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**The relationship between corporate governance and corporate performance for listed  
companies in China**

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# **The Relationship between Corporate Governance and Corporate Performance for Listed Companies in China**

## **ABSTRACT**

The study examines the relationship between corporate governance and corporate performance in China using the data from listed companies over the period between 2007 and 2016. Corporate governance is measured by a variety of vectors, including CEO duality, ownership of management, board size, board meeting, and board independence. The corporate performance is measured by both ROA and Tobin's Q. This empirical study indicates multiple relationships between corporate governance and corporate performance. First, CEO duality is positively related to corporate performance. Second, the board meeting shows an adverse impact on the firm's performance. Third, board size has a negative relationship with the firm's performance. Fourth, the managerial ownership, however, positively correlates to corporate performance. Overall, the corporate governance policies have impacts on the firm's performance, and the better the firm governmental structure designed, the better the firm performed.

Keywords: *corporate governance, corporate performance, China*

JEL Classification: *G34, L25*

## 1. INTRODUCTION

The paper studies the relationship between corporate governance and corporate performance, aiming to seek better governmental strategies a company could apply. Corporate performance is crucial for companies in many aspects, ranging from attracting investments to increasing profits. Thus, both the academic field and real business entities put great interest in this topic. Many research papers address this issue and relate it to corporate governance, believing that better governance policies will promote companies to be more successful. For instance, in Bhagat and Bolton's (2008) paper, this relationship is clearly addressed: if a company can better manage its governance structures, more likely the company can outperform other equivalent firms. However, on the opposite, worse governance will bring more troubles than goods. The inefficient corporate governance structure will raise the firm's cost and create potential problems (Gibbs, 1993). This governmental problem can be entrenched due to the rigidity of the governance policies and as well as the reluctance to change. Both managers and workers hate to change because it means a great possibility of risking their company to uncertainties or losing jobs. Therefore, the strong and reliable evidence that supports the positive impact of governance on firm performance should be provided to encourage firms to change and improve. These research supports give many companies strong confidence to change and give them a clue about how to change.

Even the mainstream of belief is supportive of the positive correlation between corporate performance and corporate governance, the detailed aspects related to governance show the different results among various researches done worldwide. Since corporate governance is interdisciplinary, many factors can be included. For example, Judge et al. (2003) conduct the research for Russia companies and have extremely specific vectors for corporate governance that

includes 4 big sectors, namely manager characteristics, board characteristics, organizational characteristics and strategies. Each of the sectors is then specified again. The detailed policies are tested to find meaningful correlations and can give companies more detailed and useful advice. While, Vo and Nguyen (2014) only include several variables to measure the corporate governance in Vietnam, including CEO duality, board independence, the board size, and ownership. The board view of corporate governance can also influence the firm's decision on whether to change and how to change because every policy and structural design should be tailored according to the company itself. The researches' results basically give the companies an idea about the importance of corporate governance and rough idea about what sections to improve. On the specific vectors for corporate governance, their influences on the corporate performance also varies among different papers. For example, the board meeting frequency has two sides of view, one of which is the positive relationship to the corporate performance, and the other is the negative relationship. On the one side, frequent and abundant board meeting time can help the company to address and solve more issues and develop better business strategies (Conger et al., 1998). On another side, Vafeas (1999) find that board meeting frequency cannot improve the corporate performance, because too much board meetings held in the company can waste time and lower the efficiency.

This difference in research methods among studies has many reasons, but the national conditions and policies must be one of them. The economy and national business policies vary with countries, and they are important for a company to design its governance structure. Therefore, every study for different nations or even for different industries is unique and meaningful. This is the charm of the management and governance because nothing could be copied, and nothing could be defined. No one can give you the exact answer unless you actually

implement it. Therefore, the research is carried out, specifically analyzing the Chinese companies. This research tries to find the Chinese unique pattern in corporate performance and corporate governance relationship analysis and gives Chinese firms the courage to change.

The results of this research show the overall positive relationship between corporate performance and corporate governance. The company that can better organize its governance has better performance than others. In our research, out of 5 vectors of corporate governance, 4 vectors significantly relate to corporate performance whether measured by ROA or Tobin's Q, specifically board meeting, the board size, the managerial ownership, and CEO duality. The results are mostly consistent with prior researches. CEO duality, less board meeting, the smaller board size, and high managerial ownership have a good impact on firms in terms of overall performance.

