

Board independence and fluctuations of corporate performance

——A research from the angle of social relations of independent directors

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Based on whether there is social relation between independent directors and CEOs, there are two types of independence in the board of directors: nominal independence and real independence. Their influences on the fluctuations of corporate performance are varied. First, the board independence will strengthen supervision and reduce the fluctuations in corporate performance. Second, the nominal board independence will reduce performance fluctuations but with inadequate significance; however, the real independence significantly reduces fluctuations of corporate performance; social relations between CEO and independent directors will encourage fluctuations of corporate performance. This also confirms that the independent directors can reduce the corporate performance instead of just holding the post and doing nothing. At the same time, in order to improve the real board independence, when recruiting independent directors, those gray directors who have social relations with CEO must be identified and excluded.

Keywords: social relations, nominal board independence, real board independence, performance fluctuations

1. Introduction

Economic fluctuations can demonstrate risks that the economy faces. Existing research mainly focuses on macroeconomic volatility, but pays less attention to the micro-mechanism—fluctuations of corporate performance. Currently, domestic and foreign literature discusses more on the relationship between corporate governance structure and performance growth, but less on the correlation between governance structure and performance fluctuations (Cheng, 2008; Yang and Liu, 2015). And the

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consistency and cooperativeness of our country's economic system are very strong, so herd effect is prone to occur and it is very important to study the micro-mechanism of economic fluctuations.

The independent director system is the main compulsory standard designed for the board structure and operation mechanism in many countries. Currently, a large amount of literature studies whether the board independence has improved corporate performance, especially after the United States issued the Sarbanes-Oxley Act in 2002. However, there has not been a uniform conclusion on board independence's role in improving the performance of companies (Adams *et al.*, 2010). We believe that such research has two shortcomings: first, the perspective will be limited to the level of corporate performance value, so the issue of performance fluctuations is neglected. The main function of the independent directors is to supervise management on behalf of shareholders, especially small and medium-sized shareholders (Adams *et al.*, 2010). The result of such supervision is executives' opinions tend to compromise in order to avoid extreme decisions being made, which can be embodied in the reduction of performance fluctuations. For the optimization of decision making, as the independent directors have many social appointments and thus invest little time into the company, they offer few constructive opinions (Schwartz-Ziv, 2013). As a result, the independent directors' contributions to improving corporate performance may not be as prominent as curbing the volatility. Second, representing the board independence by the proportion of independent directors in the board of directors is not scientific enough (Fracassi and Tate, 2012), because it ignored the social process of the company's top management in making decisions (Stevenson and Radin, 2009), the role of social relations in particular. If the independent directors have social relations with CEO, the supervision of the board independence will be distorted. To this end, this paper studies the relation between board independence and performance fluctuations of companies. With consideration given to the existence of the CEO-independent directors relationship, the nominal independence has been distinguished from real independence. In this way, the micro-mechanism of corporate performance fluctuation is explored not only from the aspects of corporate governance but also from corporate characteristics. And this provides more objective and reasonable evaluation to the independent director system.

The innovation of this paper is mainly manifested in the following several aspects. First, taking China's institutional environment as the background, it inspects the governance structure and performance fluctuations of listed companies in China, thus offering reliable micro basis for our country's macroeconomic fluctuations; Second, different from a great number of prior researches that believe the independent directors as useless titles, this paper confirms the role of independent directors in our country in lowering corporate performance fluctuation; Third, considering the influence of the social relations on board independence, the understanding on board independence has been deepened in theory and some requirements for the recruitment and selection

system of independent directors have been put forward in reality.

The rest of the paper is arranged as follows. Part 2 reviews relevant literature and proposes research hypothesis; Part 3 explains sample selection, variables and measurement equation and reports some basic statistical results; Part 4 offers the empirical results of the relation between board dependence and fluctuations of corporate performance and conducts robustness test; Part 5 is the conclusion.

