monitoring and advising, private benefits and CEO influence have showed no variation in the analysis and thus, remain consistent.

3.4 Determinants of board independence for large and small firms

In this section, the empirical setting has been expanded to test the argument that whether the applicability of hypotheses concerning level of complexity, monitoring and advising costs and CEO influence remains same for all the sizes of firms. To investigate the same, the sample was divided into two categories, i.e., large and small firms. Large firms are coded as '1' if their average market capitalisation (or market value of equity) for the five-year period (2005–2006 to 2009–2010) comes under large firm-group sample.

Similarly, '0' code has been assigned to small firms whose average market capitalisation (or market value of equity) for the five-year period (2005–2006 to 2009–2010) belongs to small firm-group sample. The large and small firm-group samples have been derived after sorting their market capitalisation into ascending order whereby the first half firm-group is labelled as small firm-group whilst the firms included in the second half are taken under large firm-group sample.

Results of Table 9 suggests that the level of firm complexity and advising benefits argument holds only for large firms in the expected direction. More specifically, the nonlinear relationship between firm age and board independence has also been observed for large firm-group sample. The positive relationship between firm leverage and board independence too holds for large firms.

Table 4 Determinants of board independence (BIND): testing of 'firm complexity' and 'monitoring and advising costs' hypotheses: regression analysis

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Constant	0.3388*** (0.0991)	0.3058*** (0.0971)	0.2662*** (0.0998)	0.2739*** (0.0978)	0.2334*** (0.0991)	0.2707*** (0.0950)	0.2210** (0.0958)	0.2442** (0.0990)	0.2440** (0.0977)
LMCAP	0.0080 (0.0085)	0.0104 (0.0085)	0.0110 (0.0085)	0.0080 (0.0083)	0.0086 (0.0082)	0.0024 (0.0082)	0.0028 (0.0080)	0.0076 (0.0082)	0.0033 (0.0085)
LISTAGE	0.0014** (0.0006)	0.0014** (0.0006)	0.0039** (0.0016)	0.0015** (0.0006)	0.0040** (0.0015)	0.0017** (0.0007)	0.0047*** (0.0014)	0.0043*** (0.0015)	0.0045*** (0.0015)
LISTAGESQ			-0.00003** (0.00001)		-0.00002** (0.00001)		-0.00003** (0.00001)	-0.00003** (0.00001)	-0.00003** (0.00001)
LEVERAGE1		0.1129* (0.0627)	0.1268** (0.0615)	0.1172** (0.0592)	0.1304** (0.0583)	0.1682*** (0.0587)	0.1868*** (0.0580)	0.1231** (0.0588)	0.1400** (0.0594)
LEVERAGE2	0.0449 (0.0560)								
TOBINQ						0.0216*** (0.0049)	0.0227*** (0.0050)		
MTB				0.0022*** (0.0007)	0.0022*** (0.0008)			0.0023*** (0.0008)	0.0372*** (0.0115)
LMTB									2.3676*** (0.6739)
R&D1				2.5349*** (0.6618)	2.5317*** (0.6822)	2.4342*** (0.6465)	2.4253*** (0.6709)	1.5959*** (0.3860)	
R&D2									
STDDEV				-0.0001 (0.0007)	-0.0001 (0.0007)	-0.0002 (0.0007)	-0.0001 (0.0007)	-0.0002 (0.0007)	-0.0002 (0.0007)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F	2.73	2.66	2.70	4.21	4.12	4.47	4.71	4.39	3.72
Prob. > F	0.0000	0.0011	0.0007	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R-sq.	14.66	15.58	16.88	23.32	24.58	28.40	30.25	23.94	27.00

Notes: ***, ** and * denotes levels of significance at 1, 5 and 10% respectively.

