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Executive Compensation and CEO Equity Incentives in China's Listed Firms (CRI 2009-006)

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Keywords

China, Executive Compensation, CEO Equity Incentives

Comments

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Abstract

This study investigates the economic, ownership and governance determinants of executive compensation and CEO equity incentives in China's listed firms. Consistent with the agency theory, we find that executive compensation is positively correlated with firm size, performance, and growth opportunities. CEO incentives are negatively associated with firm size, positively linked with firm performance and growth opportunity. Firm risk has a negative effect on pay and incentives. Compensation and CEO incentives are significantly greater in privately-controlled firms compared to state-run firms and are lower in firms with concentrated ownership structures. Boardroom governance is important: firms with compensation committees or a greater fraction of independent directors on the board have higher executive pay and greater CEO equity incentives.

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1. Introduction

The determinants of executive compensation and equity incentives provide fundamental insights into how effectively a firm resolves the divergent interests between top management and shareholders. By tying the personal fortunes of senior executives to measures of corporate performance, firms can better align the interests of management with owners (Murphy 1999). Although there is a voluminous executive pay literature using Western data, there is hardly any evidence pertaining to China. The goal of this paper is to investigate the determinants of executive compensation and CEO equity incentives in China's listed firms between 2001 and 2005. We augment previous executive compensation studies in China, notably Firth, Tam and Tang (1999), Firth, Fung and Rui (2007), and Kato and Long (2006b).

China's stock market has grown significantly.[i] This has stimulated considerable interest in the appropriate governance of publicly traded firms (Schipani, and Liu 2002; Xi 2006). The ownership and control patterns of China's listed firms are very distinctive. The majority of firms are previous state-owned enterprises where the state continues to be the dominant shareholder. Firms are governed by two-tier boards, consisting of separate management and supervisory elements (Firth et al. 2007). Executives are often state-appointed bureaucrats whose effectiveness in delivering shareholder value has been questioned (Fan, Wong, and Zhang 2007). Importantly, investors, policy makers and academics have also questioned whether China's corporate governance mechanisms provide adequate protection for investors (Allen, Qian, and Qian 2005; Jingu 2007) or provide incentives for managers to promote shareholder welfare (Firth et al. 2007).[ii] The context of our study is the reforms initiated by the China Securities Regulatory

2

Commission (CSRC) since early 2000s aimed at improving the corporate governance quality of listed Chinese firms. These enable us to study the effectiveness of compensation and incentive arrangements (Murphy 1999; Core, Guay, and Larcker 2003)[iii]

Very few prior studies have investigated executive pay in China and none, to our knowledge, directly examine CEO equity incentives. Mengistae and Xu (2004) investigate CEO pay in approximately 400 Chinese state-owned enterprises in the 1980s using survey data. They find the CEO pay sensitivity decreases with the variance of performance. Our study, in contrast, focuses on public firms. Kato and Long (2006b) examine a sample of 937 firms listed in China between 1998 and 2002. They find that executive cash pay is positively related to firm performance and that the state sector is an important determining factor. Firth, Fung and Rui (2007) examine a sample of 549 listed firms in China between 1998 and 2000. They find that cash compensation is related to firm performance and that ownership and governance factors are determinants of cash pay. In related research, Firth, Tam, and Tang (1999) examine cash compensation in Hong Kong finding little statistical correlation between pay and firm's stock market performance.

Our study is significantly different from prior studies in a number of important ways. First, we examine the determinants of CEO equity incentives (arising from the ownership of firm shares) in addition to factors driving executive cash pay. Second, prior studies are based on data when the disclosure of executive compensation was voluntary, not mandatory.[iv] This can give rise to important selection effects and potential biases. If there are political costs associated with disclosing high executive pay then firms may

choose not to disclose under a voluntary regime. We use data from 2001 to 2005 when executive pay disclosure was mandatory, hence mitigating such sample selection effects. Finally, our study is based on a large sample of listed firms that is nearly the population of available listed firms in China.

We make several significant contributions to the existing literature. Foremost, we provide the first evidence on the determinants of CEO equity incentives in China. As noted, previous studies have focused exclusively on cash compensation rather than CEO share ownership. Using Western data, such equity incentives have been documented to be very important relative to flow measures of compensation (Hall, and Liebman 1998; Core et al. 2003; Conyon, and Murphy 2000; Murphy 1999). Second, we provide significant new evidence on the determinants of CEO equity incentives as well as the determinants of cash pay. We document the importance of economic, ownership structure and boardroom governance factors. We therefore augment prior studies on cash pay (Firth et al. 2007; Firth et al. 1999; Kato et al. 2006b). Third, we use a representative sample of firms during a mandatory pay-disclosure period compared to data collected from a voluntary-pay disclosure era.

The remainder of the paper is organized as follows. The next section presents theoretical issues and develops our hypotheses. Section three presents data and methods. Section four contains the empirical results. We conclude our paper in section five.

2. Theoretical issues and hypotheses

Little is known about executive compensation and CEO equity incentives in China, especially compared to Anglo-Saxon economies (Firth et al. 2007). We develop a set of

hypotheses arguing that executive pay and incentives in China's listed firms are determined by economic, ownership and corporate governance factors (Core, Holthausen, and Larcker 1999). Our study makes an important distinction between pay and incentives. Executive pay measures the flow of compensation received by an individual during a given time period. CEO equity incentives are the change in managerial wealth arising from a change in shareholder value and are directly related to an individual's ownership of firm shares or other equity such as stock options (Conyon et al. 2000; Murphy 1999; Core et al. 2003). Two CEOs may receive identical flow compensation in a given year, but one might own fifty percent of his firm's stock and the other nothing. The CEO with higher fractional ownership has stronger incentives since his wealth is directly tied to the firm's stock price. If the stock price declines, so too does CEO wealth. Since the value of current CEO shareholdings can be considerably larger than current annual compensation, incentives arising from equity ownership are often economically more important than the level of CEO pay (Core et al. 2003). Hence, in this paper we model both executive cash compensation and CEO incentives.

Economic determinants of CEO compensation and equity incentives

The standard economic theory of executive compensation is the principal-agent model (Holmstrom 1979; Mirrlees 1997, 1976; Murphy 1999). It predicts that firms design efficient compensation packages in order to attract, retain, and motivate CEOs and senior executives.[v] The standard agency model posits a risk-neutral principal who designs an optimal contract for a risk and effort-averse agent in the presence of a moral hazard problem. CEO pay and incentives are optimally set by the board of directors based on

economic determinants, the magnitude of agency problems and monitoring difficulty so that CEOs will work to promote shareholder interests (Core et al. 2003; Core, and Guay 1999; Fama, and Jensen 1983b; Jensen, and Meckling 1976). Compensation incentives and monitoring activities are typically argued to be substitute mechanisms that jointly contribute to the alleviation of agency problems (Core et al. 2003; Hermalin, and Weisbach 1998, 2003). Therefore, even if certain board or governance characteristics indicate inferior monitoring quality, the overall compensation package may still be optimal if greater equity incentives can compensate for the lower quality of board monitoring. The contract approach to executive pay and equity incentives is standard in the accounting, finance and economics literature.[vi]

Several economic factors are expected to determine executive compensation and CEO equity incentives in China's listed firms. Consistent with prior research we expect large complex firms require more talented managers who have higher levels of equilibrium pay (Core, Holthausen et al. 1999; Murphy 1985). Equity incentives refer to the change in managerial equity wealth brought about by a change in firm value (Murphy 1999; Conyon et al. 2000; Jensen, and Murphy 1990; Core, and Guay 1999; Core et al. 2003). If incentives are measured by the CEOs percentage holding of firm shares then a negative relation to firm size is expected (Schaefer 1998). This is because in larger firms it is more difficult for liquidity constrained, undiversified or risk-averse CEOs to hold a greater fraction of the firm (Core, and Guay 1999; Core et al. 2003; Schaefer 1998; Conyon, and Lerong 2004).[vii] We use firm sales to proxy firm size and complexity.