2. Relevant literature and research hypothesis

2.1. Board independence and corporate performance fluctuations

Corporate governance structure (such as the scale of the board of directors and executives heterogeneity) is an important factor affecting the fluctuations of an enterprise. Adam *et al.* (2005), using data of American companies for empirical research, find that the greater the authority of the CEO is, the greater the fluctuations in corporate performance will be. Li *et al.* (2009) find that ownership balance can reduce the fluctuations in corporate performance. Quan and Wu (2010) think that CEO's authority intensity exacerbates corporate performance fluctuations. Yang and Liu (2013) empirically test different influences on corporate performance by the executive authority of different dimensions. Cheng's study (2008) find that the smaller the board of directors is, the more concentrated the decision-making authority tends to be, causing greater fluctuations in corporate performance.

What influence corporate governance structure will exert on performance fluctuations is an important question to explore the micro-mechanism of corporate fluctuations, but the existing literature only focuses on the executive authority and scale of the board of directors, ignoring the lifeline linking managers and the board of directors-board independence. Independence is the prerequisite for the board of directors to undertake the duties of exercising supervision and making suggestions on behalf of shareholders. But in fact the management has strong influencing power on the board and its members. It even decides the appointment of the board to a certain extent. (Hermalin and Weisbach, 1998; Fracassi and Tate, 2012; Liu *et al.*, 2012). Board independence, therefore, becomes an important prerequisite to check the efficiency of the board and the behavior of management and also a theoretical difficulty for the literature on corporate governance (Adams *et al.*, 2010). So, researches on executive authority or the influence of the scale of the board on performance fluctuations cannot bypass the role of board independence.

Studies of relation between board independence and corporate performance mainly focus on whether board independence has raised the level of corporate performance value (Adams *et al.*, 2010). Agency theory believes that the purpose for board to maintain independence is for better supervision and management (Weisbach, 1988). Schwartz-Ziv (2013) uses the 2007-2009 data of the board meetings from listed

companies in Israel, records the time of the discussion on various topics, and finds that most of the board directors' time is spent on monitoring.¹ Therefore, this paper argues that the main function of the board of directors is to supervise the management, and the stronger board independence is, the stronger supervision power will be. The watchdog role, in fact, may be more reflected in the fluctuation value rather than on the level. The greater the CEO's power is, the more concentrated the company's decision-making power will be. Against such background, the group decision of the management is easily to be led by CEO, thus the possibility of making extreme decisions is quite large. While the main result of board supervision is to compromise the decisions, so extreme decisions will be avoided. This can be reflected by the reduction of performance fluctuations and corporate operation risk. From this we get hypothesis 1.

Hypothesis 1: Board independence will strengthen supervision and reduce corporate performance fluctuations.

The main discovery and contribution of hypothesis one is that it finds out the evidence for independent directors not just holding the post and doing nothing. However, in order to know the essence of independent directors and the connotations of board independence directors, we will further explore the method to test board independence.

2.2. Understanding of board independence

In empirical research, the existing literature generally uses the proportion of independent directors of the board to measure the board independence.² The logic as the independent director must satisfy the company and its executives with the independence on money and personnel. In addition, most of them have social appointments and receive fixed reward, making themselves unattached to management in terms of money and personnel. Thus they can maintain relatively strong independence. However, this does not take the social factors into account, and ignores the social process of decision-making by executives. The independent directors who are legally being protected may have close social relationship with the company's management, which makes it difficult for independent directors to

¹ In existing literature, the behavior of the board of directors cannot be observed. Behavior of the board and research into corporate performance tend to degenerate into the board structure and corporate performance (Hermalin and Weisbach, 2003). The logical premise is the structure has influenced the behavior, but the endogeneity problem has been introduced. Schwartz-Ziv (2013) directly uses the board meeting data and observes directors itself, not only saving the circuitous also avoiding the endogenous problems. But the author also points out that the defect of this approach is that it ignores the behavior outside the meeting of the board. However, the social relations of this paper are one of the important behavior factors outside the meeting.

