Influential government customers and environmentally responsible firms

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Abstract

A critical strategy choice for a corporate governance is how to disclose corporate performance to satisfy its key stakeholders. Using data from 2009 to 2016 on the environmental information disclosure (EID), we document consistent evidence that if the government is a customer of the firm, the firm has higher corporate EID scores, which indicates a firm is motivated to disclose a higher level of corporate environmental responsibility (CER). Firms tend to disclose higher levels of CER efforts to accommodate their influential government customer's environmental concerns. The relative bargaining advantage in the supply chain plays a moderating role on the association between government customer and CER, where the positive impact is more pronounced in firms operating in competitive industries, at a small scale, and with high trade credit. Therefore, a firm should strategically disclose its proactive environmental performance to reflect key stakeholder demands, and allocates resources for environmental-friendly activities by evaluating its relative bargaining position in the supply chain. Our results are robust to alternative measures of government customer and different estimation strategies.

Keywords: Government customer; resource dependence; corporate environmental responsibility; supply firm; bargaining; political connection

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1. Introduction

Information disclosure in corporations may have ambiguous effects on firms' values (Hermalin & Weisbach, 2012). With growing concerns about climate change, corporate social responsibility (CSR), and corporate environmental responsibility (CER) in particular, has become an important message that a firm sends to its stakeholders. Recent studies have shown that customers can affect a supplier's CSR through the complex supply chain (Dai et al., 2021), regardless of whether information disclosure is greening or greenwashing behaviour (Li and Wu, 2020; Shi et al., 2020). As CER represents the voluntary-based private contribution of a firm, one way to enforce corporate environmental disclosure is through regulation or legislation (Cai et al., 2016; Dummett, 2006; Kim et al., 2017). Resource dependence theory (Pfeffer & Salancik, 1978) suggests that organizations take strategic actions to manage their dependence on vital resources. Therefore, a critical strategic question for corporate governance is how to disclose a company's environmental performance to satisfy key stakeholders.

According to the World Trade Organization (2014), government spending accounts for approximately 15% of gross domestic product (GDP) in developed and developing countries. In China, government procurement expenditure has increased continuously and is now more than 30% of GDP. Therefore, the government customer is one of the influential stakeholders that can affect firms' investment decisions (Abdurakhmonov et al., 2021). Recent studies have pointed out that contracting business with the government increases a firm's profitability (Cohen and Li, 2020), and a firm can improve its competitiveness in wininng government procurement contracts by taking CSR (Flammer, 2018). Thus, as environmental sustainability becomes one of the government's top strategies, will firms commit to a higher level of corporate environmental performance in order to maintain their business relationships with government customers? The literature is silent on such discussions.

In this paper, we investigate how the government contract or government customer induces firms to adopt environmental responsibility in their business model, thus driving the market toward green sustainability. We follow the arguments of Buysse and Verbeke (2003) and Delmas and Montiel (2009), which indicate that proactive environmental strategies at the firm level reflect key stakeholder demands and the resource dependence theory that corporate decisions are affected by a firm's dependency on external resources (Abdurakhmonov et al., 2021). By investigating the business transactions that are completed with the government, we first address the extent to which the government customers affect firms' incentives to disclose more environmental responsibility. Based on panel data of Chinese listed firms in the polluting industry from 2009 to 2016, we find that the government as the major customer has a positive and significant impact on the level of corporate environmental discloures, which implies that a firm will strive to be "green" and disclose more environment-friendly actions if its income mainly relies on government procurement orders. Our results survive across a battery of robustness tests, including alternative measurements of key variables, after addressing potential endogeneity and carrying out additional placebo tests to rule out the possibility of other influential confounders.

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We further explain why government customers can affect a supply firm's decisions about environmental strategies. In the literature of business management, a firm's positive response to CER in the presence of government customers can be explained by the relative bargaining power between the firm and the government in the supply chain game. Bargaining power plays a crucial role in the customer–supplier business relationship, and the party with valuable chips can normally take a strong position (Kale and Shahrur, 2007; Lian, 2017; Petersen and Rajan, 1997). The government customer is generally in a stronger position relative to the supply firms as the public procurement orders represent long-term, low-risk, sustainable profits for the supply firms (Geng and Doberstein, 2008). Therefore, it is very likely that the government can induce their supplier to undertake more CER activities. This view is in line with Dai et al. (2021), who state that customers can affect a supplier's CSR through the decision-making process.

On the supplier side, the supply firms that are in a less favourable position are more likely to accept the customer's additional environmental-related requirements to retain the business relationship. Specifically, we have constructed three indicators to measure the relative bargaining power of the supply firms. First, we use the operating scale of the firm to represent the bargaining power of the supply firms (Chipty, 1995). Our result shows that larger firms tend to disclose less CER as they are less constrained by their government clients. Second, we show that degree of market competition plays a role, as firms in a more competitive industry are likely to be replaced by competitors if they fail to meet the requirement of their government clients, and thus are in a position with less bargaining power (Bonaime et al., 2018). Third, we utilize trade credit to reflect the bargaining power between the customer and the supplier. We use this proxy because the supply firm in a weak position has to provide its major customer with a more relaxed trade-credit offer to keep the corporate relationship (Fabbri and Klapper, 2016). As expected, we find the supply firm discloses more CER if its government client is offered higher trade credits.

This paper makes two significant contributions to the literature. First, it speaks to the literature on the information disclosure and corporate governance (Cai et al., 2016; Dai et al., 2020; Dummett, 2006; Kim et al., 2017). Corporate disclosure can have both positive and negative impacts on firms. An improved disclosure reduces asymmetry of information and thus increase a firm's value. It may also aggravate agency problems as the managerial compensation rises (Hermalin & Weisbach, 2012). Thus, corporate environmental responsibility, which is the environmental component of CSR, has been an increasing concern in corporate strategic management. The discussion of such environmental public goods is on the external drivers with mandatory or regulatory policies (Abrell and Rausch, 2017) or on internal factors such as the composition of top management (Kwak et al., 2012). How to motivate firms to take more environmental responsibility voluntarily remains a challenging strategic question for both government and corporate governance.

A growing number of studies in the literature have scrutinized the drivers for firms to take CER.[2] Cohen and Li (2020) show that firm profitability increases with the concentration of major government customers, mainly due to the lower demand uncertainty compared to the situation with major corporate customers. In this paper, we further examine why and how firms engage in more pro-environmental activities in the presence of major government customers. That is, in addition to the invisible relationships such as corporate political connections and corporate bribery behaviour (Deng et al., 2020; Grey, 2018; Hong and Teh, 2019; Zhang, 2017), this paper provides a new angle for exploring CER from the perspective of visible business relationships.

Second, our findings extend a nascent but growing literature on the role of government in firm dynamics. Moretti et al. (2019) show that government defense-related R&D funding results in a significant increase in private R&D and thus improves the productivity of private firms. Public procurements are often used by the government as an instrument to foster economic growth and promote technology innovation. Recent microlevel evidence from Ferraz et al. (2015) confirms that firms grow more if they win government procurement contracts.

We extend the literature by shifting the focus from a firm's financial performance to corporate strategic information management and the role of relative bargaining power through the supply chain. As shown in Chu (2012), the high-intensity competition places supply firms in a poor bargaining position, and therefore existing supply firms usually offer concessions to maintain their relationship with major customers. Fabbri and Klapper (2016) find that suppliers in a weak bargaining position with their customers are more likely to extend trade credit. By examining the bargaining power hypothesis from the perspective of industry competition and trade credit, we argue that the bargaining power of the government customer imposes a strong influence on supply firms' decisions regarding CER activities. This influence will significantly raise the environmental awareness of all firms in the market, which will accelerate the green economic transition of the world and possibly reduce costs. Therefore, our paper extends the bargaining theory to the study of governance by suggesting local governments should reconsider how to utilize their advantageous positions to encourage firms to take more environmental responsibility when transacting business with the corresponding suppliers.

2. Literature review and hypothesis development

2.1 Information disclosure and resource dependence

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[2]There are three groups of determinants of firm CER activities in the literature. The first group focuses on firm-specific characteristics, such as operating scale, ownership, and related financial indexes (Bostian et al.2016; El Ghoul, Guedhami et al., 2018; Etzion, 2007). The second group includes management features. CER activities are related to the CEO's demographic and psychological desire, CEO incentive, and education level (Lewis et al., 2014; De Villiers and Van Staden, 2011; Walls et al., 2012). The last group highlights the social pressure on firms, which mainly comes from market competition, non-government organizations (NOGs), regulators, and business cooperation partners (Delmas and Montiel, 2009).

