Superstar Chinese CEOs

Dr. Martin J. Conyon
Lancaster University Management School
Bailrigg, Lancaster, UK;
&
The Wharton School, University of Pennsylvania
Philadelphia, PA, 19104, USA
Email: conyon@wharton.upenn.edu

Dr. Lerong He
School of Business Administration and Economics
The College at Brockport
State University of New York
Brockport, NY, 14420
Email: lhe@brockport.edu

Dr. Xin Zhou
School of Management
Fudan University
Shanghai, China
Email: xinzhou@fudan.edu.cn

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Abstract

The paper investigates costs and benefits of hiring a star CEO. Using a sample of Chinese listed firms between 2000 and 2010, we find that the appointment of a star CEO is associated with significantly positive cumulative abnormal returns surrounding the announcement day. These findings remain after controlling for other confounding factors that influence the market response to CEO turnover. In addition, we find that star CEOs receive significantly higher executive compensation than their non-star counterparts. Star CEOs also receive more equity incentives compared to non-stars. Our empirical results are robust to controls for other firm and CEO characteristics as well as the endogenous determination of CEO star status. Moreover, we find that firms hiring a star CEO are associated with significantly better short-term market performance than their counterparts in the first year of CEO tenure, while the performance effect gradually attenuates over time. Overall, our results indicate that it is economically rational for Chinese firms to hire a star CEO and the star CEO effect is on top of the CEO's other measurable human capital and social capital.

Keywords: Star CEO, Executive Compensation, CEO Turnover, China

I. Introduction

The paper investigates the market for Superstar Chinese Chief Executive Officers (CEOs). This subject is important since stars have potentials to earn higher rents and contribute to higher organizational value compared to non-stars. China is an important research context to study such issues since its comparatively new equity market is likely to contain ample heterogeneity in CEO talent. In addition, China is now the second largest economy in the world and so investigating the distribution and contribution of talent in listed firms helps to advance our understanding on drivers of economic development.

Rosen (1981) defined the system of superstars as "wherein relatively small number of people earn enormous amounts of money and dominate the activities in which they engage". Such phenomena have been observed among athletics, musicians, lawyers, financial analysts, etc. (see e.g., Groysberg, et al., 2011; Krueger, 2005; Rosen, 1992; Stickel, 1992). Malmendier and Tate (2009) suggest that the labor market for top executives has also gradually evolved to fit this description, particularly in the US. The superstar system is argued to be driven by an *ex ante* tournament contest (Lazear and Rosen, 1981, Rosen, 1986), where the pay gap between tournament winners and the other players in the competition provides sufficient incentives to motivate tournament participants to exert efforts. Winning contests also provides a valid signal to the market about the quality and credibility of these winners (Spence, 1974). From this perspective, higher pay of star CEOs is justified as an optimal process of returns to talents whereas the managerial labor market pays more for more reputable and qualified players (Kaplan and Rauh, 2010, 2013). Consequently the extant literature built on this optimal contracting perspective has documented a positive relationship between CEO star status and firm performance, i.e., star CEOs are indeed better performers than their counterparts (Falato et al.,

2012; Chemmanur and Paeglis, 2005; Kaplan and Rauh, 2010; Kaplan et al., 2012). On the contrary, the other group of researchers argues that the superstar system is a reflection of managerial power (Bebchuk and Fried, 2004). More powerful star CEOs are often able to extract rents from shareholders in terms of excessive compensation, while their performance may not necessarily be better. Malmendier and Tate (2009) for example find that firms with CEOs winning prestigious awards underperform not only relative to their prior performance but also relative to a matched sample of non-winning CEOs. These superstar CEOs are also found to receive higher compensation and have a larger tendency to manage earnings. In their study of the financial analyst industry, Groysberg et al. (2011) similarly are unable to document that star analysts are associated with more accurate earnings forecast, while they do receive much higher compensation. In broad stroke, the extant literature suggests that the executive labor market in US is indeed a superstar system where star CEOs receive much higher compensation than their counterparts. Researchers however disagree on whether such a system is a market-driven process of rewards for talents or is a reflection of managerial rent-seeking power.

Compared to the growing number of literature studying the superstar system in the US executive labor market, limited attention has been paid to the other contexts. Conyon and Murphy (2000) argued that executive compensation and corporate governance issues should be "examined in the context of broader competitive and culture factors", because it "largely reflects subtle political and cultural differences". Bertrand (2009) likewise suggests that it is crucial to turn some of research attention outside of the US when examining CEO characteristics, pay, and performance. This study thus echoes these suggestions to fill the gap in the literature by studying the star CEO phenomenon in China, a topic no study has investigated to date.

The Chinese context is crucial in the following ways. First of all, although a typical western society such as US is dominated by the "winner-take-all" philosophy where the idea of a superstar system and a skewed compensation structure is more acceptable (Frank and Cook, 2005), the Chinese society is more concerned with equity and fairness. For example, both Chen et al. (2011) and Firth et al. (2010) indicate that CEO compensation in government controlled Chinese companies is often capped at multiples of an average worker's wage in their firms. Such a strong expectation inherent in the Chinese culture to keep pay dispersion within a reasonable range is at odd with the underlying rationale of a superstar system that encourages larger pay differential (Lazear and Rosen, 1981, Rosen, 1981). As a result, whether there is a superstar system in Chinese executive labor market becomes an essential empirical question. The answer to this question is also crucial due to the newness and immaturity of the executive labor market and equity markets in China, which provides the possibility of good variation in the data. China's unique institutional contexts also enable us to explore the role of ownership structure and corporate governance mechanisms in mitigating star executives' rent-seeking behavior (Chang and Wong, 2009; Jiang et al., 2010). This study therefore supplements the extant literature on the CEO superstar system which has dominantly focused on the US context (e.g., Chemmanur and Paeglis, 2005; Falato et al., 2012; Kaplan and Rauh, 2010; Kaplan et al., 2012, Malmendier and Tate, 2009). It also contributes to the broad literature on Chinese executive compensation and corporate governance (e.g., Allen et al., 2005; Conyon and He, 2011, 2012; Firth et al, 2006, 2009, 2010; Kato and Long, 2006).

Prior literature typically captures CEO's star status in three ways. First, CEO's reputation and quality is directly measured by their human capital. For example, Bertrand and Schoar (2003) measure managerial style and quality using managers' age and MBA degree. CEO tenure and

outsider status are also widely adopted as indicators of CEO reputation (Chemmanur and Paeglis, 2005; Jian and Lee, 2011; Milbourn, 2003). A recent study by Kaplan et al. (2012) uses a detailed matrix to assess CEOs' general ability and interpersonal skills. However, as Rosen (1981) suggests managerial talent is hard to be measured precisely, and CEO quality is "a combination of talent and charisma in uncertain proportions". Using CEOs' human capital to measure CEO reputation and star status is unable to distinguish between the objective level of CEO talents embedded in CEOs' human capital and social capital and the subjective glamor associated with the star status. Another popular approach adopted by prior literature is to use the number of business-related articles containing the CEO's name as an indicator of CEO fame or celebrity status (e.g., Jian and Lee, 2011; Milbourn, 2003; Rajgopal et al., 2006). However, as Falato et al. (2012) suggest, business press coverage might reflect bad publicity or a simple coverage of high-visibility firm, while may not accurately capture the CEO's credential. To avoid such problems in identifying CEO reputation, a few studies have used winning a CEO contest as a credible external signal that conveys important information on CEO quality (Graffin et al., 2008; Malmendier and Tate, 2009, Koh, 2011). Our approach closely resembles this one.

We identify CEO star status as whether the CEO is a deputy to the National People's Congress (NPC) or a member of the National Committee of the Chinese People's Political Consultative Conference (CPPCC). The NPC is viewed as the highest organization of state power, which is supposed to exercise the legislative power of the State such as electing key central government officials, amending the Constitution and other legal documents, supervising the enforcement of the constitution and other legislations, as well as determining other major state affairs. Deputies to the NPC are elected from 35 provincial levels of the people's congresses and are typically nominated by the standing committee members of the provincial

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congresses. There are no competing parties for NPC seats and the chance of getting elected was originally 100% and later reduced to roughly 95% once nominated. NPC deputies hold a term of five years and there is no restriction on the maximum number of terms.[1] In contrast, CPPCC is an institution of multiparty cooperation and political consultation led by the Communist Party of China. CPPCC is mainly responsible for conducting political consultation, democratic supervision, and participation in the deliberation and administration of national affairs. The standing committee of each region, affiliated political parties or organizations, and ethnic groups nominate CPPCC members. The Chair's Council of the preceding CPPCC national committee subsequently approves membership. Importantly, no election process is required. CPPCC members hold a term of five years and there is no limit on the maximum number of terms either.[2] The NPC and CPPCC jointly host the national meeting every five years concurrently, known as "LiangHui" or "two meetings". The unique way that membership in NPC or CPPCC is obtained is literally a state-led contest. Although the nomination process is somehow opaque, the winning member does gain the highest political status and public recognition (Li et al., 2006, 2008). As a result, NPC deputies and CPPCC members often become celebrities and are heavily chased and reported by journalists particularly surrounding the national meeting time. Being a deputy of the NPC or a member of the CPPCC therefore closely fits the description of a superstar by Rosen (1981). Our paper therefore uses this indicator to capture CEO's star status. We also take into account the underlying human capital and social capital determinants of CEO star status. In this way, we are able to not only capture the general star effect but also entangle concrete measures of CEO talents from the glamor of being a star CEO.

