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Mandatory Corporate Social Responsibility (CSR) Reporting and Financial Reporting Quality: Evidence from a Quasi-Natural Experiment

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Abstract This study examines the impact of mandatory Corporate Social Responsibility (CSR) reporting on firms' financial reporting quality using a quasi-natural experiment in China that mandates a subset of firms to report their CSR activities starting in 2008. We find that mandatory CSR disclosure firms constrain earnings management after the policy. The result is robust to a battery of sensitivity tests and more prominent for firms with lower analyst coverage. Further analyses reveal that upward earnings management by mandatory disclosure firms is more likely to be caught after the policy. The findings suggest that mandatory CSR disclosure mitigates information asymmetry by improving financial reporting quality.

Keywords Corporate Social Responsibility · CSR · Earnings management · Information asymmetry

JEL Classification G14 · G38 · M14 · M41

Introduction

Corporate Social Responsibility (CSR) reporting is an important practice in the business world. According to the 2011 Klynveld Peat Marwick Goerdeler (KPMG) survey, companies around the world have shown growing interest in reporting their practices on key societal issues over the past decade (KPMG 2011). Because of the rapid growth of CSR reporting, academic interest has emerged. One naturally raised research question is: What are the economic consequences of CSR reporting? Specifically, what are the impacts of CSR reports on managers' behavior? Does CSR disclosure help improve the quality of firms' financial reporting? Most previous research examines the relationship between CSR and financial reporting quality using firms with voluntary CSR reports, which suffers from severe endogeneity problem. This study explores a quasi-natural experiment in China, where a subset of listed firms are mandated to report their CSR activities, in order to mitigate the endogeneity problem in the studies that investigate the effect of CSR reporting on earnings management and financial reporting quality.

Earnings management is one of the central issues for both the accounting academics and investing communities because it masks firms' true financial performance and reduces resource allocation efficiency. Thus, investigating the impact of CSR disclosure on earnings management improves our understanding of the role of CSR disclosure on capital markets. Several studies have examined the relationship between voluntary CSR disclosure and earnings management and yielded inconsistent results (e.g., Sun et al. 2010; Yip et al. 2011). One potential problem with such research is that both voluntary CSR reporting and earnings management are self-chosen by the managers. Hence, such research is severely plagued by the endogeneity problem since managers with different motives for financial reporting may disclose CSR information strategically (Barth et al. 1997; Li et al. 1997; Li and McConomy 1999; Hughes et al. 2000; Dhaliwal et al. 2011; Al-Tuwaijri et al. 2004). For instance, managers may use voluntary CSR reporting either to signal their high-quality financial reporting, leading to a negative relation between

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CSR and earnings management, or to camouflage their earnings-management activities, resulting in a seemingly positive association between CSR and earnings management (Hemingway and Maclagan 2004).

In this paper, we exploit a quasi-natural experiment in China that allows us to better identify the impacts of CSR disclosure on earnings management with less endogeneity concern. In December 2008, the Shanghai and Shenzhen stock exchanges mandated a subset of Chinese listed firms to issue CSR reports along with their annual reports. This change in the CSR reporting requirement provides us with a unique setting with an exogenous shock to the subset of firms that are required to report their CSR activities. The regulation enables us to compare the change in earnings management in the treatment group (mandatory CSR reporting firms) with those in the control group (non-CSR disclosure firms[1]) surrounding the implementation of the policy. The exogenous mandatory CSR shock, together with the difference-in-differences analysis, allows us to better deal with the potential endogeneity issue and provide more insightful evidence on how CSR disclosure affects firms' financial reporting behavior.

Our sample comprises 1888 firms (11,619 firm-years) listed on China's stock exchanges between 2003 and 2012. During the period 2008–2012, 296 firms (1355 firm-years) were required to report their CSR activities along with annual reports every year.[2] Using the absolute value of discretionary accruals as the proxy for earnings management, we examine the impact of mandatory CSR reporting on earnings management by performing a difference-in-differences analysis. We find that the absolute discretionary accruals of the mandatory CSR reporting firms are significantly lower than those of the non-CSR reporting firms after the disclosure regulation. Our results are robust after controlling for firm fixed effect, which suggests that the effect of mandatory CSR reporting on earnings management is unlikely due to the differences in firm characteristics between mandatory disclosure firms and the control group. Our findings are also robust to the propensity-score-matching approach, to the placebo test, to the use of alternative control groups, and to the alternative measure of earnings management.