Since Chamberlain's (1979) study of firms' behaviour on social contribution, research on corporate social responsibility has remained unabated.[3] As one specific component of CSR, corporate environmental responsibility has received strong interest in the recent decade. McWilliams and Siegel (2001) employ the demand-and-supply framework to point out that CER-related investment in the form of pollution prevention and mitigation is costly, and normally acts as an approach for the firm to comply with all applicable regulations and laws to maximize the wealth of its shareholders. As such, CER investment expenditures that are beyond minimum compliance and result in unnecessary extra costs, profit reduction, and a transfer of shareholder interests to the public are not preferred. It is very likely that firms are less concerned about the environment when they face relatively looser external pressure on environmental protection (Quairel-Lanoizelee, 2016).

On the other hand, CER can potentially enhance the reputation of a firm, which helps to eliminate information asymmetry problems and further boost the external confidence of outsiders (Heikkurinen, 2010; Hussainey and Salama, 2010; Meng et al., 2013). Previous studies have shown that a firm with remarkable CER activities can maintain a more statable and reliable relationship with its stakeholders and achieve more operating advantages, including avoiding the potential penalty related to pollutant emissions (López-Gamero et al., 2010), enjoying low operating costs (Jayachandran et al., 2013), and obtaining more product advantages or subsidy benefits through the green-products innovation (Li et al., 2020). Thus, a firm actively discloses more environmental responsibility in the hope of improving its public image and meeting stakeholders' demands (Crifo and Sinclair-Desgagné, 2014; Siltaoja, 2006).

The government customer is a special, influential stakeholder that is sensitive to sustainable development and environmental production for maximising social welfare (Halkos and Paizanos, 2013; Sergi et al., 2019). The government can directly influence a firm's CER investment decision through legislation, as evidenced by Dummett (2006) through face-to-face interviews. That is, almost all of the managers surveyed by Dummett disclosed that government legislation or the threat of legislation is the main concern of their CER investment decisions. This situation is supported by empirical studies in the United Kingdom (Groves et al., 2011), United States (Cai et al., 2016), China (Peng et al., 2018; Zhang, 2017), and other global cases (Kim et al., 2017). Compared with other types of customers, the government customer normally cares more about the corporate qualification or related social impacts than financial interests (Cohen and Li, 2020; Fabbri and Klapper, 2016).

Voluntary disclosure theory concludes that firms disclose information only when the perceived benefit of disclosure outweights the perceived cost (Lewis et al., 2013; Verrecchia, 1983). Doing business with government will help firms lower demand uncertainty (Cohen and Li, 2020; Dhaliwal et al., 2016), reduce potential market competition (Mills et al., 2013), and obtain benefits from the government, such as subsidy benefits through the green-products

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[3] Numerous studies have attempted to explain corporate social responsibility from the perspective of corporate internal governance (McGuinness et al., 2017), external finance (Goss and Roberts, 2011; Lee at al., 2017), and government intervention (Lin et al., 2015).

innovation (Li et al., 2020). Therefore, a supply firm with government customers is willing to disclose higher level of environment-related activities.

On this basis, we therefore develop the following hypothesis:

> Hypothesis 1: *The existence of a government customer induces its supply firm to disclose higher levels of CER.*

We then focus on the degree of firms' dependence on the government customer. As discussed in the resource dependence theory (Abdurakhmonov et al., 2021), firm investment is affected by its dependence on key resources. When the financial performance of a firm depends largely on its government customer, it provides a strong incentive for the firm to allocate more resource for environment-related activities and disclosure higher level of CER to meet the need of its government stakeholders, We define a firm's government dependence as the share of a supply firm's sales revenue that is sourced through government contracts as in Abdurakhmonov et al. (2021), Lux et al. (2011), and Pfeffer and Salancik (1978). We expect that the positive effect is stronger if the government purchase accounts for a larger share of the supplier's sales revenue, with the following hypothesis:

> Hypothesis 2: *The positive effect of a government customer on its supply firms' CER disclosure increases with the degree of dependency of the supply firm.*

2.2 A bargaining perspective on resource dependence

Lack of price information for certain upriced resource makes it strategically important however difficult for a corporation to administrate and deploy such resources. Many strategic scholars have dicussed this from a bargaining perspective, as any resources controlled by the firm can be translated into bargaining power, such as new wealth by discovering and trading various resource advantages (Lippman and Rumelt, 2003), decisions on outsourcing (De Fontenay and Gan, 2008), and mergers and acquisitions (Moatti et al, 2014).

CSR is a typical unpriced resource or output that a firm controls, which has been exploring by strategy scholars (Awaysheh et al., 2020; Durand et al., 2019; Gupta et al., 2020; Kim et al., 2021). As mentioned above, we expect that the government customer induces its supply firms to disclose more CER, as the government as a special client takes a dominant position in the business relationship. However, the strong bargaining power of the government over the supply firm can be moderated by the relative bargaining position embedded in supplier's charactersitics.

First, corporate operating scale matters. Large firms are usually able to provide more qualified goods and services with reliable goodwill in the market, and can generate more stable revenue and cash flow to defend against unpredictable risk, including the possible lose of some major customers in the short run (Chipty, 1995). As such, a firm operating on a large scale tends to have more bargaining power to negotiate with its clients. On the other hand, a small firm is more likely to have an asymmetric relationship with its larger customers due to its weak bargaining capacity (Harrison, 2004; Johnson and Ford, 2008).

Second, the degree of market competition that the supply firm faces matters. A high degree of market competition implies homogeneous goods supply across the industry (Wu, 2009). Therefore, a supply firm in the competitive industry normally stays in a weaker position, as its customers, either government or non-government customers, can easily switch to another supplier without incurring much additional cost (Cai and Zhu, 2020). Consequently, supply firms in a competitive market only have low profit margins, making them more dependent on large orders from the major customers.

Third, the operating risk that a supply firm faces lowers its bargaining power. A weak supply firm is likely to provide extra benefits to retain a stable relationship with its major customers. Moreover, the supply firms with a major government customer can obtain more favourable bank loans at relatively lower cost, as the bank labels a firm with a major government customer as a qualified lender. For the same reason, the government's supply firms are more likely to obtain external finance and less likely to face corporate financial destress (Asaad Al-Thaqeb, 2019; Lian, 2017). However, once this business relationship breaks, supply firms will quickly lose the advantages that are protecting them from an unpredictable operating risk (Campello and Gao, 2017; Patatoukas, 2012). Thus, a weaker supply firm holds less bargaining power than its strong government customer.

Accordingly, we offer the following hypotheses related to the bargaining power of supply firms.

> Hypothesis 3: *The positive effect of the government customer on its supply firms' CER discloures becomes more pronounced if the supply firm operates at a smaller operating scale.*
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> Hypothesis 4: *The positive effect of the government customer on its supply firms' CER discloures is stronger if the supply firm operates in a more competitive market.*
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> Hypothesis 5: *The positive effect of the government customer on its supply firms' CER discloures is stronger if the supply firm presents a higher level of trade credits.*

3. Data and descriptive statistics

In this paper, we focus on Chinese publicly listed firms in the manufacturing sector. Information on each firm's characteristics can be obtained from the *Chinese Market and Accounting Research (CSMAR)* database, which contains detailed information on the nature of firms, such as the firm's operating scale, ownership, corporate internal financing, and governance. For data reliability, companies where the stocks were or used to be designated as "Special Treatment" are excluded. We also check firms' information in the *WIND* database and excluded firms with inconsistent information across the two databases. After the sample filtering, our final sample contains 3825 firm-year observations from 2009 to 2016.

3.1 Measure of corporate environmental responsibility

The information on a firm's CER is manually collected from the Corporate Social Responsibility Report Sheet, which is downloadable from the Shenzhen Stock Exchange

(SZSE) website and the Shanghai Stock Exchange (SHSE) website[4]. We follow Fonseka et al. (2019) in constructing indicators based on the 10 main components defined by the China State Environmental Protection Administration (CSEPA). Specifically, we set the score range from 0 to 3 for each component. The CER index for each firm is thus the total score of the 10 components. This measurement approach is consistent with the voluntary disclosure theory. A higher CER score implies that a firm has disclosed more CER activities.

