Restricting CEO Pay Backfires: Evidence from China

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This version: November 2017

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Abstract

Using the pay restriction imposed on CEOs of centrally administered state-owned enterprises (CSOEs) in China in 2009, we study the effects of limiting CEO pay. Compared with firms not subject to the restriction, the CEOs of CSOEs experience a significant pay cut. Pay-performance sensitivity for these firms also significantly decreases. In response to the pay cut, CEOs increase their consumption of perks and siphon off firm resources for their own benefit. Ultimately, the performance of these firms drops significantly following the pay restriction. Our findings suggest that restricting CEO pay distorts CEO incentives and brings unintended consequences. Our findings caution against limiting the pay of CEOs.

1. Introduction

Should CEO pay be restricted? Proponents of restrictions on CEO pay argue that executive pay is excessive and unjustified by performance, and should thus be restricted (e.g., Bebchuk and Fried 2003, 2004; Bebchuk 2007). Opponents argue that regulating the compensation contracts between executives and shareholders causes unintended consequences and may create more problems in CEO pay than it solves (e.g., Jensen and Murphy 1990; Kaplan 2007; Jensen and Murphy 2017). Despite the intense debate on this controversial issue, there are few empirical studies in the U.S. regarding the effects of directly restricting CEO pay, because such restrictions could pre-empt state corporation laws.[1]

In this paper, we investigate the consequences of CEO pay restriction using Chinese data. In 2009, the Central Government of China introduced a regulation to limit executive salaries for the country's centrally-administered state-owned enterprises (CSOEs). The regulation appears to have been triggered by the disclosure of executive compensation by Ping An Insurance, the largest insurance company in China, which caused a huge public outcry. The CEO pay of Ping An Insurance Group was 2,751 times the average national pay of workers in Chinese firms in 2007.[2] Six administrative departments of the central government of China jointly issued the policy document endorsed by the State Council, the highest authority for setting government policy. While the policy was intended to provide comprehensive guidance on executive compensation, it served primarily to restrict excessive executive compensation by setting a cap on the ratio of total executive compensation to employee compensation.

[1] Executive pay regulations in the U.S. have taken place mainly through changes in taxation. For instance, the Internal Revenue Code Section 162(m) of 1992–93 limits the deductibility of non-performance related compensation over one million dollars. The effect of the regulation is at best mixed (see Perry and Zenner 2001; Rose and Wolfram 2002; Balsam and Ryan 2007). For a comprehensive discussion of executive pay regulations, see Murphy (2013).

[2] http://finance.sina.com.cn/g/20080321/08014650670.shtml (in Chinese).

The pay regulation in China provides an ideal setting to examine the effects of pay restriction on CEO behavior and firm performance.[3] First, the regulation is exogenous to firm performance, reducing the endogeneity issue regarding CEO pay and firm performance. Second, the pay restriction applies only to CSOEs but not to other state-owned enterprises (SOEs) or private enterprises. This enables us to do difference-in-difference (DiD) tests to sort out the effects of pay restriction on CEO and corporate behavior.

Using the sample of CSOEs and non-CSOEs during 2005–2015, we find several interesting results. First, we find a significant pay cut for the CEOs of CSOEs. As the measure of CEO pay, we use basic salary plus bonus (cash compensation) but omit stock options, as very few firms have stock option schemes (Firth, Fung, and Rui 2006). In our baseline regression model, the CEOs of CSOEs experience a drop of 17.3% relative to those of non-CSOEs after the regulation. A potential concern with our results is that the decrease in CEO compensation may have been driven mostly by the anti-corruption campaign initiated in November 2012 through downward pressure on executive compensation. However, when we exclude the sample period after 2012, we find our results unchanged. We also exclude firms dual-listed in Hong Kong, as CEO compensation disclosed by these firms may not reflect actual compensation.[4] Again, our results remain intact.

Second, we find a significant drop in pay-performance sensitivity (PPS) for CSOEs. We use return on sales (ROS) and return on assets (ROA) as measures of firm performance. Depending on the specification, the CEO compensation of CSOEs is two to six times as sensitive to performance as

[3] While the pay regulation is intended for all executives, we focus on the compensation of general managers, equivalent to CEOs in the U.S.

[4] CNOOC's chairman Fu Chengyu was said to reveal that "all of the firm's top management had 'donated' all their compensation (salary plus bonus) to its parent company, as their pay packages from CNOOC were 'too high' and not in line with China's 'national characteristics' in view of the low incomes earned by the vast majority of their subordinates. The parent company would give them back an undisclosed salary and bonus for the year as their real compensation." — "Pay cuts no cure for good governance," South China Morning Post, July 4, 2016.

that of non-CSOEs before 2009. However, after 2009, the PPS of CSOEs drops significantly to the level of non-CSOEs. The pay cut imposed on the CEOs seems to have decreased their incentive to perform. Alternatively, the decrease in PPS could simply be a mechanical result of the CEO pay restriction without affecting CEO incentives.

To further examine the effect of pay restriction on CEO incentives, we examine perk consumption and tunneling activities. As a proxy for perk consumption, we use the sum of six types of expense (scaled by the number of paid executives), comprising travel, business entertainment, overseas training, board meetings, company cars, and meeting expenses, as in Gul, Cheng, and Leung (2011) and Xu, Li, Yuan, and Chan (2014), who study the effect of perks on stock price informativeness and stock price crash risk, respectively. We hypothesize that these expenses are correlated with CEO incentives for perk consumption, although these are also incurred during normal business activities. Perks are often granted as allowances, and the unused part may even be pocketed by the executives (Firth, Leung, and Rui 2010). In the base regression model, we find a 22.4% increase in perk consumption in CSOEs relative to non-CSOEs after 2009. Furthermore, the CEOs who experience a higher pay cut consume more perks.

We use net other receivables as a proxy for tunneling activities following Jiang, Lee, and Yue (2010). This variable measures the extent to which controlling shareholders use intercorporate loans to siphon funds from firms. Since the influential paper by Jiang, Lee, and Yue (2010), this variable is well known as a proxy for the extent of tunneling by Chinese firms (Busaba, Guo, Sun, and Yu 2015; Liu, Luo, and Tian 2015; Liu, Miletkov, Wei, and Yang 2015; Li, Liu, Ni, and Ye 2017). Consistent with the evidence from perk consumption data, we find a significant increase in tunneling by CSOEs. Relative to non-CSOEs, the extent of tunneling increases by 20.5% after 2009. Furthermore, the CSOEs whose CEOs experience a higher pay cut tunnel more firm resources. The

difference in the extent of tunneling for these firms compared with non-CSOEs increases by as much as 37.7% after 2009.

Our findings suggest that the CEOs of CSOEs consume more perks and tunnel more firm resources to compensate for their pay cuts. A natural question that arises then is whether CSOE performance deteriorate following the pay restriction. We find that the ROS of CSOEs drops significantly after 2009. The difference-in-difference in ROS between CSOEs and non-CSOEs is 3.51%, driven mainly by the decrease in ROS of CSOEs after 2009. The ROS of non-CSOEs, if anything, increases slightly after 2009. As the average ROS of CSOEs during the sample period is 6.4%, the deterioration in their firm performance is economically substantial. We also find that the deterioration occurs only in CSOEs whose CEOs realize higher pay cuts.

One may argue that CSOEs suffered more from the global crisis of 2008, which led to the pay cut for CEOs in these firms, which in turn encouraged them to consume more perks and tunnel more resources. We argue that our evidence is inconsistent with such an interpretation. Note that the PPS of CSOEs drops significantly following the pay cut regulation. If performance deterioration following the crisis was the driver of the pay cut, one should not see a drop in PPS. We also conduct several robustness tests using alternative measures for executive compensation, perks, and tunneling, and find robust results.

Our study adds to the growing literature on pay restriction. Dittmann, Maug, and Zhang (2011) analyze the effect of CEO pay restrictions and find that many restriction proposals may have unintended consequences. Thanassoulis (2012) develops a theoretical argument for limiting banker pay. Cadman, Carter, and Lynch (2012) show that executive pay restrictions associated with the Troubled Asset Relief Program (TARP) deterred participation in the program. Cebon and Hermalin (2015) derive conditions under which limits on performance-based payments can enhance efficiency

and benefit shareholders. Dhole, Khumawala, Mishra, and Ranasinghe (2015) study the effect of the California Nonprofit Integrity Act of 2004 on CEO compensation, and find that contrary to the objective of this act to ensure "just and reasonable" executive compensation, CEO compensation for affected non-profit organizations increased relative to unaffected non-profit organizations. Our experimental setting utilizes a policy targeted at directly regulating executive compensation, and provides unambiguous evidence of the effects of pay restriction on CEO pay, perk consumption, tunneling, and firm performance.

In a recent paper, Abudy, Amiram, Rozenbaum, and Shust (2017) conduct an event study of the passage of a law in Israel restricting executive pay to a binding upper limit in the insurance, investment, and banking industries. They find significantly positive abnormal announcement returns in these industries, thus pay restriction appears to benefit shareholders, at least in the short term. Our findings from CSOEs in China indicate that limiting CEO pay backfires. In addition to institutional differences in Israel and China, our study differs from that of Abudy, Amiram, Rozenbaum, and Shust (2017) in at least two important ways. First, they use a sample of firms in the financial industry, whereas we use all CSOEs covering a broad range of industries. Second, they focus on the short-term market reaction to the announcement of pay regulation, while we focus on the effect of regulation on long-term firm performance and valuation.