² According to the guidance of establishing the independent director system of listed companies published in 2001, independent board is defined in our country as follows: independent directors of the listed company are those who do not undertake other positions than directors and who do not have social relationships that may hinder their independent judgment including the one with the listed companies employing them and with major shareholders.

remain objective and independent (Hwang and Kim, 2009; Fracassi and Tate, 2012; Liu, 2015). Therefore, this paper defines board independence in two ways: One is nominal independence, measured by the proportion of independent directors in the board; Second, real independence, which means to identify and exclude the board directors who have social relations with CEOs first and then measures the proportion of independent directors. The first way is adopted by most of the literature. In order to maintain comparability with previous research, we still use this way. The second way is to define board independence by current literature about gray directors.¹ To use such method means to test the influence of the board independence on corporate performance fluctuations more precisely.

CEO-independent directors' social relations allow independent directors to be captured by the CEO, posing a serious impediment to the function of independent supervision on the management by the board (Hwang and Kim, 2009; Kramarzy and Thesmar, 2013). There were also scholars who think grey relationship leads to distortions and inefficiency of corporate governance, such as the election for directors (Kuhnen, 2009), the CEO replacement (Nguyen, 2012), and corporate investment (Guner *et al.*, 2008). Fracassi and Tate (2012) argue that CEO-independent directors' social relations not only weakens the independent directors' supervision, but reduces the value of the company as well. Therefore, we get the hypothesis 2.

Hypothesis 2: The nominal independence of board of directors will reduce the fluctuations in corporate performance but with inadequate significance; Real independence of the board will significantly reduce the corporate performance fluctuations; CEO-independent directors' social relations will increase corporate performance fluctuations.

Hypothesis 2 is an extension of hypothesis 1, incorporating such important factors as social relationship into the board independence and further testifying the influence of board independence on corporate performance fluctuations. At the same time, it also answers the question that the other reason why an equivocal conclusion has been drawn by existing literature when testifying the effect of board of directors: unreasonable understanding of board independence.²

3. Research design

3.1. Sample selection

The data in this paper come from CSMAR database of Guotaian information

¹ Gray directors refer to those who have legal independence on money and family but also social relations with CEO.

² Combining hypothesis one and two, we believe that, to test the effect and the role of independent board, we must make judgment from performance fluctuations instead of performance levels and meanwhile distinguish nominal independence and real independence.

technology Co., LTD and CCER database of Beijing Xenophon Information Technology Company. The standard for selection is as follows: using small and medium-sized companies set up between 2004 and the end of 2011 and using five-year floating average calculation for the fluctuations that year, we can get the unbalanced 2006-2009 panel data as initial sample; then, further excluding financial companies and those done by ST during sample period, through the CSMAR and CCER database data concerning board independence and control variables are added, while the samples which are seriously lacked are eliminated. In the end, this paper selects 422 small and medium-sized listed companies from 2006 to 2009 as the research object.

3.2. Measurement equation

To test the influence of board independence on the fluctuation of corporate performance, we use the basic measurement equation as follows:

$$\text{variability of performance}_{it} = \alpha_0 + \alpha_1 \text{independent}_{it} + \beta z_{it} + u_{it} \quad (1)$$

The explained variable on the left of (1) is company i 's performance fluctuation. Variables on the right are explanatory variables, including the company i 's board independence, "independent" and control variables " z ". Control variables mainly include the traits of the actual controller of enterprise such as nature, age, size, growth, etc. This paper also controls annual time effect and fixed effect of individual enterprise.

3.3. The index design

Before the empirical analysis, definitions and illustrations must be made on corporate performance fluctuations, the CEO-independent director social relations, the board independence and other control variables.

