The Determinants and Effects of Voluntary Adoption of a Cumulative Voting System: Evidence from China

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ABSTRACT: Using a unique sample of China's listed firms, we find that firms with strong corporate governance are more likely to adopt the Cumulative Voting System (CVS) and CVS adoption improves firm performance. Further analyses show that the positive relationship between CVS adoption and firm performance is more significant for firms with less mutual funds' ownership, in a weak firm information environment, and whose managers have more power. Finally, we find three channels – professionalism of board directors, controlling shareholders' expropriation, and managerial entrenchment- through which CVS adoption affects firm performance. This study enriches the literature on corporate governance in general and the literature on the principal-principal problems in particular. Our findings also have important policy implications for minority shareholder protection.

Keywords: cumulative voting system; principal-principal problems; expropriation; firm performance; managerial entrenchment

JEL classification: G23, G32, G34, G38

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1. Introduction

Firms in emerging markets such as China often have highly concentrated corporate ownership structures in which controlling shareholders frequently seek to extract private benefits at the expense of minority shareholders (i.e., the principal-principal problems) (Shleifer and Vishny, 1997; La Porta et al., 1998). The limited protection of minority rights and low corporate transparency in Asia exacerbates the expropriation of minority shareholders (Claessens and Fan, 2002).

Shareholders' meetings and the board of directors are perhaps the two most important of all of the corporate governance mechanisms. Shareholder voting and board representation are an important means by which shareholders participate in corporate governance to protect their interests. In this study, we examine the determinants and effects of the voluntary adoption by China's listed firms of a cumulative voting system (CVS), which is designed to give a degree of control to minority shareholders and increase minority shareholder representation on the boards.

Before 2002, almost all of China's listed firms used a straight voting system to elect their directors.[1]

[1] China Vanke Co., Ltd (Stock ID: 000002) and Foshan Electrical and Lighting Co., Ltd. (Stock ID: 000541) adopted the CVS in 1988 and 2000, respectively.

Under this system, each shareholder votes according to the number of shares s/he owns for as many candidates as may be elected. If two directors are to be elected, the shareholder may vote dependent on the number of shares s/he owns for each of the two candidates. Under this procedure, a shareholder who owns a majority of the shares in a particular election can elect the entire board of directors.

In 2002, the China Securities Regulatory Committee (CSRC) introduced *the Code of Corporate Governance for Listed Firms in China*, which stipulated provisions for the protection of investors' interests and rights, including the CVS. The CSRC required listed firms whose controlling shareholders hold over 30% of the total number of shares to adopt the CVS. In 2006, the CVS was incorporated into the newly amended *Corporate Law*.[2] Under the CVS, each shareholder receives a block of votes equal to the number of shares s/he owns multiplied by the number of directors to be elected. The shareholder may then cast his entire block for a candidate or may distribute his votes among any number of candidates in whatever proportion s/he desires. Therefore, with the CVS it is possible for minority shareholders to elect one or more board members even if a controlling shareholder opposes their election (Bhagat and Brickley, 1984).

The 2002 Code of Governance does not require firms whose controlling shareholders hold less than 30% of the total number of shares to adopt the CVS. That is, the CVS is optional for these firms. However, between 2002 and 2005, 143 listed firms voluntarily adopted the CVS even though they did not meet the shareholding criteria.[3] Using these firms as the unique sample, this paper examines the determinants and effects of voluntary adoption of the CVS.

[2] We collected the data and found that more than 90% of listed firms adopted the CVS after 2006.

[3] For convenience, we refer to the firms that adopted the CVS during 2002-2005 as "CVS-adopting firms" and firms that did not adopt the CVS as "non-adopting firms".

It is particularly important to identify corporate governance factors associated with voluntary CVS adoption to inform securities regulators of the demand for and (dis)incentives against CVS adoption. On the one hand, compared with firms with strong corporate governance, firms with weak corporate governance may be under greater regulatory pressure and minority shareholders in such firms have stronger desire to protect their benefits. If such pressure and desire are sufficiently high, it is likely for these firms to adopt the CVS. On the other hand, it is more likely for firms with strong corporate governance to adopt the CVS because monitoring agents like institutional investors (e.g., mutual funds) and independent directors may push them to adopt new corporate governance mechanisms. Identifying the corporate governance determinants of CVS adoption may assist regulators to gauge the likelihood of success of the CVS, any potential impediments or favorable factors, and the strategies necessary to make the system successful. Furthermore, by finding out whether the CVS is effective in protecting shareholder benefits and how it does, regulators can decide whether CVS adoption should be a mandatory requirement for all listed firms in China. It can also help minority investors to make appropriate investment decisions by focusing on CVS-adopting firms.

To investigate the determinants of CVS adoption, we focus on corporate governance variables that potentially affect the voluntary adoption of the CVS. We find that firms with strong corporate governance (in terms of mutual funds ownership and board independence) are more likely to adopt the CVS.

Adopting propensity score matching (PSM) and difference-in-differences (DID) analysis, we find that CVS adoption improves firm performance. Moreover, we explore the moderating factors that influence the positive association between CVS adoption and firm performance and find that this relationship becomes more significant for firms in a weak firm information environment, with less mutual

funds' ownership, and whose managers have more power.

Finally, we identify three channels – professionalism of board directors, controlling shareholders' expropriation, and managerial entrenchment – through which CVS adoption affects firm performance.

Our study differs from the prior studies in two ways. First, contrary to the findings of Xi and Chen (2014), Chen and Du (2015), and Chen et al. (2015), our study empirically demonstrates that CVS adoption can help curb the conflicts between controlling-minority shareholders and improve firm performance by increasing the number of directors with professional experience, mitigating controlling shareholders' expropriation, and constraining managerial entrenchment. In this regard, our study enriches the literature on corporate governance in general and the literature on the principal-principal problems in particular. As the expropriation of minority shareholders is common in China's listed firms, our findings are important to researchers and regulators interested in resolving the principal-principal problems.

Second, contrary to Xi and Chen (2014), Chen and Du (2015), and Chen et al. (2015), we focus on voluntary CVS adoption during the period 2002-2005. Compared with compulsory adoption, voluntary adoption is more interesting as it shows what firms are likely to be the first movers and whether there are economic consequences of doing so. When examining the effects of CVS adoption, we combine the PSM and DID methods to address endogeneity issues arising from omitted unobservable variables and reverse causality. As an overwhelming majority of listed firms adopt the CVS from 2005 (Xi and Chen, 2014), examining the voluntary adoption of the CVS during 2002-2005 helps us find out an appropriate matched sample which did not voluntarily adopt the CVS during that period.

The remainder of the paper is organized as follows. We introduce the institutional background and discuss principal-principal problems in relation to the CVS in Section 2, develop hypotheses in Section

3, introduce the research design in Section 4, discuss the empirical results in Section 5, examine the moderating effects of firm information environment, mutual funds' ownership, and managerial power in Section 6, and explore channels through which CVS adoption affects firm performance in Section 7. Section 8 concludes the paper.

2. Institutional background

2.1. Principal-principal problems in China's listed firms

Traditionally, agency theory focuses on the agency relationship and divergent interests between the principal and the agent in the context of diffused ownership (Jensen and Meckling, 1976). However, emerging economies are characterized by dominant ownership (in the form of state ownership, family ownership, pyramid ownership, or a combination of these). Weak corporate governance structures, often found in emerging economies like China, potentially create severe principal-agent problems. High ownership concentration is seen as a way to alleviate such problems (Dharwadkar et al., 2000). However, dominant ownership, coupled with weak corporate governance and limited investor protection, nurtures a new set of agency problems: principal-principal problems. In such a setting, controlling shareholders are in a position to exert a great deal of influence on their companies' operations, and obtain private benefits of control at the expense of minority shareholders. In a concentrated ownership structure, corporate managers usually represent controlling shareholders and thus make the principal-principal problems more pronounced (Firth et al., 2011).