Table 1 reports the summary statistics for the 10 components of CER evaluation. Noticeably, we observe significant variations among these 10 components. Specifically, the components I_3 (firm's environmental investment expenditure for technology development) and I_4 (government grants, subsidies, and tax reduction related to environmental protection) are the top two components. In contrast, firms seem not to prefer to disclose the two specific components I_6 (construction and operation of environment protection) and I_8 (construction and operation of environment protection). These findings are consistent with Zhang (2017), which implies that firms are more interested in conducting environmental-friendly activities that are related to government support or technology innovation.

3.2 Measure of government procurement

In this study, we manually match information about the top five customers to the *Chinese National Enterprise Credit Information Publicity Systems*.[5] We then follow Asaad Al-Thaqeb's (2019) approach to construct an indicator variable *GC*. It is equal to one if one of the top-five customers belongs to the government (either local or central government), and zero otherwise. Alternatively, we follow Patatoukas (2012) and Cohen and Li (2020) to measure the customer-base concentration. The concentration of major government customers is calculated by the share of sales revenue associated with government customers to total sales revenue.

3.3 Descriptive statistics

Table 2 presents the summary statistics of all variables. The average value of the CER index is 7.91 out of 30, implying the level of environmental responsibility for the firms in our sample is low. About 25% of the firms have obtained procurement orders from the government. Meanwhile, procurement orders from the government contribute to over 5% of supply firms' total sales revenue. Table A1 presents the results of the univariate analysis on corporate environmental responsibility and other firm characteristics from the sample with and without government customers. The results show that the CER index is significantly higher in the group with a government customer than in the group without (See Appendix). This finding supports our argument that firms with government customers disclose more corporate environmental

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[4] In response to the sustainable development target of the *National Economic and Social Development 11th Five-Year Plan,* the China Securities Regulatory Commission (CSRC) has required the Chinese listed companies to disclose more environment-related information in their Corporate Social Responsibility (CSR) report since 2007.

[5] In 2007, CSRC issued the *Compulsory Disclosure Standards for Publicly Listed Firm (No.2 version, 2007)*, which points out the duty to disclose information about the top five customers, which is the five largest customers that contribute to the public firm's sales revenue. The *National Enterprise Credit Information Publicity System* provides public access to official registration data for all legal entities in China. The registration data also contain names of key individuals, such as legal representatives, shareholders, and key staff defined as board members.

responsibility. Similar to Cohen and Li (2020), we also observe that firms without government customers seem to have less cash flow and lower growth opportunities, while having government customers induces firms to have a higher leverage level. This finding is consistent with Asaad Al-Thaqeb's (2019) finding that government customers work as a certification that enables their supply firms to obtain more external capital.

4. Results

4.1 Impact of government customers on supply firms' CER performance

We first estimate the association between the government customer and the firm-level CER based on publicly listed manufacturing firms. Our testable hypothesis is that government customers enhance the level of corporate environmental responsibility disclosed. To test the first two hypotheses, we construct the following baseline model:

$$CER_{i,t} = \alpha + \beta_1 GC_{i,t} + \boldsymbol{\beta X} + \boldsymbol{\gamma Z} + \delta_i + \varphi_t + \varepsilon_{i,t} \quad (1)$$

where the dependent variable $CER_{i,t}$ measures the corporate environmental responsibility efforts disclosed by firm i in period t. The key explanatory variable is government customer ($GC_{i,t}$), which is a dummy variable that equals one if at least one of the top five customers is a government client. Meanwhile, we follow Cohen and Li (2020)'s study to utilize the concentration of major government customers as an alternative measurement. We include a set of firm-specific control variables $\boldsymbol{X}$, such as firm operating scale (*Size*), leverage (*Leverage*), the return on assets (*ROA*), firm's growth opportunity (*GO*), sales expenditure (*SaleCost*), tax burden (*Tax*), and cash status (*Cash*) and a set of management-related control variables $\boldsymbol{Z}$, such as the top management characteristics of the firm that include the age (*Mage*), salary (*MPay*), and education level (*MEdu*) of the chief executive officer (CEO). The choices of these control variables are all guided by the relevant literature, and the definitions and summary statistics are listed in Table 2: δ_i is the firm fixed effect, φ_t is the time fixed effect, and $\varepsilon_{i,t}$ is the random noise. To account for possible heteroscedasticity and serial correlation, we estimate this regression with a fixed-effects model and robust standard errors clustered at the firm level.

In column (1) of Table 3, we regress firm-level CER on the indicator of government customer and only control for firm and year fixed effects. The result shows that government customer is positively and significantly associated with firms' CER (β=1.700, *sd*=0.204). Given the sample mean of the *GC* is 7.906, having a government customer is associated with a 21.5% (=1.700/7.906) higher disclosure of CER of a firm. Column (2) shows that this effect (β=1.273, *sd*=0.204) remains significant when controlling for a set of firm-specific factors. The estimated coefficients of these variables show that corporate operating scale (*Size*) has a significant and positive relationship with CER (β=4.612, *sd*=0.263). That is, large firms disclose more CER, which is consistent with the finding reported by Zhang (2017). Firm leverage (*Leverage*) is significantly positive (β=5.385, *sd*=1.009), suggesting that the debt holder as an external stakeholder exercises pressure on firms to disclose more environmental information to access potential further external liabilities (Meng et al., 2013). For the same reason, a firm with relatively poor future growth opportunities (*GO*) attempts to attract the attention of outside investors or stakeholders by taking more CER. The profitability of the firms (*ROA*) is positively

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related to CER activities (β=21.502, sd=2.698). Indeed, this finding is consistent with the previous literature, which points out that financial performance is the main driver for corporate environmental-related expenditure (Cormier et al., 2004). The negative coefficients of the expenditure on sales (*SaleCost*, β=-6.012, sd=3.262) and tax (*Tax*, β=-8.570, sd=4.510) reflect the substitutional relationship between CER and other corporate expenditures.

From the perspective of corporate governance, column (3) further controls the top management characteristics of each firm. The age of the firm's manager (*MAge*) is negatively related to CER (β=-7.136, sd=2.894), indicating firms with a younger manager prefer to undertake more environmental-friendly activities. We do not find a significant association between a manager's education and the firm's CER (β=-0.078, sd=0.104). The salary of the manager negatively influences firm CER activities (β=-10.503, sd=3.548). Overall, the regression results in Table 3 consistently support Hypothesis 1; that is, the government customer has a positive effect on its supply firms' disclosed CER.

We then replace the key variable of government customer with an alternative measure of government customer concentration *GC%*, which reflects the share of government purchase in the supplier's sales revenue and thus the level of the government's bargaining power. If government purchases account for a larger sales percentage of the supply firms, the government customer will hold a stronger position to negotiate with its supply firms. As shown in column (4), the coefficient of *GC%* remains positive at the 1% significance level with a magnitude of 0.052 (sd=0.011), which implies that a 10% increase in government procurement induces a 6.6% (=10*0.052/7.906) rise in corporate disclosed CER. This regression result not only proves the positive association between the government customer and the supply firm's CER disclosure, but also supports Hypothesis 2; that is, the supply firm will disclose more environmental responsibility if its sale revenue is more dependent on the procurement orders from the government customer. This finding is also consistent with the previous literature that states that the customer who is in a strong position can influence its supplier to meet additional expectations, because a weak supplier cannot afford the losses from a deal-breaker (Campello and Gao, 2017; Inderst and Wey, 2007; Patatoukas, 2012).

In addition, we further adopt the Poisson estimation for our baseline model to take into account the feature of count data for our dependent variable. As reported in columns (5) and (6), the results are still consistent with our expectations. Finally, we also follow Du et al. (2014) to calculate the Z-score normalized CER scores as an alternative measure of our dependent variable. As shown in Table A2 (see Appendix), our main finding still survives.

4.2 Bargaining power and customer-supplier relationship

We found evidence from the demand side that the customer with the bargaining advantage can induce its supply firm to disclose more environmental responsibility. In this setion, we explore how corporate characteristics change the bargaining (dis)advantage of a firm and thus affect the role of the government customer on the level of CER the supply firm discloses. In general, a supply firm with a bargaining disadvantage tends to conduct more CER in the presence of government customers, as discussed in Hypotheses 3–5.

To verify these hypotheses, we construct three indicators to measure the bargaining position of the supply firm. First, we utilize the corporate operating scale to reflect firms' bargaining power, which has been shown by Chipty (1995) to be an effective factor, as small firms are normally unable to obtain sufficient revenue and stable, free, cash flow to anticipate or defend against unpredictable risks. During the business negotiation, large firms are well treated by the government due to their contribution to the local economy and employment compared to small firms.

