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Citation for final published version:

Yuan, Rongli, Liu, Chao, Xiao, Jason and Sun, Jian 2018. The determinants and effects of voluntary adoption of a cumulative voting system: evidence from China. *Pacific-Basin Finance Journal* 51 , pp. 251-266. 10.1016/j.pacfin.2018.07.004

Publishers page: <http://dx.doi.org/10.1016/j.pacfin.2018.07.004>

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

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

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

19    **JEL classification:** G23, G32, G34, G38

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

27

28 **1. Introduction**

29 Firms in emerging markets such as China often have highly concentrated corporate ownership  
30 structures in which controlling shareholders frequently seek to extract private benefits at the expense of  
31 minority shareholders (i.e., the principal-principal problems) (Shleifer and Vishny, 1997; La Porta et al.,  
32 1998). The limited protection of minority rights and low corporate transparency in Asia exacerbates the  
33 expropriation of minority shareholders (Claessens and Fan, 2002).

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

40 Before 2002, almost all of China's listed firms used a straight voting system to elect their directors.<sup>1</sup>

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<sup>1</sup> 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.

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

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

55 The 2002 Code of Governance does not require firms whose controlling shareholders hold less than  
56 30% of the total number of shares to adopt the CVS. That is, the CVS is optional for these firms. However,  
57 between 2002 and 2005, 143 listed firms voluntarily adopted the CVS even though they did not meet the  
58 shareholding criteria.<sup>3</sup> Using these firms as the unique sample, this paper examines the determinants and  
59 effects of voluntary adoption of the CVS.

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<sup>2</sup> We collected the data and found that more than 90% of listed firms adopted the CVS after 2006.

<sup>3</sup> 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".

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

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

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

81 funds' ownership, and whose managers have more power.

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

84 Our study differs from the prior studies in two ways. First, contrary to the findings of Xi and Chen  
85 (2014), Chen and Du (2015), and Chen et al. (2015), our study empirically demonstrates that CVS  
86 adoption can help curb the conflicts between controlling-minority shareholders and improve firm  
87 performance by increasing the number of directors with professional experience, mitigating controlling  
88 shareholders' expropriation, and constraining managerial entrenchment. In this regard, our study enriches  
89 the literature on corporate governance in general and the literature on the principal-principal problems in  
90 particular. As the expropriation of minority shareholders is common in China's listed firms, our findings  
91 are important to researchers and regulators interested in resolving the principal-principal problems.

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

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

102 3, introduce the research design in Section 4, discuss the empirical results in Section 5, examine the  
103 moderating effects of firm information environment, mutual funds' ownership, and managerial power in  
104 Section 6, and explore channels through which CVS adoption affects firm performance in Section 7.  
105 Section 8 concludes the paper.

## 106 **2. Institutional background**

### 107 *2.1. Principal-principal problems in China's listed firms*

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

120 China is one of the largest emerging markets, but its government still plays a decisive role in its  
121 economy. Government ownership is prevalent as most listed firms were previously state-owned  
122 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.<sup>4</sup> 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

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<sup>4</sup> See Jiang et al. (2010) for a detailed summary of regulatory reforms and policies.

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

147 La Porta et al. (2000) argue that granting more voting rights to minority shareholders can curb the  
148 expropriation from controlling shareholders. Under the CVS, minority shareholders can cast all of their  
149 voting rights for one or several of their favored candidates and increase their representation on the boards.  
150 For example, if an election is for two directors and a shareholder owns 200 shares (one vote per share).  
151 Under a straight voting system, the shareholder has a maximum of 200 shares for each candidate (and  
152 400 votes in total. With a CVS, all 400 votes could be cast for one candidate, or divided whichever way  
153 the shareholder chooses. Therefore, it is possible for minority shareholders to elect one or more board  
154 members even if a controlling shareholder opposes their election.

