

CEO duality and firm performance for Chinese shareholding companies

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Abstract

CEO plays an important role in the corporate governance system. Whether CEO duality has negative implication to firm performance has been widely researched. However, empirical evidence showed mixed results. The development of code of best practices in the world over has advocated that CEO and chairman role should be separated. In the new century what is the implication of CEO duality to firm performance for Chinese shareholding companies?

Since China's economic reform from 1980s, Chinese government endeavoured to separate government from control of state-owned enterprises which equalled to the increasing separation of principal from agents. The agency problem worsened and state-owned enterprises (SOEs) performance deteriorated during the process of reform. This study tries to shed lights by answering the question: "Does CEO duality leadership structure have negative implications to the performance of Chinese shareholding companies compared to split positions? "

Agency theory and stewardship theory have conflicting assumptions of human behaviour and different prescriptions regarding governance mechanisms with firm performance. The study uses multiple theory lenses to examine the relations of leadership structure, ownership structure, agency control mechanisms and agency problems with firm performance. The characteristics of the board and firm are controlled in the model and examined. This study especially identifies moderating

environmental factors that influence the relations of CEO duality with firm performance.

Since China's economic reform in early 1980s China's economy has been developing quickly and thus making research in this market intriguing. OLS regression analysis techniques are used to examine all Chinese public listed firms in Shanghai Stock Exchange in manufacturing sector from 2000 to 2004. Research showed that industry and environment have moderating effects to the relations of CEO duality with firm performance. CEO duality is not related with firm performance in 2000 and 2001. After complying with the regulation regarding splitting CEO duality roles, CEO duality is positively related with firm performance in 2002 and 2003; the positive relation with firm performance is stronger in high volatility and low munificence environment. The research findings reveal the newest development of Chinese public listed companies and the positive change of board leadership structures. It provides policy implications to Chinese government and organizations and enriches the literature of corporate governance in transitional economies.

Key words: Corporate governance, Leadership structure, CEO duality, Firm Performance

Introduction

Since China's economic reform from 1980s, Chinese government endeavoured to separate government from control of state-owned enterprises which equalled to the increasing separation of principal from agents. The agency problem worsened and state-owned enterprises (SOEs) performance deteriorated during the process of reform (Wang 2004). As it's common for Chinese enterprises suffer from "insider control" problems (Lin, 2001), this study tries to shed light by answering the question: "What are the implications of CEO duality to firm performance for Chinese shareholding companies?"

The firms' leadership structure is important determinant of firm performance and the topics have been widely studied by previous researchers. (e.g. Dalton *et al* 1998; Dawna *et al*, 2001; Qi *et al*, 2000). CEO duality symbolizes greater "insider control" compared to separate leadership structure. There are mixed evidence regarding the implications of CEO duality to firm performance, thus making the study of CEO duality with firm performance prevailing.

The present study intends to test the theories in a Chinese context, on the basis of identifying external moderating environmental factors. The objective is to investigate the relationship between CEO duality and firm performance for Chinese public listed companies (PLCs) from 2000 to 2004. The key findings are that industry and external environmental factors have moderating effects to the relations of firms' leadership structure to firm performance. CEO duality is not related with firm performance in 2000 and 2001. After complying with the "basic Norms" regarding splitting CEO duality roles, CEO duality is positively related with firm performance in 2002 and 2003; the positive relation with firm performance is stronger in high volatility and low munificence environment. The research findings reveal the newest development of Chinese public listed companies and the positive change of board leadership structures.

Literature review

Jensen and Meckling (1976) investigated the nature of the agency costs and showed its relationship to the 'separation of ownership and control' issue. Agency theory believes that duality promotes CEO entrenchment by reducing board monitoring effectiveness. According to organization theory, such CEO duality enhances firm performance by providing clear and unambiguous leadership to the CEO (Donaldson and Davis, 1991). Stewardship theorists assume that managers are good stewards of the company. They are trustworthy and work diligently to attain high levels of corporate profit and shareholders' returns (Donaldson and Davis, 1994). Agency theory and stewardship theory provide contradicting prescriptions to the influence of a certain leadership structure (CEO duality) to firm performance from a particular perspective.

Empirical evidence on CEO duality with firm performance showed mixed results (Rhoades *et al.*, 2001; Kang and Zardkoohi, 2005). In a Meta analysis of 31 empirical studies of board leadership structure to firm financial performance, the conclusion is that there is no relationship between board leadership structure and firm performance (Dalton *et al.*, 1998).

Despite the mixed empirical evidence, a movement to separate the positions of CEO and board chairperson has received considerable attention in recent years, especially from board reform critics (Committee on the Financial Aspects of Corporate Governance, 1992; Monks and Minow, 1991). Between the publication of the Cadbury Report in December 1992 and December 2002, at least 16 other countries witnessed publication of similar guidelines calling for the separation of the combined CEO and Chairman position (Dahya, 2005).

