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RESEARCH ARTICLE

Does the government procurement market favor corporate social responsibility in a weak institution? Evidence from China

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This study investigates, in the context of a weak institution, the single and interactive effects of firms' nonmarket strategies in China's government procurement market. Based on transaction cost and signal theory, using data pertaining to Chinese government procurement contracts from 2016 to 2018, this study also provides evidence that superior corporate social responsibility (CSR) performance enables firms to obtain more government procurement contracts. However, the effect is only significant in non-state-owned enterprises. Considering the interaction effect of corporate political activity (CPA) and CSR in business to government (B2G) markets, this study finds that CPA, characterized by the political attributes of executives, enhances the signal effect of CSR in B2G markets. Further heterogeneity analysis indicates that CSR's signal effect diminishes over time and is enhanced with high industry competition. Our findings provide new insights on nonmarket mechanisms (such as CSR), through which firms competing in China's B2G market can compensate for the weak institution.

Keywords: Corporate social responsibility, Government procurement, CPA, Signal, Trust

1. Introduction

Worldwide, governments are an important purchaser of goods and services; they form large markets for government procurement (business to government or B2G) markets.[1] Due to the growing importance of B2G markets, a small body of literature has explored how firms influence governments' procurement decisions in the context of developed countries (Banerjee et al., 2000; Goldman et al., 2013; Flammer, 2018; Baltrunaite, 2020). While the quality of institutions varies, even in developed countries, firms in emerging markets face a number of institutional voids (Gao et al., 2017). "Institutions" directly determine what arrows a firm has in its quiver as that firm struggles to formulate and implement a business strategy and to create a competitive advantage (Ingram and Silverman, 2002). Therefore, the question of how companies compete in a B2G market with a weak institution needs further investigation.

In this study, different from the "strong" institution background discussed in previous studies, a "weak" institution in China is considered to be one, in which institutional arrangements fail to ensure effective markets, or even undermine markets.[2] Limited market mechanisms in emerging countries (e.g., China) with institutional voids increase transaction costs (Peng and Heath, 1996; Stiglitz, 2000). Firms must develop strategic responses to overcome these voids and minimize transaction costs (Gao et al., 2017). In China's B2G market, the regulatory systems and contract enforcement mechanisms are either absent or weak in the specific institutional context (Ioannou and Serafeim, 2012; Lanis and Richardson, 2015). Thus, transaction costs in the market increase, and the effectiveness of public procurement is undermined.[3] Therefore, in China's B2G

1. Global procurement by government agencies accounts for approximately one-fifth of the total gross domestic product (GDP) per year (https://www.worldbank.org/en/publication/wdr2017). In the largest developing country, the scale of Chinese government procurement continues to grow rapidly, creating a huge and fast-growing market. According to statistics, the scale of government procurement in China has increased nearly 36 times (from 100.9 billion RMB to 369,070.6 billion RMB) between 2002 and 2020, with its share of GDP increasing from 0. 98% to 4.0%.

2. According to the World Bank Global Governance Index, a large gap exists between China and developed countries, such as Britain and the United States, in terms of the indexes of Rule of Law and Regulatory Quality. Meanwhile, China underperforms among global economies in terms of the business environment.

3. Specifically, due to institutional deficiencies in structure, procedures, and oversight, companies engage in many opportunistic behaviors, such as providing spurious materials to win bids, engaging in collusive bids, and obtaining changes, suspension, or termination of government procurement contracts.

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market, where institutions perform relatively weakly and opportunism is prevalent, how firms decrease their transaction costs and alleviate the "trust dilemma" in their relations with the government is an issue of theoretical and practical concern.

At the broader level, the aim of nonmarket strategies and associated firm behaviors is generally to improve firm performance by "managing the firm's institutional context" (Lux et al., 2011). In the context in which formal institutions are relatively weak, nonmarket strategies take center stage in developing competitive advantages and in dealing with the evolving business environments (Matten and Crane, 2005; Valente and Crane, 2010; Li et al., 2013; Park et al., 2014). As an important nonmarket strategy, a large body of literature has examined how corporate social responsibility (CSR) helps firms develop a competitive advantage in business to business (B2B) and business to customer (B2C) markets (Porter, 1980; Dyer and Singh, 1998; Frooman, 1999; Kassinis and Vafeas, 2006; Porter, 2008; Barney, 2018). However, little is known about whether and how CSR plays a role in the increasingly important B2G markets; even less attention has been paid to the weak institutional contexts (Peng and Heath, 1996; Visser, 2008; Gao, 2009; Zhang et al., 2010; Flammer, 2018). In practice, CSR has been signaled as being highly contextual (Crotty, 2016; Demirbag et al., 2017), and thus, it is important to conduct studies that develop such contextualization. Meanwhile, the linkages between CSR and corporate political activity (CPA) remain a neglected area of research (McWilliams et al., 2002; Rodriguez et al., 2006; Zhang et al., 2010; Ghauri et al., 2014; Marquis and Raynard, 2015; Mellahi et al., 2016; Flammer, 2018). In a market shaped by government consumption, this article seeks to address this gap in extant literature by exploring whether and how CSR interacts with CPA in the specific B2G context.

This article investigates, in the weak institutional context, whether and how CSR can help firms gain a competitive advantage; the interaction effect of CPA and CSR in B2G markets is also analyzed. Based on data related to government procurement contracts and listed companies in China, from 2016 to 2018, this study finds that CSR can help firms obtain government procurement contracts. However, the effect only exists in non-state-owned enterprises (non-SOEs) and not in SOEs. Considering the CPA–CSR interaction effect, this study finds that there is a boosting effect on the CSR signal, that is, CPA characterized by the political attributes of executives enhances the signal effect of CSR to gain government contracts. Further examining the heterogeneity of CSR's signal effect in terms of time and industry, this study finds that the role of CSR in B2G markets diminishes along with the formation of a long-term partnership between firms and governments. In addition, the role of CSR is more pronounced in highly competitive industries. The above findings indicate that, in B2G markets, CSR can act as a "lubricant" between weak institutions and imperfect market mechanisms: CSR provides an important nonmarket signal for firms to reduce transaction costs, gain government's trust, and develop a competitive advantage. Meanwhile, CPA reinforces the role of CSR and is an important complementary signal in the Chinese B2G market.