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1 Information obtained from the official NPC site: http://www.npc.gov.cn/englishnpc/news/

2 Information obtained from the official CPPCC site: http://www.cppcc.gov.cn/zxww/zxyw/home/

Using a proprietary database of a sample of Chinese firms between 2000 and 2010, we document that CEO star status is significantly associated with CEOs' human capital and social capital. Other things being equal, we find that a CEO with political connections, technology background, less job variety, being older, or being a female is a more likely to be a star. Our results also suggest that younger and private firms, firms with larger stock price volatility, more dispersed ownership, as well as firms with a combined leadership position are more likely to hire star CEOs. We next document a significantly positive stock market response to the hiring of a star CEO. The cumulative abnormal returns during the seven-day window surrounding the announcement of CEO turnover are significantly higher for firms hiring star CEOs. Our further analysis indicates that the star CEO effect remains significant after controlling for the incoming CEOs' human capital and social capital as well as departing CEO's star status and other key characteristics. This result suggests that the stock market does put a higher valuation on star CEOs and such evaluation is supplementary to these CEOs' political connection and other measurable talents.

We next investigate compensation and incentives of star CEOs. We find that star CEOs earn significantly more cash compensation than their counterparts of non-star CEOs and such difference remains after controlling for other measurable CEO talents and characteristics. We first establish these results in pooled cross-sectional models and panel data fixed effect models that control for unobservable firm level correlates. We then adopt the propensity score method to construct a nearest-neighbor matching estimator following Inbents (1980) and Rosenbaum and Robin (1983). After controlling for these observable firm and CEO characteristics that predict CEO compensation, our results indicate that star CEOs still earn significantly higher cash compensation compared to the matched sample of non-star CEOs who possess similar traits and

work in similar types of firms. Taken as a whole, these findings suggest that the superstar phenomenon does exist in the Chinese executive labor market where star CEOs earn considerable pay premiums compared to their peers.

We then turn to the issue of CEO equity incentives. Milbourn (2003) predicts that the optimal stock-based pay sensitivity should be higher for more reputable CEOs. Because the probability of retention is higher when the CEO is more reputable and capable, the stock price therefore is more informative for this type of CEO, which consequently leads to a larger weight of equity compensation in executive contracts. Our results suggest star CEOs are indeed associated with larger pay to stock performance sensitivity as measured by the CEO's percentage equity holding. Similarly we establish these results in both pooled cross-sectional models and fixed effects models after controlling for CEO and firm level characteristics. We then replicate these tests using the propensity score methods as described above. Our results again demonstrate that star CEOs are associated with significantly higher equity incentives compared to the matched sample of non-star CEOs.

Finally, we investigate short-term performance impact of star CEOs using cumulative abnormal returns after the CEO appointment. Our results indicate that star CEOs outperform their non-star counterparts in the first year of their tenure, after controlling for other firm level and individual level determinants of firm performance. We also find that the star CEO effect gradually diminishes over time and is not significant any more by the end of the first year and afterwards. Our further investigations also suggest that firms hiring star-CEOs are associated with larger performance variation. These results are consistent with Adams et al. (2005), who argue that star-CEOs' larger decision making power likely leads to more extreme consequences and results in larger performance variability but not necessary better average performance.

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The rest of the paper is organized as follows. Section 2 describes data and measurements used in the study. Section 3 provides summary statistics. Our main results are presented in sections 4, 5, 6, and 7. We conclude our paper with a discussion in section 8.

II. The Data and Variable Measures

We construct our sample using firms included in China Securities Index (CSI) 800, a component index that includes large, medium, and small-cap companies listed on the Chinese domestic exchanges: both Shanghai and Shenzhen stock markets. For each firm in this index, we build a panel dataset for the period between 2000 and 2010. We obtain financial and market information, as well as ownership and corporate governance data, from the China Stock Market & Accounting Research database (CSMAR) supplied by GuoTaiAn Information Service (GTA). These data have been used in several prior studies of Chinese securities markets (e.g. Chen et al., 2011; Conyon and He, 2011, 2012). Information on CEO turnover event, type, and announcement date is also provided by CSMAR.

Our paper is significant and unique because we also use hand-collected data on important variables such as superstar status and political connections of CEOs. Specifically, we supplement the CSMAR data by hand-collecting demographic, educational, career background, and political connections of CEOs using their resumes reported in firm websites as well as in Sina-Finance (finance.sina.com.cn). Using this data, for example, we can determine the CEO's star status in terms of membership of the National People's Congress (NPC) or the National Committee of the Chinese Political Consultative Conference (CPPCC). Importantly, this involved a labor-intensive data collection strategy translating from the original Chinese version of CEO resume. The data (described below) is very rich in detail and significantly augments prior research in this area.

After excluding firms with missing financial, stock market, corporate governance, ownership, CEO turnover, and demographic background information, the final sample consists of 572 unique firms and 4,778 firm years. Table 1a reports sample distribution by year. It should be noted that there are fewer observation for earlier periods due to the difficulty of recovering CEO background information retrospectively. However, the trade-off is that we are able to map an important phenomenon, namely the star status of CEOs together with their political connections. Table 1b presents industry distributions of these sample firms based on the CSRC industry classification method. We notice that all categories of CSRC industries are represented in our sample. The majority of sample firms are from manufacturing industries, accounting for approximately 53% of the total sample firms. The industry distribution is consistent with the overall industry distribution in the Chinese stock markets.

Insert Table 1 Here

As explained earlier, we measured the CEO's star status, Star CEO, as a dummy variable, which is equal to one if the CEO is a delegate of the National People's Congress (NPC) or a member of the National Committee of the Chinese People's Political Consultative Conference (CPPCC) and zero otherwise. It should be noted that using "Chief Executive Officer" to identify the firm's chief executive is a rather recent phenomenon. Most Chinese firms instead use the title of "General Manager". In our analysis, we follow Chen et al. (2011), Conyon and He (2012) to recognize CEO as the general manager of the firm. In our data there are 76 unique star CEOs and 309 firm years with star-CEOs identified in our sample, representing 6.47% of the total sample size.

We measure additional CEO characteristics as follows. First, we measure CEO's Political Connection using a dummy variable to indicate whether the CEO has a prior position in central government, local government, or the military. This measure is consistent with prior studies on Chinese CEO's political connections such as Fan et al. (2007) and Francis et al. (2009). We measure CEO's Foreign Experience as a dummy variable set equal to one if the CEO has worked for a foreign firm or has foreign study experience. We measure a CEO's Technology Background using a dummy variable to capture whether the CEO has worked in the fields of engineering or research and development. We use Job Variety to capture the CEO's career background, which is calculated as the total number of organizations the CEO has worked for. In addition, we classify CEO's educational background into three categories: Above Bachelor indicates the CEO has a master or a PhD degree. Below Bachelor indicates the CEO has a high school or an associate degree. The default category suggests the CEO has a bachelor degree. We also include measurements of CEO age and gender. All CEO background information is directly retrieved from CEOs' resume and hand-collected for this research.

The following (more standard) firm characteristics are measured using CSMAR data. First, we measure firm performance using industry adjusted return on assets (denoted as Adjusted ROA), which is calculated as net operation profits divided by the book value of assets then minus industry average return on assets. The industry average ROA is calculated as median ROA for all listed firms in the same industry based on CSRC industry classification codes. Market to Book captures a firm's growth opportunity and is calculated as the total market value of the firm divided by total assets. We calculate Leverage using the debt to equity ratio calculated as total long-term debt divided by total equity. We measure firm size using the logarithm of total sales, denoted as Log Sales. We measure stock volatility, Volatility, using the

three-year rolling variance of stock returns. Firm age indicates the age of the firm calculated as the difference between the current calendar year and the founding year. SOE is a dummy variable set equal to one if the controlling shareholder is the State and zero otherwise. Largest SH% indicates the percentage shareholding of the single largest shareholder. We measure Board Size as the number of members on the board of directors. Outsider Ratio indicates the proportion of independent directors on the board. Combine is a dummy variable set equal to one if the post of CEO and chairperson is combined and zero otherwise. Such firm level and corporate governance variables have been used in prior Chinese research and our use of them is consistent with these works (e.g. Chen et al., 2011, Conyon and He, 2011, 2012; Firth et al., 2006, 2010).

CEO Cash Pay measures CEO's total cash compensation as reported by the firm, which is the sum of salary, bonus, stipends, and other cash compensation. We measure equity incentives from share ownership as the dollar change in CEO wealth from a $1000 dollar change in shareholder wealth (Baker and Hall, 2004; Jensen and Murphy, 1990). In our context it can be written as: $1000 \times$ (Shares Held)$\div$(Total Number of Common Shares outstanding). It could also be simply understood as CEO's percentage ownership relative to total shares outstanding. A full model of compensation and equity incentives should also include estimates of CEO stock options. However, Chinese public firms are not allowed to grant stock options or other equity incentives until 2006. Even after 2006, the adoption rate of equity incentives is very limited. Conyon and He (2012)'s review, for example, document that only about 1.07% of publicly traded firms have adopted equity compensation during the period between 2006 and 2010, and details of equity grants are often not disclosed. We therefore conclude that our measures of CEO cash pay and CEO equity incentives closely resemble CEO total pay and CEO total equity incentives. We

believe that measurement error arising from the treatment of stock options in our paper is very slight.

We measure market response to CEO appointment using the cumulative abnormal returns (CAR) surrounding the event date. We identify the nomination date of the CEO and calculate the cumulated seven-day abnormal returns (CAR3,3) surrounding the announcement of the succession event from 3 days before the event till 3 days after the event. We choose a seven-day interval (-3 days to +3 days around the event date) as our main measure to account for the full impact of the announcement on the market as well as to overcome problems associated with (possible) inexact announcement dates. We also provide sensitivity analysis by supplementing our main measure with an analysis using a three-day event window (-1, +1) and an eleven-day (-5, +5) window. To calibrate the cumulative abnormal returns (CAR), we first calculate the abnormal returns (AR) using the difference between the actual returns and expected returns calculated from the weighted average returns for Shanghai and Shenzhen stock exchanges respectively. We then compute the CAR by aggregating (summing) the abnormal returns over the event window. We also calculate the CEO's short-term firm performance using cumulative abnormal returns after CEO appointments. The same weighted average method is applied to calculate CARs 1 month, 3 month, 6 month, 9 month, and 12 month after turnover. Detailed descriptions of variables are summarized in Appendix I.