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

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

167 Moreover, concentrated ownership structures are common in Chinese firms, minority shareholders  
168 are always passive and usually do not attend shareholders' meetings due to their limited shareholdings.  
169 Even if they attend and speak at meetings, controlling shareholders tend to ignore them. However, if a  
170 firm adopts the CVS, minority shareholders can elect "representative" directors and mitigate controlling  
171 shareholders' expropriation. For example, Gree Electric Appliances, Inc. of Zhuhai, a listed Chinese firm  
172 (Stock ID: 000651), adopted the CVS to elect board directors at the shareholders' meeting held in May  
173 2012. With the CVS, the minority shareholders, mainly institutional investors, elected their  
174 "representative" director and a candidate recommended by the controlling shareholders was voted out  
175 (Liu, 2012). This greatly encourages minority shareholders, especially institutional investors, to actively  
176 take part in the corporate governance of listed companies.

### 177 **3. Hypotheses development**

#### 178 *3.1. The competing hypotheses on the corporate governance determinants of CVS adoption*

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

185 minority shareholders.

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

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

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

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

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

### 203 3.2. *The hypothesis on the impact of CVS adoption on firm performance*

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

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

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

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

## 216 **4. Research design**

### 217 *4.1. Sample selection*

218 Our sample initially comprised all companies listed on the Shanghai Stock Exchange and the  
219 Shenzhen Stock Exchange between 2002 and 2005. We then applied the following restrictions: (1) the  
220 percentage of shareholdings held by controlling shareholders during the sample period was less than 30%;  
221 (2) a firm was excluded if it did not make an announcement on whether it adopted the CVS or not between  
222 2002 and 2005; (3) a firm that adopted the CVS in its IPO year was excluded to ensure that all firms have  
223 data for the years both before and after CVS adoption when we adopt the DID analysis to examine the  
224 effect of CVS adoption in Section 5; (4) a firm was excluded if it adopted the CVS in 2006 as the sample  
225 period is between 2002 and 2005 and we use one-year window when conducting DID analysis; and (5)  
226 a firm/year should not have missing data.

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

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

#### 241 4.2. *The research design for the determinants of CVS adoption*

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

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<sup>5</sup> 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.

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

250 where  $\alpha_i$  represents regression coefficients,  $\varepsilon$  is an error term. *CVS adoption* is a dummy variable that  
251 equals 1 when a firm adopts the CVS in year  $t$ , 0 otherwise. Following prior studies (e.g., Jiang et al.,  
252 2010; Wang, 2015), we include the seven proxies for corporate governance:

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

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

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

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

#### 319 4.3. The research design for the impact of CVS adoption on firm performance

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

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

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<sup>6</sup> 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.

<sup>7</sup> 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.

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

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

344 The basic empirical model is as follows:

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

347 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 equals 1 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 ( $\beta_3$ ) is our estimate of the effects. A significant  $\beta_3$  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

369 2001-2004, ranging from 0 to 55.6%. This is reasonable as the CSRC did not enact a formal,  
370 comprehensive guideline on independent directors of domestically listed firms until 2001. The  
371 regulations stipulated that boards must have at least two independent directors by 30 June 2002, and at  
372 least one-third of the board members should be independent directors by 30 June 2003. In 14.2% of firms  
373 CEOs and board chairmen are the same person, 84.4% of firm/year observations engage in related party  
374 transactions, 5.1% of sample firms have been subject to the CSRC disciplinary sanctions or received  
375 reprimands from stock exchanges. The firms in our sample have an average *Tobin's Q* of 2.450, an  
376 average leverage of 0.529, an average size of 20.832, and the cumulative percentage of firms adopting  
377 the CVS in the same province is 0.085.

378 <Insert Table 1 about here>

### 379 5.2. Correlation analysis

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

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

388 <Insert Table 2 about here>

### 389 5.3. Multivariate Results on the determinants of CVS adoption

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

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

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

400 <Insert Table 3 about here>

#### 401 5.4. The regression results on the impact of CVS adoption on firm performance

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

411 <Insert Table 4 about here>

412 The regression results of model (2) are reported in Table 5. After controlling for firm fixed effects,  
413 we find that the coefficient on *NewCVSfirm*×*Post* in Column (1) remains positive and significant at the  
414 5% level ( $t=2.01$ ). The finding indicates that the CVS-adopting firms outperform the control firms. Our  
415 hypothesis (H2) is supported.