There are several contributions of this paper. The primary contribution of this study is to address the importance of corporate governance in terms of its impacts on firm performance. The development of corporate governance is relatively slow in China (Lin et al., 2006). Thus, the actions should be taken to upgrade the governmental strategies that suitable for ourselves. Our research investigates the relationship between the separate corporate governance variables and corporate performance, which gives Chinese companies a hint about where to change. Also, the study can increase the companies' confidence in improving governmental strategies and allow them to believe that improving governance structure can also improve their firm performance. However, Lin et al. (2006) also point out the problem that exists in many Chinese firms when they try to change: how to reconcile the different interests between parties. Similar issues definitely will occur in this process. Although this paper does not give answers to those kinds of questions, the paper does encourage other researchers and businessmen to seek solutions. Apart from that,

the specific vectors for Chinese companies' governance are concluded based on many other researches, which not only gives the companies basic advice about how to improve their governmental structure and policies, but also inspires other researchers' interests in this field and put more efforts on finding better solutions for Chinese companies to improve the corporate governance.

The remainder of this paper is followed by a literature review, methodology, results, and conclusion. Both the research limitation and future suggestions will also be addressed at the end of this paper. In the literature view, the paper discusses the previous research and background of the topic. The methodology of this study is carefully designed and detailly discussed in the third part. Then, the results will be analyzed, giving possible explanations and comparing them with other papers. Finally, the paper will mention the overall results, the limitation of this research, and the suggestions for future research in the conclusion part.

## **2. LITERATURE REVIEW**

Many researchers study the field that examined the relationship between corporate governance and corporate performance, and many of them find similar results of the positive relationship between these two. Ueng (2015) investigates the relationship between corporate governance policies and financial performance. He controls the board rating, compensation policies, takeover defense policies, and accounting practice. The results of his research show that better governance could lead to better performance, specifically in terms of stock return. Core et al. (1999) also look at the relationship between these two elements and get the same results. Meanwhile, they pay closer attention to executive officer compensation and find that chief executives often earn more when the firm operates poorly.

However, Larcker et al. (2007) apply the different indicators to this complex concept—corporate governance by using board size, the board of directors, stock ownership by executives and board members, debt and preferred stock holdings, etc. The paper defines corporate performance more extensively, which includes future operating performance (industry affiliation and firm size) and future stock returns. Even changing the parameters, they reach the same result as others: better corporate governance could lead to better corporate performance. Their research does shed light on the accurate definition of the dependent and independent variables. Bauer et al. (2008) also do a research on the impact of corporate governance over corporate performance, but they investigate the relationship separately, dividing the governance into six categories. Internal control, shareholder rights, and remuneration show a positive relationship with corporate performance, while the board accountability, market for control, and corporate behavior do not impact on firm's performance. In their research, corporate performance is measured by stock performance. During their investigation, they also find out that well-governed companies outperform poor-governed ones by up to 15% annually.

There are a variety of measurements for corporate performance. Compared to the previous researches that mainly define corporate performance using financial measurements, some papers show other methodologies for analyzing the firms' performance. Guest et al. (2003) define organizational performance by using both accounting-based measures and market-based measures, which are labor productivity, Tobin's Q, and return on investment. They also control the variables including industry fields (manufacturing or service) and multinational status of the corporation, so that they can measure firms' performance more accurately. However, Vo and Nguyen (2014) point out that both accounting ratios and Tobin's Q have their disadvantages, and they also employ the Z-score to measure the performance.

Corporate governance is a complex concept, which blends with many governmental policies and internal structure designs. Carter et al. (2003) mention in their research that board diversity is crucial in corporate governance. Diversity refers to the board members' gender, race, and culture. Clark (2003) carries out research about Chinese corporate governance, where he stated that it is important to separate the state-owned companies and private companies when measuring Chinese firm governance. La Porta et al. (1999) take a deep look into the topic as he finds that the insiders' exploration over minor investors may pose a large threat to firms' governance and to its economy. They analyze the investor protection, by comparing relevant laws from different nations, and concluded that the strong investor protection that stated in laws can facilitate the firms' governance. It is a bidirectional influence between investor protection and estimated future corporate performance (Johnson et al.,1999 as cited in La Porta, 1999).