This study contributes to existing literature in several ways. First, it contributes to the existing literature on nonmarket strategies in the context of weak institutions and emerging economies (Visser, 2008; Gao, 2009; Zhang et al., 2010; Marquis and Raynard, 2015; Flammer, 2018). The strategic literature has dedicated less attention to the institutional environment that shapes competitive strategies (Marquis and Raynard, 2015). Rather, this study focuses on the role of nonmarket strategies in weak institutional contexts, providing important implications for other developing countries with similar situations. By doing so, this study also contributes an understanding of firm interaction in relation to institutional context and the burgeoning literature on "nonmarket" strategies (Lux et al., 2011). Second, this study enriches previous findings on the interaction of nonmarket strategies. The linkages between CSR and CPA remain a neglected area of research, one that has the potential to contribute to the existing understanding of firms' nonmarket strategies. Through empirically investigating the interaction effect between CSR and CPA, this study compensates for the focus of most studies on a single nonmarket strategy and responds to calls advocating a better understanding of the interconnectivity between notions of CSR and CPA within such institutional environments (Rodriguez et al., 2006; Den Hond et al., 2014; Mellahi et al., 2016; Frynas et al., 2017). Third, this study broadens the theory and literature of CSR. Going beyond the literature that focuses on B2B and B2C markets (Porter, 1980; Dyer and Singh, 1998; Frooman, 1999; Kassinis and Vafeas, 2006; Porter, 2008; Barney, 2018), this study provides new evidence of how CSR can improve firms' competitiveness and also its important boundary conditions in B2G markets. Meanwhile, additional institutional contextualized evidence on CSR is also provided. Moreover, this study enriches the findings of CSR and organizational outcomes, providing novel evidence through which CSR may create value for firms.

2. Research context and hypothesis development

2.1. The context of weak institution and CSR

Context remains a key issue in management and organization studies (Child, 2009; Meyer and Peng, 2016). Institutions are comprised of a "collections of rules and routines that define actions in terms of relations between roles and situations" (March and Olsen, 1989). The institutional environment affects the efficiency of a market and the transaction costs (North, 1990). Western approaches to CSR have limited relevance in non-Western institutional environments, especially in transitional countries (Barkemeyer, 2009). In specific institutional environments in which institutions are weak, CSR may be understood and enacted in alternative ways, thereby giving CSR a different "twist" (Dobers and Halme, 2009). As a result, traditional assumptions about CSR have increasingly been challenged. A corpus of scholars (Blasco and Zølner, 2010) have been arguing the need for more contextualized research on CSR, one that appreciates the importance of varieties of

institutional, legal, and cultural contexts. Recently, there has been an increase in the number of studies on CSR in emerging and developing countries (Kolk and van Tulder, 2010; Park et al., 2014; Khan et al., 2015), including China (Li and Zhang, 2010; Xu and Yang, 2010).

The institutional contextualization of CSR is controversial. Some studies hold the view that CSR initiatives can help firms reduce transaction costs arising from institutional voids. In this case, the strategic value of CSR should be higher in countries with weaker market-supporting institutions (Ghoul et al., 2017). Meanwhile, some scholars have pointed out that institutional voids emerge because of weak governance, legal, and monitoring mechanisms in a specific institutional context (Ioannou and Serafeim, 2012; Lanis and Richardson, 2015). In such contexts, stakeholders are less capable of monitoring companies' irresponsible behaviors; they tend to evaluate CSR actions with more skepticism, compared to contexts without institutional voids (Amaeshi et al., 2016; Jamali and Karam, 2018). Therefore, it is important to conduct studies that further develop the institutional contextualization of CSR.

2.2. The signal effect of CSR in a weak-institution B2G market

In China's B2G market, regulatory systems and contract enforcement mechanisms are either absent or weak (Ioannou and Serafeim, 2012; Lanis and Richardson, 2015). As such, opportunistic behaviors such as adverse selection and ethical hazards are easily fostered due to institutional deficiencies. This situation further increases transaction costs, such as search, negotiation/contract, and monitoring/enforcement costs. If contracts are not enforced by an effective institutional system, the government purchaser cannot recover losses in the event of a firm reneging on the terms of its contracts. Under such circumstances, governments will be hesitant about entering into long-term agreements. At this point, the role of market signals from firms may be weakened or even dysfunctional, while positive signals from nonmarket behavior, such as CSR, become important factors in the government's choice of "trustworthy" suppliers in the weak institutional context.

As a form of nonmarket behavior, the effectiveness of CSR in reducing transaction costs and signaling trust has been widely studied (Fombrun and Shanley, 1990; Orlitzky et al., 2003; Walsh and Beatty, 2007; Brammer et al., 2008; Surroca et al., 2010; Gallego Álvarez et al., 2011; Cheng et al., 2014). Prior studies have shown that investors associate firms investing in CSR with high transparency (Gelb and Strawser, 2001; Dhaliwal et al., 2012) and low short-term opportunism (Bénabou and Tirole, 2010), which in turn helps lower perceived agency costs and information asymmetry (Su et al., 2014). In addition, CSR initiatives help reduce contracting costs by signaling a firm's commitment to act in accordance with stakeholders' expectations (Brammer and Millington, 2008; Du et al., 2011; Zhang et al., 2014), which may help increase consumer confidence in exchange agreements. In addition, CSR investments result in greater trust and a better reputation (Porter, 1980; Barney, 1991; Hart, 1995), which can help increase customer loyalty and attract new customers (Lev et al., 2010). Moreover, the fact that not many firms have the capabilities necessary to invest in CSR in countries with institutional voids also adds to a greater competitive advantage for firms that do invest in CSR (Flammer, 2015; García Piqueres and García Ramos, 2019). Therefore, CSR reflects the participation and commitment of enterprises to stakeholders on the basis of mutual trust and cooperation; CSR is also a more efficient way of contracting with key stakeholders (Jones, 1995). In summary, CSR can help firms gain a competitive advantage by conveying information and reducing transaction costs, building a trusting relationship with external stakeholders, and finally, by differentiating "CSR firms" from their competitors (Bergh and Gibbons, 2011; Di Giuli and Kostovetsky, 2014).

In China's B2G market, CSR can reduce transaction costs, including search, negotiation/contract, and monitoring/enforcement costs in the procurement process. Before contracting, a bidding firm may use its information advantage to proactively send false signals for government contracts. To maintain that information advantage, in order to implement opportunistic behavior after contracting, firms may also intentionally withhold information during contracting. The better CSR performance can convey effective information about a firm's intentions and quality, demonstrating that firm's ex ante and ex-post nonopportunistic characteristics, to some extent alleviating the ex ante information asymmetry between the government and the enterprise. This helps the government to search for and identify high-quality supplier enterprises. Moreover, businesses in B2G are often characterized by high complexity, large scale, and long lead times, especially those engaged in engineering and service projects. In the performance of the contract, a supplier may adopt opportunistic behaviors, exploiting information advantages and regulatory disadvantages, resulting in a loss of procurement efficiency. At this point, the sense of responsibility demonstrated by companies conveys their characteristics of presenting low moral hazards (Montiel et al., 2012; Ramchander et al., 2012), thereby establishing a credible, ethical, and mutually beneficial corporate image (Gardberg and Fombrun, 2006). Such companies are usually perceived by the government to be honest and trustworthy in the performance of the procurement contract.