Source: Computed from STATA 11.0 software

Table 5 Determinants of board independence (BIND) – testing of ‘firm complexity’, ‘monitoring and advising costs’, ‘private benefits’ and CEO influence hypotheses: advance analysis

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Constant	0.2350** (0.0995)	0.2326** (0.1017)	0.2559** (0.1006)	0.2253** (0.0985)	0.2199** (0.0988)	0.2209** (0.0984)	0.2398** (0.0997)	0.3112*** (0.1064)
LMCAP	0.0086 (0.0082)	0.0087 (0.0083)	0.0024 (0.0087)	0.0052 (0.0078)	0.0049 (0.0076)	0.0043 (0.0076)	0.0002 (0.0082)	
LSIZE								-0.0061 (0.0081)
LISTAGE	0.0040** (0.0015)	0.0040** (0.0015)	0.0046*** (0.0015)	0.0045*** (0.0015)	0.0045*** (0.0014)	0.0046*** (0.0014)	0.0050*** (0.0015)	0.0051*** (0.0015)
LISTAGESQ	-0.00002** (0.00001)	-0.00002** (0.00001)	-0.00003** (0.00001)	-0.00003** (0.00001)	-0.00003** (0.00001)	-0.00003** (0.00001)	-0.00003** (0.00001)	-0.00003** (0.00001)
LEVERAGE1	0.1233** (0.0604)	0.1241** (0.0609)	0.1212** (0.0616)	0.1581** (0.0601)	0.1676*** (0.0609)	0.1701*** (0.0606)	0.1569** (0.0609)	0.1517** (0.0582)
MTB	0.0023*** (0.0008)	0.0022** (0.0009)		0.0018** (0.0007)	0.0018** (0.0007)	0.0017** (0.0007)		
LMTB			0.0408*** (0.0132)				0.0319** (0.0121)	0.0289** (0.0115)
R&D1	2.5319*** (0.6816)	2.5431*** (0.6946)	2.3194*** (0.6817)	2.3761*** (0.7010)	2.4454*** (0.7047)	2.3825*** (0.7046)	2.2351*** (0.6958)	2.1956*** (0.7024)
STDDEV	-0.0001 (0.0007)	-0.0001 (0.0007)	-0.0003 (0.0007)	0.0000 (0.0006)	0.0002 (0.0006)	0.0002 (0.0006)	-0.0000 (0.0006)	-0.0001 (0.0006)
FCF	-0.0235 (0.0664)	-0.0274 (-0.0730)	-0.0422 (0.0713)	-0.1039 (0.0694)	-0.0864 (0.0667)	-0.1090 (0.0673)	-0.1109 (0.0683)	-0.1142 (0.0682)
DIV		-0.0151 (0.0669)	0.0443 (0.0693)	0.0906 (0.0651)	0.0941* (0.0564)	0.1132* (0.0612)	0.1370** (0.0668)	0.1445** (0.0652)
ROA ₀				0.3469*** (0.1266)				
ROA ₍₋₁₎					0.3882*** (0.1155)			
AVGROA						0.4381*** (0.1360)	0.3754** (0.1419)	0.3750** (0.1466)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F	3.97	3.91	3.65	4.33	4.51	4.51	3.89	3.98
Prob. > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R-sq.	24.61	24.62	27.21	27.14	28.58	28.45	29.77	29.97

Notes: ***, ** and * denotes levels of significance at 1, 5 and 10%, respectively.