CEO duality in China

Empirical evidence on CEO duality with firm performance in a Chinese context also showed mixed results (Peng *et al.* 2007). CEO duality is generally seen as a barrier to effective corporate governance by Chinese policy makers and researchers (Tian and Lau, 2001). Chinese shareholding companies have considerable autonomy in either combining or splitting CEO and chairman roles (Peng *et al.*, 2007). In China, the basic norms of state owned large and medium sized enterprises in establishing modern

enterprise system and strengthening management (hereafter referred to as “the basic Norms”) was issued by State Economic and Trade Commission in Oct. 2000. It’s stipulated that in principle that the chairperson of the board of directors and the general manager (CEO) could not be the same person. The Code of Corporate Governance for Listed Companies in China (CSRC, 2002) legally mandates the necessity to appoint outside directors. Thus the percentage of companies practicing CEO duality has been reduced and independent director percentage has increased. In reality, the percentage of public listed companies practicing CEO duality has been decreasing, from approximately 60 percent in the early 1990s to approximately 30 percent by the end of the 1990s (Bai *et al* 2004) and to approximately 10 percent in the early 2000s.

Research hypotheses

CEO duality and firm performance

It is argued that the same person should not hold the CEO and chairman roles simultaneously, as this will reduce the effectiveness of board monitoring (Finkelstein and D’Aveni, 1994). Agency theory indicates that CEO duality has negative implication to firm performance (Malette and Fowler, 1992). Stewardship theorists argue, however, that one person in both roles may improve firm performance as such a structure removes any internal and external ambiguity regarding responsibility for firm processes and outcomes (Finkelstein and D’Aveni, 1994). There is evidence in support of stewardship theory (e.g. Donaldson and Davis, 1991) and agency theory (e.g. Worrell *et al.* 1997), along with a body of research that finds no impact of leadership structure on firm performance (e.g. Daily and Dalton, 1992, 1993; Rechner and Dalton, 1989). Boyd (1995, p.309) suggests that neither agency nor stewardship theory can predict the consequences of CEO duality and that “duality can have a positive effect under certain industry conditions, and a negative effect under other conditions”.

So, hypothesis 1a is derived according to agency theory and hypothesis 1b according to stewardship theory:

Hypothesis 1a: Firms with CEO duality leadership structure are negatively related with firm performance.

Hypothesis 1b: Firms with CEO duality leadership structure are positively related with firm performance.

Moderating factors of environment

The key finding of meta-analysis (Rhoades *et al*, 2001) is that the decision context moderates the relationship between CEO duality and firm performance. It provides support for the contingency view regarding the effect of CEO duality (Boyd, 1995; Finkelstein and D'Aveni, 1994). In the 1990s, there is contingency approach for the research on CEO duality and firm performance. Boyd (1995) concludes that duality can have a positive effect on performance under certain industry conditions (i.e. resource scarcity or high complexity).

In a Chinese context, Peng *et al.* (2007) followed Boyd's (1995) contingency approach and studied Chinese listed companies from 1992 to 1996 and found positive relationship between CEO duality and firm performance; the positive relationship is stronger for firms in low munificence and high dynamism environments. However, studies of Wu *et al* (1998) and Yu & Gu (2002) showed no significant influence of CEO duality to firm performance in low munificence and high dynamism environments. The following hypotheses are proposed from above evidence:

Hypothesis 2a: There will be a stronger positive relationship between CEO duality and firm performance in a low munificence than in a high munificence environment.

Hypothesis 2b: There will be a stronger positive relationship between CEO duality and firm performance in a high dynamism environment than in a low dynamism environment.

Variable definition

Dependent variables

In this study industry adjusted ROA (return on asset), industry adjusted ROE (return on equity) and industry adjusted ROS (return on sales) are used to measure profitability.

As industry type is an important factor to influence firm performance, this study will use industry adjusted performance figures. For an examination of the effects of CEO

duality on shareholder returns, Donaldson and Davis (1991) controlled for exogenous effects on shareholder returns by controlling for industry, which proxies numerous factors such as product, market, competition and so on. All listed companies in manufacturing sector were divided into 13 industries according to 2 digit industry code. For each firm year of data, the industry median for that year was subtracted from the firm's observation for that year to arrive at the annual industry-adjusted observation for the firm (Brickley *et al.*, 1997).

Accounting measures have the limitation that they are somewhat open to manipulation by management, so multiple performance measures were used because of the inherent limitations in any single financial measurement (Muth and Donaldson, 1998). Based on suggestions in previous research, multiple measures produce a more accurate description of performance (Rechner and Dalton, 1991).

