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Article

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China Journal of Accounting Research

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Suggested Citation: Yan, Suyan (2021) : Do common owners influence corporate social responsibility? Firm-level evidence from China, China Journal of Accounting Research, ISSN 1755-3091, Elsevier, Amsterdam, Vol. 14, Iss. 3, pp. 315-339, <https://doi.org/10.1016/j.cjar.2021.05.005>

This Version is available at:

<https://hdl.handle.net/10419/241842>

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Contents lists available at ScienceDirect

China Journal of Accounting Research

journal homepage: www.elsevier.com/locate/cjar

Do common owners influence corporate social responsibility? Firm-level evidence from China

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ARTICLE INFO

Article history:

Received 4 December 2020

Accepted 25 May 2021

Available online 10 June 2021

Keywords:

Common owners

Corporate social responsibility

State-owned enterprises

Corporate strategy

Stock returns

Financial constraints

ABSTRACT

Using a sample of Chinese A-share listed companies from 2007 to 2018, this article explores the influence of common owners on corporate social responsibility (CSR). The results show that common owners significantly promote CSR investment, indicating that increased CSR represents a bright side to common owners, in contrast to their anticompetitive effect. Further analysis shows that the nature of state ownership significantly weakens the positive relationship between common owners and CSR investment. Prospector firms strengthen the positive influence of common owners on CSR investment, whereas defender firms weaken the effect. Moreover, common owners benefit from increasing CSR investment, and co-owned firms benefit by easing their financial constraints when they invest or increase their investment in social responsibility. The findings enhance the outstanding of how common owners affect corporate behavior and enrich the literature on common ownership and CSR investment. © 2021 Sun Yat-sen University. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

As stakeholders' claims have attracted attention, investment in corporate social responsibility (CSR) has become an important aspect of corporate strategic management. The view that CSR investments are beneficial for obtaining and maintaining a sustainable competitive advantage (Jones et al., 2018) is also now widely acknowledged. The literature provides extensive evidence of factors determining the level of CSR investment at the institutional, organizational, and personal levels (Aguinis and Glavas, 2012). Shareholders, as important stakeholders, particularly institutional investors, have a powerful effect on CSR investment (Graves and Waddock, 1994; Johnson and Greening, 1999; Neubaum and Zahra, 2006; David et al., 2007;

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<https://doi.org/10.1016/j.cjar.2021.05.005>

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Schaefer, 2008; Glac, 2014; Hart and Zingales, 2017; Buchanan et al., 2018; F. Cao et al., 2019; Erhemjamts and Huang, 2019; Dyck et al., 2019). How do common owners that hold stocks in several companies within an industry influence CSR investment? This article investigates the association between common owners and CSR investment. According to the preliminary statistics of Chinese A-share listed companies from 2007 to 2018,¹ 64% of listed companies have common owners, among which the top 10 shareholders include at least one common owner, and this percentage reached 75.59% in 2015. Common owners are noticeably prevalent in Chinese A-share listed companies, motivating the author to explore how common owners influence firms' behavior in the context of emerging economies.

The U.S. antitrust agencies define common owners as investors simultaneously holding stocks in competing corporations. Azar et al. (2018) refer to common owners as overlapping investors holding many natural competitors' shares in the U.S. airline industry and verify that common ownership can impair product market competition. There is growing interest in common owners. However, theoretical and empirical studies primarily focus on the fierce debate regarding whether the anticompetitive effects of common owners are serious enough to violate relevant anti-monopoly laws and regulations and whether authorities must take action to limit the anticompetitive effects of common owners (He and Huang, 2017; Kennedy et al., 2017; O'Brien and Waehrer, 2017; Posner et al., 2017; Azar et al., 2018; Elhauge, 2018). Scholars also explore the effects of common owners on corporate governance (Antón et al., 2018a; Kang et al., 2018; Gilje et al., 2019), corporate information disclosure (Jung, 2013; Pawliczek and Skinner, 2018; Park et al., 2019) and corporate innovation (López and Vives, 2017; Antón et al., 2018b; Borochin et al., 2018; Kostovetsky and Manconi, 2018). However, the literature on common owners does not consider the effects of common owners on CSR. The only relevant study, that of Condon (2019), constructs a framework to theoretically explore how institutional investor activism influences environmental issues using common owners' economic incentives; however, it does not address the effect of common owners on other aspects of CSR and does not provide empirical evidence of a correlation between common owners and CSR.

Considering common owners as those that hold the shares of several competitors in an industry as an entry point, this study advances two rival hypotheses concerning the association between common owners and CSR. First, considering firms' motivation for CSR, which can provide better access to financing to increase the likelihood of success under fierce product market competition, the anticompetitive effects of common owners may decrease firms' investment in CSR. Second and in contrast, considering the objective of common owners to maximize their portfolio value, common owners may be more concerned about firms' commitments to CSR, which can promote the industry's sustainable development; therefore, firms' managers may invest more in CSR to cultivate a reputable corporate image among common owners and to align with their preferences concerning CSR. The findings show that common owners significantly boost firms' investment in CSR.

Considering the different ownership types, the different types of corporate strategy, and the different characteristics of firms' decisions and behaviors, this study further explores whether the cross-sectional characteristics of the nature of the ultimate controller and the type of corporate strategy moderate the positive influence of common owners on CSR. The empirical results show that the nature of state ownership significantly weakens the positive relation between common owners and CSR. Prospector firms, which use a certain corporate strategy, strengthen the positive influence of common owners on CSR, whereas defender firms, which use another type of corporate strategy, weaken the positive influence of common owners on CSR. Moreover, common owners receive rewards from the stock market by improving firms' CSR, and firms can benefit from easing their financial constraints when they invest or increase their investment in social responsibility. Notably, although investing in CSR creates costs, firms consider shareholders' preference for social responsibility in their business process, which includes corporate citizenship (Jones, 2010; Lin et al., 2010).

To alleviate endogeneity concerns, this study uses various empirical strategies, such as adding corporate governance variables, lagging the independent variables in the regression models, using propensity score matching, and using the Heckman two-stage regression. In addition, this study re-estimates all of the models

¹ The data are from the China Stock Market and Accounting Research (CSMAR) database, which is used frequently in studies on China.

by clustering standard errors at the firm level and changing the scope of common owners to recalculate the proxy variables. The regression results suggest that the conclusions are robust.

This study makes several contributions to the literature. First, it enhances the understanding of how common owners affect corporate behavior. Existing research focuses on anticompetitive effects, corporate governance, information disclosure, and corporate innovation. However, despite the importance of common owners, there remains a paucity of evidence regarding the relationship between common owners and CSR. Regarding the anticompetitive effects of common owners, [Azar et al. \(2018\)](#) document that common owners have anticompetitive effects, and [He and Huang \(2017\)](#) imply that common owners reduce product market competition. Scholars disagree whether authorities should formulate and enforce an antitrust policy to limit common owners' competitive harm ([Elhauge, 2016, 2017, 2018](#); [Posner et al., 2017](#); [O'Brien and Waehrer, 2017](#); [Patel, 2018](#); [Bebchuk and Hirst, 2018](#); [Klovers and Ginsburg, 2018](#)). Nevertheless, [Park et al. \(2019\)](#) find that common owners have positive impacts on corporate information disclosure; [Antón et al. \(2018b\)](#) argue that common owners improve R&D when technological spillovers are large relative to product market spillovers; and [Kostovetsky and Manconi \(2018\)](#) indicate that greater common institutional ownership is related to more patent citations. In brief, common owners have negative effects on product market competition but positive effects on promoting information disclosure and corporate innovation. This study complements the literature concerning how common owners affect corporate behavior and provides evidence of the bright side of common owners in terms of promoting firms' investment in CSR.

Second, this study enriches the literature on the determinants and economic consequences of CSR investments. Regarding the association between shareholders and CSR, the literature is more interested in the effects of institutional shareholders. [Graves and Waddock \(1994\)](#) show that institutional investors are inclined to hold shares of companies that exhibit better CSR performance. [Johnson and Greening \(1999\)](#) find that pension fund managers who keep an eye on a company for a long time can improve both the people and product quality of corporate social performance. [Neubaum and Zahra \(2006\)](#) show that the relationship between institutional ownership and corporate social performance varies with investment horizon, activism, and coordination. [Buchanan et al. \(2018\)](#) find that during the 2008 global financial crisis, CSR firms with high institutional ownership had significantly higher firm values than firms with low institutional ownership. [Erhemjamts and Huang \(2019\)](#) argue that institutions with longer investment horizons can upgrade CSR at the firm level, that is, there is a positive correlation between institutional ownership horizon and CSR. [Dyck et al. \(2019\)](#) show that institutional ownership increases firms' environmental and social performance across 41 countries. This study suggests that common owners are an important factor influencing CSR. It explores and recognizes the moderating role of the nature of state ownership and corporate strategies in the positive association between common owners and CSR. The findings expand research on shareholders' influence on CSR investments.

Finally, this study deepens the understanding of firms' commitment to CSR. [Parmar et al. \(2010\)](#) claim that CSR is an expansion of corporate obligations through business ethics based on maximizing shareholder value. Closely related to that, [Hart and Zingales \(2017\)](#) highlight that the maximization of shareholders' welfare is not equivalent to the maximization of market value, and they suggest that firms and asset managers should consider the preferences of their investors when developing corporate policies and that shareholders can express their preferences through the right to vote. The findings of this study suggest that although investment in CSR generates considerable costs, firms consider shareholders' preferences regarding social responsibility, which corroborates the viewpoints of [Hart and Zingales \(2017\)](#).