We therefore extend our baseline model by introducing the interaction between the new indicator and our key independent variable *GC*. The revised model is given as follows:

$$CER_{i,t} = \alpha + \beta_1 GC_{i,t} + \beta_2 New_{i,t} + \beta_3 GC_{i,t} \times New_{i,t} + \boldsymbol{\beta X} + \boldsymbol{\gamma Z} + \delta_i + \varphi_t + \varepsilon_{i,t} \ (2)$$

where $New_{i,t}$ is the newly constructed indicator for bargaining power of the supply firm and the coefficient β_3 is of interest.

The results are presented in panel A of Table 4. As expected, the resulting sign of β_2(=4.793) suggests that larger firms are able to conduct more CER behaviour, which is consistent with the previous literature (see, e.g. Reid and Toffel, 2009, and Zhang, 2017). Meanwhile, we find that the coefficient β_3(=-0.319, *sd*=0.144) is negative, implying that a firm with a larger corporate operating scale enjoys a bargaining advantage in the customer–supplier relationship and are thus less likely to contribute any additional level of CER. On the other hand, a firm with a small operating scale discloses more CER in the presence of a government customer. This finding confirms Hypothesis 3 that the positive effect of a government customer on its supply firms' CER discloure becomes more pronounced if the supply firm operates at a smaller operating scale.

Second, we follow Bonaime et al. (2018) to employ the industrial market competitive level to measure supplier–customer bargaining power. Specifically, we introduce the Herfindahl–Hirschman Index (HHI)[6] into our model. In a more competitive market, the supplier has lower bargaining power with its customers as its competitors can easily replace it (Cai and Zhu, 2020). As a consequence, suppliers in the competitive market have to maintain their major customer orders by sacrificing their operating interests (Delmas and Montiel, 2009; Inderst and Wey, 2007). In contrast, the customer in a more competitive industry will take a stronger position to request more from the supply firms, such as extra societal-related requirements. The results using HHI as the proxy for bargaining power are reported in panel B of Table 4. These results show that the supply firms that contract with government customers tend to invest more in CER-related activities, as the long-term and high-margin profits from the public procurement orders of government customers are attractive to the supplying firms. The supply firm in the more competitive market has to show its efforts in CER to maintain government customers. Thus, Hypothesis 4 is confirmed.

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[6] The HHI is a common measure of market concentration and is used to determine market competitiveness. HHI ranges from 0 to 1. The closer a market is to a monopoly (HHI index close to 1), the higher the market's concentration (and the lower its competition), and vice versa.

Third, we use trade credit to measure the operating risk of supply firms, which is calculated as the ratio of accounts receivable to net sales (Burkart and Ellingsen, 2004; Chod et al., 2019; Lian, 2017). We suppose that the supply firm in a weak position has to provide its major customer with a more relaxed trade credit offer to retain the corporate relationship (Fabbri and Klapper, 2016). By using the trade credit as the indicator for bargaining power in equation (2), we observe that the estimated coefficient β_2(=-2.885, sd=1.021) is negative and statistically significant, implying that firms with higher trade credits tend to avoid unnecessary expenses (see panel C of Table 4). However, in the presence of a government customer, the supplying firm tends to engage in more CER activities, as evidenced by the positive and statistically significant coefficient of the interaction term (β_3=0.130, sd=0.067). As higher trade credit indicates a bargaining disadvantage, the firm has an incentive to comply with the government's environmental preferences in order to keep the government customers' procurement orders, which is consistent with the prediction of Hypothesis 5.

5. Robustness Check

Our findings above show a strong indication that the existence of government customers is positively associated with the level of CER activities that the supply firm discloses. To rule out concerns of omitted variables, our baseline model includes a number of confounding factors. Nevertheless, the potential endogeneity between the government customer and the level of CER dislosed by the firms remains for interpreting the causal relationship of our results.

5.1 Assortative matching

It is likely that the government chooses its supplier based on some unobserved matching qualities, such as the environmental preferences of the firms, in addition to observed bidding prices. Therefore, firms with a higher level of CER are likely to be offered procurement orders by the government. If the unobserved matching qualities are correlated with the unobserved characteristics in the error term of the firm's CER equation, our explanatory variable *GC* becomes endogenous. This is a well-known assortative mating or assortative matching problem discussed in the literature, that agents with similar characteristics tend to interact with each other in isolation of others (Alger and Weibull, 2013; Eeckhout and Kircher, 2018; Greenwood et al. 2014; Pencavel, 1998; Shimer and Smith, 2000). We address this in the following way.

We re-construct our proxy for government customer by limiting it to customers that have at least a three-year relationship with the firms. This is because unobserved matching qualities have the strongest incentives for assortative mating when changes of supply firms take place. Using a long-term stable customer can mitigate the sorting related endogeneity to a certain extent. In the new setting, the firm will not be labelled as having a government customer unless they retain their business-to-government relationship for three years or more. The results are shown in panel A of Table 5. The new adjusted proxies of government customer still have significant positive effects (β=0.816, sd=0.190) on the long-term supply firms' CER activities, which is evidence that the government can utilize their long-term government procurement order as an effective tool to induce supply firms to conduct more CER activities. Overall, we therefore conclude that having a government customer indeed increases CER at the firm level.

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5.2 Propensity score matching

We employ the propensity score matching method, which can mitigate endogeneity arising from sample selection bias.[7] In this study, sample selection bias may occur if some firm characteristics might influence both the supplier's corporate environmental responsibility and the status of its government procurement order. We first apply a logistic model to regress the dummy variable *GC* on all the firm-level characteristic variables (see panel A of Table A3 in Appendix). We observed the statistically significant coefficient of some control variables, and the Pseudo R2 and p-value from the chi-square testes of the overall logistic are 0.036 and 0.000, which indicates a significant impact of several firm features on the existence of a business-to-government relationship. As such, the potential endogeneity caused by the sample selection bias could not be ignored. We then use the one-to-one nearest neighbour (NN) propensity score matching approach, which ensures that a firm with a government customer is significantly similar to a matched firm without a government customer. That is, each firm with a government customer is matched to a firm that obtains the closest propensity score in the same year and has no government customer.

The matched sample includes 746 firms with government customers and 706 firms without government customers. We apply three diagnostic tests to ensure the accuracy of the matching quality. First, we regress the dummy variable *GC* on all the firm-level characteristic variables for the matched sample and find that the coefficients of all control variables are statistically insignificant, with the R-squared being 0.002 (see panel A of Table A3 in Appendix). Therefore, the corporate characteristics found to be decisive in the pre-matched sample lose their power in explaining the existence of a government customer in the matched sample. Second, we compare the propensity scores distribution between the firms with and without government customers in the matched sample. As shown in panel B of Table A3, all the differences in propensity scores are less than 0.01, which is evidence of the success of the propensity matching procedure. Thirdly, we apply univariate tests for variables in the matched sample and find that the differences for all control variables are less significant (see panel C of Table A3). All the results indicate the appropriateness of the matched sample.

We then regress the CER on government customer using the matched sample. Panel B of Table 5 shows the results. As expected, the coefficient of the government customer is consistently positive and significant (β=0.869, *sd*=0.323), which is consistent with the regression results before matching. Thus, even in the matched sample, the supply firm with the government procurement order is still taking more corporate environmental responsibility, implying that the reliability of our finding would be driven by the potential sample selection bias.

5.3 Difference-in-differences estimation

We also apply the alternative research design to mitigate for potential endogeneity issues. We have followed previous studies by using an approach akin to a difference-in-differences (DID)

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[7] In 1985, Rosenbaum and Rubin pioneered the propensity score matching method, which is a statistical matching technique for reducing the bias caused by the confounding variables. Manyimportant studies utilize this technique to estimate the effect of a treatment, policy, or other intervention (Bonaime et al. 2018; Cai and Zhu, 2020; Caliendo and Kopeinig, 2008).

design (Bertrand and Mullainathan, 2003; Cohen and Li, 2020). With this approach, we assume that government procurement acts as an event that can deeply influence supply firms' CER investment strategy in the long run. A firm is considered as a treated group if it experiences a change in government customer ($Treat_i$), and all other firms in that year will serve as the control observation. Therefore, the model based on the DID design is given as follows:

$$CER_{i,t} = \alpha_i + \beta DID_{i,t} + \gamma DX_{i,t} + \theta DZ_{i,t} + \delta_i + \mu_t + \varepsilon_{i,t}$$

where $DID_{i,t} = Treat_i \times Time_t$ indicates the event when the government became the major customer of the firm i in year t. $Time_t$ equals 1 when the government became a major customer for supply firm i for the first time from year t to the last period.