Chinese scholars, practitioners and officials attach great importance to ROE. China Securities Regulatory Commission (CSRC)- the Chinese equivalent of the US Securities and Exchange Commission (SEC)- has required that for a firm already listed, its ROE has to be positive in one of every three consecutive years; otherwise, it will be delisted (Peng *et al.*, 2007). ROE was obtained by using net income divided by the average of owners' equity during a given year. This approach is used in Mishra and Nielsen (2000); Qi *et al.* (2000) and Peng *et al.* (2007).

ROA was used because it is directly related to management's ability to efficiently utilise corporate assets, which are ultimately the property of shareholders. However ROA measures are likely to be distorted by the significant increase in total assets resulting from the firm's share offering, which create a downward bias the firm's post-issue performance. ROA was obtained by using net income divided by the average of beginning and ending period book value of total asset during a given year. This approach is used in Mishra and Nielsen (2000) and Barber and Lyon (1996).

Sun and Tong (2003) suggest scaling returns by sales instead of total assets. ROS was obtained by scaling operating (net) profits by total sales recorded over the same period. It reflects the ability of the company to generate profit through its operating activities. Facing fierce product market competition, the advantages of CEO duality as

unity of command, clear cut leadership (Finkelstein and D'Aveni, 1994; Boyd, 1995) and lower information costs (Brickley *et al.*, 1997) will enable CEO to make prompt decisions and imply a positive influence to firm performance compared to separate leadership structure.

Independent and control variables

Proxies for agency control mechanisms and market induced monitoring are as follows: The percentage of director ownership, director compensation, proportion of independent directors and size of the board are measures of the extent to which agency problems are managed. The variables chosen are common agency control mechanisms recognized in the finance literature. The proxies for agency problems are CEO duality, state ownership, proportion of non-fixed assets and debt ratio. Proxies for firm characteristics are firm age and firm size.

CEO duality was a dichotomy variable with 0 standing for “non-duality” and 1 for “duality”. Proportion of independent directors is calculated as the ratio of the number of independent directors to the total number of directors. Board size is the total number of directors.

CEO age

It was argued that boards of higher average age may exhibit a conservative bias and better judgment and therefore be more likely to want to control risks to shareholders (Muth and Donaldson, 1998). However, according to Bantel and Jackson (1989), some cognitive abilities seem to diminish with age, including learning ability, reasoning and memory. Younger managers are likely to have received their education more recently than older managers. So younger directors are expected to bring better cognitive resources to decision-making tasks and ultimately result in high returns to shareholders.

Director ownership and salary

Managerial equity ownership has long been recognized as a means of aligning shareholder and management interests. Jensen and Meckling (1976) argue for a convergence of interest between outside shareholders and management as managerial ownership increases. Thus, the incentive alignment that comes with higher managerial

ownership can provide a binding constraint on the CEO's behaviour. Hence, the additional cost of non-duality is not worthwhile when the CEO owns substantial equity. Director compensation is measured by the yearly salary of the top three highly paid board members (may include CEO). The yearly salaries of the top three highly paid board members are disclosed in the annual reports of Chinese listed companies.

State ownership

Property right theory (Alchain, 1965) indicates that state ownership is inefficient compared to private ownership. Many studies examined the relations of state ownership with firm performance in China and the empirical evidence is mixed. Most of the studies argue that state shares are negatively related with firm performance (Tong, 2002; Qi *et al.*, 2000; Sun and Tong, 2003).

Debt ratio: various theories on the role of debt provide us with a complementary corporate governance mechanism that monitors the management. Jensen and Meckling (1976) and Shleifer and Vishny (1989) argue that a high leverage keeps agency costs in check by decreasing the firm's free cash flows available for the managers' own consumption. In the case of Chinese SOEs, things are different. Chinese SOEs are characterised by high debt ratio and soft budget constraint. The loans from state-owned banks to SOEs sometimes might be written off because of the poor performance of SOEs (Tian, 2003). This study uses total liability divided by total book assets as a proxy of debt level.

Firm age: Ang *et al.* (1999) argue that due to the effects of the learning curve and survival bias older firms are likely to be more efficient than younger ones. Thus a better performance should be expected. The old Chinese enterprises are characterized by both resource advantage and social burden (Tian and Lau, 2001). Given the possible influences of firm age on organizational performance, it was included as a control variable.