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

420 <Insert Table 5 about here>

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

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

$$427 \quad ROA_{i,t} = \theta_0 + \theta_1 CVS\ adoption_{i,t} + \sum_{q=2}^m \theta_q Control\ variables_{i,t} + Year\ fixed\ effects$$
$$428 \quad + Firm\ fixed\ effects + \varepsilon \quad (3)$$

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

432 moderating effects. All the variables are defined in Appendix.

#### 433 6.1. *The moderating effect of firm information environment*

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

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

441 We divide the sample into two subsets: the subset in strong information environment with the number  
442 of financial analysts above the median of the same year and industry, and the subset weak information  
443 environment with the number of financial analysts below the median. We re-estimate model (3) with the  
444 two subsets separately. The results are reported in Columns (1) and (2) of Table 6. As we expected, the  
445 coefficient on *CVS adoption* for firms in weak information environment in Column (1) is positive and  
446 significant at the 1% level, while it is not significant for firms in strong information environment in  
447 Column (2). A test of the difference in regression coefficients on *CVS adoption* generates a *p*-value of  
448 0.069 (two-tailed) between Columns (1) and (2). The result indicates that a strong firm information  
449 environment mitigates the impact of CVS adoption on firm performance.

#### 450 6.2. *The moderating effect of mutual funds' ownership*

451 As we discuss above, mutual funds help pool the share interests of individuals, strengthens their  
452 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

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

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

486 <Insert Table 6 about here>

487 Taken the above together, we find that the positive relationship between CVS adoption and firm  
488 performance becomes more significant for firms in a weak firm information environment, with less  
489 mutual funds' ownership, and whose managers have more power.<sup>8</sup>

## 490 **7. Channels through which CVS adoption affects firm performance**

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

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<sup>8</sup> 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).

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

#### 499 *7.1 CVS adoption and the professionalism of board directors*

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

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

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

515 The results in Column (2) show that the coefficient on *CVS adoption* is positive and significant at the  
516 1% level. This indicates that CVS adoption increases the proportion of directors with professional  
517 experience and improves the professionalism of board directors, hence leading to better performance.

518 <Insert Table 7 about here>

#### 519 7.2. *CVS adoption and controlling shareholders' expropriation*

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

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

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

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

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

539 <Insert Table 8 about here>

### 540 7.3. *CVS adoption and managerial entrenchment*

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

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

549 We now examine whether CVS adoption curbs managerial entrenchment. As perks may be created  
550 by managers to divert resources from the firm for their own private benefit (Jensen and Meckling, 1976;  
551 Yermack, 2006), we use abnormal perks as a proxy of managerial entrenchment. Following Gul et al.  
552 (2011), we read through the notes to the section of "other cash flows related to operating activities" in  
553 the statements of cash flows; for each firm, we manually collect the six items of perk expenses data.<sup>9</sup>

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<sup>9</sup> The six items of perk expenses include expenses relating to traveling, business entertainment, overseas training, board meetings, company cars, and other meetings.

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

$$558 \quad Perks/Sales_{i,t} = \gamma_0 + \gamma_1 LnCompensation_{i,t} + \gamma_2 Lnassets_{i,t} + \gamma_3 Lnincomepercapita_{i,t} + \varepsilon \quad (4)$$

559 where *Perks/Sales* is ratio of the sum of the six items of perk expenses divided by sales, *Lncompensation*  
560 is the natural logarithm of total compensation for all firm employees, *LnAsset* is the natural logarithm of  
561 the book value of total assets, and *Lnincomepercapita* is the natural logarithm of total income per capita  
562 of the region in which a firm is located. We run the regressions of model (4), the residuals are our main  
563 variable, *abPerks6*.<sup>10</sup>

564 We include the following variables in the model which may affect managerial entrenchment: state  
565 control (*State control*), power balance (*Power balance*), the percentage of A shares (*A share*),  
566 shareholdings held by mutual funds (*Mutual funds' ownership*), board independence (*Board*  
567 *independence*), return on assets (*ROA*), firm size (*Firm size*), and financial leverage (*Leverage*). We  
568 control for year fixed effects and firm fixed effects. All continuous variables are winsorized at 1% at both  
569 tails and all variables are summarized in Appendix. The results are reported in Columns (1)-(2) of Table  
570 9.