III. Descriptive Statistics

Table 2 provides descriptive statistics of key dependent and independent variables for the full sample as well as subsamples for star-CEOs and non-star CEOs. Within the 4778 firm years, 309 firm years are managed by star-CEOs, and 4,469 firm years are managed by non-star CEOs. We

report means and standard deviations as well as P values of the two tailed t-test for the null hypothesis of equal means between the star-CEO subgroup and the non-star CEO subgroup.

Insert Table 2 Here

Table 2 suggests that 19% of CEOs in our sample have political connections, 6% have foreign experience, and 38% possesses some types of technology background. An average CEO holds about 4 prior jobs and is 47 years old. We find that about 4% of CEOs are female. 53% of CEOs have a Master's or higher degree and about 10% of CEOs do not have a bachelor's degree. Importantly, Table 2 also indicates that a star CEO possesses different characteristics than a non-star CEO. First of all, a CEO with political connections is more likely to be a star (the univariate result is consistent with the claims of this paper). We also notice that the likelihood of being classified as a star CEO is higher for a female CEO, a CEO with less job variety, and a CEO with higher degree.

Next consider other more standard firm level variables. The results in Table 2 also suggest that an average sample firm has an industry adjusted ROA of -0.01. The average market to book ratio is 2.29 in our sample period. The average leverage ratio is 1.35 and average stock volatility is 0.49. An average sample firm is 12 years old and 59% of sample firms are SOEs. The largest shareholder on average owns 41% of firms. An average board has 9.6 members and 33% of outsiders. 13% of firms have a combined CEO and chair position.

Furthermore, Table 2 shows that firms hiring star CEOs are different from those hiring non-star CEOs in the following aspects. Generally speaking, firms with star-CEOs are more likely to be private, are associated with larger stock price volatility, smaller ownership concentration ratio, a smaller proportion of outside directors, and a combined leadership post.

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In terms of CEO compensation,, we find that the average CEO in our sample earns approximately 505,099 RMB. The cash compensation is significantly higher for the average star-CEO (748,986 RMB) compared to that of a non-star CEO (488,461 RMB). The average CEO equity ownership is 0.06% in our sample, and is significantly higher for a star CEO (0.44%) than a non-star CEO (0.03%). The findings are consistent with the claim that star CEOs earn higher rents than non-star CEOs. Table 2 also indicates that star-CEOs on average perform better than non-star CEOs when evaluated from the cumulative abnormal returns (CAR) after appointment, again consistent that stars add value relative to non-stars. The number is significantly higher for star-CEOs in case of 1 month, 3 month, 6 month, and 9 month CARs, while it is insignificant for the 12 month CAR.

IV. Who Are Star-CEOs and Who Hires Star-CEOs?

Our univariate analysis suggests that star-CEOs possess different characteristics than non-star CEOs. To shed more light on this issue, we first estimate a probit regression to predict CEO star-status using CEO characteristics. We report our results in Column 1 of Table 3. Our descriptive analysis also suggests that firms with star-CEOs are different from those without. We then estimate firm-level determinants by incorporating firm and board characteristics in column 2 of Table 3. Column 3 of Table 3 includes both individual level and firm level characteristics that may affect CEO star-status. The probit regression is again used and marginal effects are reported so that economic comparisons can be made.

Insert Table 3 Here

The coefficient estimates in Table 3 confirm the patterns identified in our descriptive analysis. First of all, CEOs with political connections are more likely to be stars. Specifically, a

politically connected CEO has 4% larger chance than a non-connected CEO to win the star competition. We also find that CEO star status is positively related to CEOs' technological background, negatively related to CEO prior job variety. Both CEOs with more advanced degrees or those without a bachelor's degree have a larger probability of becoming stars compared with the baseline CEOs with a bachelor's degree. In addition, a female CEO is 17% more likely to become a star than a male CEO. Overall, these results suggest that star Chinese CEOs do possess different human capital and social capital compared to non-star CEOs. These results thus echo earlier studies on star CEOs in the US context that indicates CEOs' reputation and celebrity status is associated with their talents (Bertrand and Schoar, 2003; Kaplan and Rauh, 2010; Milbourn, 2003). Table 3 also indicates that firms employing star-CEOs tend to have lower market-to-book ratio, larger stock volatility, smaller ownership concentration, younger, and more likely to have a combined leadership position. These results indicate that there exist some significant difference between firms with star-CEOs and those without.

V. Market Reaction to the Appointment of star-CEOs

We then examine the stock market reaction to the appointment of star-CEOs using the event study method arising from Fama (1970)'s famous efficient capital market hypothesis. Fama et al. (1968) predict that the movement of a firm's stock return around the event point effectively captures shareholder price response to news about an event. Abnormal stock price responses surrounding, in this case a CEO succession event, is a direct test of the stock market's expectation of change in future firm value caused by leadership change (Denis and Denis, 1995). That is, if the abnormal price reaction is positive to an unanticipated event, it is the added value of star-CEO appointment signaled by CEO turnover.

During our sample period, there are a total of 923 CEO turnover events for which we can identify a known announcement date, with 71 of these events involving a star CEO turnover. 39 of these turnovers are associated with nominating a new star CEO and 32 are related to the departure of a previous star-CEO. Table 4a reports daily cumulative abnormal returns surrounding the announcement of CEO turnover. We report results for the full sample, subsamples of star-CEOs and non-star CEOs respectively. We notice that daily CARs are significantly higher for the announcement of star-CEOs staring from day one after the announcement. Table 4b reports CARs surrounding the turnover announcement windows. The (-3, +3) seven-day CARs are 1.07 % for the full sample, and are as high as 10.83% for the star-CEO subsample in contrast with 0.66% for the non-star CEO subsample. This difference is significant at the 0.01 level. The (-5, +5) eleven-day CARs show the same pattern, with the CARs being significantly higher for the star-CEO subsample (10.86%) than the non-star CEO subsample (2.23%). We conclude that hiring star CEOs are perceived by the market as good news for future corporate earnings potential.

Insert Table 4 Here

To better understand the market movement surrounding the turnover announcement day, we plot average daily CARs of our sample firms in Figure 1. We report results for the full sample, the star-CEO, and non-star CEO subsamples respectively. Figure 1 indicates that there is a significant increase of cumulative abnormal returns one day after the announcement of a star-CEO appointment, while this pattern is not salient for the non-Star CEO subsample or the full sample. In our un-tabulated results, we also split our sample firms in three categories: those with incoming star-CEOs, those with departing star-CEOs, and status quo firms without a change of

CEO star status. We don't find a significant difference between the subsample of firms with departing star-CEOs and status quo firms. As a result, we choose to report more condensed results that group firms with departing star-CEOs along with the status quo firms.

Insert Figure 1 Here

Table 5 reports multivariate regression results on the impact of star CEOs on announcement date CARs (using as noted above the 7-day CAR window). In effect, this controls for any potential confounding factors that might be correlated to star-CEO status that can be observed in the data set. Column 1 reports results controlling for firm-level characteristics including firm prior performance, firm size, firm growth opportunity, leverage, volatility, firm age, ownership structure, board structure, as well as industry and year effects. All firm-level control variables are lagged one year to help build causality. Column 2 adds controls for CEO characteristics identified in section 3 to entangle the star CEO effect from the influence of incoming CEO's human capital and social capital. Column 3 adds more controls on the departing CEO's characteristics that may affect announcement date CARs as well. These additional control variables include the departing CEO's age, tenure, and star status. Columns 4 and 5 report the impact of the change of CEO star status (ΔStar CEO) on announcement date CAR. ΔStar CEO is calculated using the incoming CEO's star status minus the departing CEO's star status. It may take three values: -1 indicates a loss of star CEO, +1 indicates a gain of star CEO, and 0 indicates no change in the CEO star status. Column 4 includes only firm level control variables specified above and column 5 add all individual CEO characteristics as additional controls. Because the measure of ΔStar CEO requires each firm to have at least two CEO observations, our sample size declines from 914 observations to 731 observations.

Insert Table 5 Here

We find consistent support that a star-CEO is associated with significantly positive CARs surrounding the 7 day turnover announcement period. This result is robust and significant in the data. Our empirical findings are robust to many control factors such as the departing CEO's star status along with other firm level and CEO characteristics. Specifically, the 7-day cumulative abnormal returns surrounding CEO turnover announcements range from 0.10% to 0.16% higher when the turnover is associated with a star-CEO. Our results thus indicate that investors in the Chinese stock market place a price premium on the appointment of a star-CEO relative to a non-star CEO in the sense defined in this paper.

Some of the control variables are also worth discussing in their own right. Table 5 indicates that an incoming CEO with foreign experience is associated with significantly higher announcement date CARs. Surprisingly, CEOs with less education are actually associated with higher CARs. Table 5 also indicates that firms with poor performance, smaller leverage ratio, or higher volatilities are all associated with significantly larger CARs surrounding turnover announcement. We also find that the departing CEO's tenure is positively associated with CARs. This is consistent with the view that the market views long tenure of the departing CEOs as a sign of entrenchment and responds favorably to their departure. Taken together, our results indicate that the stock market does respond favorably to star-CEOs. In particular, the star-CEO effect is supplementary to other identifiable CEO talents and quality, such as the CEO's political connection, technology background, and education. These results thus indicate that there are additional value-added and glamor associated with being a star.