In summary, in China's B2G market, with its weak institutions and high prevalence of opportunism, through signaling quality and intentions information, CSR plays a "lubricant" role in reducing transaction costs and building trust between firms and government. This enables firms to differentiate themselves from competitors and ultimately gain a competitive advantage. Based on the above analysis, Research Hypothesis 1 is proposed.

Hypothesis 1: Companies with better CSR are more likely to obtain more government procurement contracts.

2.3. The role of CSR in different nature of property rights

Apart from generally weak institutions, an important institutional background in China is the coexistence of SOEs and non-SOEs (Peng et al., 2004; Zhang et al., 2014). This provides a unique experimental scenario in which to investigate CSR in a more unique institutional context.

In China's B2G market, where formal institutions are inefficient and market rules fail, SOEs and non-SOEs have different market positions. The logic based on transaction costs has weakened or no longer even holds. Considering the natural "blood relationship" between SOEs and the government, SOEs still have a natural advantage in China's B2G market (Shleifer and Vishny, 1994; Allen et al., 2005). Meanwhile, representing the image of the government, the social responsibility activities of SOEs are greatly influenced by the government (Zhang et al., 2010). SOEs generally perform CSR well to fulfill their political mandate, making it difficult to regard CSR as a differentiation signal in China's B2G market. Therefore, the motivation of SOEs to compete for government resources is relatively weak, and the marginal utility generated by the signal of CSR is lower (Zhang et al., 2010). Unlike SOEs, non-SOEs do not have a natural advantage when competing in China's B2G market. Therefore, sending a CSR signal has become one important way for non-SOEs to win the trust of the government and gain access to government resources (Bai et al., 2006; Ma and Parish, 2006). In addition, non-SOEs always face a more unfavorable market environment in terms of competitive pressure and market risk. In such cases, the profit and publicity effects brought about by government procurement contracts make non-SOEs' motivation to compete in the B2G market much stronger (Su and He, 2010; Qian et al., 2015). Thus, the marginal utility generated by the CSR signal should be more obvious. Based on the above analysis, the following hypothesis is proposed.

Hypothesis 2: Compared with SOEs, the CSR signal effect is stronger for non-SOEs.

2.4. CPA—CSR interaction effect

Two main types of nonmarket strategies are found in the existing studies: CSR and CPA. As a market formed by government consumption, political attributes are inherent in a B2G market. Therefore, in a B2G market, it is most likely that CPA interacts with CSR strategies to affect government procurement performance.

Political connections are the most common manifestation of political behavior in developing and emerging economics (Faccio, 2006; Boubakri et al., 2008). The trust, commitment, and recognition brought about by political connections help companies obtain government support and resources, directly due to their "relationships" with government officials (Okhmatovskiy, 2010; Liu et al., 2011; Zhang et al., 2012). For example, these companies receive priority access to financing (Guo et al., 2014), tax cuts (Adhikari et al., 2006), government assistance and subsidies (Faccio et al., 2006; Baltrunaite, 2020), and so on. Previous studies have shown that CSR and CPA are complementary in their response to government pressure, helping companies enhance their legitimacy and facilitating the inflow of critical government-controlled resources (Marquis and Raynard, 2015). In a B2G market, on the one hand, executives' political connections facilitate the communication and coordination between firms and the government. These connections further enhance the government's reception and recognition of CSR signals when companies signal their quality and intentions to the government (Yu et al., 2020). On the other hand, when the CSR signal is weak, political connections can serve as an effective complementary signal, helping to directly reduce transaction costs between companies and governments and helping firms gain government support and resources in the B2G market.

Hypothesis 3: CPA will enhance CSR's signal effect in B2G markets.

This study develops a theoretical framework that presents the role of CSR in mitigating transaction costs and building trust with governments and ultimately improves firms' competitive advantages in B2G markets within weak institutions (see **Figure 1**) .

3. Research design and data

3.1. Sample and data selection

This article takes all Chinese A-shares listed firms in both the main boards of the Shanghai and Shenzhen Stock Exchanges as study samples. The government procurement data were manually collected from the tender database on the Chinese government procurement website (http://www.ccgp.gov.cn/), the only media designated by the Ministry of Finance to publish government procurement information online. Since the public disclosure of government procurement information was formally implemented on March 2015,[4] the years 2016–2018 are selected for this study. Text mining technology was used to obtain the procurement contract data of firms from the website. Supplier names were then fuzzy matched against the full names of listed companies, using the natural year as the basis for compiling statistics on the total number and amount of government procurement orders received by each listed company in that year.[5] The CSR performance of firms used in this study is taken from the Rankins CSR Ratings (RKS)

4. Since March 2015, departments at all levels have started to disclose information on the Chinese government procurement website and local subwebsite, in accordance with the regulations.

5. In the manual collation process, the data were processed as follows: First, government procurement orders obtained by subsidiaries of listed companies were also counted in the total number of government procurement contracts obtained by listed companies when determining the winning companies. Second, in forming the listed enterprises' bidding and procurement data, information on government procurement contracts containing the situation of multiple winning units (such as subcontracts and joint winning bids) were counted as part of the total number of government procurement contracts obtained by the winning units in the year, respectively.

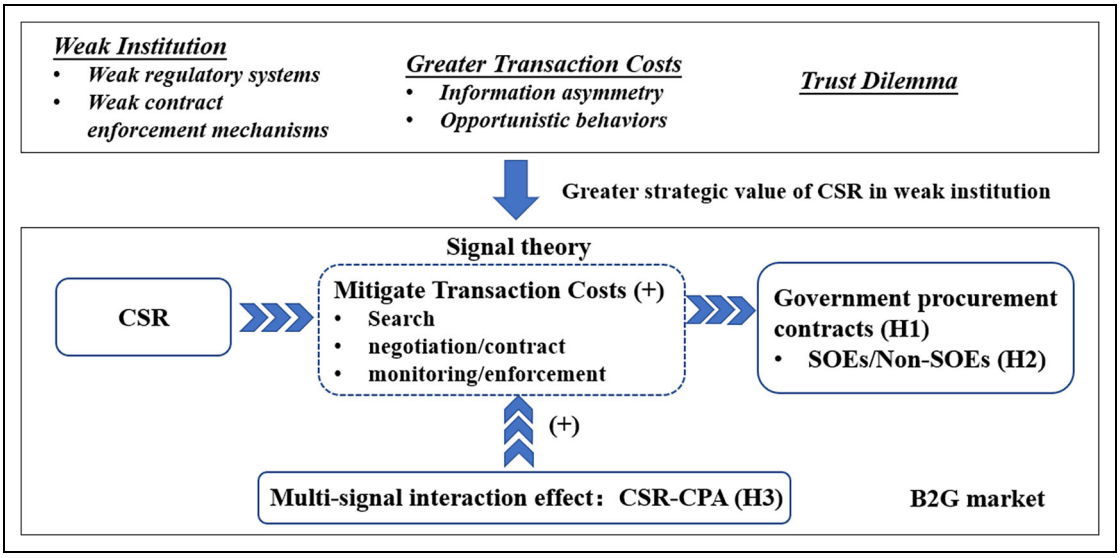

Figure 1. Theoretical framework.

database. Other data of listed firms are mainly from the China Stock Market & Accounting Research Database.