Apart from the board idea about the topic discussed above, detailed measurements for corporate governance are discussed as follows. First, many pieces of research mention the CEO duality as an important measurement for corporate governance. Boyd's research (1995) shows the positive relationship between CEO duality and corporate performance. According to Boyd (1995), this is because duality can increase the CEO's decision power and increase accountability for decision making as well. Therefore, when facing the firm's dilemma, the better decision is easier to make and to implement. Similarly, Baliga (1996) also finds a positive relationship that advocates the goodness of CEO duality. The CEO of the company who also serves as the chairman can enhance the firm performance. However, Fama and Jensen (1983) criticized CEO duality as it could decrease the legitimacy of the board and may increase corruption.

H1: CEO duality has a positive relationship with corporate performance.

Second, board size can also influence the company's performance. Based on Guest (2009), board size is negatively related to firm performance measured by ROA. Even the same results are made in many other papers, the relationship between the board size and the company performance is not defined, because the influence of board size on firm performance varies with the country's industry environment and the specific function of the board (Guest, 2009). This negativity can be explained in several ways. For example, Cosh and Hughes (1987) mention that basically the outside directors have a low financial benefit from monitoring a firm's performance, and hence the large board size results in an overstaffed group and lower the operating efficiency and then poor firm performance. In addition, Steiner (1972) gives another reason: more people included in the board can increase the probability of disagreements and conflicts, which makes the firm hard to make decisions and hard to perform the plan following the schedule. It is really hard to conciliate the parties because people have different thoughts and their own interests, which inevitably affects the performance negatively.

H2: Board size has a negative relationship with corporate performance.

Third, the managerial ownership imposes importance on the firm's performance. Li, et al. (2007) find that firms with high managerial share ownership outperform those with lower share ownership. The reason for it is mentioned by Jensen and Meckling (1976): high ownership encourages managerial persons to work harder and to create the firm's value. Another perspective is then mentioned by Ongore (2011) that the residual of corporate income can

directly influence the managers who hold the stocks because they can earn the cash or share dividends based on the firm performance. The better the company performs on sales, the higher the amount will be presented on the net income and hence the more dividends the managers can get from the company. This direct connection between managers earning and firm performance encourages the manager to enhance the companies' operation to a great extent (Ongore, 2011).

H3 Ownership of management has a positive relationship with corporate performance.

The fourth, apart from ownership, the independence of board is also important for determine the corporate governance. Likewise, board independence is included in the related research of Akbar et al. (2016). In their research, board independence is positively related to corporate performance, which indicates that the more independent members of the board, the better the company can perform. Liu et al. (2015) also conduct the research related to board independence and firm performance for Chinese listed firms, and they find the same result that the good internal control of board independence can enhance the performance of the company. Independent directors have the objective advantage of supervising agency roles and can bring resources support in a non-related way (Arora and Sharma, 2016). Strategic Suggestions are also given to the companies, and then the efficiency of the board gets improved and the probability of financial success increases.

H4: Board independence has a negative relationship with corporate performance.

The fifth, Board meeting is also considered as one of the board characteristics. The board meeting frequency has an impact on firm performance (Johl, et al., 2015). Also, Vafeas (1999) carries out the study that specifically investigating the relationship between the board meeting frequency and firm performance, and she concludes that high board meeting frequency has worse influence on corporate performance and reduces the firm's value. The increase of this kind of board activity influences the share price of the firm, this is because overtime board meetings waste time and lower the operating efficiency, and then ruin the reputation of the company and result in lower share price (Vafeas, 1999). On the contrary, Conger et al. (1998) state that the board meeting is vital for a company because shareholders can use the meeting time to discuss the problems the company faced and provide valuable and diverse suggestions, which enhances the corporate performance tremendously.

H5: the board meeting frequency has a negative relationship with corporate performance.

### **3. METHODOLOGY**

The logistic model is to detect the relationship between corporate governance and corporate performance. The baseline model is applied:

$$CP_{it} = \alpha_0 + \beta_1 CG_{it} + \epsilon_{it}$$

Where CP indicates corporate performance, CG indicates corporate governance, and C is a vector of control variables.  $\alpha_0$  and  $\beta_1$  are the intercept and parameters.  $\epsilon_{it}$  is the error term. In this model, "i" stands for the specific firm, and "t" stands for the specific year. Since the panel data are used, the fixed effect is applied instead of pool OLS. Both industry and year are fixed in this study.