Prior theoretical and empirical work predicts that firms with greater growth opportunities will demand high-quality managers who in turn receive higher equilibrium

compensation (Rosen 1982; Smith, and Watts 1992; Core, Holthausen et al. 1999). We expect that firms with more growth opportunities will have higher levels of compensation and more equity incentives to motivate CEOs to take actions that promote owner welfare. We use the firm's market to book ratio as a proxy for the firm's investment opportunity set. Standard agency models also predict that the level of executive pay is an increasing function of firm performance to align manager and owner interests (Murphy 1999). Similarly, executives are more willing to accept higher incentives. As a result, we also expect that greater firm performance is associated with greater equity incentives.

Risk is also considered as an important determinant of CEO pay (Holmstrom 1979; Mirrlees 1976; Core, Holthausen et al. 1999). Such risks refer to uncertainties in the firm's information environment and operating environment. Consistent with prior research, we include a measure of firm risk in our econometric models (Core, Holthausen et al. 1999). Previous research has found mixed results on the effect of risk on compensation (Core et al. 2003; Prendergast 2002a, 2002b). We thus predict an indeterminate relation between firm risk and executive pay and incentives. To summarize, we predict that executive pay and CEO equity incentives in Chinese public firms will be determined by a set of economic factors related to the degree of agency concerns within the firm. This discussion suggests the following hypotheses:

Hypothesis 1a: *Executive compensation is positively correlated with firm size; CEO equity incentives (percentage ownership) are negatively related to firm size.*

Hypothesis 1b: *Executive compensation and CEO equity incentives are positively correlated with firm growth opportunities.*

Hypothesis 1c: *Executive compensation and CEO equity incentives are positively correlated with firm performance.*

Hypothesis 1d: *Executive compensation and CEO equity incentives have an indeterminate relation to firm risk.*

Ownership determinants of CEO compensation and equity incentives

Publicly listed firms in China have distinct ownership structures (Kato et al. 2006b; Kato, and Long 2006c; Firth et al. 2007). In most firms there is a dominant shareholder whose significant share stake commands considerable power and influence over the way the firm is run. This is especially the case in matters relating to the appointment and compensation of the CEO or the board. Typically, the largest shareholder in a Chinese public firm has an ownership stake of about 40%, the second largest 10% and the third largest 4% (our own calculations from the data described below). Ownership of Chinese public firms is therefore highly concentrated, especially compared to diffuse ownership structures that characterize Anglo-Saxon economies.

Ownership concentration has important consequences for the pattern of executive compensation and CEO equity incentives. Agency theory predicts that when ownership is dispersed, individual owners have weak incentives to invest in monitoring and exert influence over key corporate decisions (Fama, and Jensen 1983a; Jensen et al. 1976). This is the free-rider problem which can be mitigated in the case of concentrated share ownership. A high stake in a company's outstanding equities should provide block-holders or controlling shareholders strong incentives to supervise managerial activities (Jensen, and Warner 1988). As a result, concentrated ownership often indicates that

shareholders are able to better guard their interests in their firms. Core, Guay and Larcker (2003) and Shivdasani (1993) hypothesize that large share stakes by outside shareholders will also mitigate potential CEO entrenchment and is negatively correlated with CEO compensation. We too predict that the greater ownership stakes by investors are negatively associated with CEO compensation. Since the presence of large shareholders is associated with greater monitoring capabilities, they can more effectively monitor CEO behavior, ensuring it is consistent with shareholder welfare. In the presence of monitoring activities fewer incentives are required to motivate the CEO since monitoring and equity incentives serve as substitute mechanisms to promote owner goals. This reasoning suggests that CEO equity incentives are a decreasing function of ownership concentration.

In addition, we predict that the type of ownership is an important determinant of executive compensation and incentives in China's listed firms. The state is still the ultimate owner of China's listed firms in the majority of cases; private ownership is the second most common ownership type. Our data show that the state was the ultimate owner in about 70% of cases and private ownership represents about 27% of cases.[viii] When the state is the firm's owner the CEO is more likely to be a bureaucrat (Firth et. al. 2007) and managerial quality is expected to be lower. Managerial quality is likely to be greater under private firm ownership. This increased demand for managerial talent suggests that equilibrium wages will be higher in the private firms. In addition, private ownership is likely to result in compensation contracts that focus managerial behavior on maximizing firm value. Conversely, state-run firms might pursue political or multiple objectives, such as employment growth, rather than profit maximization. Privately owned

firms, therefore, are expected to set optimal contracts with greater pay-for-performance incentives. To summarize, we expect firm ownership structure to impact the level of executive compensation and CEO equity incentives in China's listed firms. We consequently hypothesize that:

Hypothesis 2a: *Executive compensation and CEO equity incentives are negatively correlated with ownership concentration.*

Hypothesis 2b: *Executive compensation and CEO equity incentives are greater in privately controlled firms.*

Board determinants of CEO compensation and equity incentives

Executive compensation is generally designed by the board of directors or a subcommittee of the board called the compensation committee. Previous research has indicated that the board's capacity to design an optimal compensation contract that maximizes shareholder value is dependent on the board's structure (Conyon, and Peck 1998; Core, Holthausen et al. 1999). In this study the effectiveness of monitoring by the board of directors is proxied by four factors identified from the previous corporate governance literature. We take as our null hypotheses that a compensation contract that is favorable to the CEO will contain higher levels of compensation and lower levels of share / equity incentives (Bebchuk, and Fried 2006, 2004). The latter is because, other things being equal, the CEO prefers not to be exposed to the increased risk associated with share ownership but would prefer instead the certainty equivalent in cash compensation.

First, it is frequently argued that the board of directors should consist of independent and outside directors (Core, Holthausen et al. 1999). One reason for this is that inside directors are more loyal to the CEO or the CEO can exert power and influence over them by controlling factors such as their career opportunities. Outside directors, on the other hand, have incentives to effectively monitor the CEO because they are experts in decision-control, subject to less CEO influence and have reputations to protect in the labor market (Fama et al. 1983b). However, the efficacy of outside directors may be impaired if they are too busy, have limited information about the firm or owe their position to the CEO (Jensen 1993). We predict that more independent directors on the board are associated with less managerial opportunism and more efficient contracts.

Second, previous research argues that the effectiveness of board monitoring is influenced by the size of the board. Jensen (1993) argues that large boards are less effective than small boards, because large boards may suffer free-riding problems in decision-making and control thereby diluting monitoring incentives for given board members. Therefore, when deciding executive compensation, a large board is less able to constrain managerial power and is more likely to compromise and make decisions in favor of management's rather than shareholders' interests (Yermack 1996).

Third, a stream of corporate governance research has argued for the separation of the board chair and CEO. A number of empirical studies suggest that agency problems are higher when the CEO is also the board chair (Yermack 1996; Jensen 1993). These studies suggest that executive pay contracts are more likely to tilt toward the CEOs interests when the CEO also holds the position of chairperson of the board. Finally, we consider the role of compensation committees: a sub-committee of the main board that is

responsible for setting executive pay (Baker, Jensen, and Murphy 1988). Compensation committees are common in US and UK firms but much less so in China's listed firms. The data reported below suggest only about fifty percent of firms have them in 2005 and even fewer in the years before. Previous research has hypothesized that firms with compensation committees are more likely to design a better compensation contract for the shareholders' interests. (Conyon et al. 1998; Newman, and Mozes 1999; Vafeas 2003). Overall, we expect:

Hypothesis 3a: Executive compensation is negatively related to the proportion of independent directors on the board; CEO equity incentives are positively related to the proportion of independent directors on the board.