China is one of the largest emerging markets, but its government still plays a decisive role in its economy. Government ownership is prevalent as most listed firms were previously state-owned enterprises (SOEs) whose largest shareholders are their parent groups, with further ownership stakes held

123 by government agencies. Minority tradable shares are mainly held by over 70 million individuals and
124 mutual funds. Given that government agencies have effective control over all company decisions,
125 corporate governance is not well established (Sun et al., 2013) and fraudulent activities are increased.
126 Due to the lack of effective monitoring mechanisms, the controlling shareholders and the management
127 usually possess excessive control over the company. This facilitates immoral behavior aimed at pursuing
128 private gains rather than the best interests of the company and shareholders. Hence, the main agency
129 problems become the expropriation of minority shareholders by controlling shareholders. Indeed,
130 previous studies have reported that large shareholders in China can extract cash by selling assets, goods,
131 or services to the company through self-dealing transactions; obtaining loans on preferential terms;
132 transferring company assets to other companies under their control; and diluting the interests of minority
133 shareholders by acquiring additional shares at a preferential price (Wang, 2015).

134 *2.2. Adopting the CVS to protect the interests of minority shareholders*

135 Since 1997, the Chinese government has taken various measures to protect minority investors from
136 controlling shareholders' expropriation through a series of regulations.[4] CVS adoption is one of the
137 means to improve minority shareholder protection. In January 2002, the CSRC issued *the Code of*
138 *Corporate Governance for Listed Companies in China*. Article 31 of this *Code* states that "the election
139 of directors shall adequately reflect the opinions of minority shareholders and the CVS shall earnestly be
140 promoted at the shareholders' meeting to elect directors. Listed companies with a controlling shareholder
141 owning more than 30 percent of the outstanding shares shall adopt the CVS." It is the first time when
142 Chinese regulators put forward the CVS in this Code. In 2006, the CVS was incorporated into the newly

[4] See Jiang et al. (2010) for a detailed summary of regulatory reforms and policies.

amended China's *Corporate Law* and recognized as a statutory rule. *The Corporate Law* (2006) sets out in Article 106 that when listed firms elect board directors or supervisory directors at shareholders' meetings, they may adopt the CVS according to their articles of association or resolutions of shareholders' meetings.

La Porta et al. (2000) argue that granting more voting rights to minority shareholders can curb the expropriation from controlling shareholders. Under the CVS, minority shareholders can cast all of their voting rights for one or several of their favored candidates and increase their representation on the boards. For example, if an election is for two directors and a shareholder owns 200 shares (one vote per share). Under a straight voting system, the shareholder has a maximum of 200 shares for each candidate (and 400 votes in total. With a CVS, all 400 votes could be cast for one candidate, or divided whichever way the shareholder chooses. Therefore, it is possible for minority shareholders to elect one or more board members even if a controlling shareholder opposes their election.

The ability of minority shareholders to elect "representative" directors is particularly important in China. Although China has introduced independent directors to the board of directors and requires listed firms to establish supervisory boards, the available evidence on the effectiveness of their monitoring roles is mixed. Furthermore, China is a civil-law country where the legal protection of minority shareholders is weak (Chen et al., 2009). Private securities litigation (PSL) was not allowed until the promulgation of a specific PSL rule by the Supreme People's Court in 2002, but the enforcement of this rule is often clouded by the dilemma of protecting listed SOEs and defrauded minority shareholders, and by the undue influence of local government in protecting local interests (Zou et al., 2008). In contrast, directors elected by the CVS to represent the minority shareholders have greater incentives to exercise

their rights. Minority representation on the boards may add independent critical scrutiny of controlling shareholders-dominated firms and sometimes presents a prior constraint on illegal behavior, thus enhancing the protection of minority shareholders (Feinerman, 2007).

Moreover, concentrated ownership structures are common in Chinese firms, minority shareholders are always passive and usually do not attend shareholders' meetings due to their limited shareholdings. Even if they attend and speak at meetings, controlling shareholders tend to ignore them. However, if a firm adopts the CVS, minority shareholders can elect "representative" directors and mitigate controlling shareholders' expropriation. For example, Gree Electric Appliances, Inc. of Zhuhai, a listed Chinese firm (Stock ID: 000651), adopted the CVS to elect board directors at the shareholders' meeting held in May 2012. With the CVS, the minority shareholders, mainly institutional investors, elected their "representative" director and a candidate recommended by the controlling shareholders was voted out (Liu, 2012). This greatly encourages minority shareholders, especially institutional investors, to actively take part in the corporate governance of listed companies.

3. Hypotheses development

3.1. The competing hypotheses on the corporate governance determinants of CVS adoption

China's listed firms usually have concentrated ownership structure. Controlling shareholders and the management often possess excessive control over the company and seek to extract private benefits at the expense of minority shareholders. CVS seems an effective corporate governance mechanism to protect minority shareholders. With the CVS it is possible for minority shareholders to elect their 'representative' directors even if controlling shareholder opposes their election. Minority representation on the boards may add independent critical scrutiny of the controlling shareholder and improve the protection of

minority shareholders.

On the one hand, the CSRC has made great efforts to improve the corporate governance of listed firms by issuing *the Code of Corporate Governance for Listed Companies in China* in 2002 and requiring listed firms to comply with the *Code*. Accordingly, compared with firms with strong corporate governance, firms with weak corporate governance may suffer more regulatory pressure. Meanwhile, minority shareholders in firms with weak corporate governance may have stronger desire to protect their benefits. As CVS adoption may increase minority shareholder monitoring and curb controlling shareholder entrenchment, it is more likely for firms with weak corporate governance to adopt the CVS so that they can benefit more from an earlier adoption.

On the other hand, it is more likely for firms with strong corporate governance to adopt the CVS because they may be pushed by such monitoring agents as institutional investors (e.g., mutual funds) and independent directors to adopt new corporate governance mechanisms. This is plausible because under the CVS minority shareholders can elect their "representative" directors to mitigate controlling shareholders' expropriation or managerial entrenchment.

Therefore, we propose two competing hypotheses relating to the corporate governance determinants of CVS adoption:

H1a: *Ceteris paribus*, firms with weak corporate governance are more likely to adopt the CVS.

H1b: *Ceteris paribus*, firms with strong corporate governance are more likely to adopt the CVS.

3.2. The hypothesis on the impact of CVS adoption on firm performance

We then explore the impact of CVS adoption on financial performance. Agency theory (Jensen and Meckling, 1976) suggests that a better-governed firm should have better performance and a higher

valuation due to lower agency costs. This prediction is supported by many empirical studies. For example, Brown and Caylor (2006) find that better-governed U.S. firms have a higher return on equity, a higher return on assets, and higher Tobin's Q. Sami et al. (2011) find a positive relationship between corporate governance and firm performance.

The objective of the CVS is to improve the protection of minority shareholders by increasing minority representation on the boards and monitoring and alleviating controlling shareholders' expropriation and managerial entrenchment. To the extent that CVS adoption improves corporate governance, and ultimately, firm performance, we expect the CVS-adopting firms to outperform the control firms. Hence, we hypothesize:

H2: *Ceteris paribus*, CVS-adopting firms have better performance than non-adopting firms.

4. Research design

4.1. Sample selection

Our sample initially comprised all companies listed on the Shanghai Stock Exchange and the Shenzhen Stock Exchange between 2002 and 2005. We then applied the following restrictions: (1) the percentage of shareholdings held by controlling shareholders during the sample period was less than 30%; (2) a firm was excluded if it did not make an announcement on whether it adopted the CVS or not between 2002 and 2005; (3) a firm that adopted the CVS in its IPO year was excluded to ensure that all firms have data for the years both before and after CVS adoption when we adopt the DID analysis to examine the effect of CVS adoption in Section 5; (4) a firm was excluded if it adopted the CVS in 2006 as the sample period is between 2002 and 2005 and we use one-year window when conducting DID analysis; and (5) a firm/year should not have missing data.