This study applies a variety of measurements for corporate governance and applies 2 measurements for corporate performance, and the 2 detailed models are listed below:

$$ROA_{it} = \alpha_0 + \beta_1 M_{it} + \beta_2 DUAL_{it} + \beta_3 BSIZE_{it} + \beta_4 OWN_{it} + \beta_5 INDE_{it} + \beta_6 RD_{it} + \beta_7 indcdi + \varepsilon_{it} \quad (1)$$

$$Tobin_{it} = \alpha_0 + \beta_1 M_{it} + \beta_2 DUAL_{it} + \beta_3 BSIZE_{it} + \beta_4 OWN_{it} + \beta_5 INDE_{it} + \beta_6 RD_{it} + \beta_7 indcdi + \varepsilon_{it} \quad (2)$$

Tobin's Q and ROA are the measurements for corporate performance (CP), and they run in two models separately. Corporate governance (CG) is measured by 5 independent variables: M is board meeting; DUAL is CEO duality; BSIZE is the board size; OWN is ownership of management; INDE is the board independence rate. Control variables (C) are SALE, RD, and indcd, which are the net sale, research and development expenditure, and industry dummies respectively.

For corporate performance, this study uses Tobin's Q or ROA to measure the performance. These two measurements are commonly used in the researches related to corporate performance. For instance, Anum Mohd Ghazali (2010) applies Tobin's Q in his researches related to corporate performance and corporate governance. While Akbar et al. (2016) apply both ROA and Tobin's Q in their researches for the UK's firm performance. Tobin's Q is the market value measurements for firm performance, and ROA is the accounting measurements for the performance. This study applies both Tobin's Q and ROA, which provided two aspects of firm

performance. Therefore, corporate marketing performance and operating performance are rounded presented and more accurately investigated.

As for the measurement of corporate governance, according to Vo and Nguyen (2014), 4 aspects are considered: CEO duality, ownership of management, Board size, and Board independence. CEO duality is categorized by nominal data: if the CEO is also the chairman, it is coded as “1”, and coded as “2” otherwise. The management ownership is calculated by shares held by management over the total outstanding shares, and the management share includes the shares held by all the directors, supervisors and executives. Board independence is the ratio of the independent members over total members. Board size is the total number of board of directors. All these 4 measurements listed above are included in both models of this research. Arora and Sharma (2006) also consider the board meeting as an important vector for corporate governance. This study also applies it as the independent variables, which is measured by the frequency of the annual board meeting. Overall, all five measurements conclude the basic corporate governance activities, which can help better conduct this research and seek the relationship.

In terms of control variables, this study includes firm size, industry dummies, and the Research and Development expenditure. According to Vo and Nguyen (2014), it is important to control the industry dummies when investigating the relationship between firm performance and corporate governance. Also, Shah et al (2013) find out that there is a positive relationship between R&D and corporate performance. Therefore, this paper also applies R&D as one of the control variables, and it is scaled by the total asset. Similarly, firm size is measured by sales and is scaled by total assets as well.

#### 4. RESULTS

Data are downloaded from CSMAR, a Chinese database. This research uses information about firm performance and corporate governance over 10 consecutive years from 2007 to 2016. Only listed Chinese firms' information is used in this research. Data are deleted, if the corporate governance and the corporate performance information are not available during the same period, as well as if the missing value exists. 19 major industries are included. 1105 firms and 10707 firm-year observations remain after the data cleaning.

Table 1 shows the mean and the standard deviations for all variables including ROA, Tobin's Q, board meeting, board independence, the board size, firm size, etc. The average ROA is .035. ROA reaches a maximum of 4.837 in 2013 in the company with the stock code of 600769 and a minimum of -1.526 in 2008 in the company with the stock code of 34. Furthermore, the maximum and minimum Tobin's Q is 69.876 and is 0.153 respectively during these 10 years. The average Tobin's Q is 2.24, which is greater than 1, and it indicates the overall positive sign for the Chinese firm's performance in this period of time. The Chinese companies the study investigated have averagely 8 board meetings each year, but they have a wide interval between the highest meeting frequency (57 times per year) and lowest meeting frequency (0 times per year). Similarly, Research and Development expenditure experiences a wide interval, ranging from 0 to 2.872. Ownership of management ranges from 0 to 63.6%, while these figures for board independence are 9.1% and 75% respectively. The mean value for board size is 9.124 and it has a standard deviation of 1.836. In addition, the average sale for those investigated companies is 0.681, with a standard deviation of 0.552. The minimum value of it is 0.001, but the maximum value is much greater (10.6)