3.3.1. Corporate performance fluctuations

Fluctuations in corporate performance can be measured by the absolute value of the ratio of the standard deviation and corporate performance. In the period when $\tau = 0$, corporate performance indicator γ 's standard deviation for the time change is

$$\sigma_{it} = \left[\frac{1}{5} \sum_{\tau=-2}^{\tau=2} (\gamma_{it-\tau} - \bar{\gamma}_{it})^2 \right]^{1/2}, \text{ in which } \bar{\gamma} \text{ symbolizes the average value of } \gamma \text{ (Comin and}$$

Philippon, 2005). In this paper γ means net return on assets (*roe*) and return on total assets (*roa*). Specific, this paper uses the company's financial data from 2004 to 2011, calculates the return on assets of enterprises from 2006 to 2009 (*roe* or *roa*) and

gets the floating average of standard deviation in five years (this year, previous two years and later two years). And then it is used to divide the absolute value of the annual return on assets (*roe* or *roa*) in order to measure the volatility of corporate performance as the proxy variable of corporate performance fluctuations.

3.3.2. The CEO-independent directors' social relations

We use the data for small and medium-sized enterprise from 2006 to 2009 to select the CEO¹ and independent directors of each company. And then we use the resume information of CEO and the directors to manually identify CEO-independent directors' social relations. Social relations are complicated, but we choose to work from the three aspects of the person's hometown, alumni and jointly-working experience. First, it is because the three kinds of relations are specially important and universal in our country. Second, because of the complexity, the data can't cover every aspect. Third, ignorance of other social relations (e.g., involvement in the common charity, entertainment, religion and other social organizations) won't have much influence (Fracassi and Tate, 2012). Including all the existing influence of all social relations as the research content would go to the other extreme.²

"Townsmen" is an indicator rarely used in western literature to measure social relationships, but it is particularly important in the human society of Chinese Confucian culture. One by one, we identify the native place of CEO and the independent directors. If their native place belongs to the same local city, we regard them as "townsmen". "Alumni" is a kind of relationship frequently used in literature about gray directors (Fracassi and Tate, 2012; Kramarzy and Thesmar, 2013). We also use the index. We identify the university information of CEO and the independent directors and match both of them. Using "common working experience" to measure social relations is the most commonly used and accurate way (Nguyen, 2012; Kramarzy and Thesmar, 2013). This paper uses the criteria that whether there are binary variables to be measured to judge grey relations. When there is no social relationship from all three perspectives of townsmen, alumni, and common working experience, the value would be 0. Otherwise, the value is 1.

3.3.3. Board independence

This paper identifies those independent directors with social relations with CEO as

¹ As the titles for top management by different companies are different, this paper believes CEO, executives, managers as CEO in the order of CEO, executives, and managers. Only one CEO is identified for each company.

² As Granovetter (1985) says, analysis on the operators' social embeddedness cannot be under-socialized or over-socialized.

gray directors. According to the above explanation, we will use two ways to measure the board independence: nominal independence = the number of independent directors/ the number of board; real independence = (the number of independent directors-gray directors)/the number of the board of directors.

3.3.4. Control variables

According to research by Adams *et al.* (2005) and Cheng (2008), the control variables this paper selects are: (1) CEO power (*power*), manifested by whether the CEO and the chairman are joint together as one position; (2) the board size (*boards*), represented by the number of members of the board of directors; (3) the nature of the actual controller of enterprise (*control*). According to the data on ultimately controlled persons disclosed by listed companies, Liu *et al.* (2003) will divide listed companies into state-owned ones and non-state-owned ones. This paper holds that companies controlled by the administrative departments, government institutions, state-owned companies and state holding companies are finally controlled by the government, and other companies are controlled by non-governmental departments; (4) age of companies (*age*), the time that the company is set up; (5) the company size (*asset*), represented by the natural logarithm of the company's total assets; (6) the company growth (*tobin's q*) is the equal to the ratio of company market value and book value; (7) variable of year (*year*), used to control the time effect. The definition of main variables is presented in Table 1.