The government procurement contract data, CSR performance, and firm-level variables were matched according to the names of listed firms.[6] As the impact of CSR on firms' access to government procurement contracts has a time lag, the data were selected with the explanatory variables lagged by one period. The samples of financial and insurance industries and sample outliers were then excluded. In addition, considering the weak participation of some industries in China's B2G market, the following data processing was conducted: If all enterprises in one industry did not receive any government procurement contracts during a year, then the sample firms in the industry were excluded. A final sample of 1,866 firms was obtained. To exclude extreme value effects, winsorize smoothing was performed on all continuous variables at the 1% and 99% levels.

3.2. Empirical model and variable measurement

To examine the impact of CSR on firms' acquisition of government procurement orders, the following model is constructed:

$$\text{Procurements}_{it} = \alpha_i + \alpha_t + \beta \times \text{CSR}_{it-1} + \gamma\tau' X_{it-1} + \varepsilon_{it},$$

where Procurement_{it} is the government procurement orders obtained by firm i in year t; CSR_{it-1} is the CSR performance of firm i in year $t-1$, and X_{it-1} is a set of control variables of firm i in year $t-1$. Variables were defined as follows.

6. As the information of all the bidding enterprises of the procurement project is not included in the bid information of the tender database, this study works according to the principle of "sunshine transaction" stipulated in the Government Procurement Law of China, that is, "no unit or individual shall use any means to obstruct and restrict the free access of suppliers to the government procurement market in their own region and industry." For the purposes of this study, the sample data also include enterprises with CSR scores that have not received government procurement orders.

3.2.1. Government procurement contracts (Procurement)

The number of annual government procurement contracts each firm obtains is used as a measure. As a robustness check, the following 3 alternative measures are also used: (1) total value of annual government procurement contract, (2) whether or not the firm received government procurement contracts in the year, and (3) the number of different types of procurement projects.

3.2.2. CSR

Drawing on the existing practices (McGuinness et al., 2017; Wang et al., 2018; Ko et al., 2020), this study uses the RKS data to measure CSR performance. Higher CSR rating scores indicate better CSR performance (Chen and Wan, 2019). There is a high degree of confidence in using the RKS data to characterize CSR performance. On the one hand, the indicator system is based on the international social responsibility standard ISO 260000, covering all aspects of CSR in a more comprehensive way. On the other hand, in terms of evaluation methodology, the RKS database has adopted a structured expert scoring method to objectively evaluate enterprises' social responsibility performance. According to theoretical expectations, the estimated coefficients of CSR should be significantly positive.

3.2.3. Control variables (*X*)

Drawing on existing research (Flammer, 2018), the following control variables were included in the model: nature of property right, firm age, competitiveness of the industry, political connection, firm size, financial leverage, firm performance, and investment opportunities. In addition, this study controlled for industry effects and year effects (see **Table 1** for detailed variable definitions).

3.3. Descriptive statistics

Table 2 reports the basic statistical information on the main variables. In terms of average value and standard

Table 1. Description of variable definitions

Variable Type	Variable Name	Variable Symbols	Variable Description
Explained variables	Corporate access to government procurement contracts	Procurement	The number of government procurement orders a company receives annually
Explanatory variables	Corporate social responsibility	CSR	The Rankins CSR Ratings (RKS) score
Control variables	Nature of property right	State	State-owned or state-controlled, take 1; otherwise, take 0
	Firm age	Age	The natural logarithm of the number of years the business has been established
	Competitiveness of the industry	Competition	The Herfindahl Index (HHI) of the industry in which the company operates, with smaller values indicating greater competition
	Political connection	CPA	If the general manager or chairman of the company has been or is currently a member of a government agency at district or county level or above, take 1; otherwise, take 0
	Firm size	Size	The natural logarithm of net fixed assets
	Financial leverage	Leverage	Long-term gearing ratio
	Firm performance	ROA	The annual net return on total assets
	Investment opportunities	Opportunity	The Tobin's *Q* value

CPA = corporate political activity; ROA = return on assets.

Table 2. Descriptive statistics for key variables

Variable Name	Variable Symbols	Sample Size	Average Value	Standard Deviation	Minimum Value	Maximum Value
Corporate access to government procurement contracts	Procurement	1,866	1.994	6.891	0	48
Corporate social responsibility	CSR	1,866	41.747	10.931	22.54	74.9
Nature of property right	State	1,866	0.585	0.493	0	1
Firm age	Age	1,866	3.018	0.261	2.303	3.526
Competitiveness of the industry	Competition	1,866	0.127	0.118	0.026	0.777
Political connection	CPA	1,866	0.124	0.33	0	1
Firm size	Size	1,866	12.092	1.807	7.351	16.607
Financial leverage	Leverage	1,866	0.216	0.19	0	0.735
Firm performance	ROA	1,866	0.039	0.053	−0.156	0.206
Investment opportunities	Opportunity	1,866	1.478	1.361	0.131	7.476

CPA = corporate political activity; ROA = return on assets.

deviation, the values of all variables are within reasonable limits, and there is a degree of variation.

Table 3 shows the correlation coefficients between the main variables. From **Table 3**, one can see that the correlation coefficient between CSR and corporate access to government procurement contracts is 0.080 and significant at the 1% level. This finding initially supports the assertion that CSR has a facilitating effect on corporate access to government procurement contracts. The correlation coefficients between the other corporate variables are all much less than 0.5, indicating that the model has no serious colinearity problems.

For the estimation model, as the explanatory variable of corporate access to government procurement contracts is a discrete variable of count type, the negative binomial model was chosen as the estimation model. In addition, as the explanatory variable is a truncated variable with a lower bound of 0, the Tobit model is used to obtain parameter estimates that are more accurate.

Table 3. Correlation coefficient matrix for key variables

Variable Name	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Procurement (1)	1								
Corporate social responsibility (2)	0.080***	1							
State (3)	0.066***	0.151***	1						
Age (4)	−0.034	−0.003	0.157***	1					
Corporate political activity (5)	0.098***	0.009	−0.098***	−0.049**	1				
Size (6)	0.026	0.398***	0.254***	−0.002	0.006	1			
Leverage (7)	−0.048**	0.155***	0.215***	0.144***	0.038*	0.356***	1		
ROA (8)	0.024	0.036	−0.194***	−0.077***	0.010	−0.087***	−0.308***	1	
Opportunity (9)	−0.023	−0.166***	−0.193***	−0.128***	0.007	−0.416***	−0.388***	0.286***	1

ROA = return on assets.