VI. Star CEO Compensation and Equity Incentives

Our next step is to investigate compensation and incentives of star-CEOs. Do star CEO's command a compensation premium compared to non-stars? The prior literature on CEO compensation has argued that CEO compensation should be determined based on CEOs' human capital that affects their marginal productivity and reservation wage (Holmstrom, 1979). CEO compensation level should also be linked to performance outcome so as to mitigate agency costs associated with separation of ownership and control (Fama and Jensen, 1983; Jensen and Meckling, 1976). In addition, the level of CEO compensation will be affected by board and ownership structure of the firm that affects the magnitude of agency costs (Jensen and Murphy, 1990; Murphy, 1985). Consequently, the prior literature on Chinese executive compensation has documented that CEO compensation in China is influenced by 1) firm level characteristics such as size, performance, growth opportunity, risks, industry 2) ownership structure such as the state ownership and ownership concentration, 3) board structure such as the proportion of outsiders on the board, leadership duality, and board size (Mengistae and Xu, 2004; Kato and Long, 2006; Firth et al., 2007; 2010; Conyon and He, 2011, 2012). We thus build on this stream of literature to investigate star-CEO compensation.

We first use a standard fixed-effects panel data model that controls for fixed yet unobserved heterogeneity in firm quality to conduct our analysis (Wooldridge, 2002). As noted by Murphy (1985), a pooled cross-sectional compensation regression may omit significant explanatory variables and potentially cause statistical bias in estimations. Our models thus control for firm fixed effects to filter out time-invariant factors that may contaminate the compensation estimates. We also present pooled-OLS results as a contrast. We report our results in Table 6. Columns 1 and 2 apply the pooled-OLS models to examine the between sample difference in CEO compensation. Columns 3 and 4 use the fixed-effect models to investigate the

within sample difference in CEO compensation. Columns 1 and 3 include firm level control variables identified by prior literature. All firm level control variables are lagged for one year to help build causality. Columns 2 and 4 add additional CEO characteristics to single out the star-CEO effect. A logarithm transformation is applied to the compensation measure.

Insert Table 6 Here

Table 6 indicates a strong star-CEO effect. The pooled-OLS results suggest that a star-CEO on average earns 13% to 15% higher compensation than his/her peers. The fixed-effects results are even stronger and the star-CEO premium is as high as 23% to 24%. We also notice that CEOs' talents and quality influence CEO compensation. A CEO with foreign experience enjoys a pay premium of 25% to 48%. Similarly, a CEO with an advanced degree is paid 11% to 12% higher than a CEO with the bachelor's degree. CEO compensation also increases with the age of the CEO. Finally, Consistent with prior literature on CEO pay in China, we find that CEO pay is positively related to firm performance, firm size, firm growth opportunity, and firm age. Table 6 also suggests that board and ownership structures affect CEO pay. Other things being equal, CEO compensation is lower in SOEs, but is higher when the board is larger, when there is a combined leadership position, and when there are more outsiders.

Milbourn (2003) suggests that CEO reputation should affect the optimal incentive contract in CEO compensation design. He argues that since the likelihood of the CEO will be kept in the future is increasing when the CEO is more capable, the stock price is more informative for CEO performance in this case. As a result, an optimal incentive contract should put more weight on equity based compensation for more reputable CEOs. Using a sample of US firms, Milbourn (2003) documents a positive relationship between CEO reputation and stock-

based pay sensitivities. We then explore whether this hypothesis holds in the Chinese executive labor market for star-CEOs.

We estimate a CEO share ownership model (i.e. an equity incentive equation) and report our results in Table 7. This model is the same as the cash compensation model specified above, except that we replace the dependent variable with CEO equity incentives. We again include a full set of firm level characteristics identified by prior literature that affect CEO equity incentives (Core et al., 1999; Conyon and He, 2011). Similar to table 6, columns 1 and 2 report the pooled sample estimates using the OLS method. Columns 3 and 4 are panel data fixed effects estimates. First of all, we document a strong star-CEO effect. Equity incentives of a star CEO are 24% to 38% higher than those of a non-star CEO. Consistent with prior literature, we find a positive cross section correlation between CEO share ownership incentives and firm performance. Better performing firms provide their CEOs with greater share incentives. We also find that CEO equity incentives and growth opportunities are positively correlated. We find CEO share ownership is negatively associated with firm size, firm age, and ownership concentration of the largest shareholder. We document that ownership type matters as well. CEO ownership incentives are lower when the State is the ultimate owner of the firm. Overall, our results are consistent with the notion that Chinese firms attempt to set incentive contracts optimally to mitigate agency costs. Most importantly, we document a consistent star-CEO effect, i.e., a star-CEO is associated with significantly stronger pay performance sensitivity (Milbourn, 2003).

Insert Table 7 Here

Our results up to this point have mainly assumed that CEO star status is exogenous. However, Malmendier and Tate (2009) argue that a CEO's star status may well be endogenous.

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The general concern is that a star-CEO may be different from a non-star CEO and a firm hiring a star-CEO may also be different from the firm hiring a non-star. Our earlier probit regression results also confirm this concern, i.e., there are selection effects whereby companies that hiring stars are different from those that do not. The problem, as is well known, is very difficult to fully resolve. This should not detract from the economic and practical importance of addressing the phenomenon at hand, but only to recognize some of the limitations with interpreting the results. To address the endogenous selection issues we use propensity score methods to partially resolve such selection effects (Angrist and Pischke, 2009; Rosenbaum and Robin, 1983). The goal of propensity score matching (Heckman, Ichimura, and Todd, 1997, 1998; Imbens, 2000) is to find a set of non-star control samples that can be matched optimally to the set of firms that have hired star CEOs. The treatment (star) firms and control group (non-star) firms are made to be as statistically alike as possible using a matching algorithm. Having done this one can compare average CEO compensation and equity incentives between the treatment and control groups because they are statistically alike in all other economically relevant characteristics. Consistent with much of the program evaluation literature, we document the average treatment effect of the treated star-CEO group (i.e. ATT).

We matched like-for-like firms using a nearest neighbor algorithm with caliper 0.01, and no replacement. Our match is conducted based on two criteria: 1) matched on firm characteristics as identified column 2 of Table 3, including firm performance, leverage, market to book, sales, volatility, firm age, SOE, ownership concentration, board size, leadership duality, outsider ratio, and industry 2) matched based on both firm and CEO characteristics as identified in column 3 of Table 3, including firm-level variables listed above plus CEO age, gender, education background, political connection, technology background, and foreign experience. The basic propensity score

model (estimated using the probit model) is omitted due to its similarity to Columns 2 and 3 of Table 3.

Table 8a and 8b contains estimates of the star-CEO effect on executive compensation and equity incentives respectively based on the propensity score estimates. We first examine results reported in Panel A on executive compensation. After matching based on firm characteristics, the mean log compensation of the treated group (star) is 12.90, the mean log compensation of the control group (non-star) is 12.67, and the difference is 0.23, which is statistically significant (t-statistic 2.01). A similar pattern is found when the matching is conducted based on both firm characteristics and CEO characteristics. In the matched sample the mean of the treated group (star) is 12.88, the mean of the control group (non-star) is 12.62, and the difference is 0.26, which is statistically significant as well (t-statistic 2.14). We conclude that propensity score matching models establish a positive and statistically significant difference in compensation of star-CEOs and non-star CEOs. Indeed, our propensity score models re-enforce the findings from the fixed effects models that we reported earlier.

Insert Table 8 Here

We then turn our attention to estimates of CEO equity incentives in Panel B of Table 8. After matching based on firm characteristics, the mean equity incentives of the treated group (star) is 0.45, the mean equity incentives of the control group (non-star) is 0.14, and the difference is 0.31, which is statistically significant with a t-statistic of 2.00. Similarly, when the matching is conducted based on both firm characteristics and CEO characteristics, in the matched sample the mean of the treated group (star) is 0.49, the mean of the control group (non-star) is 0.38, and the difference of 0.16 is statistically significant as well (t-statistic 2.32). These

results thus indicate that star-CEOs are associated with significantly higher equity incentives compared with a matched group of non-star CEOs with similar individual and firm-level characteristics. Again, the propensity score models and average treatment effects re-enforce the results derived earlier using fixed effects methods.

To summarize this section we find that there is a strong support for the existence of a superstar phenomenon in China, whereas star-CEOs are paid much higher than their non-star peers. This higher compensation remains significant even after controlling for other firm level and individual level characteristics that may affect CEO compensation, as well as the endogenous determination of CEO star status. In addition, we document that star-CEOs are associated with significantly higher pay-performance sensitivity. This result is likewise confirmed after controlling for other firm level and individual level characteristics and the endogenous selection effect.

VII. Star-CEO and Short-term Firm Performance

Prior literature has suggested that star-CEOs may possess larger power in their firm, and may subsequently entrench themselves at the cost of shareholders (Malmendier and Tate, 2009). As a result, the *ex post* value consequences of the managerial star system may not necessarily be positive. That is, star-CEOs may not be associated with higher performance compared to their non-star counterparts. We then investigate the performance impact of Chinese star CEOs. As we described in the data section, we measure firm performance using short-term cumulative abnormal returns after CEO appointment. We report our results in Table 9. The dependent variables are one-month CAR, three-month CAR, six-month CAR, nine-month CAR, and twelve-month CAR after CEO turnover in columns 1, 2, 3, 4, 5 respectively. We again apply the

full set of control variables taking into account firm level characteristics and CEO individual level characteristics. We lag all firm-level characteristics to help better establish causality. First of all, we establish a significant positive star-CEO performance effect for the month of 1, 3, 6, and 9 after CEO turnover. The results however are not statistically significant for the 12 month CAR and CAR afterwards.