Table 1
Name and definition of main variables

	Variables	Symbols	Definition
Performance fluctuation	Volatility of return on equity	<i>vroe</i>	Five-year floating average standard deviation of return on equity/ return on equity
	Volatility of return on total assets	<i>vroa</i>	Five-year floating average standard deviation of return on total assets / return on total assets
Board independence	Nominal independence	<i>nominal</i>	Number of independent directors/ Number of board directors
	Real independence	<i>real</i>	(Number of independent directors-number of gray directors)/number of board
CEO power		<i>power</i>	Whether the position of chairman and CEO is joint together, yes means 1, no means 0
Board size		<i>boards</i>	Number of board of directors
Nature of actual controllers		<i>control</i>	Whether the actual controller is government, yes means 1, no means 0
Company age		<i>age</i>	Time that the company has established for from the year t
Company size		<i>asset</i>	Natural logarithm of total assets of the company
Company growth		<i>tobin's q</i>	Company's market value/company's book value
Variable of year		<i>year</i>	Annual dummy variable

3.4. Description of statistics

Table 2 gives a description of the variables. Both of the averages of return on equity and return on total assets volatility are about 1.5 with slight fluctuations but great differences between the companies. The standard deviation of volatility of a certain company is dozens of times of the company's level. The size of company board is about 9 people on average, with independent directors accounting for an average of 36.2%, among which gray directors make up about half of the independent directors, making real independence lower to 0.194. It can be seen that there are obvious differences in measuring the board independence by nominal independence and real independence. From the point of whether CEO is concurrently holding the position of chairman, most companies carry out the practice of separating the chairman and general manager while only 27.7% of companies choose to join the two position together. The number of companies that are controlled by government is less, at only 17.4%. The average age of companies is 8.431 years, with 1.77-billion-yuan assets at an average; the average of *tobin q* is 2.11.

Table 2
Descriptions of statistics

Variables	Observed value	Mean value	Standard deviation	Minimum value	Maximum value
<i>vroe</i>	422	1.456	4.190	0.051	38.890
<i>vraa</i>	422	1.412	3.887	0.052	35.758
<i>nominal</i>	417	0.362	0.046	0.143	0.571
<i>real</i>	417	0.194	0.024	0.000	0.538
<i>power</i>	422	0.277	0.448	0.000	1.000
<i>boards</i>	417	8.916	1.586	3.000	15.000
<i>control</i>	408	0.174	0.380	0.000	1.000
<i>age</i>	422	8.431	2.744	3.000	21.000
<i>asset</i>	422	1.774	2.743	0.226	35.840
<i>tobin's q</i>	422	2.110	1.372	0.815	10.244

4. Empirical results

4.1. Nominal independence of board of directors and corporate performance fluctuations

To test two hypotheses, we first examine the influence of the nominal independence of board on the volatility of company performance. The measurement of the nominal independence in existing literature is usually by the formula—nominal independence = the number of independent directors/the number of board directors. Regressing equation (1), we use the method of panel's fixed effect to estimate. Measurement results are as shown in Table 3. Both model (1) and (2) are the results of direct regression of

the performance fluctuation on nominal independence. On such basis, control variables are added to get model (3) and (4). Results show that when using fluctuations of the total assets of yields (*vraa*) as explained variables, the nominal independence can significantly reduce the corporate performance fluctuations, which is only at the level of 10%; While using the return on equity volatility (*vroe*) as explained variables, the role of nominal independence is no longer significant. This proves hypothesis 1 to some extent, because board independence reduces the corporate performance fluctuations and verifies the first conclusion of hypothesis 2 at the same time. Nominal board independence will reduce the corporate performance fluctuations but with inadequate significances. In addition, it is found by research that different from the results by Adams *et al.* (2005), CEO's power can reduce corporate volatility. The possible reason for such difference may be the influence of CEO's power on performance fluctuations varies depending on the dimension and measurement (Yang and Liu, 2013). And similar to empirical results by Cheng (2008), the size of the board of directors can reduce corporate volatility. But the empirical results in this paper are not significant either. In addition, we also found that the nature of the actual controllers, be it state-owned or private, does not influence corporate volatility, and the role of company age is not significant either. Company size and growth can significantly reduce the volatility.