Our study provides important insights surrounding the controversial debate on the "pay ratio disclosure rule." Initially proposed in the Dodd-Frank Act and finally adopted by the Securities Exchange Commission in August 2015, the rule requires disclosure of the ratio of CEO pay to the median pay of all employees. The pay-ratio disclosure is mandated for fiscal years beginning on or after 1 January 2017. The provision is based on the implicit assumption that CEO pay is excessive

and that disclosure of the ratio will create public pressure to lower CEO pay. As of now, it is unclear whether this rule can be implemented and whether it can effectively curb CEO pay if implemented.

Proponents of the disclosure rule claim that large pay gaps undermine coordination by creating feelings of relative deprivation among lower level managers and employees, and that an egalitarian approach where pay gaps are smaller may lead to greater productivity (Cowherd and Levine 1992, Bloom 1999; Henderson and Fredrickson 2001). Opponents argue that the high pay gap ratio is a result of competition for talented managers and should not be lowered under pressure. In fact, Faleye, Reis, and Venkateswaran (2013) and Mueller, Ouimet, and Simintzi (2017) show that within-firm pay inequality is positively correlated with operating performance and firm valuation. Firth, Leung, and Rui (2010) find similar evidence using a sample of non-financial companies listed on the Shanghai and Shenzhen stock exchanges. In a survey paper on executive compensation, Edmans, Gabaix, and Jenter (2017) predict that a focus on pay ratios and social pressure to lower them are likely to induce unintended consequences that will make CEO pay less sensitive to firm performance and reduce shareholder value. This is exactly what we find in our empirical study—limiting CEO pay distorts CEO incentives and negatively affects firm performance.

Our study proceeds as follows. Section 2 provides a brief review of the 2009 pay regulation in China. Section 3 discusses the data construction and the methodology used for our tests. Section 4 presents the empirical results and section 5 the robustness tests. Section 6 concludes.

2. The pay regulation policy of 2009

On September 16, 2009, six administrative departments[5] in China jointly issued the Guideline to Further Regulate Executive Compensation in Central State Owned Enterprises (hereafter the Guideline) with the consent of the State Council, the chief administrative authority in China. The Guideline itself was not made available to the public, but the government posted the announcement of the Guideline issuance and a summary of the Guideline on its official website.[6] The Guideline suggests that executive compensation should consist of a basic salary, pay for performance (bonuses), and incentive compensation. It also indicates that because incentive compensation such as stock options is under development, the Guideline focuses more on basic salary and pay-for-performance. The Guideline stipulates that the design of executive compensation packages should strike a balance between motivating executives and narrowing the pay disparity between executives and employees. It indicates that the annual salary of executives should be in line with that of employees and that the pay for performance should be based on the business performance of the enterprise.

While the Guideline was issued as a comprehensive guide to regulating executive compensation, the media regarded the Guideline primarily as a regulation to restrict excessive executive compensation. There are several reasons to believe that the 2009 pay regulation is binding and effective. First, although the exact number is unclear, the Guideline appears to set a cap on the pay gap ratio. Before the issuance of the Guideline, it was reported in the media[7] that the Ministry of Human Resources and Social Security was preparing a new act to restrict total

[5] The Ministry of Human Resources and Social Security, Ministry of Finance, State-Owned Assets Supervision and Administration Commission, National Audit Office, Ministry of Supervision, and Organization Department of the Communist Party of China.

[6] http://www.gov.cn/jrzg/2009-09/16/content_1419270.htm (in Chinese).

[7] http://www.china.com.cn/economic/txt/2009-02/19/content_17299446.htm (in Chinese). The news website is under the supervision of The State Council Information Office.

executive compensation to 10 to 12 times that of employee compensation. Second, the Guideline was issued jointly by six administrative departments with the consent of the State Council, which indicates the seriousness of the regulation. Moreover, two departments—the State-Owned Assets Supervision and Administration Commission and the Organization Department of the Communist Party of China—are responsible for hiring CSOE executives. Third, the Guideline specifically emphasizes the monitoring duty of the departments, including the National Audit Office and the Ministry of Supervision, and requires punitive measures to be taken in a timely manner should any irregularity be detected.

3. Data and summary statistics

This section describes the sample selection process and presents summary statistics for the main variables: CEO compensation, perk consumption, tunneling, and firm performance.

3.1. Data construction

Our sample selection process starts with all companies listed on the Shanghai and Shenzhen stock exchanges. We obtain executive compensation, financial statements, and ownership data from the China Securities Market and Accounting Research (CSMAR) database, which is the most widely used database for Chinese financial market research. The sample period covers 2005 to 2015. We start with the year 2005 because the prior data on executive compensation is poor.[8] To be included into the sample, the sample firm must satisfy the following criteria:

1. the ultimate controlling shareholder can be identified;

2. the number of employees is more than 10;

[8] Early studies of CEO compensation in China could only use the compensation of the three highest paid executives as a proxy for CEO compensation (e.g., Firth, Fung, and Rui 2006).

3. the CEO's annual compensation is more than 1,000 CNY; and

4. the total assets and total sales are greater than 0.

To investigate the effect of the policy introduced in 2009, we require the company to have at least one observation in both the pre-policy (2005–2008) and post-policy (2010–2015) period. We further require that the identity of the company as a CSOE remains unchanged throughout the sample period. A company is identified as a CSOE if its ultimate controlling shareholder is the State-Owned Assets Supervision and Administration Commission of the State Council (SASAC) or the Ministry of Finance.

We collect the perk consumption data from the footnotes of financial statements. As a proxy for perk consumption, we use the sum of six types of expense, namely travel, business entertainment, overseas training, board meetings, company cars, and meeting expenses. While such expenses are necessarily incurred in relation to normal business activities and do not necessarily reflect perk consumption by executives, much of this expenditure is at the discretion of executives and is correlated with executive perk consumption incentives (Cai, Fang, and Xu 2011).

To construct our perk consumption data, we first collect the data available in the CSMAR database. CSMAR collects perk-related expenses from the "Management Expenses" section of the financial statement footnotes, but before 2009, very few companies disclosed their perk-related expenses in this section of the footnotes. We obtain perk consumption data for 7,216 firm-year observations from CSMAR, among which 7,022 observations are from the period 2009–2015. Our analysis requires perk data to be available for both the pre- and post-policy period, and we supplement the data from CSMAR with hand-collected data from the "Cash Payments for Expenses Related to Operating Activity" section of the footnotes.

We manually download the financial statements of all CSOEs in 2005–2015 from the Shanghai and Shenzhen stock exchange websites and hand-collect their perk expense data from the "Cash Payments for Expenses Related to Operating Activity" section. We then match each CSOE with at most three non-CSOEs by industry and size and hand-collect their perk consumption data. In total, we hand-collect 802 firm-year observations from the "Cash Payments for Expenses Related to Operating Activity" section, 413 of which are from the period 2005–2008.

To ensure that the data from the two different footnote sections are comparable, we run a simple regression model to adjust the data collected from the "Cash Payments for Expenses Related to Operating Activity" section. The result is 360 firm-year observations with perk data available from both footnote sections. We regress the logarithm of total perk consumption from the "Management Expenses" section on the logarithm of total perk consumption from the "Cash Payments for Expenses Related to Operating Activity" section without a constant,[9]

$$\log(Perk_{ME}) = \beta \log(Perk_{CP}) + \varepsilon, \quad (1)$$

where Perk_{ME} and Perk_{CP} denote perk consumption from the "Management Expenses" section and the "Cash Payments for Expenses Related to Operating Activity" section, respectively. The estimate of β is 0.97 and the adjusted-R^2 is 72.5%. We then use $(\text{Perk}_{\text{CP}})\exp^{\hat{\beta}}$ as the "adjusted" total perk consumption for the remaining 442 observations with perk data from only the "Cash Payments for Expenses Related to Operating Activity" section, and merge them with the perk consumption data from the "Management Expenses" section.

[9] The results are similar if we include a constant in the regression.

In our final subsample of perk data, we require each firm to have perk data in both sub-periods 2005–2008 and 2010–2015, which shrinks the sample size to 1,504 observations.[10] Of these, 1,216 are from the "Management Expenses" section, and the remaining 288 are adjusted values from the "Cash Payments for Expenses Related to Operating Activity" section.

Table 1 presents our sample composition. In the full sample, there are 102 unique CSOEs and 1,212 unique non-CSOEs. Among these firms, we obtain the perk data for 55 CSOEs and 115 non-CSOEs. As shown in Table 1, in each year we have perk data for about half of the CSOEs from the full sample. Although the perk data coverage of non-CSOEs appears quite small, note that we select the non-CSOEs in the perk data sample to match each of the CSOEs by size and industry, and thus they serve well as a control group in our analysis.