**Table 1**  
**Descriptive Statistic**

Variable	Obs	Mean	Std.Dev.	Min	Max
roa	10707	.035	.097	-1.526	4.837
tobin	10707	2.244	2.453	.153	69.876
m	10707	7.645	5.023	0	57
dual	10707	1.841	.366	1	2
bsize	10707	9.124	1.836	3	18
own	10707	.012	.051	0	.636
inde	10707	.367	.053	.091	.75
sale	10707	.681	.552	.001	10.6
rd	10707	.005	.052	0	2.872

Table 2 presents the correlation matrix for dependent and independent variables. It is evident that there is no significant relation among independent variables, specifically the board meeting, CEO duality, board size, ownership of management, and board independence. The maximum correlation is the one between the board size and board independence with the value of 0.315. In contrast, the lowest correlation is nearly 0 between CEO duality and board meeting frequency. Both ownership of management and board meeting are positively correlated to ROA, while for Tobin's Q, board independence and ownership show the positive sign.

**Table 2**  
**Correlation matrix among variables**

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) roa	1.000								
(2) tobin	0.031	1.000							
(3) m	0.003	-0.020	1.000						
(4) dual	-0.021	-0.054	0.000	1.000					
(5) bsize	-0.001	-0.086	0.030	0.149	1.000				
(6) own	0.040	0.015	0.048	-0.140	-0.075	1.000			
(7) inde	-0.006	0.026	0.009	-0.066	-0.315	0.023	1.000		
(8) sale	0.074	-0.014	-0.055	0.030	0.024	-0.018	-0.047	1.000	
(9) rd	-0.036	0.312	0.005	0.004	-0.019	-0.021	0.012	0.038	1.000

Table 3 gives information about the linear regression, investigating the relationship between corporate performance and corporate governance. For model 1, the results show that several corporate governance indexes have a relationship with ROA, the vector for corporate performance. Both CEO duality and ownership of management strongly relate to ROA, with a P-value of 0.004 and 0.003 respectively. These two variables are both at 99% of the confident level. However, compared to those two, the board size has a weaker relationship with ROA with the confident level at 90%. Ownership is positively related to ROA, with the coefficient value of 0.069, which indicates that lowering the shares holding by the managerial people cannot improve the firm's performance. It is consistent with the results of Vo and Nguyen (2014). It can be explained that high share compensation for managers can increase their incentive to better perform their duty and hence improve the firm's performance. However, in model 2, management ownership has no significant result related to Tobin's Q.

The coefficient value for duality is -0.008. This negative relationship between nonduality and ROA suggests that duality 2 (CEO is not the chairman) has a reverse influence on ROA compared to duality 1 (CEO is also the chairman). When controlling all other variables, ROA of the firm whose CEO is also the chairman is 0.008 larger than that of the firm whose CEO is not in charge. Although Tobin's Q shows no relationship with the CEO duality, the sign of it is also negative. The result of this paper is similar to many other related types of research. This is because CEO duality can increase the organization's operational efficiency. CEO who serves as the chairman can make decisions easier due to their combined power of these two positions. Therefore, decisions can be efficiently made and implemented. Hence, the performance of the company can be improved.

For model 2, the one using Tobin's Q to measure corporate performance, the results show the different information. Compared to the model (1), Tobin's Q is overall less sensitive in response to corporate governance. As shown in table 4, board meeting and board size have an extremely strong relationship with Tobin's Q, with the P-value of almost 0. The coefficient for the board meeting is -0.007, suggesting that the more redundant meetings a firm held per year, the poorer the firm performs in terms of Tobin's Q. However, the board meeting has no relationship with ROA. The high board meeting frequency reflects the rigidity of the organization, and the useless meeting routines waste a large amount of time for both shareholders and managers. Thus, the efficiency of the firm is lowered and as well as firm performance. Vafeas (1999) also reasons it by saying that not all board activities are productive, and excessively routines will lower firm efficiency.