Table 3
Nominal independence and performance fluctuations

Explanatory variables	Performance fluctuations			
	Model (1) <i>vroe</i>	Model (2) <i>vraa</i>	Model (3) <i>vroe</i>	Model (4) <i>vraa</i>
<i>nominal</i>	-12.010 (8.631)	-19.353* (10.025)	-16.001 (14.222)	-32.229* (16.643)
<i>power</i>			-1.896 (1.727)	-4.251** (2.021)
<i>boards</i>			-0.001 (0.580)	-0.235 (0.679)
<i>control</i>			1.498 (3.531)	-0.323 (4.133)
<i>age</i>			0.917 (0.597)	-0.183 (0.698)
<i>lnasset</i>			-2.988* (1.644)	-3.520* (1.924)
<i>tobin 'q</i>			-0.856* (0.435)	-0.405 (0.509)
<i>cons</i>	5.863* (3.126)	8.616** (4.325)	2.669 (9.594)	20.266* (11.227)
<i>year</i>	No	No	Yes	Yes
Individual effect	No	No	Yes	Yes
Observed value	417	417	403	403
R-squared	0.004	0.008	0.061	0.103

Notes: Inside the bracelets is the report of robustness standard error. "Yes" means the fixed effect of relevant variables. R-squared is the R's square within the group. ***, ** and * represent the level of significances of 1%, 5% and 10% respectively.

4.2. Real board independence and corporate performance fluctuations

We find that the board independence, compared with the conclusion of lowering corporate performance fluctuations, is not significant but equivocal in measurement. This is similar to the controversial conclusion that independent directors raise corporate performance. The possible reason is the understanding on board independence is not reasonable, thus ignoring the social influence of friendly relation between directors and management on corporate decision-making. To this end, we will further test the relation between real board independence and corporate performance volatility.

Table 4
Real independence and performance fluctuations

Explanatory variables	performance fluctuations			
	Model (5) <i>vroe</i>	Model (6) <i>vra</i>	Model (7) <i>vroe</i>	Model (8) <i>vra</i>
<i>real</i>	-31.362* (14.201)	-43.214** (17.390)	-38.531* (20.307)	-67.308** (23.472)
<i>power</i>			-1.907 (1.789)	-4.580** (2.036)
<i>boards</i>			-0.002 (0.596)	-0.234 (0.681)
<i>control</i>			1.643 (4.420)	-0.372 (4.109)
<i>age</i>			0.938* (0.542)	-0.255 (0.903)
<i>lnasset</i>			-2.991* (1.656)	-3.564* (1.810)
<i>tobin'q</i>			-0.799* (0.413)	-0.518* (0.346)
<i>cons</i>	6.071* (3.415)	8.703** (4.032)	2.905 (10.007)	23.104* (12.350)
<i>Year</i>	No	No	Yes	Yes
Individual effect	Yes	Yes	Yes	Yes
Observed value	417	417	403	403
R-squared	0.010	0.014	0.072	0.131

Notes: Inside the brackets is the report of robustness standard deviation. "Yes" means the fixed effect of relevant variables is controlled. "R-squared" means the square of R within the group. ***, ** and * represent the significances of 1%, 5% and 10% respectively.