Source: Computed from STATA 11.0 software

Table 6 Determinants of board independence (BIND): robustness testing

Variables	Robust regression		Median regression		Tobit regression		Tobit regression	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 5	Model 6
Constant	0.2732*** (0.0544)	0.2817*** (0.0548)	0.2767*** (0.0641)	0.3022*** (0.0837)	0.2677*** (0.0544)	0.2858*** (0.0543)	0.2677*** (0.0544)	0.2858*** (0.0543)
LMCAP	0.0019 (0.0045)	-0.0021 (0.0047)	0.0031 (0.0053)	-0.0035 (0.0071)	0.0018 (0.0045)	-0.0022 (0.0046)	0.0018 (0.0045)	-0.0022 (0.0046)
LISTAGE	0.0042*** (0.0007)	0.0047*** (0.0008)	0.0034*** (0.0009)	0.0044*** (0.0012)	0.0043*** (0.0007)	0.0047*** (0.0007)	0.0043*** (0.0007)	0.0047*** (0.0007)
LISTAGESQ	-0.00003*** (0.00000)	-0.00003*** (0.00000)	-0.00002*** (0.00001)	-0.00003*** (0.00001)	-0.00003*** (0.00000)	-0.00003*** (0.00000)	-0.00003*** (0.00000)	-0.00003*** (0.00000)
LEVERAGE1	0.1387*** (0.0382)	0.1327*** (0.0387)	0.1340*** (0.0440)	0.1472** (0.0582)	0.1486*** (0.0379)	0.1370*** (0.0382)	0.1486*** (0.0379)	0.1370*** (0.0382)
MTB	0.0021*** (0.0006)		0.0026*** (0.0007)		0.0020*** (0.0006)		0.0020*** (0.0006)	
LMTB		0.0346*** (0.0071)		0.0308*** (0.0109)		0.0332*** (0.0071)		0.0332*** (0.0071)
R&D1	2.4212*** (0.3418)	2.2943*** (0.3442)	2.6957*** (0.4027)	2.5389*** (0.5236)	2.3571*** (0.3384)	2.2110*** (0.3383)	2.3571*** (0.3384)	2.2110*** (0.3383)
STDDEV	0.0007 (0.0006)	0.0005 (0.0006)	0.0004 (0.0007)	0.0003 (0.0009)	0.0002 (0.0006)	0.0000 (0.0006)	0.0002 (0.0006)	0.0000 (0.0006)
FCF	-0.0190 (0.0491)	-0.0275 (0.0494)	0.0207 (0.0564)	-0.0106 (0.0750)	-0.0702 (0.0493)	-0.0723 (0.0492)	-0.0702 (0.0493)	-0.0723 (0.0492)
DIV	0.1747*** (0.0598)	0.1951*** (0.0589)	0.1565*** (0.0673)	0.1758** (0.0859)	0.1370*** (0.0593)	0.1553*** (0.0580)	0.1370*** (0.0593)	0.1553*** (0.0580)
AVGROA	0.4472*** (0.0734)	0.4021*** (0.0771)	0.3131*** (0.0838)	0.3417*** (0.1141)	0.4192*** (0.0740)	0.3551*** (0.0772)	0.4192*** (0.0740)	0.3551*** (0.0772)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F	9.55	10.37						
Prob. > F	0.0000	0.0000	11.24	11.74	188.13	198.06	188.13	198.06
Pseudo R-sq.								
LR chi2								
Prob. > chi2								

Notes: ***, ** and * denotes levels of significance at 1, 5 and 10% respectively.

Source: Computed from STATA 11.0 software

Table 7 Determinants of board independence (BIND) for the three-year sampling period: subsample analysis

Variables	2005–2006 to 2007–2008		2006–2007 to 2008–2009		2007–2008 to 2009–2010	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	0.1816 (0.1178)	0.2028* (0.1184)	0.1998* (0.1156)	0.2238** (0.1144)	0.2706*** (0.1021)	0.2870*** (0.1046)
LMCAP	0.0068 (0.0091)	0.0024 (0.0094)	0.0068 (0.0089)	0.0021 (0.0093)	0.0026 (0.0077)	-0.0010 (0.0085)
LISTAGE	0.0050*** (0.0017)	0.0054*** (0.0017)	0.0046*** (0.0016)	0.0051*** (0.0016)	0.0043*** (0.0014)	0.0048*** (0.0015)
LISTAGESQ	-0.00003** (0.00001)	-0.00004** (0.00001)	-0.00003** (0.00001)	-0.00004** (0.00001)	-0.00003** (0.00001)	-0.00003** (0.00001)
LEVERAGE1	0.1928** (0.0776)	0.1718** (0.0769)	0.1714** (0.0753)	0.1613** (0.0722)	0.1545** (0.0637)	0.1440** (0.0655)
MTB	0.0020 (0.0014)		0.0034*** (0.0009)		0.0021*** (0.0004)	
LMTB		0.0396** (0.0164)		0.0385*** (0.0123)		0.0281** (0.0111)
R&DI	2.3734*** (0.7195)	2.1617*** (0.7142)	2.3280*** (0.7659)	2.2054*** (0.7623)	2.2599*** (0.8157)	2.2165*** (0.8146)
STDDEV	-0.0003 (0.0006)	-0.0007 (0.0007)	-0.0004 (0.0008)	-0.0005 (0.0008)	0.0003 (0.0007)	0.0004 (0.0007)
FCF	-0.2271** (0.0891)	-0.2237** (0.0918)	-0.0948 (0.0809)	-0.1018 (0.0812)	0.0242 (0.0626)	0.0065 (0.0639)
DIV	0.0823 (0.0846)	0.1120 (0.0869)	0.1356** (0.0641)	0.1425** (0.0682)	0.1504*** (0.0494)	0.1558*** (0.0549)
AVGROA	0.5090*** (0.1728)	0.4339** (0.1821)	0.3951** (0.1575)	0.3379** (0.1595)	0.3507*** (0.1246)	0.3018** (0.1255)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
F	3.44	3.40	4.44	3.39	6.16	3.33
Prob. > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R-sq.	30.94	32.79	29.66	30.82	28.40	28.84

Notes: ***, ** and * denotes levels of significance at 1, 5 and 10% respectively.