3.2. Summary statistics

Table 2 presents the summary statistics. All variables are defined in Appendix 1. We winsorize all ratio variables that have financial variables as denominators (except leverage) at 1% and 99%. Panel A of Table 2 presents the summary statistics for firm characteristic variables. It is well known that CSOEs tend to be large, operate in strategic industries such as oil exploration and airlines, and enjoy varying degrees of regulatory protection, price control, and protection from competition (e.g., retail gasoline and telecoms). A median-sized CSOE is more than twice the size of a median-sized non-CSOE in terms of total assets and total sales, while the median market capitalization of CSOEs is almost twice that of non-CSOEs. CSOEs are also more leveraged than non-CSOEs, perhaps because of regulatory protection and larger firm size. However, non-CSOEs realize a higher market to book ratio with a median of 2.76 compared to 2.41 for CSOEs.

[10] We obtain similar results when our sample includes 4,902 observations from firms with no perk data for 2005–2008 but with data for 2009 and 2010–2015.

Panel B presents CEO compensation and employee wages. For CEO compensation we include only cash compensation, the sum of basic salary and bonuses. We exclude incentive compensation as it is not widely adopted by Chinese firms. Stock options have only been allowed since 2007, and as stock option schemes require approval from the CSRC, very few firms adopt them (Firth, Fung, and Rui 2006; Firth, Leung, and Rui 2010). The mean annual CEO cash compensation is 542,479 CNY, which is approximately 80,135 USD.[11] While quite small relative to CEO compensation levels in developed markets, the annual cash compensation of Chinese CEOs is no small figure when compared to GDP per capita in China (4,560 USD in 2010). A Chinese CEO earned more than 17 times what the average Chinese worker earned in 2010. CEO compensation is higher on average for CSOEs, but as CSOEs are much larger than non-CSOEs, their CEOs are not necessarily overpaid by comparison. If anything, when adjusted for firm size, they appear relatively underpaid.

Because there are no accounting standards in China requiring the number of employees to be recorded, the data for average employee wages are noisy. We therefore focus on the median figure. The wage of a median rank-and-file employee in our sample is 64,185 CNY (9,481 USD), a bit lower than the GDP per capita of Shanghai (76,074 CNY) and Shenzhen (94,296 CNY) in 2010. The median employee wage of CSOEs is about 56% higher than that of non-CSOEs. The median of the pay gap ratio between CEOs and employees is about 5.8 times for non-CSOEs and 5.2 times for CSOEs, suggesting that the pay gap between executives and ordinary staff is more constrained in CSOEs. The Wilcoxon-Mann-Whitney test indicates that the difference between the two medians is significant. The CEO-worker pay ratio of our Chinese sample firms is substantially lower than that of U.S. firms. For firms in the S&P 1500 index during 1993–2006, Faleye, Reis,

[11] We use the 2010 exchange rate of 6.7695 CNY per USD throughout the paper.

and Venkateswaran (2013) obtain mean and median ratios of 36.7 and 25.0, respectively, for cash compensation, and 95.5 and 52.2 for total compensation, respectively.

We present the statistics on perk consumption in Panel C. Perks are scaled by the number of paid executives including CEOs, chief financial officers, and members of the board of directors and supervisory board. The mean value of perks per paid executive for our sample firms is about 3 million CNY; this number is doubled in CSOEs and halved in non-CSOEs. As CSOEs are significantly larger, the level of perk consumption does not necessarily suggest that CSOE executives enjoy excessive perks. In fact, the average total perk consumption scaled by sales (assets) for CSOEs is 0.73% (0.42%), which is smaller than the 1.02% (0.50%) for non-CSOEs. We note that the scaled perk figures are comparable to those of Gul, Cheng, and Leung (2011) and Xu, Li, Yuan, and Chan (2014).

The mean (median) perk consumption per executive is about 5.5 (1.9) times the value of CEO compensation in our sample. Although the level of perk consumption per executive is large compared to CEO cash compensation, note that not all perks represent wasteful consumption by executives rather than expenditure for business purposes. Moreover, the utility provided by perk consumption is likely lower than that provided by cash compensation.

In Panel D, we present variables that proxy for tunneling. We use net other receivables from the balance sheet as a proxy for tunneling as in Jiang, Lee, and Yue (2010). The mean (median) net other receivables over total assets is 2.4% (1.1%) during our sample period (2005–2015), less than that reported by Jiang, Lee, and Yue (2010) for 1996–2004. The other receivables balance declined after 2001, mainly due to a campaign by the China Security Regulatory Commission.

We present the ROS and ROA figures in Panel E. We calculate ROS as operating profit over total sales; we use operating profit because it is less subject to managerial discretion than net profit

(Firth, Fung, and Rui 2006). We choose ROS as our main measure of firm performance over more popular measures such as return on equity (ROE) because Chinese listed companies frequently issued equity throughout our sample period, and equity issuance mechanically decreases ROA and ROE (Li, Megginson, Shen, and Sun 2017). In our sample, the average share capital growth is 12.3%, while in each year about 27% of the companies issued equity. We also present results for ROA, as ROA is less contaminated by equity issuances than ROE. We find that non-CSOEs deliver slightly better operating performance than CSOEs in both ROS and ROA, but the differences are not statistically significant.

Table 3 presents the medians for CEO compensation, perk consumption, net other receivables over total assets, ROS, and ROA by year during 2005–2015 for both CSOEs and non-CSOEs. During 2005–2009, the level of CEO compensation increases monotonically for both CSOEs and non-CSOEs. After the introduction of the pay restriction policy for CSOEs in 2009, the CEO compensation of CSOEs remains stagnant until 2015. In sharp contrast, the CEO compensation of non-CSOEs continues to grow monotonically even after 2009, suggesting that the policy is binding for CSOEs.

The pay gap ratio is seen to be lower for CSOEs than non-CSOEs in 2005 and 2006, but increases significantly and almost catches up with non-CSOEs by 2008. The ratio peaks at 5.7 in 2010, after which it follows a downward trend, while the pay gap in non-CSOEs continues to grow, albeit slowly, to peak at 6.1 in 2013. These statistics on CEO compensation and the pay gap suggest that the policy effectively slowed CEO compensation growth in CSOEs but did not affect non-CSOEs, which is precisely what one would expect, as the policy is only targeted at CSOEs.

The change shown in perk consumption in CSOEs is striking. The average perk consumption per executive in CSOEs ranges from 0.66 to 0.81 million CNY during 2005–2008, but almost

doubles in 2009, the year the policy was introduced, and increases to 2.1 million CNY by 2011. While perk consumption by non-CSOEs increases by 53% from 2005 to 2011, CSOE perk consumption rises by as much as 162% during the same period, much of it starting in 2009. However, after President Xi Jinping put forward the anti-corruption campaign in November 2012, perk consumption in CSOEs starts to decrease drastically and is almost halved by 2015. By contrast, we do not observe such a sharp decrease in perk consumption in non-CSOEs after 2012.

Other net receivables over total assets continue to decrease in both CSOEs and non-CSOEs until 2010. This downward trend is reversed for CSOEs after 2010, while the downward trend continues for non-CSOEs.

The last four columns of Table 3 present the median firm performance of CSOEs and non-CSOEs by year. Focusing on the time-series variation, we see an improvement in firm performance during 2005–2007 for both CSOEs and non-CSOEs before the significant drop in 2008 caused by the global financial crisis. The performance picks up a bit during 2009–2010 but starts to decrease again in 2011 and never returns to the pre-crisis level. Looking at the difference between CSOEs and non-CSOEs, we find that the ROS is not statistically different during 2005–2009. However, during 2010–2015, non-CSOEs outperform CSOEs in all 6 years and the differences are both economically large and statistically significant. The ROA results present a similar pattern, suggesting that the operating performance of CSOEs deteriorates significantly after 2009 compared to non-CSOEs. While firm performance is determined by many factors, the summary statistics of CSOE performance together with perk consumption and tunneling appear consistent with the view that the disincentive imposed on the CEOs of CSOEs by the pay restriction regulation contributed to the poor performance of CSOEs relative to non-CSOEs.

4. Empirical results

In this section, we first present evidence that the pay regulation of 2009 significantly decreases CEO compensation in CSOEs and their pay-performance sensitivity. We then show that perk consumption and tunneling significantly increase in these firms while firm performance deteriorates. Finally, we discuss and exclude alternative interpretations of our results.

4.1. Univariate difference-in-difference tests

The summary statistics in Table 3 suggest that following the pay restriction regulation in 2009, the CEO compensation of CSOEs decreases, while their perk consumption and tunneling increase compared to non-CSOEs. In Table 4, we conduct the univariate difference-in-difference (DiD) tests between CSOEs and non-CSOEs before and after 2009. The DiD test is a popular strategy in medical research to identify the causal effects of medicines. The typical research setting for DiD tests is a medical experiment in which all subjects are "sick" and "the medicine or placebo" is randomly assigned to the subjects (Adams 2017). Our setting does not resemble such an ideal medical experiment. As shown in Table 2, CSOEs are different from non-CSOEs in several respects, and thus the DiD test may not be able to detect the causal effect of pay restriction regulation. We assume that the differences in firm characteristics between CSOEs and non-CSOEs remain constant throughout the sample period and are not driven by factors other than the pay restriction regulation.