The remainder of this paper proceeds as follows. [Section 2](#) puts forward the hypotheses based on a review of the literature and theoretical analysis. [Section 3](#) outlines the proxy variables and empirical models used in this study. [Section 4](#) reports the sample selection process, describes the statistics of the main variables, and conducts the correlation analysis. [Section 5](#) reports the baseline multivariate regression results and those of a series of cross-sectional tests and supplemental analyses. [Section 6](#) discusses potential endogeneity and conducts various robustness checks, and [Section 7](#) presents the conclusions.

2. Related literature and hypothesis development

The literature indicates that CSR investments can contribute to obtaining and maintaining a sustainable competitive advantage. [Freeman \(1984, 1994\)](#) documents that firms associate stakeholders' claims with corpo-

rate operational philosophy, consider stakeholders' preferences, and balance the competing demands of various stakeholder groups, which can contribute to better strategic decisions by managers and a better operational environment for firms. Pratima Bansal and Roth (2000) claim that obtaining a competitive advantage is one of the motivations for CSR investments. Sen and Bhattacharya (2001) argue that CSR is a crucial strategic factor for firms to succeed in product market competition. McWilliams et al. (2002) also claim that social responsibility norms can result in a sustained competitive advantage. Porter and Kramer (2002) propose that corporate philanthropy, an aspect of CSR, can improve a firm's competitive advantage. The establishment of mutually beneficial relationships with stakeholders can engender sustainable competitive advantages (Harrison et al., 2010; Jones et al., 2018). Gregory et al. (2016) show that corporate social performance is value relevant, and this valuation mainly stems from improved earnings persistence, which is consistent with better corporate social performance conferring a competitive advantage. Accordingly, the more intense the product market competition is, the greater the volatility of operational profits and the greater the operational risk. Nevertheless, firms engaging in CSR can contribute to social capital and reduce firms' heterogeneous risk (Bansal and Clelland, 2004). In other words, the more intense the product market competition is, the more prone firms are to invest in CSR as a competitive strategy in response to the liquidation threats created by fierce product market competition (Schmidt, 1997).

Furthermore, research shows that CSR can improve access to external capital. Cheng et al. (2014) find that superior CSR performance results in better access to finance, which can be ascribed to reduced agency costs and information asymmetry that then lower financial constraints. Benlemlih (2015) shows that firms with high CSR significantly shorten their debt maturity, and they use more short-term debt and shareholders' equity and less long-term debt to finance investments. These findings indicate that firms with better CSR performance are more likely to obtain loans in the debt market. Therefore, as fierce product market competition intensifies the uncertainty of operating profits and future cash flows and increases the financial constraints firms face, firms have a strong incentive to invest in CSR to reduce the financial constraints caused by intense product market competition.

However, investors holding shares in natural competitors can discourage firms from competing and even push the product market toward monopolistic competition (Azar et al., 2018). That is, common owners can adversely affect the extent of product market competition (He and Huang, 2017; Azar et al., 2018). Azar et al. (2018) examine whether common ownership hinders product market competition in the U.S. airline industry, and their empirical results show that common ownership concentration increases ticket prices by approximately 3% to 7%, suggesting that common ownership has anticompetitive effects. He and Huang (2017) argue that common owners can offer product market benefits by fostering collaboration and facilitating significantly greater market share growth for cross-held firms in the same industry. Moreover, Posner et al. (2017) propose limiting common owners' holdings to below a particular threshold to restrain anticompetitive forces. Elhauge (2016, 2017, 2018) introduces new legal theories to address the problem of common owners' anticompetitive effects, which harm economic growth. However, some scholars argue that the anticompetitive effects of common owners are substantially overstated (Klovers and Ginsburg, 2018; Bebchuk and Hirst, 2018). Taking a step back, regardless of whether common owners' holdings should be limited, scholars basically agree that common owners are highly likely to reduce product market competition.

Given that common owners reduce firms' incentives to compete and thus adversely affect product market competition, firms' motivation for social responsibility, which is a competitive strategy to obtain sustainable competitive advantages and to improve access to finance, is weakened as product market competition decreases. That is, common owners alleviate competition in the product market, directly reducing firms' motivation for CSR investments to obtain competitive superiority. Reduced product market competition reduces liquidation threats and the fluctuation and uncertainty of operating profits and future cash flows, which can be directly attributed to the anticompetitive effects of common owners. In this regard, co-owned firms have significantly lower financing needs, and their motivations for social responsibility decline further. In brief, from the perspective of firms' incentives to invest in CSR, common owners should reduce co-owned firms' incentives to invest in CSR through their anticompetitive effects. According to the above discussion, this study formulates **Hypothesis 1**:

Hypothesis 1. *Ceteris paribus*, common owners are negatively associated with co-owned firms' CSR investments.

However, the maximization of common owners' portfolio value converges with the interests of the industry as a whole, even with the overall economy to some extent. The extent of convergence may be greater as more firms within an industry are held by common owners. According to the definition of common ownership, the basic characteristic of common owners is holding multiple firms in the same industry. This basic characteristic indicates that common owners should seek to maximize their portfolios' value regardless of the value of individual firms (Azar et al., 2018; Schmalz, 2018). In this regard, compared with individual firms, the objective of maximizing portfolio value suggests that common owners should pay greater attention to the industry and even more to macroeconomic growth. Therefore, common owners are concerned about firms' CSR investments, which are closely related to industry and even macroeconomic growth (Akerlof, 2002; Campbell, 2007). Condon (2019) documents that considering the benefit of portfolio returns, diversified investors may reasonably motivate firms within their portfolios to internalize negative externalities and engage in or increase climate change-related activism, such as exerting pressure to reduce carbon emissions, which is conducive to the industry's long-term development and that of the overall economy. In other words, when co-owned firms' investments in CSR enhance portfolio value, common owners should push co-owned firms to pursue CSR investments.

Furthermore, individual firms may weigh the costs and benefits of CSR investments. Individual firms should be unwilling to invest in CSR when the costs outweigh the benefits. However, common owners connect several firms within an industry through their portfolio, which is similar to a mini ecosystem. Firms within the mini ecosystem actively invest in CSR and pay attention to the claims of stockholders, creditors, customers, and suppliers, attracting excellent managers and skilled employees, maintaining a friendly relationship with local communities and the general public, and developing their reputation (Brammer and Pavelin, 2006). They have a positive role in the sustainable development of these mini ecosystems. Corporate donations,² as a visible component of CSR performance, are conducive to forming a good corporate reputation and improving stakeholders' understanding of corporate image (Brammer and Millington, 2005, 2006). Saiia (2002) states that strategic philanthropy is an important embodiment of good corporate citizenship. Wang and Qian (2011) find that corporate philanthropy has a positive impact on corporate financial performance, and firms that are not government owned or politically well-connected benefit more from corporate philanthropy. In addition, CSR investments can broker greater trust between firms and their stakeholders and investors. Social capital derived from trust helps increase profitability and growth for firms with high CSR intensity; even during the 2008–2009 financial crisis, firms with high CSR intensity had higher stock returns than firms with low CSR intensity (Lins et al., 2017), which meant less speculative risk for common owners. Specifically, CSR can decrease systematic risk (Albuquerque et al., 2018), which is an important issue with respect to the value of common owners' portfolios. Therefore, common owners have strong incentives to maximize their portfolio value by pushing co-owned firms to invest in CSR and by promoting the mini ecosystem and the entire industry to enter and maintain a virtuous development circle.

Finally, given that co-owned firms connect through common owners' portfolios, Jung (2013) finds that common ownership can be a transmission channel, and firms that take the lead in increasing market risk disclosure inspire investors to pursue analogous increases from other firms in their portfolios, which implies that common owners facilitate the diffusion of disclosure practices. Similarly, an overlapping investor may lead firms with common owners to have similar CSR practices. There are at least two reasons that co-owned firms may satisfy common owners' demands for CSR investments. First, co-owned firms may adopt similar CSR practices after a first-mover firm's investment in CSR because of peer pressure from other firms owned by common owners (Cao et al., 2017; Lin et al., 2018). Second, common owners can decide which stocks to retain or sell (Edmans et al., 2019), and the behaviors of holding and selling can strongly signal that the firm being sold is bad, which may cause the firm's stock price to suffer a large slump. To avoid being sold first when inves-

² As Lys et al. (2015) highlight, corporate donations are one type of CSR investment. Although the distinction between corporate donations and CSR investment decisions is conducive to understanding the determinants of different CSR investments, this study does not discuss it in detail, which is a shortcoming and requires further research.

tors suffer a liquidity shock, co-owned firms may develop their image and reputation and build trust by investing or increasing their investment in CSR to satisfy common owners' preferences for social responsibility (Glac, 2014; Hart and Zingales, 2017). In addition to exit, common owners can govern and influence co-owned firms' CSR strategies through voice (Edmans et al., 2019).

Overall, common owners have strong incentives and abilities to push co-owned firms to make CSR investments, and co-owned firms may invest or increase their investment in CSR in response to common owners' preference for social responsibility. Based on the foregoing analysis, this study formulates **Hypothesis 2**:

Hypothesis 2. *Ceteris paribus*, common owners are positively associated with co-owned firms' CSR investments.

3. Variables and empirical models

3.1. Variable measurements

3.1.1. Common owners variables

As some top 10 shareholders hold too few shares to influence a firm, this study's definition of common owners is limited to shareholders holding at least 1% of a firm's outstanding shares. Following He and Huang (2017) and Park et al. (2019), this study constructs four variables to gauge firms' common owner status in a given fiscal year: *DumCross*, which is an indicator variable that equals 1 if shareholders holding at least 1% of the firm's outstanding shares simultaneously hold the shares of at least one other firm in the same industry; *NumCross*, which is the number of common owners that hold the focal firm; *NumConnect*, which is the number of same-industry peers that share any common owners with the focal firm; and *AvgNum*, which is the average number of same-industry peers held by common owners. According to conventional practices, this study uses the natural logarithm of *NumCross*, *NumConnect*, and *AvgNum* to reduce skewness.