As shown in panel C of Table 5, the results indicate that the supply firm undertakes more CER investment if it obtains a government customer (β=1.189, sd=0.182). To limit the potential sample selection bias, we have also employed the PSM on the sample before estimation, and the regression results remain robust (see Table A4 in Appendix and Table 5).

Furthermore, we conduct the parallel trend test to rule out the possibility of the estimation bias caused by differential trends across supply firms. The parallel trend assumption assumes that supply firms' CER levels should follow the same trend in the absence of treatment. To test the parallel trend assumption, we estimate the following event-study model:

$$CER_{i,t} = \alpha_i + \beta_\tau \sum_{\tau=-4}^{4} Treat_i * I_t^\tau + \gamma DX_{i,t} + \theta DZ_{i,t} + \delta_i + \mu_t + \varepsilon_{i,t}$$

The model includes trends between the four pre-event periods or four years following the supply firm's building of the business relationship with its major government customer, using a set of dummy variables $I_{i,t}^\tau$. The estimated coefficients of β_τ are plotted in Figure A1 (see Appendix), which shows a clear difference before and after the supply firm started to do business with their major government customer. The estimated coefficients are close to zero during the pre-event period, implying that no difference exists in pre-trends for the disclosed level of CER between treated and control firms. The statistically significant coefficients after the treatment indicate that supply firms' CER performance increases significantly in the first two years after they build the business relationship with the government customer.

As the treatment effects tend to diminish after two periods in the above event study estimation, we relax the assumption of constant treatment by considering the treatments with varying start years and different treatment durations, that is the flexible conditional panel difference-in-differences (FCP-DID) with staggered treatment adoption design. The staggered treatment adoption design modifies the traditional DID model in three ways: a) During the matching process, it takes the panel individual treatment time information into consideration, b) It employs a combined statistical distance functions to improving the matching accuracy, c) It includes flexible observation durations in the DID model. Such an estimation strategy has been increasingly used in recent literature to improve the matching accuracy before DID estimation (Sun and Abraham, 2020; Chaisemartin et al., 2019; Imai and Kim, 2019).

As shown in panel C of Table 5, the regression results (β=1.439, sd=0.510) again confirm our finding that the supply firm becomes more environmentally friendly with higher levels of disclosued CER activities after it establishes a formal business relationship with the

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government customer. Therefore, the positive and significant relationship between government customer and supply firms' CER remains robust.

6. Further Analyses

In this section, we address additional confounders that may affect our causal inferences. Firstly, as the government can impose its impacts on firms through non-business channels, the estimated causal effect is likely to be attributed to other political influences of the government; therefore, we have to rule out these possibilities. Secondly, we anwer the question about whether the positive effect on the firm's CER exists only for government customers.

6.1 Impacts of other political influences

The government can also indirectly influence firms' CER performance. Some studies indicate that the government can induce politically connected firms to invest more in environmental protection (Zhang, 2017). Apart from the business-to-government relationship, the government may also exert its influence on the supply firms via other forms of relationship, such as state-ownership and informal political connections. To rule out the potential impacts, this section further investigates whether the effect of government customers is robust once we control for such political confounders.

Ownership. State-owned enterprises (SOEs) act as extended arms of the government to implement policies, and contribute more to social responsibility than to maximizing corporate benefits (Fan et al., 2007). In contrast, non-state-owned enterprises (non-SOEs) are driven more by profits than social objectives. We thus divide our sample into two groups based on firm ownership. In panel A of Table 6, columns (1)-(4) present the results for the subsample of SOEs and columns (5)-(8) present the results for the subsample of non-SOEs. As shown, the coefficients for government customer remain positive and statistically significant for both subsamples. We do find that the coefficient of government customer is higher for SOEs (β=1.316, sd=0.375) than for non-SOEs (β=1.284, sd=0.251), suggesting that SOEs are more environmentally responsible. This situation is because the top management of SOEs is appointed directly by the central government, and thus is more likely to follow orders from the State-owned Asset Supervision and Admission Commission (SASAC) to execute environmental protection duties.

Political connections. The government can induce the politically connected firm to disclose more CER in exchange for valuable government grants, subsidies, and tax reductions (Houston et al., 2014; Zhang, 2017). Our results could be driven by such political confounding factors. To tease out this possibility, we construct a dummy variable for political connection (*PC*), similar to Li et al. (2008) and Lin et al. (2015). It equals one if the firm's CEO was or is currently holding membership of the Chinese People's Congress (CPC) or the Chinese People's Congress or the Chinese People's Political Consultative Conference (CPPCC)[8], and zero

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[8]The *CPC* is the foundational political system of China, and its main functions include amendments, legislation, the appointment of top officials, and determination of major state issues. The *CPPCC* is an advisory body for all

otherwise. Meanwhile, we alternatively follow Yu et al.'s (2020) study to employ the ratio of politically connected directors to all board members (*PC%*) as another proxy of political connections. We then introduce these two proxies of political connections into equation (2), which includes an interaction term with government customer (*GC* and *GC%*) in the regression. The results presented in panel B of Table 6 suggest that our main finding that government customers induce CER at the firm level is still valid. We also find that political connection indeed has a positive impact on CER performance (β=0.934, *sd*=0.163), which is in line with Zhang (2017). In addition, we do observe the negative coefficients of the interaction term (β=-0.519, *sd*=0.222) between political connection and government customer, indicating the substitution effects between the firm's formal and informal business–government relationship on their CER performance.

6.2 Do other types of major customers matter?

Our argument is that government customers induce their supplying firms to engage in more CER. To further assess this argument, we examine whether the positive effects on CER are driven only by government customers. Some recent studies have revealed the difference between major government customers and major corporate customers (Asaad Al-Thaqeb, 2019; Cohen and Li, 2020). Also, foreign customers can significantly influence the economic and innovative performance of domestic supply firms (Presutti et al., 2007; Presutti et al., 2016). Hence, it is worthwhile to distinguish the difference between the government and other kinds of corporate clients, and to further explore whether the positive effects on CER are driven only by government customers. We thus construct two measures for the major corporate customer: dummy indicative variable (*CC*) and the concentration of corporate customers (*CC%*). Similarly, we develop two measures for the foreign customer (*FC* and *FC%*). We use the new variables to replace *GC* in equation (1).

The results are listed in Table 7**:** the supply firm with the major corporate customer in columns (1) to (4) and the supply firm with the major foreign customer in columns (5) to (8). It shows that corporate customer (*CC* and *CC%*) has a significant and negative relationship with CER, implying that firms tend to disclose less CER if their major corporate customer plays a more important role in their sales revenue. As Cohen and Li (2020) mention, the major corporate customer maximizes its own benefits, and most of them require customer-specific investment from their suppliers. More customer-specific investment implies that the supply firm has to carry a higher unpredictable risk for demand uncertainty, potential investment inefficiency, and poor future profitability. Therefore, suppliers with a major corporate customer are less likely to disclose more environmental responsibility.

In contrast, we find that a major foreign customer has a consistently positive effect on its supply firm's CER. The main reason could be the technological spillover effects through the supply chain (Presutti et al., 2007; Presutti et al., 2016). Firms contracting with a major foreign customer have more opportunity to engage in international research and development (R&D)

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the domestic parties, and its main functions include political consultation, democratic supervision, and participation in the deliberation and administration of state affairs.

activities, and they obtain advanced technology that could be beneficial for the environment. Hence, compared with the corporate customer, the foreign customer seems to play a similar role to that of the government customer in inducing firms to disclose more environmental responsibility.

As the customer information of our sample firms is based on the corporate top five customers, it is likely that some firms have both government and foreign customers simultaneously. To eliminate the possible co-existing positive effects of the foreign customer, we revise our variables on the government customer. In the new setting, if a firm has both a major foreign customer and a government customer, it is coded as a firm with a non-government customer. The results using the revised variables of government customer are shown in columns (9) to (12). The positive relationship between the government customer and the supply firm's disclosed corporate environmental responsibility remains significant.

7. Conclusion

In this paper, we studied how government customers induce their supply firms to engage in more environmental responsibility. Based on data from Chinese publicly listed firms in the manufacturing sector, we find robust evidence that government customers have a positive and significant impact on promoting CER at the firm level. Our results survive across a battery of robustness tests, after addressing potential endogeneity and ruling out other possible confounders.