The above criteria yielded a usable sample of 335 firms (1265 observations), including 129 adopting firms and 206 non-adopting firms.[5] From 2002, the CSRC required listed firms to adopt the CVS when the shareholding percentage held by controlling shareholders is over 30%. The CVS was incorporated into the newly amended *Corporate Law* in 2006. Almost all firms adopted the CVS after the new *Corporate Law* became effective from January 1, 2006.

The announcements of CVS adoption are manually collected from articles of associations via www.sina.com.cn. When selecting sample, we also check whether a firm's announcement of voluntary CVS adoption was associated with potentially confounding events, including earnings announcements, profit distributions, mergers and acquisitions, share issues, related party transactions, asset write-downs, termination of investment projects, granting managers more decision-making powers. We double-checked the data with www.cninfo.com.cn and the official websites of the Shanghai Stock Exchange and Shenzhen Stock Exchange. The portfolio composition data of mutual funds and the accounting and share price data used in this study are obtained from the WIND system and China Stock Market Accounting Research (CSMAR) system. The data are cross-checked for consistency.

4.2. The research design for the determinants of CVS adoption

To investigate the determinants of CVS adoption, we use the following probit regression model with a binary dummy *CVS adoption* as the dependent variable and possible testable variables affecting a firm's adoption of the CVS. To mitigate the potential endogeneity of explanatory variables with CVS adoption, we measure all independent variables in a one-period lag.

[5] During 2002-2005, 143 firms voluntarily adopted the CVS. Of these firms, 14 firms were excluded as they adopted the CVS in their IPO years. Therefore, the number of usable adopting firms in this study is 129.

$$Prob(CVS\ adoption_{i,t}=1 \mid x) = \alpha_0 + \alpha_1 Top1_{i,t-1} + \alpha_2 State\ control_{i,t-1} + \alpha_3 Mutual\ funds'\ ownership_{i,t-1} + \alpha_4 Board\ independence_{i,t-1} + \alpha_5 Duality_{i,t-1} + \alpha_6 Related\ party\ transaction_{i,t-1} + \alpha_7 Sanction_{i,t-1} + \alpha_8 Tobin's\ Q_{i,t-1} + \alpha_9 Leverage_{i,t-1} + \alpha_{10} Firm\ szie_{i,t-1} + \alpha_{11} CVS\ imitation_{i,t-1} + \sum Industry + \sum Year + \varepsilon_{i,t} \quad (1)$$

where α_i represents regression coefficients, ε is an error term. *CVS adoption* is a dummy variable that equals 1 when a firm adopts the CVS in year *t*, 0 otherwise. Following prior studies (e.g., Jiang et al., 2010; Wang, 2015), we include the seven proxies for corporate governance:

Large shareholders (*Top 1*): Large shareholders who gain effective control of a firm's management have greater incentives to pursue their own interests at the expense of minority investors (e.g., Shleifer and Vishny, 1997). Prior studies in China have reported that large shareholders extract cash through opportunistic behaviors which greatly harm listed firms' operations and the benefits of minority shareholders (e.g., Jiang et al., 2010). Therefore, large shareholders may be more resistant to adopting the CVS, because the CVS may inhibit them from electing their preferred directors to the board and harm their interests. *Top1* is measured as the proportion of shares owned by the largest shareholder.

State control (*State control*): State ownership is prevalent as most listed Chinese companies were previously state-owned enterprises (SOEs). As the ultimate owner, the state has the power to intervene in the operations of SOEs. However, evidence has been produced that state ownership has not been an effective governance mechanism in China and it contributes to inefficient monitoring, higher executive pay, poor operating efficiency, and more acute agency problems (Gul, 1999). We therefore expect that a firm whose ultimate controlling owner is the state will attempt to maintain state control and be reluctant to adopt the CVS. *State control* is a dummy variable that equals 1 if the ultimate controlling owner is the

267 state, 0 otherwise.

268 Mutual funds' ownership (*Mutual funds' ownership*): Since 2000, mutual funds have emerged and
269 rapidly developed in China. Their emergence helps pool the share interests of individuals, strengthens
270 their bargaining power and monitoring of a firm's controlling shareholders and their agents (e.g.,
271 managers). Yuan et al. (2008) and Chan et al. (2014) find that mutual funds have played a positive role
272 in monitoring large shareholders and their agents. However, due to the short history of Chinese capital
273 market, it is likely that Chinese institutional investors have little power or desire to play their governance
274 role in firms which they own stocks (Tam, 2002; Jiang and Kim, 2013). Given the mixed evidence, we
275 do not predict the direction of this variable. *Mutual funds' ownership* is measured as the percentage of
276 common shares in a firm held by mutual funds at year-end.

277 Board independence (*Board independence*): Independent directors are considered as an important
278 corporate governance mechanism to protect the interests of investors, especially minority rights in China
279 (Wang, 2015). Some recent studies provide evidence that independent directors are effective in China.
280 For example, independent directors are found to increase bank performance and asset quality (Liang et
281 al., 2013), protect the interests of outside investors (Tang et al., 2013), and improve internal control
282 quality (Hu et al., 2017). However, there is also evidence to suggest that they are ineffective. For example,
283 Liu and Lu (2004) document that independent directors find it difficult to vote against their executive
284 director friends in China's *guanxi* culture. Given the mixed evidence, we do not predict the direction of
285 this variable. *Board independence* is measured as the proportion of independent directors on a firm's
286 board of directors.

287 CEO duality (*CEO duality*): Jensen (1993) argues that Chairman – CEO duality gives the CEO

288 excessive power over the decision-making process, plus scope to pursue personal interests at the expense
289 of shareholders. This duality compromises board independence and weakens its monitoring function
290 (Fama and Jensen, 1983). Indeed, Pi and Timme (1993) and Rechner and Dalton (1991) find negative
291 links between CEO duality and firm performance. However, stewardship theorists argue that CEO duality
292 encourages the CEO to act in the best interest of the firm and reduce the agency cost of duality
293 (Donaldson and Davis, 1991; Desai et al., 2003). Supporting this view, Cheung et al. (2006) find that
294 CEO duality is negatively related to undertaking value-destroying connected transactions. Therefore, we
295 do not predict the direction of this variable. *Duality* is a dummy variable that equals 1 if a firm's CEO is
296 also the chairperson of the board, 0 otherwise.

297 Related party transaction (*Related party transaction*): In firms with concentrated corporate ownership
298 structures, controlling shareholders frequently seek to extract private benefits at the expense of minority
299 shareholders (principal-principal problems) (La Porta et al., 1998). The limited protection of minority
300 rights and low corporate transparency exacerbates the expropriation of small shareholders (Claessens
301 and Fan, 2002). Numerous studies show that controlling shareholders often profit from minority
302 shareholders through related party transactions, particularly in emerging economies with poor protection
303 of minority shareholders (e.g., Berkman et al., 2009; Jiang et al., 2010; Wang, 2015). On the one hand,
304 as related party transactions are potentially detrimental to a firm's minority shareholders, firms engaging
305 in tunneling these transactions are more likely to adopt the CVS as they may be criticized by the CSRC.
306 On the other hand, because may curb their controlling shareholders' expropriation, these firms may be
307 less likely to adopt the CVS. Therefore, we do not predict the direction of this variable. *Related party*
308 *transaction* is dummy variable that equals 1 if a firm engages in related party transactions, 0 otherwise.

Sanction (*Sanction*): Prior administrative sanctions by the CSRC and/or stock exchanges indicate poor corporate governance and thus firms that have incurred such sanctions are under more regulatory pressure to improve their corporate governance and are more likely to adopt the CVS. *Sanction* is a dummy variable that equals 1 if a firm has been subject to CSRC disciplinary actions or if the firm has received reprimands from stock exchanges, 0 otherwise.