We next explore the possible mechanisms through which CSR reporting affects financial reporting quality. CSR information helps investors to assess the financial positions and future prospects of the firm (e.g., Al-Tuwaijri et al. 2004; Hung et al. 2013; Dhaliwal et al. 2012). In addition, CSR reporting tends to increase the firms' exposure to public attention. For example, some CSR reports disclose information on customer satisfaction and supplier relations, which might help investors assess the creditability of the financial earnings reported, i.e., whether the increase in sales is supported by improved supplier and customer relations. Other information in the CSR reporting may relate to different aspects of corporate governance, such as investor relations, creditor relations, and employee relations, which may reveal information on the integrity and trustworthiness of the management that helps outside investors to gauge the effectiveness of internal control over financial reporting.

When high-quality financial information is disclosed to the public and more investor and media attentions are drawn toward the firm, any misbehavior of the managers is more likely to be detected and punished. Therefore, the mandatory CSR disclosure tends to reduce information asymmetry and prevent managers from manipulating earnings. Also, the deterring role of CSR reports on earnings management should be more prominent for those firms with severe information asymmetry. Consistent with the arguments, we find that the mandatory disclosure effect is more pronounced among firms with worse information environments, i.e., firms with lower analyst coverage. Further analyses reveal that upward earnings management by mandatory CSR firms is more likely to be caught after the policy. These results together confirm that mandatory CSR reporting reduces information asymmetry between managers and investors (regulators), increases the probability of detection, and therefore deters firms' earnings management activities.

This study contributes to the literature in several ways. First, it sheds light on the impact of CSR reporting on earnings management by exploring the mandatory CSR disclosure setting. The previous literature on the relationship between CSR disclosure and earnings management only focuses on voluntary CSR disclosure and the findings are inconsistent. The problem with the setting of voluntary CSR disclosure is that both voluntary CSR disclosure and earnings management are made endogenously by the managers. We use the mandatory CSR requirement in 2008 as a quasi-natural experiment to mitigate the endogeneity problem, and hence to better isolate the effects of CSR disclosure on earnings management. A recent paper by Hung et al. (2013) also examines the mandatory CSR reporting firms and focuses on the change in information asymmetry surrounding the policy. They find that

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[1] We also use both non-mandatory CSR reporting firms and non-disclosure firms as control group in the robustness test.

[2] From 2008 to 2012, a total of 454 listed firms were mandated to disclose CSR reports. We exclude the mandatory reporting firms in the financial sector and classify a firm as a mandatory CSR reporting firm if the firm is mandated to submit a CSR report every year from 2008 to 2012. We also require that the firms have available information to calculate earnings management proxies and control variables. As a result, we have 296 firms as mandatory CSR reporting firms in our sample.

mandatory CSR reporting firms reduce information asymmetry by increasing CSR-related information disclosure. In other words, Hung et al. (2013) suggest that mandatory CSR reporting mitigates information asymmetry by providing more CSR-related information (the more information effect). In contrast, we suggest that mandatory CSR firms decrease information asymmetry by improving the quality of financial information disclosure (the better information effect). In this sense, our study complements Hung et al. (2013) by revealing an alternative channel (the better information channel) that mandatory CSR disclosure affects information asymmetry, and makes significant contributions relative to Hung et al. (2013) to the literature on the economic consequences of CSR reporting.

Second, this study adds to the literature of determinants of earnings management. We find that mandatory CSR reporting deters firms' earnings-management behavior, which suggests that nonfinancial information disclosure (e.g., CSR reporting) can be additional determinant of financial reporting quality in addition to the ones documented by previous studies. This indicates that increasing nonfinancial disclosure helps to improve financial reporting quality.