*Significant at the 1% level. **Significant at the 5% level. ***Significant at the 10% level.

4. Empirical analysis

4.1. CSR and government procurement contracts

Table 4 reports the results of the impact of CSR on corporate access to government procurement contracts. Column (1) shows the estimation result of the negative binomial model, and Column (4) shows the estimation result of the Tobit model. The CSR coefficients are all significantly positive, regardless of the estimation models. More specifically, the coefficients are 0.023 and 0.127, and all are significant at the 5% level. This finding indicates that CSR performance brings about a significant contribution to a company's access to government procurement contracts. The results above validate Hypothesis 1.

The results of the main control variables are consistent with existing literature. For example, the coefficient of variable "State" was significantly and positively associated with dependent variable "Procurement" at 1% level. This finding indicates that government procurement orders are more readily accessible to SOE firms than non-SOE firms, which is in line with the prevailing competitive advantage of SOEs in China's B2G market. In addition, the coefficients of other variables are as anticipated.

4.2. The role of CSR in different nature of property rights

Table 4 also shows the signal effect of CSR for firms under different natures of property rights. In the subsample regressions, the results in Columns (2) and (5) show that the estimated coefficients of CSR among SOEs are negative and insignificant. Meanwhile, the estimated CSR coefficient among the non-SOEs in Columns (3) and (6) are both positive and significant at the 1% level. When CSR is further interacted with the natures of property rights, the results show that the estimated coefficients of interaction are significantly negative at the 1% and 5% levels.[7] The above results indicate that the contribution of CSR to the access to government procurement contracts is only found in non-SOEs, a finding which supports Hypothesis 2.

Since we have confirmed the positive effect of CSR only occurs for non-SOEs, the next analysis will focus on the non-SOEs sample.

4.3. Robustness tests

4.3.1. Alternative proxies of corporate government procurement contracts

Corporate access to government procurement contracts is the explanatory variable in this study; any error in the measurement of corporate access may affect the estimation results. For this reason, this study uses whether or not the firm received a government procurement contract in the year as proxy variables. The results in Columns (1)–(3) in **Table 5** show that the estimated coefficients of the CSR are always significantly positive in full samples firms and non-SOE samples and are always insignificant in SOEs samples. This finding confirms the robustness of our results. Moreover, the total value of annual government procurement contracts is also used as a proxy variable.[8]

In addition, government procurement contracts are classified and divided into engineering, service, and goods categories, according to the procurement items. The relationship between CSR performance and access to the multiple categories of government procurement contracts is then examined. The results show that, except for service procurement projects, CSR signaling functions exist in both goods and engineering procurement projects. Among them, the service procurement items show that the equilibrium is not achieved. One possible explanation for this finding is that there were fewer data of this type during the sample window, and better regression convergence could not be achieved. Columns (4)–(9)

7. This is not presented due to space reasons. If necessary, this information can be obtained from the author.

8. This is not presented due to space reasons. If necessary, this information can be obtained from the author.

Table 4. Corporate social responsibility (CSR) and government procurement contracts

Variable Name	(1) Procurement	(2) Procurement	(3) Procurement	(4) Procurement	(5) Procurement	(6) Procurement
CSR	0.023*** (0.008)	0.009 (0.009)	0.056*** (0.013)	0.127** (0.054)	0.051 (0.077)	0.213*** (0.072)
State	0.801*** (0.168)			3.911*** (1.257)		
Age	−0.169 (0.296)	−1.013** (0.464)	1.115*** (0.385)	−0.632 (1.812)	−4.924* (2.836)	4.362** (2.111)
Size	0.256*** (0.067)	0.230*** (0.082)	0.229* (0.117)	1.413*** (0.470)	1.400** (0.693)	0.997* (0.589)
Leverage	−0.440 (0.623)	−0.885 (0.768)	−0.658 (1.013)	−3.110 (3.914)	−2.860 (5.226)	−2.843 (5.646)
ROA	2.494 (1.752)	4.251* (2.516)	1.248 (2.514)	29.421** (12.485)	44.601** (19.136)	13.100 (14.173)
Opportunity	−0.000 (0.081)	−0.191* (0.115)	0.076 (0.104)	−0.488 (0.527)	−1.494 (0.926)	−0.253 (0.592)
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−4.726*** (1.540)	−0.301 (2.336)	−9.932*** (1.867)	−37.197*** (9.769)	−11.844 (15.044)	−45.833*** (11.134)
Number of observations	1,866	1,092	774	1,866	1,092	774
Pseudo R^2	.083	.097	.138	.080	.088	.114

CSR = corporate social responsibility; ROA = return on assets.

Standard errors are in parenthesis. *Significant at the 1% level. **Significant at the 5% level. ***Significant at the 10% level.

Table 5. Robustness test: Alternative proxies of corporate access to government procurement contract

Variable Name	(1) Procurement_dummy	(2) Procurement_dummy	(3) Procurement_dummy	(4) Goods	(5) Goods	(6) Services	(7) Services	(8) Engineering	(9) Engineering
Corporate social responsibility	0.012*** (0.004)	0.007 (0.005)	0.017** (0.007)	0.008 (0.012)	0.093*** (0.019)	−0.025* (0.013)	0.009 (0.020)	0.025** (0.012)	0.056** (0.023)
State	0.190** (0.085)								
Age	0.053 (0.139)	−0.253 (0.195)	0.521** (0.220)	−1.917*** (0.644)	2.342*** (0.618)	−2.237*** (0.745)	0.402 (0.540)	−1.086** (0.500)	0.550 (0.524)
Size	0.071** (0.032)	0.073* (0.042)	0.068 (0.059)	0.033 (0.139)	0.244 (0.171)	0.317*** (0.120)	0.061 (0.141)	0.016 (0.101)	0.157 (0.135)
Leverage	−0.303 (0.279)	−0.102 (0.347)	−0.849 (0.534)	−2.997*** (0.945)	0.462 (1.348)	−1.325 (1.279)	−2.587 (1.622)	0.412 (0.977)	−1.348 (1.465)
ROA	1.542* (0.843)	1.892 (1.153)	1.358 (1.308)	7.964** (3.737)	5.778 (3.590)	6.191** (3.143)	−3.168 (3.397)	3.500 (2.736)	4.154 (4.382)
Opportunity	−0.016 (0.039)	−0.033 (0.061)	−0.036 (0.058)	−0.507*** (0.133)	0.312** (0.150)	−0.393* (0.237)	−0.010 (0.140)	−0.055 (0.171)	−0.311** (0.144)
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−2.319*** (0.709)	−0.347 (1.008)	−3.750*** (1.013)	−8.584*** (3.023)	−16.519*** (3.085)	1.760 (3.411)	−17.740*** (2.582)	1.830 (2.768)	−22.568*** (2.672)
Number of observations	1,866	1,031	717	1,092	774	1,092	774	1,092	774
Pseudo R^2	.173	.180	.202	.189	.178	.206	.323	.179	.28

ROA = return on assets.