In addition, we control for the effect of the following firm characteristics, including firm performance (*Tobin's Q*),[6] financial leverage (*Leverage*), firm size (*Firm size*), CVS imitation (*CVS imitation*).[7] Finally, we control for the industrial fixed effect and dynamic changes in the macroeconomic environment common to all firms over the sample period, respectively. All continuous variables are winsorized at 1% at both tails and all variables are summarized in Appendix.

4.3. The research design for the impact of CVS adoption on firm performance

Recognizing the issue of endogeneity in evaluating the effects of CVS adoption, we control for the potential endogeneity between CVS adoption and firm performance by comparing a new CVS-adopting firms (treatment firms) with a sample of matched non-adopting firms (control firms) with the propensity to adopt the CVS. The primary benefit of using a control sample matched on propensity scores is that it allows us to more clearly attribute any observed effects to CVS adoption itself, rather than to the firm characteristics associated with the adoption (Armstrong et al., 2010).

The propensity-score matching proceeds as follows. For each year *t* with new CVS adoption,

[6] To be cautious with Tobin's Q as the proxy for firm performance in a nascent stock market, we use return on assets (ROA), return on sales (ROS), and return on investment (ROI) as three alternative performance measures in Section 5 to examine the effect of CVS adoption on firm performance.

[7] DiMaggio and Powerll (1983) argue that in situations where a clear course of actions is unavailable, organizational leaders may decide to mimic a peer perceived to be successful as response to uncertainty. CVS can be seen as an innovation of corporate governance and non-adopting firms will imitate the adopters to adopt the innovation so as to improve their competitiveness.

we include the new CVS-adopting firms in that year and set the dummy variable *NewCVS* to one for these new adopters; we set *NewCVS* in the same year to zero for firms that never adopt the CVS over the sample period. This completes the selection of observations for CVS adoption in year *t*, and we repeat this procedure for other CVS-adoption years and then pool together all the resulting firm-years. We then estimate a probit model based on this sample. The determinants of CVS adoption are the same as those in model (1). We conduct covariate imbalance checks by testing whether the means of the covariates used in model (1) differ between the treatment firms and control firms.

We then use the DID method to ensure that our results are not driven by cross-sectional heterogeneity between the treatment and control firms as well as common time trends that affect both groups of firms. We determine one year as the comparing window for DID analysis. Using a short window in DID analysis has two advantages: (1) the sample, by construction, purposefully focuses on adoption before 2006 to avoid the confounding effects caused by the *Corporate Law* in 2006, and (2) using a short window before and after CVS adoption in DID analysis can help reduce the confounding effects, making sure that the treatment firms and the matched control firms are comparable; in a longer window, many firm characteristics can change, especially in the post-adoption years. Finally, our sample includes 129 treatment firms and 129 control firms (258 sample firms in total). The observations in year 0 (the adoption years) and those with missing data are excluded, remaining 493 observations.

The basic empirical model is as follows:

$$ROA_{i,t} = \beta_0 + \beta_1 NewCVSfirm_{i,t} + \beta_2 Post_{i,t} + \beta_3 NewCVSfirm_{i,t} \times Post_{i,t} + \sum_{q=4}^{m} \beta_q Control\ variables_{i,t} + Year\ fixed\ effects + Industry\ fixed\ effects + \varepsilon \quad (2)$$

where *Return on assets* (*ROA*) is used to proxy for firm performance, which is measured as the net profit

348 divided by year-end total assets. *NewCVSfirm* is a dummy variable that equals 1 if a firm is a new CVS-
349 adopting firm during 2002-2005 and 0 otherwise. *Post* is a dummy variable that equals1 if the observation
350 is after the year of CVS adoption and 0 otherwise. *NewCVSfirm*×*Post* is an interaction term to pick up
351 the changes in the effects of the CVS-adopting firms relative to the matched control firms. The coefficient
352 on the interaction term (β_3) is our estimate of the effects. A significant β_3 means that CVS adoption
353 generates a difference between treatment firms and control firms. Note that if the firm fixed effects are
354 controlled for, the industry fixed effects will be deleted.

355 We take into account various factors that could affect firm performance in model (2). Following
356 prior studies (e.g., Yuan et al., 2008), we include the following control variables: state control (*State*
357 *control*), managerial ownership (*Managerial ownership*), ownership concentration (*Ownership*
358 *concentration*), financial leverage (*Leverage*), the percentage of tangible assets (*Tangibility*), and firm
359 size (*Firm size*). All continuous variables are winsorized at 1% at both tails and all variables are
360 summarized in Appendix.

361 **5. Empirical analyses**

362 *5.1. Descriptive statistics*

363 Descriptive statistics of the variables used in model (1) are reported in Panel A of Table 1. As Panel
364 A shows, 16.2% of firm/year observations adopted the CVS over the period of 2002-2005. The average
365 percentage of shareholdings held by the largest shareholders is 23.9%. 50.8% of sample firms are
366 ultimately controlled by the government. Mutual funds' ownership is relatively low, only accounting for
367 1.0% of the total number of shares in issue though it can be as high as 29.1% in some firms.

368 Panel A also presents that on average, 24.9% of board members are independent directors during

2001-2004, ranging from 0 to 55.6%. This is reasonable as the CSRC did not enact a formal, comprehensive guideline on independent directors of domestically listed firms until 2001. The regulations stipulated that boards must have at least two independent directors by 30 June 2002, and at least one-third of the board members should be independent directors by 30 June 2003. In 14.2% of firms CEOs and board chairmen are the same person, 84.4% of firm/year observations engage in related party transactions, 5.1% of sample firms have been subject to the CSRC disciplinary sanctions or received reprimands from stock exchanges. The firms in our sample have an average *Tobin's Q* of 2.450, an average leverage of 0.529, an average size of 20.832, and the cumulative percentage of firms adopting the CVS in the same province is 0.085.

<Insert Table 1 about here>

5.2. Correlation analysis

Table 2 reports the calculated Pearson correlation coefficients between variables in mode (1). *CVS adoption* is positively and significantly correlated with *Mutual funds' ownership*, *Board independence*, and *CVS imitation*, while negatively and significantly related to *state control* and *Tobin's Q*. Table 2 also shows that all the correlations between the independent variables are relatively low.

To further test the existence of multicollinearity, we compute the variance inflation factor (VIF) for independent variables and the largest is 1.84, well below the rule-of-thumb cutoff of 10.0 for multiple regression models (Kennedy, 1998). Thus, we conclude that multicollinearity is probably not a serious problem in our study.

<Insert Table 2 about here>

5.3. Multivariate Results on the determinants of CVS adoption

Table 3 reports the results of mode (1). As shown in Table 3, the coefficient on *Mutual funds' ownership* is positive and significant, which suggests that when a firm has a greater proportion of ownership held by mutual funds, it is more likely to adopt the CVS. This supports previous evidence that mutual funds can play an important governance role in monitoring controlling shareholders and their agents in China where a central agency problem is the principal-principal problems (Yuan et al., 2008).

CVS adoption is positively and significantly associated with board independence, indicating that independent directors are an important corporate governance mechanism to protect the interests of investors, especially minority rights in China.

In summary, the results are consistent with H1b that firms with strong corporate governance are more likely to adopt the CVS.

<Insert Table 3 about here>

5.4. The regression results on the impact of CVS adoption on firm performance

Based on the probit estimation, for each new ERP-adopter in a year, we select a non-adopter with the closest propensity score in the same year as the matched control firm. To confirm whether the matching is satisfactory, we check the covariate balance by comparing the means of the covariates used in matching and report the results in Table 4. As Table 4 shows, there is no significant difference in the means of any of the covariates between treatment and control firms, indicating that the propensity-score matched sample firms resemble the CVS-adopting firms along virtually all dimensions. In general, the results suggest that in comparing the CVS-adopting firms to control firms, we effectively control for the potential endogeneity linking CVS adoption and firm performance. Finally, we have 129 CVS-adopting firms during 2002-2005 and they are matched with 129 control firms.