Same as the above regression, we still conduct regression on equation (1), and estimate by using fixed panel effect method. The measurement results are shown in Table 4. Model (5) and (6) are the direct regression of real independence by performance fluctuation. On such basis control variables are added to get model (7) and (8). Obviously, the real independence can significantly reduce the corporate

performance fluctuations, regardless of whether *vroe* or *vroa* is used as explained variable, or whether the control variable is added or not. This verifies hypothesis 1 that board independence reduces the corporate performance and verifies the second conclusion of hypothesis 2. The real board independence will significantly reduce the corporate performance volatility. In addition, by comparing the empirical results of Tables 3 and 4, the third conclusion of hypothesis 2 can be indirectly testified. The CEO-independent directors' social relations will increase corporate performance fluctuations. In addition, compared with the results in table 3, the significance of other variables does not have obvious changes.

The economic connotation of this conclusion is the supervision of independent board will curb the making of extreme decisions, causing less corporate fluctuations. However, gray board will lessen its supervision on CEO, causing exacerbated performance fluctuation. The significance of this conclusion is as follows. First, independent board is proved to be not a rubber stamp, being able to lessen corporate fluctuations and reduce operation risk instead; Second, gray relationship is testified to weaken board's supervision and break the reasonability of independent board system. Criticism and solution are put forward toward "nepotism" phenomenon when selecting and appointing independent board.

4.3. Robustness test

4.3.1. Dynamic panel

Corporate performance fluctuations of this year may be influenced by that of previous year, which was first shown in the generalized ARCH model established by Engle (1982) and Bollerslev (1986), and then widely applied in various fields including finance and economics.¹ To this end, we controll the corporate performance fluctuations of previous year in explanatory variables as a robustness test for the above conclusion. In addition, as previous year's corporate performance fluctuation is endogenous variable, in order to solve the problem of endogeneity, we use GMM estimation method introduce by Blundell and Bond (1998), and Arellano and Bover (1995) with estimated results shown in Table 5. Results show that previous year's volatility exerts significantly negative influence on this year and fluctuations in corporate performance present the characteristics of reverting to the mean. In line with the above conclusion, both nominal independence and real independence fluctuation will reduce the performance fluctuations and the latter is more significant.

¹ For example, similar to ARCH theory, dynamic capital structure theory believes that the company capital structure fluctuates around the optimal structure. Namely, the wave direction of this year is likely to be opposite to last year's.

4.3.2. Conditions for board independence to reduce performance fluctuations

The independent watchdog role of board is mainly embodied in the constraints and balances on management. However, there is controversy concerning whether executives' power intensities or lessens corporate fluctuations among existing literature. Sah and Stiglitz (1986) point out that in the process of decision-making within the organization's team, the more concentrated the decision-making authority is, the greater the fluctuations in performance will be. Adam *et al.* (2005) also find the greater authority of the CEO is, the greater the fluctuations in corporate performance will be. But at the same time, some scholars think a powerful CEO will tend to engage in activities to reduce risk and thus would prefer to maintain a quiet life (Bertrand and Mullainathan, 2003). However, no matter which of these views is right, there is an obvious fact, that is the supervision and discipline of the board of directors can hardly to exert influences on non-active management. This means poor effect of board independence's supervision in calming companies. (Kang, *et al.*, 2012). As a result, we make the second robustness test: to regress companies with great and small performance fluctuations and predict that in the sample group with great performance fluctuations board independence plays a more significant role in reducing corporate fluctuations.

Table 5
GMM estimate of dynamic panel of GMM

Explanatory variables	Performance fluctuations			
	Model (9) <i>vroe</i>	Model (10) <i>vraa</i>	Model (11) <i>vroe</i>	Model (12) <i>vraa</i>
Performance fluctuation of previous year	-0.087*** (0.021)	-0.061** (0.030)	-0.101*** (0.032)	-0.075** (0.038)
Nominal	-10.072 (7.535)	-15.652* (8.074)		
Real			-49.570*** (12.843)	-32.792** (15.466)
Control variables	Yes	yes	yes	yes
Constant term	yes	yes	yes	yes
Year	yes	yes	yes	yes
Individual effect	yes	yes	yes	yes
Observed value	200	200	200	200
AR(2)	0.652	0.879	0.950	0.826
Hansen	0.438	0.406	0.549	0.634