Firm size: in this study, size will control for the size effect and is taken as the natural log of annual average asset in Renminbi (RMB). If the dependent variable is ROA, the firm size is taken as the natural log of sales. A vast amount of literature has investigated the relation between size and performance of firms. Himmelberg *et al.*

(1999) argue that firm size could negatively affect operating performance as monitoring and agency costs are higher in large firms. In contrast, Barber and Lyon (1996) suggest that large firms benefit from economies of scale. In the case of China, Sun and Tong (2003) indicate that, while large SOEs benefit from large market share and market power, they are also more likely to be hampered by government interference, and be characterized by a redundant workforce as well as serious agency problems, all of which are detrimental to the firm's performance. It is thus expected that the variable "firm size" is negatively correlated with firm performance (Xu and Wang, 1999)

So the research will be OLS regressions with CEO duality, other agency control mechanism, agency problems and firm characteristics as independent variables, industry adjusted ROA, ROE and ROS as dependable variables.

Model design

$$P = \alpha + \sum \beta_i G_i + e$$

Here P= performance measure G_i = board characteristics and firm characteristics. The variables employed for board characteristics are CEO duality dummy, director ownership, director compensation, proportion of independent directors, board size and CEO age. The variables for firm characteristics are state ownership, percentage of non-fixed asset, debt ratio, firm size and firm age.

OLS regressions are used in this study because of the nature of the independent variable. The use of panel data requires variation over time in the independent variables. CEO duality is time invariant variable, thus can't be estimated by panel data fixed effect model.

First OLS regressions are run for each year's sample with ROS, ROE and ROA being dependent variable respectively, then for subgroup samples according to the classification of environment munificence and volatility.

Variable list

Following in the table is the list of variables.

Table 1: Variable list with variable abbreviation

Variable Name	Variable abbreviation	Variable definition
Board structure variables		
CEO Duality	CEODUA	A binary variable which equals one when the CEO also serves as board chairman, zero otherwise.
Independent Directors	INDEP	The percentage of independent directors
Board Size	BSIZE	the number of directors
Annual salary of board members	BSALARY	Yearly salary of top three board members (may include CEO), not including emuloment.
CEO age	CEOAGE	Age of CEO
Ownership variables		
Total director ownership	BSHAREOP	The proportion of outstanding shares owned by the directors.
State ownership	STATEOP	State ownership percentage
Control variables		
Firm size	LOGASSET	Log of firm assets
Firm age	FIRMAGE	Year of establishment
Non-fixed asset percentage	NONFIXAP	Non-fixed assets/ total assets
Debt level	DEBTP	Total debt/ total assets
Dependent variables		
Industry adjusted ROS	IAROS	ROS -median of industry ROS
Industry adjusted ROA	IAROA	ROA-median of industry ROA
Industry adjusted ROE	IAROE	ROE-median of industry ROE

Data source

There are two stock exchange markets in China. One is Shanghai Stock Exchange and the other is Shenzhen Stock Exchange. The data will cover all companies in Shanghai stock exchange market in manufacturing sector which maintained stable leadership structure from 2000 to 2004.

Of Chinese listed companies the manufacturing sector is the main focus. In the Chinese securities market, about 60% of the listed companies belong to the manufacturing sector (SHSE, 2005; SZSE, 2005). The data provider is GTA IT Co., Ltd. Data from this company are used by other researchers such as Peng *et al.* (2007) and Wang *et al.* (2004).

The original sample size is 1,977. In order to avoid the influence of extreme values to the test result, the data of 12 companies that have negative equity figures and negative net income are deleted. So the total sample size is 1,965. Firm financial performance variables are examined. 4 ROE values and 10 ROS values which are below -3 are deleted.

Data analysis

Descriptive data

Table 2: Descriptive statistics for Chinese PLCs

Year	CEO duality	Board size	Independent director percentage	Board salary	Board share ownership	State ownership	ROA	ROE	ROS
Average	0.072	9.812	0.211	386708.5	0.0029	0.368	0.031	0.049	0.058
2000	0.149	9.501	0.018	125872.1	0.0003	0.355	0.045	0.063	0.067
2001	0.08	9.38	0.061	273705.3	0.0004	0.371	0.033	0.056	0.069
2002	0.058	10.015	0.24	331227.6	0.002	0.375	0.019	0.03	0.051
2003	0.043	10.026	0.331	440224.6	0.005	0.364	0.03	0.048	0.05
2004	0.047	10.02	0.343	504963	0.006	0.373	0.031	0.049	0.055

On average only 7.2 % of companies practicing CEO duality leadership structure. Every year the percentage of companies practicing CEO duality leadership structure has been decreasing from 14.9% in 2000 to 4.7% in 2004. The average board size is 9.8, that is, about 10 board members. The average independent director percentage is

21.1%. The percentage of independent directors has been increasing from 1.8% in 2000 to 34.3% in 2004. On average board shareholding percentage is 0.29%. The board salary and board share ownership are much lower compared to the western standards. However, the percentage has been increasing since 2000 which is good practice. The average state ownership is 36.8% and state ownership has been stable during the five years. The mean return of ROA, ROE and ROS are 3.1%, 4.9% and 5.8% respectively. The firm performance is lowest in 2002.