The coefficient for Board size is -0.053 in model 2, which means that for every person added to the board, the Tobin's Q decreases 0.053. Although in model 1 board size has a lower

confident level, the sign of the coefficient in both models is the same. The reason for it can be explained by the redundancy of the organization. The heavier of the organization, the slow the organization can operate. Steiner (1972) mentions that a larger group of people is difficult to reach an agreement because every person has their own perspectives. This difficulty in making decisions leads to low efficiency and thereby lower the firm performance.

Different from the previous paper, this paper does not find the relationship between board independence and board performance. Both sales control and research and development expenditure control significantly influence on corporate performance. The ROA increases significantly when sales increase. Also, ROA shows a slight correlation to research and development expenditure. For Tobin's Q, only sales control indicates the significance at 99%.

**Table 3**  
**Results of Regression**

VARIABLES	(1) roa	(2) tobin
m	0.000 (0.735)	-0.007*** (0.004)
2.dual	-0.008*** (0.004)	-0.076 (0.109)
bsize	-0.001* (0.093)	-0.053*** (0.000)
own	0.069*** (0.003)	0.272 (0.217)
inde	-0.000 (0.993)	-0.169 (0.577)
sale	0.017*** (0.000)	0.032 (0.174)
rd	-0.113* (0.053)	15.291*** (0.000)
Constant	0.031** (0.013)	2.950*** (0.000)
Observations	10,707	10,707
R-squared	0.019	0.110
year FE	YES	YES
industry FE	YES	YES
Adj. R-sq	0.0157	0.107

t-statistics in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## 5. CONCLUSION

The main finding of the paper is the various impact of corporate governance on corporate performance. Specifically, the board meeting, the board size, CEO duality, and ownership of management show the significance related to corporate performance in terms of either ROA or Tobin's Q. First, the board meeting is negatively related to Tobin's Q. Minimizing the meeting frequency can improve firm performance. Second, fewer board members in the company can

increase the firm's ROA that indicates the firm's overall financial conditions. Third, CEO duality can also promote a company to grow. It is beneficial for companies to assign their CEOs to serve as chairman as well. Finally, managerial ownership also influences firm performance. The higher shares a firm offers to managerial people, and the better the firm can perform. However, different from Vo and Nguyen's (2014) paper, this research shows no relationship between board independence and corporate performance. This paper can give Chinese companies some suggestions about how to improve the governmental structures that can further improve the company's performance. Also, the significant relationship between corporate governance and corporate performance can give Chinese companies confidence in changing governmental structures.

However, there are still some limitations of this paper. First, since, the governance of a firm is an interdisciplinary topic, many aspects should be considered. Apart from the 5 aspects we listed in this paper, many other factors may have an impact on corporate performance as well. For example, Chiang and Chia (2005) also include information transparency to measure corporate governance. Similarly, the measurement of corporate performance has different variables. This paper only uses ROA and Tobin's Q. Both ROA and Tobin's Q cannot perfectly infer the firm's performance, and Zscore should be also considered (Vo and Nguyen, 2014). Second, this paper does not mention the problems that will commonly occur during the process of changing the firm's governmental structure and does not give detailed advice and information about how to address these problems. The change in corporate governance is not as easy as conducting research and writing an essay. Managers will confront many unexpected problems and resistance when changing governmental policies, which need more studies to find the proper solutions, and then generate the common practice to solve similar issues. Despite the limitations,

this paper provides support for many related pieces of research and the Chinese companies as well. For the limitation of this paper, several suggestions can be made to future researches. Since this business topic is highly related to corporates and the real business world, the more the paper considered in the real situation, the better and more meaningful results can be generated.

## Appendix

### The summary of variables

<b>Variables</b>	<b>Definition</b>	<b>Measurement</b>
<b>Dependent Variables</b>		
ROA	Return on asset	Earning after tax/Total assets
Tobin	Tobin's Q	
<b>Independent Variables</b>		
M	Board meeting	
DUAL	CEO duality	Coded "1" if CEO is also chairman and "2" for other case.
BSIZE	Board size	Total number of board director.
OWN	Ownership of management	Percentage of shares held by director, supervisors, and executives over total number of shares.
INDE	Board independence	Percentage of independent members over total members.
<b>Control Variables</b>		
Sale	Firm size	Net sales
RD	Research and development intensity	Research and development expenditure
indcd	Industry effect	Industry dummy

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