Table 4 presents the results. In panel A, we apply the DiD test to the raw figures for CEO compensation, perk consumption, net other receivables balance, and firm performance. Compensation and perk consumption are in logarithm form. In panel B, we use the residuals from regressing the raw figures on the firm and year fixed effects. The figures used in the tests are the

firm-level time-series average during the sub-periods 2005–2008 and 2010–2015. Both panels present the same patterns and we focus on the changes in the residual figures for interpretation.

Before the CEO pay restriction we find higher compensation for the CEOs of CSOEs than non-CSOEs, which reverses after the pay restriction. CEO compensation for CSOEs is seen to decrease significantly while that for non-CSOEs hardly changes, resulting in significantly lower CEO compensation for CSOEs after the regulation. The pattern of change in perk consumption and net other receivables is exactly opposite to that of CEO compensation. Perk consumption and net other receivables are significantly lower for CSOEs than non-CSOEs before the regulation, but significantly higher afterwards, resulting in significantly higher perk consumption and net other receivables for CSOEs. Turning to ROS and ROA, we find that firm performance for CSOEs deteriorates after the regulation, but improves for non-CSOEs, so that CSOEs end up performing significantly worse than non-CSOEs after the pay regulation of 2009.

In sum, the univariate test results indicate that relative to non-CSOEs, CEO compensation for CSOEs decreases after 2009, while perk consumption and tunneling increase, and as a result, firm operating performance deteriorates.

4.2. Policy effect on CEO compensation, perk consumption, tunneling, and firm performance

We now move on to multivariate regression analysis to test the effect of the 2009 regulation on CEO compensation, perk consumption, tunneling, and firm performance while controlling for variables that might affect these outcome variables.

4.2.1. Policy effect on CEO compensation

To examine the policy effect on CEO compensation, we estimate the following regression model:

$$Log(CEO\ compensation) = \beta_1 D\_CSOE \times After\ 2009 + \beta_2 Log(total\ assets) + \beta_3 ROS + \beta_4 Market\ to\ book\ ratio + Firm\ FE + Year\ FE + \varepsilon \quad (2)$$

The dependent variable is the logarithm of annual CEO cash compensation. The control variables include the logarithm of total assets, ROS, and market to book ratio. In all regressions, we control for both firm and year fixed effects and adjust the standard errors for clustering at the firm and year level.

Table 5 reports the results. In column (1), we include only the control variables and fixed effects in the regression. Not surprisingly, we find that the CEOs of firms that are larger and show higher operating performance get paid more. However, the market to book ratio is found to be unrelated to CEO compensation. In column (2), we include our key independent variable, D_CSOE×After2009, which is the interaction of the CSOE dummy and a time-period dummy that takes the value of one for the years after 2009 (i.e., 2010–2015). Because we already control for firm and year fixed effects, neither the CSOE dummy nor the After2009 dummy is included in the specification. The negative coefficient estimate for D_CSOE×After2009 captures the difference-in-difference of CEO compensation between CSOEs and non-CSOEs before and after the pay regulation, and indicates that relative to non-CSOEs, the CEO compensation of CSOEs decreases more after 2009. The estimate is both statistically and economically significant. The magnitude of the estimate (-0.180) is quite close to the estimate from the univariate test (-0.177) in Table 4.

In column (3), we additionally control for D_CSOE×After2012 where After2012 is a time-period dummy that takes the value of one for the years after 2012 (i.e., 2013–2015). This is because a concern with the results in column (2) is that the decrease in CEO compensation may be mostly driven by the anti-corruption campaign initiated in November 2012, which had more effect on the CEO compensation of CSOEs than non-CSOEs. However, we find that the coefficient estimate

for D_CSOE×After2009 remains significant, ruling out the anti-corruption campaign explanation. In column (4), we exclude firms that are dual-listed in both the China A-share and the Hong Kong H-share markets, because CEO compensation disclosed by firms listed in Hong Kong may not reflect actual CEO compensation. This is because the pay packages from these firms were considered "too high" and not in line with domestic companies, thus the top management of these firms "donated" their compensation to the parent company, which then returned an undisclosed salary and bonus for the year as their real compensation (South China Morning Post, July 4, 2016). Our results still hold when we restrict the sample to companies listed on the domestic stock exchanges only.

Table 6 presents the results of the same tests as Table 5, but uses the subsample of firms with perk consumption data available for both the 2005–2008 and 2010–2015 periods. While the size of the subsample with perk data available is small relative to the whole sample, the results are strikingly similar in this subsample.

Next, we examine the effect of pay restriction on pay-performance sensitivity (PPS) in CSOEs using the following specification:

$$Log(CEO\ compensation) = \beta_1 Performance + \beta_2 Performance \times After\ 2009 + \beta_3 Performance \times D\_CSOE + \beta_4 D\_CSOE \times After\ 2009 + \beta_5 Performance \times D\_CSOE \times After\ 2009 + \beta_6 Log(total\ assets) + \beta_7 Market\ to\ book\ ratio + Firm\ FE + Year\ FE + \varepsilon. \quad (3)$$

The dependent variable is the logarithm of CEO compensation. We use ROS and ROA as measures of firm performance. While most previous studies of PPS in the U.S. use stock return performance, we do not use this measure for several reasons. First, there is evidence that stock prices in the Chinese stock markets are influenced largely by noise traders (Eun and Huang 2007; Sun, Tong, and Yan

2009; Tong and Yu 2012). Second, stock returns in China are mostly a function of macro events (Morck, Yeung, and Yu 2000) over which CEOs have no control. Third, state-owned enterprises base performance-related CEO pay on accounting profitability rather than on stock returns (Firth, Fung, and Rui (2006).

We use ROS to measure firm performance in columns (1) and (3) and ROA in columns (2) and (4). In columns (3) and (4), the sample period is constrained to 2005–2012 to exclude the anti-corruption campaign effect. The interpretation of the coefficients is as follows: β_1 measures PPS for non-CSOEs; β_2 is the difference in PPS before and after 2009 for non-CSOEs; β_3 is the difference in PPS between CSOEs and non-CSOEs before 2009; β_4 is the difference in CEO compensation between CSOEs and non-CSOEs after 2009; and β_5 is the difference-in-difference in PPS between CSOEs and non-CSOEs before and after 2009, which is the main coefficient of interest.

Table 7 presents the results. The coefficient estimates for performance measures are significantly positive for all specifications, suggesting a strong positive PPS for non-CSOEs before 2009. We find that the estimates for Performance×After2009 are not statistically significant in all specifications, suggesting that the PPS for non-CSOEs remained unchanged after 2009. The significantly positive coefficient estimates for Performance×D_CSOE suggest that CSOEs have a higher PPS than non-CSOEs before 2009. Depending on the specification, the compensation of CEOs for CSOEs is 2 to 6 times as sensitive to performance as that for non-CSOEs before 2009. For instance, in column (4), the estimates of PPS before 2009 for non-CSOEs and CSOEs are 0.287 and 1.787 (0.287+1.5), respectively, indicating that the PPS of CSOEs is 6.2 times that of non-CSOEs. This finding is consistent with Firth, Fung, and Rui (2006) who find that CEO pay is

positively related to ROS for CSOEs but not for firms whose controlling shareholder is a state bureaucracy.

Our main variable of interest, Performance×D_CSOE×After2009, captures the difference-in-difference in PPS between CSOEs and non-CSOEs before and after 2009. The coefficient estimates are significantly negative in all specifications, suggesting that the PPS of CSOEs relative to non-CSOEs decreases significantly after 2009. Interestingly, the magnitude of the estimates is close to that of the coefficient estimates for Performance×D_CSOE in absolute value. This result suggests that after 2009, the PPS of CSOEs decreases to the level of non-CSOEs. Unlike the results in Table 5, the coefficient estimates for D_CSOE×After2009 are not significant. This is because in Table 7 we allow the slope of compensation with respect to performance to vary between CSOEs and non-CSOEs and across time.

4.2.2. Policy effect on perk consumption

In Table 8 we investigate the policy effect on perk consumption and its association with compensation changes. The dependent variable is the logarithm of total perk consumption over the number of paid executives. The control variables are the logarithms of total assets and total employee wages as in Gul, Cheng, and Leung (2011). We control for firm size as a proxy for operating complexity because executives of more complex firms are likely to consume more perks for work-related reasons (e.g., more frequent meetings and long-distance flights). We also control for total employee wages because total perk consumption includes several types of work-related expenses that non-executive employees can also consume, such as company car expenses and meeting expenses. Controlling for firm size and employee wages helps us tease out the portion consumed by executives in their personal interest (i.e., excess perks).

In column (1), we include only control variables and fixed effects. As expected, the coefficient estimates for both control variables are positive and significant. In column (2), we add D_CSOE×After2009 in addition to the control variables. The coefficient estimate for D_CSOE×After2009 is 0.224 and is significant at the 10% level, showing that compared to non-CSOEs, the perk consumption of CSOEs increases significantly after 2009. The coefficient estimate remains significant in column (3) when we include D_CSOE×After2012 to control for the anti-corruption campaign effect.