Descriptive data according to CEO duality

Table 3: Performance measures according to CEO duality

Variable	CEO duality		Non CEO duality		T-ratio comparison	
	Sample size	Mean	Sample size	Mean	T-ratio	P-ratio
ROA	142	0.047	1821	0.03	-2.458	0.014**
IAROA	142	0.006	1821	-0.008	-2.029	0.043**
ROE	141	0.077	1818	0.046	-1.775	0.076*
IAROE	141	-0.001	1818	-0.025	-1.437	0.151
ROS	141	0.073	1809	0.057	-0.867	0.386
IAROS	141	-0.009	1809	-0.022	-0.718	0.473

* P<0.10 ** P<0.05 *** P<0.01

Here industry-adjusted measures are obtained by deducting industry median of ROA, ROE and ROS from firm performance measure ROA, ROE and ROS respectively. Of all the above financial measures it's higher in CEO duality firm than non-duality firms. From above descriptive data basically speaking CEO duality firms have better profit figures. T test is used to compare whether the performance difference of the two groups are significantly different. The results showed that ROA, IAROA and IAROE are significantly higher in CEO duality firms.

Regression analysis

Industry adjusted ROS, ROE and ROA are dependent variables. Five OLS regressions are run on each year's data with the same explanatory variables. In 2000 the variable of board salary has lots of missing values, so it is not included in the model in the regressions in 2000.

Before regression analysis collinearity issues are examined by correlation test, no two variables are significantly co-related, so there is no issue of multi-collinearity.

Table 4(a): OLS regression with ROS being dependent variable

OLS regression		Dependent variable: Industry adjusted ROS				
	year2000	year2001	year2002	year2003	year2004	
Independent variables	Coef	Coef	Coef	Coef	Coef	
ceodua	-0.032	0.011	.0551*	.0729*	0.024	
bsize	0	0.002	0.006	0.004	-0.002	
indep	-0.084	0.031	-0.029	-0.097	0.350	
ceoage	0.001	-0.001	0	0	0.001	
bshareop	2.08*	0.981	0.006	-.339*	0.104	
logasset	0.027	-0.012	0.005	.0456*	0.011	
firmage	0	-0.003	-0.005	-0.001	-0.001	
debt	-.764***	-.301***	-0.151	-.559**	-0.084	
nonfixap	.123*	0.002	0.080	.156*	0.017	
stateop	0.000	0.016	-0.008	0.039	0.101	
bsalary		5.4e-08**	1.1e-07***	0	4.2e-08**	
_cons	-0.403	.387*	-0.188	-0.842	-0.393	
r2	0.345	0.213	0.115	0.240	0.039	
r2_a	0.324	0.180	0.085	0.214	0.012	
rmse	0.19	0.117	0.185	0.194	0.212	
F value	9.36***	7.65***	15.72***	3.18***	4.07***	
N	319	278	335	338	416	

* p<0.05 ** p<0.01 ***p<0.001

From above we know that CEO duality is positively related with ROS in year 2002 and 2003. Board salary is positively related with ROS in 2001, 2002 and 2004. Debt level is negatively related with ROS in 2000, 2001 and 2003.

Table 4(b): OLS regression with ROE being dependent variable

OLS regression		Dependent variable: Industry adjusted ROE				
	year2000	year2001	year2002	year2003	year2004	
Independent variables	Coef	Coef	Coef	Coef	Coef	
ceodua	-0.040	0.021	0.120	.0738**	.0534**	
bsize	-0.001	-0.002	0.011	0.001	0.000	
indep	-0.267	0.062	-0.053	.353*	0.276	
ceoage	0.000	-0.001	0.000	-0.001	-0.001	
bshareop	1.390	1.57*	-.345*	-0.251	0.070	
logasset	.0329**	0.018	0.025	.0391*	.0306***	
firmage	0.002	-0.001	-0.001	0.001	-0.001	
debtpr	-.516**	-0.168	-0.167	-0.250	-.199*	
nonfixap	0.126	0.065	.196**	0.147	.113**	
stateop	0.017	0.055	-0.003	-0.004	.0773*	
bsalary		8.7e-08***	1.2e-07***	0.000	4.5e-08***	
_cons	-.605*	-0.329	-.72*	-.931*	-.738**	
r2	0.211	0.129	0.143	0.129	0.156	
r2_a	0.185	0.093	0.114	0.100	0.133	
rmse	0.185	0.131	0.214	0.16	0.142	
F value	3.46***	4.84***	7.03***	2.94***	6.14***	
N	318	280	338	338	417	

* p<0.05 ** p<0.01 ***p<0.001

From above CEO duality is positively related with ROE in year 2003 and 2004. Board salary is positively related with ROE in 2001, 2002 and 2004. State ownership is positively related with ROE in 2004 only.