Standard errors are in parenthesis. *Significant at the 1% level. **Significant at the 5% level. ***Significant at the 10% level.

Table 6. Robustness tests: Alternative proxies of corporate social responsibility (CSR)

Variable Name	(1) Procurement	(2) Procurement	(3) Procurement	(4) Procurement	(5) Procurement	(6) Procurement
CSR_mean	0.137** (0.059)	0.044 (0.083)	0.281*** (0.082)			
CSR_indus				3.935*** (1.150)	2.933 (1.800)	4.027*** (1.372)
State	4.163*** (1.363)			3.858*** (1.240)		
Age	−2.299 (2.227)	−6.501* (3.417)	4.032 (2.488)	−0.719 (1.827)	−4.883* (2.831)	3.616* (2.106)
Size	1.460*** (0.507)	1.329* (0.718)	0.518 (0.612)	1.331*** (0.467)	1.225* (0.697)	1.111* (0.568)
Leverage	−1.851 (4.137)	0.821 (5.411)	−1.977 (5.944)	−3.446 (3.911)	−3.228 (5.250)	−3.735 (5.596)
ROA	33.122** (14.364)	47.186** (21.364)	19.242 (14.767)	28.470** (12.523)	42.306** (19.221)	12.541 (14.411)
Opportunity	−1.020 (0.629)	−2.289** (1.069)	−0.469 (0.646)	−0.532 (0.532)	−1.491 (0.925)	−0.334 (0.607)
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−41.278*** (12.215)	−7.667 (16.629)	−46.362*** (12.675)	−32.304*** (9.812)	−8.325 (15.379)	−37.763*** (10.775)
Number of observations	1,581	972	609	1,866	1,092	774
Pseudo R^2	.088	.094	.127	.081	.089	.114

CSR = corporate social responsibility; ROA = return on assets.

Standard errors are in parenthesis. *Significant at the 1% level. **Significant at the 5% level. ***Significant at the 10% level.

Table 7. Robustness tests: Alternative study sample

Variable Name	(1) Procurement	(2) Procurement	(3) Procurement	(4) Procurement	(5) Procurement	(6) Procurement
Corporate social responsibility	0.195** (0.085)	0.102 (0.128)	0.224*** (0.076)	0.131** (0.054)	0.046 (0.076)	0.236*** (0.073)
State	5.989*** (1.937)			4.391*** (1.249)		
Age	0.510 (2.401)	−4.965 (4.077)	5.181** (2.261)	−0.576 (1.804)	−5.035* (2.804)	4.385** (2.109)
Size	2.276*** (0.744)	2.597** (1.099)	0.968 (0.619)	1.234*** (0.454)	1.201* (0.667)	0.725 (0.582)
Leverage	−10.874* (6.413)	−12.180 (9.079)	−4.008 (6.120)	−3.444 (3.846)	−3.404 (5.146)	−2.989 (5.582)
ROA	26.576* (15.347)	44.905* (27.063)	10.784 (12.066)	31.142** (12.539)	45.491** (19.036)	16.844 (14.312)
Opportunity	−0.830 (0.597)	−2.166** (0.987)	−0.445 (0.583)	−0.703 (0.524)	−1.844** (0.888)	−0.449 (0.601)
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−170.162*** (23.471)	−174.240*** (29.458)	−109.004*** (15.637)	−39.346*** (9.466)	−8.569 (14.480)	−47.368*** (11.053)
Number of observations	2,080	1,229	851	1,866	1,092	774
Pseudo R^2	.091	.099	.131	.084	.092	.121

ROA = return on assets.

Standard errors are in parenthesis. *Significant at the 1% level. **Significant at the 5% level. ***Significant at the 10% level.

in **Table 5** show the estimation results for state-owned and non-state-owned samples. The results indicate that the CSR effect of non-SOEs is not significantly positive, and the CSR effect of SOEs is significantly negative.

4.3.2. Alternative proxies of CSR

In this study, CSR is the key explanatory variable, and a CSR measurement error may also lead to incorrect or inconsistent estimated coefficients. To reduce the impact of CSR measurement error, this study uses the average CSR rating score of the company's RKS scores (CSR_mean) for the past 3 years as a proxy measure of CSR in order to examine the impact of long-term CSR performance on the company's access to government procurement contracts. Columns (1)–(3) in **Table 6** show a robust result, namely, that the estimated CSR coefficients are significantly positive only for non-SOEs.

A company's main competitors in any B2G market are mainly companies in the same industry. When a company's CSR performance is at the leading position in the industry, that company's CSR signals are more clearly differentiated and are more likely to become a competitive advantage in a B2G market. Therefore, this study compares a company's CSR performance with the average performance of companies in the same industry, assigning a value of 1 if the CSR performance of the focal company is higher than the industry average and 0 otherwise. The dummy variable (CSR_indus) is used as an alternative measure of CSR. Column (5) in **Table 6** shows that the relative performance of CSR in the SOEs sample has no significant effect on access to government procurement. Columns (4) and (6) in **Table 6** indicate among all firms and non-SOEs, better CSR performance in the same industry has a positive contribution to access to government procurement orders, thereby validating the signal effect of CSR.

4.3.3. Alternative study sample

In the previous section, a sample of firms was excluded if all enterprises in any given industry did not receive any government procurement contracts during a year. Considering that this part of the sample may also actually compete in the B2G market, that sample is included in this part to further examine the robustness of the findings. The results are shown in Columns (1)–(3).

In addition, some procurement projects may be directly linked with distinct characteristics, such as being energy-saving, eco-friendly, and so on. These kinds of projects are most likely to be on the government procurement list for energy-saving products or eco-labeled products. Such projects are more likely to be allocated to designated companies according to special procurement procedures and rules. Then, we excluded such government procurement contracts from the sample. Columns (4)–(6) in **Table 7** show that the estimated coefficients of CSR after conducting the above sample replacement remain robust.

4.3.4. Heckman self-selection model

There may also be a self-selection problem in the sample used in this study, that is, companies may be determining whether they are active in CSR due to their own characteristics, per se. To address the above bias, the signal effect of CSR was retested, using the Heckman two-stage approach. In the first stage, the Probit model on the influencing factors of CSR was built, calculated the inverse Mills ratio "imr," and added it into the baseline model to correct the self-selection problem of the sample in the second stage. Columns (2) and (6) in **Table 8** show that the CSR coefficient in full sample and non-SOEs remains significantly positive, indicating that the results remain robust after correcting for the potential self-selection bias.