3.1.2. CSR variables

Parmar et al. (2010) state that CSR expands corporate obligations based on business ethics beyond the objective of maximizing shareholders' wealth. CSR concerns the interests of multiple stakeholders, such as shareholders, creditors, employees, suppliers, customers, governments, and the community. Therefore, CSR is corporate behavior involving resource allocation (Carroll, 1979; Waddock and Graves, 1997). Among the various aspects of CSR, corporate donations are a highly externally visible and discretionary aspect of CSR (Brammer and Millington, 2005, 2006, 2008), and they demonstrate social responsiveness to multiple stakeholders, for instance, employees, governments, and the community (Berman et al., 1999; Wood and Jones, 1995). Hence, it is reasonable to consider corporate donations as largely reflecting firms' concerns about and fulfillment of CSR.

Therefore, referring to Griffin and Mahon (1997) and Brammer and Millington (2008), this study measures CSR based on firms' donation data, which is consistent with Marquis and Qian (2014), who advise that CSR activities should be directly examined. This study constructs three variables to proxy CSR investments at the firm-year level: *DumDonation*, which is an indicator variable that equals 1 for firm-years in which the firm makes any donations and 0 otherwise; *Donation*, which is the amount of all donations made scaled by total assets; and *DM_Donation*, which is *Donation* adjusted by the average donation ratio of the industry to which the firm belongs, i.e., *DM_Donation* equals *Donation* minus the industry's average donation ratio.

3.1.3. Control variables

Following previous studies (W. Li and Zhang, 2010; Jo and Harjoto, 2011, 2012; Choi et al., 2018; Yuan et al., 2019), this study includes several control variables that may affect a firm's CSR investments. The firm-level control variables include the following: firm size (*Lnasset*) is measured as the natural logarithm of the firm's total assets; leverage (*Lev*) is the ratio of total liabilities divided by total assets; return on assets (*RoA*) is net profits divided by total assets; sales growth (*Growth*) is the change between the current year's sales and last year's sales divided by last year's sales; operating cash flow (*Cflow*) is net cash flow from operating activities divided by total assets; the nature of state ownership (*SOE*) equals 1 if the state ownership of the

listed firm is a central or local government agency or government-controlled state-owned enterprise and 0 otherwise (Du, 2014b); firm age ($Lnage$) is the natural logarithm of the number of years since the firm was founded. In addition, this study controls both year and industry fixed effects to mitigate concerns that time-invariant firm or industry characteristics affect the association between common owners and CSR investments. See Appendix A for a detailed description of all of the variables.

3.2. Empirical models

To test the hypotheses, this study estimates Eq. (1) to link common owners and CSR investments along with firm-specific control variables and year and industry fixed effects:

$$CSR_{it} = \beta_0 + \beta_1 CO_{it} + \beta Controls + Year + Industry + \delta_{it} \quad (1)$$

where i and t index firms and years, respectively. The dependent variable is *CSR investments*, proxied by *DumDonation*, *Donation*, and *DM_Donation*; and the independent variable is *CO*, i.e., common owners, proxied by *DumCross*, *NumCross*, *NumConnect*, and *AvgNum*. *Controls* is a vector of control variables as mentioned above, and *Year* and *Industry* are year and industry fixed effects, respectively. As discussed, how common owners affect CSR investments remains an open question. Therefore, a negative and significant β_1 will be consistent with Hypothesis 1, whereas a positive and significant β_1 will be consistent with Hypothesis 2. Notably, when the dependent variable is *DumDonation*, this study uses a logit regression model to examine Eq. (1).

4. Sample and descriptive statistics

4.1. Sample selection

The sample includes Chinese A-share listed firms during the 2007–2018 period. Then, firms in banking, insurance, and other financial industries are deleted because of their unique financial characteristics. Next, the firm-year observations with transaction statuses of ST (special treatment), *ST (suspension from trading), or PT (particular transfer) are deleted. Finally, firm-year observations missing common owners, CSR investments, or firm-specific control variables are deleted. This sample selection process results in a final sample of 23,091 firm-year observations.

To alleviate the potential influence of extreme observations, the continuous variables are winsorized at the 1% and 99% levels. Furthermore, the t -statistics based on the standard errors of the regression results are adjusted following White (1980). Common owner data, CSR investment data, and other data are from the CSMAR database, which is frequently used in studies on China.

4.2. Descriptive statistics

Fig. 1 presents a time series of the percentage of Chinese A-share listed firms with at least one common owner from 2007 to 2018. During this period, the percentage of listed firms having common owners increasingly fluctuated. The lowest percentage was about 34% in 2008, and the highest percentage was 55% in 2018; that is, 55% of listed firms had shareholders holding at least 1% of the firm's outstanding shares and simultaneously holding shares from at least one other firm in the same industry.

Table 1 provides the descriptive statistics for the variables used in the main tests. Approximately 68.0% of the firm-year observations include donations³ (*DumDonation*). However, the mean value of *Donation* as a percentage of total assets is approximately 0.017%, and the maximum value of *Donation* is approximately 0.241%. The mean (maximum) value of *DM_Donation* is –0.009% (0.202%), which suggests that firms' donation percentages of total assets differ greatly within an industry. The statistics of *NumCross*, *NumConnect*, and *AvgNum* are described before taking their natural logs. The mean value of *Dumcross* is 0.428, which means that

³ Corporate donation data are from specific items in the nonoperating expenditures of firms' financial statements. When there is no value for corporate donations, 0 is used.

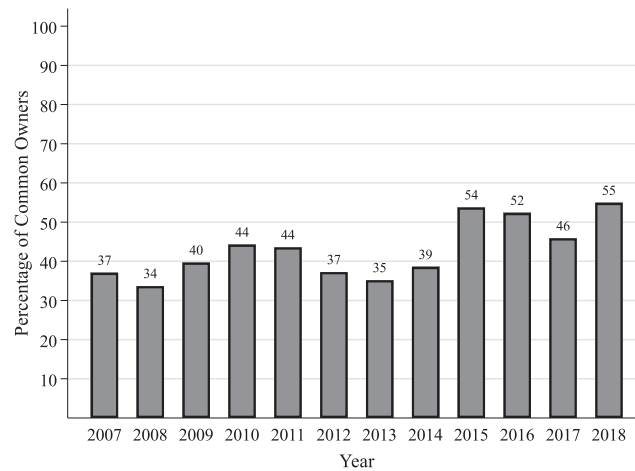


Fig. 1. Time series of the percentage of Chinese A-share listed firms with common owners.

Table 1
Descriptive Statistics.

Variable	<i>N</i>	Min	P25	<i>M</i>	P50	P75	Max	<i>SD</i>
<i>DumDonation</i>	23,091	0	0	0.680	1	1	1	0.466
<i>Donation</i>	23,091	0	0	0.017	0.002	0.014	0.241	0.038
<i>DM_Donation</i>	23,091	-0.062	-0.016	-0.002	-0.009	-0.001	0.202	0.036
<i>DumCross</i>	23,091	0	0	0.428	0	1	1	0.495
<i>NumCross</i>	23,091	0	0	0.746	0	1	5	1.101
<i>NumConnect</i>	23,091	0	0	3.477	0	2	50	8.419
<i>AvgNum</i>	23,091	0	0	2.047	0	1.500	32	5.052
<i>Lnasset</i>	23,091	19.07	21.08	22.01	21.86	22.78	27.00	1.344
<i>Lev</i>	23,091	0.049	0.294	0.465	0.462	0.626	1.088	0.223
<i>Roa</i>	23,091	-0.289	0.012	0.035	0.033	0.062	0.213	0.063
<i>Growth</i>	23,091	-0.653	-0.028	0.225	0.116	0.294	4.429	0.627
<i>Cflow</i>	23,091	-0.216	0.001	0.041	0.041	0.085	0.262	0.078
<i>SOE</i>	23,091	0	0	0.472	0	1	1	0.499
<i>Lnage</i>	23,091	1.099	2.485	2.666	2.708	2.944	3.401	0.413

This table presents the descriptive statistics for the variables used in the main tests. All of the variables are defined in Appendix A.

42.8% of the observations include at least one shareholder holding more than 1% of the firm's outstanding shares and the shares of more than one other firm in the same industry. The maximum value of *NumCross* is 5, indicating that a firm has five common owners, and the mean value of *NumConnect* is 3.477, indicating that the average co-owned firm is connected to approximately eight firms (3.477/42.8%) in the same industry through common owners. The maximum value of *AvgNum* is 32, meaning that the average commonly owned firm is connected to 32 firms in the same industry through one common owner.

Table 2 shows the Pearson correlation analysis between the dependent variable, independent variable, and firm-specific control variables. As shown in Table 2, *DumDonation* is significantly positively correlated with *DumCross*, *NumCross*, *NumConnect*, and *AvgNum* at the 1% level. *DM_Donation* is identical to *DumDonation*. *Donation* is significantly positively correlated with *DumCross* and *NumCross* at the 1% level, but not with *NumConnect* and *AvgNum*. The correlation analysis mostly and preliminarily supports Hypothesis 2. Moreover, the coefficients of the pairwise correlations between the control variables are no higher than 0.4, suggesting that multicollinearity is not a serious problem when these variables are simultaneously included in the regressions.

Table 2
Pearson correlation analysis.