Source: Computed from STATA 11.0 software

Table 8 Determinants of board independence (BIND)-impact of CEO duality, CEO tenure and inside shareholding: regression analysis

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Constant	0.2242** (0.0987)	0.2244** (0.0985)	0.2445** (0.1002)	0.2446** (0.0998)	0.1179 (0.0869)	0.1758 (0.1193)	0.4765*** (0.1619)	0.5002*** (0.1578)
LMCAP	0.0027 (0.0081)	0.0028 (0.0080)	-0.0019 (0.0088)	-0.0017 (0.0087)	0.0042 (0.0071)	-0.0036 (0.0089)	0.0054 (0.0080)	0.0009 (0.0084)
LISTAGE	0.0047*** (0.0014)	0.0047*** (0.0014)	0.0052*** (0.0015)	0.0052*** (0.0015)	0.0033** (0.0013)	0.0039** (0.0018)	0.0040** (0.0016)	0.0044*** (0.0016)
LISTAGESQ	-0.00003** (0.00001)	-0.00003** (0.00001)	-0.00003*** (0.00001)	-0.00003*** (0.00001)	-0.00002** (0.00001)	-0.00003** (0.00001)	-0.00003** (0.00001)	-0.00003** (0.00001)
LEVERAGE1	0.1800*** (0.0601)	0.1800*** (0.0603)	0.1676*** (0.0607)	0.1678*** (0.0608)	0.2847*** (0.0664)	0.2628*** (0.0867)	0.1505** (0.0598)	0.1348** (0.0594)
MTB	0.0017** (0.0007)	0.0018** (0.0007)			0.0023** (0.0009)		0.0023*** (0.0007)	
LMTB			0.0326** (0.0127)	0.0326** (0.0127)		0.0505*** (0.0146)		0.0364*** (0.0116)
R&DI	2.3930*** (0.6836)	2.3903*** (0.6847)	2.2426*** (0.6706)	2.2399*** (0.6724)	1.9872*** (0.4959)	1.8285** (0.8504)	2.2659*** (0.6587)	2.0986*** (0.6528)
STDDEV	0.0002 (0.0006)	0.0002 (0.0006)	0.0000 (0.0006)	0.0000 (0.0006)	0.0013 (0.0008)	0.0009 (0.0008)	0.0004 (0.0006)	0.0002 (0.0006)
FCF	-0.1034 (0.0684)	-0.1033 (0.0690)	-0.1047 (0.0700)	-0.1046 (0.0705)	-0.0323 (0.0747)	-0.0163 (0.0806)	-0.0970 (0.0652)	-0.1013 (0.0661)
DIV	0.11164* (0.0605)	0.11164* (0.0606)	0.1434** (0.0659)	0.1427** (0.0659)	0.0337 (0.0719)	0.0158 (0.0752)	0.1135** (0.0614)	0.1335** (0.0673)
AVGROA	0.45222*** (0.1348)	0.4483*** (0.1347)	0.3921*** (0.1404)	0.3870*** (0.1405)	0.2618** (0.1142)	0.1363 (0.1868)	0.4272*** (0.1390)	0.3625*** (0.1418)
DUALITY1	0.0164 (0.0209)		0.0195 (0.0208)					
DUALITY2		0.0153 (0.0216)		0.0181 (0.0214)				
CEOTEN			Yes	Yes	0.0081*** (0.0011)	0.0072*** (0.0014)		
LINSOWN		Yes	Yes	Yes	Yes	Yes	-0.0642** (0.0243)	-0.0655*** (0.0237)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F	4.29	4.25	3.83	3.78	8.83	9.84	5.09	4.43
Prob. > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R-sq.	28.70	28.67	30.13	30.08	46.50	48.48	30.82	32.31

Notes: ***, ** and * denotes levels of significance at 1, 5 and 10% respectively.