Third, this study provides evidence regarding the impact of CSR disclosure on firms' financial reporting quality using Chinese data, which increases the understanding of the economic consequences of CSR disclosure in developing countries. Despite the growth of CSR reporting worldwide, the extant literature primarily focuses on the US, the largest developed country. Cooper and Owen (2007) suggest that CSR reporting is country dependent and that research on CSR disclosure in developing countries is particularly necessary. This study adds to the literature by exploring the relation between CSR reporting and financial reporting quality based on evidence from China, the largest developing country.

Institutional Background, Literature Review, and Hypothesis Development

Institutional Background on China's CSR Reporting

China's economy has been experiencing rapid growth since the "reform and open-door" policy was initiated in 1978. The World Bank Annual Report 2011 reported that China's GDP grew at an average rate of 10.3 % per year in the 1980s, and after 1990 it grew at an average rate of 9.6 % per year. During this fast growth period, many environmental and safety issues have arisen.[3] For example, the

Sanlu Group milk powder scandal in 2008 has raised a great deal of public attention regarding firms' social responsibility practices.[4] Social responsibility and sustainability of the economic development have become concerns of the government, enterprises, and society at large. Therefore, many regulations and guidelines on CSR practices have been launched by the Chinese government, as well as by stock exchanges.

In 2001, the China Securities Regulatory Commission and the State Economic and Trade Commission required companies to take all stakeholders' interests and the welfare, environmental protection, and public interests of the community at stake into account. In late 2005, companies were required to comply with social morality and business morality and to bear social responsibilities.[5] In 2008, the State-Owned Assets Supervision and Administration Commission of the State Council (SASAC) asked central-government-owned enterprises (CSOEs) to establish reporting systems for CSR fulfillment mechanisms and for mandatory CSR information reporting. The SASAC then provided instructions and performance indicators to guide different industries to report CSR issues in China.

For the listed companies, the Shenzhen Stock Exchange (SZSE hereinafter) launched the *Social Responsibility Instructions to Listed Companies* guidelines in September 2006, which encouraged listed companies to prepare CSR reports along with annual reports. The Shanghai Stock Exchange (SHSE hereinafter) also provided two guidelines encouraging all listed companies to disclose nonfinancial information, which is related to economic, social, and environmental aspects.[6] In December 2008, the SHSE and the SZSE issued the *Notice for Better Preparing 2008 Annual Reports* (the *Notice*, hereinafter), which obligated a subset of listed companies to file CSR reports along with their 2008 annual reports. According to the *Notice*, the mandated subset of companies listed on the SZSE is those companies included in the SZSE 100 index, while the three types of firms required by the SHSE for mandatory CSR reporting are companies included in the SHSE Corporate Governance Section Index (CGSI),[7] companies in the financial sector, and companies with shares listed overseas.

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[3] See, for example, Barboza (2007), Martin (2007), Bogdanich (2007).

[4] Fairclough (2008).

[5] On October 27, 2005, the Chinese Government adopted Articles 5 and 17 under "Company Law of the People's Republic of China" in the 18th session of the Standing Committee of the 10th National People's Congress of the People's Republic of China.

[6] *Notice on Strengthening Listed Companies' Social Responsibility* (Shanghai CSR Notice) and *Guidelines on Listed Companies' Environmental Information Disclosure* (Shanghai Environmental Disclosure Guidelines) were issued in May 2008.

[7] The SHSE Corporate Governance Section Index (CGSI) includes 199 SHSE listed firms that were selected by SHSE for their well-established corporate governance in December 19, 2007. As the launching of CGSI coincides with the issuance of the *Notice*, and as

This study utilizes the December 2008 *Notice* as a quasi-natural experiment to examine the earnings management behavior before and after the exogenous shock for both the treatment group (mandatory CSR reporting firms) and control group (non-CSR reporting firms). Because the treatment group tends to include larger firms that compose the indices, this setting can only be considered as a quasi-natural experiment. However, since larger firms usually have less severe information asymmetry problems compared with smaller firms (Hasbrouck 1991), we may underestimate the impact of mandatory CSR reporting on earnings management. In other words, the bias of the nonrandom selection of firms should work against our possible findings.