4.3.5. Instrumental variables method

Considering the endogeneity issue arising from the fact that firms that receive more government procurement orders are likely to be more motivated and capable of fulfilling their CSR, the instrumental variables method is used to address the endogenous problems. Drawing on existing practices (Krishnamurti et al., 2019), the industry mean (CSR_IND) and regional mean (CSR_STATE) for each year of the CSR of the sampled firms were used as instrumental variables. Regressions were conducted using the instrumental variable Tobit (IV Tobit) two-step method. The first-stage regression in **Table 9** shows that the industry mean (CSR_IND) and regional mean (CSR_STATE) for each year of the CSR are significantly positive at the level of 5%. The second-stage regression shows that the effect of CSR is still significantly positive after controlling for the endogeneity problems.

4.4. The CPA—CSR interaction effect in China's B2G market

In China's B2G market, the CPA will interact with the CSR strategy to affect firm's government procurement performance. To examine the above question, we interact the CSR with the dummy variable of whether a firm's executives are politically connected (CPA). **Table 10** reports the interaction effect of CPA and CSR on government procurement performance. Columns (1) and (2) show the full-sample regression results of the negative binomial and Tobit regressions, respectively. Given that SOEs are naturally politically connected, non-SOEs are chosen for further estimation. Columns (3) and (4) show the regression results for non-SOEs. The results show that there is a boosting effect of CPA on the signaling role of CSR. This is true for both the full sample and the non-SOEs sample, thereby validating Hypothesis 3 of this study.

5. Heterogeneity analysis

5.1. Temporal heterogeneity of CSR signaling

The signaling effect of CSR is likely to diminish as long-term partnerships are formed between companies and governments. Specifically, long-term partnerships allow for the establishment of stable trust between the two parties engaged in a transaction. A history of successful transactions with the government can in reality be a direct signal of the firm's nonopportunistic behavior and thus can help the firm gain the government's trust (Flammer, 2018). As a result, suppliers who have been awarded contracts and then successfully performed and fulfilled those

Table 8. Robustness test: Heckman test

Variable Name	(1) CSR_indus	(2) Procurement	(3) CSR_indus	(4) Procurement	(5) CSR_indus	(6) Procurement
Corporate social responsibility		3.660*** (1.137)		2.840 (1.780)		3.606*** (1.381)
State	0.161** (0.074)	5.839*** (1.896)				
Age	0.020 (0.127)	−0.387 (1.824)	0.160 (0.180)	−4.738 (3.225)	−0.132 (0.202)	0.522 (2.490)
Size	0.290 (0.235)	−0.801 (4.783)	0.388 (0.293)	−2.516 (6.478)	0.184 (0.454)	−3.497 (5.681)
Leverage	0.098 (0.096)	7.033*** (1.778)	−0.029 (0.145)	7.540*** (2.465)	0.183 (0.138)	10.008*** (2.841)
ROA	2.770*** (0.743)	59.437** (29.941)	3.984*** (1.060)	56.316 (46.465)	0.991 (1.176)	39.620** (17.740)
Opportunity	−0.003 (0.033)	−0.843 (0.529)	−0.026 (0.053)	−1.986** (0.939)	0.052 (0.050)	0.570 (0.830)
imr		14.936 (14.202)		4.966 (15.737)		33.281** (14.375)
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−4.639*** (0.659)	−91.890 (56.057)	−4.994*** (0.943)	−22.800 (65.435)	−4.964*** (0.934)	−178.261*** (62.311)
Number of observations	1,866	1,866	1,072	1,072	740	740
Pseudo R^2	.099	.085	.136	.091	.137	.115

ROA = return on assets.

Standard errors are in parenthesis. *Significant at the 1% level. **Significant at the 5% level. ***Significant at the 10% level.

Table 9. Robustness tests: IV method

Variable Name	(1) CSR	(2) Procurement	(3) CSR	(4) Procurement	(5) CSR	(6) Procurement
Corporate social responsibility (CSR)		0.271** (0.123)		0.266 (0.167)		0.334* (0.198)
CSR_IND	0.516** (0.209)		0.563* (0.298)		0.553** (0.217)	
CSR_STATE	0.826*** (0.036)		0.944*** (0.052)		0.842*** (0.037)	
State	0.578 (0.463)	4.049*** (1.276)				
Age	−0.641 (0.809)	−0.358 (2.181)	−0.491 (1.175)	−5.133 (3.338)	−0.488 (0.801)	4.678* (2.767)
Size	1.504 (1.502)	−3.559 (4.157)	3.474* (1.875)	−3.643 (5.666)	1.559 (1.502)	−3.507 (6.097)
Leverage	12.639*** (4.412)	29.056** (12.636)	16.429*** (6.018)	41.418** (18.962)	12.094*** (4.367)	15.911 (14.820)
ROA	2.322*** (0.170)	0.847 (0.558)	2.561*** (0.224)	0.563 (0.811)	2.335*** (0.169)	0.437 (0.794)
Opportunity	0.224 (0.208)	−0.740 (0.570)	0.362 (0.327)	−1.885* (0.971)	0.224 (0.208)	−0.510 (0.600)
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−45.074*** (9.024)	−40.258*** (11.293)	−56.254*** (18.298)	−10.625 (17.122)	−47.656*** (9.272)	−47.955*** (12.931)
Number of observations	1,866	1,866	1,092	1,092	774	774

ROA = return on assets.

Standard errors are in parenthesis. *Significant at the 1% level. **Significant at the 5% level. ***Significant at the 10% level.

Table 10. Corporate political activity–corporate social responsibility (CSR) interaction effect in China's business to government market

Variable Name	(1) Procurement	(2) Procurement	(3) Procurement	(4) Procurement
CSR*Political	.016*** (.004)	.142*** (.037)	.024*** (.007)	.134*** (.048)
CSR	.021*** (.007)	.11** (.054)	.054*** (.013)	.209*** (.072)
State	.855*** (.167)	4.287*** (1.242)		
Age	−.246 (.292)	−.515 (1.806)	1.053*** (.391)	4.358** (2.087)
Size	.23*** (.066)	1.21*** (.454)	.217* (.116)	.731 (.576)
Leverage	−.31 (.622)	−3.321 (3.847)	−1.194 (1.022)	−3.189 (5.562)
ROA	2.799 (1.723)	31.613** (12.517)	.776 (2.494)	16.62 (14.157)
Opportunity	−.034 (.08)	−.677 (.524)	.044 (.105)	−.455 (.597)
Year fixed effect	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes
Constant	−4.651*** (1.498)	−37.63*** (9.332)	−10.131*** (1.79)	−45.519*** (10.789)
Number of observations	1,866	1,866	774	774
Pseudo R^2	.085	.083	.143	.12

CSR = corporate social responsibility; ROA = return on assets.