Source: Computed from STATA 11.0 software

Table 9 Determinants of board independence (BIND) for large and small firms – impact of CEO duality: regression analysis

Variables	Large firms		Small firms		Large firms		Small firms		Large firms		Small firms	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
Constant	0.0157 (0.1526)	0.3606** (0.1739)	0.0601 (0.1498)	0.4760** (0.1830)	0.0266 (0.1588)	0.5149*** (0.1861)	0.0110 (0.1513)	0.5524*** (0.1779)				
LMCAP	0.0188* (0.0110)	0.0016 (0.0171)	0.0125 (0.0113)	-0.0134 (0.0190)	0.0174 (0.0131)	-0.0203 (0.0191)	0.0194 (0.0123)	-0.0256 (0.0192)				
LISTAGE	0.0064*** (0.0020)	-0.0049 (0.0054)	0.0065*** (0.0020)	-0.0050 (0.0053)	0.0064*** (0.0020)	-0.0042 (0.0051)	0.0063*** (0.0020)	-0.0034 (0.0050)				
LISTAGESQ	-0.00005*** (0.00001)	0.0002 (0.0001)	-0.00005*** (0.00001)	0.0002 (0.0001)	-0.00005*** (0.00001)	0.0002 (0.0001)	-0.00005*** (0.00001)	0.0002 (0.0001)				
LEVERAGE1	0.2938*** (0.0950)	0.0850 (0.0751)	0.2680*** (0.0907)	0.0834 (0.0745)	0.2379** (0.0920)	0.1057 (0.0758)	0.2268** (0.0945)	0.1233 (0.0750)				
MTB	0.0060* (0.0035)	0.0022*** (0.0006)										
LMTB			0.0575*** (0.0192)	0.0350** (0.0172)	0.0554*** (0.0194)	0.0355*** (0.0178)	0.0537*** (0.0189)	0.0351* (0.0181)				
R&DI	2.3942** (1.0149)	1.9250** (0.7365)	1.9464* (1.0320)	1.8433** (0.7693)	1.9245* (1.0162)	1.7284** (0.7148)	1.9406* (1.0201)	1.6503** (0.6854)				
STDDEV	-0.0022** (0.0009)	-0.0013 (0.0013)	-0.0022** (0.0008)	-0.0001 (0.0012)	-0.0021** (0.0008)	-0.0001 (0.0012)	-0.0020** (0.0007)	-0.0000 (0.0012)				
FCF	-0.0814 (0.1327)	-0.0464 (0.0835)	-0.1112 (0.1285)	-0.0457 (0.0873)	-0.1214 (0.1312)	-0.0514 (0.0869)	-0.1253 (0.1307)	-0.0462 (0.0869)				
DIV	0.1271 (0.1620)	0.2090*** (0.0648)	0.1851 (0.1490)	0.2266*** (0.0809)	0.1690 (0.1496)	0.2150*** (0.0769)	0.1440 (0.1499)	0.2089*** (0.0722)				
AVGROA	0.2157 (0.1558)	0.4472** (0.2006)	0.1504 (0.1560)	0.4246** (0.2043)	0.1154 (0.1441)	0.4232** (0.2052)	0.1023 (0.1407)	0.4233** (0.2047)				
DUALITY1					-0.0241 (0.0329)	0.0380 (0.0266)						
DUALITY2												
Industry dummies	No	No	No	No	No	No	No	No				
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes				
F	3.02	3.35	5.00	2.15	4.94	2.32	5.45	2.51				
Prob. > F	(0.0016)	(0.0000)	(0.0000)	(0.0225)	(0.0000)	(0.0121)	(0.0000)	(0.0093)				
R-sq.	25.12	21.27	28.03	22.26	28.47	23.91	29.05	25.66				

Notes: ***, ** and * denotes levels of significance at 1, 5 and 10% respectively.