<Insert Table 4 about here>

The regression results of model (2) are reported in Table 5. After controlling for firm fixed effects, we find that the coefficient on *NewCVSfirm*×*Post* in Column (1) remains positive and significant at the 5% level (t＝2.01). The finding indicates that the CVS-adopting firms outperform the control firms. Our hypothesis (H2) is supported.

To further substantiate our hypothesis, we use return on sales (*ROS*) and return on investment (*ROI*) as alternative measures of firm performance. We calculate *ROS* as net profit divided by sales and *ROI* as net profit divided by investment. The results, reported in Columns (2)-(3) of Table 5, are qualitatively unchanged.

<Insert Table 5 about here>

6. Heterogeneities in the effect of CVS adoption on firm performance

As discussed above, CVS provides minority shareholder protection through voting and hence it is an effective governance mechanism. Accordingly, we predict that the positive association between CVS adoption and firm performance is more pronounced for firms with less monitoring. In this section, we examine the moderating effects of mutual funds' ownership, firm information environment, and managerial power, using the following model:

$$ROA_{i,t} = \theta_0 + \theta_1 CVS\ adoption_{i,t} + \sum_{q=2}^{m} \theta_q Control\ variables_{i,t} + Year\ fixed\ effects + Firm\ fixed\ effects + \varepsilon \quad (3)$$

where θ_i represents regression coefficients, ε is an error term. *CVS adoption* is a dummy variable that equals 1 when a firm adopts the CVS, 0 otherwise. The control variables are the same as those in model (2). We use the sample of 129 treatment firms and control firms (258 firms in total) to examine the

moderating effects. All the variables are defined in Appendix.

6.1. The moderating effect of firm information environment

A strong information environment means low information asymmetry (Liao et al., 2018), hence resulting in lower agency problems. As the CVS tends to alleviate principal-principal problems in firms with concentrated ownership structures, we accordingly posit that the effect of CVS adoption on firm performance is more pronounced for firms in a weak information environment.

As financial analysts can reduce information asymmetry (He and Tian, 2013), we use the number of financial analysts following a firm (*Analysts*) to measure the quality of firm information environment. More analysts indicate a stronger information environment.

We divide the sample into two subsets: the subset in strong information environment with the number of financial analysts above the median of the same year and industry, and the subset weak information environment with the number of financial analysts below the median. We re-estimate model (3) with the two subsets separately. The results are reported in Columns (1) and (2) of Table 6. As we expected, the coefficient on *CVS adoption* for firms in weak information environment in Column (1) is positive and significant at the 1% level, while it is not significant for firms in strong information environment in Column (2). A test of the difference in regression coefficients on *CVS adoption* generates a *p*-value of 0.069 (two-tailed) between Columns (1) and (2). The result indicates that a strong firm information environment mitigates the impact of CVS adoption on firm performance.

6.2. The moderating effect of mutual funds' ownership

As we discuss above, mutual funds help pool the share interests of individuals, strengthens their bargaining power and provides monitoring of a firm's controlling shareholders and their agents (e.g.,

453 managers), therefore we predict that the effect of CVS adoption on firm performance is more pronounced
454 for firms with lower mutual funds' ownership.
455 We divide the sample into two subsets: the subset with higher mutual funds' ownership with the
456 ownership above the median of the same year and industry, and the subset with lower ownership with
457 the ownership below the median. We re-estimate model (3) with the two subsets separately. The results
458 are reported in Columns (3) and (4) of Table 6. As we expected, the coefficient on *CVS adoption* for
459 firms with lower mutual funds' ownership in Column (3) is positive and significant at the 1% level, while
460 it is not significant for firms with higher ownership in Column (4). A test of the difference in regression
461 coefficients on *CVS adoption* generates a *p*-value of 0.001 (two-tailed) between Columns (3) and (4).
462 The result indicates that the impact of CVS adoption on firm performance is more pronounced for firms
463 with lower mutual funds' ownership.
464 *6.3. The moderating effect of managerial power*
465 Jensen (1993) argues that Chairman–CEO duality provides the CEO with excessive power over the
466 decision-making process and the scope to pursue personal interests at the expense of shareholders. This
467 duality compromises board independence and weakens its monitoring function (Fama and Jensen, 1983).
468 In a similar vein, Lasfer (2006) argues that through their shareholdings, managers entrench their position
469 and weaken the monitoring power of a board. In a word, managers with more power tend to shield from
470 the monitoring from the board. Therefore, we predict that the perceived relationship between CVS
471 adoption and firm performance is more pronounced for firms with higher managerial power.
472 Following Hu et al. (2017), we use the principal components analysis (PCA) to construct an index to
473 represent managerial power. Following Hu and Kumar (2004) and considering China's practice, we

include five proxies for managerial power, i.e., *ownership concentration*, *managerial ownership*, *duality*, *board size*, and *board independence*. We retain the first factor that explains 87.6% of the five variables and use it to proxy for managerial power. A higher value of the index indicates higher managerial power.

We divide the sample into two subsets: the higher power subset with the power index above the median of the same year and industry, and the lower power subset with the power index below the median. We re-estimate model (3) with the two subsets separately. The results are reported in Columns (5) and (6) of Table 6. As we expected, the coefficient on *CVS adoption* for firms with higher managerial power in Column (6) is positive and significant at the 5% level, while it is not significant for firms with lower managerial power in Column (5). A test of the difference in regression coefficients on *CVS adoption* generates a *p*-value of 0.007 (two-tailed) between Columns (3) and (4). The result indicates that the positive impact of CVS adoption on firm performance is more significant for firms with high managerial power.

<Insert Table 6 about here>

Taken the above together, we find that the positive relationship between CVS adoption and firm performance becomes more significant for firms in a weak firm information environment, with less mutual funds' ownership, and whose mangers have more power.[8]

7. Channels through which CVS adoption affects firm performance

Our evidence suggests that firms adopting the CVS tend to have better performance, as can be seen from an improved ROA in Section 5. In this section, we seek to identify the channels through which CVS

[8] These heterogeneities found in the cross-sectional analysis also help lessen the concern that the positive effect of CVS adoption on firm performance is purely driven by endogeneity (Rajan and Zingales, 1998).

adoption could affect firm performance. We explore three possibilities: (1) whether CVS adoption increases the number of board directors with professional experience, (2) whether CVS adoption reduces controlling shareholders' expropriation, and (3) whether CVS adoption reduces managerial entrenchment. The professionalism of board directors may improve firm performance, while controlling shareholders' expropriation and managerial entrenchment may decrease firm performance, therefore, these three factors could be viable channels by which CVS adoption affects firm performance.

7.1 CVS adoption and the professionalism of board directors

Since CVS is mainly used to select board directors, CV adoption may result in the selection of more directors with professional experience to a firm's board and an improvement on the professionalism of board directors. As directors' professional experience helps them perform their monitoring and advisory roles better, increased board professionalism should lead to improved increasing firm performance (e.g., Adams et al., 2018; Drobetz et al., 2018).

We now test whether CVS adoption increases the professionalism of board directors. The dependent variable *Professionalism* is measured by the proportion of directors with professional experience in a firm's board of directors. Following Chen and Du (2015), we consider that a director has professional experience if he/she is a(n) economist, lawyer, and accountant, etc. Following Yuan and Wen (2018), we include the following control variables in the model: state control (*State control*), the shareholding of the largest shareholder (*Top1*), shareholdings held by mutual funds (*Mutual funds' ownership*), board size (*Board size*), board independence (*Board independence*), sales growth (*Sales growth*), return on assets (*ROA*), firm size (*Firm size*), and financial leverage (*Leverage*). We also control for year fixed effects and firm fixed effects. All continuous variables are winsorized at 1% at both tails and all variables are

summarized in Appendix. The results are reported in Table 7.