Insert Table 9 Here

To better illustrate the performance impact of star-CEOs, Figure 2 plots the mean monthly CAR of the sample firms from the first month to the 12th month after CEO turnover. We separate our sample firms into two subgroups by CEO star status and report the results for the whole sample as well. We notice that there are significant difference in the star-CEO and the non-star CEO subgroups. The star-CEO group is associated with much higher CAR in the early month post appointment. The performance difference gradually diminishes with time passing by. By the end of the 1st year, the performance difference between the star-CEO group and the non-star CEO group is negligible.

Insert Figure 2 Here

Our further analysis indicates that firms hiring star CEOs experience larger performance variation. For example, the standard deviation for the 1month CAR is 0.82 for star-CEOs and 0.10 for non-stars, the standard deviation is 0.95 vs. 0.19 for the 3 month CAR, 0.59 vs. 0.25 for the 6 month CAR, 0.62 vs. 0.31 for the 9 month CAR, and 0.49 vs. 0.36 for the 12month CAR. These differences are all statistically significant. These results are consistent with Adams et al. (2005)'s argument that performance variation increases with the degree of CEO influence. A

more powerful CEO, such as a star CEO in our case, has larger influence on firm decision and also tends to make more decisions, while a less powerful CEO is more likely to make modest decisions that have to compromise with other members of the top-management team. As a result, the risk arising from judgment errors is not well diversified in case of a star CEO. Extreme consequences are thus more likely to happen. Because "the likelihood of either very good or very bad decisions is higher" in this case, it results in larger performance variability but not necessary better average performance (Adams et al., 2005). Overall, our results indicate a modest star-CEO performance impact. That is, star-CEOs do perform better than their non-star counterparts particularly within the first year of the CEO tenure, although such an effect gradually diminishes over time.

VIII. Conclusions

This paper contributes to the understanding of executive labor markets by investigating the economics of 'superstars' in China. Superstars are individuals who possess premium quantities of human capital. In consequence, we predict that stars will contribute positively to organizational value. In addition, we predict such individuals command a compensation premium, after controlling for other economic and social determinants of executive pay. Our empirical results are generally supportively of this argument.

We measure CEO star status as a membership in NPC or CPPCC and test our hypotheses using a proprietary data set covering a sample of listed Chinese firms between 2000 and 2010. We demonstrate the following important empirical findings. First, our results show that the appointment of a star CEO is associated with significantly positive cumulative abnormal returns surrounding the announcement day. These results hold after controlling for other confounding

factors such as firm level characteristics and traits of incoming and departing CEOs that may also influence the market response to CEO turnover. Second, our study shows that star CEOs receive significantly higher cash compensation than their counterparts. More importantly, we find that star CEOs also have a higher pay-for-performance sensitivity measured by large amounts of equity incentives. Our empirical findings are established after controlling for other firm level and CEO level characteristics as well as the endogenous determination of CEO star status. Third, we find that firms hiring a star CEO are associated with significantly better short-term market performance than their counterparts in the first year of CEO tenure, while the performance effect gradually attenuates over time.

Overall, our paper is the first to show that economic superstar effects are an important phenomenon in Chinese executive labor markets. For example, Star-CEOs are paid much higher than their non-star counterparts even taking into account of other measurable determinants of CEO compensation such as innate talent. The Chinese stock market does appreciate the value of these star-CEOs, as indicated by a significantly positive equity price response surrounding the announcement date of their appointment. We also document stronger pay performance sensitivity as well as a positive short-term performance impact of these star CEOs, which are broadly consistent with the optimal contracting perspective. Overall our results indicate that it is worthwhile for Chinese firms to hire a star CEO. We hope that our findings will stimulate further research on the role of star CEOs in China.

Table 1: Sample Distribution by Year and Industry

This table presents distributions of our samples by year and by industry from 2000 to 2010.

Panel A: Sample Distribution by Year

	Frequency	Percentage	Cumulated %
2000	79	1.66	1.66
2001	101	2.13	3.79
2002	244	5.14	8.92
2003	406	8.55	17.47
2004	518	10.90	28.37
2005	565	11.89	40.27
2006	566	11.91	52.18
2007	568	11.96	64.13
2008	569	11.98	76.11
2009	568	11.86	88.07
2010	567	11.93	100.00
Total	4,751	100.00	

Panel B: Distribution by Industry

	Frequency	Percentage	Cumulated %
Agriculture	68	1.43	1.43
Communication	60	1.26	2.69
Construction	90	1.89	4.59
Finance	119	2.50	7.09
Information Technology	170	3.58	10.67
Manufacturing-Electronic	210	4.42	15.09
Manufacturing-Food/Beverage	285	6.00	21.09
Manufacturing-Furniture	18	0.38	21.47
Manufacturing-Machinery	644	13.56	35.02
Manufacturing-Metal	433	9.11	44.14
Manufacturing-Others	33	0.69	44.83
Manufacturing-Paper/Printing	47	0.99	45.82
Manufacturing-Petroleum	403	8.48	54.30
Manufacturing-Pharmaceutical	325	6.84	61.15
Manufacturing-Textiles	121	2.55	63.69
Mining	133	2.80	66.49
Others	226	4.76	71.25
Real Estates	409	8.61	79.86
Service	172	3.62	83.48
Transportation	226	4.76	88.23
Utilities	226	4.76	92.99
Wholesale & Retail	333	7.01	100.00
Total	4,751	100.00	

Table 2: Descriptive Statistics

This table reports descriptive statistics of key variables. Both mean and standard errors are reported. Two-tailed t-tests are performed for equal mean between star CEO and non-star CEO subsamples. P value is reported and *, **, *** indicate significance at 10%, 5% and 1% level respectively.

	Full Sample		Star CEO		Non-star CEO		
Variables	Mean	SD	Mean	SD	Mean	SD	P value
CEO Characteristics							
Political Connection	0.19	0.39	0.25	0.43	0.19	0.39	0.01***
Foreign Experience	0.06	0.24	0.05	0.22	0.06	0.24	0.55
Tech. Background	0.38	0.48	0.40	0.49	0.38	0.48	0.50
Job Variety	3.94	1.99	3.75	2.20	3.95	1.98	0.10*
CEO Age	47.51	6.77	48.37	6.98	47.45	6.75	0.02
Female CEO	0.04	0.20	0.14	0.35	0.04	0.18	0.00***
Above Bachelor	0.53	0.49	0.58	0.49	0.53	0.49	0.09*
Below Bachelor	0.10	0.31	0.13	0.33	0.10	0.30	0.18
Firm and Board Characteristics							
Adjusted ROA	-0.01	0.14	-0.01	0.07	-0.01	0.14	0.90
Market to Book	2.29	31.96	1.61	1.61	2.34	33.02	0.69
Leverage	1.35	25.72	2.80	11.41	1.25	26.41	0.31
Log Sales	21.27	1.50	21.35	1.64	21.27	1.49	0.37
Volatility	0.49	0.47	0.57	0.64	0.49	0.45	0.00***
Firm Age	12.42	4.39	12.12	4.79	12.44	4.36	0.22
SOE	0.59	0.49	0.44	0.49	0.60	0.49	0.00***
Largest SH %	0.41	0.17	0.35	0.17	0.41	0.17	0.00***
Board Size	9.61	2.18	9.80	2.79	9.60	2.12	0.12
Outsider Ratio	0.33	0.08	0.33	0.09	0.34	0.08	0.05**
Combine	0.13	0.33	0.40	0.49	0.09	0.29	0.00***
Compensation &Performance Outcome							
CEO Cash Pay	505,099	706,276	748,986	1,233,749	488,461	652,036	0.00***
CEO Equity Incentives	0.06%	0.71	0.44%	2.20	0.03%	0.44	0.00***
CAR-1 month post turnover	0.36%	0.21	9.10%	0.09	-0.11%	0.00	0.00***
CAR-3 month post turnover	0.66%	0.28	9.86%	0.11	0.16%	0.01	0.01***
CAR-6 month post turnover	0.68%	0.28	6.94%	0.07	0.35%	0.01	0.05**
CAR-9 month post turnover	1.32%	0.33	10.26%	0.08	0.84%	0.01	0.02**
CAR-12month post turnover	2.32%	0.37	3.54%	0.06	2.26%	0.01	0.78

Table 3: Who are Star CEOs and Who Hire Star CEOs?

The dependent variable is star CEO which is equal to 1 if the CEO is a member of NPC or CPPCC. Variable definitions are provided in Appendix I. Probit models are estimated using maximum likelihood. Marginal effects are reported with asymptotic robust standard errors in parenthesis. *** significant at 0.01, ** significant at 0.5, *, significant at 0.10.

	(1) Star dF/dx	(2) Star dF/dx	(3) Star dF/dx
Political connection	0.04***		0.03***
	(0.01)		(0.01)
Foreign Experience	-0.01		-0.01
	(0.01)		(0.01)
Technology background	0.01**		0.02***
	(0.01)		(0.01)
Job Variety	-0.00**		-0.00***
	(0.00)		(0.00)
CEO age	0.00**		0.00
	(0.00)		(0.00)
Female CEO	0.17***		0.14***
	(0.03)		(0.03)
Above Bachelor	0.03***		0.02***
	(0.01)		(0.01)
Below Bachelor	0.04**		0.03**
	(0.02)		(0.01)
Adjusted ROA		-0.01	-0.00
		(0.02)	(0.02)
Market to book		-0.01**	-0.00**
		(0.00)	(0.00)
Leverage		0.00*	0.00
		(0.00)	(0.00)
Log Sales		0.01**	0.00
		(0.00)	(0.00)
Volatility		0.01***	0.01***
		(0.01)	(0.00)
Firm age		-0.00***	-0.00***
		(0.00)	(0.00)
SOE		-0.01	-0.01
		(0.01)	(0.01)
Largest SH%		-0.00***	-0.00***
		(0.00)	(0.00)
Board size		0.00	0.00*
		(0.00)	(0.00)
Outsider ratio		-0.05	-0.03
		(0.06)	(0.05)
Combine		0.16***	0.15***
		(0.01)	(0.02)
Industry/Year effects	No	Yes	Yes
Observations	4770	4154	4154
Pseudo R Square	0.039	0.154	0.191

Table 4: Star CEO Appointment and Market Reaction

This table reports announcement date mean CARs for firms appointing star CEOs vs non-star CEOs. Two-tailed t statistics are performed. *** significant at 0.01, ** significant at 0.5, *, significant at 0.10.

