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CORPORATE SOCIAL RESPONSIBILITY PRACTICES, CORPORATE SUSTAINABLE DEVELOPMENT, VENTURE CAPITAL AND CORPORATE GOVERNANCE: EVIDENCE FROM CHINESE PUBLIC-LISTED FIRMS

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ABSTRACT

This study intends to investigate the relationship between the different corporate social responsibility (CSR) practices of firms and their corporate sustainable development (CSD) as well as whether venture capital (VC) and corporate governance (CG) moderate this relationship and capital allocation efficiency (CAE) mediates the relationship. The sample of this study consist of Chinese A-share public-listed firms as well as the Growth Enterprise Market (GEM) listed firms in China. The duration covered is from 2013 to 2020. There are significant positive relationships between CSR and CSD among Chinese A-shares listed firms and GEM listed firms. In addition, there is a significant positive moderating effect of CG and no significant moderating effect of VC on the relationship between CSR and CSD among Chinese A-shares listed firms. However, for GEM listed firms, there is no significant moderating effect of both VC and CG on the relationship

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between CSR and CSD. Finally, there is a significant positive mediating effect of CAE on the relationship between CSR and CSD among Chinese A-shares listed firms and GEM listed firms.

Keywords: Corporate social responsibility, Venture capital, Corporate governance, Capital allocation efficiency, Corporate sustainable development

INTRODUCTION

As the main body of market economy, the growth of listed firms is of great significance to the overall economic operation and social development, and corporate social responsibility (CSR) has always been the key issue that listed firms must face in their growth. How it affects the corporate sustainable development (CSD) in real economy has become a hot topic of academic research recently. According to the integrative social contract theory, the essence of CSD is the process of value creation by stakeholders, and the sustainability of value creation by stakeholders depends on the reasonable return and compensation of each production factor of value creation, namely the timely and effective fulfilment of CSR (Donaldson & Dunfee, 2002). In recent decades, the world has encountered several climate change and public health concerns, and the global community has been constantly challenged by the impact of unsystematic risk (Duppati et al., 2023). To achieve sustainable growth, firms need to formulate sustainable long-term development strategies, strengthen environmental protection, fulfil social responsibilities and emphasise strong corporate governance (CG). The essence of CSR is a comprehensive social contract relationship between firms and stakeholders. A perfect and effective CG mechanism can coordinate the relationship between all stakeholders, equally protect each stakeholder's claim on specific investment, motivate each stakeholder to better contribute resources and coordinate value creation, so as to promote CSD (Zhang et al., 2020; Peng & Isa, 2020; Belas et al., 2022).

In the context of the CG and capital markets environment in China, the establishment of China's Growth Enterprise Market (GEM) market, the New Third Board market and the regional equity exchange market have encouraged new business corporations to be formed (He et al., 2019). With the continuous establishment of new business corporations, access to capital has become the main factor restricting corporate development. Basically, new firms in China such as start-ups still face severe financing constraints because they are plagued with information asymmetry problem (Yu et al., 2023). This had impeded access to financing for start-ups in China because investors and lenders encounter more difficulties in accessing information from start-ups compared to other type of firms in the market. This led to difficulties in accessing finance for these start-ups

as investors and lenders are reluctant to directly finance them due to information asymmetry (Pan & Yang, 2019). As a result, the cost of financing for these start-ups became higher due to the higher risks encountered by investors and lenders. Therefore, this results in a shortage of capital in Chinese start-ups due to lack of direct external financing from investors and lenders which increase their risk of bankruptcy. Due to lack of direct external financing from investors and lenders, these start-ups have to rely upon other forms of financing such personal savings of entrepreneurs, retained profits, financing from family and friends as well as private endowments to expand their businesses (Pan & Yang, 2019). As these start-ups stabilise and move into other development stages, their capital structure gradually change as well. In the stage of corporate expansion, they become more mature and are ready to be more transparent in terms of their credit records as well as provide guarantee to investors to improve their reputation in order to attract more capital. When these start-ups matured, they will replace their internal financing with external ones via venture capital (VC), commercial credit and bank loans (Zhang et al., 2019b). Since venture capital is one of the ways that Chinese start-ups can access financing as they matured, they were formed in China and in 1985, China's first venture capital firm was established (Guo et al., 2017).

When venture capital investors provide external financing to start-ups which are maturing, they will still encounter adverse selection, moral hazard problems and agency problems to a certain extent in these firms even though there is transparency to investors in terms of their activities and documentations as they mature (Lu et al., 2013). It can be seen that the role of venture capital in the sustainable development of the firm is worth studying in depth. Furthermore, studies on the role of venture capitalists on the relationship between CSR and CSD are still limited.

Overall, existing studies often only study the impact of CG or CSR or VC or capital allocation efficiency (CAE) on CSD from a specific perspective. They have less discussion on the overall impact of these factors on firms as well as very possess little relevance to the variables for empirical analyses. Relevant research often focuses on short-term corporate performance, usually based on static financial profitability indicators or corporate value indicators based on market performance, making research conclusions vulnerable to emergencies or human factors. To the best of our knowledge, we are the first who analyse how CG and VC influence the relationship between CSR and CSD especially for the GEM firms in China. In addition, we investigated the mediating effect of CAE on CSR and CSD, this analysis aims to enhance the existing body of research on the connection between CSR and CSD. The conclusion of this paper expands the perspective of the application of social contract theory to the sustainable development of listed firms, provides a useful reference for promoting the sustainable development of

listed firms in China under complex and dynamic environmental changes, and provides policy recommendations for the Chinese government to develop the capital market.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

CSR and CSD

According to social contract theory (Donaldson & Dunfee, 2002), the essence of CSD is the process of value creation by stakeholders of firms. The sustainability of value creation by stakeholders depends upon the reasonable return of each value-creating factors of production as well as the effective implementation of CSR (Freeman et al., 2021). Basically, CSR are contractual connections between stakeholders of the firm. Businesses can only obtain long-term competitive advantages if they adapt to ongoing changes and developments in the global society as well as accepting the responsibility for CSR (Chomvilailuk & Butcher, 2023). Through CSR, businesses encourage CSD and in order to do that, continuous innovation is essential (Crisan-Mitra et al., 2016; Vagin et al., 2022) whereby CSR can assist in this process by enhancing the innovation of firms (Tarigan et al., 2021). Besides, Carrasco-Monteagudo and Buendia-Martinez (2013) argue that businesses can enhance innovation by incorporating CSR into their culture which ultimately improve corporate profits and fosters sustainable development. Furthermore, by engaging in CSR, businesses provide resources for sustainable development as well. Basically, businesses consist of contracts signed by resource holders. Firms develop by coordinating and controlling resource inputs from stakeholders and continuously assimilate resource inputs from potential stakeholders (Avotra et al., 2021). Likewise, Siltaloppi et al. (2021) argue that CSR involve stakeholder management, environmental assessment as well as issue management and strategic CSR based upon centrality, exclusivity and visibility can bring numerous benefits to businesses. Moreover, Lu et al. (2021) argue that firms' CSR can help improve their market competitiveness and fosters long-term stability. Thus, CSR is a "win-win mechanism" through which companies can achieve competitive advantage via CSD. Generally, CSR focus upon the existence and development of a company so that it can create profits for shareholders as well as contribute to a broad range of stakeholders, such as employees, customers, suppliers, governments and communities. Considering all the previous discussions, we propose the following hypothesis:

H1: There is a positive relationship between CSR and CSD among Chinese A-shares listed firms and GEM listed firms.

The Moderating Effects of Venture Capital on The Relationship between CSR and CSD

According to stakeholder theory, Freeman et al. (2021) argue that the support of stakeholders is crucial to the survival and development of firms. Stakeholders can provide key resources for firms to assist them in achieving their strategic goals. As stakeholders of firms, venture capital (VC) institutions own equities of their acquired firms as well as share financial and operational risks with them. VC institutions provide equity financing to listed firms (Fu & Ng, 2020). Compared with other small and medium sized investors, VC institutions have the right to participate in the business activities of the invested enterprises, to improve their CG mechanisms, to increase their information channels and to ensure the generation of investment returns. Furthermore, the investment behaviour of VC firms is in part based upon reputation considerations. Gompers (1996) argue that VC companies try to communicate their ability to the market through relevant performance measures as soon as possible in order to create a reputation in the industry and this is consistent with their "grandstanding hypothesis". The "grandstanding hypothesis" states that VC institutions tend to recoup their investments in a short period of time to generate higher profits. Additionally, Sun et al. (2020) argue that VC firms only pursue their investment interests, and they do not bother about the improvement of CG in the firms they invested.

Amor and Kooli (2020) found that venture capitalists may signal to the market that the company is competitive by increasing the salary of the management of the invested firm in order to mislead external investors to invest in order to enhance the value of the firm in the short run. Otherwise, the internal coordination costs of the firm and agency problems between VC institutions and managers of firms will increase which will result in less CSD (Sun et al., 2020). According to Katti and Raithatha (2020), VC is characterised by a short-term investment horizon, aiming to generate substantial returns within a limited period. This phenomenon has the potential to give rise to opportunistic behaviour and a prioritisation on quick disengagement strategies, like as initial public offerings (IPOs) or acquisitions, rather than a steadfast commitment to the company's long-term, sustainable development. Start-up enterprises sometimes place a higher emphasis on achieving quick expansion rather than on profitability, potentially resulting in the adoption of unsustainable business strategies. Wöhler and Haase (2022) argued that venture capitalists may become emotionally driven or influenced to make investment choices, which may be detrimental to the CSD. According to Ciccullo et al. (2023), their analysis indicates that the allocation of resources towards research, development, and market growth by start-ups might potentially result in resource depletion and environmental consequences, hence

potentially conflicting with the objectives of sustainable development. Venture capitalists may encounter difficulties in China due to the regulatory landscape, particularly in sectors characterised by dynamic and evolving laws and constraints (Chen, 2023). The presence of uncertainty may have an impact on a company's capacity to strategise and prepare for long-term sustainability (Zhang et al., 2019b). Considering all the previous discussions, we propose the following hypothesis:

> H2: Venture capital negatively moderates the relationship between CSR and CSD among Chinese A-shares listed firms and GEM listed firms.

The Moderating Effects of CG on CSR and CSD

Principal–agent theory states that CG aims to alleviate agency problems between shareholders and managers as well as to promote the long-term growth of firms (Gao et al., 2015). In the real economy, this process is realised through certain internal and external CG mechanisms which include equity governance, board governance, management incentives, information disclosure and legal ramifications. Afrifa and Tauringana (2015) argue that the ultimate goal of CG is to achieve the sustainable development of firms. An organisation must develop a purpose and vision, formulate strategic planning, set predetermined goals and devise detailed methods for achieving these goals. To assist this process, a company growth plan is vital (Achim et al., 2016; Liew & Devi, 2022). If a firm possess good CG, it can reduce the risk of blind corporate development and excessive expansion, which increases the sustainability of the firm (Sabbaghi, 2016; Vagin et al., 2022; Ludwig & Sassen, 2022).

Generally, effective CG suppresses the opportunistic behaviour of stakeholders by reducing information symmetry between the different stakeholders as well as protecting their legal rights which eventually helps to achieve enterprise profitability, maximising stakeholder interests as well as effectively promoting CSR (Altuner et al., 2015). Hence, there is a possible interaction effect between CSR and CG of firms. Firms can effectively improve the CG environment and establish a long-term mechanism for stakeholders to participate in its internal control (Lopez et al., 2022). Furthermore, CG can also help mitigates the positive relationship between environmental uncertainty and capital cost (Adinehzadeh et al., 2018). Simultaneously, by standardising and improving the CG system and its operations, firms can assist in improving sustainability. Considering all the previous discussions, we propose the following hypothesis:

H3: CG positively moderates the relationship between CSR and CSD among Chinese A-shares listed firms and GEM listed firms.

The Mediating Effects of CAE on CSR and CSD

CAE refers to the ability of firms to effectively manage and distribute their finite resources, including financial capital, human resources, technological assets, and equipment (Zhang et al., 2021). By strategically allocating resources to areas with high potential and strategic significance, firms may enhance their resource utilisation, optimise productivity and efficiency, and ultimately attain sustainable growth (Zhao et al., 2021). Engaging in social responsibility initiatives may effectively bolster a firm's image and augment its brand value. This enhances the credibility of the firm among customers, investors, and stakeholders, thus fostering increased investment and commercial prospects (Franco et al., 2020). Enhanced trust and reputation have the potential to decrease the financial expenses incurred by firms and enhance the efficacy of their financing activities. CSR practises has the ability to assist organisations in mitigating a range of operational risks (Cook et al., 2019). By doing so, these practises may contribute to the reduction of possible financial losses in the future and enhance capital efficiency. CSR initiatives have the potential to provide novel market prospects for firms, particularly in the realm of ecologically sustainable goods and green technology, which are seeing a steady increase in market demand. By allocating resources to these specific sectors, firms have the potential to enhance their market share and generate additional revenue streams, leading to improved CAE (Safi et al., 2023).

CSR often places emphasis on the long-term sustainability and creation of value, as opposed to just prioritising short-term financial gains (Lu et al., 2021). This implies that firms have a greater propensity to allocate resources towards enduring initiatives and tactics, as opposed to only prioritising immediate financial gains. The adoption of a long-term perspective facilitates the enhancement of long-term CAE and the cultivation of durable competitive advantages for firms. Considering all the previous discussions, we propose the following hypothesis:

H4: CAE positively mediates the relationship between CSR and CSD among Chinese A-shares listed firms and GEM listed firms.

RESEARCH METHODOLOGY

Sample Selection and Data Sources

The samples for this study comprise of Chinese A-share firms listed on the main boards of the Shanghai and Shenzhen stock exchanges as well as the GEM listed firms from 2013 to 2020. The data screening is conducted based upon three criteria where it excludes:

1. The finance and insurance listed firms.
2. Observation samples with missing relevant data and index values.
3. Observation samples with abnormal data and indicators.

To effectively investigate the dynamic characteristics of CSD of listed firms, we adjust the observed values of most indicators at the first and 99th percentile of their distribution, as some indicators in the sample firms may have extreme values and outliers. After this treatment, a total of 23,352 research samples of 2,919 A-share companies are obtained. All the CG and corporate financial data used in this empirical research are from the China Stock Market and Accounting Research Database (CSMAR) and the official website of the China Securities Regulatory Commission. Data related to VC and CAE is collected from CSMAR database, prospectus, corporate annual reports and CNINFO (http://www.cninfo.com.cn/new/index). The social responsibility data comes from the CSR rating scores in the social responsibility evaluation system of Hexun (https://www.hexun.com/).

Definition of Variables

CSD

CSD refers to the ability of firms to make profits and grow steadily in their existing competitive fields (Crisan-Mitra et al., 2016). On this basis, this paper adopts Van Horn's equilibrium sustainable growth model to measure CSD (Mukherjee & Sen, 2019; Ul Ain et al., 2022) because this model is widely used, and we are able to analyse CSD from the perspective of corporate profitability and competitiveness. The underlying assumption of the model is that there is no change in equity financing, the steady state variables remain constant, and the retention of earnings and debts are of significant importance (Fonseka et al., 2012; Liu et al., 2022).

CSR

This article uses the professional assessment index method of CSR of listed firms in Hexun.com to measure CSR (Wang et al., 2021; Zhang et al., 2019a; Zhang, 2022). Hexun.com is the first professional organisation in China to evaluate CSRs of publicly-traded firms. This article's explanation of CSR connotations is congruent with Hexun's approach of developing a social responsibility grading system based upon stakeholder theory. Hexun's approach in rating social responsibility is based upon the annual reports of public-traded firms, social responsibility reports and other publicly available information, including overall CSR, shareholder responsibility, social responsibility, employee responsibility, equity responsibility and environmental responsibility. The overall CSR is the sum of shareholder responsibility, social responsibility, employee responsibility, equity responsibility and environmental responsibility. The company adopts a 100-point scientific assessment to evaluate CSR performance. It is argued that the higher the score, the greater the CSR performance of the firm.

VC

In this paper, as an indicator of VC, we employ the VC shareholding ratio, which is the aggregate of the shareholding ratios of VC firms among their 10 largest shareholders (Li et al., 2021; Yi et al., 2023). In the case where a single VC firm is engaged in the investee company, an examination of the annual report and other pertinent data can ascertain the nature and shareholding ratio of the VC firm. Nevertheless, joint VC investments are commonplace in the capital markets and can be evaluated in the same way as investments made by individual VC firms.

CG

Through a review of the existing literature (Sabbaghi, 2016; Esan et al., 2022), we select seven CG variables with respect to ownership structure, board governance and management incentives (i.e. two-in-one manager duality [DUAL], insider board size [INBOARD], independent directors ratio [INDENP], top three executive compensation [MANAPAY], executive shareholding ratio [EXCUSHARE], equity balance [SHARE-BALA], institutional investors' shareholding ratio [INST]) to construct a corporate governance index (CorGovindex) using Principal Component Analysis (PCA). Table 1 shows the descriptive statistics of the CG variables of the Chinese listed firms used in this study based upon PCA.

Table 1
Descriptive statistics of various variables of corporate governance

Variables	(1)	(2)	(3)	(4)	(5)
	N	Mean	S. D.	Minimum	Maximum
DUAL	23,352	0.297	0.457	0	1
INBOARD	23,352	2.117	0.197	1.609	2.708
INDENP	23,352	0.377	0.0535	0.313	0.571
MANAPAY	23,352	14.46	0.685	12.52	16.73
EXCUSHARE	23,352	0.0807	0.145	0	0.625
SHARE-BALA	23,352	0.768	0.620	0.0186	2.969
INST	23,352	0.371	0.238	0.000132	0.880

CAE

CAE is intricately linked to investment, since it encompasses the processes of selecting, managing and monitoring investment projects in order to attain the financial and strategic goals of the firm. We draw on previous literature and use investment expenditure as an indicator to measure CAE (Bhandari & Javakhadze, 2017; Khediri, 2021).

Control Variables

The control variables for this study are enterprise scale and asset–liability ratio (Boubaker et al., 2020; Xu & Li, 2020). The definition of each variable used in the regression models is shown in Table 2.

Table 2
Variable definition

Variable name	Variable symbol	Variable definition and description	References
Corporate Sustainable Development	CSD	Based on Van Horn's static model of sustainable development, corporate sustainable development = [sales net profit rate × earnings retention rate × (1 + property right ratio)] / [1 / total asset turnover rate – sales net profit margin × profit retention rate × (1 + property rights ratio)]	Mukherjee and Sen (2019); Ul Ain et al. (2022)

(*Continued on next page*)

Table 2 (*Continued*)

Variable name	Variable symbol	Variable definition and description	References
Corporate Social Responsibility	CSR	The comprehensive score of corporate social responsibility in the social responsibility evaluation system of Hexun.com (including CSR – overall corporate social responsibility, CSR1 – shareholder responsibility, CSR2 – social responsibility, CSR3 – employee responsibility, CSR4 – equity responsibility, CSR5 – environmental responsibility)	Wang et al. (2021); Zhang et al. (2019a); Zhang (2022)
Venture Capital	VC	Venture capital shareholding ratio is used to represent the sum of the shareholding ratio of venture capital institutions among the top 10 shareholders.	Li et al. (2021); Yi et al. (2023)
Corporate Governance	CorGovindex	A corporate governance index based upon seven CG variables from the aspects of ownership structure, board governance, management incentive (i.e., Two-in-one manager [DUAL], board size [INBOARD], independent director ratio [INDENP], top three executive compensation [MANAPAY], executive shareholding ratio [EXCUSHARE], equity balance [SHARE-BALA], institutional investor shareholding ratio [INST]) is constructed using Principal Component Analysis (PCA).	Sabbaghi (2016); Esan et al. (2022)
Capital Allocation Efficiency	CAE	Investment expenditure	Bhandari and Javakhadze (2017); Khediri (2021)
Enterprise Size	Size	Log of total assets	Boubaker et al. (2020); Xu and Li (2020)
Asset-liability Ratio	Lev	The ratio of total liabilities to total assets	Boubaker et al. (2020); Xu and Li (2020)

MODEL DESIGN

According to Zikmund et al. (2010), multiple regression analysis can yield the regression equation $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \ldots$ This research develops Model (1) to evaluate H1, namely, the influence of existing CSR on CSD. To quantify the effect of a moderating variable in multiple regression analyses involving the regression of variable Y on X, a new term is added to the model. The interaction between X and the proposed moderating variable is denoted by this term. Consequently, for a response Y and moderating variable X_2, $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_1 X_2 \ldots$ In this instance, the role of X_2 as a moderating variable is determined by evaluating β_2, the interaction term parameter estimates (Helm & Mark, 2012). Model (2) is intended to evaluate H2, specifically, the moderating effects of VC on the relationship between CSR and CSD. Lastly, Model (3) is used to evaluate H3, namely, the moderating effects of CG on the relationship between CSR and CSD. This study further investigates the mediating effects based on principal regression. In relation to the selection of the mechanism testing model, it is important to consider the traditional "three-step" approach put forth by Baron and Kenny (1986). It is worth noting that including both the core explanatory variable and the mediating variable simultaneously in the regression equation during the third step can potentially result in biased and inconsistent estimation outcomes due to endogeneity concerns (Cui et al., 2023). Hence, recent scholarly investigations have shown a prevailing inclination towards examining the influence of the primary explanatory factor on the mediating variable. Given these reasons, this research formulates Model (4) for evaluating the H4.

$$CSD_{it} = \beta_0 + \beta_1 CSR_{it} + \Sigma\, control_{it} + \varepsilon_{it} \quad (1)$$

$$CSD_{it} = \gamma_0 + \gamma_1 CSR_{it} + \gamma_2 VC_{it} + \gamma_3 CSR_{it} \times VC_{it} + \Sigma\, control_{it} + \varepsilon_{it} \quad (2)$$

$$CSD_{it} = \gamma_0 + \gamma_1 CSR_{it} + \gamma_2 CorGovindex_{it} + \gamma_3 CSR_{it} \times CorGovindex_{it} + \Sigma\, control_{it} + \varepsilon_{it} \quad (3)$$

$$CAE_{it} = \beta_0 + \beta_1 CSR_{it} + \Sigma\, control_{it} + \varepsilon_{it} \quad (4)$$

RESEARCH RESULTS

Descriptive Statistics

Table 3 shows the descriptive statistics of the variables in the regression models, i.e., sample size, mean value, standard deviation, minimum value and maximum value for each variable. Firstly, the mean value of sustainable business development

across all 23,352 observation samples is 0.046 with a standard deviation of 0.105. The lowest and the highest value is –0.450 and 0.734, respectively. This suggests that the degree of sustainable development across sample companies is relatively low and there is still room for improvement. Secondly, CSR has a mean value of 20.120, a standard deviation of 2.530, a minimum value of 18.000 and maximum value of 25.290, indicating that the average level of CSR performance across the sample organisations is low and that there are substantial individual variances. Furthermore, all the sub-indicator standard deviations for CSR are relatively high, which is an indication of major differences between individuals. Thirdly, the mean value and standard deviation of CG are 0.104 (the lowest value is –2.176; the highest value is 4.346) and 1.041, respectively, suggesting that the degree of CG among the sample firms is relatively poor and there is still room for improvement. Fourthly, the mean and standard deviation of VC is 0.009 (the lowest value is 0; the highest value is 0.625) and 3.105, respectively, suggesting that there are substantial individual variances. Finally, the mean value of CAE is 0.064 with a standard deviation of 0.078. The lowest and the highest value is –0.069 and 0.456, respectively.

Table 3
Descriptive statistics of main variables

Variables	(1)	(2)	(3)	(4)	(5)
	N	Mean	S.D.	Minimum	Maximum
CSD	23,352	0.046	0.105	–0.450	0.734
CSR	23,352	20.120	2.530	18.000	25.290
CSR1	23,352	13.730	6.559	–12.670	28.190
CSR2	23,352	4.458	4.352	–15.000	30.000
CSR3	23,352	2.235	2.487	0	31.630
CSR4	23,352	0.896	3.607	0	20.000
CSR5	23,352	0.874	3.670	0	30.000
VC	11,445	0.009	3.105	0	0.625
CorGovindex	23,352	0.104	1.041	–2.176	4.346
CAE	23,352	0.064	0.078	–0.069	0.456
Size	23,352	22.180	1.282	19.830	26.140
Lev	23,352	0.416	0.205	0.056	0.899

Table 4
Correlation test of main variables

	CSD	CSR	CSR1	CSR2	CSR3	CSR4	CSR5	VC	CorGovindex	CAE	Size	Lev
CSD	1											
CSR	0.032***	1										
CSR1	0.634***	0.029***	1									
CSR2	0.247***	0.051***	0.298***	1								
CSR3	0.080***	0.263***	0.150***	0.111***	1							
CSR4	0.050***	0.317***	0.128***	0.151***	0.786***	1						
CSR5	0.036***	0.299***	0.103***	0.078***	0.809***	0.901***	1					
VC	0.006	0.056***	–0.005	–0.003	0.009	–0.001	–0.006	1				
CorGovindex	0.009	–0.068***	0.019***	–0.090***	–0.129***	–0.110***	–0.108***	–0.049***	1			
CAE	0.143***	0.060***	0.153***	–0.017***	–0.020***	0.006	0.005	0.019**	0.110***	1		
Size	0.098***	–0.049***	0.107***	0.173***	0.225***	0.149***	0.152***	0.002	–0.397***	–0.018***	1	
Lev	–0.127***	0.006	–0.311***	0.050***	0.094***	0.062***	0.071***	0.0110	–0.265***	–0.058***	0.518***	1

Correlation Analysis

Correlation analysis is used to analyse how variables are correlated between each other. If the correlation coefficient between two variables is less than 0.80, no substantial association exists (Bao et al., 2018). The correlation matrix is shown in Table 4. Except for CSR3, CSR4 and CSR5, the correlation coefficients of all other variables are less than 0.80. Therefore, there are no serious multi-collinearity problems in the regression models.

Regression Analysis

A bidirectional fixed effect was used for regression in this article (Wintoki et al., 2012; Imai & Kim, 2021; Liew & Devi, 2021; Liew et al., 2021). Table 5 is the benchmark regression results of Model 1. The core explanatory variables: CSR, CSR1 and CSR2 in the regression of columns (1), (2) and (3) are significantly positive at 1% level, indicating that there is a significant positive relationship between CSR, CSR1 and CSR2 and CSD. The results indicate that CSR, i.e., overall CSR, shareholder responsibility and social responsibility enable A-shares listed firms to increase their degree of sustainable development, thereby validating H1. However, the other set of core explanatory variables – CSR3, CSR4 and CSR5 in columns (4), (5) and (6) regression is not significant, indicating that employee, equity and environmental social responsibilities have no significant effect on CSD.

Table 5
Regression results of Model 1

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	m1	m2	m3	m4	m5	m6
	CSD	CSD	CSD	CSD	CSD	CSD
CSR	0.0115***					
	(20.91)					
CSR1		0.0129***				
		(101.71)				
CSR2			0.0059***			
			(31.34)			
CSR3				0.0002		
				(0.49)		
CSR4					–0.0001	
					(–0.32)	
CSR5						–0.0003
						(–1.28)

(*Continued on next page*)

Table 5 (*Continued*)

Variables	(1) m1 CSD	(2) m2 CSD	(3) m3 CSD	(4) m4 CSD	(5) m5 CSD	(6) m6 CSD
Size	0.0470*** (24.53)	0.0101*** (6.34)	0.0409*** (21.74)	0.0469*** (24.39)	0.0470*** (24.52)	0.0471*** (24.56)
Lev	–0.2447*** (–34.46)	–0.0321*** (–5.26)	–0.2242*** (–32.22)	–0.2448*** (–34.45)	–0.2447*** (–34.45)	–0.2445*** (–34.42)
Constant	–1.1794*** (–17.23)	–0.3583*** (–6.97)	–0.8152*** (–13.18)	–0.9075*** (–14.32)	–0.9094*** (–14.36)	–0.9107*** (–14.38)
Observations	23,352	23,352	23,352	23,352	23,352	23,352
R^2	0.098	0.413	0.142	0.098	0.098	0.099
Year	control	control	control	control	control	control
Industry	control	control	control	control	control	control

Notes: t-statistics in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 6 shows the regression results of Model 2. The interaction terms of CSR and VC and CSR2 and VC are not significant, while only the interaction term of CSR1 and VC is significant at the 1% level and the coefficient is negative. This suggests that VC negatively moderates the relationship between shareholder responsibility and CSD, but VC has no significant moderating effects on the relationship between overall CSR and social responsibility with CSD. The findings possibly imply that VCs are excessively involved in small and medium-sized listed firms with high shareholding concentration (Nguyen et al., 2022), which may generate conflict with family managers and affect the sustainable development of these firms; hence, the significant moderating effect. This confirms the "grandstanding hypothesis" (Gompers, 1996) that VC has a negative impact on enterprises. In other words, venture capitalists are not motivated by the opportunities to participate in the management of those firms which they invested, but they are more motivated by the changes in the firm's market valuation. In addition, because most small and medium-sized listed firms are family businesses (Xue et al., 2019), family managers and VC institutions may encounter conflict or internal friction which can make decision-making inefficient (Jia et al., 2020). This reduces the ability of listed firms to make timely decisions on internal control, thus making their performance worse. At present, China's VC market is still in its infancy, so not all VC institutions can bring a positive impact on firms. Some VC may be driven to pursue profits and fame and thus hinder the value creation of small and medium-sized listed firms. In general, VC firms started relatively late in China, and there are still major deficiencies in the construction of the relevant laws and regulations governing these firms.

Table 6
Regression results of Model 2

Variables	(1) m1	(2) m2	(3) m3
	CSD	CSD	CSD
VC	–0.0214 (–0.10)	0.1923*** (2.77)	–0.0170 (–0.28)
CSR	0.0084*** (11.05)		
c_CSR_VC	–0.0012 (–0.13)		
CSR1		0.0114*** (65.82)	
c_CSR1_VC		–0.0177*** (–4.29)	
CSR2			0.0045*** (15.64)
c_CSR2_VC			–0.0065 (–0.62)
Size	0.0358*** (12.75)	0.0057** (2.48)	0.0329*** (11.89)
Lev	–0.1315*** (–12.78)	–0.0304*** (–3.51)	–0.1215*** (–11.97)
Constant	–0.9034*** (–10.39)	–0.2995*** (–4.75)	–0.6677*** (–8.74)
Observations	11,445	11,445	11,445
R^2	0.061	0.385	0.090
Year	control	control	control
Industry	control	control	control

Note: t-statistics in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 7 shows the regression results for Model 3. The interaction terms in the regression of columns (1) and (3) are significant at 1% level, indicating that CorGovindex positively moderates the effects of overall CSR and social responsibility on CSD. These results imply that an increase of CorGovindex encourages the promotion of overall CSR and social responsibility which increases CSD. The results also suggest that overall CSR and social responsibility as well as CG have a synergistic positive impact on the degree of CSD. Consequently, H3 is confirmed. The regression outcomes for the control variables in Models 2 and 3 are consistent with Model 1.

Table 7
Regression results of Model 3

Variables	(1) m1	(2) m2	(3) m3
	CSD	CSD	CSD
CorGovindex	0.0201*** (3.82)	0.0046** (2.51)	0.0060*** (3.71)
CSR	0.0117*** (21.15)		
c_CSR_CorGovindex	0.0008*** (3.25)		
CSR1		0.0128*** (100.53)	
c_CSR1_CorGovindex		0.0001 (1.20)	
CSR2			0.0058*** (30.87)
c_CSR2_CorGovindex			0.0006*** (3.06)
Size	0.0474*** (24.29)	0.0098*** (6.03)	0.0410*** (21.45)
Lev	–0.2412*** (–33.52)	–0.0307*** (–4.99)	–0.2230*** (–31.83)
Constant	–1.1878*** (–17.21)	–0.3461*** (–6.67)	–0.8111*** (–13.01)
Observations	23,352	23,352	23,352
R^2	0.099	0.412	0.142
Year	control	control	control
Industry	control	control	control

Note: t-statistics in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 8 shows the regression results for Model 4. The interaction term of core explanatory variables: CSR, CSR1 and CSR2 and CAE in the regression of columns (1), (2) and (3) are significantly positive, indicating that CAE positively mediates the relationship between CSR and CSD, thereby validating H4. CSR facilitates the enhancement of long-term CAE and then places emphasis on the long-term sustainability.

Table 8
Regression results of Model 4

Variables	(1) m1	(2) m2	(3) m3
	CAE	CAE	CAE
CSR	0.0115*** (28.69)		
CSR1		0.0015*** (13.06)	
CSR2			0.0004** (2.50)
Size	0.0405*** (29.05)	0.0363*** (25.42)	0.0402*** (28.63)
Lev	–0.0026 (–0.49)	0.0220*** (4.01)	–0.0013 (–0.26)
Constant	–1.1181*** (–22.43)	–0.7844*** (–16.99)	–0.8423*** (–18.25)
Observations	23,352	23,352	23,352
R^2	0.085	0.093	0.086
Year	control	control	control
Industry	control	control	control

Note: t-statistics in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Further Analysis

In China, GEM is a separate form of stock exchange from the main board. It is a market for trading securities that offer funding channels and development space for entrepreneurial businesses temporarily unable to list on the main board market. GEM is a significant addition to the main board, and it has a significant position in the capital market. The listing criteria of the GEM are often more flexible than those of the main board as reflected in the requirements of the establishment period, size of capital as well as expected medium and long-term performance. The most notable characteristic of GEM is that it has minimal entry requirements which enable small and medium-sized firms in the entrepreneurial phase to obtain funding (He et al., 2019).

Table 9 is the benchmark regression results of Model 1 for GEM. The core explanatory variables, namely CSR, CSR1 and CSR2 in the regression of columns (1), (2) and (3) are significantly positive at 1% level, indicating that there is a significant positive relationship between overall CSR, shareholder responsibility

and social responsibility with CSD. In other words, overall CSR, shareholder responsibility and social responsibility enable GEM listed firms to increase CSD, thereby validating H1.

Table 9
Regression results of Model 1 for GEM

Variables	(1) m1	(2) m2	(3) m3	(4) m4	(5) m5	(6) m6
	CSD	CSD	CSD	CSD	CSD	CSD
CSR	0.0138*** (9.44)					
CSR1		0.0133*** (50.94)				
CSR2			0.0055*** (12.47)			
CSR3				0.0012 (1.03)		
CSR4					–0.0001 (–0.07)	
CSR5						–0.0007 (–1.03)
Size	0.0496*** (11.50)	0.0109*** (3.17)	0.0435*** (10.22)	0.0492*** (11.35)	0.0496*** (11.50)	0.0497*** (11.52)
Lev	–0.1963*** (–12.18)	–0.0255** (–1.97)	–0.1819*** (–11.47)	–0.1964*** (–12.18)	–0.1963*** (–12.18)	–0.1964*** (–12.18)
Constant	–1.3251*** (–9.63)	–0.3777*** (–4.02)	–0.8747*** (–7.39)	–0.9939*** (–8.26)	–1.0001*** (–8.32)	–1.0021*** (–8.34)
Observations	4,835	4,835	4,835	4,835	4,835	4,835
R^2	0.152	0.490	0.185	0.153	0.152	0.153
Year	control	control	control	control	control	control
Industry	control	control	control	control	control	control

Note: t-statistics in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 10 is the regression results of Model 2 for GEM. The interaction terms between CSR and VC as well as between CSR2 and VC are not significant. However, the interaction term between CSR1 and VC is significant at 1% level and the coefficient are negative. This indicates that VC negatively moderates the effect of shareholders responsibility on CSD, but it has no moderating effect on the effect of overall CSR and social responsibility on CSD. This result is consistent with the previous results of the A-shares listed companies in China.

Table 10
Regression results of Model 2 for GEM

Variables	(1) m1	(2) m2	(3) m3
	CSD	CSD	CSD
VC	0.0581 (0.18)	0.2191** (2.50)	–0.0489 (–0.52)
CSR	0.0118*** (7.64)		
c_CSR_VC	–0.0048 (–0.32)		
CSR1		0.0119*** (41.73)	
c_CSR1_VC		–0.0169*** (–3.29)	
CSR2			0.0043*** (8.64)
c_CSR2_VC			0.0055 (0.36)
Size	0.0374*** (7.70)	0.0033 (0.87)	0.0329*** (6.84)
Lev	–0.0843*** (–4.65)	0.0406*** (2.84)	–0.0754*** (–4.22)
Constant	–1.2204*** (–8.68)	–0.2751*** (–2.91)	–0.8763*** (–7.37)
Observations	3,486	3,486	3,486
R^2	0.090	0.455	0.117
Year	control	control	control
Industry	control	control	control

Notes: t-statistics in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 11 shows the regression results for Model 3 for GEM. The interaction term in the regression of column (2) is negatively significant at 10% level, indicating that CorGovindex negatively moderates the relationship between shareholder responsibility and CSD. Nevertheless, the interaction terms of column (1) and column (3) are not significant, indicating that CorGovindex has no moderating effect on the relationship between overall CSR and social responsibility with CSD. Consequently, H3 is not supported for GEM listed firms. This result is completely different from the previous results of the A-shares listed firms in China and it demonstrates the uniqueness of GEM listed firms.

Table 11
Regression results of Model 3 for GEM

Variables	(1) m1	(2) m2	(3) m3
	CSD	CSD	CSD
CorGovindex	–0.0003 (–0.03)	0.0056 (1.62)	–0.0028 (–0.90)
CSR	0.0141*** (9.28)		
c_CSR_CorGovindex	0.003 (0.01)		
CSR1		0.0136*** (45.56)	
c_CSR1_CorGovindex		–0.0004* (–1.89)	
CSR2			0.0052*** (9.99)
c_CSR2_CorGovindex			0.002 (0.05)
Size	0.0503*** (11.50)	0.0113*** (3.24)	0.0442*** (10.25)
Lev	–0.1977*** (–12.19)	–0.0276** (–2.12)	–0.1830*** (–11.49)
Constant	–1.3474*** (–9.63)	–0.4028*** (–4.23)	–0.8801*** (–7.36)
Observations	4,835	4,835	4,835
R^2	0.153	0.491	0.188
Year	control	control	control
Industry	control	control	control

Note: t-statistics in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The regression analysis in Table 12 reveals that the interaction term including the main explanatory variables, namely CSR, CSR1, CSR2 and CAE, in columns (1), (2) and (3) exhibits a statistically significant positive effect. This suggests that CAE plays a positive mediating role in the association between CSR and CSD among GEM listed firms.

Table 12
Regression results of Model 4

Variables	(1) m1	(2) m2	(3) m3
	CAE	CAE	CAE
CSR	0.0202*** (17.01)		
CSR1		0.0015*** (5.64)	
CSR2			0.0008** (2.18)
Size	0.0478*** (13.68)	0.0434*** (12.14)	0.0469*** (13.34)
Lev	0.0620*** (4.75)	0.0817*** (6.06)	0.0641*** (4.89)

(*Continued on next page*)

Table 12 (*Continued*)

Variables	(1) m1	(2) m2	(3) m3
	CAE	CAE	CAE
Constant	–1.5265*** (–13.68)	–0.9798*** (–10.01)	–1.0335*** (–10.57)
Observations	4,835	4,835	4,835
R^2	0.135	0.142	0.136
Year	control	control	control
Industry	control	control	control

Note: t-statistics in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Robustness Analysis

Considering endogeneity problems, this article utilises the two stage least square method (2SLS) to test the robustness of the benchmark regression and uses industry medians of the core explanatory variable CSR (CSR_M) as the instrumental variable to estimate (Aivazian et al., 2005; Peng, 2020; Atif et al., 2023) (Table 13). The unrecognisable tests of the models are all significant which indicates the absence of identification problems (Staiger & Stock,1997). The F-values of the weak instrumental variable tests of the models are all greater than the 10% critical value (16.38) and this indicate that the models have passed the weak instrumental variable tests (Staiger & Stock, 1997). The 2SLS tests confirm that there are no endogeneity issues in the regression estimates. The consistency of the significance and the signs of the models' primary explanatory variables with the baseline regressions indicate the validity of the prior results.

Table 13
2SLS method results

Variables	(1) m1	(2) m2	(3) m3	(4) m4	(5) m5	(6) m6
	2SLS (First Stage)	2SLS (Section Stage)	2SLS (First Stage)	2SLS (Section Stage)	2SLS (First Stage)	2SLS (Section Stage)
	CSR	CSD	CSR1	CSD	CSR2	CSD
CSR_M	1.1227*** (16.08)					
CSR		0.0383*** (3.98)				
CSR1_M			0.8036*** (29.49)			

(*Continued on next page*)

Table 13 (*Continued*)

Variables	(1) m1 2SLS (First Stage)	(2) m2 2SLS (Section Stage)	(3) m3 2SLS (First Stage)	(4) m4 2SLS (Section Stage)	(5) m5 2SLS (First Stage)	(6) m6 2SLS (Section Stage)
	CSR	CSD	CSR1	CSD	CSR2	CSD
CSR1				0.0059*** (11.83)		
CSR2_M					0.9772*** (72.13)	
CSR2						0.0022*** (6.13)
Size	–0.1703*** (–11.29)	0.0996*** (4.83)	1.8524*** (53.73)	0.0072*** (6.77)	0.4584*** (19.67)	0.0168*** (26.03)
Lev	0.3646*** (3.87)	–0.2043*** (–15.48)	–15.2771*** (–70.42)	–0.0294*** (–3.41)	–2.0705*** (–14.28)	–0.1217*** (–32.34)
Constant	1.1575 (0.83)	–2.8489*** (–4.36)	–32.0205*** (–39.46)	–0.1833*** (–12.19)	–9.2022*** (–18.98)	–0.2862*** (–21.89)
Unrecognisable test		27.695***		838.526***		4254.967***
Weak instrumental variable test		27.731		869.609		5202.116
R^2	0.015	0.750	0.224	0.339	0.208	0.085

Note: z-statistics in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

CONCLUSION

This study conducts a comprehensive empirical analysis of the relationship between CSR and CSD using data from Chinese A-shares listed firms as well as GEM listed firms. The findings show that overall CSR, shareholder responsibility and social responsibility can support the CSD of both the Chinese A-share listed firms and GEM firms in China. Such findings are consistent with the studies by Donaldson and Dunfee (2002) and Mwesigwa et al. (2020). Moreover, our findings also show that CG can influence the relationship between the firm's overall CSR and social responsibility with CSD. However, these findings are only limited to Chinese A-shares public-listed firms. Hence, these firms should integrate CG with their overall CSR and social responsibility in order to encourage sustainable growth of their firms. On the other hand, our study also shows that CG has a negative influence on the relationship between shareholder responsibility and CSD in GEM companies. This shows that GEM listed firms are not governed well and their poor governance can be detrimental to their own CSD. Additionally, our

study also shows that VC has a negative influence on the relationship between shareholder responsibility and CSD in both the Chinese A-shares listed firms and the GEM listed firms. We also find a significant positive mediating effect of CAE on the relationship between CSR and CSD among Chinese A-shares listed firms and GEM listed firms.

As a result, public-listed firms in China need to carefully decide the number of shares that can be held by VC firms because the latter's relatively high shareholding can have a negative impact on its CSD. It is argued that high VC shareholding can increase the rights of VC firms to speak at shareholders' meeting. However, if their ideas are inconsistent with the views of the managers and other shareholders of the firm during these meetings, conflict may arise between these two parties which can reduce the efficiency of corporate decision-making and ultimately reduces CSD. When VC firms possess high shareholding, they are also more motivated to pursue corporate profits to yield higher capital gains for their investors. Unfortunately, if this occurs, the management of these listed firms will have higher incentives to expropriate resources from their firms. Ultimately, all these will reduce the CSD of the public-listed firms in China (Sun et al., 2020). Hence, in order to achieve sustainable development of public-listed firms in China, the government needs to increase the regulation of VC firms as well as the public-listed firms in China so that CSD can be achieved in the long run. There is a need for the Chinese government to enhance policy initiatives aimed at promoting the fulfilment of social responsibility by listed firms. It is also essential for listed firms to enhance their CG standards, optimise the efficiency of capital allocation, and foster the sustainable growth of their operations.

The primary constraint of this study is to the inadequate availability of data about VC, mostly attributable to the non-disclosure of such information by some listed firms. This lack of data transparency may introduce potential discrepancies in the statistical findings.

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