Thus, perk consumption increases significantly following the pay restriction. The question that naturally follows is whether the CEOs who experience greater pay cuts are more likely to consume perks to compensate for these cuts. In column (4), we divide CSOEs into two groups by the median of change in CEO compensation before and after 2009. For each CSOE, we compute the change in abnormal CEO compensation by subtracting the mean compensation during 2005–2009 from that during 2010–2015. Abnormal CEO compensation is the residual from column (1) of Table 6. We then create two dummy variables: one takes the value of one if the change in compensation is lower than the median (more negative), and the other takes the value of one if the change is higher than the median (less negative). In short, we divide the CSOE dummy into two dummy variables by the median of CEO compensation change for CSOEs before and after the pay restriction, and then interact each with the After2009 dummy. The results show a strikingly high (and statistically significant) 40% increase in perk consumption for CSOEs that experience below median CEO compensation change (i.e. a more negative change), but only a 3.9% (not significant) increase in CSOEs with above median (less negative) compensation change. These results suggest that CEOs who suffer more severe pay cuts tend to consume more perks. Column (5) tests the same specification as column (4), but uses the sample period 2005–2012 to eliminate the anti-

corruption campaign effect. The results remain unchanged. In unreported tests, we use entertainment and travel costs (ETC) as in Lin, Morck, Yeung, and Zhao 2017 as a measure of perk consumption, and find similar results.

In sum, the results in Table 8 suggest that CEO cash compensation and perk consumption are substitutes: when compensation decreases due to pay restrictions, CEOs increase their perk consumption to offset the pay cut.

4.2.3. Policy effect on tunneling

In Table 9 we investigate the effect of the policy on tunneling activities and its association with the change in CEO compensation. In column (1), we include only control variables and fixed effects. We control for the key determinants of net other receivables used in Jiang, Lee, and Yue (2010), including the logarithm of total assets, firm performance, and block ownership. We do not include the state ownership dummy or regional marketization as control variables because we control for firm fixed effects. We find that larger firms tend to have greater net other receivables, unlike Jiang, Lee, and Yue (2010) who find a negative relation between firm size and net other receivables. The difference appears to be due to controlling for firm fixed effects in the regression—when we drop firm fixed effects, we find evidence consistent with Jiang, Lee, and Yue (2010). More profitable firms have less net other receivables. Block ownership is negatively but at best weakly correlated with net other receivables.

The positive coefficient estimates for D_CSOE×After2009 in columns (2) and (3) indicate an increase in the extent of tunneling by CSOEs after 2009 relative to non-CSOEs. The coefficient estimate is significant at the 10% level in column (2) but not significant in column (3) where we use D_CSOE×After2012 to control for the anti-corruption campaign. In column (4), we again

divide CSOEs into two groups by the median of change in CEO compensation around 2009, and create two dummy variables: one takes the value of one if the change in compensation is lower than the median, and the other takes the value of one if it is higher than the median. When we interact both with the After2009 dummy, the results suggest that tunneling increases by 37.5% for CSOEs whose CEOs experience a more negative change in compensation. This increase in tunneling is statistically significant. In sharp contrast, tunneling increases insignificantly by only 2.9% for CSOEs whose CEOs experience less negative compensation change. The chi-square test indicates that the difference between the two coefficient estimates is significant at the 5% level. In column (5), we restrict the sample period to 2005–2012 to remove the anti-corruption effect on tunneling, but find the results unchanged.

Overall, Table 9 provides evidence that CSOEs whose CEOs experience significant cash compensation decreases engage in more tunneling activities. This result is consistent with the view that when CEOs' cash compensation decreases due to a pay restriction policy, they tunnel more resources from their company to compensate for their utility losses, indicating that tunneling, like perk consumption, serves as a substitute for cash compensation.

4.2.4. Policy effect on firm performance

In Table 10, we examine the policy effect on firm performance. As the dependent variable, we use ROS in columns (1) to (3) and ROA in columns (4) to (6), respectively. In column (1), we find a significantly negative estimate for D_CSOE×After2009, indicating that the ROS of CSOEs decreases more after 2009 relative to non-CSOEs. The magnitude of the change is large at -3.51%. In the next column, we add D_CSOE×After2012 to control for the 2012 anti-corruption campaign and find the results unchanged. The effect of the anti-corruption campaign on firm performance is

not significant, perhaps due to the short sample period after the campaign. In column (3), we examine whether the decrease in CEO pay is directly related to the decrease in firm performance. We use the same dummy variables as in column (4) of Table 9 based on the median of CEO compensation change for CSOEs before and after the pay restriction. We find that CSOEs whose CEOs received a bigger pay cut experience twice as big a drop in ROS as those whose CEOs received a smaller pay cut. The difference in performance between the two groups of CSOEs is statistically significant.

Using ROA as the measure of firm performance, we find similar but statistically weaker results. The coefficient estimates are only marginally significant, but the magnitude of the estimates still indicates an economically large decrease in ROA for CSOEs after 2009. The decrease is estimated to be 1.1% in columns (4) and (5), representing about 30% of the sample mean (3.6%) for CSOEs. When we partition CSOEs into two groups of firms by the median CEO compensation changes before and after the pay restriction, we find an economically and statistically significant decrease in ROA only for CSOEs whose CEOs experienced a bigger pay cut.

5. Robustness tests

In this section, we present the results of our robustness tests. We show that our findings are not due to the global crisis of 2008, and conduct several robustness tests using alternative measures of executive compensation, perks, tunneling, and firm performance.

5.1. Crisis effect on compensation, perks, and tunneling

One identification issue in our study is that the post-regulation period largely overlaps with the post-crisis period of the 2008 financial crisis. One may argue that CSOEs were more sensitive to the financial crisis, which would result in the same findings we document, that is, that CSOEs suffered more after the crisis, resulting in greater pay cuts for their executives, which in turn encouraged them to consume more perks and tunnel more resources. Thus, our findings may have little to do with pay regulation and more to do with the crisis-induced performance decline of CSOEs. However, we note that pay-performance sensitivity in CSOEs dropped significantly following the pay cut regulation, as evidenced in Table 7. If the pay cut was driven by the deterioration in performance following the crisis, we should not observe this drop in pay-performance sensitivity in CSOEs.

To further address the concern, we examine whether the crisis-induced performance decline led to the increase in perk consumption and tunneling. Table 11 presents the results. In column (1), we repeat the regression in column (2) of Table 6 but replace the main variable of interest with D_CSOE×After2008. The interaction variable captures the difference-in-difference of CEO compensation between CSOEs and non-CSOEs before and after the 2008 financial crisis. The coefficient estimate is significant and negative, indicating that CEO pay in CSOEs drops more after the crisis. In the next column, we further partition CSOEs into two groups by the median of performance change before and after the crisis. We use ROS as performance measure. Not surprisingly, we find that CEO pay drops more for those CSOEs whose performance declines more. In columns (3) and (4), we repeat the analysis of columns (1) and (2) but replace the dependent variable with perk consumption. In column (3), we find a positive coefficient estimate for D_CSOE×After2008, but it is not significant. More importantly, we find no difference in perk consumption between the two groups of CSOEs partitioned by performance change around the

crisis. This finding suggests that the performance decline of CSOEs after the crisis do not drive the CEOs of these firms to consume more perks. In contrast, the evidence in Table 8 indicates that CEOs who suffer higher pay cuts consume more perks. In columns (5) and (6), we examine the effect of the crisis on tunneling. In column (5), we find a positive but insignificant coefficient estimate for D_CSOE×After2008. Again, we find no difference in tunneling between the two groups of CSOEs partitioned by performance changes around the crisis, suggesting that the performance decline of CSOEs after the crisis do not drive the CEOs of these firms to tunnel more firm resources.

5.2. Top three executive compensation as a measure of compensation

Because the pay regulation of 2009 applies to all executives, not just CEOs, as a robustness test, we use the average compensation of the three most highly paid executives (top three executives) and repeat the tests of previous sections. In most companies, the most highly paid executives are the general manager (CEO), vice general manager, CFO, chairman of the board, and chairman of the supervisory board. We find consistent results using the compensation of the top three executives. The results are available in the Internet Appendix.

5.3. Entertainment and travel costs as a proxy for perks

Cai, Fang, and Xu (2011) note that "accounting practice in China is sufficiently lax that managers may be reimbursed for almost any kind of entertainment and travel for any purpose, often with fake or inflated receipts" (p. 61). In their study of the anti-corruption reforms and shareholder valuation, Lin, Morck, Yeung, and Zhao (2017) argue that entertainment and travel costs (ETC) from SOEs mainly fund private benefits. While our measure of perks includes ETC,

given previous studies, ETC may serve to better capture the extent of private benefits. However, when we repeat the analysis in Table 6, we obtain practically the same results. We report the results the Internet Appendix.

5.4. Related-party transactions as a measure of tunneling

Ideally, we seek to measure the portion of net other receivables related to the controlling shareholders to proxy for tunneling. Using the "Related Party Relationships and Business Transactions" category in annual reports, Bailey, Huang, and Yang (2011) collect information on "other accounts receivable" in their study of loan decisions by state-controlled banks. This variable reflects the cash amount owed by related parties that is not associated with the sale of goods, which should better capture the extent of expropriation or tunneling. We sum up the balance of all "other accounts receivable" items for each firm-year and use its logarithm as a proxy for tunneling. The disadvantage of using this variable is that this data is missing for many of our firms. Nevertheless, when we repeat the tests in Table 8, we find similar albeit weak results. We report the results the Internet Appendix.