Panel A: Daily Cumulative Abnormal Returns Surrounding Announcements

Event Day	Full Sample Mean	Star-CEO	Non-Star
-5	0.51%	-0.68%	0.56%
-4	0.33%	-0.56%	0.38%
-3	0.22%	-0.55%	0.25%
-2	0.21%	-0.27%	0.23%
-1	0.09%	-0.41%	0.12%
0	-0.09%	-0.49%	-0.08%
1	-0.14%	0.03%	-0.14%
2	0.78%	11.72%	0.32%
3	0.99%	13.05%	0.48%
4	1.74%	13.37%	1.25%
5	2.12%	12.93%	1.67%

Panel B: Cumulative Abnormal Returns Surrounding Announcement Windows

CAR Windows	Full Sample Mean	Star-CEO	Non-Star	P value
(-1, +1)	-0.14%	0.75%	-0.12%	0.42
(-3, +3)	1.07%	10.83%	0.66%	0.00***
(-5, +5)	2.58%	10.86%	2.23%	0.09*

Table 5: The Impact of Star CEO on Announcement Date CARs

This table reports regression results on the effect of star CEO on CARs. The dependent variables are 7day CARs. Variable definitions are provided in Appendix I. Two-tailed *t* statistics are shown in parentheses. Robust standard errors are adjusted for heteroskedasticity. *** significant at 0.01, ** significant at 0.5, *, significant at 0.10.

	CAR33				
	(1)	(2)	(3)	(4)	(5)
Star CEO	0.13***	0.14***	0.16***		
	(0.04)	(0.04)	(0.05)		
ΔStar CEO				0.10***	0.11***
				(0.04)	(0.04)
Previous Star CEO			-0.06		0.00
			(0.04)		(0.00)
Previous CEO age			0.00		0.02***
			(0.00)		(0.01)
Previous CEO tenure			0.02***		0.00
			(0.01)		(0.00)
Political connection		0.02	0.02		0.02
		(0.02)	(0.02)		(0.02)
Foreign Experience		0.09***	0.09***		0.09***
		(0.03)	(0.04)		(0.04)
Technology background		-0.02	-0.02		-0.02
		(0.02)	(0.02)		(0.02)
Job Variety		0.01	0.01		0.01
		(0.00)	(0.00)		(0.00)
CEO age		-0.00	-0.00		-0.00
		(0.00)	(0.00)		(0.00)
Female CEO		0.01	0.02		0.02
		(0.04)	(0.04)		(0.04)
Above Bachelor		-0.04**	-0.05**		-0.05**
		(0.02)	(0.02)		(0.02)
Below Bachelor		0.06*	0.07**		0.07**
		(0.03)	(0.04)		(0.04)
Adjusted ROA	-0.12**	-0.13**	-0.15**	-0.13**	-0.15**
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Market to book	-0.00	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Leverage	-0.00***	-0.01***	-0.01***	-0.01***	-0.01***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Log Sales	0.01	0.01*	0.01*	0.01	0.01*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Volatility	0.08*	0.09**	0.12**	0.07	0.11**
	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)
Firm age	-0.00	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
SOE	0.01	0.02	0.01	0.02	0.01
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Largest SH%	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

Board size	0.00	0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Outsider ratio	0.04	0.04	0.02	-0.06	0.03
	(0.12)	(0.12)	(0.16)	(0.16)	(0.16)
Combine	-0.01	-0.00	-0.02	-0.03	-0.02
	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)
Industry Control	Included	Included	Included	Included	Included
Year Control	Included	Included	Included	Included	Included
Constants	-0.28*	-0.27*	-0.38*	-0.28	-0.38*
	(0.15)	(0.15)	(0.22)	(0.21)	(0.22)
Observations	923	922	739	745	739
Adjusted R-squared	0.16	0.18	0.25	0.21	0.25

Table 6: Star CEO and Cash Compensation

The dependent variable is the log of CEO Cash Pay. Star=1 if the CEO is a star and 0 otherwise. Other variables are defined in Appendix1. *** significant at 0.01, ** significant at 0.5, *, significant at 0.10

	(1) Log CEO Pay	(2) Log CEO Pay	(3) Log CEO Pay	(4) Log CEO Pay
	OLS		Fixed Effects	
Star CEO	0.13*	0.15**	0.24**	0.23**
	(0.07)	(0.07)	(0.09)	(0.09)
Political connection		0.15***		-0.00
		(0.04)		(0.05)
Foreign Experience		0.48***		0.25***
		(0.06)		(0.08)
Technology background		-0.10***		0.02
		(0.03)		(0.04)
Job Variety		0.01		0.01
		(0.01)		(0.01)
CEO age		0.01***		0.02***
		(0.00)		(0.00)
Female CEO		-0.11		0.01
		(0.08)		(0.08)
Above Bachelor		0.12***		0.11***
		(0.03)		(0.04)
Below Bachelor		-0.00		-0.08
		(0.05)		(0.07)
Adjusted ROA	1.24***	1.21***	0.62***	0.63***
	(0.26)	(0.25)	(0.15)	(0.15)
Market to book	0.00***	0.00***	0.00*	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Leverage	0.00	0.00	0.00***	0.00***
	(0.00)	(0.00)	(0.00)	(0.00)
Log Sales	0.19***	0.19***	0.11***	0.10***
	(0.01)	(0.01)	(0.02)	(0.02)
Volatility	-0.01	-0.01	0.00	0.01
	(0.01)	(0.01)	(0.02)	(0.02)
Firm age	0.01***	0.01***	0.16***	0.15***
	(0.00)	(0.00)	(0.01)	(0.01)
SOE	-0.16***	-0.16***	-0.04	-0.05
	(0.03)	(0.03)	(0.04)	(0.04)
Largest SH%	-0.00***	-0.00***	0.00**	0.00***
	(0.00)	(0.00)	(0.00)	(0.00)
Board size	0.04***	0.03***	0.04***	0.03***
	(0.01)	(0.01)	(0.01)	(0.01)
Outsider Ratio	0.75***	0.78***	0.58**	0.63**
	(0.28)	(0.28)	(0.29)	(0.29)
Combine	0.13***	0.09*	-0.06	-0.09
	(0.05)	(0.05)	(0.05)	(0.05)

Constant	8.33***	7.48***	7.49***	6.64***
	(0.31)	(0.32)	(0.48)	(0.49)
Industry Effects	Yes	Yes	No	No
Year Effects	Yes	Yes	Yes	Yes
Observations	3,126	3,122	3,126	3,122
Number of Firms	n.a.	n.a.	568	568
R-squared	0.23	0.27	0.30	0.31

Table 7: Star CEO and Equity Incentives

The dependent variable is the CEO percentage equity ownership. Star=1 if the CEO is a star and 0 otherwise. Other variables are defined in Appendix1. *** significant at 0.01, ** significant at 0.5, *, significant at 0.10

	(1) CEO Equity %	(2) CEO Equity %	(3) CEO Equity %	(4) CEO Equity %
	OLS		**Fixed Effects**	
Star CEO	0.38***	0.39***	0.24***	0.25***
	(0.13)	(0.13)	(0.05)	(0.06)
Political connection		0.10**		0.03
		(0.04)		(0.03)
Foreign Experience		-0.09***		-0.00
		(0.02)		(0.05)
Technology background		-0.06***		0.04
		(0.02)		(0.03)
Job Variety		0.01*		-0.02***
		(0.01)		(0.01)
CEO age		0.00		0.01***
		(0.00)		(0.00)
Female CEO		-0.08**		-0.05
		(0.04)		(0.06)
Above Bachelor		0.03		-0.04
		(0.02)		(0.02)
Below Bachelor		0.13**		-0.13***
		(0.06)		(0.04)
Adjusted ROA	0.34***	0.33***	0.15	0.13
	(0.10)	(0.10)	(0.10)	(0.10)
Market to book	0.00***	0.00***	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Leverage	-0.00	-0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Log Sales	-0.01**	-0.01*	0.08***	0.08***
	(0.01)	(0.00)	(0.01)	(0.01)
Volatility	-0.00	-0.01	-0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)
Firm age	-0.02***	-0.02***	-0.03***	-0.03***
	(0.00)	(0.01)	(0.01)	(0.01)
SOE	-0.11***	-0.11***	-0.04	-0.04
	(0.03)	(0.03)	(0.03)	(0.03)
Largest SH%	-0.00***	-0.00***	-0.00***	-0.00***
	(0.00)	(0.00)	(0.00)	(0.00)
Board size	-0.00	-0.00	0.01	0.01
	(0.00)	(0.00)	(0.01)	(0.01)
Outsider Ratio	0.01	-0.01	0.18	0.20
	(0.21)	(0.21)	(0.15)	(0.15)
Combine	-0.00	-0.01	0.10***	0.09***
	(0.05)	(0.05)	(0.03)	(0.03)

Constant	0.78***	0.61***	-1.20***	-1.38***
	(0.21)	(0.21)	(0.28)	(0.29)
Industry Effects	Yes	Yes	No	No
Year Effects	Yes	Yes	Yes	Yes
Observations	4,620	4,612	4,620	4,612
Number of Firms	n.a.	n.a.	572	572
R-squared	0.06	0.07	0.02	0.03