Some firms may have voluntarily disclosed CSR information in their annual reports before the regulation. However, the CSR information in their annual reports is generally less comprehensive and covers CSR activities in less depth compared with the information in the mandatory standalone CSR reports (Dhaliwal et al. 2011). Furthermore, the voluntary disclosure of CSR information may be driven by firms' strategic considerations, and hence may result in severe endogeneity problems. Hence, we remove those voluntary disclosure firms from our sample and use only nondisclosure firms as the control group. We find similar results in the robustness test with those voluntary disclosure firms included in the control group.

Related Literature and Hypothesis Development

The extant literature primarily focuses on the relationship between CSR *performance* and earnings management. Prior et al. (2008) examine whether firms engage in CSR activities strategically to disguise earnings management and find a positive relationship between earnings management and CSR performance for regulated firms, but no statistically significant result for unregulated firms. Kim et al. (2012), on the other hand, investigate managers' incentive to do the right things as motivation for CSR activities and find that CSR firms are less likely to engage in earnings management. There are also a few studies that find no consistent evidence on the relationship between firms' CSR performance and earnings management (Trébucq and Russ 2005; Chih et al. 2008).

Unlike the extant studies that focus on the association between CSR *performance* and financial reporting quality, this study examines how firms' CSR *disclosure* action affects a firm's financial reporting quality. It is important to distinguish between CSR performance and CSR disclosure

(Richardson et al. 1999). Also, firms with superior CSR performance do not necessarily disclose more CSR-related information (Li et al. 1997; Richardson et al. 1999; Al-Tuwaijri et al. 2004). Hence, whether and how CSR disclosure affects financial reporting quality remain interesting empirical questions.

Several studies have investigated the endogenous relationship between firms' incentives to report CSR activities and earnings management behavior and have yielded inconsistent results. Sun et al. (2010) examine the relationship between corporate environmental disclosure (CED) and the earnings management of 245 UK nonfinancial companies and find no significant relationship between CED and earnings management. Yip et al. (2011) suggest that the relationship between CSR reporting and earnings management is context specific, and document a negative correlation in the oil and gas industry and a positive one in the food industry. Given that voluntary CSR reporting and earnings management are both endogenously determined by the managers, the relationship between the two could be positive, negative, or neutral depending on different incentives of CSR reporting and financial reporting. For instance, well-governed firms may have incentives to reveal their type by voluntarily disclosing more CSR information. On the other hand, poorly governed firms may also engage in CSR disclosure to camouflage their self-serving activities.

This study is the first to examine the relationship between mandatory CSR reporting and earnings management. With the exogenous shock of mandatory CSR reporting, we could investigate the relationship between CSR disclosure and earnings management without the contamination of self-selection bias. In this subsection, we review the related literature that provides the theoretical arguments and empirical evidences motivating our hypothesis on the relationship between CSR reporting and earnings management behavior.

Prior studies have shown that CSR engagement can boost sales, lower financing and operating costs, and reduce the regulatory and litigation costs encountered by a firm (Richardson et al. 1999; Luo and Bhattacharya 2006; Goss and Roberts 2011; Lev et al. 2010; Dhaliwal et al. 2011; Blacconiere and Patten 1994). Furthermore, firms' CSR reports may provide information on customer satisfaction and supplier relations. Hence, investors are able to utilize this information to evaluate the creditability of the financial earnings reported. For example, whether the better sales number reported arises from improved customer satisfaction or from more reliable supplier relation. Hence, information on CSR activities is performance relevant and can help investors and analysts to assess a firm's current financial situation and future growth prospects (Al-Tuwaijri et al. 2004; Dhaliwal et al. 2012).

Footnote 7 continued

cross-listed firms may be subject to stricter regulation, we exclude those SHSE listed firms in the robustness test and our main findings remain valid.

The extant studies suggest that investors do use CSR information for equity valuation (Cormier and Magnan 1997; Li and McConomy 1999; Hassel et al. 2005; Clarkson et al. 2004). Anderson and Frankel (1980), for example, find that firms with social disclosure perform better than nondisclosing firms in stock markets. They interpret the result as a confirmation of the information content of the social disclosure. Servaes and Tamayo (2013) also suggest that CSR does increase the market value of firms with high customer awareness.