Standard errors are in parenthesis. *Significant at the 1% level. **Significant at the 5% level. ***Significant at the 10% level.

Table 11. Temporal and industry heterogeneity of corporate social responsibility (CSR) signaling

Variable Name	(1) Procurement	(2) Procurement
CSR*Age	−0.387* (0.222)	
CSR*HHI		−1.367** (0.640)
CSR	1.356** (0.662)	0.360*** (0.108)
Age	20.947** (9.941)	4.384** (2.080)
Size	0.998* (0.587)	1.093* (0.582)
Leverage	−1.763 (5.674)	−3.279 (5.566)
ROA	12.640 (14.288)	11.723 (14.017)
Opportunity	−0.169 (0.599)	−0.207 (0.584)
HHI		54.658 (41.572)
Constant	−95.724*** (31.874)	−52.887*** (17.025)
Number of observations	774	774
Pseudo R^2	.115	.116

HHI = Herfindahl index; CSR = corporate social responsibility; ROA = return on assets.

Standard errors are in parenthesis. *Significant at the 1% level. **Significant at the 5% level. ***Significant at the 10% level.

contracts in the past may have an advantage over new suppliers in a B2G market. At this point, governments may be less sensitive to the CSR signals. In summary, as firms form stable relationships with governments for long-term procurement, the signaling role of CSR will diminish.

Given the importance of government procurement in China, it is reasonable to use firm age as a proxy variable for a firm's government procurement history. Firm age is often taken as a proxy for "firm visibility" (Hansen and Mitchell, 2001), "experience," "competitiveness," or "reliability" (Boddewyn, 1994). In addition, the older the firm is, the more social relationships that firm will have accumulated, including the firm's relationship with the government (Minoja et al., 2010). Therefore, older firms are more likely to have participated in a B2G market earlier and to have established long-term partnerships with the government. This study interacts CSR with a firm's age (Age) to estimate the heterogeneity of CSR signaling. Column (1) in **Table 11** shows that the coefficient of interaction term is significantly negative at 10% levels. The results indicate that, as firms establish long-term partnerships (as firms get older) with governments, the CSR signaling effect diminishes, that is, the signaling effect of CSR has a time effect.

5.2. Industry heterogeneity of CSR signaling

In a B2G market, the government is more sensitive to trustworthy signals from firms when there are multiple bidders and strong competition. When a firm is in a more concentrated industry, that firm is more likely to win government procurement orders (Carril and Duggan, 2020). On the one hand, when the industry is highly competitive, competitive pressures may induce firms to engage in unethical behavior and corrupt practices and other forms of malpractice (Bennett et al., 2013). As a result, firms in highly competitive industries are perceived to be at a higher moral risk of opportunistic behavior, and therefore, governments are more likely to build trust in firms by identifying positive CSR

signals. On the other hand, as competition reduces corporate profits and leads to higher CSR performance costs, industry competition may actually increase the credibility of CSR signals.[9] Based on the above analysis, the intensity of industry competition may be expected to enhance the CSR signal effect. To test the above, we interact CSR with the industry Herfindahl index (HHI). Column (2) in **Table 11** shows that the more competitive the industry in which a firm operates is (the smaller the HHI index), the stronger the CSR signal effect in the B2G market will be. The results suggest that industry competition can enhance and amplify the CSR signal effect and that there is industry heterogeneity of CSR signaling.

6. Conclusions and implications

In transitional economies with weak institutions, as a nonmarket strategy, CSR is an important nonmarket signal that companies can use to gain government trust and resources. This study shows that the CSR of non-SOEs can play the role of "lubricant" in the partnership between enterprises and the government and help firms to obtain more government procurement contracts in a B2G market. Moreover, CPA, which is characterized by the political attributes of executives, has a boosting effect on the CSR signal. This study suggests that CSR can help firms reduce the transaction costs arising from weak institutions and develop a competitive advantage in B2G markets. At the same time, the political power of firms in a weak institution context cannot be ignored and is an important complementary signal in B2G market.

The study has relevant theoretical and practical implications. For theoretical implications, first, nonmarket strategy and institutional factors are incorporated into the same framework and are theoretically complementary to each other. Institution theory expands the connotation and boundary of theories related to nonmarket strategies. Theoretical feedback is realized through enhancing the explanatory power of institutional theory. Specifically, this study focuses on the role of nonmarket strategies in weak institutional contexts and contributes to a deeper understanding of firm "nonmarket" strategies and interactions in relation to institutional context. Secondly, the study is of significance to perfect a theoretical framework of nonmarket strategy. Specifically, the minor attempt of this study will help to further build a comprehensive framework of nonmarket strategies, including how nonmarket strategies interact (substitution/complementary effects) and how firms realize value maximization through nonmarket strategic resource allocation. Finally, by providing institutional contextualized evidence of CSR in B2G market, the value connotation of CSR theory is enriched and broadened.

For practical implications, first, non-SOEs, especially those that have not yet established trust and long-term relationships with governments, should consider the benefits of CSR in an integrated manner and benefit from CSR practices in their strategic management. Firms should improve their CSR performance, as well as the quality of information disclosure. Then, firms can enhance their brand image, build a good industry reputation, and finally improve their competitiveness in B2G markets. Moreover, in addition to focusing on CSR, firms should pay attention to the overall management of other nonmarket behaviors, including the firms' political connections, media reports and reputation and so on, to enhance overall market competitiveness.

This article also has some shortcomings such as the short sample period and the limited available data pertaining to government procurement, thereby leading to a call for more research in the future. In addition, this study suggests the following future research directions: First, a further exploration of whether the resource allocation based on CSR signals in China's B2G market can really maximize social welfare. The second is to further discuss the heterogeneity of CSR signaling for more fine-grained classification of contracts.

Data availability statement

The following data sets were generated:

Government procurement data: openly available in the tender database on the Chinese government procurement website (http://www.ccgp.gov.cn/).

CSR performance: available in the Rankins CSR Ratings database.

Other data of listed firms: available in the China Stock Market & Accounting Research Database.

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The authors have declared that no competing interests exist.

Author contributions

The coauthors contributed to this piece in the following ways:

- Contributed to conception and design: RR, WQ, LZ.
- Contributed to acquisition of data: WQ.
- Contributed to analysis and interpretation of data: RR, WQ.
- Drafted and/or revised the article: RR, WQ, LZ, LS.
- Approved the submitted version for publication: RR, WQ, LZ, LS.

9. Spence (1973) pointed out that expensive signals are more credible because they are difficult to imitate.

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