571 The results show that the coefficient on *CVS adoption* is negative and significant at the 5% level ( $t=-$   
572 2.57). This indicates that CVS adoption reduces managerial entrenchment, hence resulting in higher firm

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<sup>10</sup> 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 managers 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

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

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617 **Appendix**618 **Variable definitions**

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Variables	Definitions
<b>Variables in probit model (1)</b>	
<i>CVS adoption</i>	A dummy variable that equals one if a firm adopts the cumulative voting system (CVS) in year $t$ and zero otherwise
<i>Top1</i>	The proportion of shares held by the largest shareholder
<i>State control</i>	A dummy variable that equals one if the ultimate controlling shareholder of a listed firm is the state in year $t$ and zero otherwise
<i>Mutual funds' ownership</i>	A firm's percentage of common shares held by mutual funds as of year-end
<i>Board independence</i>	The proportion of independent directors on a firm's board of directors
<i>Duality</i>	A dummy variable that equals one if a firm's CEO is also the chairperson of the board and zero otherwise
<i>Related party transaction</i>	A dummy variable that equals one if a firm engages in related party transactions and zero otherwise
<i>Sanction</i>	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
<i>Tobin's Q</i>	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
<i>Leverage</i>	Total liabilities divided by total assets
<i>Firm size</i>	The natural logarithm of book value of total assets
<i>CVS imitation</i>	Cumulative percentage of firms adopting the CVS in the same province as of year-end
<b>Variables in DID model (2)</b>	
<i>Return on assets (ROA)</i>	Net profit divided by year-end total assets
<i>Return on sales (ROS)</i>	Net profit divided by sales
<i>Return on investment (ROI)</i>	Net profit divided by investment
<i>Managerial ownership</i>	The percentage of common shares owned by managers and directors as of year-end
<i>Ownership concentration</i>	The sum of squared percentage of shares held by the top five shareholders
<i>Tangibility</i>	The sum of net fixed assets and inventory divided by total assets
<i>NewCVS<sub>firm</sub></i>	

<i>Post</i>	A dummy variable that equals one if a firm is a new CVS-adopting firm during 2002-2005 and zero otherwise
<b>Other variables</b>	
<i>Analysts</i>	A dummy variable that equals one if the observation is after the year of CVS adoption and zero otherwise
<i>Managerial power</i>	A proxy for information environment. It is the number of financial analysts following a firm
<i>Professionalism</i>	An index to measure managerial power. We use the principal components analysis (PCA) to construct this index. Please see Section 6.3 for detail
<i>Tunneling</i>	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
<i>abPerks6</i>	A proxy for controlling shareholders' expropriation. It is the ratio of other receivables divided by total assets
<i>abPerks8</i>	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
<i>Board size</i>	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
<i>Power balance</i>	The number of directors in a firm's board of directors
<i>Sales growth</i>	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
<i>A share</i>	The increased percentage of sales
	A firm's proportion of tradable A-shares as of year-end

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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)						
<i>Variables</i>	N	Mean	Median	Std. Dev	Minimum	Maximum
<i>CVS adoption</i>	1265	0.162	0.000	0.369	0.000	1.000
<i>Top1</i>	1265	0.239	0.250	0.060	0.089	0.624
<i>State control</i>	1265	0.508	1.000	0.500	0.000	1.000
<i>Mutual funds' ownership</i>	1265	0.010	0.000	0.029	0.000	0.291
<i>Board independence</i>	1265	0.249	0.308	0.136	0.000	0.556
<i>Duality</i>	1265	0.142	0.000	0.349	0.000	1.000
<i>Related party transaction</i>	1265	0.844	1.000	0.363	0.000	1.000
<i>Sanction</i>	1265	0.051	0.000	0.221	0.000	1.000
<i>Tobin's Q</i>	1265	2.450	1.950	1.650	0.907	12.755
<i>Leverage</i>	1265	0.529	0.522	0.244	0.050	1.501
<i>Firm size</i>	1265	20.832	20.851	0.847	18.918	23.955
<i>CVS imitation</i>	1265	0.085	0.026	0.122	0.000	0.500