With performance-relevant information, the mandatory CSR disclosure is likely to reduce information asymmetry between managers and investors, and empirical evidences confirm this argument. For example, Dhaliwal et al. (2012) find that CSR disclosure helps reduce information asymmetry, as measured by analyst forecast error. In addition, Dhaliwal et al. (2011) find that CSR reporting can attract more institutional investors and financial analysts, which in turn further reduces information asymmetry between insiders and outside investors.

In addition, investment in CSR activities can serve as a signal of managers' honesty if there is a positive relationship between a manager's utility from CSR engagement and his or her disutility from earnings management behavior (Elfenbein et al. 2012). Different aspects of corporate governance issues are specified in the CSR reports, such as shareholder relations, creditor relations, and employee relations. This detailed information on corporate governance can reveal information on the integrity and trustworthiness of the management that helps outside investors to gauge the effectiveness of internal control over financial reporting. Kim et al. (2012) finding that socially responsible firms do exhibit high earnings quality suggests that CSR information can reveal manager types and hence help investors better assess financial reporting quality, further lowering the information asymmetry between management and outside investors.

Management may have various incentives to manage earnings,[8] e.g., altering the firms' performance from accurately reflecting the underlying economics in order to boost compensation (via exercising stock options or stock sales after managing earnings), to secure their positions, to avoid violating debt covenants, or to reduce political costs.[9] However, managers are not able to manipulate

earnings if the firm is completely transparent (Dye 1988; Trueman and Titman 1988; Richardson 2000). In other words, information asymmetry serves as a necessary condition of earnings management. If shareholders have access to the same information as managers, a firm's managers cannot alter the firm's earnings without being detected by stakeholders. Hence, with the increasing threat of discovery when information asymmetry is reduced, managers are less likely to engage in earnings management.

In summary, CSR reporting provides performance-relevant information. CSR information also helps reveal manager types and attracts stakeholders' attention on the scrutiny of the firms' financial reports. Both the theoretical argument and the empirical evidences suggest that mandatory CSR disclosure reduces information asymmetry between managers and investors. Since the reduction in information asymmetry tends to deter managers' earnings-management activities, we expect a negative association between mandatory CSR reporting and earnings management due to improved information environment in publicly listed firms. Therefore, we have the following hypothesis.

Hypothesis: Firms with mandatory CSR reporting requirement are less likely to engage in earnings management.

Data

Sample

To construct our sample, we start with all Chinese A-share[10] listed companies during the period of 2003–2012 from the China Securities Market and Accounting Research (CSMAR) database. Our sample begins with 2003 because Chinese listed companies did not disclose information on their ultimate controlling shareholders until 2003. The initial sample consists of 17,185 firm-year observations. We then drop 242 observations from the financial sector because disclosure requirements and

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[8] See Healy and Wahlen (1999) and Richardson (2000) for the definition of earnings management.

[9] Burns and Kedia (2006), Bergstresser and Philippon (2006), and Efendi et al. (2007) conclude that managers manage earnings to boost their compensation by shifting earnings to raise stock prices during or before stock option exercising periods. Beneish and Vargus (2002) and Bergstresser and Philippon (2006) show that managers sell more stocks when firms have abnormally high accruals. DeFond and Park (1997), Ahmed and Lobo (2006), and Mergenthaler et al. (2009) find

Footnote 9 continued

that managers' job security is an incentive for earnings management. DeFond and Jiambalvo (1994) and Sweeney (1994) show that managers have incentives to manage earnings to avoid violating debt covenants and gain accounting flexibility. Watts and Zimmerman (1978) and Bushman and Piotroski (2006) report that political costs serve as one factor in managers' earnings-management decisions. See Fudenberg and Tirole (1995) and Hermalin and Weisbach (2007) for theoretical perspectives on these issues.