The results in Column (2) show that the coefficient on *CVS adoption* is positive and significant at the 1% level. This indicates that CVS adoption increases the proportion of directors with professional experience and improves the professionalism of board directors, hence leading to better performance.

<Insert Table 7 about here>

7.2. CVS adoption and controlling shareholders' expropriation

As we discuss above, CVS adoption protects the interests of minority shareholders by increasing the representation of minority shareholders in a board and mitigates controlling shareholders' expropriation. Therefore, we predict a negative association between CVS adoption and controlling shareholders' expropriation. Meanwhile, controlling shareholders' expropriation damages firm value (e.g., Lei and Song, 2011).

We now examine whether CVS adoption alleviate controlling shareholders' expropriation. Jiang et al. (2010) use inter-corporate lending used by controlling shareholders to measure the expropriation, which is reported as part of "Other Receivables" in annual reports, Wang and Xiao (2011) adopt the amount of cash transferred from listed companies to their controlling shareholders as another proxy of the expropriation, which is also disclosed in "Other Receivables". Hence, we use the ratio of the amount of other receivables to total assets (*Tunneling*) to measure controlling shareholders' expropriation.

We include the following control variables in the model: state control (*State control*), the shareholding of the largest shareholder (*Top1*), board size (*Board size*), board independence (*Board independence*), firm size (*Firm size*), return on assets (*ROA*), and financial leverage (*Leverage*). We also control for the year fixed effects and firm fixed effects. All continuous variables are winsorized at 1% at both tails and

all variables are summarized in Appendix. The results are reported in Table 8.

The results in Column (2) show that the coefficient on *CVS adoption* is negative and significant at the 5% level (*t*=-2.11). This indicates that CVS adoption mitigates controlling shareholders' expropriation, hence resulting in higher firm value.

<Insert Table 8 about here>

7.3. CVS adoption and managerial entrenchment

Based on the agency theory, managers tend to expropriate shareholders by diverting corporate resources for perquisites and empire building at the expense of shareholders (Jensen and Meckling, 1976; Jensen, 1989). This agency conflict between shareholders and managers becomes more intense when corporate management are entrenched (Pan, 2007).

As we discuss above, CVS adoption is one of effective corporate governance mechanisms and perceived to protect the interests of shareholders, especially minority shareholders. Therefore, we predict a negative association between CVS adoption and managerial entrenchment. Meanwhile, managerial entrenchment curtails shareholders' wealth (Jensen, 1986; Pan, 2007).

We now examine whether CVS adoption curbs managerial entrenchment. As perks may be created by managers to divert resources from the firm for their own private benefit (Jensen and Meckling, 1976; Yermack, 2006), we use abnormal perks as a proxy of managerial entrenchment. Following Gul et al. (2011), we read through the notes to the section of "other cash flows related to operating activities" in the statements of cash flows; for each firm, we manually collect the six items of perk expenses data.[9]

[9] The six items of perk expenses include expenses relating to traveling, business entertainment, overseas training, board meetings, company cars, and other meetings.

We add the six items together to get a firm's overall perk expenses and then standardize a firm's overall perk expenses by its sales (Perks/Sales). Finally, following Gul et al. (2011) and Xu et al. (2014), we employ the residuals from the following model to generate the abnormal perks (*abPerks6*), our main variable of interest.

$$Perks/Sales_{i,t} = \gamma_0 + \gamma_1 LnCompensation_{i,t} + \gamma_2 Lnassets_{i,t} + + \gamma_3 Lnincomepercapita_{i,t} + \varepsilon \quad (4)$$

where *Perks/Sales* is ratio of the sum of the six items of perk expenses divided by sales, *Lncompensation* is the natural logarithm of total compensation for all firm employees, *LnAsset* is the natural logarithm of the book value of total assets, and *Lnincomepercapita* is the natural logarithm of total income per capita of the region in which a firm is located. We run the regressions of model (4), the residuals are our main variable, *abPerks*6.[10]

We include the following variables in the model which may affect managerial entrenchment: state control (*State control*), power balance (*Power balance*), the percentage of A shares (*A share*), shareholdings held by mutual funds (*Mutual funds' ownership*), board independence (*Board independence*), return on assets (*ROA*), firm size (*Firm size*), and financial leverage (*Leverage*). We control for year fixed effects and firm fixed effects. All continuous variables are winsorized at 1% at both tails and all variables are summarized in Appendix. The results are reported in Columns (1)-(2) of Table 9.

The results show that the coefficient on *CVS adoption* is negative and significant at the 5% level (*t*=-2.57). This indicates that CVS adoption reduces managerial entrenchment, hence resulting in higher firm

[10] In addition to the six items of perk expenses in Note 8, work-related expenses and communication expenses may also be perk expenses. We use the eight items of perk expenses to generate an alternative abnormal perks (*abPerks8*). Using *abPerks8* as the dependent variable, we examine the impact of CVS adoption on abnormal perks and obtain results similar to those in Columns (1)-(2) of Table 9. The results are reported in Columns (3)-(4) of Table 9.

573 value.

574 <Insert Table 9 about here>

575 In sum, these results bolster our findings and help explain the link between CVS adoption and firm
576 performance. CVS adoption appears to be associated with more directors with professional experience,
577 less expropriation by controlling shareholders, and less managerial entrenchment.

578 **8. Conclusions**

579 In 2002, the CSRC required listed firms to adopt the CVS when over 30% of their total number of
580 shares were held by controlling shareholders, with the aim of improving fair minority representation and
581 protecting minority interests. However, 129 firms voluntarily adopted the CVS during 2002-2005, even
582 though they did not meet the shareholding requirement. This study examines why these firms voluntarily
583 adopted the CVS and whether CVS adoption affects firm performance.

584 Using this unique sample over the period 2002-2005, we find that firms with strong corporate
585 governance are more likely to voluntarily adopt the CVS and CVS adoption improves firm performance.
586 Further analyses show that the positive relationship between CVS adoption and firm performance is more
587 significant for firms in a weak firm information environment, with less mutual funds' ownership, and
588 whose mangers have more power. Finally, we find three channels – the professionalism of board directors,
589 controlling shareholders' expropriation, and managerial entrenchment - through which CVS adoption
590 affects firm performance.

591 Our study enriches the literature on corporate governance in general and on the principal-principal
592 problems in particular. It also has important policy implications. First, our findings suggest that in
593 countries where ownership is concentrated, CVS adoption is a useful way to protect the interests of

minority shareholders, because it reduces controlling shareholders' expropriation and managerial entrenchment. Second, in China, a further reduction of the influence of controlling shareholders over listed firms could be considered so as to limit the expropriation by controlling shareholders, thus improving investor protection.