We also provide potential channels through which government procurement increases a supply firm's CER performance. We find that the positive effect of the major government customer on a supply firm's CER is more pronounced when the supply firm operates with a higher trade credits ratio, at a smaller company scale, or in a more competitive market. Our results confirm that the supply firm in the weak position is more likely to disclose CER activities to satisfy their major government customer's environmental demand.

This paper carries several important policy implications. First, the government as the customer can "green" the supply chain by imposing stringent environmental requirements on its suppliers. As the consumer of the final goods, the government can utilize its strong bargaining power to induce their related supply firms to produce more environmental-friendly products. The positive effect can spill over to the upper stream products and finally clean up the whole supply chain. Second, there is a lack of incentive for firms to engage in CER as it incurs extra costs. Our results suggest that the firms are not willing to disclose CER unless they are in a weak bargaining position and are trying to retain government procurement orders to obtain more economic benefits. Therefore, the government should seek ways to maintain its strong bargaining position to ensure the positive effects of public procurement orders on CER performance.

While this paper makes several contributions to the literature, it is with caveats that need to be explored in future research. First, one of the critical issues is the measurement of the CER score. As the level of CER is self-reported by firms, the actual environmental performance may be

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different from the reported efforts. Chatterji et al. (2009) find that CER data are only modestly useful for identifying firms' actual environmental behaviour. It is therefore of relevance to measure "real" changes in environmental performance after a firm establishes the business relationship with the government. Second, we limit our analysis to demonstrate that government purchase indeed increases CER among the supplying firms. This may induce distortions at the society level. For instance, it may disort public procurement from its optimal level, as the government is likely to sacrifice lower bids for higher CER when it chooses supply firms. Discussions on this issue can inform policy makers on the social costs of scaling up government purchase as a policy instrument for environmental management. Finally, we argue that the bargaining disadvantage forces the supply firms to provide more CER in competetive industries. However, the more underlying question is how a firm strategically manages CER performance in the presence of evolving market structures. All these are fruitful avenues for future research.

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Table 1: Ten components of CER index

Table 1 presents the definition and summary statistics for the ten components of the CER index. The classification of CER index subjects takes the environmental Disclosure Rules issued by China's MEP as the main basis. Each component is scored according to its level of disclosure. The score range is from 0 to 3: equal 3 for the monetary and quantitative environmental information disclosure; equal 2 for the specific non-monetary environmental information disclosure; equal 1 for the general environmental information disclosure; and equal 0 for no environmental information disclosure.

Variable	Definition	Obs	Mean	Std. Dev.	Min	Max
I1	Information related to IOS environmental system authentication	3,825	0.322	0.616	0	2
I2	Lawsuit, atone, penalty, and bounty related to environmental protection	3,825	0.658	0.838	0	3
I3	Firm's environmental investment expenditure for technologies development	3,825	1.409	0.960	0	3
I4	government grants, subsidies, and tax reduction related to the environment protection	3,825	1.370	0.954	0	3
I5	Firm's environmental protection policies, strategy and goals	3,825	0.852	0.897	0	3
I6	Construction and operation of environmental improvement	3,825	0.277	0.638	0	3
I7	Impact of government environmental protection policy on corporate environmental practice	3,825	0.779	0.644	0	3
I8	Loans related to environmental protection	3,825	0.208	0.560	0	3
I9	Disposal and treatment of generated waste and integrated utilization of waste products	3,825	0.954	0.720	0	3
I10	Other environment-related information	3,825	1.073	0.847	0	3

Table 2: Summary statistics

Variable	Definition	Obs	Mean	Std. Dev.	Min	Max
Key Measurements						
CER	CER score ranges from 0 to 30, and firm with higher CER score implies its strong responsibility in environmental protection	3,825	7.906	4.371	0	24
GC	GC is the indicator variable. It equals one if the firm has government customer, and zero otherwise, which can identify whether firms have government procurement order or not	3,825	0.246	0.431	0	1
GC%	GC% using the concentration of major government customer to quantify the importance of governments customer to target firms' sale revenue	3,825	5.518	8.015	0	23.34
Firm Characteristics						
Lev	The ratio of total debt to total assets	3,825	0.501	0.192	0.117	0.812
Size	The log number of total assets	3,825	17.992	1.423	10.911	22.734
ROA	The ratio of firm' net income to total assets	3,825	0.043	0.043	-0.069	0.129
GO	The ratio of the market value of trades share to the difference value of total assets minus the intangible assets and goodwill	3,825	1.842	0.921	0.988	4.616
SaleCost	The ratio of sales cost to total income	3,825	0.059	0.071	0	0.618
Cash	The ratio of operating cash flows to total assets	3,825	0.17	0.123	0	0.864
Tax	The tax burden	3,825	0.022	0.029	-0.114	0.736
Manager Characteristics						
MEdu	The education level of chief executive officer	3,825	1.785	1.263	0	3
MPay	The logarithm of chief executive officer's salary	3,825	0.032	0.041	0	0.548
MAge	The logarithm of chief executive officer's age	3,825	3.904	0.062	3.572	4.094

Table 3: Main results

The government customer and the firm-level CER. The dependent variable, the firm's CER index, measures the level of corporate environmental responsibility. The main explanatory variable in column (1)-(3) and (5), governmental customer, is measured as a dummy variable, where the firm without government customer is the baseline. The alternative measurement in column (4) and (6) uses the concentration of major government customer as the proxy to quantify the importance of government customer to target firm's sale revenue. Column (1)-(4) employ the ordinary least squares (OLS) model, and column (5)-(6) are based on the Poisson model. Furthermore, each regression considers fixed-year and fixed-firm individual effects. Clustered (firm) standard errors are shown in the parenthesis. ***p <0.01, **p<0.05, *p<0.1.

	OLS				Poisson model	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
GC	1.700***	1.273***	1.271***		0.180***	
	(0.204)	(0.204)	(0.207)		(0.029)	
GC%				0.052***		0.007***
				(0.011)		(0.002)
Leverage		5.385***	5.370***	5.566***	0.855***	0.877***
		(1.009)	(1.026)	(0.992)	(0.151)	(0.146)
Size		4.612***	4.733***	4.777***	0.726***	0.730***
		(0.263)	(0.280)	(0.288)	(0.056)	(0.057)
ROA		21.502***	22.225***	21.910***	3.278***	3.216***
		(2.698)	(2.699)	(2.768)	(0.421)	(0.432)
GO		-1.649***	-1.597***	-1.604***	-0.226***	-0.226***
		(0.137)	(0.136)	(0.136)	(0.021)	(0.021)
SaleCost		-6.012*	-6.484**	-6.049*	-1.086**	-1.017**
		(3.262)	(3.215)	(3.211)	(0.474)	(0.472)
Tax		-8.570*	-8.703**	-8.792*	-1.545**	-1.626**
		(4.510)	(4.366)	(4.731)	(0.748)	(0.811)
Cash		0.896	0.756	0.962	-0.029	0.005
		(1.004)	(1.006)	(1.000)	(0.143)	(0.144)
MAge			-7.136**	-7.270**	-1.285***	-1.306***
			(2.894)	(2.903)	(0.422)	(0.422)
MEdu			-0.078	-0.092	-0.015	-0.016
			(0.104)	(0.105)	(0.015)	(0.015)
MPay			-10.503***	-9.676***	-1.461***	-1.376***
			(3.548)	(3.427)	(0.514)	(0.511)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
Individual effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	3825	3825	3825	3825	3730	3730
Adj. R-squared	0.316	0.420	0.423	0.420		

Table 4: Bargaining power in the customer supplier relationship

The dependent variable is the firm's CER index, and the two explanatory variables are *GC* (dummy variable) and *GC%* (concentration of major government customer). Panel A employs *Size* (Operating Scale) as a proxy of bargaining power of the supply firms, which is measured as the natural log of corporate total assets. The panel B employs *HHI* index (industry competition) as a proxy of bargaining power. Panel C employs *TC* (trade credit) as a proxy, which is measured as the ratio of accounts receivable to net sales. The interaction terms between the proxy of government customer and various bargaining indicators are also been included. Both OLS and Poisson estimation results are listed. All results have controlled for firm- and manager-specific characteristics, year fixed effects and firm fixed effects. Clustered (firm) standard errors are shown in the parenthesis. ***$p<0.01$, **$p<0.05$, *$p<0.1$.