Pearson	<i>DumDonation</i>	<i>Donation</i>	<i>DM_Donation</i>	<i>DumCross</i>	<i>NumCross</i>	<i>NumConnect</i>	<i>AvgNum</i>	<i>Lnasset</i>	<i>Lev</i>	<i>Roa</i>	<i>Growth</i>	<i>Cflow</i>	<i>SOE</i>	<i>Lnage</i>
<i>DumDonation</i>	1													
<i>Donation</i>	0.305***	1												
<i>DM_Donation</i>	0.266***	0.911***	1											
<i>DumCross</i>	0.062***	0.025***	0.032***	1										
<i>NumCross</i>	0.078***	0.068***	0.057***	0.782***	1									
<i>NumConnect</i>	0.032***	0.002	0.033***	0.477***	0.562***	1								
<i>AvgNum</i>	0.019***	−0.020***	0.019***	0.468***	0.343***	0.874***	1							
<i>Lnasset</i>	0.191***	−0.049***	0.023***	0.246***	0.233***	0.247***	0.207***	1						
<i>Lev</i>	0.013*	−0.111***	−0.088***	0.013*	0.011*	−0.012*	−0.020***	0.324***	1					
<i>Roa</i>	0.108***	0.156***	0.125***	0.123***	0.153***	0.062***	0.034***	0.070***	−0.363***	1				
<i>Growth</i>	0.012*	0.008	0.01	−0.014**	−0.009	−0.034***	−0.034***	0.043***	0.034***	0.175***	1			
<i>Cflow</i>	0.051***	0.102***	0.071***	0.078***	0.100***	0.056***	0.039***	0.060***	−0.149***	0.324***	0.005	1		
<i>SOE</i>	−0.045***	−0.107***	−0.106***	0.163***	0.137***	0.079***	0.059***	0.303***	0.259***	−0.089***	−0.057***	0.048***	1	
<i>Lnage</i>	−0.046***	−0.090***	−0.035***	0.019***	0.024***	0.112***	0.097***	0.147***	0.178***	−0.095***	−0.006	−0.030***	0.138***	1

This table presents the Pearson correlation analysis between the dependent variable, independent variable, and firm-specific control variables. All of the variables are defined in Appendix A. ***, **, and * denote significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

5. Empirical results

5.1. Baseline multivariate regression results

Table 3 reports the results from estimating Eq. (1) with the CSR investment proxy⁴ variables *DumDonation*, *Donation*, and *DM_Donation*, and the corresponding regression results are shown in Columns (1)–(4), (5)–(8), and (9)–(12), respectively. As shown in all columns of Table 3, except for the coefficient of *DumDonation* on *AvgNum* being positive but not significant in Column (4), the coefficients of *DumDonation* on *DumCross*, *NumCross*, and *NumConnect*, the coefficients of *Donation* on *DumCross*, *NumCross*, *NumConnect*, and *AvgNum*, and the coefficients of *DM_Donation* on *DumCross*, *NumCross*, *NumConnect*, and *AvgNum* are all positive and significant at the 1% level, providing strong and consistent support for Hypothesis 2. These results reveal that common owners promote CSR investments, echoing the conjecture that common owners are concerned about firms' CSR investments as they are closely related to industry and even macroeconomic growth and that common owners promote mini ecosystems and sustainable industry development. Regarding co-owned firms, their managers consider common owners' preference for social responsibility when they develop CSR strategies.

Considering that the incentives for corporate donations are seeking legitimacy from the Chinese government (Zhang et al., 2016; Zheng et al., 2017), do nongovernment-affiliated common owners encourage firms to donate for the same purpose? To answer this question, this study categorizes common owners into government-affiliated and nongovernment-affiliated groups and constructs two variables based on the common owner variables *DumCross* and *NumCross*: *Gov_DumCross* is an indicator variable that equals 1 if any of a firm's common owners are affiliated with the government, and *NonGov_DumCross* is an indicator variable that equals 1 if any of a firm's common owners are not affiliated with the government; *Gov_NumCross* is the number of common owners affiliated with the government, and *NonGov_NumCross* is the number of common owners not affiliated with the government.

The regression results are shown in Table 4. The results show that the positive effect of nongovernment-affiliated common owners on CSR investment is more prominent (Columns 1, 3, and 5). Moreover, as the number of common owners not affiliated with the government increases, CSR investment significantly increases, and as the number of common owners affiliated with the government increases, CSR investment significantly decreases (Columns 2, 4, and 6). That is, the incentive of nongovernment-affiliated common owners to promote corporate donations to seek legitimacy is stronger than that of government-affiliated common owners. It also means that common owners encourage firms to invest in CSR based on not only their concerns about CSR and sustainable industry development but also the motivation of seeking legitimacy, which complements the conclusions of previous studies (Zhang et al., 2016; Zheng et al., 2017).

Additional empirical tests confirm and supplement this conclusion. First, in the empirical model (Eq. (1)), adding the political connection variable to the control variables, which follows the definition in Chen et al. (2011), the results are consistent with those in Table 3 and supplement the findings on the influence of institutional antecedents on corporate donation decisions in the Chinese context by Zhang et al. (2016) and Zheng et al. (2017). In other words, in addition to gaining legitimacy, catering to the concerns of common owners is an important factor influencing corporate donation decisions. Second, conducting the empirical test using only the non-SOE sample, the results show that the positive effect of common owners on CSR investments remains significant in non-state-owned enterprises. Last, this study estimates Eq. (1) again controlling for *Year*Industry* fixed effects, and the results, as shown in Table 3, are robust.⁵

⁴ Additionally, this study adopts RKS rating scores (Marquis and Qian, 2014; Li et al., 2020), which are provided by third-party agencies that assess listed companies' CSR reporting, as a CSR investment proxy, and the regression results are essentially consistent with the baseline multivariate regression results in Table 3. The results are not included in the text but will be provided upon request.

⁵ The results are not included in the text but will be provided upon request. Thanks to an anonymous reviewer for their valuable comments.

Table 3
Common Owners and CSR Investments.

Variable	Dum_Donation (Logit Model)				Donation (OLS Model)				DM_Donation (OLS Model)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>DumCross</i>	0.105*** (3.179)				0.003*** (5.117)				0.002*** (4.787)			
<i>NumCross</i>		0.137*** (4.194)				0.004*** (7.451)				0.004*** (6.980)		
<i>NumConnect</i>			0.034** (2.024)				0.002*** (6.479)				0.002*** (6.469)	
<i>AvgNum</i>				0.022 (1.075)				0.001*** (4.380)				0.001*** (4.585)
<i>Lnasset</i>	0.511*** (29.362)	0.506*** (29.029)	0.513*** (29.365)	0.516*** (29.656)	0.001*** (5.101)	0.001*** (4.238)	0.001*** (4.609)	0.001*** (5.301)	0.001*** (4.904)	0.001*** (4.091)	0.001*** (4.344)	0.001*** (4.992)
<i>Lev</i>	-0.110 (-1.273)	-0.109 (-1.266)	-0.110 (-1.277)	-0.112 (-1.300)	-0.009*** (-7.367)	-0.009*** (-7.354)	-0.009*** (-7.280)	-0.009*** (-7.327)	-0.009*** (-7.283)	-0.009*** (-7.270)	-0.009*** (-7.190)	-0.009*** (-7.232)
<i>Roa</i>	2.118*** (7.368)	2.077*** (7.224)	2.146*** (7.465)	2.168*** (7.544)	0.054*** (10.957)	0.053*** (10.635)	0.054*** (10.961)	0.055*** (11.152)	0.051*** (10.380)	0.050*** (10.074)	0.051*** (10.358)	0.052*** (10.543)
<i>Growth</i>	-0.049** (-1.970)	-0.048* (-1.930)	-0.049** (-1.969)	-0.050** (-2.020)	-0.001** (-2.041)	-0.001* (-1.888)	-0.001* (-1.826)	-0.001** (-1.989)	-0.001** (-2.000)	-0.001* (-1.851)	-0.001* (-1.763)	-0.001* (-1.918)
<i>Cflow</i>	0.592*** (2.806)	0.577*** (2.732)	0.593*** (2.809)	0.603*** (2.857)	0.023*** (6.680)	0.023*** (6.527)	0.023*** (6.574)	0.023*** (6.686)	0.020*** (5.799)	0.020*** (5.653)	0.020*** (5.683)	0.020*** (5.791)
<i>SOE</i>	-0.499*** (-14.121)	-0.502*** (-14.209)	-0.494*** (-13.980)	-0.490*** (-13.881)	-0.008*** (-15.733)	-0.009*** (-16.004)	-0.008*** (-15.834)	-0.008*** (-15.604)	-0.008*** (-15.911)	-0.009*** (-16.171)	-0.009*** (-16.060)	-0.008*** (-15.850)
<i>Lnage</i>	-0.228*** (-5.080)	-0.228*** (-5.084)	-0.230*** (-5.118)	-0.232*** (-5.151)	-0.002** (-2.290)	-0.002** (-2.285)	-0.002** (-2.224)	-0.002** (-2.281)	-0.002** (-2.383)	-0.002** (-2.379)	-0.002** (-2.305)	-0.002** (-2.353)
<i>Year</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Industry</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>_Cons</i>	-8.555*** (-20.431)	-8.468*** (-20.161)	-8.586*** (-20.463)	-8.643*** (-20.651)	0.006 (1.160)	0.009* (1.785)	0.008 (1.444)	0.005 (0.997)	-0.013** (-2.411)	-0.010* (-1.817)	-0.011** (-2.082)	-0.013** (-2.513)
<i>R2_A</i>	0.091	0.091	0.091	0.091	0.118	0.119	0.118	0.117	0.041	0.042	0.041	0.040
<i>N</i>	23,091	23,091	23,091	23,091	23,091	23,091	23,091	23,091	23,091	23,091	23,091	23,091

This table presents the estimation results for the effects of common owners on CSR investments. The models in Columns (1)–(4) are estimated by logit regression, and Columns (5)–(12) are estimated by ordinary least squares (OLS). All of the continuous variables are winsorized at the 1% and 99% levels. All specifications include all of the control variables and year and industry fixed effects. The sample period is 2007–2018. The *t*-statistics (*z*-statistics in the logit model) based on robust standard errors adjusted for White (1980) are shown in brackets. All variables are defined in Appendix A. ***, **, and * denote significance at 1%, 5%, and 10% levels (two-tailed), respectively.