615

616

617 **Appendix**

618 **Variable definitions**

619

Variables	Definitions
Variables in probit model (1)	
CVS adoption	A dummy variable that equals one if a firm adopts the cumulative voting system (CVS) in year *t* and zero otherwise
Top1	The proportion of shares held by the largest shareholder
State control	A dummy variable that equals one if the ultimate controlling shareholder of a listed firm is the state in year *t* and zero otherwise
Mutual funds' ownership	A firm's percentage of common shares held by mutual funds as of year-end
Board independence	The proportion of independent directors on a firm's board of directors
Duality	A dummy variable that equals one if a firm's CEO is also the chairperson of the board and zero otherwise
Related party transaction	A dummy variable that equals one if a firm engages in related party transactions and zero otherwise
Sanction	A dummy variable that equals one if a firm has been subject to the CSRC disciplinary sanctions, or a firm received reprimands from stock exchanges in year *t* and zero otherwise
Tobin's Q	The sum of the market value of equity and book value of total liabilities divided by book value of total assets. The market values of A and B shares are calculated based on the year-end share price
Leverage	Total liabilities divided by total assets
Firm size	The natural logarithm of book value of total assets
CVS imitation	Cumulative percentage of firms adopting the CVS in the same province as of year-end
Variables in DID model (2)	
Return on assets (ROA)	Net profit divided by year-end total assets
Return on sales (ROS)	Net profit divided by sales
Return on investment (ROI)	Net profit divided by investment
Managerial ownership	The percentage of common shares owned by managers and directors as of year-end
Ownership concentration	The sum of squared percentage of shares held by the top five shareholders
Tangibility	The sum of net fixed assets and inventory divided by total assets
NewCVSfirm	

Post	A dummy variable that equals one if a firm is a new CVS-adopting firm during 2002-2005 and zero otherwise
	A dummy variable that equals one if the observation is after the year of CVS adoption and zero otherwise
Other variables	
Analysts	A proxy for information environment. It is the number of financial analysts following a firm
Managerial power	An index to measure managerial power. We use the principal components analysis (PCA) to construct this index. Please see Section 6.3 for detail
Professionalism	A proxy for the professionalism of board directors. It is the proportion of directors with professional experience in a firm's board of directors. We consider that a director has professional experience if he/she is a(n) economist, lawyer, and accountant, etc
Tunneling	A proxy for controlling shareholders' expropriation. It is the ratio of other receivables divided by total assets
abPerks6	A proxy for managerial entrenchment. It is abnormal perks expenses, the residuals estimated from model (4) using six items of perk expenses. Please see section 7.2 for detail
abPerks8	A proxy for managerial entrenchment. It is abnormal perks expenses, the residuals estimated from model (4) using eight items of perk expenses. Please see Footnote No. 11 for detail
Board size	The number of directors in a firm's board of directors
Power balance	The natural logarithm of the ratio of the number of shares held by the largest shareholder divided by the sum of the number of shares held by the second to the fifth largest shareholders
Sales growth	The increased percentage of sales
A share	A firm's proportion of tradable A-shares as of year-end

This table contains the definitions of variables used in our analysis. All continuous variables are winsorized at 1% at both tails.

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Table 1

Descriptive statistics

Panel A: The variables in the probit model (1)						
Variables	N	Mean	Median	Std. Dev	Minimum	Maximum
CVS adoption	1265	0.162	0.000	0.369	0.000	1.000
Top1	1265	0.239	0.250	0.060	0.089	0.624
State control	1265	0.508	1.000	0.500	0.000	1.000
Mutual funds' ownership	1265	0.010	0.000	0.029	0.000	0.291
Board independence	1265	0.249	0.308	0.136	0.000	0.556
Duality	1265	0.142	0.000	0.349	0.000	1.000
Related party transaction	1265	0.844	1.000	0.363	0.000	1.000
Sanction	1265	0.051	0.000	0.221	0.000	1.000
Tobin's Q	1265	2.450	1.950	1.650	0.907	12.755
Leverage	1265	0.529	0.522	0.244	0.050	1.501
Firm size	1265	20.832	20.851	0.847	18.918	23.955
CVS imitation	1265	0.085	0.026	0.122	0.000	0.500
Panel B: Main variables in the performance model (2)						
Variables	N	Mean	Median	Std. Dev	Minimum	Maximum
Return on assets	493	0.002	0.019	0.091	-0.326	0.204
Return on sales	493	-1.709	0.275	8.745	-36.338	6.361
Return on investment	493	-0.073	0.037	0.447	-1.892	0.682
State control	493	0.513	1.000	0.500	0.000	1.000
Managerial ownership	493	0.024	0.000	0.102	0.000	0.748
Ownership concentration	493	0.083	0.078	0.042	0.014	0.331
Leverage	493	0.568	0.548	0.283	0.050	1.501
Tangibility	493	0.442	0.448	0.177	0.016	0.838
Firm size	493	20.875	20.865	0.948	18.918	23.855

This table reports the summary statistics of the main variables defined in Appendix and used in subsequent analyses. Panel A shows the summary statistics of the variables used in probit model (1) and Panel B shows the summary statistics of the main variables for performance model (2). Except for the variable of *CVS adoption* that is manually collected, the other variables are extracted from the CSMAR database and Wind system.

Table 2

Correlation coefficients

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
CVS adoption	1											
Top1	-0.028	1										
State control	-0.047*	-0.024	1									
Mutual funds' ownership	0.125***	-0.116***	-0.025	1								
Board independence	0.231***	-0.089***	-0.080***	0.054*	1							
Duality	0.012	-0.005	-0.081***	-0.046	-0.017	1						
Related party transaction	0.035	0.048*	0.091***	-0.001	0.029	-0.038	1					
Sanction	0.005	0.015	-0.079***	-0.025	-0.012	0.008	-0.009	1				
Tobin's Q	-0.144***	0.102***	-0.127***	-0.086***	-0.256***	0.024	-0.107***	0.036	1			
Leverage	-0.003	-0.017	-0.123***	-0.136***	0.105***	0.042	-0.042	0.132***	0.165***	1		
Firm size	0.023	-0.182***	0.105***	0.231***	0.085***	-0.014	0.119***	-0.071**	-0.605***	-0.057**	1	
CVS imitation	0.471***	-0.011	-0.029	0.139***	0.339***	0.012	0.060**	0.049*	-0.184***	0.100***	0.048*	1

This table presents the Pearson correlation coefficients on main variables defined in Appendix and used in probit model (1). *, **, ***: statistically significantly different from zero at the 0.10, 0.05 and 0.01 level (two-tailed), respectively.

Table 3

The determinants of CVS adoption: Pobit regressions

Prob(CVS adoption=1)	(1)	(2)	(3)
Top1	-0.045	-0.016	-0.501
	(-0.04)	(-0.01)	(-0.42)
State control	-0.145	-0.126	-0.114
	(-1.02)	(-0.86)	(-0.78)
Mutual funds' ownership	3.293**	3.439**	3.453**
	(2.15)	(2.20)	(2.07)
Board independence		1.329**	1.282*
		(2.01)	(1.86)
Duality		0.142	0.064
		(0.79)	(0.37)
Related party transaction		0.108	0.072
		(0.66)	(0.42)
Sanction		-0.171	-0.152
		(-0.79)	(-0.62)
Tobin's Q			-0.152**
			(-2.31)
Leverage			-0.485*
			(-1.65)
Firm size			-0.196*
			(-1.79)
CVS imitation			4.184***
			(7.40)
Year fixed effect	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes
N	1265	1265	1265
Pseudo R^2	0.176	0.182	0.279

This table reports the probit results from regressing CVS adoption on one-period lagged determinants. The variables are defined in Appendix. *t*-statistics in the brackets are based on standard errors adjusted for clustering at the firm level. The coefficients on the constant, year and industry fixed effects are omitted for brevity. *, **, ***: statistically significantly different from zero at the 0.10, 0.05 and 0.01 level (two-tailed), respectively.

Table 4

The results of covariate balance checks

	Means		*t* values
	NewCVS=1	*NewCVS*=0	
Top1	0.233	0.238	-0.66
State control	0.500	0.523	-0.37
Mutual funds' ownership	0.019	0.015	0.69
Board independence	0.310	0.317	-0.52
Duality	0.164	0.148	0.34
Related party transaction	0.875	0.844	0.72
Sanction	0.055	0.047	0.28
Tobin's Q	1.988	2.131	-0.82
Leverage	0.523	0.553	-0.96
Firm size	20.870	20.801	0.61
CVS imitation	0.209	0.191	1.09

This table reports the results of covariate balance checks (*pstest*) on the mean difference in the covariates used in the probit model between the CVS-adopting firms and the matched control firms, when propensity score matching is adopted. All the variables are one-year lagged and defined in Appendix.