Table 8: Star CEO Compensation and Equity Incentives-Average Treatment Effects

Panel A: Propensity Score Matching on Executive Compensation

Model 1: Match based on firm characteristics

Star (1/0)	Sample	Treated	Controls	Difference	S.E.	T-stat
Log(CEO Pay)	Unmatched	12.91	12.69	0.21	0.07	3.05
[treated = 177]	ATT	12.90	12.67	0.23	0.11	2.01

Model 2: Match based on both firm and CEO characteristics

Star (1/0)	Sample	Treated	Controls	Difference	S.E.	T-stat
Log(CEO Pay)	Unmatched	12.91	12.70	0.21	0.07	2.93
[treated = 140]	ATT	12.88	12.62	0.26	0.12	2.14

Panel B: Propensity Score Matching on Equity Incentives

Model 3: Match based on firm characteristics

Star (1/0)	Sample	Treated	Controls	Difference	S.E.	T-stat
CEO Equity%	Unmatched	0.46	0.04	0.42	0.04	9.20
[treated = 258]	ATT	0.45	0.14	0.31	0.16	2.00

Model 2: Match based on both firm and CEO characteristics

Star (1/0)	Sample	Treated	Controls	Difference	S.E.	T-stat
CEO Equity%	Unmatched	0.47	0.04	0.43	0.05	9.23
[treated = 249]	ATT	0.49	0.11	0.38	0.16	2.32

Table 9: The Impact of Star CEOs on Monthly CARs Post Appointment

This table reports regression results on the effect of star CEO on monthly CARs. The dependent variables are CARs 1 month, 3 month, 6 month, 9 month, and 12 month after the appointment. Variable definitions are provided in Appendix I.   Two-tailed *t* statistics are shown in parentheses. Robust standard errors are adjusted for heteroskedasticity. *** significant at 0.01, ** significant at 0.5, *, significant at 0.10.

	CAR				
	(1)	(2)	(3)	(4)	(5)
	1 month	3 month	6 month	9 month	12 month
Star CEO	0.11***	0.12***	0.06*	0.10**	0.01
	(0.03)	(0.04)	(0.04)	(0.04)	(0.05)
Political connection	0.03**	0.02	0.01	-0.00	-0.00
	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)
Foreign Experience	-0.00	-0.02	-0.03	-0.06	-0.01
	(0.02)	(0.03)	(0.03)	(0.04)	(0.04)
Technology background	-0.01	-0.03	-0.01	-0.02	-0.01
	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
Job Variety	0.00	0.00	-0.00	-0.01	-0.01
	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)
CEO age	-0.00*	-0.00	0.00	-0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Female CEO	-0.00	0.03	0.04	0.08*	0.10*
	(0.03)	(0.04)	(0.04)	(0.05)	(0.05)
Above Bachelor	-0.02	-0.02	-0.02	-0.02	-0.01
	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
Below Bachelor	0.05**	0.06**	0.06**	0.11***	0.06*
	(0.02)	(0.03)	(0.03)	(0.03)	(0.04)
Adjusted ROA	0.10*	0.11	0.07	0.00	-0.02
	(0.05)	(0.07)	(0.07)	(0.08)	(0.09)
Market to book	-0.00	-0.00	-0.01	-0.02***	-0.02**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Leverage	-0.00	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Log Sales	-0.01	-0.00	0.00	-0.00	-0.02*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Volatility	0.09**	0.14**	0.06	0.14**	0.18**
	(0.04)	(0.06)	(0.06)	(0.07)	(0.07)
Firm age	-0.00	-0.00	-0.00*	-0.00	-0.01*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
SOE	0.02	0.02	-0.02	-0.00	-0.03
	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)
Largest SH%	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Board size	0.00	0.00	0.00	0.00	0.01
	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
Outsider ratio	-0.08	-0.00	0.02	0.03	0.04
	(0.10)	(0.13)	(0.13)	(0.15)	(0.17)
Combine	-0.02	-0.02	-0.03	-0.03	-0.03
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)

Industry Control	Included	Included	Included	Included	Included
Year Control	Included	Included	Included	Included	Included
Constants	0.14	-0.01	-0.01	0.16	0.31
	(0.13)	(0.18)	(0.18)	(0.21)	(0.24)
Observations	1,291	1,291	1,291	1,289	1,289
Adjusted R-squared	0.06	0.05	0.05	0.06	0.07

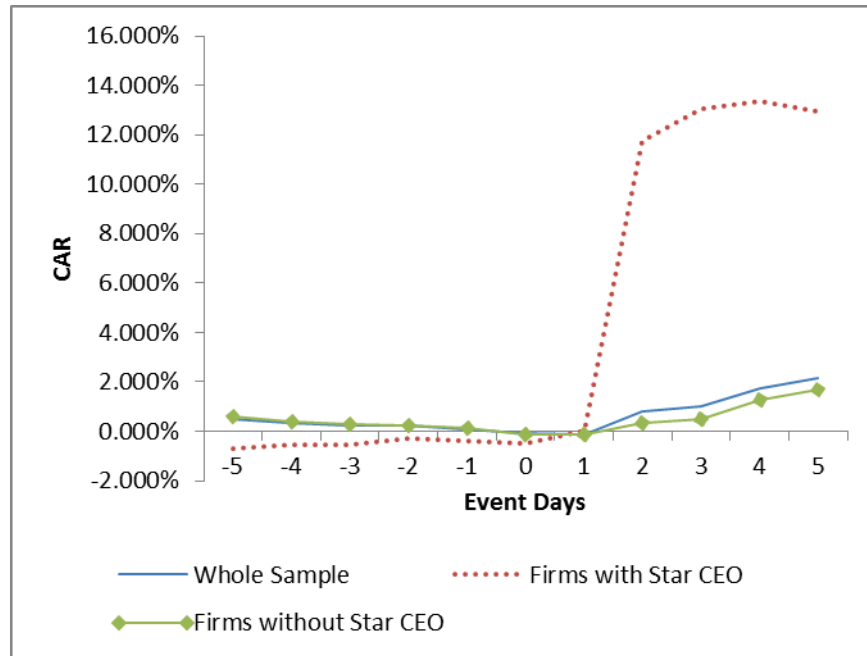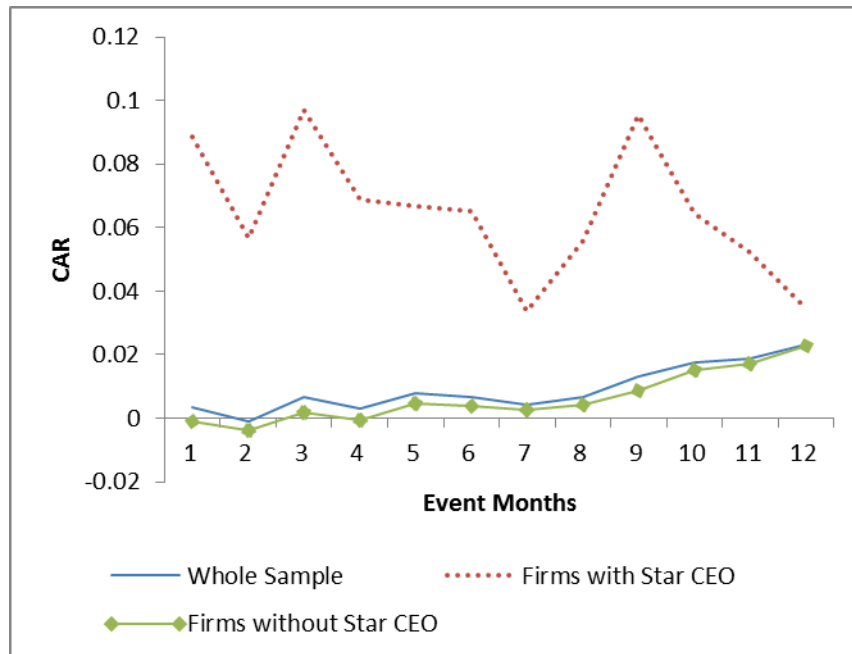**Figure 1: Cumulative Abnormal Returns Surrounding Turnover Announcement Date**

Figure 2: Short Term Stock Performance after CEO Appointment

Appendix: Data Definition

Star CEO	=	1 if the CEO is a member of the National People's Congress (NPC) or the National Committee of the Chinese People's Political Consultative Conference (CPPCC) and 0 otherwise.
CAR33	=	The cumulated abnormal returns surrounding the announcement of the succession event from -3 to +3.
CAR Post Turnover	=	The cumulated abnormal returns 1 month, 3 month, 6 month, 9 month, and 12 month post CEO turnover.
Log CEO Pay	=	Logarithm of CEO compensation calculated as the sum of salary, bonus, and other cash compensation as reported by the firm.
CEO equity incentives	=	Share ownership of the CEO as the percentage of total shares outstanding.
Political connection	=	1 if the CEO has prior work experience in military, central government, or local government, and 0 otherwise.
Foreign experience	=	1 if the CEO has study or work experience in a foreign country, and 0 otherwise.
Technology background	=	1 if the incoming CEO has a technological background and 0 otherwise.
Job Variety	=	The total number of firms the CEO has worked for.
CEO Age	=	The age of the CEO.
Female CEO	=	1 if the CEO is female and 0 if male.
Above Bachelor	=	1 if the CEO has a master or a PhD degree.
Below Bachelor	=	1 if the CEO has an associate, or high school degree.
Adj. ROA	=	Industry adjusted return on assets, which is calculated as net profits divided by the book value of assets then minus industry average return on assets.
Market to book	=	Market to book ratio calculated as market value of the firm divided by total assets.
Leverage	=	Leverage ratio calculated as total liability divided by total equity.
Log Sale	=	Log total sales to capture firm size.
Volatility	=	Past three year stock returns volatility calculated as rolling average.
Firm Age	=	The age of the firm calculated as the current year minus the founding year.
SOE	=	1 if the ultimate owner of the firm is the state and 0 otherwise.
Largest SH%	=	The percentage ownership of the largest shareholders.
Board Size	=	The number of directors on the board.
Outside Director	=	The proportion of outside directors on the board.
Combine	=	1 if the CEO is also the chairperson of the board, 0 otherwise.
Previous Star-CEO	=	1 if the departing CEO is a star and 0 otherwise.
Δ Star	=	Change in CEO's star status by subtracting the departing CEO's star status from the incoming CEO's star status.
Previous CEO Age	=	The age of the departing CEO
Previous CEO Tenure	=	The tenure of the departing CEO.