Source: Computed from STATA 11.0 software

Table 10 Determinants of board independence (BIND) for large and small firms – impact of CEO tenure and inside shareholding: regression analysis

<i>Variables</i>	<i>Large firms</i>	<i>Small firms</i>	<i>Large firms</i>	<i>Small firms</i>
Constant	-0.3008 (0.2092)	-0.0188 (0.3170)	0.4359* (0.2321)	0.7947*** (0.2374)
LMCAP	0.0146 (0.0104)	-0.0077 (0.0294)	0.0181 (0.0114)	-0.0245 (0.0198)
LISTAGE	0.0079*** (0.0024)	0.0081 (0.0070)	0.0050* (0.0026)	-0.0042 (0.0054)
LISTAGESQ	-0.00006*** (0.00002)	-0.0002 (0.0002)	-0.00004* (0.00002)	0.0002 (0.0001)
LEVERAGE1	0.4937*** (0.1214)	0.0814 (0.0981)	0.1645* (0.0891)	0.0882 (0.0719)
LMTB	0.0765*** (0.0263)	0.0321* (0.0190)	0.0613*** (0.0180)	0.0399** (0.0174)
R&D1	2.9634** (1.4696)	1.8488** (0.8213)	1.2460* (0.7468)	2.0435** (0.7816)
STDDEV	-0.0023** (0.0008)	0.0001 (0.0008)	-0.0018** (0.0007)	0.0001 (0.0012)
FCF	0.1415 (0.1628)	-0.0319 (0.0822)	-0.0839 (0.1196)	-0.0246 (0.0819)
DIV	0.2062 (0.1623)	0.2106** (0.0835)	0.1795 (0.1441)	0.2181*** (0.0797)
AVGROA	-0.0067 (0.2267)	0.8431*** (0.2197)	0.0889 (0.1440)	0.4110** (0.1959)
CEOTEN	0.0045*** (0.0012)	0.0089** (0.0033)		
LINSOWN			-0.1009*** (0.0374)	-0.0545** (0.0265)
Industry dummies	No	No	No	No
Year dummies	Yes	Yes	Yes	Yes
F	14.34	7.98	6.14	2.47
Prob. > F	0.0000	0.0000	0.0000	0.0075
R-sq.	48.32	49.88	33.14	24.43

Notes: ***, ** and * denotes levels of significance at 1, 5 and 10% respectively.

Source: Computed from STATA 11.0 software

With regard to monitoring and advising costs, analysis demonstrated that board independence was positively and significantly determined by the growth opportunities in both large and small firm-group samples, however, was negatively affected by the information asymmetry in large firm-group sample only. Analysis of private benefits hypothesis revealed that only the dividend payments appear to be significant in determining board independence for small firms only. Similarly, CEO influence (ROA) emerged as significant factor in explaining the board independence for small firms. The above findings continued to hold in all the models, more specifically, in models 5 to 8 where the impact of CEO duality measures (DUALITY1 & DUALITY2) had also been

considered. However, the analysis reported some evidence for the positive relationship between DUALITY2 and board independence for small firm sample. This provides, although weak evidence that presence of dominant CEOs (individuals holding both titles of CEO as well as chairman of the board) in boards tends to have greater representation of independent directors on the boards of small firms.

Table 10 also reports the determinants of board independence for large and small firms when the effects of additional variables such as CEO tenure and inside shareholding are also taken into account. The coefficients of CEOTEN and LINSOWN came out to be significant in the positive and negative directions respectively for both large and small firm sub-samples. This suggests that longer the CEO tenure, greater demand for board monitoring arises in terms of higher proportion of independent directors on the board. Also, the proportion of independent directors on the board tends to decrease with the increasing ownership stakes of the promoters. The other findings pertaining to firm complexity, monitoring costs, private benefits and CEO influence for large and small firms remained unaltered in the analysis.

4 Discussion and implications of the study

The primary motive of this study is to gauge the factors that could affect the proportion of independent directors on the boards. This study contributes to the limited/scanty research on determinants of board independence in India by presenting an empirical evidence on the concerned issue from the Indian corporate sector. The policy makers, academicians and corporates would find the results useful by recognising the significant factors determining the level of corporate board independence.

The findings of the present study with regard to the determinants of board independence are new to the Indian corporate governance literature. In particular, the argumentation made under 'firm complexity and advisory benefits' hypothesis by the studies based on the USA and the UK also holds for the Indian corporate sector. For example, firm age and leverage have emerged as significant predictors of board independence in Indian corporates which signifies that matured and highly levered firms tend to have more independent directors on the boards. In other words, boards are highly structured and determined by the firms' level of complexity and advising benefits. Moreover, the extent of 'firm complexity' can be directly linked with 'scope of operations' hypothesis as envisaged in Boone et al. (2007) which argues that complexity in firm's operations leads to more outside (independent) directors' proportion on the board. The significant board independence consequences of firm 'scope of operations' and 'complexity' in the directions consistent with past literature have narrowed the distances between Indian and other developed countries' corporate governance literature.