[10] Currently, there are two classes of shares issued by Chinese firms that are listed and traded on the Shanghai Stock Exchange (SHSE) and Shenzhen Stock Exchange (SZSE): A- and B-shares. A-shares are domestic shares that are restricted to domestic investors and Qualified Foreign Institutional Investors (QFII). B-shares are foreign shares that until February 2001 were only available to foreign investors.

accounting rules are significantly different for the regulated industry. We further exclude 3053 observations due to missing information for earnings management proxies and control variables. We also exclude voluntary disclosure firms (2271 observations) and only examine the difference between mandatory disclosure firms and nondisclosure firms so as to better isolate the mandatory disclosure effect. Our final sample includes 11,619 observations representing 1888 unique firms. Among them, there are 296 firms mandated by the Shanghai Stock Exchange (SHSE) and Shenzhen Stock Exchange (SZSE) to disclose CSR reports since 2008,[11] and 1592 firms as the non-CSR reporting firms.

The Difference-in-Differences Estimation Model

To better isolate the impact of mandatory CSR disclosure on earnings management, we employ a difference-in-differences specification (DiD) by comparing the changes in earnings management surrounding the issuance of the mandatory CSR disclosure regulation in mandatory CSR firms with those in nondisclosure firms. The DiD approach can remove other concurrent macroeconomic shocks that may affect earnings management but are unrelated to the 2008 regulation. Specifically, we estimate the following model to test our hypothesis:

$$|DA_{it}| = \beta_0 + \beta_1 MD_{it} * POST_{it} + \beta_2 MD_{it} + \beta_3 POST_{it} + \text{Control Variables} + \varepsilon_{it}$$
(1)

where $|DA_{it}|$ is the magnitude of earnings management, measured by the absolute value of discretionary accruals, which is the difference between the total accruals and the fitted normal accruals obtained from two modified Jones (1991) models. Specifically, $|DA1|$ is the residuals obtained from the performance-adjusted Jones model (Kothari et al. 2005), and $|DA2|$ is the residuals obtained from the performance- and growth-adjusted Jones model (Raman and Shahrur 2008). The modified Jones models are estimated cross-sectionally for each industry-year group. We exclude the industry-year groups with observations <10 to ensure reliable estimations. Because both positive and negative values of discretionary accruals represent earnings management (Klein 2002; Bergstresser and Philippon 2006), we use the absolute value of discretionary accruals to capture the magnitude of a firm's earnings management.

MD is an indicator equal to 1 for the 296 firms that are mandated to disclose CSR reports and 0 for the remaining 1592 listed firms in our sample that do not disclose CSR reports during the sample period. Mandatory CSR disclosure firms constitute the treatment sample and nondisclosure firms serve as the control sample. There are 363 firms that voluntarily disclose their CSR reports during the sample period. We exclude those firms in the main test and include them in the control group in the robustness check. The coefficient on MD represents any innate difference in the magnitude of earnings management between mandatory CSR reporting firms and non-CSR reporting firms before the 2008 *Notice*.

The indicator variable $POST$ denotes the time periods after the 2008 *Notice*. $POST$ equals 1 for the years 2008–2012 (postmandatory disclosure period) and 0 for the years 2003–2007 (premandatory disclosure period) because the mandatory CSR report along with the annual reports for fiscal year 2008 became public after the 2008 *Notice*. The coefficient on $POST$ reflects the change in earnings management for non-CSR reporting firms surrounding the 2008 *Notice*.

$MD*POST$ is the interacting term between $POST$ and MD, which is our variable of interest. The coefficient on the interaction variable (β_1) captures the incremental change in the absolute discretionary accruals surrounding the reform year of firms that are mandated to report CSR activities relative to the change for firms that do not disclose CSR reports. A negative (positive) β_1 suggests that mandatory CSR disclosure tends to decrease (increase) the absolute value of discretionary accruals, i.e., to enhance (deteriorate) earnings quality.

Following previous studies (e.g., Kothari et al. 2005; Zang 2012), we include firm characteristics that have been shown to affect a firm's discretionary accruals: *Asset* is the natural logarithm of the firm's total assets at the fiscal year end, *Lev* is the ratio of total liabilities to total assets at the fiscal year end, *ROA* is the net income during the fiscal year divided by total assets at the fiscal year end, and *MB* is constructed as the market value of equity divided by book value of equity at the fiscal year end.