Table 4(c): OLS regression with ROA being dependent variable

OLS regression		Dependent variable: Industry adjusted ROA				
	year2000	year2001	year2002	year2003	year2004	
Independent variables	Coef	Coef	Coef	Coef	Coef	
ceodua	0.005	0.006	.0392*	.0249**	.0174*	
bsize	-0.001	-0.001	0.004	-0.001	-0.001	
indep	-0.134	0.021	0.009	0.074	0.152	
ceoage	0	-.00068*	0	0	0	
bshareop	.501*	1.1***	-0.100	-0.062	0.023	
logasset	.0124***	0.003	.0168*	.0158***	.0112***	
firmage	0	0	0.001	0	-0.001	
debtpr	-.172***	-.111***	-0.189	-.157***	-.0958*	
nonfixap	0.024	0.018	.107**	.044*	0.023	
stateop	-0.004	.0245*	-0.007	-0.004	0.016	
bsalary		2.7e-08***	0	0	1.9e-08***	
_cons	-.206***	0.001	-.366**	-.302***	-.247***	
r2	0.384	0.279	0.303	0.292	0.250	
r2_a	0.364	0.249	0.279	0.268	0.229	
rmse	0.045	0.039	0.099	0.054	0.048	
F value	14.40***	9.78***	14.88***	5.77***	7.22***	
N	319	278	338	339	418	

* p<0.05 ** p<0.01 ***p<0.001

From table 4(c) we know that CEO duality is positively related with ROA in year 2002, 2003 and 2004. Board salary is positively related with ROA in 2001 and 2004. Debt level is negatively related with ROA in 2000, 2001, 2003 and 2004. State ownership is positively related with ROA in 2001 only.

Generally speaking, from above evidence CEO duality is positively related with firm performance in year 2002, 2003 and 2004. This result is consistent with the studies in Tian and Lau (2001) and Peng *et al.* (2007). From above evidence hypothesis 1b is supported that CEO duality is positively related with firm performance and hypothesis 1a is rejected. Board salary, firm size, debt level (-) and the percentage of non-fixed assets are significantly related with firm performance. Wu *et al* (2001) did empirical research of non-executive directors with firm performance for Chinese PLCs using the data in 1999. They found out that firm performance as measured by ROA is positively related with firm asset and negatively related with debt level. So the empirical results are consistent in these two studies in this respect.

Endogeneity issues

We need to be aware of the fact that “the basic Norms” issued by State Economic and Trade Commission in Oct. 2000 stipulated that CEO duality role should be separated. As a result, the percentage of companies practicing CEO duality reduced greatly from 2001 onwards. So is there a self selection problem that good performing firms chose to retain CEO duality structure? It’s agreed that board leadership structure is one corporate governance mechanism that help to control agency costs (Kwok, 1998). Reward is one antecedent of CEO duality (Kang and Zardkoohi, 2005) according to the succession framework of Vancil (1987). To test the endogeneity issues, I design a model as follows:

$$Y_{t+1} = \alpha + \beta P + \sum \beta_i G_i + e$$

Here Y_{t+1} = CEO duality in next year. P= performance measure which is measured by IAROS, IAROE and IAROA respectively. G_i = board characteristics and firm characteristics. The variables employed for board characteristics are director ownership, director compensation, proportion of independent directors, board size and

CEO age. The variables for firm characteristics are state ownership, percentage of non-fixed asset, debt ratio, firm size and firm age.

Four different logit models are run each year with firm performance variables measured by IAROA, IAROE and IAROS respectively. So there are 12 logit regressions. IAROS has no influence to the choice of CEO duality leadership structure in next year. IAROA in 2003 is positively related with CEO duality in 2004 at 5% significance level. IAROE in 2003 is positively related with CEO duality in 2004 and IAROE in 2000 is negatively related with CEO duality in 2001, both at 10% significance level.

Table 5 Summary of findings from previous OLS regressions

	Independent variable: CEO duality				
Dependent variable	2000	2001	2002	2003	2004
IAROS	None	None	+	+	None
IAROE	None	None	None	+	+(endogenous)
IAROA	None	None	+	+	+(endogenous)
CEO duality percentage	14.9%	8%	5.8%	4.3%	4.7%

From logit model we know that firms with better IAROA and IAROE in 2003 are more likely to have CEO duality structure in 2004. From OLS regressions CEO duality is positively related with IAROA and IAROE in 2004. There are endogeneity issues here and thus the findings from OLS regressions in 2004 are disregarded. Reconsidering regression results from above table clearly shows that CEO duality is not related with firm performance in 2000 and 2001. CEO duality is positively related with firm performance in 2002 and 2003. So hypothesis 1a is rejected and hypothesis 1b is supported in year 2002 and 2003.