	Panel A: New= Operating Scale (Size)				Panel B: New= Industry Competition (HHI)				Panel C: New=Trade Credit (TC)			
	OLS	OLS	Poisson	Poisson	OLS	OLS	Poisson	Poisson	OLS	OLS	Poisson	Poisson
GC	7.040***		0.988***		1.131***		0.238***		1.006***		0.138***	
	(2.631)		(0.366)		(0.196)		(0.041)		(0.311)		(0.044)	
GC%		0.392***		0.058***		0.065***		0.011***		0.027		0.004
		(0.118)		(0.017)		(0.014)		(0.002)		(0.017)		(0.002)
*GC*New*	-0.319**		-0.045**		-0.598***		-0.126***		1.448		0.234	
	(0.144]		(0.020]		(0.223)		(0.047)		(1.354)		(0.190)	
*GC%*New*		-0.019***		-0.003***		-0.034**		-0.007***		0.130*		0.020**
		(0.006)		(0.001)		(0.016)		(0.002)		(0.067)		(0.010)
New	4.793***	4.884***	0.735***	0.746***	1.483***	1.873***	0.308***	0.316***	-2.657**	-2.885***	-0.401**	-0.443***
	(0.283)	(0.295)	(0.057)	(0.059)	(0.171)	(0.245)	(0.038)	(0.039)	(1.030)	(1.021)	(0.160)	(0.160)
Firms Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Managers Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	3821	3821	3728	3728	3825	3825	3730	3730	3814	3814	3718	3718

Table 5: Addressing potential endogeneity

The results in Panel A are based on re-constructed government customers that have at least 3-year relationship with the firms. The two re-constructed explanatory variables are GC* (dummy variable) and GC%* (concentration of major government customer which have equal or more than three years of business cooperation with the company). The results in Panel B are based on the one-to-one nearest neighbour propensity score matching. The results in panel C are based on alternative research design with DID model. The dependent variable is the firm's CER index. All results have controlled for firm- and manager-specific characteristics, year fixed effects and firm fixed effects. Clustered (firm) standard errors are shown in the parenthesis. ***p <0.01, **p<0.05, *p<0.1.

	Panel A: Results from stable customer				Panel B: Results based on the PSM method				Panel C: Results based on DID		
	OLS	OLS	Poisson	Poisson	OLS	OLS	Poisson	Poisson	DID	PSM+DID	FCP-DID
GC*	0.816***		0.118***								
	(0.190)		(0.026)								
GC%*		0.046***		0.006***							
		(0.013)		(0.002)							
GC					0.869***		0.137***				
					(0.323)		(0.044)				
GC%						0.036*		0.006*			
						(0.021)		(0.003)			
DID									1.189***	1.131***	1.439***
									(0.182)	(0.309)	(0.510)
Firms Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Managers Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	3823	3825	3730	3730	1452	1452	1256	1256	3825	1480	750

Table 6: Effects of other corporate political factors

Panel A considers the influence from corporate state ownership, which presents the results based on the SOEs and Non-SOEs sample in column (1)-(4), and column (5)-(8), respectively. The dependent variable is the firm's CER index, and the two explanatory variables are *GC* (dummy variable) and *GC%* (concentration of major government customer). The panel B considers the influence from corporate political connections. The added main explanatory variables are political connections, which is measured as the dummy variable (*PC*) in column (1)-(4), whereas is measured as the ratio of politically connected directors to all broad members (*PC%*) in column (4)-(8). The interaction terms between the proxy of government customer between corporate political connections are also been respectively included; Column (1)-(2) and (5)-(6) employ the OLS model. Column (3)-(4) and (7)-(8) use the Poisson model. All results have controlled for firm- and manager-specific characteristics, year fixed effects and firm fixed effects. Clustered (firm) standard errors are shown in the parenthesis. ***p <0.01, **p<0.05, *p<0.1.

Panel A: Ownership

	SOEs Sample				Non-SOEs Sample			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
GC	1.316***		0.190***		1.284***		0.181***	
	(0.375)		(0.054)		(0.251)		(0.034)	
GC%		0.061***		0.009***		0.047***		0.007***
		(0.019)		(0.003)		(0.013)		(0.002)
Firms Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Managers Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	1017	1017	1000	1000	2808	2808	2730	2730

Panel B: Political Connections

	New=PC				New=PC%			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
GC	1.066***		0.205***		1.113***		0.226***	
	(0.172)		(0.033)		(0.217)		(0.042)	
GC%		0.023***		0.006***		0.024***		0.005***
		(0.005)		(0.001)		(0.006)		(0.001)
GC New*	-0.519**		-0.114***		-1.450*		-0.374**	
	(0.222)		(0.042)		(0.781)		(0.152)	
GC% New*		-0.014**		-0.002*		-0.036*		-0.008**
		(0.006)		(0.001)		(0.020)		(0.004)
New	0.934***	0.932***	0.189***	0.202***	8.342***	8.308***	1.843***	1.824***

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	(0.163)	(0.161)	(0.031)	(0.030)		(0.884)	(0.878)	(0.184)	(0.182)
Firms Characteristics	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Managers Characteristics	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Individual effects	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Number of observations	3825	3825	3730	3730		3825	3825	3730	3730

Table 7: The role of other types of major customers

The table presents the heterogeneous impacts of different types of major customer. The dependent variable is the firms' CER index. The measurement of major customers is defined as either corporate customer, or foreign customer, or adjusted government customer to exclude foreign customer. Corporate customer: CC (dummy variable) in column (1) and (3), and CC% (concentration of major corporate customer) in column (2) and (4). Foreign customer: FC (dummy variable) in column (5) and (6) and FC% (concentration of major foreign customer) in column (6) and (8). Adjusted government customer, with adjusted measurement proxy, named adj.-GC (dummy variable) in column (9) and (11), and adj.-GC% (concentration of major government customer) in column (10) and (12). Column (1)-(2), (5)-(6), and (9)-(10) employ the OLS model. Column (3)-(4), (7)-(8), and (11)-(12) use the Poisson model. Clustered (firm) standard errors are shown in the parenthesis. ***p <0.01, **p<0.05, *p<0.1

	Corporate customer				Foreign customer				Government customer (adjusted)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
CC	-0.344*		-0.048*									
	(0.200)		(0.027)									
CC%		-0.017**		-0.002**								
		(0.007)		(0.001)								
FC					0.817***		0.123***					
					(0.219)		(0.030)					
FC%						0.020*		0.003**				
						(0.012)		(0.002)				
Adj-GC									1.262***		0.173***	
									(0.224)		(0.031)	
Adj-GC%										0.076***		0.011***
										(0.015)		(0.002)
Firms Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Managers Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	3825	3825	3730	3730	3825	3825	3730	3730	3825	3825	3730	3730

Appendix:

Table A1: Difference between firms with government procurement and firms without the government procurement order

The table reports the univariate test of all the variables in Eq. (1). Column (2) and (3) separately report the average value for the firm with government customer and without government customer. Column (4) and (5) list the difference between these two group firms in statistics.

Variable	With GC	Without-GC	Difference tests	T test
CER	8.878	7.589	1.289	(7.912***)
Size	17.991	17.992	-0.001	(-0.017)
Lev	0.520	0.494	0.026	(3.554***)
ROA	0.043	0.043	0.000	(-0.187)
GO	1.755	1.871	-0.116	(-3.356***)
SaleCost	0.053	0.061	-0.008	(-2.899***)
Tax	0.024	0.021	0.003	(3.315***)
Cash	0.156	0.175	-0.019	(-4.127***)
MAge	3.904	3.905	-0.001	(-0.404)
MEdu	1.781	1.786	-0.005	(-0.111)
MPay	0.029	0.033	-0.004	(-2.881***)

Table A2: Regression with alternative independent variable

The governmental customer and the firm-level CER. The independent variable, the firms' CER index, is measured as the Z-score normalization of CER Index alternatively. The main dependent variable in column (1)-(3), governmental customer, is measured as a dummy variable, where the firm without governmental customer is the baseline. Another measurement of governmental customer in column (4)-(6) uses the concentration of major government customer as the proxy to quantify the importance of government customer to target firms' sale revenue. All regressions employ the ordinary least squares (OLS) model, and each regression considers fixed-year and fixed-firm individual effects. Clustered (firm) standard errors are shown in the parenthesis. ***p <0.01, **p<0.05, *p<0.1.