  

Panel B: Main variables in the performance model (2)						
<i>Variables</i>	N	Mean	Median	Std. Dev	Minimum	Maximum
<i>Return on assets</i>	493	0.002	0.019	0.091	-0.326	0.204
<i>Return on sales</i>	493	-1.709	0.275	8.745	-36.338	6.361
<i>Return on investment</i>	493	-0.073	0.037	0.447	-1.892	0.682
<i>State control</i>	493	0.513	1.000	0.500	0.000	1.000
<i>Managerial ownership</i>	493	0.024	0.000	0.102	0.000	0.748
<i>Ownership concentration</i>	493	0.083	0.078	0.042	0.014	0.331
<i>Leverage</i>	493	0.568	0.548	0.283	0.050	1.501
<i>Tangibility</i>	493	0.442	0.448	0.177	0.016	0.838
<i>Firm size</i>	493	20.875	20.865	0.948	18.918	23.855

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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.

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

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

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

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

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794 **Table 4**  
 795 The results of covariate balance checks  
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	Means		<i>t</i> values
	<i>NewCVS=1</i>	<i>NewCVS=0</i>	
<i>Top1</i>	0.233	0.238	-0.66
<i>State control</i>	0.500	0.523	-0.37
<i>Mutual funds' ownership</i>	0.019	0.015	0.69
<i>Board independence</i>	0.310	0.317	-0.52
<i>Duality</i>	0.164	0.148	0.34
<i>Related party transaction</i>	0.875	0.844	0.72
<i>Sanction</i>	0.055	0.047	0.28
<i>Tobin's Q</i>	1.988	2.131	-0.82
<i>Leverage</i>	0.523	0.553	-0.96
<i>Firm size</i>	20.870	20.801	0.61
<i>CVS imitation</i>	0.209	0.191	1.09

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

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822 **Table 5**  
823 The effect of CVS adoption on firm performance: DID analysis  
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	(1)	(2)	(3)
	<i>ROA</i>	<i>ROS</i>	<i>ROI</i>
<i>NewCVS<sub>firm</sub> × Post</i>	0.025** (2.01)	0.180*** (2.86)	2.811** (2.03)
<i>State control</i>	0.017 (0.74)	0.127 (1.08)	-0.522 (-0.17)
<i>Managerial ownership</i>	0.168 (1.26)	0.635 (1.36)	15.928 (1.58)
<i>Ownership concentration</i>	0.211 (1.61)	0.365 (0.53)	1.690 (0.12)
<i>Leverage</i>	-0.124*** (-2.71)	-0.659*** (-2.64)	-11.543** (-2.10)
<i>Tangibility</i>	0.003 (0.05)	-0.144 (-0.43)	2.221 (0.30)
<i>Firm size</i>	0.008 (0.49)	0.070 (0.76)	-1.644 (-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

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

833 **Table 6**  
834 The moderating effects of firm information environment, mutual funds' ownership, and managerial power  
835

	(1)	(2)	(3)	(4)	(5)	(6)
	Less Analysts	More Analysts	Lower mutual funds' ownership	Higher mutual funds' ownership	Lower managerial power	Higher managerial power
<i>CVS adoption</i>	0.032*** (2.65)	-0.003 (-0.40)	0.041*** (3.34)	-0.017 (-1.47)	0.003 (0.24)	0.035** (2.59)
<i>State control</i>	0.005 (0.27)	0.014 (0.90)	0.004 (0.19)	0.008 (0.39)	-0.000 (-0.02)	0.023 (0.83)
<i>Managerial ownership</i>	0.123 (0.48)	0.215 (1.40)	0.117 (0.48)	0.330 (1.28)		
<i>Ownership concentration</i>	0.268 (1.44)	0.190 (1.45)	0.285 (1.40)	0.077 (0.46)	0.126 (0.65)	0.304 (1.38)
<i>Leverage</i>	-0.158*** (-5.47)	0.058* (1.88)	-0.157*** (-5.27)	-0.103** (-2.60)	-0.143*** (-4.21)	-0.183*** (-5.25)
<i>Tangibility</i>	0.026 (0.63)	0.002 (0.05)	0.010 (0.23)	0.038 (0.64)	0.035 (0.71)	0.020 (0.41)
<i>Firm size</i>	0.017 (1.06)	-0.032*** (-2.77)	0.002 (0.15)	0.026* (1.78)	0.010 (0.61)	-0.008 (-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***	