Table 5

The effect of CVS adoption on firm performance: DID analysis

	(1)	(2)	(3)
	ROA	*ROS*	*ROI*
NewCVSfirm×Post	0.025**	0.180***	2.811**
	(2.01)	(2.86)	(2.03)
State control	0.017	0.127	-0.522
	(0.74)	(1.08)	(-0.17)
Managerial ownership	0.168	0.635	15.928
	(1.26)	(1.36)	(1.58)
Ownership concentration	0.211	0.365	1.690
	(1.61)	(0.53)	(0.12)
Leverage	-0.124***	-0.659***	-11.543**
	(-2.71)	(-2.64)	(-2.10)
Tangibility	0.003	-0.144	2.221
	(0.05)	(-0.43)	(0.30)
Firm size	0.008	0.070	-1.644
	(0.49)	(0.76)	(-0.72)
Firm fixed effect	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
N	493	493	493
R-squared	0.106	0.142	0.068

This table reports the difference-in-difference results regarding the effect of CVS adoption on firm performance. The matched control sample is identified by using propensity score matching. We then use the difference-in-difference method to compare firm performance in one year before and after the CVS adoption year of the treatment firms. *t*-statistics in the brackets are based on standard errors adjusted for clustering at the firm level. The coefficients on the constant, and year and firm fixed effects are omitted for brevity. *, **, ***: statistically significantly different from zero at the 0.10, 0.05 and 0.01 level (two-tailed), respectively.

Table 6

The moderating effects of firm information environment, mutual funds' ownership, and managerial power

	(1)	(2)	(3)	(4)	(5)	(6)
	Less Analysts	More Analysts	Lower mutual funds' ownership	Higher mutual funds' ownership	Lower managerial power	Higher managerial power
CVS adoption	0.032***	-0.003	0.041***	-0.017	0.003	0.035**
	(2.65)	(-0.40)	(3.34)	(-1.47)	(0.24)	(2.59)
State control	0.005	0.014	0.004	0.008	-0.000	0.023
	(0.27)	(0.90)	(0.19)	(0.39)	(-0.02)	(0.83)
Managerial ownership	0.123	0.215	0.117	0.330		
	(0.48)	(1.40)	(0.48)	(1.28)		
Ownership concentration	0.268	0.190	0.285	0.077	0.126	0.304
	(1.44)	(1.45)	(1.40)	(0.46)	(0.65)	(1.38)
Leverage	-0.158***	0.058*	-0.157***	-0.103**	-0.143***	-0.183***
	(-5.47)	(1.88)	(-5.27)	(-2.60)	(-4.21)	(-5.25)
Tangibility	0.026	0.002	0.010	0.038	0.035	0.020
	(0.63)	(0.05)	(0.23)	(0.64)	(0.71)	(0.41)
Firm size	0.017	-0.032***	0.002	0.026*	0.010	-0.008
	(1.06)	(-2.77)	(0.15)	(1.78)	(0.61)	(-0.45)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
N	357	136	317	176	273	231
R-squared	0.142	0.087	0.111	0.060	0.067	0.147
P value of test of difference	0.003*		0.001***		0.080***	

This table reports the results regarding the moderating effects of firm information environment, mutual funds' ownership, and managerial power on the association between CVS adoption and firm performance. The dependent variable is *ROA*. The variables are defined in Appendix. *t*-statistics in the brackets are based on standard errors adjusted for clustering at the firm level. The coefficients on the constant, year and firm fixed effects are omitted for brevity. *, **, ***: statistically significantly different from zero at the 0.10, 0.05 and 0.01 level (two-tailed), respectively.

Table 7

CVS adoption and the professionalism of board directors

	Professionalism	
	(1)	(2)
CVS adoption	0.060***	0.066***
	(2.61)	(2.73)
State control	0.039	0.043
	(0.84)	(0.92)
Top1	-0.330*	-0.331*
	(-1.69)	(-1.86)
Mutual funds' ownership	-0.085	-0.166
	(-0.51)	(-0.91)
Board size	-0.039***	-0.040***
	(-4.04)	(-3.85)
Board independence	-0.010	0.299
	(-0.03)	(1.05)
Sales growth		0.002
		(1.52)
ROA		-0.013
		(-0.07)
Firm size		0.035
		(0.89)
Leverage		-0.266***
		(-3.04)
Firm fixed effect	Yes	Yes
Year fixed effect	Yes	Yes
N	501	480
R-squared	0.200	0.284

This table reports the results regarding the relationship between CVS adoption and the professionalism of board directors. *Professionalism* is a proxy for the professionalism of board directors. The variables are defined in Appendix. *t*-statistics in the brackets are based on standard errors adjusted for clustering at the firm level. The coefficients on the constant, year and firm fixed effects are omitted for brevity. *, **, ***: statistically significantly different from zero at the 0.10, 0.05 and 0.01 level (two-tailed), respectively.

Table 8

CVS adoption and controlling shareholders' expropriation

	Tunneling	
	(1)	(2)
CVS adoption	-0.170	-0.150**
	(-1.53)	(-2.11)
State control	-0.138	0.029
	(-1.16)	(0.39)
Top1	-1.067	-0.887
	(-0.83)	(-0.89)
Board size	-0.012	-0.033*
	(-0.69)	(-1.96)
Board independence	-0.146	-0.816*
	(-0.27)	(-1.75)
Firm size		0.148
		(1.08)
Tobin's Q		0.401***
		(3.04)
Leverage		0.210
		(0.72)
Firm fixed effect	Yes	Yes
Year fixed effect	Yes	Yes
N	501	488
R-squared	0.034	0.548

This table reports the results regarding the relationship between CVS adoption and controlling shareholders' expropriation, between CVS adoption and managerial entrenchment. *Tunneling* is a proxy for the expropriation. The variables are defined in Appendix. *t*-statistics in the brackets are based on standard errors adjusted for clustering at the firm level. The coefficients on the constant, year and firm fixed effects are omitted for brevity. *, **, ***: statistically significantly different from zero at the 0.10, 0.05 and 0.01 level (two-tailed), respectively.

Table 9

CVS adoption and managerial entrenchment

	abPerks6		*abPerks8*	
	(1)	(2)	(3)	(4)
CVS adoption	-0.020***	-0.020**	-0.028***	-0.025***
	(-2.81)	(-2.57)	(-2.87)	(-2.73)
State control	-0.010**	-0.010*	-0.011**	-0.009
	(-2.02)	(-1.74)	(-2.13)	(-1.20)
Power balance	-0.001	-0.001	-0.000	-0.000
	(-0.32)	(-0.24)	(-0.02)	(-0.02)
A share	-0.189	-0.194	-0.175	-0.194
	(-1.41)	(-1.47)	(-1.27)	(-1.42)
Mutual funds' ownership	0.038	0.045	-0.001	0.019
	(0.60)	(0.71)	(-0.01)	(0.24)
Board independence	-0.025	-0.033	-0.036	-0.053
	(-0.91)	(-1.09)	(-0.87)	(-1.00)
ROA		-0.045		-0.137
		(-1.57)		(-1.49)
Firm size		-0.003		0.005
		(-0.27)		(0.40)
Leverage		-0.009		0.009
		(-0.33)		(0.27)
Firm fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
N	424	424	424	424
R-squared	0.082	0.087	0.062	0.090

This table reports the results regarding the relationship between CVS adoption and managerial entrenchment. *abPerks* is a proxy for managerial entrenchment. The variables are defined in Appendix. *t*-statistics in the brackets are based on standard errors adjusted for clustering at the firm level. The coefficients on the constant, year and firm fixed effects are omitted for brevity. *, **, ***: statistically significantly different from zero at the 0.10, 0.05 and 0.01 level (two-tailed), respectively.