	(1)	(2)	(3)	(4)	(5)	(6)
GC	0.389***	0.291***	0.291***			
	(0.047)	(0.047)	(0.047)			
GC%				0.016***	0.012***	0.012***
				(0.003)	(0.002)	(0.002)
Leverage		1.232***	1.229***		1.279***	1.274***
		(0.231)	(0.235)		(0.223)	(0.227)
Size		1.055***	1.083***		1.069***	1.093***
		(0.060)	(0.064)		(0.062)	(0.066)
ROA		4.920***	5.085***		4.867***	5.013***
		(0.617)	(0.618)		(0.631)	(0.633)
GO		-0.377***	-0.365***		-0.378***	-0.367***
		(0.031)	(0.031)		(0.031)	(0.031)
SaleCost		-1.375*	-1.484**		-1.281*	-1.384*
		(0.746)	(0.735)		(0.744)	(0.735)
Tax		-1.961*	-1.991**		-1.990*	-2.012*
		(1.032)	(0.999)		(1.117)	(1.082)
Cash		0.205	0.173		0.253	0.22
		(0.230)	(0.230)		(0.229)	(0.229)
MAge			-1.633**			-1.663**
			(0.662)			(0.664)
MEdu			-0.018			-0.021
			(0.024)			(0.024)
MPay			-2.403***			-2.214***
			(0.812)			(0.784)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
Individual effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3825	3825	3825	3825	3825	3825
Adj. R-squared	0.318	0.422	0.426	0.312	0.419	0.422

Table A3: The comparison before and after the propensity score matching

This table represents the sample difference before and after the propensity score matching. Panel A conducts the logistic regression by using all the control variables in Eq. (1). Panel B tests the propensity score difference between the supply firms with or without government customer. Panel C reports the results of the univariate test of all the control variables in Eq. (1). ***p <0.01, **p<0.05, *p<0.1.

Panel A: Pre- and post-matched regression

	Pre-match			Post-match	
	Coefficient	S.E.		Coefficient	S.E.
Leverage	0.615**	(0.280)		-0.263	(0.393)
Size	0.147***	(0.044)		-0.005	(0.059)
ROA	1.075	(1.257)		-0.991	(1.772)
GO	-0.095	(0.059)		-0.095	(0.078)
SaleCost	-0.329	(0.675)		0.638	(0.880)
TAX	4.870***	(1.844)		1.243	(2.313)
Cash	-1.354***	(0.369)		0.145	(0.528)
MEdu	-3.792**	(0.031)		-0.009	(0.043)
MAge	0.817	(0.673)		0.114	(0.987)
MPay	-3.792**	(1.550)		0.346	(1.779)
Number of observations	3825			1457	
prob>$\chi2$	0.000			0.998	
Pseudo R^2	0.036			0.002	

Panel B: Estimated propensity score distribution

	N	Mean	S.D.	Min	P25	Medium	P75	Max
With GC	746	0.267	0.088	0.087	0.195	0.246	0.341	0.578
Without GC	706	0.265	0.088	0.075	0.196	0.249	0.344	0.572
Difference	40	0.002	0	0.012	-0.001	-0.003	-0.003	0.006

Panel C: Univariate tests for propensity matched sample

Variables	With GC [Obs.=746]		Without GC [Obs.=706]		Difference	
	Mean	**S.D**	**Mean**	**S.D**	**Difference**	**t-statistics**
Leverage	0.519	0.188	0.522	0.187	-0.003	-0.303
Size	17.983	1.394	18.003	1.414	0.204	-0.277
ROA	0.416	0.041	0.043	0.041	0.001	-0.405
GO	1.767	0.908	1.82	0.924	-0.051	-1.061
SaleCost	0.055	0.075	0.053	0.058	0.002	0.479
TAX	0.027	0.025	0.022	0.027	0.005	0.358
Cash	0.159	0.116	0.158	0.112	0.001	0.0894
MAge	3.904	0.001	3.903	0.002	0.001	0.280
MEdu	1.792	1.296	1.8	1.23	-0.008	-0.121
MPay	0.031	0.042	0.091	0.036	-0.06	-0.0461

Table A4: The comparison before and after the propensity score matching for DID estimation

This table represents the sample difference before and after the propensity score matching. Panel A conducts the logistic regression by using all the control variables in Eq. (1). Panel B tests the propensity score difference between the supply firms with or without government customer. Panel C reports the results of the univariate test of all the control variables in Eq. (1). ***p <0.01, **p<0.05, *p<0.1.

Panel A: Pre- and post-matched regression

	Pre-match			Post-match	
	Coefficient	S.E.		Coefficient	S.E.
Leverage	0.979***	(0.286)		0.065	(0.379)
Size	0.183***	(0.044)		0.001	(0.059)
ROA	1.536	(1.304)		-0.297	(1.709)
GO	-0.092	(0.057)		0.028	(0.080)
SaleCost	0.469	(0.629)		0.172	(0.819)
TAX	6.576***	(2.184)		3.058	(2.331)
Cash	-1.197***	(0.373)		-0.155	(0.480)
MEdu	-0.024	(0.031)		-0.029	(0.042)
MAge	0.059	(0.662)		1.196	(0.983)
MPay	-4.149***	(1.455)		0.055	(1.788)
Number of observations	3825			1480	
prob>χ2	0			0.947	
Pseudo R^2	0.036			0.004	

Panel B: Estimated propensity score distribution

	N	Mean	S.D.	Min	P25	Medium	P75	Max
With GC	749	0.285	0.041	0.087	0.191	0.266	0.378	0.555
Without GC	731	0.288	0.042	0.075	0.191	0.273	0.382	0.562
Difference	18	-0.003	-0.001	0.012	0.000	-0.008	-0.004	-0.007

Panel C: Univariate tests for propensity matched sample

| Variables	With GC [Obs.=749]		Without GC [Obs.=731]			Difference	
	Mean	**S.D**	**Mean**	**S.D**		**Difference**	**t-statistics**
Leverage	0.522	0.007	0.520	0.007		-0.002	0.009
Size	18.043	0.049	18.086	0.050		0.043	0.069
ROA	0.042	0.002	0.042	0.002		0.000	0.002
GO	1.779	0.032	1.772	0.031		-0.007	0.045
SaleCost	0.057	0.003	0.057	0.002		0.000	0.004
TAX	0.023	0.001	0.021	0.001		-0.002	0.001
Cash	0.163	0.004	0.167	0.004		0.004	0.006
MAge	3.903	0.048	3.898	0.046		-0.005	0.033
MEdu	1.733	1.296	1.778	1.23		0.045	-0.121
MPay	0.03	0.001	0.031	0.001		0.001	0.002

Figure A1:
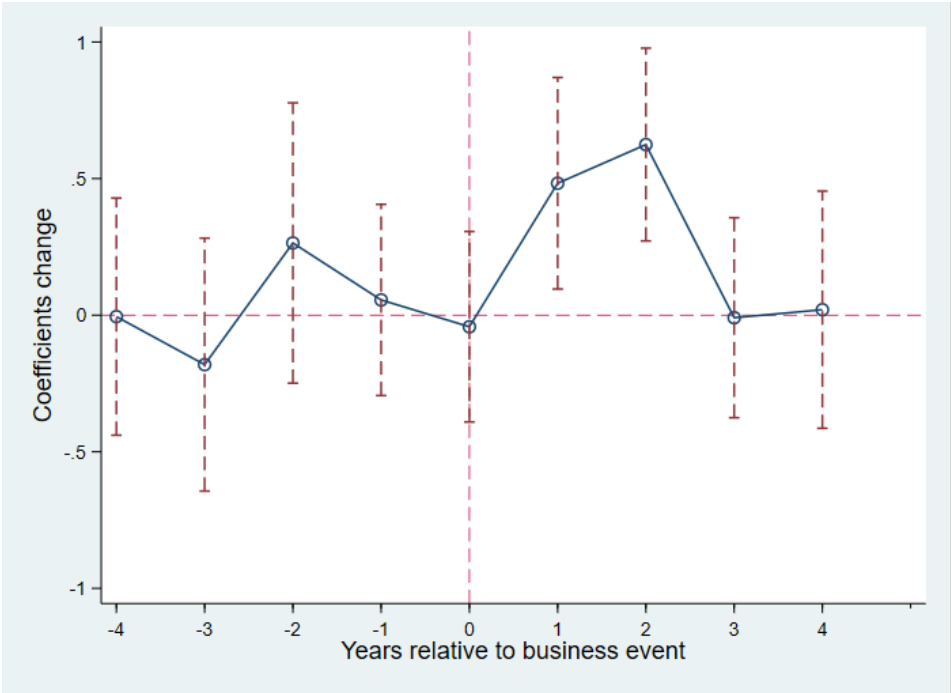
Figure A1: Parallel trend tests for the effects on business event