5.5 Exclusion of financial firms from the sample

As financial firms have substantially different characteristics from industrial firms, we examine whether the results are affected by such firms. We exclude financial firms from the sample and repeat the main tests in Tables 5 through 10. Financial firms comprise 1.63% of the total sample and 5.19% of the subsample with perks data. We find that the results remain similar after excluding financial firms. The results are available in the Internet Appendix.

6. Conclusion

The aftermath of the financial crisis of 2008 sparked an intense debate over executive compensation among politicians, investors, regulators, and the public. There are two essential issues in this debate: whether CEO compensation is excessive, and whether CEO pay should be restricted. The second issue warrants investigation regardless of the findings of the first. If CEO pay is not excessive, any restriction on CEO pay will lead to suboptimal results. But even where CEO pay is excessive, a pay restriction regulation may not achieve its intended objectives but instead produce unintended consequences. Using the executive pay regulation the Chinese government imposed on centrally administered state owned enterprises in 2009, we find that limiting CEO pay backfires, as CEOs with pay cuts respond by consuming more perks and tunneling more firm resources, which in turn destroys firm value.

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Appendix 1. Variable definitions

Variable	Definition
CEO compensation	Total annual cash compensation (basic salary plus bonus) of CEO, adjusted to 2010 CNY.
Top 3 executive compensation	Total annual cash compensation of the three highest paid executives, adjusted to 2010 CNY.
Employee wages	Cash paid to employees over the average number of employees during the year, adjusted to 2010 CNY.
Perks	Sum of expenses for travel, business entertainment, overseas training, board meetings, company cars, and meetings, adjusted to 2010 CNY.
Number of paid executives	Number of executives with nonzero cash compensation.
Net other receivables	Balance on net other receivables.
Return on assets (ROA)	Operating profits over total assets.
Return on sales (ROS)	Operating profits over total sales.
Total assets	Total assets.
Total sales	Total sales.
Market capitalization	Market value of shares outstanding.
Market to book ratio	Market capitalization over book value of total shareholder equity.
Leverage	Total liabilities over total assets.
Block ownership	The percentage of shares owned by the ultimate controlling shareholders.
CSOE	Centrally-administered state-own enterprises whose ultimate controlling shareholder is the State-Owned Assets Supervision and Administration Commission of the State Council (SASAC) or the Ministry of Finance.
D_CSOE	A dummy variable that takes the value of one for CSOEs and zero otherwise.
After2009	A dummy variable that takes the value of one for the years after 2009 (i.e., years 2010–2015) and zero otherwise.
After2012	A dummy variable that takes the value of one for the years after 2012 (i.e., years 2013–2015) and zero otherwise.
Pay_Cut_High	A dummy variable that takes the value of one for CSOEs whose pay change is below the median of CSOE pay changes after the regulation and zero otherwise.
Pay_Cut_Low	A dummy variable that takes the value of one for CSOEs whose pay change is above the median of CSOE pay changes after the regulation and zero otherwise.
After2008	A dummy variable that takes the value of one for the years after 2008 (i.e., years 2009–2015) and zero otherwise.

Performance_High	A dummy variable that takes the value of one for CSOEs whose performance change is above the median CSOE performance change after the 2008 financial crisis and zero otherwise.
Performance_Low	A dummy variable that takes the value of one for CSOEs whose performance change is below the median CSOE performance change after the 2008 financial crisis and zero otherwise.

Table 1. Sample composition

This table presents the distribution of sample firms by year and firm type (CSOEs and non-CSOEs) for the full sample and the subsample with perk data available. All data are obtained from the China Securities Market and Accounting Research (CSMAR) database. All variables are defined in Appendix 1.

Year	All sample firms		Firms with perk data	
	CSOE	Non-CSOE	CSOE	Non-CSOE
2005	67	712	31	35
2006	80	872	42	55
2007	94	1024	46	74
2008	99	1144	49	88
2009	95	1119	52	105
2010	95	1122	50	105
2011	94	1116	51	107
2012	95	1103	52	107
2013	93	1096	51	103
2014	92	1076	50	103
2015	89	1044	47	101
Total	993	11428	521	983

Table 2. Descriptive statistics

This table presents the summary statistics for firm characteristics, CEO compensation, employee wages, perk consumption, tunneling, and firm performance. All variables are defined in Appendix 1.

Variable	All firms			CSOEs			Non-CSOEs		
	N	Mean	Median	N	Mean	Median	N	Mean	Median
Panel A: Firm characteristics									
Total assets (in millions)	12421	25160	2764	993	155824	6320	11428	13806	2641
Total sales (in millions)	12421	6575	1579	993	23938	4185	11428	5067	1474
Market capitalization (in millions)	12421	9658	3777	993	30463	6954	11428	7850	3617
Market to book ratio	12421	3.831	2.728	993	3.214	2.410	11428	3.885	2.757
Leverage	12421	0.502	0.510	993	0.553	0.579	11428	0.498	0.505
Panel B: CEO compensation and employee wages									
CEO compensation	12421	542479	378338	993	642538	531293	11428	533785	365630
Employee wages	12194	122308	64185	982	209289	96772	11212	114690	62044
CEO compensation / employee wages	12194	8.246	5.737	982	6.962	5.227	11212	8.358	5.792
Panel C: Perk consumption									
Perks (in thousands) [A]	1504	52941	10437	521	115610	17260	983	19725	8330
Number of paid executives [B]	1504	15	14	521	15	14	983	15	15
A / B	1504	2968	712	521	6136	1237	983	1289	533
Perks / sales (%)	1504	0.921	0.578	521	0.728	0.487	983	1.023	0.633
Perks / assets (%)	1504	0.470	0.309	521	0.423	0.255	983	0.495	0.325
Panel D: Proxy variables for tunneling									
Net other receivables (in thousands)	12331	161310	32320	967	637311	64853	11364	120806	30701
Net other receivables / assets (%)	12331	2.432	1.068	967	1.792	0.947	11364	2.486	1.081
Panel E: Firm performance									
ROS (%)	12421	6.802	5.627	993	6.394	4.513	11428	6.837	5.768
ROA (%)	12421	3.789	3.333	993	3.623	3.072	11428	3.804	3.350

Table 3. Time variation in main variables

This table presents the medians of CEO compensation, CEO-worker wage ratio, perks, tunneling, firm performance by year, and firm type. All variables are defined in Appendix 1.

Year	CEO compensation (in thousands)		CEO compensation / employee wages		Perks / number of paid executives (in thousands)		Net other receivables / assets (%)		ROS (%)		ROA (%)	
	CSOE	Non-CSOE	CSOE	Non-CSOE	CSOE	Non-CSOE	CSOE	Non-CSOE	CSOE	Non-CSOE	CSOE	Non-CSOE
2005	310	230	3.392	5.309	806	423	1.627	2.515	5.602	5.036	4.648	3.139
2006	358	250	3.806	5.203	659	394	1.446	1.969	6.440	5.468	4.169	3.597
2007	485	298	5.302	5.647	744	371	1.050	1.278	7.623	7.309	5.054	4.952
2008	519	315	5.425	5.545	755	438	1.068	1.122	4.147	5.020	3.394	3.298
2009	535	347	5.317	5.730	1472	476	0.841	0.997	5.249	6.601	2.994	3.865
2010	608	396	5.686	5.824	1578	580	0.682	0.977	6.050	7.195	3.560	4.266
2011	594	429	5.405	5.877	2112	646	0.822	0.962	3.594	6.315	2.276	3.784
2012	610	444	5.123	6.025	2098	709	0.803	0.931	3.173	4.881	2.224	2.855
2013	562	450	5.309	6.055	2010	682	0.831	0.869	3.504	4.982	2.671	2.728
2014	622	467	5.549	5.809	1685	527	0.968	0.909	3.007	4.887	1.908	2.572
2015	582	479	5.083	5.596	1132	526	0.991	0.866	3.576	5.084	1.959	2.470

Table 4. Univariate difference-in-difference tests

This table shows the results of the univariate difference-in-difference (DiD) tests for the variables CEO compensation, perks, tunneling, and firm performance. Abnormal figures are the residuals from regressing the variables of interest on firm and year fixed effects. For each variable, we calculate firm-level means before and after 2009, and for CSOEs and non-CSOEs, respectively, and then conduct DiD tests for each variable. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively. All variables are defined in Appendix 1.