Matched pair sample comparisons

Table 6: Firm characteristics according to CEO duality

Variable	CEO duality		Non CEO duality	
	Sample size	Mean	Sample size	Mean
Employee No	141	2708.04	1814	4061.93
Sales	141	1.30e+09	1821	2.40e+09
Asset	142	1.79e+09	1821	3.05e+09
Equity	142	9.49e+08	1821	7.50e+09
Firm age	142	6.33	1823	6.89
IPO year	142	2.8	1823	4.28

From above we can clearly see that firms with CEO duality leadership structure have less employees, less sales, less asset and equity and less IPO age compared to companies with separate leadership structure. In order to compare alike with alike, I would like to compare industry adjusted firm performance measures for matched pair companies with different leadership structures. The few matched criteria are firm characteristics variables such as industry, sales, employee No. These matched approach are used in Daily and Dalton (1994) and Hambrick and D'Aveni, (1988). Matching firms on industry, year and size provides some control for firms' operating environment.

Table 7 Comparison of firm performance for Chinese PLCs

Year	2000-2004			2002-2003		
	Sample	Difference	T-stat	Sample	Difference	T-stat
IAROA	Unmatched	0.0163	2.59***	Unmatched	0.0339	2.33**
	Matched	0.0089	1.56	Matched	0.0286	3.12***
IAROE	Unmatched	0.0251	1.50	Unmatched	0.0938	2.75***
	Matched	0.0132	0.50	Matched	0.1058	2.42**
IAROS	Unmatched	0.024	1.31	Unmatched	0.0741	2.17**
	Matched	0.0237	0.87	Matched	0.1082	1.85*

* P<0.10 ** P<0.05 *** P<0.01

For the whole sample from 2000 to 2004 the matched pair comparison results showed that the mean of industry adjusted ROA is significantly different for unmatched CEO duality and non CEO duality firms. But for matched paired samples there is no

performance difference for industry adjusted ROA, ROE and ROS. The result is consistent with the regression results from regression analysis using the data in 2000 and 2001.

From previous regression analysis we know that CEO duality is positively related with firm performance in 2002 and 2003. So what's the result for matched pair comparisons? For the sample in 2002 and 2003 the performance difference between matched pair groups or non-matched pair groups are all significant, no matter if the firm performance is measured by industry adjusted ROA, ROE or ROS. This is consistent with previous regression results.

The moderating influence of environment

How to measure environment munificence and volatility? This study followed Yu & Gu (2002)'s approach to measure environment according to the framework of Dess & Beard (1984): (1) Environmental munificence which means the abundance of resources in one industry is measured by 5 year standardized industry sales growth. The formula is regression coefficient divided by mean of industry sales. (2) Environmental volatility which means the unstableness or changeability of the environment is measured by 5 year standardized industry sales growth changeability. The formula is standard deviation of regression coefficient divided by mean of industry sales. In this study the five years' data (2000-2004) are used to measure industry munificence and volatility. The companies are divided into subgroups according to environment munificence and volatility. Munificence dummy equals to 1 for companies with high environment munificence and zero otherwise. Volatility dummy equals to 1 for companies with high environment volatility and zero otherwise.

From previous OLS regressions we know that there are endogeneity issues in the data in 2004 as industry adjusted ROE and ROA in 2003 are positively related with CEO duality in 2004. So the data in year 2004 is excluded and only the data from 2000 to 2003 are used. Each year the companies are divided into two groups according to environment munificence and another two groups according to environment volatility. So there are four subgroups of each year's data. The same independent and dependent variables are used and four multiple regressions are run each year in 4 subgroup data. For the ease of presentation the coefficients of all independent variables will not be

reported. The results of CEO duality estimator will be reported. “+” is used to symbolize significant positive results and “leaving it blank” represents non significant results. Data analysis from year 2000 showed no significant results, so the result is not reported. The results from year 2001 to 2003 are reported in following table 8.

Table 8 Results of subgroups regression analysis according to environment munificence and volatility

		Independent variable: CEO duality estimator			
Year	Dependent variable	High munificence	Low munificence	High volatility	Low volatility
2001	IAROS				
	IAROE				
	IAROA	+			
2002	IAROS	+	+	+	
	IAROE	+	+	+	
	IAROA		+	+	
2003	IAROS				+
	IAROE		+	+	+
	IAROA		+	+	+

Note: CEO duality estimator is non-significant in 2000 in 4 subgroup regressions.

From above we know that CEO duality has a stronger positive relationship with firm performance in a low munificence than in a high munificence environment. So hypothesis 2a is supported. CEO duality has a stronger positive relationship with firm performance in a high volatility than in a low volatility environment. So hypothesis 2b is supported. The moderating role of environment is only significant in 2002 and 2003, not in other years. The findings are consistent with previous studies in a Chinese context: such as the findings of Peng *et al.* (2007) using the data from 1992 to 1996 of Chinese PLCs in the early stage of China’s stock market development. This again confirmed the contingency approach from Boyd’s (1995) regarding CEO duality with firm performance across institutional boundaries in a Chinese context.