Table 4
Common Owners According to Government Affiliation.

Variable	Dum_Donation (Logit Model)		Donation (OLS Model)		DM_Donation (OLS Model)	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Gov_DumCross</i>	-0.124 (-1.582)		-0.001 (-0.613)		-0.001 (-0.540)	
<i>NonGov_DumCross</i>	0.129*** (3.806)		0.003*** (5.544)		0.003*** (5.181)	
<i>Gov_NumCross</i>		-0.253** (-2.277)		-0.003* (-1.814)		-0.002* (-1.659)
<i>NonGov_NumCross</i>		0.155*** (4.699)		0.004*** (7.908)		0.004*** (7.386)
<i>Lnasset</i>	0.512*** (29.430)	0.508*** (29.111)	0.001*** (5.195)	0.001*** (4.329)	0.001*** (4.989)	0.001*** (4.180)
<i>Lev</i>	-0.110 (-1.272)	-0.109 (-1.268)	-0.009*** (-7.381)	-0.009*** (-7.373)	-0.009*** (-7.296)	-0.009*** (-7.288)
<i>Roa</i>	2.096*** (7.289)	2.054*** (7.142)	0.054*** (10.891)	0.052*** (10.544)	0.051*** (10.319)	0.049*** (9.991)
<i>Growth</i>	-0.046* (-1.855)	-0.045* (-1.803)	-0.001* (-1.915)	-0.001* (-1.710)	-0.001* (-1.880)	-0.001* (-1.682)
<i>Cflow</i>	0.583*** (2.759)	0.567*** (2.686)	0.023*** (6.643)	0.023*** (6.482)	0.020*** (5.763)	0.019*** (5.610)
<i>SOE</i>	-0.493*** (-13.892)	-0.494*** (-13.933)	-0.008*** (-15.591)	-0.008*** (-15.818)	-0.008*** (-15.783)	-0.008*** (-16.000)
<i>Lnage</i>	-0.227*** (-5.062)	-0.228*** (-5.071)	-0.002** (-2.275)	-0.002** (-2.267)	-0.002** (-2.369)	-0.002** (-2.363)
<i>Year</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Industry</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>_Cons</i>	-8.605*** (-20.520)		0.006 (1.049)	0.009* (1.679)	-0.013** (-2.511)	-0.010* (-1.919)
<i>R2_A</i>	0.091	0.091	0.118	0.120	0.041	0.042
<i>N</i>	23,091	23,091	23,091	23,091	23,091	23,091

This table presents the estimation results with common owners sorted into government- and nongovernment-affiliated categories. All of the continuous variables are winsorized at the 1% and 99% levels. All specifications include all of the control variables and year and industry fixed effects. The sample period is 2007–2018. The *t*-statistics (z-statistics in the logit model) based on robust standard errors adjusted for White (1980) are shown in brackets. All of the variables are defined in Appendix A. ***, **, and * denote significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

5.2. Cross-sectional tests

5.2.1. Cross-sectional tests: state-owned enterprises

According to the literature (Li and Zhang, 2010; Du, 2014b), compared with non-state-owned firms, corporate governance and corporate strategies, such as CSR, differ in state-owned firms. Li and Zhang (2010) find that the positive correlation between corporate ownership dispersion and CSR for state-owned firms is reversed. Du (2014b) provides evidence that the negative association between Confucianism and minority shareholder expropriation differs between state-owned and non-state-owned enterprises. Therefore, these studies prompt further examination of whether and how common owners' positive influence on CSR investments differs between state-owned and non-state-owned enterprises. This study introduces an interaction between common owners and the nature of state ownership (i.e., $CO_{it} * SOE_{it}$) into Eq. (1) to examine the interactive effects on CSR investments.

$$CSR_{it} = \beta_0 + \beta_1 CO_{it} + \beta_2 SOE_{it} + \beta_3 CO_{it} * SOE_{it} + \beta Controls + Year + Industry + \delta_{i,t} \quad (2)$$

In Eq. (2), SOE_{it} is the nature of state ownership, and it equals 1 if the ultimate controller of the listed firm is a central or local government agency or government-controlled state-owned enterprise and 0 otherwise (Du, 2014b). All of the other variables are the same as in Eq. (1).

Table 5
Common owners, SOE, and CSR investments.

Variable	DumDonation (Logit Model)				Donation (OLS Model)				DM_Donation (OLS Model)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>DumCross</i>	0.204*** (4.480)				0.004*** (5.224)				0.004*** (5.090)			
<i>DumCross*SOE</i>	−0.192*** (−3.085)				−0.003*** (−3.082)				−0.003*** (−3.196)			
<i>NumCross</i>		0.238*** (5.165)				0.006*** (7.136)				0.006*** (6.996)		
<i>NumCross*SOE</i>		−0.187*** (−3.060)				−0.004*** (−3.912)				−0.004*** (−4.134)		
<i>NumConnect</i>			0.083*** (3.513)				0.002*** (6.208)				0.002*** (6.248)	
<i>NumConnect*SOE</i>			−0.090*** (−2.915)				−0.002*** (−3.198)				−0.002*** (−3.273)	
<i>AvgNum</i>				0.077*** (2.731)				0.002*** (4.345)				0.002*** (4.443)
<i>AvgNum*SOE</i>				−0.106*** (−2.822)				−0.001** (−2.339)				−0.001** (−2.283)
<i>SOE</i>	−0.423*** (−9.733)	−0.434*** (−10.309)	−0.436*** (−10.719)	−0.434*** (−10.708)	−0.007*** (−11.290)	−0.007*** (−11.241)	−0.007*** (−12.394)	−0.008*** (−12.680)	−0.007*** (−11.419)	−0.007*** (−11.262)	−0.007*** (−12.584)	−0.008*** (−12.965)
<i>Controls</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Year</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Industry</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>_Cons</i>	−8.614*** (−20.558)	−8.527*** (−20.287)	−8.646*** (−20.574)	−8.698*** (−20.754)	0.005 (0.974)	0.008 (1.534)	0.007 (1.281)	0.005 (0.891)	−0.014*** (−2.593)	−0.011** (−2.072)	−0.012** (−2.238)	−0.014*** (−2.607)
<i>R2_A</i>	0.091	0.091	0.091	0.091	0.118	0.120	0.119	0.117	0.041	0.043	0.042	0.040
<i>N</i>	23,091	23,091	23,091	23,091	23,091	23,091	23,091	23,091	23,091	23,091	23,091	23,091

This table presents the estimation results for the moderating effects of the nature of state ownership, i.e., *SOE*, on the association between common owners and CSR investments. The models in Columns (1)–(4) are estimated by logit regression, and Columns (5)–(12) are estimated by OLS. All of the continuous variables are winsorized at the 1% and 99% levels. All specifications include all of the control variables and year and industry fixed effects. The sample period is 2007–2018. The *t*-statistics (z-statistics in the logit model) based on robust standard errors adjusted for White (1980) are shown in brackets. All of the variables are defined in Appendix A. ***, **, and * denote significance at 1%, 5%, and 10% levels (two-tailed), respectively.

Table 5 presents the results from estimating Eq. (2) with the CSR investment proxy variables *DumDonation*, *Donation*, and *DM_Donation*, and the corresponding regression results are shown in Columns (1)–(4), (5)–(8), and (9)–(12), respectively. As shown, the coefficients of SOE_{it} (β_2) are negative and significant at the 1% level in all cases.

Moreover, when the dependent variable is *DumDonation*, the interaction items between *CO* and *SOE*, i.e., *DumCross*SOE*, *NumCross*SOE*, *NumConnect*SOE*, and *AvgNum*SOE*, are negative and significant at the 1% level across Columns (1)–(4) of Table 5. When the dependent variable is *Donation*, the interaction items between common owners and the nature of state ownership are negative and significant at the 1%, 1%, 1%, and 5% levels in Columns (5)–(8) of Table 5, respectively. When the dependent variable is *DM_Donation*, adjusted by the average donation ratio of the industry to which the firm belongs, the interaction items of *DumCross*SOE*, *NumCross*SOE*, *NumConnect*SOE*, and *AvgNum*SOE*, are negative and significant at the 1%, 1%, 1%, and 5% levels in Columns (9)–(12), respectively. In other words, the coefficients of the interaction between common owners and the nature of state ownership, that is, $CO*SOE$ (β_3), are negative and significant.

These results ($\beta_3 < 0$) indicate that because state-owned firms intensely interact with the government, common owners may have less influence on state-owned firms' CSR investments even if they are co-owned. In this regard, the financial objectives of state-owned firms are distinct from those of non-state-owned firms, i.e., maximizing firm value. Therefore, state-owned firm managers may consider common owners' preferences for social responsibility to a lesser extent. In sum, the nature of state ownership weakens the positive effects of common owners on CSR investments, suggesting that common owners' positive influence on CSR investments is less pronounced for state-owned firms. These findings support the arguments in the literature.

In addition, the results ($\beta_2 + \beta_3 < 0$) suggest that state-owned firms are already burdened with many government policy tasks (Shleifer and Vishny, 1994), such as infrastructure development and the resolution of unemployment challenges, so they may be less involved in CSR investments. In other words, state-owned firms are politically committed to CSR, thus they invest in CSR differently from how non-state-owned firms invest in CSR, such as making donations as nonoperating expenses.

5.2.2. Cross-Sectional Tests: Prospectors and Defenders

Firms with different business strategies have different characteristics (Miles and Snow, 1978; Miles and Snow, 2003; Bentley et al., 2013). Prospectors focus on innovation, which produces greater outcome uncertainty and a greater need for financing, whereas defenders focus on efficiency, which produces less outcome uncertainty and more operating cash flow (Bentley et al., 2013). Therefore, prospectors may have stronger incentives to invest in CSR to better access finance, whereas defenders may make fewer CSR investments as they have less need for financing. Therefore, this study conjectures that the association between common owners and CSR investments may vary between firms with different business strategies.

Following Bentley et al. (2013), this study classifies business strategy into three types according to the strategy score: defenders (strategy score from 6 to 12), analyzers (strategy score from 13 to 23), and prospectors (strategy score from 24 to 30). This study introduces an interaction between common owners and business strategies (i.e., $CO_{it} * Prospectors_{it}$ and $CO_{it} * Defenders_{it}$) into Eq. (1) to examine their interactive effects on CSR investments.

$$CSR_{it} = \beta_0 + \beta_1 CO_{it} + \beta_2 Prospectors_{it} + \beta_2 Defenders_{it} + \beta_3 CO_{it} * Prospectors_{it} + \beta_3 CO_{it} * Defenders_{it} + \beta Controls + Year + Industry + \delta_{it} \quad (3)$$

where $Prospectors_{it}$ and $Defenders_{it}$ are indicator variables for the types of business strategy. Specifically, $Prospectors_{it}$ equals 1 for the observations with a strategy score from 24 to 30 and 0 otherwise; $Defenders_{it}$ equals 1 for the observations with a strategy score from 6 to 12 and 0 otherwise. All of the other variables are the same as in Eq. (1).

Table 6 reports the results from estimating Eq. (3). With *DumDonation* as the dependent variable, the coefficients of *DumCross*Prospectors*, *NumCross*Prospectors*, *NumConnect*Prospectors*, and *AvgNum*Prospectors* are positive and significant at the 1%, 1%, 5%, and 5% levels in Columns (1)–(4), respectively. The coefficients of *DumCross*Defenders*, *NumCross*Defenders*, *NumConnect*Defenders*, and *AvgNum*Defenders* are negative but not significant in Columns (1)–(4).

Table 6
Common owners, business strategy, and CSR investments.

Variable	DumDonation (Logit Model)				Donation (OLS Model)				DM_Donation (OLS Model)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>DumCross</i>	0.073 (1.482)				0.003*** (3.832)				0.002*** (3.792)			
<i>DumCross*Prospectors</i>	0.415*** (3.099)				0.003 (1.498)				0.003 (1.379)			
<i>DumCross*Defenders</i>	−0.114 (−0.906)				−0.002 (−1.337)				−0.002 (−1.502)			
<i>NumCross</i>		0.108** (2.224)				0.004*** (5.063)				0.003*** (4.957)		
<i>NumCross*Prospectors</i>		0.418*** (3.005)				0.003 (1.320)				0.003 (1.260)		
<i>NumCross*Defenders</i>		−0.177 (−1.401)				−0.001 (−0.816)				−0.002 (−1.021)		
<i>NumConnect</i>			0.019 (0.843)				0.001*** (4.572)				0.001*** (4.657)	
<i>NumConnect*Prospectors</i>			0.163** (2.486)				0.000 (0.448)				0.000 (0.393)	
<i>NumConnect*Defenders</i>			−0.036 (−0.688)				−0.001 (−1.576)				−0.001* (−1.729)	
<i>AvgNum</i>				0.009 (0.317)				0.001*** (3.535)				0.001*** (3.688)
<i>AvgNum*Prospectors</i>				0.176** (2.259)				0.000 (0.243)				0.000 (0.169)
<i>AvgNum*Defenders</i>				−0.016 (−0.256)				−0.001* (−1.752)				−0.001* (−1.875)
<i>Prospectors</i>	0.067 (0.805)	0.083 (1.027)	0.120 (1.556)	0.130* (1.682)	−0.000 (−0.192)	−0.000 (−0.090)	0.001 (0.784)	0.001 (0.931)	−0.000 (−0.294)	−0.000 (−0.221)	0.001 (0.616)	0.001 (0.771)
<i>Defenders</i>	−0.186** (−2.256)	−0.163** (−2.044)	−0.207*** (−2.739)	−0.227*** (−3.016)	−0.001 (−1.608)	−0.002* (−1.805)	−0.001* (−1.786)	−0.002* (−1.879)	−0.001 (−1.402)	−0.001 (−1.556)	−0.001 (−1.577)	−0.001* (−1.701)
<i>Controls</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Year</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Industry</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>_Cons</i>	−9.753*** (−16.669)	−9.670*** (−16.481)	−9.783*** (−16.671)	−9.831*** (−16.789)	0.012* (1.823)	0.015** (2.246)	0.014** (2.087)	0.012* (1.768)	−0.009 (−1.351)	−0.006 (−0.935)	−0.007 (−1.060)	−0.009 (−1.376)
<i>R2_A</i>	0.100	0.100	0.099	0.099	0.093	0.095	0.093	0.093	0.051	0.053	0.052	0.051
<i>N</i>	12,913	12,913	12,913	12,913	12,928	12,928	12,928	12,928	12,928	12,928	12,928	12,928

This table presents the estimation results for the moderating effects of business strategy type, i.e., prospectors and defenders, on the association between common owners and CSR investments. The models in Columns (1)–(4) are estimated by logit regression, and those in Columns (5)–(12) are estimated by OLS. All of the continuous variables are winsorized at the 1% and 99% levels. All specifications include all of the control variables and year and industry fixed effects. The sample period is 2007–2018. The *t*-statistics (z-statistics in the logit model) based on robust standard errors adjusted for White (1980) are shown in brackets. All of the variables are defined in Appendix A. ***, **, and * denote significance at 1%, 5%, and 10% levels (two-tailed), respectively.

With *Donation* as the dependent variable, the interaction items between common owners and prospectors, i.e., *DumCross*Prospectors*, *NumCross*Prospectors*, *NumConnect*Prospectors*, and *AvgNum*Prospectors*, are positive but not significant, as shown in Columns (5)–(8), respectively. The interaction item *AvgNum*Defenders* is negative and significant at the 10% level in Column (5), and the interaction items *DumCross*Defenders*, *NumCross*Defenders*, and *NumConnect*Defenders* are negative but not significant in Columns (6)–(8), respectively. With *DM_Donation* as the dependent variable, the interaction items between common owners and prospectors are positive but not significant in Columns (9)–(12). The interaction items *NumCross*Defenders* and *AvgNum*Defenders* are negative and significant at the 10% level in Columns (11) and (12), and the interaction items *DumCross*Defenders* and *NumCross*Defenders* are negative but not significant in Columns (9) and (10).

These results indicate that prospectors strengthen the positive association between common owners and CSR investments, whereas defenders weaken the positive association, even though the weakening effect of defenders is not particularly significant. Further analysis shows that compared with defenders, prospectors have strong incentives to invest in CSR because of their need for financing to support their continually seeking and marketing new products and that common owners can facilitate research and development cooperation for prospectors (He and Huang, 2017). For these reasons, common owners' support is more important for prospectors. Thus, common owners have a stronger influence on prospectors, which can encourage prospector firms to invest more in CSR, and the managers of prospector firms are more prone to satisfying common owners' preferences for social responsibility. In contrast, the motivation to invest in CSR to improve access to financing and to seek collaboration is lower for defenders as they have less outcome uncertainty and less need for financing. Hence, common owners have a weaker influence on defenders, and the positive impacts of common owners on CSR investments are weakened by defenders.

5.3. Supplemental analyses

5.3.1. Supplemental analysis: higher stock returns

Studies indicate that firms that invest more in CSR have higher stock returns (Lins et al., 2017). Therefore, this study introduces the interaction term of common owners and CSR investments and constructs the following regression model to examine the effect of common owners on the positive relationship between CSR investments and stock returns:

$$StockReturn_{it} = \beta_0 + \beta_1 CSR_{it} + \beta_2 CO_{it} + \beta_3 CO_{it} * CSR_{it} + \beta Controls + Year + Industry + \delta_{it} \quad (4)$$

In Eq. (4), the dependent variable is *StockReturn_{it}*, measured by firms' annual stock returns. All of the other variables are the same as in Eq. (1).

Table 7 presents the results from estimating Eq. (4) with *DumDonation*, *Donation*, and *DM_Donation* as the CSR investment proxy variables, and the corresponding regression results are shown in Columns (1)–(4), (5)–(8), and (9)–(12), respectively. As shown in Columns (1)–(4), the interaction terms *DumCross*DumDonation*, *NumCross*DumDonation*, *NumConnect*DumDonation*, and *AvgNum*DumDonation* are not significant. However, the interaction terms *DumCross*Donation*, *NumCross*Donation*, *NumConnect*Donation*, and *AvgNum*Donation* are positive and significant at the 1% level in Columns (5)–(8). When the dependent variable is *DM_Donation*, the coefficients of *DumCross*DM_Donation*, *NumCross*DM_Donation*, and *NumConnect*DM_Donation* are positive and significant at the 1%, 1%, and 5% levels in Columns (9) and (10), respectively. This result is consistent with the conclusion of Lys et al. (2015)⁶ that CSR is significantly positively correlated with stock returns.

These results reveal that whether co-owned firms invest in CSR does not significantly affect their stock returns compared with non-co-owned firms, as shown in Table 7 Columns (1)–(4), but co-owned firms that invest more in CSR have higher stock returns than non-co-owned firms, as shown in Columns (5)–(12). That is, the stock market cannot recognize whether firms invest in CSR, but it can identify firms that invest heavily in CSR and reward them with higher stock returns. From the perspective of common owners, these results

⁶ Corporate donations in this study represent one type of CSR investment, which is consistent with Lys et al. (2015), but it differs from "charity" in the charity hypothesis that posits that CSR expenditures are negatively correlated with future financial performance.

Table 7
Common Owners, CSR Investments, and Stock Returns.

Variable	Stock Return (DumDonation)				Stock Return (Donation)				Stock Return (DM_Donation)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>DumCross</i>	0.029** (2.323)				0.031*** (4.039)				0.043*** (6.016)			
<i>DumCross*CSR</i>	0.018 (1.268)				0.637*** (3.828)				0.498*** (2.825)			
<i>NumCross</i>	0.052*** (3.893)				0.053*** (6.788)				0.062*** (8.667)			
<i>NumCross*CSR</i>	0.015 (1.006)				0.448*** (3.157)				0.401*** (2.621)			
<i>NumConnect</i>	0.010* (1.814)				0.007* (1.953)				0.011*** (3.201)			
<i>NumConnect*CSR</i>	0.001 (0.099)				0.225*** (3.116)				0.158** (2.076)			
<i>AvgNum</i>	0.002 (0.305)				−0.003 (−0.743)				0.001 (0.161)			
<i>AvgNum*CSR</i>	−0.002 (−0.289)				0.247*** (2.670)				0.156 (1.632)			
<i>CSR Vars</i>	−0.017* (−1.790)	−0.016* (−1.737)	−0.009 (−1.048)	−0.007 (−0.831)	−0.224* (−1.906)	−0.175 (−1.557)	−0.103 (−0.931)	−0.055 (−0.501)	−0.211* (−1.757)	−0.201* (−1.747)	−0.100 (−0.899)	−0.054 (−0.488)
<i>Controls</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Year</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Industry</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>_Cons</i>	2.618*** (34.955)	2.664*** (35.400)	2.599*** (34.492)	2.561*** (34.156)	2.626*** (35.170)	2.672*** (35.587)	2.609*** (34.725)	2.572*** (34.408)	2.622*** (35.109)	2.669*** (35.542)	2.607*** (34.686)	2.571*** (34.375)
<i>R2_A</i>	0.642	0.643	0.641	0.641	0.642	0.643	0.642	0.641	0.642	0.643	0.641	0.641
<i>N</i>	22,767	22,767	22,767	22,767	22,767	22,767	22,767	22,767	22,767	22,767	22,767	22,767

This table presents the estimation results for the moderating effects of common owners on the association between CSR investments and stock returns. All of the models are estimated by OLS. All of the continuous variables are winsorized at the 1% and 99% levels. All specifications include all of the control variables and year and industry fixed effects. The sample period is 2007–2018. The *t*-statistics based on robust standard errors adjusted for White (1980) are shown in brackets. All of the variables are defined in Appendix A. ***, **, and * denote significance at 1%, 5%, and 10% levels (two-tailed), respectively.

suggest that common owners encouraging firms to invest more in CSR benefit from higher stock returns. In other words, common owners earn rewards through the stock market for improving CSR.

5.3.2. Supplemental analysis: alleviate financial constraints

Additionally, following the literature documenting that CSR can lower financial constraints (Cheng et al. (2014)), this study introduces the interaction term of common owners and CSR investments and constructs the following regression model to examine the effect of common owners on the association between CSR investments and financial constraints:

$$FinancialConstraint_{it} = \beta_0 + \beta_1 CSR_{it} + \beta_2 CO_{it} + \beta_3 CO_{it} * CSR_{it} + \beta Controls + Year + Industry + \delta_{it} \quad (5)$$

In Eq. (5), *FinancialConstraint* is the extent of listed firms' financial constraints, measured using the SA index in Hadlock and Pierce (2010). All of the other variables are the same as in Eq. (1).

Table 8 reports the regression results using Eq. (5) and *DumDonation*, *Donation*, and *DM_Donation* as the CSR investment proxy variables, and the corresponding regression results are shown in Columns (1)–(4), (5)–(8), and (9)–(12), respectively. The results in Columns (1)–(4) show that the coefficients of *DumCross*DumDonation*, *NumCross*DumDonation*, *NumConnect*DumDonation*, and *AvgNum*DumDonation* are negative and significant at the 1% level across all columns. Moreover, except the interaction item *DumCross*DM_Donation* that is negative and significant at the 1% level in Column (9), the interaction items *NumCross*DM_Donation* and *AvgNum*DM_Donation* are negative and significant at the 5% level in Columns (10)–(12). These results indicate that co-owned firms that invest or invest more in CSR experience significantly

Table 8
Common owners, CSR investments, and financial constraints.

Variable	Financial Constraint (DumDonation)				Financial Constraint (Donation)				Financial Constraint (DM_Donation)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>DumCross</i>	0.012*** (3.051)				−0.010*** (−4.659)				−0.009*** (−4.665)			
<i>DumCross*CSR</i>	−0.031*** (−6.669)				0.081 (1.641)				−0.140*** (−2.675)			
<i>NumCross</i>		0.008* (1.866)				−0.013*** (−5.883)				−0.011*** (−5.529)		
<i>NumCross*CSR</i>		−0.027*** (−5.676)				0.106*** (2.736)				−0.100** (−2.372)		
<i>NumConnect</i>			−0.002 (−1.200)				−0.012*** (−10.537)				−0.011*** (−10.674)	
<i>NumConnect*CSR</i>			−0.012*** (−5.246)				0.061*** (2.837)				−0.052** (−2.247)	
<i>AvgNum</i>				−0.002 (−0.804)				−0.014*** (−10.268)				−0.013*** (−10.726)
<i>AvgNum*CSR</i>				−0.016*** (−5.664)				0.056* (1.934)				−0.080** (−2.537)
<i>CSR Vars</i>	0.056*** (19.459)	0.054*** (19.238)	0.052*** (19.745)	0.052*** (19.975)	0.084** (2.192)	0.073** (2.038)	0.080** (2.300)	0.091*** (2.645)	0.176*** (4.370)	0.163*** (4.313)	0.161*** (4.430)	0.162*** (4.498)
<i>Controls</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Year</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Industry</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>_Cons</i>	2.433*** (55.510)	2.428*** (55.077)	2.416*** (54.562)	2.423*** (54.979)	2.391*** (54.077)	2.384*** (53.564)	2.370*** (53.035)	2.378*** (53.450)	2.394*** (54.158)	2.387*** (53.645)	2.372*** (53.106)	2.380*** (53.522)
<i>R2_A</i>	0.691	0.691	0.692	0.692	0.685	0.685	0.686	0.686	0.685	0.685	0.686	0.686
<i>N</i>	23,091	23,091	23,091	23,091	23,091	23,091	23,091	23,091	23,091	23,091	23,091	23,091

This table presents the estimation results for the moderating effects of common owners on the association between CSR investments and financial constraints. All of the models are estimated by OLS. All of the continuous variables are winsorized at the 1% and 99% levels. All specifications include all of the control variables and year and industry fixed effects. The sample period is 2007–2018. The *t*-statistics based on robust standard errors adjusted for White (1980) are shown in brackets. All of the variables are defined in Appendix A. ***, **, and * denote significance at 1%, 5%, and 10% levels (two-tailed), respectively.

lower financial constraints. From the perspectives of co-owned firms, CSR investments can therefore lower financial constraints to some extent.

However, the interaction items *NumCross*Donation*, *NumConnect*Donation*, and *AvgNum*Donation* are positive and significant at the 1%, 1%, and 5% levels in Columns (6)–(9), respectively, and the coefficient of *DumCross*Donation* is positive but not significant in Column (5), suggesting that co-owned firms with more CSR investments have greater financial constraints. These results seem to conflict with the results with *DumDonation* and *DM_Donation* as the CSR investment proxies. However, these results may be attributable to *Donation* being regarded as a cash outflow and nonoperating expenses that directly lower available cash flow, but *DumDonation* and *DM_Donation* are somewhat removed from directly influencing firms' cash flows.

In addition, as the results in Table 8 show, the total effects of CSR investments on financial constraints ($\beta_1 + \beta_3$) are positive and significant. In this regard, donations, as they affect cash outflow, would exacerbate the degree of financial constraints faced by firms, which is consistent with the viewpoint expressed in Friedman (1970), namely, as an expenditure, corporate donations directly reduce corporate operating profits. Even so, listed firms make donations to commit to CSR. This practice indicates that firms consider shareholders' preferences for social responsibility, including common owners' preferences (Hart and Zingales, 2017), which is consistent with views on corporate citizenship in the literature (D. A. Jones, 2010; C. Lin et al., 2010).

6. Potential endogeneity and robustness checks

6.1. Potential endogeneity

6.1.1. Mitigating potential endogeneity driven by omitted variables

To mitigate potential endogeneity driven by omitted variables, this study includes additional corporate governance variables,⁷ such as the percentage of shares owned by a firm's top shareholder, *Shar1*, the percentage of shares owned by a firm's managers, *Manageshare*, the natural logarithm of the number of directors on the board, *Board*, the ratio of independent directors to the total directors on the board, *Indenpendr*, and whether the CEO and chairman of the board are the same person, *Dual*, and re-estimates Eqs. (1)–(5). All of the variables are defined in Appendix A. These results are not tabulated; however, they are qualitatively similar to those reported in Tables 3–8.