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837 This table reports the results regarding the moderating effects of firm information environment, mutual funds' ownership, and managerial power on  
838 the association between CVS adoption and firm performance. The dependent variable is *ROA*. The variables are defined in Appendix. *t*-statistics in  
839 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  
840 omitted for brevity. \*, \*\*, \*\*\*: statistically significantly different from zero at the 0.10, 0.05 and 0.01 level (two-tailed), respectively.

841 **Table 7**  
 842 CVS adoption and the professionalism of board directors

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

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

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857 **Table 8**  
 858 CVS adoption and controlling shareholders' expropriation  
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	<i>Tunneling</i>	
	(1)	(2)
<i>CVS adoption</i>	-0.170 (-1.53)	-0.150** (-2.11)
<i>State control</i>	-0.138 (-1.16)	0.029 (0.39)
<i>Top1</i>	-1.067 (-0.83)	-0.887 (-0.89)
<i>Board size</i>	-0.012 (-0.69)	-0.033* (-1.96)
<i>Board independence</i>	-0.146 (-0.27)	-0.816* (-1.75)
<i>Firm size</i>		0.148 (1.08)
<i>Tobin's Q</i>		0.401*** (3.04)
<i>Leverage</i>		0.210 (0.72)
Firm fixed effect	Yes	Yes
Year fixed effect	Yes	Yes
N	501	488
R-squared	0.034	0.548

860  
 861 This table reports the results regarding the relationship between CVS adoption and controlling  
 862 shareholders' expropriation, between CVS adoption and managerial entrenchment. *Tunneling* is a proxy  
 863 for the expropriation. The variables are defined in Appendix. *t*-statistics in the brackets are based on  
 864 standard errors adjusted for clustering at the firm level. The coefficients on the constant, year and firm  
 865 fixed effects are omitted for brevity. \*, \*\*, \*\*\*: statistically significantly different from zero at the 0.10,  
 866 0.05 and 0.01 level (two-tailed), respectively.

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874 **Table 9**  
875 CVS adoption and managerial entrenchment  
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	<i>abPerks6</i>		<i>abPerks8</i>	
	(1)	(2)	(3)	(4)
<i>CVS adoption</i>	-0.020*** (-2.81)	-0.020** (-2.57)	-0.028*** (-2.87)	-0.025*** (-2.73)
<i>State control</i>	-0.010** (-2.02)	-0.010* (-1.74)	-0.011** (-2.13)	-0.009 (-1.20)
<i>Power balance</i>	-0.001 (-0.32)	-0.001 (-0.24)	-0.000 (-0.02)	-0.000 (-0.02)
<i>A share</i>	-0.189 (-1.41)	-0.194 (-1.47)	-0.175 (-1.27)	-0.194 (-1.42)
<i>Mutual funds' ownership</i>	0.038 (0.60)	0.045 (0.71)	-0.001 (-0.01)	0.019 (0.24)
<i>Board independence</i>	-0.025 (-0.91)	-0.033 (-1.09)	-0.036 (-0.87)	-0.053 (-1.00)
<i>ROA</i>		-0.045 (-1.57)		-0.137 (-1.49)
<i>Firm size</i>		-0.003 (-0.27)		0.005 (0.40)
<i>Leverage</i>		-0.009 (-0.33)		0.009 (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

877  
878 This table reports the results regarding the relationship between CVS adoption and managerial  
879 entrenchment. *abPerks* is a proxy for managerial entrenchment. The variables are defined in Appendix.  
880 *t*-statistics in the brackets are based on standard errors adjusted for clustering at the firm level. The  
881 coefficients on the constant, year and firm fixed effects are omitted for brevity. \*, \*\*, \*\*\*: statistically  
882 significantly different from zero at the 0.10, 0.05 and 0.01 level (two-tailed), respectively.