State ownership is positively related with ROE and ROA in low munificence and high volatility environment in 2001 only, not in other years. The evidence is not strong. The findings are different than the results in Peng *et al.* (2007)'s studies. In their studies state ownership is negatively related with ROE and sales growth regardless of the external environmental conditions. In comparison of the findings of the two studies, it reveals that state ownership has evolved from having negative implications to firm performance in the early 1990s to not having negative impact to firm performance in early 2000s. Corporate governance evolves over time and it's good to see that state ownership no longer plays a negative role in Chinese PLCs in the new century.

Contribution

This study used multiple measures for firm's profitability. ROS, ROE and ROA measure a certain aspect of firm's profitability and each has limitations. If a certain variable is associated with ROE, but not with ROS and ROA, we can't claim the variable is strongly associated with firm performance. Previous researchers normally used one or two of the above three profitability measurement. This study used all and it reveals the comprehensive picture of a certain governance variable with firms' profitability.

When examining CEO duality with firm performance, previous Chinese researchers used one year or few years' data. Doing data analysis using one year's data has its limitations. From 2001 onwards Chinese PLCs changed leadership structure in complying with the "basic Norms", thus it's imperative to examine the dynamic change of CEO duality with firm performance considering the change of outside forces to corporate governance structures. This study examines the change effect of CEO duality and firm performance during the five years.

This study also examines the moderating factors of environment to the relations of CEO duality and firm performance which have been largely ignored by previous researchers. It explores the issue of CEO duality with firm performance to more depth. Compared to previous studies, this study used new data sets and further developed the model. The research findings confirmed contingency approach in a Chinese context.

Most of the studies on CEO duality were published in 1990s. Very few were published in or after 2000. The decrease in the number of publications may be attributed to the failure of existing paradigms to shed light on the duality-performance relationship. There are even fewer studies on CEO duality in transitional economies. Thus this research has special implications and will enrich the literature of corporate governance in transitional economies. The research findings will reveal the newest development of Chinese public listed companies and provide valuable information to Chinese policy makers and organizations.

Policy implications

The splitting of CEO-chair positions is one of several mechanisms for controlling agency costs arising from shareholder-manager conflicts of interest. For firms with fewer monitoring mechanisms and higher levels of agency problems, the benefits of split positions exceed the costs, thus a policy of split positions is not appropriate for all firms (Kwok, 1998). The empirical evidence in this paper is that CEO duality is not related with firm performance in 2000 and 2001 for Chinese PLCs; CEO duality is positively related with firm performance in 2002 and 2003 after complying with the “the basic Norms” regarding splitting CEO duality roles. It reveals that firms chose the optimum leadership structure to fit each firm’s conditions while complying with the recommendations from the government. Thus it’s appropriate for Chinese policy makers to allow more freedom for Chinese companies to choose the right board leadership structures to fit the firms’ internal and external environments. The right guidance from regulations and Code of best practice is necessary to help Chinese PLCs to build effective corporate governance models in transitional economies.

Conclusion

The literature on corporate governance examines the efficacy of alternative structures of ownership and the boards of directors and various other governance mechanisms. The empirical evidence to date is mixed and gives little coherent evidence for the shape of an optimal governance structure. One explanation is that existing theories have not been sufficiently complete to include all major determinants of good corporate governance.

Since China's economic reform in early 1980s China's economy has been developing quickly and thus making research in this market intriguing. The key findings are that industry and environment have moderating effects to the relations between firms' leadership structures and firm performance. CEO duality is not related with firm performance in 2000 and 2001. After complying with the Code regarding splitting CEO duality roles, CEO duality is positively related with firm performance in 2002 and 2003 and it has stronger positive relations with firm performance in high volatility and low munificence environment. It reflects the positive change of board leadership structures for Chinese PLCs. Building effective corporate governance models need both the forces within the company and outside guidance from policy makers.

Limitation

About leadership structure, normally researchers divide the leadership structure to two states: 1 for CEO duality and 0 for split positions. For Chinese scholars one representative viewpoint is that under China's institutional environment there is a middle ground, that is, CEO acts as vice-Chairman or board member. This will influence board independence. Though this influence is not as big as CEO duality, the importance can't be neglected. So it's reasonable to divide leadership structure to 3 states: 1 for CEO duality, 0 for split position and 0.5 for CEO working as vice-Chairman or board member (Yu and Gu, 2002; Song 2006). However, the data company can't provide the data. This is one limitation of the study.

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