Notes: Inside the brackets is the report of robustness standard deviation. "Yes" means the fixed effect of controlled relevant variables. ***, ** and * represent the significance of 1%, 5% and 10% respectively. AR (2) shows the value p testified by Arrelano-Bon which is relevant to sequences of order two. The original hypothesis of this test is first difference of the error term without serial correlation. Hansen shows the value of p tested by Hansen with the effectiveness of instrumental variable. The original hypothesis of this test is that instrumental variables chosen satisfy moment condition.

The performance fluctuation rate of return on total assets (*vroa*) is used as explained variable. According to the median of *vroa*, samples are divided into two groups—one with great fluctuations and the other with small fluctuations. The measurement results are shown in Table 6. Compared with the regression results of the whole samples, samples with less volatility witness reduced effect of board independence on fluctuations. With lowered significance, the role of sample group's independence is enhanced and becomes more significant. In this way, we not only further verify the two hypotheses, but also get a condition for board independence to reduce corporate volatility: active management is connected with volatile corporate performance.

Table 6
Regression by groups

Explanatory variables	<i>vroa</i>			
	Model (13) Small fluctuations	Model (14) Great fluctuations	Model (15) Small fluctuations	Model (16) Great fluctuations
Nominal	-20.819 (13.752)	-51.309** (18.031)		
Real			-53.458* (27.754)	-82.005*** (20.404)
Control variables	yes	yes	yes	yes
Constant term	yes	yes	yes	yes
Year	yes	yes	yes	yes
Individual effect	yes	yes	yes	yes
Observed value	202	202	202	202
R-squared	0.084	0.114	0.125	0.138

Notes: Inside the brackets is the report of robustness standard error. "Yes" means the fixed effects of relevant variables have been controlled. R-squared is R's square in the group. ***, ** and * represent the significance level of 1%, 5% and 10% respectively.

5. Conclusions

Research into micro-mechanism of economic fluctuations by existing literature is relatively insufficient. How can corporate governance structure affect corporate performance fluctuations? There have been studies that focus on the influence of CEO power (Adams *et al.*, 2005) and the board size (Cheng, 2008) on the fluctuation of corporate performance. But they did not explain the role of board independence in it. And the research into the function of independent board focuses on the analysis of the corporate performance level. This paper emphasizes the test on the relation between board independence and corporate performance fluctuation, and proves that the independent directors have the function to reduce fluctuations in corporate performance. First, we obtains hypothesis 1: the board independence will strengthen supervision and reduce the fluctuations in corporate performance. Further, this

paper introduces the factors of social relations, expands the understanding on board independence, and puts forward hypothesis 2: the nominal board independence will reduce corporate performance but with inadequate significance; The real board independence will significantly reduce the corporate performance volatility; social relations between CEO and independent directors will increase corporate performance fluctuations.

This paper uses the small and medium-sized enterprises set up between the year of 2004 and the end of 2011. Adopting five-year floating average to calculate corporate performance fluctuations of that year, we get the unbalanced panel data from 2006 to 2009 as the initial samples; Thus, two main explanatory variables of nominal board independence and real independence are built. The CEO power, the board size, the nature of the actual controllers are all introduced as control variables; Then, we use fixed effect panel method for the measurement analysis and test the two hypotheses; Finally, using dynamic panel and regression by groups to conduct robustness test and extend research. The main contribution of this paper is to confirm the function of independent board in lowering corporate performance fluctuation and provides the evidence for the rationality of the independent director system in China. Moreover, this paper tests the influence of the relation between the board of directors and management on corporate performance. This study found that CEO-independent board social relations will weaken the supervision by board and thus exacerbates corporate performance fluctuations.

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