Bergstresser and Philippon (2006) and Chen et al. (2011) show that ownership structure and corporate governance may impact the firms' discretionary accruals, so we also include the following variables in Model (1) estimation: *MSH* is the percentage of shares held by the management, *Indepen* is the proportion of independent directors on the board, and *Ceodual* is an indicator that equals 1 if the Chair of the Board also serves as the CEO and 0 otherwise. We also include state ownership because Chen et al. (2011) suggest that state-owned firms are less likely to engage in earnings manipulation. *SOE* is an indicator variable that equals 1 for state-owned enterprises

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[11] The 2008 *Notice* mandates 454 listed firms to disclose CSR reports. We exclude the mandatory reporting firms from the financial sector and classify a firm as non-mandatory CSR reporting firm if the firm is mandated to disclose CSR report in 2008 but not in the subsequent years. As a result, we classify 296 firms as mandatory CSR reporting firms with available information to calculate earnings management and control variables.

and 0 otherwise. We further include audit quality (*Big4*) because high-quality auditing tends to constrain firms' earnings management. *Big4* is an indicator that equals 1 if the firm is audited by an international Big-4 audit firm and 0 otherwise.

In alternative models, we add firm fixed effect to control for the effects of time-invariant firm characteristics on earnings quality, and we also include the year effects to remove any aggregate time effect. Finally, we cluster standard errors at both the firm and year levels to alleviate the potential cross-sectional and time-series dependence issues (Petersen 2009).

Summary Statistics

Table 1 Panel A reports the summary statistics on the variables used in our analyses. All continuous variables are winsorized at the top and bottom 1 % of their distributions. Among the full sample, 22.6 % of firm-year observations are mandated to disclose their CSR activities. The two discretionary accruals measures are similar in terms of magnitude as well as distribution. The mean value of absolute discretionary accruals is 6 % of lagged total assets, which is similar to the level reported by Chen et al. (2011).

For the control variables, the mean values of the natural logarithm of total assets (*Asset*), *ROA*, market-to-book value (*MB*), and leverage are 21.5, 0.03, 3.52, and 0.51, respectively. On average, 8 % of our firms are audited by the Big-4 accounting firms. Management holds about 2 % of the shares outstanding. The average percentage of independent directors on the board is 35.7 %. We also find that 16.4 % of our sample firms have a CEO who also serves as the Chair of the board (*Ceodual*), and 60.9 % of our sample firms are state-owned enterprises (*SOE*). Overall, our sample firms' summary statistics are consistent with Hung et al. (2013), representing the full A shares market.

Panel B of Table 1 presents descriptive statistics for mandatory disclosure firms listed in Shanghai Stock Exchange (SHSE) and Shenzhen Stock Exchange (SZSE), respectively. It also shows the univariate analysis on the mean and median differences for mandatory disclosure firms between SHSE and SZSE. The results shown in Panel B suggest that the mandated firms in SHSE tend to have lower earnings management, less asset, lower profitability, and higher leverage, compared to mandated firms in SZSE.[12]

Panel C of Table 1 reports the descriptive statistics on the disclosure contents in CSR reports. CSR contents data are also obtained from the China Securities Market and Accounting Research (CSMAR) database. CSMAR classifies the contents of CSR disclosure into ten categories, i.e., Shareholder Relations, Creditor Relations, Employee Relations, Supplier Relations, Customer Relations, Environmental Protection, Public Relations and Charities, CSR Policies, Work Conditions, and Deficiency in CSR performance. We define dummy variables for each category based on whether the firm's CSR report discloses information falling in that category. If it does, the respective dummy variable equals 1 and 0 otherwise. *CSRscore* is the sum of the ten dummy variables. Panel C of Table 1 shows that *CSRscore* has an average score of 4 and a standard deviation of 3.8. This large variation on *CSRscore* motivates us to analyze the impact of CSR disclosure level on earnings management in "The Impact of the Disclosure Quality of CSR Reports on Earnings Management" section.

Panel D of Table 1 reports univariate analysis for mandatory disclosure firms partitioned by the median *CSRscore*. We first stratify mandatory CSR firms into two groups according to the CSR score and then compare the earnings management of high CSR score firms with that of low CSR score firms. The results in Panel D of Table 1 show that within mandatory CSR firms, high CSR score firms tend to have smaller earnings management measured by the median absolute discretionary accruals relative to low CSR score firms, although only marginally significant.