		(1)	(2)	(3)
Variable		Before 2009	After 2009	Difference
	Panel A: Raw figures			
CEO compensation	CSOEs	12.975	13.232	0.256***
	Non-CSOEs	12.531	12.957	0.426***
	Difference	0.444***	0.275***	-0.169***
Perks / number of paid executives	CSOEs	13.798	14.383	0.585***
	Non-CSOEs	13.129	13.383	0.255***
	Difference	0.669***	0.999***	0.331**
Net other receivables / assets (%)	CSOEs	2.087	1.518	-0.569**
	Non-CSOEs	3.267	1.987	-1.281***
	Difference	1.181***	0.469*	0.712*
ROS (%)	CSOEs	8.336	4.941	-3.395***
	Non-CSOEs	6.338	6.886	0.548
	Difference	1.999	-1.944	-3.943**
ROA (%)	CSOEs	4.278	2.796	-1.482***
	Non-CSOEs	3.883	3.574	-0.309**
	Difference	0.395	-0.777	-1.173**
	Panel B: Residual figures net of firm and time fixed effects			
Abnormal CEO compensation	CSOEs	0.095	-0.067	-0.162***
	Non-CSOEs	-0.012	0.004	0.015
	Difference	0.106***	-0.071***	-0.177***
Abnormal (perks / number of paid executives)	CSOEs	-0.140	0.088	0.228*
	Non-CSOEs	0.057	-0.015	-0.072
	Difference	-0.197**	0.103**	0.300**
Abnormal (net other receivables / assets) (%)	CSOEs	-0.306	0.238	0.544**
	Non-CSOEs	0.131	-0.079	-0.210**
	Difference	0.437*	-0.317**	0.754**
Abnormal ROS (%)	CSOEs	1.841	-1.392	-3.233***
	Non-CSOEs	-0.336	0.296	0.632
	Difference	2.177**	-1.688**	-3.865**

Abnormal ROA (%)	CSOEs	0.515	-0.411	-0.925*
	Non-CSOEs	-0.130	0.074	0.203
	Difference	0.644*	-0.485**	-1.129**

Table 5. Effect of pay regulation on CEO compensation

This table presents the regression results for the effect of pay regulation on CEO compensation. The dependent variable is the logarithm of CEO compensation. Column (4) excludes firms that are dual-listed on the Hong Kong Stock Exchange. All regressions include firm fixed and year fixed effects. Standard errors are adjusted for clustering at the year and firm level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively. All variables are defined in Appendix 1.

	(1)	(2)	(3)	(4)
D_CSOE×After2009		-0.180***	-0.129**	-0.140**
		(-3.225)	(-2.695)	(-2.346)
D_CSOE×After2012			-0.104*	
			(-2.133)	
Log(total assets)	0.209***	0.211***	0.211***	0.210***
	(8.859)	(9.074)	(9.120)	(8.936)
Return on sales	0.412***	0.405***	0.406***	0.393***
	(7.820)	(7.841)	(7.865)	(7.668)
Market to book ratio	0.007*	0.007*	0.007*	0.007*
	(1.983)	(1.955)	(1.985)	(1.865)
Number of observations	12421	12421	12421	12058
Adjusted R^2	0.666	0.667	0.667	0.662
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

Table 6. Effect of pay regulation on CEO compensation using the subsample with perk data

This table presents the regression results for the effect of pay regulation on CEO compensation for the subsample in which we can obtain perk data. The dependent variable is the logarithm of CEO compensation. Column (4) excludes firms that are dual-listed on the Hong Kong Stock Exchange. All regressions include firm fixed and year fixed effects. Standard errors are adjusted for clustering at the year and firm level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively. All variables are defined in Appendix 1.

	(1)	(2)	(3)	(4)
D_CSOE×After2009		-0.194**	-0.192**	-0.183*
		(-2.246)	(-2.326)	(-2.097)
D_CSOE×After2012			-0.005	
			(-0.056)	
Log(total assets)	0.132*	0.136*	0.136*	0.144**
	(2.042)	(2.129)	(2.137)	(2.236)
Return on sales	0.557***	0.537***	0.537***	0.437**
	(3.457)	(3.281)	(3.279)	(2.721)
Market to book ratio	0.010	0.010	0.010	0.009
	(0.817)	(0.769)	(0.764)	(0.722)
Number of observations	1504	1504	1504	1443
Adjusted R^2	0.632	0.634	0.634	0.650
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

Table 7. Effect of pay regulation on pay-performance sensitivity

This table presents the regression results for CEO pay-performance sensitivity. The dependent variable is the logarithm of CEO compensation. The sample period is 2005–2015 in columns (1) and (2) and 2005–2012 in columns (3) and (4). Columns (1) and (3) use ROS as the performance measure, and columns (2) and (4) use ROA. All regressions include firm fixed and year fixed effects. Standard errors are adjusted for clustering at the year and firm level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively. All variables are defined in Appendix 1.

Variable	Sample period 2005–2015		Sample period: 2005–2012	
	(1) ROS	(2) ROA	(3) ROS	(4) ROA
Performance	0.386***	1.776***	0.287***	1.579***
	(4.663)	(8.067)	(3.660)	(6.798)
Performance×After2009	-0.023	0.216	0.046	0.254
	(-0.247)	(0.738)	(0.441)	(0.914)
Performance×D_CSOE	1.475***	1.925***	1.500***	2.054**
	(4.049)	(3.204)	(3.858)	(3.260)
D_CSOE×After2009	-0.073	-0.089	-0.044	-0.040
	(-1.379)	(-1.542)	(-0.895)	(-0.703)
Performance×D_CSOE×After2009	-1.155**	-1.817***	-0.860*	-1.912*
	(-2.905)	(-3.211)	(-1.937)	(-2.219)
Log(total assets)	0.214***	0.212***	0.218***	0.218***
	(9.187)	(9.021)	(7.445)	(7.792)
Market to book ratio	0.007*	0.005	0.007	0.006
	(1.876)	(1.489)	(1.795)	(1.602)
Number of observations	12421	12421	8927	8927
Adjusted R^2	0.668	0.674	0.695	0.700
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

Table 8. Effect of pay regulation on perks

This table presents the regression results for the effect of pay regulation on perk consumption. The dependent variable is the logarithm of perk consumption. The sample period is 2005–2012 in column (5) and 2005–2015 in all other columns. All regressions include firm fixed and year fixed effects. Standard errors are adjusted for clustering at the year and firm level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively. All variables are defined in Appendix 1.

	(1)	(2)	(3)	(4)	(5)
D_CSOE×After2009		0.224*	0.228*		
		(1.945)	(2.126)		
D_CSOE×After2012			-0.010		
			(-0.125)		
Pay_Cut_High×After2009				0.400**	0.403**
				(2.716)	(2.531)
Pay_Cut_Low×After2009				0.039	0.072
				(0.229)	(0.468)
Log(total assets)	0.310***	0.303**	0.303**	0.287**	0.227*
	(3.356)	(3.157)	(3.164)	(3.041)	(2.048)
Log(total wages)	0.399***	0.402***	0.402***	0.417***	0.448***
	(5.217)	(5.287)	(5.293)	(5.575)	(5.663)
Number of observations	1504	1504	1504	1504	1049
Adjusted R^2	0.847	0.848	0.848	0.849	0.856
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes

Table 9. Effect of pay regulation on tunneling

This table presents the regression results for the effect of pay regulation on tunneling. The dependent variable is the logarithm of net other receivables. The sample period is 2005–2012 in column (5) and 2005–2015 in all other columns. All regressions include firm fixed and year fixed effects. Standard errors are adjusted for clustering at the year and firm level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively. All variables are defined in Appendix 1.

	(1)	(2)	(3)	(4)	(5)
D_CSOE×After2009		0.201*	0.135		
		(1.959)	(1.282)		
D_CSOE×After2012			0.134		
			(1.728)		
Pay_Cut_High×After2009				0.375**	0.293*
				(2.917)	(2.054)
Pay_Cut_Low×After2009				0.029	-0.054
				(0.238)	(-0.454)
Log(total assets)	0.975***	0.973***	0.973***	0.972***	1.041***
	(13.465)	(13.487)	(13.484)	(13.500)	(10.981)
Return on sales	-0.972***	-0.964***	-0.965***	-0.961***	-0.818**
	(-4.851)	(-4.868)	(-4.872)	(-4.864)	(-3.474)
Block ownership	-0.007	-0.007	-0.007	-0.007	-0.004
	(-1.585)	(-1.601)	(-1.603)	(-1.624)	(-0.895)
Number of observations	12331	12331	12331	12331	8857
Adjusted R^2	0.709	0.709	0.709	0.710	0.721
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes

Table 10. Effect of pay regulation on firm performance

This table presents the regression results for the effect of pay regulation on firm performance. The dependent variables are return on sales in columns (1) to (3) and return on assets in columns (4) to (6). All regressions include firm fixed and year fixed effects. Standard errors are adjusted for clustering at the year and firm level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively. All variables are defined in Appendix 1.

Variable	ROS			ROA		
	(1)	(2)	(3)	(4)	(5)	(6)
D_CSOE×After2009	-3.506**	-3.862**		-1.116	-1.122	
	(-2.345)	(-2.343)		(-1.779)	(-1.657)	
D_CSOE×After2012		0.731			0.013	
		(0.553)			(0.026)	
Pay_Cut_High×After2009			-4.539**			-1.575*
			(-2.861)			(-2.004)
Pay_Cut_Low×After2009			-2.466			-0.654
			(-1.210)			(-0.787)
Number of observations	12421	12421	12421	12421	12421	12421
Adjusted R^2	0.414	0.414	0.414	0.467	0.467	0.467
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 11. Effect of financial crisis on CEO compensation, perks, and tunneling

This table presents the regression results for the effect of the 2008 financial crisis on CEO compensation, perks, and tunneling. The dependent variables are the logarithm of CEO compensation in columns (1) and (2), the logarithm of perks in columns (3) and (4), and the logarithm of net other receivables in columns (5) and (6). All regressions include firm fixed and year fixed effects. Standard errors are adjusted for clustering at the year and firm level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively. All variables are defined in Appendix 1.