However, the sharp contrast manifested in the directions of monitoring and advising costs with that of other developed countries can be attributed to the different institutional contexts in which such analyses have been performed. The increase in the level of board independence with the increase in monitoring and advising costs signals towards the requirement of greater representation of independent directors in order to minimise the extent of these costs.

In addition to the above, the analysis observes that the level of private benefits is material in influencing the board independence, however, it is only the dividend payments (and not the FCF) which significantly explains the proportion of independent

directors on the board. Moreover, the influence of the CEO (in terms of ROA) has also emerged as a significant factor in determining the level of board independence which instigates the demand for more board monitoring (in terms of higher proportion of independent directors) in situations of increasing CEO dominance (influence). Further, it has been noted that only the directional impact of firm complexity conforms to the predictions derived from the past research while the signs of the monitoring and advising costs as well as CEO influence runs opposite to the expectations made in the literature. Moreover, the implications from the 'monitoring and advising costs' and 'CEO influence' perspectives emphasise towards the monitoring role of independent outsiders whilst the firm complexity perspective highlights the advisory role of independent directors. In other words, this study offers evidence which not only accentuates the monitoring role of independent outside board members, unlike the past research, but also lays stress upon the significance of the advisory function performed by them in Indian institutional context. The robustness of these findings can be judged from the fact that use of several proxies, alternative regression methodologies (robust, median and Tobit regressions) and sub-sample testing could not bring any variation in the main findings and thus, remain uniform in nature.

Additional analysis have also divulged interesting results, for example, the implications for the positive influence of CEO tenure suggests that greater representation of independent directors is required for effective monitoring in firms where CEO entrenchment is higher or it may be the case that independent outside directors do not compete for CEO title like inside directors do, which has resulted in positive relationship between the two (Kyereboah-Coleman and Biekpe, 2007).

Moreover, the analysis also observes variation in the determinants of board independence between samples of different firm-sizes wherein the association of 'firm complexity' or 'monitoring and advising costs' with the board independence, strongly holds for large firm sub sample whilst the results for 'private benefits' and 'CEO influence' hypotheses have been mainly derived from small firm sub-sample. Overall, the analysis has adduced the importance of firm size in explaining the effects on the corporate board independence.

5 Conclusions and scope for future research

Till now, research on Indian corporate governance has largely relied on the monitoring role of corporate boards and thus, is devoid of another important role, i.e., advisory role. This study examines the factors determining the board independence in Indian corporates and presents the exploratory nature of empirical evidence by taking into consideration both the monitoring as well as advisory role of these corporate boards. In particular, it examines a specific strand of literature concerning determinants of board independence which argues that firm complexity, costs of monitoring and advising, private benefits and CEO influence can determine the level of board independence. The major findings underlying this discourse highlight that board independence is significantly determined by the level of firm complexity and private benefits in the directions consistent with the past literature. However, the findings of monitoring and advising costs, and CEO influence hypotheses are opposite to the expectations derived from the concerned literature. The changes in these expected results can be attributed to unique environment

and different institutional contexts in which the firms are operated. The robustness of the results have been checked by employing several alternate regression methodologies, sub-sample analyses, and considering the impact of additional variables such as CEO duality, CEO tenure and inside shareholding. The study has too noticed the variation in the outcomes for the different sizes of firms, i.e., large and small firms.

The present investigation can be further extended to test the phenomenon whether debt leverage, dividends and the corporate board independence can be jointly determined in the Indian institutional settings (Setia-Atmaja, 2009b). Further, the interdependence between inside shareholding (as a measure for ownership concentration) and board independence can also be examined using Indian sample of corporates with a view to ensure better firm monitoring and shareholders' interest protection (Mezhoud and Thabet, 2016).

All in all, the policy makers, academicians and corporates will find the results constructive by recognising the factors determining the level of corporate board independence. The findings generated herein are very timely as it offers several implications for the development of corporate governance policies.

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