Hypothesis 3b: Executive compensation is positively related to the size of the board; CEO equity incentives are negatively related to board size.

Hypothesis 3c: Executive compensation is higher when the leadership structure is combined; CEO equity incentives are fewer when the leadership structure is combined.

Hypothesis 3d: Executive compensation is lower in firms with a compensation committee; CEO equity incentives are greater in firms with a compensation committee.

3. Methods

Sample selection and data

Our sample is comprised of 1481 unique firms covering 6317 firm-years between the years 2001 and 2005. These firms account for about 98% of total firms listed in Chinese stock exchanges. Table 1 describes the data. In generating the sample, we combined two significant databases. These are the CCER/Sinofin and the CSMAR-A

financial databases. The primary data on executive compensation, CEO equity incentives and corporate governance are supplied by CCER (China Center for Economic Research) Sinofin Information Service. This dataset contains significant ownership information for firms listed on both Shanghai Stock Exchange and Shenzhen Stock Exchange and has been used in previous research (Kato, and Long 2006a; Kato et al. 2006b, 2006c). The SinoFin data is collected directly from public firms' annual financial reports as published in Securities Time, Shanghai Securities Daily, China Securities Daily, and other major newspapers designated by the China Securities Regulatory Commission (CSRC). Each input item is coded twice by two people to provide a cross-check and ensure coding accuracy. The financial and market information is obtained from CSMAR-A database, which collects financial and market information of all firms listed in Shanghai and Shenzhen stock exchanges. These data are also first-hand data collected from CSRC designated newspapers. Double-checking among statements published in different sources is performed to ensure data accuracy.

For periods prior to 2001 disclosure of executive pay was voluntary and this may result in important selection effects and potential biases, as discussed earlier. These may arise if there are political or economic costs to disclosing high levels of executive pay (Murphy 1996). In our data set we can probe this selection issue because we have information going back to 1998. The number of firms disclosing executive pay in earlier years was: 1998=132, 1999=103 and 2000=95. We defined an indicator variable equal to one for each early-disclosing firm (EARLY_DISCLOSE), zero otherwise. We then compared executive pay[ix] in early disclosing firms in year 2001 (when all firms had to disclose pay information) with the set of firms who did not disclose early. A simple

regression of executive pay on EARLY_DISCLOSURE for the year 2001 produced a significantly negative coefficient (β=-36578.48, t=-3.5). This result suggests that firms in the voluntary disclosure period have different pay (and potentially other) characteristics to the wider population of firms. Focusing on the 2001 to 2005 (mandatory) disclosure period and investigating the near-population set of firms we mitigate these kinds of selection issues.

Variable measurement

Dependent variables

We model two dependent variables in this paper; the natural log of executive compensation (denoted EXEC_PAY) and the natural log of CEO equity incentives (denoted CEO_EQUITY). Listed firms in China disclose the sum of total compensation for the three highest-paid managers and the three highest-paid board members (including executive board members)[x]. For the period from 2001 to 2005 Chinese regulations do not require listed companies to report the various components of annual compensation separately, but only total compensation defined as the sum of basic salary, bonus, stipends, and other benefits. We divide the single aggregated pay number by three to get an estimate of the pay received by the "typical" executive. [xi] The use of cash compensation is consistent with previous research (Firth et al. 2007; Kato et al. 2006b). In our sample period annual grants of stock options are extremely infrequent and can be ignored for the construction of the executive compensation measure.[xii]

Our second dependent variable is the log of CEO equity incentives (CEO_EQUITY). CEO equity incentives arising from stock ownership directly link CEO

wealth to shareholder value and are a major component of total CEO incentives in US and UK firms (Jensen et al. 1990; Conyon et al. 2000; Murphy 1999; Core et al. 2003; Hall et al. 1998). In western firms the prevalence of stock options and restricted stock means that these elements too have to be considered. Previous studies have introduced two important measures of equity incentives. First, the "dollars on dollars" measure (Baker, and Hall 2004; Jensen et al. 1990; Conyon et al. 2000; Murphy 1999) which defines incentives as the dollar change in CEO wealth arising from a $1,000 change in shareholder wealth. This is the measure introduced by Jensen and Murphy (1990) and effectively captures the CEO's "percentage ownership" of equity in the firm (Demsetz, and Lehn 1985; Jensen et al. 1990; Conyon et al. 2000). It can be written succinctly as: $1000×(the number of shares held / common shares outstanding) + $1000 × (option delta) × (the number of options held/common shares outstanding). If option holdings are zero then this reduces to the percentage of firm shares held.

The alternative incentive measure is the CEOs "equity stake" (Core, and Guay 1999; Baker et al. 2004). Following Core and Guay executive portfolio incentives are defined as the dollar change in the value of the CEO's stock and option portfolio arising from a one percent change in the stock price.[xiii] In the results section below, this is called PORT_INCENT. This "equity stake" measures incentives as the dollar change in managerial wealth from a one percent increase in shareholder wealth and can be written as: 1% × (share price) × (the number of shares held) + 1% × (share price) × (option delta) × (the number of options held).[xiv] Again, if the aggregate number of options held is zero then equity incentives are derived wholly from share ownership. In the case of China the absence of stock options currently makes calculating CEO equity incentives

straightforward, i.e., based on the CEOs ownership of firm shares. The number of shares and stock price are measured at the year end. The shares reported in the data are tradable A shares.[xv]

A natural question arises: which incentive measure to use? Baker and Hall (2004) document the merits of each measure.[xvi] In this paper we follow Jensen and Murphy (1990), Conyon and Murphy (2000), Conyon and He (2004) and adopt the Jensen-Murphy metric (dollars-on-dollars) as our primary incentive measure (Schaefer 1998). However, because our empirical estimates might be affected by the choice of incentives measure, we also report a sensitivity analysis using the equity stake measure.

Independent variables

The above discussion identified a set of factors which determine executive pay and incentives. The economic variables are: Firm size is measured as the log of firm sales (SALES); Firm performance is defined in two ways. The market-based measure of performance is the annualized stock return over the twelve months to December (SHR). The accounting-based measure of performance is return on assets, defined as net profits divided by the book value of assets (ROA). Growth opportunities are defined as the market value of the firm divided by the book value of assets (MKT_BK). Firm risk is measured by the standard deviation of stock returns over the year. The natural log of this measure is used in the regressions (VOL). The ownership variables are: Private ownership is an indicator variable set equal to one if the ultimate owner is a private entity and zero otherwise (PRIVATE). Ownership concentration is equal to the Herfindahl index based on the five largest owners. Namely, the sum of the five largest ownership

stakes squared (OWN_HERF). The boardroom governance variables are: The fraction of the board comprised of independent directors (IND_DIR). Board size is measured as the number of individuals on the main board (BOARD_SIZE). The leadership structure of the firm is a dummy variable set equal to one if the posts of CEO and chairman are combined, and zero otherwise (COMBINE). The presence of a compensation committee is a dummy variable equal to one if the firm has a compensation committee and zero otherwise (COMP_COMM). The boardroom governance variables are sourced from the SinoFin dataset. Finally, each of the regression models contain a set of industry dummy variables[xvii] to capture industry variation in managerial talent and a set of time dummies to capture year effects and macro-economic shocks.

Analysis

We estimate the following panel data model using ordinary least square (OLS) regression methods. We report t-statistics based on standard errors that are corrected for arbitrary heteroskedasticity, following the Huber (1964) and White (1980) transformation method (yielding robust standard errors and t-values). The executive compensation model is specified as follows:

$$\text{EXEC\_PAY} = \beta_0 + \beta_1 \text{SALES}_{it-1} + \beta_2 \text{SHR}_{it-1} + \beta_3 \text{ROA}_{it-1} + \beta_4 \text{MKT\_BK}_{it-1}$$

$$+ \beta_5 \text{VOL}_{it-1} + \beta_6 \text{PRIVATE}_{it-1} + \beta_7 \text{OWN\_HERF}_{it-1}$$

$$+ \beta_8 \text{IND\_DIR}_{it-1} + \beta_9 \text{BOARD\_SIZE}_{it-1} + \beta_{10} \text{COMBINE}_{it-1}$$

$$+ \beta_{11} \text{COMP\_COMM}_{it-1} + \beta_{12} \text{CONTROLS}_{it-1} + \varepsilon_{it} \qquad (1),$$

where β_1 to β_{12} are parameters to be estimated and CONTOLS are a set of industry and time dummies; and ε_{it} is the equation error. In the model firms are subscripted with i and

time with t. The right-hand side variables are all lagged by one period (i.e. denoted at t-1) to mitigate any endogeneity concerns (Conyon 1998). The incentive equation is similarly specified:

$$CEO\_EQUITY = \gamma_0 + \gamma_1 SALES_{it-1} + \gamma_2 SHR_{it-1} + \gamma_3 ROA_{it-1} + \gamma_4 MKT\_BK_{it-1}$$

$$+ \gamma_5 VOL_{it-1} + \gamma_6 PRIVATE_{it-1} + \gamma_7 OWN\_HERF_{it-1}$$

$$+ \gamma_8 IND\_DIR_{it-1} + \gamma_9 BOARD\_SIZE_{it-1} + \gamma_{10} COMBINE_{it-1}$$

$$+ \gamma_{11} COMP\_COMM_{it-1} + \gamma_{12} CONTROLS_{it-1} + \zeta_{it} \qquad (2),$$

where γ_1 to γ_{12} are again parameters to be estimated, CONTOLS are a set of industry and time dummies; and ζ_{it} is the equation error.

4. Empirical results

Descriptive results

Table 2 provides descriptive statistics on executive compensation for China's listed firms by year (Panel A) and broad industrial sector (Panel B). Panel A shows average (median) executive compensation in 2005 is 208,641 (146,491) renminbi (RMB). For comparison to Anglo-Saxon economies one Chinese yuan is valued at approximately 0.15 US dollars. Using this exchange rate, average (median) executive compensation in 2005 is $31,296 ($21,973) US dollars. This figure is striking as it is small in comparison to observed levels of US executive compensation. Average CEO pay in S&P500 firms increased dramatically from about $3 million in 1993 to a peak of approximately $16 million in 2000 and while it has fallen back in recent years, in 2006 it still stood at over $8 million (Kaplan 2008).[xviii] US executives earn over 200 times Chinese executives if one uses these numbers as a coarse indicator of the differences in the level of remuneration

received in each economy. Of course, such cross-national comparisons must be made with extreme care since no allowances have been made for purchasing power parity or other relevant facts, though to first-order approximation US CEOs earn considerably more than their Chinese counterparts.

Table 2 also shows that executive pay has grown considerably since 2001. For example, mean executive compensation has risen from 106,810RMB in 2001 to 208641RMB in 2005. To estimate the pay growth rate we defined a time trend variable (TREND) equal to one for 2001, two for 2002 and so on up to 2005. We then performed a simple OLS regression of the log of executive pay (EXEC_PAY) on this trend (EXEC_PAY = α + βTREND). The results indicate that executive pay has grown by about 18% per year over the period 2001 to 2005 (β=0.179, t=21.26). As China's economy has grown, so too has the growth in executive pay. Finally, Panel B shows the distribution of compensation across broad industry groups. It is noteworthy that executives in the finance sector receive greater compensation than CEOs in other sectors. This result is consistent with evidence in Anglo-Saxon executive compensation studies (Murphy, 1999).

Table 3 provides descriptive statistics (averages) on the key variables used in the study. Panel A provides information on CEO equity incentives and compensation. The typical CEO owns about 0.3% of his firm in 2005. This figure has increased significantly since 2001. Recall that the Jensen-Murphy measure can be interpreted as a dollar change in CEO wealth arising from a $1,000 change in shareholder wealth. In this case, a 1000RMB increase in shareholder wealth is associated with 2.67RMB increase in CEO wealth, which is more than ten times the 2001 level of 0.21RMB. The alternative

measure of incentives, the value of the CEOs equity holdings, has also increased over time. In 2005 the average value of the typical CEOs stock holdings was 2.9 million RMB. What is noteworthy is that this figure is considerably greater than the current compensation (about 0.2 million RMB). It is immediately apparent then that share ownership provides important incentives for CEOs to promote shareholder welfare.

Panels B and C provide average values for the dependent and independent variables in our analysis. From Panel B we see that the performance of firms is poor. This is consistent with Firth et al (2007) who also documents "lamentable" performance of listed firms. Panel C provides interesting institutional context to our study. The percentage of firms that are privately owned has more than doubled in a short period. We find that 28% have a private ultimate owner in 2005 compared with 12% in 2001. The state has withdrawn significantly. Ownership concentration of firms has fallen over time. In terms of boards, there has been an increased adoption of Western style governance practices. The fraction of independent members on the board has increased from 6% in 2001 to 34.3% in 2005. [xix] The main board size is about ten members and is relatively constant over time. About 16% of firms combine the posts of CEO and chairperson over the sample period. Finally, the proportion of firms that have adopted a compensation committee for the purposes of setting executive compensation has increased significantly from 7.7% in 2001 to 50.7% in 2005.

Econometric results

Table 4 provides evidence on the determinants of executive compensation. Panel A reports evidence for the economic determinants.[xx] First, consider the relation between

executive compensation and firm size. The evidence suggests a positive and significant association between executive pay and firm size (β_1=0.262, t=24.17). Executives of large Chinese firms, which require more talented managers to run complex organizations, receive greater compensation. The coefficient can be interpreted as an elasticity estimate since the model is specified in natural logs. A 10% increase in firm sales is associated with an increase in executive compensation of approximately 2.5%. The elasticity estimates are consistent with prior research emanating from Anglo-Saxon economies such as the United States and the United Kingdom. Murphy's (1999) review suggests the CEO compensation-size elasticity is typically in the range of 0.20 to 0.45.

Next consider the relation between executive compensation and firm performance. There is a positive and statistically significant correlation between executive pay and firm performance in Chinese publicly traded firms. The models control for macro-effects via the time dummies and cross industry differences in the demand for executive talent. For example, there is a positive correlation between executive compensation and firm stock returns (β_2=0.113, t=2.44) as well as between pay and return on assets (β_3=0.207, t=4.10). This new evidence is consistent with prior research (Firth et al. 2007; Mengistae et al. 2004; Kato et al. 2006b). In addition, the hypothesized positive correlation between executive pay and firm growth opportunities is found (β_4=0.048, t=5.47). Executives in China's listed firms with greater investment opportunity sets receive greater compensation. We find that executive compensation and firm risk are negatively correlated. More risky environments are associated with lower executive pay. In summary, there is considerable evidence for our hypotheses 1 on the

economic determinants of executive pay: executive pay in China's listed firms appears to be determined in a way predicted by economic contracting theory.

Panel B augments the executive compensation regressions with ownership and boardroom governance variables. We find that executives in firms whose ultimate owner is a private entity receive greater compensation. In firms where ownership is concentrated executives receive less pay. The results are consistent with Firth et al (2007). Hypothesis 2 is confirmed. We find mixed evidence for the effect of board characteristics on executive pay. Firms with a greater fraction of independent directors on the board are associated with higher executive compensation, different from what we have expected. However, the finding is consistent with some previous US and UK results (Conyon et al. 1998; Core, Holthausen et al. 1999). There is little evidence that board size is a determinant of executive pay in China. We find that firms with a combined CEO/chairperson post are associated with greater executive compensation. The finding is consistent with more job responsibility, or other economic benefits, from combining the roles (Brickley, Coles, and Jarrell 1997; Conyon et al. 2000). Also, we find that firms with compensation committees actually have greater executive pay. Although contrary to our hypotheses, it is consistent with previous findings in the literature where a similar positive association between pay and compensation committees has been found (Conyon et al. 1998; Anderson, and Bizjak 2003). Overall, we find mixed support for hypotheses 3.

We expected compensation committees and independent directors to reduce managerial entrenchment and hence lower pay. An alternative signaling theory might explain the results. Firms signal firm and managerial quality to capital markets by

adopting corporate governance best-practices such as compensation committees, independent directors etc. Such higher quality firms attract higher quality managers, who receive higher equilibrium wages and incentives.

Table 5 provides evidence on the determinants of CEO equity incentives. Panel A reports results of the economic determinants where as Panel B augments the regressions with ownership and board characteristics.[xxi] We find, as expected, that firm size and CEO equity incentives, measured by the CEO's fractional ownership of the firm, is negatively correlated. We find that equity incentives and firm performance are positively correlated in the case of return on assets but not in the case of shareholder returns. Accounting measures of performance seem to be empirically more important. There is evidence that CEOs of firms with greater growth opportunities, measured by the firm's market to book ratio, receive greater equity incentives. There is some mixed evidence on the relation between CEO incentives and firm risk. Empirically, the estimated models point to a negative correlation between risk and incentives. In summary, there is considerable support for our hypothesis 1. The empirical evidence is consistent with firms setting incentive contracts optimally to mitigate agency costs.

The results from Panel B demonstrate that ownership and board variables are important determinants of CEO equity incentives in China. Specifically, we find that CEOs of privately controlled firms receive significantly greater equity incentives compared to CEOs in firms where the ultimate owner is the state. Private ownership firms, therefore, provide greater equity incentives to their CEOs. Ownership concentration is significantly negatively related to CEO incentives. The evidence is consistent with the hypothesis that owners use monitoring and incentives as substitute

mechanisms to achieve optimal corporate governance goals. Overall, there is strong support for hypothesis 2. In the final column the board variables are added. There is little evidence that board factors shape CEO incentives. We find that equity incentives are greater when the posts of CEO and chairperson are combined. There is weak evidence that fewer CEO incentives are associated with larger boards. In summary, our empirical results suggest that incentive contracts are set in a way to mitigate agency costs and that economic, ownership and to some extent board factors are all important.

Sensitivity analysis

Table 6 contains the results of our sensitivity analysis. The dependent variable (PORT_INCENT) is the dollar change in CEO wealth for a percentage change in shareholder wealth, the Core and Guay (1999) equity stake measure (Baker et al. 2004; Core et al. 2003; Core, and Guay 1999). We find that the coefficient estimates associated with the economic, ownership and board governance variables are correctly signed and generally significant at conventional levels, similar to the results in Table 5. In consequence, our previous conclusions regarding the determinants of CEO equity incentives in China's listed firms are robust to the choice of dependent variable used in the regression analysis. For example, firm performance and growth opportunities are positively correlated with CEO incentives and a negative association is documented with firm risk. It is noteworthy that the firm size variable is positive and significant (Table 6, Columns 2 and 3) confirming the conjecture that the absolute level of CEO firm-wealth increases with firm size, even though CEO fractional ownership of the firm is decreasing in firm size (as seen in Table 5). We find that private ownership is positively correlated

with CEO incentives and there is a negative association between equity incentives and ownership concentration. As before, the evidence on the board determinants of equity incentives is mixed. Only leadership structure is significantly positive in the model.

One potential explanation for the mixed board results is the presence of outlying observations in the data. To mitigate the influence of such outliers, we re-estimated our models using the robust regression technique.[xxii] In non-tabulated results we found some strengthened support for the board variables. Leadership structure remained positive and significant (β_{11}=0.75, t=7.39) and now the board size variable was significantly negative (β_9=-0.027, t=1.76). Other board variables, though, remained insignificant.

As an additional robustness check we re-estimated all the models in Tables 4 and 5 using robust regression methods to ensure the results of our study are not sensitive to the choice of estimation technique. All models (executive compensation and equity incentives) performed satisfactorily and the broad results documented in Tables 4 and 5 were replicated. We conclude, then, that executive compensation and equity incentives in China's listed firms are determined by economic, ownership and board governance factors consistent with the agency theory prediction.

5. Conclusions

In this paper we have investigated the determinants of executive compensation and CEO equity incentives in China's listed firms. We argue that the distinction between flow measures of compensation and aggregate equity incentives is important (Conyon et al. 2004; Core et al. 2003; Murphy 1999; Baker et al. 2004). Two individuals may receive the same cash compensation at a given point in time but one might own fifty percent of

his firms stock and the other nothing. The CEO with high fractional ownership has stronger incentives to promote shareholder value since his wealth is directly tied to the firm's stock price: if this falls so does CEO wealth. Understanding cash compensation, then, is only part of the story; probing equity incentives provides a richer picture. By investigating the determinants of both cash-compensation and CEO equity incentives we have endeavored to augment the existing pay and corporate governance literature in China.

Our study finds that economic, ownership and boardroom governance variables are important determinants of both executive compensation and CEO equity incentives. We conclude that the compensation contracts are driven by agency cost considerations and as such the empirical results are consistent with an optimal contracting hypothesis. We find that executive compensation is positively related to firm size, performance and growth opportunities and there is a negative relation to firm risk. Compensation is higher in firms that are privately owned and is lower when firm ownership is more concentrated. Executive pay is higher in firms with a greater fraction of independent directors on the board, where the posts of CEO and chairperson are combined and in firms that have a compensation committee. We find little evidence of a relation between compensation and board size. Our results augment other studies on the determinants of executive pay in China (Firth et al. 2007; Kato et al. 2006b).

Turning to share ownership, we find that CEO equity incentives are positively related to firm performance and growth opportunities. Incentives are negatively correlated with firm size and firm-risk. CEO Incentives are also greater in firms that are privately owned and are lower when firm ownership is more concentrated. We find

mixed results relating to the effect of boardroom governance variables. Incentives are greater where the posts of CEO and chairperson are combined, but other variables generally lacked significance. These new results for China are comparable with research emanating from Anglo-Saxon economies (Core et al. 2003).

Overall, our results suggest that China's corporate governance reforms have been reasonably effective in starting to align managerial interests with those of shareholders, at least in the design of executive compensation and incentive contracts. For years, investors have criticized poor corporate governance structures and the lack of managerial incentives to promote shareholder values in Chinese listed firms. Recent governance reforms were aimed at deflecting such criticism and improving the quality of capital markets. However, there is a suspicion that such reforms were merely window-dressing and ineffective. Our evidence, though, suggests that compensation and incentive contracts in Chinese listed firms are designed to mitigate agency costs and that economic, ownership (and to some extent boardroom factors) are important determinants. To this extent, we see some convergence of Chinese corporate governance structures towards western best-practice models. However, some discrepancies are also observed. We found that independent directors and compensation committees do not curb executive compensation. Xi (2006) has argued that the independent directors are usually appointed by firms to strengthen ties to the government, increase lobbying power and pose few threats to managers' private interests. More research in the area of China's boardroom governance, and its effectiveness, is therefore recommended.

Finally, we highlight some further potential limitations with our paper and areas that warrant future research. Before deducing that managerial pay contracts best serve

shareholder goals much more detailed information about executive pay contracts is needed. For example, the determinants of bonus schemes, including performance-evaluation systems, should be investigated. Moreover, the role of stock options or other equity-based payments should be investigated as China's market reforms deepen. Current disclosure rules mean that such information is not available to us and so is left for future endeavors. Despite these potential limitations, our study provides the first evidence on the determinants of CEO incentives and compensation in China's listed firms and its relation to economic, ownership and board governance factors.

TABLE 1
Sample selection

Year	Number of listed firms	Number of firms in the database	Sample firms as percentage of population of listed firms
2001	1160	1140	98.28%
2002	1224	1205	98.45%
2003	1287	1266	98.37%
2004	1377	1355	98.40%
2005	1381	1351	97.83%

Notes:
Data on total listed firms each year is obtained from China Securities Regulatory Commission. (www.csrc.gov.cn).

TABLE 2
Descriptive statistics: executive compensation

Panel A: Executive compensation by year

Year	N	Mean	s.d.	Lower quartile	Median	Upper quartile
2001	944	106810	228218	36033	68500	125333
2002	1085	124573	129362	47667	90000	153333
2003	1168	154468	176084	63333	108544	190874
2004	1285	184176	205846	70000	129333	225160
2005	1351	208641	332603	79167	146491	250133
Total	5833	160286	232480	58400	107724	196000

Panel B: Executive compensation by industry sector, 2001 to 2005

Industry	N	Mean	s.d.	Lower quartile	Median	Upper quartile
Agriculture	143	107084	82158	52080	80000	133333
Communication	39	154951	120444	65967	123533	213333
Construction	98	161060	151702	64624	119733	196323
Finance	35	708416	1604382	107000	321334	631000
Information technology	324	208441	227182	89200	146283	243000
Manufacturing	3367	147750	208720	50000	97767	180000
Mining	99	140957	124706	59333	97700	171067
Others	484	146079	116819	66000	114933	183300
Real estate	224	223287	267792	76304	154333	276000
Services	169	187390	202656	70000	116667	250000
Transportation	229	164543	146277	64800	117700	203333
Utilities	245	155575	120025	67467	122467	213000
Wholesale & Retail	369	176332	144329	80000	130000	230000
Total	5825	160369	232597	58467	107733	196102

Notes:
Executive Compensation is average board compensation. It is the sum of three highest paid board members' total compensation disclosed a single number divided by three. Executive compensation is calculated as the sum of basic salary, bonus, stipends, and other benefits. Executive compensation is denoted in Chinese RMB.

TABLE 3
Descriptive statistics: 2001 to 2005

Panel A: Descriptive statistics for CEO equity incentives and executive pay

Year	CEO ownership (%)	Value of CEO shareholdings (000s)	Executive compensation (000s)
2001	0.021	693.378	106.810
2002	0.077	1535.944	124.573
2003	0.133	2261.253	154.468
2004	0.247	3204.854	184.176
2005	0.267	2905.520	208.641
Total	0.155	2181.606	160.286

Panel B: Descriptive statistics for economic variables

Year	EXEC_PAY	CEO_EQUITY	EQUITY_INCENT	SALES	SHR	ROA	MKT_BK	VOL
2001	11.134	-5.518	11.756	20.028	-0.217	-0.017	2.669	-1.229
2002	11.367	-5.502	11.525	20.136	-0.198	-0.018	2.009	-1.196
2003	11.581	-5.246	11.657	20.288	-0.126	-0.000	1.496	-1.309
2004	11.741	-4.687	12.013	20.469	-0.157	-0.021	1.161	-1.065
2005	11.854	-4.575	11.895	20.530	-0.124	-0.018	0.890	-0.951
Total	11.567	-5.130	11.764	20.303	-0.162	-0.015	1.604	-1.143

Panel C: Descriptive statistics for ownership and board governance variables

Year	PRIVATE	OWN_HERF	IND_DIR	BOARD_SIZE	COMBINE	COMP_COMM
2001	0.117	0.243	0.059	9.416	0.160	0.077
2002	0.170	0.238	0.237	9.952	0.142	0.308
2003	0.227	0.231	0.323	9.947	0.156	0.416
2004	0.267	0.225	0.338	9.842	0.164	0.468
2005	0.279	0.211	0.343	9.691	0.168	0.507
Total	0.217	0.229	0.267	9.775	0.158	0.365

Notes:
Panel A: CEO ownership is the percentage of shares owned by the CEO (units = %).
Value of CEO shareholdings is the number of shares held by the CEO multiplied by the

firms stock price (units = thousands). Executive compensation as defined in Table 2 (units = 000s).

Panel B: EXEC_PAY and is the log of executive pay; CEO_EQUITY is the natural log of CEO ownership percentage. EQUITY_INCENT is the natural log of the value of the CEOs stock holdings. SALES: log of firm sales; SHR: annual shareholder returns; ROA: Return on assets; MKT_BK: market value of the firm divided by the book value of assets; VOL: natural log of the standard deviation of stock returns over the year.

Panel C: PRIVATE: dummy variable equal to one if the firm firm's owner is a private entity, and zero otherwise; OWN_HERF: Ownership concentration is equal to the Herfindahl measure based on the five largest owners; IND_DIR: the fraction of the board comprised of independent directors; BOARD_SIZE: Board size is measured as the number of individuals on the main board. COMBINE: leadership structure of the firm is a dummy variable set equal to one if the posts of CEO and chairman are combined, and zero otherwise; COMP_COMM: a dummy variable equal to one if the firm has a compensation committee and zero otherwise. The regressions contain a set of industry variables and a set of time dummies.

TABLE 4
The determinants of executive pay in China's listed firms

$EXEC\_PAY = \beta_0 + \beta_1 SALES_{it-1} + \beta_2 SHR_{it-1} + \beta_3 ROA_{it-1} + \beta_4 MKT\_BK_{it-1}$
$+ \beta_5 VOL_{it-1} + \beta_6 PRIVATE_{it-1} + \beta_7 OWN\_HERF_{it-1}$
$+ \beta_8 IND\_DIR_{it-1} + \beta_9 BOARD\_SIZE_{it-1} + \beta_{10} COMBINE_{it-1}$
$+ \beta_{11} COMP\_COMM_{it-1} + \beta_{12} CONTROLS_{it-1} + \varepsilon_{it}$

	Predicted Sign	(1) EXEC_PAY	(2) EXEC_PAY	(3) EXEC_PAY
Panel A: Economic determinants				
SALES	+	0.262***	0.292***	0.282***
		(24.17)	(25.13)	(20.28)
SHR	+	0.113**	0.108**	0.161***
		(2.44)	(2.28)	(2.93)
ROA	+	0.207***	0.237***	0.235***
		(4.10)	(4.20)	(3.12)
MKT_BK	+	0.0480***	0.0603***	0.0654***
		(5.47)	(6.57)	(5.42)
VOL	?	-0.178***	-0.185***	-0.190***
		(-5.78)	(-5.87)	(-4.85)
Panel B: Ownership and board determinants				
PRIVATE	+		0.154***	0.164***
			(4.90)	(4.09)
OWN_HERF	–		-0.594***	-0.615***
			(-7.19)	(-5.93)
IND_DIR	–			0.661***
				(3.42)
BOARD_SIZE	+			0.00841
				(1.39)
COMBINE	+			0.0966***
				(2.66)
COMP_COMM	–			0.108***
				(3.27)
Constant		4.041***	3.697***	3.686***
		(8.34)	(5.68)	(4.76)
Industry and time dummies		Yes	Yes	Yes
Observations		5402	5260	3409
R-squared		0.25	0.26	0.26

Notes:
Variable definitions: The dependent variable is EXEC_PAY and is the log of executive
pay. The independent variables are: SALES: log of firm sales; SHR: annual shareholder

returns; ROA: Return on assets; MKT_BK: market value of the firm divided by the book value of assets; VOL: natural log of the standard deviation of stock returns over the year. PRIVATE: dummy variable equal to one if the firm firm's owner is a private entity, and zero otherwise; OWN_HERF: Ownership concentration is equal to the Herfindahl measure based on the five largest owners; IND_DIR: the fraction of the board comprised of independent directors; BOARD_SIZE: Board size is measured as the number of individuals on the main board. COMBINE: leadership structure of the firm is a dummy variable set equal to one if the posts of CEO and chairman are combined, and zero otherwise; COMP_COMM: a dummy variable equal to one if the firm has a compensation committee and zero otherwise. The regressions contain a set of industry variables and a set of time dummies.

Robust t-statistics are presented in parentheses below the coefficient estimates. Coefficients on the industry and time dummies are suppressed for expositional convenience.

*** p<0.01, ** p<0.05, * p<0.1

TABLE 5

The determinants of CEO equity incentives in China's listed firms

$$CEO\_EQUITY = \gamma_0 + \gamma_1 SALES_{it-1} + \gamma_2 SHR_{it-1} + \gamma_3 ROA_{it-1} + \gamma_4 MKT\_BK_{it-1}$$
$$+ \gamma_5 VOL_{it-1} + \gamma_6 PRIVATE_{it-1} + \gamma_7 OWN\_HERF_{it-1}$$
$$+ \gamma_8 IND\_DIR_{it-1} + \gamma_9 BOARD\_SIZE_{it-1} + \gamma_{10} COMBINE_{it-1}$$
$$+ \gamma_{11} COMP\_COMM_{it-1} + \gamma_{12} CONTROLS_{it-1} + \zeta_{it}$$

	Predicted Sign	(1) CEO_EQUITY	(2) CEO_EQUITY	(3) CEO_EQUITY
Panel A: Economic determinants				
SALES	–	-0.511***	-0.374***	-0.327***
		(-11.12)	(-8.29)	(-6.01)
SHR	+	0.0244	-0.0441	-0.00281
		(0.16)	(-0.32)	(-0.02)
ROA	+	1.216***	1.897***	1.580***
		(3.19)	(3.08)	(3.27)
MKT_BK	+	0.0855**	0.0986**	0.140***
		(2.03)	(2.36)	(2.80)
VOL	?	-0.231	-0.259*	-0.420***
		(-1.59)	(-1.88)	(-2.59)
Panel B: Ownership and board determinants				
PRIVATE	+		1.758***	1.627***
			(9.22)	(7.18)
OWN_HERF	–		-2.192***	-2.292***
			(-8.13)	(-7.32)
IND_DIR	+			0.740
				(0.99)
BOARD_SIZE	–			-0.0342*
				(-1.90)
COMBINE	–			0.609***
				(4.22)
COMP_COMM	+			-0.0983
				(-0.69)
Constant		2.824***	2.573**	1.013
		(2.77)	(2.57)	(0.80)
Industry and time dummies		Yes	Yes	Yes
Observations		1884	1831	1312
R-squared		0.16	0.29	0.30

Notes:
Variable definitions: The dependent variable is CEO_EQUITY and is the log of equity
incentives. Equity incentives are measured as the change in CEO wealth from a $100

dollar change in shareholder wealth. It corresponds to the Jensen and Murphy (1990) "dollars-on-dollars" metric. In this context, with no stock options, it is the percentage of shares owned by the CEO; The independent variables are: SALES: log of firm sales; SHR: annual shareholder returns; ROA: Return on assets; MKT_BK: market value of the firm divided by the book value of assets; VOL: natural log of the standard deviation of stock returns over the year. PRIVATE: dummy variable equal to one if the firm firm's owner is a private entity, and zero otherwise; OWN_HERF: Ownership concentration is equal to the Herfindahl measure based on the five largest owners; IND_DIR: the fraction of the board comprised of independent directors; BOARD_SIZE: Board size is measured as the number of individuals on the main board. COMBINE: leadership structure of the firm is a dummy variable set equal to one if the posts of CEO and chairman are combined, and zero otherwise; COMP_COMM: a dummy variable equal to one if the firm has a compensation committee and zero otherwise. The regressions contain a set of industry variables and a set of time dummies.

Robust t-statistics are presented in parentheses below the coefficient estimates. Coefficients on the industry and time dummies are suppressed for expositional convenience.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

TABLE 6
Sensitivity analysis: The determinants of CEO equity incentives in China's listed firms

$$\begin{aligned}
\text{PORT\_INCENT} = &\ \gamma_0 + \gamma_1\text{SALES}_{it-1} + \gamma_2\text{SHR}_{it-1} + \gamma_3\text{ROA}_{it-1} + \gamma_4\text{MKT\_BK}_{it-1} \\
&+ \gamma_5\text{VOL}_{it-1} + \gamma_6\text{PRIVATE}_{it-1} + \gamma_7\text{OWN\_HERF}_{it-1} \\
&+ \gamma_8\text{IND\_DIR}_{it-1} + \gamma_9\text{BOARD\_SIZE}_{it-1} + \gamma_{10}\text{COMBINE}_{it-1} \\
&+ \gamma_{11}\text{COMP\_COMM}_{it-1} + \gamma_{12}\text{CONTROLS}_{it-1} + \zeta_{it}
\end{aligned}$$

	Predicted Sign	(1) PORT_INCENT	(2) PORT_INCENT	(3) PORT_INCENT
Panel A: Economic determinants				
SALES	+	-0.0232	0.106**	0.158***
		(-0.50)	(2.22)	(2.83)
SHR	+	0.318**	0.224	0.302*
		(2.06)	(1.55)	(1.66)
ROA	+	1.648***	2.588**	2.146**
		(2.79)	(2.24)	(2.40)
MKT_BK	+	0.225***	0.232***	0.278***
		(4.93)	(5.01)	(5.26)
VOL	?	-0.375**	-0.384***	-0.497***
		(-2.51)	(-2.71)	(-3.01)
Panel B: Ownership and board determinants				
PRIVATE	+		1.769***	1.682***
			(9.13)	(7.36)
OWN_HERF	–		-1.842***	-1.888***
			(-6.65)	(-5.90)
IND_DIR	+			0.517
				(0.70)
BOARD_SIZE	–			-0.0173
				(-0.98)
COMBINE	–			0.671***
				(4.59)
COMP_COMM	+			-0.0808
				(-0.57)
Constant		12.40***	9.308***	6.711***
		(11.27)	(8.68)	(4.42)
Industry and time dummies		Yes	Yes	Yes
Observations		1878	1825	1308
R-squared		0.07	0.21	0.22

Notes:
Variable definitions: The dependent variable, PORT_INCENT, is the log executive portfolio incentives defined as the dollar change in the value of the CEO's stock portfolio

arising from a one percent change in the stock price. It corresponds to the Core-Guay (1999) measure. The independent variables are: SALES: log of firm sales; SHR: annual shareholder returns; ROA: Return on assets; MKT_BK: market value of the firm divided by the book value of assets; VOL: natural log of the standard deviation of stock returns over the year. PRIVATE: dummy variable equal to one if the firm firm's owner is a private entity, and zero otherwise; OWN_HERF: Ownership concentration is equal to the Herfindahl measure based on the five largest owners; IND_DIR: the fraction of the board comprised of independent directors; BOARD_SIZE: Board size is measured as the number of individuals on the main board. COMBINE: leadership structure of the firm is a dummy variable set equal to one if the posts of CEO and chairman are combined, and zero otherwise; COMP_COMM: a dummy variable equal to one if the firm has a compensation committee and zero otherwise. The regressions contain a set of industry variables and a set of time dummies.

Robust t-statistics are presented in parentheses below the coefficient estimates. Coefficients on the industry and time dummies are suppressed for expositional convenience.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

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End notes

i The number of firms listed on the two major exchanges of China's Shanghai and Shenzhen stock exchanges has increased from 57 in 1992 to 1434 in December 2006 with a total market capitalization of 89,403 billion RMB (or US$11,462 billion). The stock market booming in August, 2007 even pushed the total market capitalization to 245,300 billion RMB, surpassing the size of Japanese stock markets.

ii Our research contributes to a wider accounting and finance literature on the effectiveness of China's corporate governance system. For example, DeFond, Wong, and Li (1999) consider how new auditing standards affect capital market credibility;

iii For example, CSRC passed a series of "Regulation for the Content and Format of Public Firms' Information Disclosure" in 2001 to enforce disclosures of key financial and managerial compensation information in listed firms.

iv The disclosure of executive compensation information is regulated by the "Regulation for the Content and Format of Public Firms' Information Disclosure, No. 2: Content and Format of Annual Reports". The regulation has been constantly amended since 1998. In the 1998 version, the regulation does not require listed firms to disclose executive compensation information in their annual reports. The 2001 amended version, however, requires listed firms to report the sum of total compensation for the top three highest-paid management and the top three highest-paid board members (including executive board members). The same terms hold in the 2003 amended version. In the Dec., 2005 amended version, listed firms are required to report each individual board member's and top management's total compensation. This more stringent disclosure rule is maintained in the 2007 amended version as well.

v Murphy (1999) provides an authoritative review of the economic determinants of CEO pay and empirical evidence amassed for the US economy.

vi Core, Guay, and Larcker (2003) define an efficient (or optimal) contract as one that: "that maximizes the net expected economic value to shareholders after transaction costs (such as contracting costs) and payments to employees. An equivalent way of saying this is that . . . contracts minimize agency costs."

vii Even though the CEOs fractional ownership may be lower in larger firms, the absolute value of a CEOs equity holding is expected to greater in larger firms compared to small firms.

viii The calculation is for 2005. The small residual amount is made up employee ownership, foreign ownership and other legal entity ownership.

ix We discuss the precise definition of executive pay the next section.

[x] Chinese executive compensation disclosure is mandated by the Chinese Securities Regulation Committee (CSRC) since 2001. Specifically, pay disclosure was required by the passage of the "Regulation for the Content and Format of Public Firms' Information Disclosure, No. 2: Content and Format of Annual Reports".

[xi] More recently, the CSRC has approved revised executive compensation disclosure rules. From 2006 onwards the total pay of each three highest-paid individuals will be disclosed separately.

[xii] The grant of stock options to executives is a very recent phenomenon in China. Most listed firms in China are former state owned enterprises. Historically, these companies only issue non-tradable shares to executives and employees, which could not be sold in the public market. In 2005, the CSRC launched a structural reform program aimed at eliminating non-tradable shares. The reform required listed companies to transfer non-tradable shares to tradable shares by compensating existing shareholders through various ways like bonus shares, cash and stock options. This reform was accompanied by a series of changes in the Corporate Law and Exchange Law, which also paved the way for granting stock options to executives. In December 2005, the CSRC issued a trial version of "Regulation for the Stock Options Grants of Public Firms" effective from January 2006. This regulation allows public firms that have successfully completed structural reforms to offer stock options to their higher management, board and supervisory board members.

[xiii] The literature discusses two broad incentive measures (Core et al. 2003). Portfolio incentives are the dollar change in CEO wealth from a percentage change in stock price. The Jensen and Murphy (1990) measure is the dollar change in CEO wealth from a dollar change in firm value. It is proportional to the fraction of firm shares owned by the CEO. For a given firm the measures are simple transformations of each other but they can give rise to different rank orderings in a cross section of firms (Baker et al. 2004).

[xiv] The option delta (hedge ratio) is calculated as the derivative of Black-Scholes call option value with respect to the share price. The option delta can be thought of as a weight, which varies between 0 and 1, reflecting the likelihood that the stock option will end up in the money (Black, and Scholes 1973). For the general model, the value of a European call option is simply: $c = Se^{-(\ln(1+q))T} N(d1) - Xe^{-(\ln(1+r))T} N(d2)$, where $d1 = (\ln(S/X) + (\ln(1+r)-\ln(1+q) + \sigma^2/2)(T)) / (\sigma T^{1/2})$; $d2 = (\ln(S/X) + (r-q - \sigma^2/2)(T)) / (\sigma T^{1/2})$; S is the stock price; X is the exercise price; T is the maturity term; r is the risk free interest rate; q is the dividend yield and σ is the volatility of returns. N(.) is the cumulative probability distribution function for a standardized normal variable and e is Euler's constant. The option delta is the derivative of the call value with respect to the asset value: $\partial c/\partial S =. e^{-(\ln(1+q))T} N(d_1)$. Of course, in the case of China where options are not present yet this term all reduces to zero, but in the future it will likely be important.

[xv] Many private listed company CEOs or board members may be founders or large shareholders. For state-owned listed firms, many CEOs have no shareholdings at all.

xvi It is possible to show that for a given firm each measure is simple transformations of the other. However, differences arise when comparing across firms due to differences in the size of firms.

xvii CSRC classifies industries to 13 categories: A: Agriculture and fishery, B: Mining, C: Manufacturing; D: Electricity, water and other energy manufacturing and supply; E: Construction; F: Transportation and logistics; G: Information technology; H: Wholesales and retails; I: Finance and insurance; J: Real estate; K: Service; L: Communication; M: Others. Chinese listed firms sometimes report different industry classification in different years. When this occurs, the most recent year industry code is applied.

xviii Median US CEO pay also increased significantly from 1993 to 2000 from around $2 million to just over $8 million but was still around $8 million in 2006. The differences in the time series behavior of the mean and median pay suggests boards are increasingly unwilling to award very high pay in the United States (Kaplan 2008).

xix The significant increase of independent directors on the board is due to the regulation issued by CSRC in August 2001,"Guides to the Establishment of Independent Directors System", which mandate at least one third of the board members in listed firms should be independent directors.

xx The models were checked for multicollinearity among the variables. The calculated variance inflation factors were less than 3, suggesting multicollinearity is not a major problem.

xxi We estimate the model contingent on the CEO having at least some fractional ownership, this is why the number of observations falls compared to the executive compensation table. For cases where the CEO has no shares the log of CEO equity incentives is not defined. To make sure that the results are not sensitive to truncating the regression model to include only positive values of ownership we re-estimated it for CEO fractional ownership instead of the log of CEO fractional ownership (i.e we included zero as an outcome). The qualitative results that we report in Tables 5 and 6 are not sensitive to this alternative specification. Generally, our results should be interpreted as the determination of equity incentives contingent upon the CEO having some ownership stake in the firm.

xxii The robust regression algorithm uses iteratively re-weighted least squares with the Huber weight (Huber 1964) and biweight (Andrews, Tukey, and Bickel 1972) functions. Broadly speaking, it assigns cases with small residuals a weight equal to one and cases with large residuals gradually smaller weights to improve the estimation robustness against large errors. This method calculates standard errors using the pseudo-values approach