Variable	Compensation		Perk consumption		Tunneling	
	(1)	(2)	(3)	(4)	(5)	(6)
D_CSOE×After2008	-0.146**		0.210		0.192	
	(-2.379)		(1.470)		(1.682)	
Performance_High× After2008		-0.076		0.178		0.184
		(-1.049)		(1.046)		(1.326)
Performance_Low× After2008		-0.214**		0.240		0.199
		(-2.436)		(1.244)		(1.401)
Log(total assets)	0.213***	0.212***	0.304***	0.303**	0.953***	0.953***
	(9.270)	(9.257)	(3.176)	(3.159)	(13.779)	(13.775)
Return on sales	1.969***	1.946***			-2.906***	-2.904***
	(12.674)	(12.429)			(-5.401)	(-5.387)
Market to book ratio	0.005	0.005				
	(1.451)	(1.448)				
Log(total wages)			0.400***	0.403***		
			(5.314)	(5.237)		
Block ownership					-0.007	-0.007
					(-1.626)	(-1.646)
Number of observations	12421	12421	1504	1504	12358	12358
Adjusted R^2	0.673	0.673	0.848	0.848	0.752	0.752
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Backfire on CEO Pay Restriction: Evidence from China

Internet Appendix

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This version: November 2017

1. Summary

The internet appendix reports additional results from the robustness tests in Section 5. Table IA1 reports results using top 3 executive compensation as a measure of compensation (Section 5.2). Table IA2 presents results using entertainment and travel costs as proxy for perk (Section 5.3). Table IA3 uses related party transactions as a measure of tunneling (Section 5.4). Table IA4 reports results after excluding financial firms from the sample (Section 5.5).

Table IA1. Top 3 executive compensation as the measure of compensation

This table presents the results using top 3 executive compensation as a measure of compensation. The dependent variable is the average compensation of top 3 most paid executives in logarithm in columns (1) to (3), perk in logarithm in column (4), net other receivables in logarithm in column (5), and return on sales (ROS) in column (6). Each column repeats the main regression specification in Tables 5 to 10 where the table and column numbers are presented below the column number. Pay_Cut_High and Pay_Cut_Low are dummy variables based on the median of changes in top 3 executive compensation around 2009 in CSOEs. All regressions include firm fixed and year fixed effects. Standard errors are adjusted for clustering at year and firm levels. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively. All variables are defined in Appendix 1.

Dependent	(1)	(2)	(3)	(4)	(5)	(6)
	Column (3) Table 5	Column (3) Table 6	Column (1) Table 7	Column (4) Table 8	Column (4) Table 9	Column (3) Table 10
	Log(top 3 compensation)			Perk	Tunneling	ROS
D_CSOE×After2009	-0.116**	-0.137*	-0.079			
	(-2.671)	(-2.039)	(-1.781)			
D_CSOE×After2012	-0.065*	-0.076				
	(-2.092)	(-1.757)				
Pay_Cut_High×After2009				0.348**	0.374**	-4.688**
				(2.512)	(2.814)	(-2.949)
Pay_Cut_Low×After2009				0.101	0.030	-2.315
				(0.607)	(0.252)	(-1.136)
ROS×D_CSOE×After 2009			-0.750**			
			(-2.395)			
ROS×After 2009			-0.076			
			(-1.078)			
ROS×D_CSOE			0.959***			
			(4.484)			
ROS	0.313***	0.365**	0.332***		-0.961***	
	(6.671)	(2.798)	(4.869)		(-4.865)	
Total assets	0.234***	0.200**	0.239***	0.290**	0.972***	
	(12.893)	(3.169)	(12.992)	(3.069)	(13.507)	
Market to book ratio	-0.000	-0.001	-0.000			
	(-0.165)	(-0.137)	(-0.181)			
Total wage				0.413***		
				(5.545)		

Block ownership					-0.007 (-1.623)	
Number of observations	12421	1504	12421	1504	12331	12421
Adjusted R2	0.809	0.820	0.810	0.848	0.710	0.414
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Table IA2. Entertainment and travel costs (ETC) as a measure of perk consumption

This table presents regression results of the impact of pay regulation on perk consumption. The dependent variable is the logarithm of entertainment and travel costs. The sample period is 2005–2012 in column (5) and 2005–2015 in all other columns. All regressions include firm fixed and year fixed effects. Standard errors are adjusted for clustering at year and firm levels. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively. All variables are defined in Appendix 1.

	Log (entertainment and travel costs)				
	(1)	(2)	(3)	(4)	(5)
D_CSOE×After2009		0.266*	0.326**		
		(1.962)	(2.798)		
D_CSOE×After2012			-0.125		
			(-1.421)		
Pay_Cut_High×After2009				0.501**	0.518**
				(2.934)	(2.866)
Pay_Cut_Low×After2009				0.027	0.163
				(0.144)	(1.059)
Total assets	0.360***	0.352***	0.349***	0.331***	0.259**
	(3.971)	(3.748)	(3.772)	(3.729)	(2.572)
Total wage	0.437***	0.439***	0.441***	0.458***	0.466***
	(5.095)	(5.164)	(5.204)	(5.659)	(5.910)
Number of observations	1464	1464	1464	1464	1027
Adjusted R^2	0.838	0.840	0.840	0.843	0.854
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes

Table IA3. Related party transactions as a measure of tunneling

This table presents regression results of the impact of pay regulation on tunneling. The dependent variable is the logarithm of the sum of other accounts receivables from the "Related Party Relationships and the Business Transactions" section in annual reports. The sample period is 2005–2012 in column (5) and 2005–2015 in all other columns. All regressions include firm fixed and year fixed effects. Standard errors are adjusted for clustering at year and firm levels. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively. All variables are defined in Appendix 1.

	Log (other accounts receivables)				
	(1)	(2)	(3)	(4)	(5)
D_CSOE×After2009		1.189*	0.817		
		(1.921)	(1.400)		
D_CSOE×After2012			0.763*		
			(2.046)		
Pay_Cut_High×After2009				1.652*	1.723*
				(1.869)	(2.259)
Pay_Cut_Low×After2009				0.724	-0.071
				(1.006)	(-0.091)
Total assets	1.437***	1.423***	1.424***	1.421***	1.211***
	(6.381)	(6.387)	(6.391)	(6.399)	(4.807)
Return on sales	-2.495***	-2.451***	-2.454***	-2.443***	-1.888**
	(-3.986)	(-3.987)	(-3.997)	(-3.987)	(-2.577)
Block ownership	0.033	0.033	0.033	0.033	0.051*
	(1.443)	(1.425)	(1.423)	(1.467)	(1.988)
Number of observations	12421	12421	12421	12421	8927
Adjusted R^2	0.462	0.462	0.462	0.462	0.486
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes

Table IA4. Results using the sample without financial firms

This table presents regression results after excluding financial firms from the sample. The dependent variable is the CEO compensation in logarithm in columns (1) to (3), perk in logarithm in column (4), net other receivables in logarithm in column (5), and return on sales (ROS) in column (6). Each column repeats the main regression specification in Tables 5 to 10 where the table and column numbers are presented below the column number. All regressions include firm fixed and year fixed effects. Standard errors are adjusted for clustering at year and firm levels. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively. All variables are defined in Appendix 1.

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent	Column (3) Table 5	Column (3) Table 6	Column (1) Table 7	Column (4) Table 8	Column (4) Table 9	Column (3) Table 10
	Log(CEO compensation)			Perk	Tunneling	ROS
D_CSOE×After2009	-0.128**	-0.169*	-0.052			
	(-2.590)	(-2.154)	(-1.037)			
D_CSOE×After2012	-0.084	-0.001				
	(-1.667)	(-0.014)				
Pay_Cut_High×After2009				0.383**	0.291**	-4.943***
				(2.696)	(2.391)	(-3.201)
Pay_Cut_Low×After2009				0.102	-0.001	-2.276
				(0.580)	(-0.009)	(-1.074)
ROS×D_CSOE×After 2009			-1.338***			
			(-6.167)			
ROS×After 2009			-0.028			
			(-0.282)			
ROS×D_CSOE			1.826***			
			(6.854)			
ROS	0.409***	0.581**	0.382***		-0.840***	
	(7.662)	(2.863)	(4.331)		(-4.797)	
Total assets	0.194***	0.064	0.200***	0.309***	1.059***	
	(8.542)	(1.169)	(8.907)	(3.395)	(16.418)	
Market to book ratio	-0.001*	0.001	-0.001*			
	(-2.107)	(0.131)	(-2.168)			
Total wage				0.420***		
				(5.684)		

Block ownership					-0.008** (-2.569)	
Number of observations	12218	1426	12218	1426	12218	12218
Adjusted R2	0.662	0.609	0.664	0.828	0.737	0.404
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes