










“Corporate social responsibility and corporate tax aggressiveness: Evidence of mandatory vs. voluntary regulatory regimes impact”

AUTHORS

Oleh Pasko 

Li Zhang 
Alvina Oriekhova 

Mykola Hordiyenko 

Yarmila Tkal 


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Oleh Pasko, Ph.D. in Economics, Associate Professor, Department of Accounting and Taxation, Sumy National Agrarian University, Ukraine. (Corresponding author)

Li Zhang, Senior Lecturer, Xinxiang Vocational and Technical College, China; Ph.D. Student, Department of Accounting and Taxation, Sumy National Agrarian University, Ukraine.

Alvina Oriekhova, Doctor of Science, Professor, Head of the Department of Management named after L.I. Mykhailova, Sumy National Agrarian University, Ukraine.

Mykola Hordiyenko, Ph.D. in Economics, Full Professor, Head of the Department of Accounting and Taxation, Sumy National Agrarian University, Ukraine.

Yarmila Tkal, Ph.D. in Economics, Associate Professor, Department of Accounting and Taxation, Sumy National Agrarian University, Ukraine.



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Oleh Pasko (Ukraine), Li Zhang (China/Ukraine), Alvina Oriekhova (Ukraine), Mykola Hordiyenko (Ukraine), Yarmila Tkal (Ukraine)

CORPORATE SOCIAL RESPONSIBILITY AND CORPORATE TAX AGGRESSIVENESS: EVIDENCE OF MANDATORY VS. VOLUNTARY REGULATORY REGIMES IMPACT

Abstract

This study aims to investigate whether corporate social responsibility activities are associated with more or less tax avoidance by focusing on this interrelationship in mandatory vs. voluntary regulatory regimes. The sample includes 6,668 firm-year observations of Chinese A-share firms listed on the Shanghai and Shenzhen stock exchanges over 2011–2019. The study uses corporate culture and risk management theories to develop the hypotheses. Regression analysis and various robustness tests are employed to test the hypotheses. The data are retrieved from the HEXUN CSR system and CSMAR and WIND databases.

Consistent with the predictions of corporate culture theory, which argues that aggressive tax avoidance cannot be synchronously coupled with corporate social responsibility, the paper finds that notwithstanding regulatory regime, when the level of corporate social responsibility increases, the level of tax aggressiveness decreases. Thus, the results show that firms reporting corporate social responsibility tend to be less tax aggressive. Firms that engage in more corporate social responsibility activities are less likely to be tax aggressive, irrespective of regulatory regimes in place. Moreover, pollution indicators have little effect on corporate social responsibility and tax aggressiveness in Chinese institutional settings. The study contributes to the business ethics literature by implying the role of tax avoidance as a part of CSR and not as a separate non-CSR element of companies' activities.

Keywords

corporate social responsibility, tax aggressiveness, tax avoidance, corporate culture, business ethics, non-financial reporting, China

JEL Classification

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INTRODUCTION

The rich literature on corporate social responsibility (CSR) has paid insufficient attention to corporate tax avoidance, despite its true impact on the stakeholders. Companies legitimize their social contribution by pledging to be responsible and behave ethically, but those promises are only sometimes accompanied by matching corporate culture and CSR practices. Thus, the issue of how the relationship between CSR and taxation policy is shaping up can reveal new circumstances regarding how to look at CSR. It can also serve as another litmus test for the sincerity of companies in their CSR activities (Pasko, Chen, et al., 2021) as "tax payments are often considered a fundamental and easily measured example of a company's citizenship behavior" (Dowling, 2014, p. 173).

The debate over taxes and their role in CSR has been going on for the past decade. As various stakeholder groups are increasingly agitated about a company's corporate social responsibility, a timely issue arises

regarding how companies should adjust their tax policy in view of such a rise in the demand for social responsibility. From a company's point of view, both taxes and CSR exploit its wherewithal for the advancement of society, which has organizational and social significance. Corporate taxes are a direct transfer of funds by the company to the government, used mostly to purchase public social goods. CSR is defined as "the way in which business consistently creates shared value in society through economic development, good governance, stakeholder responsiveness, and environmental improvement" (Visser, 2011, p. 12). From one perspective, a company's tax policy is seen as part of CSR activity, and therefore companies that are proactive in CSR are less plausibly resort to aggressive tax policies (Sikka, 2010). However, given that both CSR and taxation costs are unrelated to its core business activities, one can assume that companies with high CSR costs may have an aggressive tax policy to save costs.

Dig deeper into the relationship between tax-paying behavior and CSR is warranted from two points of view. First, there is an observation that the CSR industry has evaded the issue of the tax payments' role in fulfilling corporate social responsibility. Moreover, in other related fields of research, such as accounting, economics, taxation and finance, and public policy, corporate tax behavior is rarely associated with CSR (Ding et al., 2022; Dowling, 2014). Second, the dearth of discussion of the interdependence between corporate taxes payment and CSR practices reveals the weakness and incompleteness of many definitions, as well as CSR performance assessment tools (Lanis & Richardson, 2015; Pasko, Marenych, et al., 2021; Raithatha & Shaw, 2022). This state of affairs is somewhat unnatural and leads to a *cul-de-sac*; since having such of the few monetary yardsticks of CSR, it is surprising that this direction did not morph into the established subfield of CSR assessments and today, only a few researchers have followed this path.

Furthermore, one more aspect that mandates scrutiny is the issue of the relationship between the behavior in the field of paying corporate taxes and CSR depending on the voluntary or mandatory regulatory environment. On the one hand, a mandatory CSR disclosure policy can reduce a firm's profitability and, thus, magnify corporate cost load (Jiang et al., 2022). On the other hand, mandatory CSR disclosure exposes the company to enhanced third-party scrutiny. Therefore, the extended transparency under the mandatory CSR regime makes it easier for governments and stakeholder groups to compel companies to engage in more CSR activities (Y.-C. Chen et al., 2018).

This study responds to the calls offered by Gulzar et al. (2018), Huseynov and Klamm (2012), Lanis and Richardson (2015), and just recently by Ling and Liu (2023) and Raithatha and Shaw (2022).

1. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Two major theories are related to CSR and aggressive tax avoidance practices: corporate culture theory and risk management theory (Table 1) (Col & Patel, 2019; Raithatha & Shaw, 2022).

The corporate culture theory assumes a negative relationship between CSR and tax avoidance. In comparison, risk management theory asserts that companies ratchet up their CSR engagement to minimize or reduce the negative reputational effects of tax aggressiveness (Col & Patel, 2019;

Raithatha & Shaw, 2022). There is also one theory that is also mentioned in the connection between CSR and tax avoidance: slack resource theory (Penrose, 1959; Watson, 2015) asserts that the relation between CSR and tax avoidance is catalyzed by earnings performance, thus assuming that "attention to the demands of non-shareholder stakeholders is curtailed when firms face scarce resources" (Watson, 2015, p. 1).

Two currents consider divergent and contradictory approaches to the relationship between CSR and tax avoidance. One camp believes that corporate culture steers both CSR activities and tax practices, thus assuming that firms with inferior CSR performance will be more aggressive in tax avoidance

Table 1. Theories explaining the relationship between CSR and tax aggressiveness

Theory	Meaning and logical reasoning behind the theory	Utilized in studies
Corporate culture theory	This theory postulates that if a company truly believes in good corporate behavior, all CSR and tax avoidance decisions should reflect that belief and shared value. A company cannot simultaneously be involved in activities that have a drastically opposite impact on society. A company conducts CSR for the benefit of all stakeholders, and this list already includes the government. Therefore, aggressive tax avoidance cannot be concomitantly combined with CSR. Therefore, corporate culture influences the decision to reduce tax aggressiveness as a result of greater involvement in CSR.	Ling and Liu (2023)
Risk management theory	A company is focused on satisfying the interests of specific shareholders, not the interests of a wide range of stakeholders. This theory assumes that companies seek to reduce reputational risks associated with negative corporate events and maximize the interests of shareholders by strengthening their CSR, which is designed to create a good reputation for them. Suppose a company is exposed to negative public attention due to active tax avoidance schemes. In that case, it can always counter these messages by strategically increasing its CSR engagement, thus “blocking” those negative public attention.	Col and Patel (2019), Huseynov and Klamm (2012), Lanis and Richardson (2015)

(Hoi et al., 2013; Y. Kim et al., 2012). The other group claims that CSR is simply a risk management instrument, assuming that by engaging in aggressive tax practices, companies should either improve and boost their CSR activities or make it perceived as being robust CSR performance (Abid & Dammak, 2022; Col & Patel, 2019; Davis et al., 2016; Huseynov & Klamm, 2012; Lanis & Richardson, 2015; Preuss, 2010; Raithatha & Shaw, 2022). It is also worth mentioning the original approach, which presented evidence that CSR and tax avoidance “act as substitutes rather than complements” (Davis et al., 2016, p. 65).

The extant literature is replete with studies that provide empirical evidence in favor of the first and second theories and groups. Thus, confirming the theory of corporate culture assumptions based on a sample of 6,082 firm-year observations of 1,577 non-financial firms listed on the Bombay Stock Exchange (BSE) between 2015 and 2018 shows that “firms that comply with CSR regulation end up showing less tax aggressiveness measured by the effective tax rate (ETR) and book-tax difference measure” (Raithatha & Shaw, 2022, p. 287). Lanis and Richardson (2015) used a sample of 434 firm-year observations (217 tax-avoidant and 217 non-tax-avoidant firm-year observations) from the Kinder, Lydenberg, and Domini databases during 2003–2009. It was found that “the higher the level of CSR performance of a firm, the lower the likelihood of tax avoidance” (Lanis & Richardson, 2015, p. 439). Kacem and Brahim Omri (2022, p. 639) targeted 71 Tunisian companies operating in different sectors and found “a negative and significant association between tax incentives and CSR practices. Therefore, there is an inefficient use of these types of

incentives.” Ling and Liu (2023) assumed that firms that considerably advance charitable causes are less aggressive in avoiding tax. They found that firms participating in corporate giving (a CSR strength) are less aggressive in tax avoidance than their peerage. Kuo (2023), on a sample of 1,277 listed firms in Taiwan from 2015 to 2020, found that firms that conduct well in CSR are less likely to participate in tax avoidance.

Contrary to the abovementioned papers, several studies substantiate the risk management theory. In particular, Col and Patel (2019), using a sample of U.S. firms, show that firms that engage in aggressive tax avoidance (proxied by the use of offshore entities in tax havens) increase their CSR ratings considerably. Their findings testify that firms’ CSR ratings rose steeply two years after opening tax haven affiliates. Özbay et al. (2023), using 1156 firm-year observations from 94 firms listed on the Istanbul Stock exchange, found that “socially responsible non-family firms engage in tax avoidance activities through discretionary book-tax differences rather than tax avoidance through aggressive tax planning and tax sheltering, and this behavior is opposite in family firms.” Sarhan (2023), using a sample of FTSE350 non-financial listed firms from 2002 to 2016, tries to determine the moderating role of the structure of shareholders on the relationship between CSR and tax avoidance. It was found that “institutional shareholding dampens the positive relationship between firms’ social responsibility and tax citizenship.” Gavius et al. (2022) found that “tax avoidance has decreased in non-CSR firms in response to this exogenous change, but surprisingly, in CSR firms, it has increased.” Abid and Dammak (2022) considered the effect of tax avoidance on cor-

porate social responsibility performance based on a sample of French non-financial companies from 2005 to 2016. They estimated that “firms with high CSR scores are more likely to engage in aggressive tax avoidance” (Abid & Dammak, 2022, p. 618). Watson (2015) can also be recorded in the second group: going out of the assumptions of slack resource theory (Penrose, 1959), the study confirms the relation between CSR and tax avoidance catalyzed by earnings performance, thus proving that “attention to the demands of non-shareholder stakeholders is curtailed when firms face scarce resources” (Watson, 2015, p. 1).

Most studies considered the environment or jurisdiction of voluntary CSR disclosure. However, it is important to check whether mandated or voluntary CSR regulatory regimes can influence this relationship.

Extant research shows that this issue is unsolved at best since the findings are mixed. In practice, CSR can lead to lower profitability, increasing corporate costs. Companies can take different approaches to respond to this in terms of the tax burden (Jiang et al., 2022). Indeed, the mandatory CSR regime could significantly increase corporate tax avoidance (Jiang et al., 2022). On the other hand, mandatory CSR disclosure exposes the company to enhanced third-party scrutiny; therefore, the extended transparency under the mandatory CSR regime makes it easier for governments and stakeholder groups to compel companies to engage in more CSR activities (Y.-C. Chen et al., 2018).

According to Marquis et al. (2016), firms can have generic and domain-specific visibility, and one of the elements of the latter can be CSR and tax aggressiveness (Pasko et al., 2022). Therefore, given the significant visibility of taxes, companies

can refuse short-term benefits obtained through tax manipulation to maintain their reputation (Kanagaretnam et al., 2018; Raithatha & Shaw, 2022). Here is the brightest example of value creation through the firm’s reputation on display (Sánchez & Sotorrío, 2007). From the firm’s point of view, being tax aggressive is positive for shareholders regarding increased profits. However, it comes at an even greater cost to the firm if it exposes itself to greater stakeholder scrutiny (Kanagaretnam et al., 2018). Therefore, greater visibility and scrutiny mean the CSR mandates regime should reduce tax aggressiveness (Ding et al., 2022; Kanagaretnam et al., 2018; Raithatha & Shaw, 2022).

The purpose of this paper is to examine how corporate social responsibility activities is associated with tax aggressiveness in mandatory vs. voluntary regulatory regimes in China. Thus, in compliance with the discussion above, the paper develops two hypotheses:

H1: All else being equal, mandatory CSR is negatively associated with corporate tax aggressiveness.

H2: All else being equal, voluntary CSR disclosure is negatively associated with corporate tax aggressiveness.

2. METHOD

2.1. Sample selection and data source

The sample consists of all Chinese A-share publicly-listed firms over the 2011–2019 period. The period of the study, which is limited to 2019, is explained by the significant impact of the Covid-19 pandemic on the business performance

Table 2. Formation of the sample

Steps	Filter applied	Sample by the end of the step
1	A-share listed companies in China’s Shanghai and Shenzhen stocks	26971
2	Exclude the financial industry	542
3	Exclude ST, *ST and PT companies	475
4	Exclude total profit before tax is less than or equal to 0	382
5	Exclude companies with abnormal effective tax rates (effective tax rates less than 0 or greater than 1)	2660
6	Exclude companies with missing data	16244
7	Total samples	6668

of companies, which significantly distorted the overall picture. However, the sample was reduced to 6,668 firm-years after excluding some companies falling into the following categories (Table 2): financial companies; ST, *ST and PT companies; total profit before tax is less than or equal to 0 companies; companies with abnormal effective tax rates (effective tax rates less than 0 or greater than 1), and companies with missing data. Finally, the CSR disclosure data comes from the HEXUN CSR system and CSMAR database; the tax-related data comes from the WIND database, and the rest of the financial data comes from the CSMAR database.

2.2. Dependent variable

Long-term effective tax rate measurement (Dyreng et al., 2008; J.-B. Kim et al., 2011) and accounting-tax difference measurement (S. Chen et al., 2010; Cheng et al., 2012) can better measure corporate income tax avoidance behavior. Concerning Desai and Dharmapala (2006), the dependent variables for empirical tests are the accounting-tax difference (BTD) and accounting-tax difference (DDBTD) after deducting the impact of accrued profits, which measure the degree of tax aggressiveness of firms. In other words, larger values of BTD and DDBTD imply greater tax aggressiveness.

Specifically, BTD is equal to (pre-tax accounting profit-taxable income)/total assets at the end of the period. Taxable income = current income tax expense/nominal income tax rate. The larger the BTD, the larger the difference between accounting profits and taxable income, and it is more likely for companies to engage in tax-aggressive activities.

At the same time, the study obtains DDBTD through the following model:

$$\begin{aligned} \llbracket BDT \rrbracket_{-}(i, t) = \alpha \cdot \llbracket TACC \rrbracket_{-}(i, t) + \\ + \mu_{-}i + \varepsilon_{-}(i, t). \end{aligned} \quad (1)$$

TACC is the total accrued profit, which is equal to (net profit – net cash flow from operating activities)/total assets. $\mu_{-}i$ is the average value of the residuals of company i over the sample period, and $\varepsilon_{-}(i, t)$ is the deviation of residual in year t from firm i 's average residual. $DDBTD = \mu_{-}i + \varepsilon_{-}(i, t)$.

Since Chinese listed companies enjoy extensive tax incentives, each company's nominal income tax rate is not the same, which leads to the direct use of income tax expense/pre-tax profit method to measure the effective tax rate, causing horizontal incomparability among companies. Drawing lessons from Dyreng et al. (2008), the average difference between the nominal income tax rate and the effective income tax rate for multiple periods is used to measure the degree of tax avoidance of the enterprise to reduce the impact of taxation over time. However, this method has not been widely used in the literature; therefore, this paper uses the above indicators to test the robustness.

2.3. Independent variable

CSR denotes the independent variable. The CSR data come from the social responsibility rating data of A-share listed companies released by the third-party professional organizations of HEXUN CSR system, which uses information disclosed by firms to proxy for CSR activity as indicated, and its scores are used to measure CSR performance and disclosure.

The full samples of whether listed companies disclose CSR reports in the current year come from the CSMAR database. When companies disclose CSR reports in the current year, the CSRREPORT variable is 1, otherwise 0.

2.4. Control variables

The base regression model includes several control variables that relate to standard determinants of tax aggressiveness. They include firm size (SIZE), leverage (LEV), return on assets (ROA), market-to-book ratio (MB), gross profit (GROSSMARGIN), fixed assets (PPE), intangible assets (INTANG), inventory intensity (INV), cash holdings (CASH), firm age (AGE), ownership concentration (SHRCR), equity balance (ZINDEX), proportion of independent directors (INDEP), board size (BOARD), loss (LOSS), and CEO duality (DUALITY). The definition is reported in Table 3. Since prior literature shows cross-industry and cross-year variation in firms' effective tax rate, the study controls for industry and year effects by including industry and year dummies in the regression analysis.

Table 3. Variable definition

Variables	Variable symbol	Definitions
Dependent variables	TA	Two indicators measure the degree of tax aggressiveness. (1) BTD is the taxation difference; (2) DDBTD is the accounting-tax difference after deducting the impact of accrued profits.
	RATE_diff	The difference between the nominal income tax rates minus the effective income tax rate.
	LRATE_diff	The five-year average difference between the nominal income tax rate and the effective tax rate.
Independent variables	CSR	CSR score provided by HEXUN CSR system.
	CSRREPORT	If a company discloses CSR in the current year, take 1; otherwise, 0.
Moderator variables	CSR_MAN	If a company is a mandatory disclosure in the current year, take 1; otherwise, 0.
	INDUSTRY1	1 for pollution companies and 0 for non-pollution companies.
Control variables	SIZE	The natural log of total assets.
	LEV	Total liability is divided by total assets.
	ROA	Net profits/Total assets.
	MB	Market-to-book ratio as of fiscal year.
	GROSSMARGIN	(Operating income – operating cost)/Operating income.
	PPE	Net fixed assets are divided by total assets.
	INTANG	Net intangible assets are divided by total assets.
	INV	Net ending inventory divided by total assets.
	CASH	Ending value of cash and its equivalent divided by total assets.
	AGE	Natural logarithm of company ages.
	SHRCR	The shareholding ratio of the company's largest tradable shareholder.
	ZINDEX	The ratio of the first shareholder to the second shareholder.
	INDEP	The proportion of independent directors serving on a board.
	BOARD	The number of directors serving on a company's board of directors.
	LOSS	A dummy variable equals 1 if the company reports negative earnings in the prior year and 0 otherwise.
	SOE	1 if state-owned enterprise, 0 otherwise.
	DUALITY	1 if the same person occupies the CEO and the board chair roles, 0 otherwise.
YEAR	Year dummy variable.	
INDUSTRY	Industry dummy variable.	

2.5. Base regression model

To test the hypotheses, the study estimates the following multiple regression:

$$\begin{aligned}
 TA_{i,t} = & \alpha_0 + \beta_1 CSR_{i,t} + \beta_2 SIZE_{i,t} + \\
 & + \beta_3 LEV_{i,t} + \beta_4 ROA_{i,t} + \beta_5 MB_{i,t} + \\
 & + \beta_6 GROSSMARGIN_{i,t} + \beta_7 PPE_{i,t} + \\
 & + \beta_8 INTANG_{i,t} + \beta_9 INV_{i,t} + \beta_{10} CASH_{i,t} + \quad (2) \\
 & + \beta_{11} AGE_{i,t} + \beta_{12} SHRCR_{i,t} + \\
 & + \beta_{13} ZINDEX_{i,t} + \beta_{14} INDEP_{i,t} + \\
 & + \beta_{15} BOARD_{i,t} + \beta_{16} LOSS_{i,t-1} + \\
 & + \sum YEAR + \sum INDUSTRY + \varepsilon_{i,t}.
 \end{aligned}$$

Since CSR disclosure willingness has a self-selection problem, the paper adapts Heckman's two-

stage model to alleviate the endogeneity. This study constructs a model with the influencing factors on CSR disclosure reports in the first stage and then performs Probit regression to estimate the Inverse Mills Ratio (IMR). The inverse Mills ratio is substituted as a control variable into the second stage to alleviate the influence of self-selection on the results. The following is the first-stage regression model:

$$\begin{aligned}
 CSRREPORT_{i,t} = & \alpha_0 + \theta_1 SIZE_{i,t} + \\
 & + \theta_2 LEV_{i,t} + \theta_3 ROA_{i,t} + \theta_4 MB_{i,t} + \\
 & + \theta_5 AGE_{i,t} + \theta_6 SHRCR_{i,t} + \theta_7 ZINDEX_{i,t} + \quad (3) \\
 & + \theta_8 INDEP_{i,t} + \theta_9 BOARD_{i,t} + \\
 & + \theta_{10} LOSS_{i,t-1} + \theta_{11} DUALITY_{i,t} + \\
 & + \sum YEAR + \sum INDUSTRY + \varepsilon_{i,t}.
 \end{aligned}$$

The second stage model:

$$\begin{aligned}
 TA_{i,t} = & \alpha_0 + \beta_1 CSR_{i,t} + \beta_2 SIZE_{i,t} + \\
 & + \beta_3 LEV_{i,t} + \beta_4 ROA_{i,t} + \beta_5 MB_{i,t} + \\
 & + \beta_6 GROSSMARGIN_{i,t} + \beta_7 PPE_{i,t} + \\
 & + \beta_8 INTANG_{i,t} + \beta_9 INV_{i,t} + \beta_{10} CASH_{i,t} + \quad (4) \\
 & + \beta_{11} AGE_{i,t} + \beta_{12} SHRCR_{i,t} + \\
 & + \beta_{13} ZINDEX_{i,t} + \beta_{14} INDEP_{i,t} + \\
 & + \beta_{15} BOARD_{i,t} + \beta_{16} LOSS_{i,t-1} + IMR + \\
 & + \sum YEAR + \sum INDUSTRY + \varepsilon_{i,t}.
 \end{aligned}$$

3. RESULTS

3.1. Descriptive statistics

Table 4 shows the descriptive statistics of each variable. The mean (median) of *BTD* is -0.00165 (-0.00299), and the maximum and minimum are 0.100 and -0.0775 . For *DDBTD*, the mean (median) is 0.00204 (-0.00299), and the maximum and minimum are 0.107 and -0.0870 . It shows that Chinese companies have great differences in tax payment and evasion due to different years and industries. The mean (median) of *CSR* is 26.75 (22.78), and the maximum and minimum are 90.87 and -0.0775 . The levels of

the corporations in the sample are relatively low because engaging in *CSR* is not mandatory.

In terms of the control variables, the study observes that the sample firms have a mean (median) effective *SIZE* of around 22.17 (22.04), the mean (median) value for *LEV* is approximately 0.401 (0.389), the mean (median) value for *ROA* is 0.0559 (0.0458), the mean (median) value for *MB* is 1.994 (1.517), the mean (median) value for *GROSSMARGIN* is 0.301 (0.267), the mean (median) value for *PPE* is 0.200 (0.175), the mean (median) value for *INTANG* is 0.0456 (0.0351), the mean (median) value for *INV* is 0.151 (0.118), the mean (median) value for *CASH* is 0.169 (0.128), the mean (median) value for *AGE* is 2.728 (2.788), the mean (median) value for *SHRCR* is 33.78 (31.51), the mean (median) value for *ZINDEX* is 8.067 (2.773), the mean (median) value for *INDEP* is 0.373 (0.333), the mean (median) value for *BOARD* is 8.562 (9), and the mean (median) value for *LOSS* is 0.0480 (0).

3.2. Correlation results

Table A1 reports the Pearson pairwise correlation results. The correlations show that *BTD* and *DDBTD* are significantly negatively associated with *CSR* ($p < 0.01$). These results indicate that the higher the corporation's level of *CSR*,

Table 4. Descriptive statistics

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	N	mean	sd	min	max	median
BTD	6,668	-0.00165	0.0249	-0.0775	0.100	-0.00299
DDBTD	6,668	-0.00204	0.0248	-0.0870	0.107	-0.00299
CSR	6,668	26.75	14.77	-0.110	90.87	22.78
SIZE	6,668	22.17	1.174	17.76	28.18	22.04
LEV	6,668	0.401	0.200	0.00752	0.973	0.389
ROA	6,668	0.0559	0.0452	-0.0120	0.547	0.0458
MB	6,668	1.994	2.217	0.0477	91.57	1.517
GROSSMARGIN	6,668	0.301	0.168	-0.486	0.975	0.267
PPE	6,668	0.200	0.143	0	0.832	0.175
INTANG	6,668	0.0456	0.0490	0	0.656	0.0351
INV	6,668	0.151	0.138	0	0.943	0.118
CASH	6,668	0.169	0.135	-0.165	0.924	0.128
AGE	6,668	2.728	0.422	0.693	3.964	2.788
SHRCR	6,668	33.78	14.70	3	89.41	31.51
ZINDEX	6,668	8.067	18.16	1	404.1	2.773
INDEP	6,668	0.373	0.0544	0.182	0.714	0.333
BOARD	6,668	8.562	1.614	4	18	9
LOSS	6,668	0.0480	0.214	0	1	0

the lower the corporate tax aggressiveness. For BTD, the results show significant correlations with SIZE ($p < 0.1$), ROA ($p < 0.01$), MB ($p < 0.01$), GROSSMARGIN ($p < 0.01$), PPE ($p < 0.01$), AGE ($p < 0.01$), and LOSS ($p < 0.05$). In terms of DDBTD, the study observes significant correlations with SIZE ($p < 0.05$), ROA ($p < 0.01$), MB ($p < 0.01$), GROSSMARGIN ($p < 0.1$), PPE ($p < 0.01$), AGE ($p < 0.01$), and LOSS ($p < 0.05$).

Moreover, Table A1 shows that only moderate levels of collinearity exist between the explanatory variables. The paper computes variance inflation factors (VIFs) when estimating the regression models to test for signs of multi-collinearity among the explanatory variables. The study finds that no VIFs exceed three, so multi-collinearity is not problematic in the study.

3.3. Multiple regression results

Table 5 reports the regression results for the base regression model 2. The CSR regression coefficient is negative and significantly associated with BTD and DDBTD ($p < 0.01$), supporting H1. These indicate that when the level of CSR is higher, the level of tax aggressiveness is lower. The results imply that firms that engage in more CSR activities are less likely to be tax aggressive.

The study also finds that several control variables are positively and significantly associated with tax aggressiveness ($p < 0.01$), including SIZE, ROA, PPE, AGE, and LOSS ($p < 0.01$), indicating that firms with bigger and older, stronger profitability, heavier proportion of fixed assets and negative earnings in the prior year are more likely to engage in tax aggressiveness. The regression coefficient for LEV, GROSSMARGIN, INTANG, CASH, and SHRCR are negative and significantly associated with tax aggressiveness ($p < 0.01$ or better), indicating that higher debt, gross margin level, proportion of intangible assets, cash holding level, and equity concentration have certain restraining effects on tax radicalization and less likely to be tax aggressive. Finally, the regression coefficients for ZINDEX and INDEP are not significant.

Large companies have more resources and greater lobbying capabilities to better conduct tax planning and obtain tax incentives. This is

reflected in companies with larger assets having a higher degree of income tax aggressive. On the other hand, although companies tend to avoid income tax, most of their taxes are still mainly turnover tax, which is difficult to evade. Therefore, companies with larger assets and stronger profitability will have a higher cash tax burden rate. Firms with higher debt ratios are more likely to be effectively supervised by investors, and it is difficult to use debt tax shields to save tax avoidance activities. Therefore, firms will consciously or be forced to reduce aggressive tax behavior in this case. Companies with a higher proportion of fixed assets are more likely to avoid tax, that is, to use the depreciation of fixed assets. The higher the proportion of fixed assets is, the more likely the enterprise is to avoid tax, that is, to use the depreciation of fixed assets. However, firms with more intangible assets will restrain their aggressive tax behavior. When companies face a cash flow shortage, they are more likely to use tax avoidance activities to reduce cash outflows.

Table 5. Multiple regression results

VARIABLES	(1)	(2)
	BTD	DDBTD
CSR	-0.000*** (-8.00)	-0.000*** (-6.28)
SIZE	0.002*** (5.00)	0.001*** (3.43)
LEV	-0.016*** (-7.45)	-0.015*** (-6.55)
ROA	0.197*** (24.74)	0.167*** (20.66)
MB	-0.000 (-1.22)	-0.000*** (-2.71)
GROSSMARGIN	-0.012*** (-5.11)	-0.013*** (-5.19)
PPE	0.008*** (2.98)	0.016*** (5.78)
INTANG	-0.026*** (-4.08)	-0.017*** (-2.67)
INV	-0.006* (-1.91)	-0.002 (-0.70)
CASH	-0.013*** (-4.61)	-0.008*** (-2.82)
AGE	0.004*** (5.07)	0.003*** (3.68)
SHRCR	-0.000*** (-3.88)	-0.000** (-2.41)
ZINDEX	-0.000 (-0.18)	-0.000 (-0.59)

Table 5 (cont.). Multiple regression results

VARIABLES	(1)	(2)
	BTD	DDBTD
INDEP	-0.000 (-0.04)	-0.003 (-0.47)
BOARD	-0.000* (-1.68)	-0.000 (-0.39)
LOSS	0.007*** (4.95)	0.005*** (3.49)
Constant	0.012 (1.04)	0.004 (0.34)
INDUSTRY	YES	YES
YEAR	YES	YES
Observations	6,668	6,668
R-squared	0.195	0.160
F test	0	0
r2_a	0.183	0.148
F	16.90	13.35

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

The mandatory CSR disclosure grouping regression results are reported in Table 6. In the mandatory disclosure group, the CSR coefficient is negative and insignificant with BTD and DDBTD. However, in the voluntary disclosure group, the regression coefficient of CSR is significantly negative (p < 0.01) with BTD and DDBTD, which support H2.

It shows that the willingness of disclosure affects the correlation between CSR and tax aggressiveness. Increasing CSR activities will reduce tax aggressiveness in voluntary disclosure, while increasing CSR activities have no obvious impact on tax aggressiveness in mandatory disclosure. This means that voluntary disclosure has strong rent-seeking motives, that is, rent-seeking to local governments by actively disclosing high-quality information to obtain the government's relaxation of tax enforcement, thereby implementing more radical tax avoidance behaviors. However, companies that are required to make mandatory disclosures do not have a clear willingness to improve the quality of CSR to obtain tax avoidance benefits. In the voluntary disclosure group, large and loss in last year firms may have more motivation to be tax aggressive. The largest shareholder has a particular inhibitory effect on tax aggressiveness. The regression coefficients for the control variables are also comparable to those reported in Table 5.

Table 6. Mandatory and voluntary disclosure regression results

VARIABLES	(1)	(2)	(3)	(4)
	BTD	DDBTD	BTD	DDBTD
	CSR_MAN==1		CSR_MAN==0	
CSR	-0.000 (-1.43)	-0.000 (-0.52)	-0.000*** (-7.79)	-0.000*** (-5.96)
SIZE	-0.001 (-0.73)	-0.001 (-0.79)	0.002*** (4.39)	0.001*** (3.32)
LEV	-0.037*** (-3.23)	-0.027** (-2.46)	-0.014*** (-6.19)	-0.013*** (-5.71)
ROA	0.247*** (8.37)	0.167*** (5.97)	0.199*** (23.12)	0.169*** (19.11)
MB	-0.003*** (-2.93)	-0.000 (-0.23)	-0.000 (-0.37)	-0.000** (-2.32)
GROSSMARGIN	-0.027** (-2.28)	-0.035*** (-3.17)	-0.011*** (-4.40)	-0.011*** (-4.27)
PPE	0.003 (0.22)	0.030*** (2.64)	0.007*** (2.70)	0.014*** (4.95)
INTANG	-0.114*** (-4.01)	-0.082*** (-3.04)	-0.024*** (-3.51)	-0.018*** (-2.59)
INV	-0.039** (-2.49)	-0.009 (-0.60)	-0.004 (-1.22)	-0.002 (-0.57)
CASH	-0.082*** (-5.56)	-0.036** (-2.54)	-0.009*** (-3.37)	-0.007** (-2.51)
AGE	0.007* (1.66)	0.003 (0.71)	0.004*** (4.63)	0.003*** (3.66)
SHRCR	-0.000 (-0.55)	-0.000 (-0.73)	-0.000*** (-4.38)	-0.000*** (-2.68)
ZINDEX	0.000 (0.06)	-0.000 (-0.28)	-0.000 (-0.20)	-0.000 (-0.57)
INDEP	0.027 (1.16)	0.012 (0.56)	-0.004 (-0.60)	-0.006 (-0.91)
BOARD	0.000 (0.01)	0.001 (1.13)	-0.000** (-1.96)	-0.000 (-1.06)
LOSS	0.008 (0.81)	0.008 (0.88)	0.006*** (4.64)	0.004*** (3.24)
INDUSTRY	YES	YES	YES	YES
YEAR	YES	YES	YES	YES
Constant	0.047 (0.97)	0.033 (0.73)	0.012 (0.96)	0.003 (0.20)
Observations	556	556	6,112	6,112
R-squared	0.412	0.381	0.191	0.155
F test	0	0	0	0
r2_a	0.330	0.294	0.178	0.142
F	5.012	4.405	15.09	11.78

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

3.4. Additional analysis

Table 7 reports the regression results of the polluting companies grouping. It is a dummy variable reflecting whether a company is a polluting

company, with a polluting company is 1 and a non-polluting company is 0. Industry classification is according to the Industry code of the China Securities Regulatory Commission, referring to the “Guidelines for Environmental Information Disclosure of Listed Companies” (draft for comments) promulgated by the Ministry of Ecology and Environment in 2010 for the definition of high-polluting industries. Whether it is a polluting or non-polluting company, the regression coefficients of CSR with BTD and DDBTD are negative and significant ($p < 0.01$); this supports H1. It shows that pollution indicators have little effect on CSR and tax aggressiveness. The work done by polluting companies in CSR can correspond to the pollution they produce, and polluting companies can obtain more tax incentives through CSR activities. In polluting companies, the board size will have a certain inhibitory effect on the company’s tax aggressive. But what is interesting is that among non-polluting companies, the regression coefficients of state-owned enterprises on BTD and DDBTD are both significantly positive ($p < 0.05$). CASH has a significant negative correlation with BTD and DDBTD. It shows that the lower the cash holdings in non-polluting companies, the stronger the profitability of the state-owned enterprises; it will show higher tax aggressiveness. Since grouping affects the number of samples, the significance of the regression coefficients of individual control variables to BTD and DDBTD is not uniform, and the significance of most control variables is consistent with those mentioned above.

Table 7. Additional analysis

VARIABLES	(1)		(2)	
	BTD	DDBTD	BTB	DDBTD
	INDUSTRY1==1		INDUSTRY1==0	
CSR	-0.000*** (-4.39)	-0.000*** (-3.90)	-0.000*** (-6.61)	-0.000*** (-4.62)
SOE	0.000 (0.11)	0.002 (1.18)	0.002** (2.34)	0.002** (2.16)
SIZE	0.002** (2.17)	0.001 (0.74)	0.002*** (4.21)	0.002*** (3.36)
LEV	-0.014*** (-3.43)	-0.011*** (-2.79)	-0.019*** (-7.22)	-0.018*** (-6.49)
ROA	0.125*** (8.58)	0.083*** (5.81)	0.243*** (25.10)	0.214*** (21.39)
MB	0.000 (0.57)	0.001** (2.09)	-0.000* (-1.71)	-0.001*** (-3.70)
GROSSMARGIN	-0.014*** (-3.17)	-0.015*** (-3.40)	-0.011*** (-3.83)	-0.012*** (-3.86)

VARIABLES	(1)		(2)	
	BTB	DDBTD	BTB	DDBTD
	INDUSTRY1==1		INDUSTRY1==0	
PPE	0.013*** (2.86)	0.019*** (4.39)	0.003 (0.81)	0.012*** (3.43)
INTANG	-0.036*** (-3.10)	-0.029** (-2.51)	-0.019** (-2.42)	-0.009 (-1.11)
INV	-0.008 (-1.25)	-0.007 (-1.09)	-0.005 (-1.42)	-0.001 (-0.20)
CASH	-0.007 (-1.34)	-0.001 (-0.15)	-0.016*** (-5.12)	-0.012*** (-3.76)
AGE	0.005*** (3.40)	0.004** (2.49)	0.003*** (3.08)	0.002** (2.04)
SHRCR	-0.000* (-1.89)	-0.000 (-1.21)	-0.000*** (-3.59)	-0.000** (-2.24)
ZINDEX	0.000 (0.38)	0.000 (0.03)	-0.000 (-0.48)	-0.000 (-0.74)
INDEP	-0.013 (-1.14)	-0.019 (-1.65)	0.003 (0.43)	0.001 (0.08)
BOARD	-0.001*** (-3.07)	-0.001* (-1.79)	-0.000 (-0.39)	0.000 (0.33)
LOSS	0.007*** (2.90)	0.005** (2.19)	0.006*** (3.97)	0.004*** (2.59)
INDUSTRY	YES	YES	YES	YES
YEAR	YES	YES	YES	YES
Constant	-0.024 (-0.82)	-0.008 (-0.29)	0.008 (0.63)	-0.005 (-0.35)
Observations	2,266	2,266	4,402	4,402
R-squared	0.112	0.106	0.253	0.207
F test	0	0	0	0
r2_a	0.0945	0.0884	0.239	0.192
F	6.371	5.995	17.42	13.44

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

3.5. Robustness checks

3.5.1. Using lead-lag regression

The paper uses the independent variable CSR to lag one period for regression in Tables A2 and A3 and finds that the regression coefficient of CSR_lag with BTB and DDBTD is significant and negative ($p < 0.01$). Consistent with the previous results, H1 is supported.

Table A3 uses the independent variable CSR to lag one period for regression to verify H2. In the mandatory disclosure group, the regression coefficients of CSR_lag with BTB and DDBTD are negative and insignificant. However, in the voluntary disclosure group, the regression coefficients of CSR_lag with BTB and DDBTD are significant and negative ($p < 0.01$). Consistent with the previous results, H2 is supported.

3.5.2. Changing dependent variable

The effective tax rate of each company does not well reflect the degree of tax aggressiveness. The paper uses the difference between the nominal income tax rate and the effective tax rate (RATE_diff) to reflect the degree of corporate tax aggressiveness. The higher the difference, the higher the degree of corporate tax aggressiveness. The results are reported in Table A3; the regression coefficient of CSR is negative and significantly associated with RATE_diff ($p < 0.01$), which is consistent with previous results, verifying H1.

Since there are tax rebates and tax disputes between companies and tax administration departments that may last for several years, it is not appropriate to use the current effective tax rate to measure corporate tax aggressively. For this reason, Dyreng et al. (2008) proposed to use the average of multiple periods of effective tax rates to characterize corporate tax avoidance. Drawing lessons from this idea, the paper also adopted the five-year average of the “difference between the nominal income tax rate and the effective tax rate” (from year $t-4$ to year t) (LRATE_diff) to measure the degree of tax avoidance of companies. According to Table A3, the regression coefficient of CSR is negative and significantly associated with LRATE_diff ($p < 0.01$), which is also consistent with previous results, verifying H1.

3.5.3. Heckman model

Tables A4 and A5 show the regression results of Heckman’s first stage (model 3). The coefficient symbols of selected variables are consistent with existing literature and all highly significant, indicating that the first stage model is more effective. It can be seen from Tables A4 and A5 that the IMR is significant in the regression, indicating an endogenous problem caused by self-selection bias, and this also shows that Heckman’s two-stage model is more effective for regression. The regression coefficient of CSR is negative and significantly associated with BTM and DDBTD ($p < 0.01$). The result is consistent with correlation and univariate analyses, verifying H1.

Next, in the mandatory group, the CSR coefficient is negative and insignificant with BTM and DDBTD. However, in the voluntary group, the regression coefficient of CSR is significantly negative ($p < 0.01$) with BTM and DDBTD, which is consistent with previous results, verifying H2. These various robustness checks indicate the overall reliability of the regression results.

4. DISCUSSION

The findings testify that firms that engage in more CSR activities are less likely to be tax aggressive regardless of which regulatory regime they operate in, whether mandatory or voluntary. In general, the results of the study give reason to confirm that the corporate culture theory reigns supreme in Chinese institutional settings.

The paper’s findings are on par with those of Kuo (2023), Lanis and Richardson (2015), Ling and Liu (2023), and Raithatha and Shaw (2022) and run counter Abid and Dammak (2022), Col and Patel (2019), and Özbay et al. (2023). Such divergent results indicate the partial incomparability of the research design of these studies, as well as the influence of existing institutional factors in different institutions and the presence of the so-called institutional complementarities (Pasko, 2022). This warrants further research to be jurisdiction-wise focused.

The outcomes can be interpreted in line with the theory of corporate culture, which stands for the inclusion of tax avoidance in CSR activity. The rationale is the following. A company conducts CSR for the benefit of all stakeholders, and this list already includes the government. Thus, aggressive tax avoidance cannot be concomitantly combined with CSR. Therefore, corporate culture influences the decision to reduce tax aggressiveness due to greater involvement in CSR. Hence, this study contributes to considering tax avoidance as a part of CSR and not as a separate non-CSR element of companies’ activities.

CONCLUSION

This paper explores the relation between corporate social responsibility and tax avoidance on the background of mandatory vs. voluntary regulatory regimes in Chinese institutional settings. The following conclusions could be drawn from the regression analysis, followed by robustness tests. Overall, notwithstanding the regulatory regime, the findings indicate that when the level of CSR is high, the level of tax aggressiveness is low. The results imply that firms that engage in more CSR activities are less likely to be tax aggressive; thus, this gives credence to corporate culture theory instead of risk management theory. Moreover, the paper testifies that the willingness of CSR disclosures affects the correlation between CSR and tax aggressiveness. Increasing CSR activities will reduce tax aggressiveness for voluntary disclosure while increasing CSR activities have no noticeable impact on tax aggressiveness for mandatory disclosure. This means that voluntary disclosure has strong rent-seeking motives, that is, rent-seeking to local governments by actively disclosing high-quality information to obtain the government's relaxation of tax enforcement, thereby implementing more radical tax avoidance behaviors. However, companies that are required to make mandatory disclosures do not have a clear willingness to improve the quality of CSR to obtain tax avoidance benefits. In the voluntary disclosure group, large and loss in last year firms may have more motivation to be tax aggressive. Furthermore, the paper finds that pollution indicators have little effect on CSR and tax aggressiveness.

AUTHOR CONTRIBUTIONS

Conceptualization: Oleh Pasko, Alvina Oriekhova.

Data curation: Li Zhang.

Formal analysis: Li Zhang, Mykola Hordiyenko.

Investigation: Li Zhang, Alvina Oriekhova, Mykola Hordiyenko, Yarmila Tkal.

Methodology: Oleh Pasko, Li Zhang, Mykola Hordiyenko.

Project administration: Oleh Pasko.

Supervision: Oleh Pasko, Li Zhang.

Validation: Alvina Oriekhova, Mykola Hordiyenko, Yarmila Tkal.

Visualization: Li Zhang, Alvina Oriekhova, Yarmila Tkal.

Writing – original draft: Oleh Pasko, Li Zhang.

Writing – review & editing: Oleh Pasko, Li Zhang, Alvina Oriekhova, Mykola Hordiyenko, Yarmila Tkal.

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APPENDIX A

Table A1. Pearson correlation matrix

	BTD	DDBTD	CSRH	SIZE	LEV	ROA	MB	GROSSM~N	PPE	INTANG	INV	CASH	AGE	SHRCR	ZINDEX	INDEP	BOARD	LOSS
BTD	1																	
DDBTD	0.880***	1																
CSRH	-0.032***	-0.035***	1															
SIZE	0.021*	0.027**	0.262***	1														
LEV	-0.125***	-0.100***	0.037***	0.566***	1													
ROA	0.276***	0.222***	0.281***	-0.066***	-0.356***	1												
MB	0.079***	0.040***	-0.00500	-0.362***	-0.341***	0.337***	1											
GROSSMARGIN	0.054***	0.021*	0.139***	-0.148***	-0.415***	0.439***	0.288***	1										
PPE	0.031**	0.066***	-0.054***	-0.0200	0.00500	-0.071***	-0.078***	-0.165***	1									
INTANG	-0.033***	-0.022*	-0.025**	-0.031**	-0.065***	-0.00800	0.0200	0.075***	0.115***	1								
INV	-0.110***	-0.098***	0.133***	0.191***	0.386***	-0.145***	-0.170***	-0.095***	-0.258***	-0.203***	1							
CASH	0.00900	-0.00300	0.091***	-0.309***	-0.448***	0.249***	0.238***	0.290***	-0.279***	-0.095***	-0.219***	1						
AGE	0.061***	0.058***	-0.026**	0.280***	0.257***	-0.123***	-0.087***	-0.069***	-0.00800	0.00100	0.090***	-0.197***	1					
SHRCR	-0.054***	-0.039***	0.092***	0.063***	0.052***	0.070***	-0.00100	-0.037***	0.021*	-0.034***	0.107***	0.053***	-0.087***	1				
ZINDEX	-0.032***	-0.030**	0.0170	0.052***	0.112***	-0.075***	-0.040***	-0.095***	-0.00200	-0.047***	0.099***	-0.045***	0.060***	0.288***	1			
INDEP	0.0110	-0.00300	0.00700	0.0180	0.0190	-0.028**	0.027**	0.00400	-0.0110	-0.035***	-0.0150	-0.022*	0.026**	0.028**	-0.024**	1		
BOARD	-0.030**	-0.0110	0.105***	0.193***	0.104***	0.00100	-0.107***	-0.027**	0.084***	0.035***	0.00900	-0.022*	0.037***	-0.050***	0.0160	-0.518***	1	
LOSS	0.032**	0.025**	-0.112***	-0.026**	0.079***	-0.148***	0.0100	-0.072***	0.041***	0.028**	-0.0120	-0.063***	0.061***	-0.066***	0.0100	0.024*	-0.0120	1

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A2. Robustness regression results

VARIABLES	(1)	(2)	(3)	(4)
	BTD	DDBTD	RATE_diff	LRATE_diff
CSR			-0.001*** (-7.02)	-0.000*** (-3.95)
CSR_lag	-0.000*** (-5.52)	-0.000*** (-4.24)		
SIZE	0.002*** (4.86)	0.002*** (3.71)	0.010*** (5.88)	0.009*** (9.34)
LEV	-0.019*** (-7.59)	-0.018*** (-7.07)	-0.079*** (-8.23)	-0.065*** (-10.87)
ROA	0.202*** (23.06)	0.168*** (19.10)	0.716*** (20.62)	0.297*** (13.84)
MB	-0.000 (-0.39)	-0.000 (-1.63)	-0.001 (-0.86)	0.000 (1.13)
GROSSMARGIN	-0.015*** (-5.51)	-0.016*** (-5.59)	-0.032*** (-3.04)	-0.006 (-0.85)
PPE	0.009*** (3.07)	0.016*** (5.46)	0.012 (0.99)	-0.007 (-0.98)
INTANG	-0.034*** (-4.76)	-0.023*** (-3.23)	-0.060** (-2.14)	-0.028 (-1.61)
INV	-0.006* (-1.69)	-0.003 (-0.73)	-0.014 (-1.07)	-0.015* (-1.86)
CASH	-0.014*** (-4.23)	-0.010*** (-3.09)	-0.036*** (-3.01)	-0.044*** (-5.95)
AGE	0.003*** (3.55)	0.002** (2.50)	0.005 (1.38)	0.003 (1.25)
SHRCR	-0.000*** (-3.99)	-0.000** (-2.41)	-0.000 (-0.48)	0.000 (0.50)
ZINDEX	-0.000 (-0.77)	-0.000 (-1.48)	-0.000*** (-2.66)	-0.000*** (-3.74)
INDEP	0.001 (0.18)	0.001 (0.17)	-0.087*** (-3.23)	-0.031* (-1.85)
BOARD	-0.000* (-1.67)	-0.000 (-0.28)	-0.003*** (-3.05)	-0.001* (-1.84)
LOSS	0.006*** (4.03)	0.004*** (2.77)	-0.017*** (-2.97)	-0.021*** (-5.93)
INDUSTRY	YES	YES	YES	YES
YEAR	YES	YES	YES	YES
Constant	0.009 (0.65)	0.000 (0.02)	-0.001 (-0.02)	-0.043 (-1.38)
Observations	5,429	5,429	6,668	6,668
R-squared	0.211	0.175	0.159	0.186
F test	0	0	0	0
r2_a	0.198	0.161	0.147	0.174
F	15.89	12.54	13.27	15.98

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

Table A3. Robustness group regression results

VARIABLES	(1)	(2)	(3)	(4)
	BTD	DDBTD	BTD	DDBTD
	CSR_MAN ==1		CSR_MAN ==0	
CSR_lag	-0.000 (-1.60)	-0.000 (-0.44)	-0.000*** (-4.90)	-0.000*** (-3.59)
SIZE	-0.002 (-1.10)	-0.001 (-0.59)	0.002*** (4.56)	0.002*** (3.76)
LEV	-0.040*** (-3.13)	-0.032*** (-2.70)	-0.016*** (-6.40)	-0.016*** (-6.23)
ROA	0.245*** (7.67)	0.177*** (5.86)	0.203*** (21.29)	0.167*** (17.26)
MB	-0.003** (-2.36)	0.000 (0.14)	0.000 (0.46)	-0.000 (-1.26)
GROSSMARGIN	-0.032** (-2.53)	-0.035*** (-2.93)	-0.014*** (-4.80)	-0.013*** (-4.60)
PPE	0.000 (0.03)	0.037*** (2.96)	0.009*** (2.80)	0.014*** (4.57)
INTANG	-0.111*** (-3.55)	-0.071** (-2.42)	-0.030*** (-4.03)	-0.023*** (-2.97)
INV	-0.053*** (-2.82)	-0.007 (-0.40)	-0.003 (-0.88)	-0.002 (-0.58)
CASH	-0.086*** (-5.26)	-0.039** (-2.53)	-0.010*** (-2.92)	-0.009*** (-2.62)
AGE	0.007 (1.60)	0.003 (0.78)	0.003*** (3.12)	0.002** (2.47)
SHRCR	-0.000 (-1.04)	-0.000 (-0.80)	-0.000*** (-4.51)	-0.000*** (-2.80)
ZINDEX	0.000 (0.17)	-0.000 (-0.05)	-0.000 (-0.77)	-0.000 (-1.50)
INDEP	0.060** (2.29)	0.032 (1.30)	-0.003 (-0.43)	-0.003 (-0.35)
BOARD	0.001 (0.63)	0.001* (1.65)	-0.001* (-1.87)	-0.000 (-0.97)
LOSS	0.011 (1.18)	0.010 (1.16)	0.006*** (3.80)	0.004*** (2.60)
INDUSTRY	YES	YES	YES	YES
YEAR	YES	YES	YES	YES
Constant	0.123** (2.26)	0.055 (1.06)	0.005 (0.36)	-0.004 (-0.24)
Observations	471	471	4,958	4,958
R-squared	0.430	0.402	0.205	0.166
F test	0	0	0	0
r2_a	0.345	0.313	0.190	0.151
F	5.058	4.510	13.92	10.78

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

Table A4. Heckman's model regression results

VARIABLES	(1)	(2)	(3)
	CSRREPORT	BTD	DDBTD
CSR		-0.000*** (-8.01)	-0.000*** (-6.30)
SIZE	-0.012*** (-3.09)	0.002*** (5.08)	0.002*** (4.28)
LEV	-0.181*** (-7.17)	-0.010** (-2.23)	-0.005 (-1.16)
ROA	1.037*** (18.02)	0.158*** (7.07)	0.113*** (4.96)
MB	-0.005*** (-4.03)	-0.000 (-0.06)	-0.000 (-0.96)
GROSSMARGIN		-0.013*** (-5.20)	-0.013*** (-5.32)
PPE		0.008*** (3.08)	0.016*** (5.92)
INTANG		-0.026*** (-4.06)	-0.017*** (-2.64)
INV		-0.006* (-1.88)	-0.002 (-0.66)
CASH		-0.012*** (-4.52)	-0.007*** (-2.70)
AGE	-0.182*** (-15.17)	0.011*** (2.90)	0.012*** (3.29)
SHRCR	-0.002*** (-8.01)	0.000 (0.10)	0.000 (1.35)
ZINDEX	-0.000** (-2.16)	0.000 (0.76)	0.000 (0.77)
INDEP	-0.287*** (-3.59)	0.010 (1.20)	0.011 (1.35)
BOARD	-0.006** (-2.11)	-0.000 (-0.48)	0.000 (0.99)
LOSS	-0.051*** (-3.21)	0.009*** (4.98)	0.008*** (4.32)
DUALITY	0.026*** (2.87)		
IMR		-0.075* (-1.85)	-0.105** (-2.56)
INDUSTRY	YES	YES	YES
YEAR	YES	YES	YES
Constant	1.266*** (11.43)	0.021* (1.66)	0.016 (1.29)
Observations	14,771	6,668	6,668
R-squared	0.129	0.195	0.161
F test	0	0	0
r2_a	0.123	0.183	0.149
F	24.09	16.76	13.29

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

Table A5. Heckman's model group regression results

VARIABLES	(1)	(2)	(3)	(4)
	BTD	DDBTD	BTD	DDBTD
	CSR_MAN==1		CSR_MAN==0	
CSR	-0.000 (-1.32)	-0.000 (-0.42)	-0.000*** (-7.72)	-0.000*** (-5.88)
SIZE	-0.003 (-1.33)	-0.003 (-1.28)	0.003*** (4.85)	0.002*** (4.31)
LEV	-0.057*** (-2.88)	-0.043** (-2.31)	-0.006 (-1.26)	-0.002 (-0.54)
ROA	0.369*** (3.55)	0.268*** (2.73)	0.151*** (6.51)	0.108*** (4.51)
MB	-0.004*** (-3.18)	-0.001 (-0.59)	0.000 (0.87)	-0.000 (-0.48)
GROSSMARGIN	-0.027** (-2.30)	-0.035*** (-3.19)	-0.011*** (-4.51)	-0.011*** (-4.42)
PPE	0.002 (0.21)	0.030*** (2.63)	0.008*** (2.82)	0.014*** (5.10)
INTANG	-0.112*** (-3.94)	-0.081*** (-2.98)	-0.023*** (-3.48)	-0.018** (-2.55)
INV	-0.037** (-2.39)	-0.008 (-0.52)	-0.004 (-1.17)	-0.002 (-0.50)
CASH	-0.085*** (-5.67)	-0.037*** (-2.65)	-0.009*** (-3.28)	-0.007** (-2.39)
AGE	-0.015 (-0.80)	-0.016 (-0.88)	0.012*** (3.14)	0.014*** (3.48)
SHRCR	-0.000 (-1.34)	-0.000 (-1.27)	0.000 (0.19)	0.000 (1.40)
ZINDEX	-0.000 (-0.38)	-0.000 (-0.65)	0.000 (0.95)	0.000 (0.92)
INDEP	-0.001 (-0.02)	-0.011 (-0.35)	0.009 (1.01)	0.010 (1.14)
BOARD	-0.001 (-0.74)	0.000 (0.23)	-0.000 (-0.55)	0.000 (0.51)
LOSS	0.001 (0.10)	0.002 (0.23)	0.009*** (4.95)	0.008*** (4.25)
IMR	0.235 (1.23)	0.196 (1.08)	-0.092** (-2.21)	-0.118*** (-2.76)
INDUSTRY	YES	YES	YES	YES
YEAR	YES	YES	YES	YES
Constant	0.045 (0.94)	0.032 (0.71)	0.022* (1.65)	0.015 (1.11)
Observations	556	556	6,112	6,112
R-squared	0.414	0.382	0.191	0.157
F test	0	0	0	0
r ² _a	0.330	0.295	0.179	0.143
F	4.966	4.359	14.99	11.75

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