Reference

Adams, R. Almeida, H., and Ferreira, D. 2005. Powerful CEOs and their impact on corporate performance. *The Review of Financial Studies*, 18(4):1403-1432.

Andersson, F. 2002. Career concerns, contracts, and effort distortions. *Journal of Labor Economics*, 20: 42-58.

Angrist, J and Pischke, J.S. 2009 Mostly Harmless econometrics, Princeton University Press.

Baker, G., Hall, B.J., 2004. CEO incentives and firm size. *Journal of Labor Economics*, 22, 767-798.

Bebchuk, L. and Fried, J. 2004. Pay without performance: The unfulfilled promise of executive compensation. Harvard University Press, Cambridge, MA.

Bertrand, M. and Schoar, A. 2003. Managing with style: The effect of managers on firm policies. Quarterly Journal of Economics, 118(4): 1169-1208.

Bertrand, M. 2009. CEOs. *Annual Review of Economics*, 1: 121-149.

Boubakri, N. Cosset, J. and Saffar, W. 2012a. The impact of political connections on firm's operating performance and financing decisions. *Journal of Financial Research*, 35 (3): 397-423.

Brown, S.J., Warner, J.B., 1985. Using daily stock returns: the case of event studies. *Journal of Financial Economics*, 14: 3–31.

Chang E, and Wong S. 2009. Governance with multiple objectives: Evidence from top executive turnover in China. *Journal of Corporate Finance*, 15: 230-244.

Chemmanur, T. and Paeglis, I. 2005. Management quality, certification, and initial public offerings. *Journal of Financial Economics*, 76: 331-368.

Chen, J., Ezzamel, M., and Cai, Z. 2011. Managerial power theory, tournament theory and executive pay in China. *Journal of Corporate Finance*, 4: 1176-1199.

Clarke, J. Khorana, A. Patel, A., and Rau, R. 2007. The impact of all-star analyst job change on their coverage choices and investment banking deal flow. *Journal of Financial Economics*, 84: 713-737.

Conyon, M and He, L, 2011. Executive compensation and corporate governance in China. *Journal of Corporate Finance*. 17 (4): 1158-1175.

Conyon, M. and He, L. 2012. CEO Compensation and Corporate Governance in China. *Corporate Governance: An International Review*, 20 (6): 575-592.

Conyon, M and Murphy, K, 2000. The prince and the pauper? CEO pay in the United States and the United Kingdom. *Economic Journal*, 110: 640-671.

Core, John E., and Wayne R. Guay. 1999. The Use of Equity Grants to Manage Optimal Equity Incentive Levels, *Journal of Accounting and Economics*, 28 (2): 151-184.

Denis, D., and Denis, D. 1995. Performance change following top management dismissals. *Journal of Finance*, 50: 1029-1057.

Falato, A. Li, D. and Milbourn, T. 2012. CEO Pay and the Market for CEOs. SSRN working paper: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2191192.

Fama, E., Fisher, L., Jensen, MC. And Roll, R. 1969. The adjustment of stock prices to new information. *International Economic Review*, 1: 1-21.

Fama, E. 1970. Efficient capital markets: A review of theory and empirical work. *Journal of Finance*, 25: 383-417.

Fan, J. Wong, T.J., and Zhang, T. 2007. Politically connected CEOs, corporate governance, and post-IPO performance of China's newly partially privatized firms. *Journal of Financial Economics*, 84: 330-357.

Firth, M., Fung, P., and Rui, O. 2006. Corporate performance and CEO compensation in China. *Journal of Corporate Finance*, 13, pp. 693-714.

Firth, M., Leung, T. & Rui, O. 2010. Justifying top management pay in a transitional economy. *Journal of Empirical Finance*, 17: 852-866.

Francis, B., Hasan, I. and Sun, X. 2009. Political connections and the process of going public: Evidence from China. *Journal of International Money and Finance*, 28: 696-719.

Francis, J., Huang, A. H., Rajgopal, S. and Zang, A. Y. 2008. CEO reputation and earnings quality, *Contemporary Accounting Research*, 25: 109-147.

Frank, R. H. and Cook, P. J. 1995. The Winner-Take-All Society. Old Tappan, NJ: Free Press.

Gabaix, X. and Landier, A. 2008. Why has CEO pay increased so much? *Quarterly Journal of Economics*, 123: 49-100.

Gibbons, R. and Murphy, K. 1992. Optimal incentive contracts in the presence of career concerns: Theory and evidence. *Journal of Political Economy*, 100: 468-505.

Graffin, S. Wade, J., Porac, J. and McNamee, R. 2008. The Impact of CEO status diffusion on the economic outcomes of other senior managers. *Organization Science*, 19(3): 457-474.

Groysberg, B. Healy, P. and Maber, D. 2011. What drives sell-side analyst compensation at high-status investment banks. *Journal of Accounting Research*, 49(4): 969-1000.

Holmström, B. 1979. Moral hazard and observability. *Bell Journal of Economics*,10, 74-91.

Imbens, G. 2000, The Role of Propensity Score in Estimating Dose-Response Functions, *Biometrika* 87(3), 706-710.

Jian, M. and Lee, K. 2011. Does CEO reputation matter for capital investments? *Journal of Corporate Finance*, 17: 929-946.

Jiang, G., Lee, C. and Yue, H. 2010. Tunneling through intercorporate loans: The Chinese experience. *Journal of Financial Economics*, 98(1): 1-20.

Jensen, M. C., Meckling, W.H., 1976. Theory of firm - managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3, 305-360.

Jensen, M. C., Murphy, K.J., 1990. Performance pay and top-management incentives. *Journal of Political Economics*, 98, 225-264.

Kaplan, S., Klebanov, M. and Sorensen, M. 2012. Which CEO characteristics and abilities matter? Journal of Finance, 67(3): 973-1007.

Kaplan, S. and Rauh, J. 2010. Wall street and main street: What contributes to the rise in the highest incomes? *Review of Financial Studies*, 23(3): 1004-1950.

Kaplan, S. and Rauh, J. 2013. It is the market: the broad-based rise in the return to top talent. *Journal of Economic Perspectives*, 27(3): 35-55.

Kato T. and C.Long,2006, Executive Turnover and Firm Performance in China. *American Economic Review* 96 (2): 363-367.

Krueger, A. 2005. The economics of real superstars: The market for rock concerts in a material world, *Journal of Labor Economics*, 23: 1-30.

Lazear, E. and Rosen, S. 1981. Rank-rider tournaments as optimum labor contracts. Journal of Political Economy, 89: 841-864.

Li, M. Meng, L., Zhang, J. 2006. Why do entrepreneurs enter politics? Evidence from China. *Economic Inquiry*. 44(3): 559-578.

Li, H., Meng, L. Wang, Q and Zhou, L. 2008. Political connections, financing and firm performance: Evidence from Chinese private firms. *Journal of Development Economics*, 87: 283-299.

MacLeod, W. and Malcomson, J. 1988. Reputation and hierarchy in dynamic models of employment. *Journal of Political Economics*, 124: 1593-1638,

Malmendier, U. and Tate, G. 2009. Superstar CEOs. *The Quarterly Journal of Economics*, 124(4): 1593-1638.

Mengistae, T., and Xu, L. X. C. 2004. Agency theory and executive compensation: The case of Chinese state-owned enterprises. *Journal of Labor Economics,* 22 (3), pp. 615-637.

Milbourn, T. 2003. CEO reputation and stock-based compensation. *Journal of Financial Economics*, 68: 233-262.

Murphy, K. J. 1985. Corporate Performance and Managerial Remuneration - An Empirical Analysis, *Journal of Accounting and Economics*, 7: 11-42.

Murphy, K. J., 2013. Executive Compensation: Where We are, and How We Got There. George Constantinides, Milton Harris, and René Stulz (eds.), Handbook of the Economics of Finance. Chapter 4: 211-356, Elsevier Science North Holland.

Rajgopal, S, Shevlin, T and Zamora, V. 2006. CEOs' outside employment opportunities and the lack of relative performance evaluation in compensation contracts. *Journal of Finance*, 61: 1813-1844.

Rosen, S. 1981. The economics of superstars. *American Economic Review*, 71: 845-858.

Rosen, S. 1986. Prizes and incentives in elimination tournaments. *American Economic Review*, 76: 701-715.

Rosen, S. 1992. The market for lawyer. *Journal of Law and Economics*, 35: 15-246.

Rosenbaum, P. and Rubin, D. 1983. The central role of the propensity score in observational studies for causal effects. *Biometrika*, 70: 41-55.

Spence, M. 1974. Market signaling: Information transfer in hiring and related processes. Cambridge, Harvard University Press.

Stickel, S.E. 1992. Reputation and performance among security analysts. *Journal of Finance*, 1811-1836.

Wooldridge, J. M., 2002. Econometric Analysis of Cross Section and Panel Data. The MIT Press, MA.