6.1.2. Mitigating potential endogeneity driven by reverse causality

The above results confirm that common owners can promote co-owned firms' CSR investments. However, the conclusion can be interpreted with an alternative explanation, namely, that common owners are inclined to select firms that invest or invest more in CSR when constructing their portfolio. To mitigate this potential endogeneity driven by reverse causality, this study lags the independent and control variables one year in Eqs. (1)–(5) and then re-estimates Eqs. (1)–(5). The findings remain strong and robust.

6.1.3. Mitigating potential endogeneity driven by sample selection bias

Propensity Score Matching

When choosing listed firms in a certain industry to build their portfolios, common owners may consider certain characteristics of listed firms. For example, they are more likely to hold shares of firms with good financial performance. Moreover, considering their effect on firms, they may tend to hold shares of firms in which the firms' largest shareholders own a lower percentage of shares. Therefore, this study uses the propensity score matching procedure to alleviate potential endogeneity from sample selection bias.

⁷ Institutional investors' shareholdings are excluded for two reasons. First, common owners may have some institutional investors. Including institutional investors' shareholdings requires considering common owners' effects on CSR investments by creating common ownership and institutional investor shareholdings proxies, which may not clearly reveal common owners' incremental effects on CSR investments. Second, the correlation coefficient between common owners' proxies (i.e., *NumConnect*) and institutional investors shareholdings is 0.481, close to 0.5, which may result in a serious multicollinearity problem and invalidate the regression results. Nevertheless, the untabulated tests also include institutional investors' shareholdings in the additional control variables, measured as the percentage of shares owned by a firm's institutional investors. The results are qualitatively similar to those reported in Tables 3–8.

Based on the firm characteristics of size (*Lnasset*), leverage (*Lev*), return on assets (*Roa*), sales growth (*Growth*), operating cash flow (*Cflow*), the nature of state ownership (*SOE*), firm age (*Lnage*), the percentage of shares owned by firms' largest shareholders (*Shar1*), the percentage of shares owned by firms' managers (*Manageshare*), the natural logarithm of the number of directors on the board (*Board*), the ratio of independent directors to total directors (*Indenpendr*), and whether the CEO and chairman of the board are the same person (*Dual*), this study uses the one-to-one nearest neighbor matching method to construct regression samples in which the firms' characteristics are as similar as possible, except for having common owners. Using the matched sample, this study re-estimates Eqs. (1)–(5), and the regression results are not tabulated but are qualitatively similar to those reported in Tables 3–8.

Heckman Two-Stage Regression

Additionally, this study adopts the Heckman two-stage regression approach to further control potential endogeneity driven by sample selection bias. In the first stage, this study uses a probit regression model to estimate the following model, Eq. (6), and acquires the inverse Mills ratio, i.e., lambda. In the second stage, this study includes the lambda obtained in the first stage in the control variables and re-estimates Eqs. (1)–(5). The regression results are not tabulated but are qualitatively similar to those reported in Tables 3–8.

$$P(Dumcross_{it}) = \alpha_0 + \alpha_1 Lnasset_{it} + \alpha_2 Lev_{it} + \alpha_3 Roa_{it} + \alpha_4 Growth_{it} + \alpha_5 Cflow_{it} + \alpha_6 SOE_{it} + \alpha_7 Lnage_{it} + \alpha_8 Shar1_{it} + \alpha_9 Manageshare_{it} + \alpha_{10} Boardr_{it} + \alpha_{11} Indenpendr_{it} + \alpha_{12} Dual_{it} + u_{it} \quad (6)$$

6.2. Robustness checks

Although this study controls the sensitivities of the regression results using many proxy variables to measure the dependent and independent variables, it conducts a series of additional tests to confirm the robustness of the baseline results. First, the study re-estimates all of the models by clustering standard errors at the firm level, and the results suggest that this study's conclusions are robust.

Second, this study recalculates the proxy variables for common owners by changing it from shareholders holding more than 1% of a firm's shares to firms' top 5 shareholders and re-estimates Eqs. (1)–(5). Except for the coefficients of *DumDonation* on *DumCross*, *NumCross*, *NumConnect*, and *AvgNum* are negative and significant at the 10%, 5%, and 5% levels, respectively, and the remaining results are robust to the alternative common owner measure of the top 5 shareholders.

In brief, the results in Tables 3–8 are valid after controlling for potential endogeneity between common owners and CSR investments, and the findings are robust to a variety of sensitivity tests.

7. Conclusions

Corporate shareholders are an important factor influencing CSR (Aguinis and Glavas, 2012). Extending this line of research, this study provides strong evidence that common owners have significantly positive effects on co-owned firms' CSR investments. Moreover, this study analyzes whether the positive association between common owners and CSR investments varies with cross-sectional characteristics, that is, the nature of state ownership and business strategy type. This study finds that the nature of state ownership significantly weakens the positive association between common owners and CSR investments, and that the prospector corporate strategy strengthens the positive influence of common owners on CSR, whereas the defender corporate strategy weakens the positive effect of common owners on CSR investments.

In addition, this study examines the economic consequences of co-owned firms improving CSR investments from the perspectives of common owners and co-owned firms. The regression results indicate that common owners can obtain rewards from the stock market by promoting more CSR investments, and co-owned firms can benefit by alleviating their financial constraints when they invest or invest more in social responsibility. Notably, although investing in CSR imposes costs, firms still consider satisfying shareholders' preferences for social responsibility, including common owners' preferences, which is consistent with the viewpoints regarding corporate citizenship.

This study extends a growing stream of the literature examining the influence of common owners on corporate behavior. The findings also enrich research on the determinants and economic consequences of CSR investments. Moreover, the findings provide evidence of the effects of common owners on corporate behavior and show that CSR investments represent a bright side of common owners. By doing so, the study also provides practical implications for firm managers devising CSR strategies and for authorities assessing the positive effects of common owners on corporate behavior.

Compliance with Ethical Standards

This article does not contain any studies with human participants or animals.

Acknowledgements

I acknowledge the executive editor and anonymous reviewer for their careful work and thoughtful suggestions that have substantially helped improve this paper.

Appendix A. Variable definitions

Variable	Label	Definition and Calculation
Common Owners	<i>DumCross</i>	An indicator variable that equals 1 if the shareholders holding at least 1% of a firm's outstanding shares simultaneously hold the shares of at least one other firm in the same industry and 0 otherwise
	<i>NumCross</i>	The number of common owners that hold the focal firm
	<i>NumConnect</i>	The number of same-industry peers that share any common owners with the focal firm
	<i>AvgNum</i>	The average number of same-industry peers held by the common owners
CSR Investments	<i>DumDonation</i>	An indicator variable that equals 1 for firm-years in which the firm makes any donations and 0 otherwise
	<i>Donation</i>	The amount of donations scaled by total assets
	<i>DM_Donation</i>	<i>Donation</i> adjusted by the average donation ratio in the industry to which the firm belongs, i.e., <i>DM_Donation</i> equals <i>Donation</i> minus the average donation ratio of the industry to which the firm belongs
Business Strategy	<i>Prospectors</i>	An indicator variable that equals 1 for observations with a strategy score from 24 to 30 and 0 otherwise (Bentley et al., 2013)
	<i>Defenders</i>	An indicator variable that equals 1 for observations with a strategy score from 6 to 12 and 0 otherwise (Bentley et al., 2013)
The Nature of State Ownership	<i>SOE</i>	An indicator variable that equals 1 if the ultimate controller of the listed firm is a central or local government agency or government-controlled state-owned enterprise and 0 otherwise (Du, 2014a)
Stock Returns	<i>StockReturns</i>	Firms' annual stock returns
Financial Constraint	<i>Financial Constraints</i>	Hadlock and Pierce (2010) financial constraints, i.e., SA index = $-0.737 * Size + 0.043 * Size^2 - 0.04 * Age$
Firm Size	<i>Size</i>	The natural logarithm of the firm's total assets

(Continued on next page)

Appendix A. (continued)

Leverage	<i>Lev</i>	The ratio of total liabilities divided by total assets
Return on Assets	<i>Roa</i>	Net profits divided by total assets
Sales Growth	<i>Growth</i>	The change between current year sales and last year's sales divided by last year's sales
Operating Cash Flow	<i>Cflow</i>	Net cash flow from operating activities divided by total assets
Firm Age	<i>Lnage</i>	The natural logarithm of the number of years since the firm was founded
Largest Shareholder	<i>Shar1</i>	The percentage of shares owned by a firm's largest shareholder
Managerial Ownership	<i>Manageshare</i>	The percentage of shares owned by a firm's managers
Board Size	<i>Board</i>	The natural logarithm of the number of directors on the board
Independent Directors	<i>Indenpendr</i>	The ratio of independent directors to total directors on the board
Whether the CEO and Chairman are the same person	<i>Dual</i>	An indicator variable that equals 1 if the CEO and chairman of the board are the same person and 0 otherwise
Year fixed effects	<i>Year</i>	Year Dummy variables are set according to the fiscal year
Industry fixed effects	<i>Ind</i>	Industry Dummy variables are set according to the industry classification code, issued by the China Securities Regulatory Commission in 2001; for manufacturing, industry dummy variables are set according to the industry category code plus the first two digits of the industry segmentation code, whereas other industry dummy variables are set according to the industry category code

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