Panel E of Table 1 shows the Pearson correlation among the variables. The two measures of absolute discretionary accruals (|*DA1*| and |*DA2*|) are highly correlated, with a correlation coefficient of 0.97. The negative correlations between *MD* and |*DA*| measures indicate that mandatory reporting firms tend to have smaller absolute discretionary accruals throughout the sample period of 2003–2012. Mandatory reporting firms are also more likely to be a state-owned enterprise (*SOE*),[13] have a larger size, achieve better profitability, have higher leverage, grant fewer stocks to management, and be audited by an international Big-4 audit firm. These results suggest that the choice of the mandatory reporting firms is not random, which is the reason that the setting can only be considered as a quasi-natural experiment. To alleviate this concern, we include firm fixed effects to control for the effect of time-invariant firm characteristics on earnings management.

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[12] Also, we run the baseline regression using the two subsamples of SHSE and SZSE, respectively. The results show that mandatory CSR firms in both SHSE and SZSE tend to reduce earnings management after they are mandated to disclose CSR report. The results are not reported for brevity and are available upon request.

[13] In an unreported test, we examine the impact of mandatory CSR policy on earnings management for state-owned enterprises (SOEs) and private-owned enterprises (POEs) separately and find that both mandated-disclosure SOEs and mandated-disclosure POEs reduce earnings management activities after 2008.

Table 1 Descriptive statistics and correlations

Panel A	Mean	SD	Min	25 %	50 %	75 %	Max
MD	0.226	0.418	0.000	0.000	0.000	0.000	1.000
POST	0.559	0.497	0.000	0.000	1.000	1.000	1.000
|DA1|	0.061	0.061	0.001	0.019	0.042	0.080	0.327
|DA2|	0.060	0.059	0.001	0.019	0.042	0.080	0.307
SOE	0.609	0.488	0.000	0.000	1.000	1.000	1.000
Asset	21.507	1.200	18.889	20.704	21.362	22.151	25.317
ROA	0.028	0.071	−0.327	0.010	0.031	0.058	0.201
MB	3.518	3.120	−5.894	1.970	2.823	4.225	19.792
Lev	0.506	0.246	0.054	0.343	0.503	0.644	1.614
Big4	0.080	0.271	0.000	0.000	0.000	0.000	1.000
MSH	0.019	0.075	0.000	0.000	0.000	0.000	0.468
Indepen	0.357	0.050	0.222	0.333	0.333	0.375	0.556
Ceodual	0.164	0.370	0.000	0.000	0.000	0.000	1.000

Panel B	Mandatory CSR firms in SHSE			Mandatory CSR firms in SZSE			Difference	
	N	Mean	50 %	*N*	Mean	50 %	*t* test	*z* test
POST	2188	0.522	1.000	435	0.490	0.000	−1.230	−1.230
|DA1|	2188	0.053	0.037	435	0.068	0.046	5.144***	4.385***
|DA2|	2188	0.053	0.037	435	0.067	0.046	4.964***	4.344***
SOE	2188	0.733	1.000	435	0.784	1.000	2.231**	2.230**
Asset	2188	22.414	22.245	435	23.072	22.986	9.483***	10.580***
ROA	2188	0.044	0.041	435	0.069	0.056	8.857***	8.330***
MB	2188	3.487	2.844	435	3.540	2.927	0.406	1.620
Lev	2188	0.520	0.526	435	0.503	0.506	−1.695*	−1.283
Big4	2188	0.235	0.000	435	0.179	0.000	−2.536**	−2.533**
MSH	2188	0.001	0.000	435	0.001	0.000	−1.535	−9.279***
Indepen	2188	0.359	0.333	435	0.356	0.333	−1.154	−0.043
Ceodual	2188	0.093	0.000	435	0.069	0.000	−1.622	−1.622

Panel C		Mean	SD	Min	25 %	50 %	75 %	Max
CSRscore		4.078	3.824	0.000	0.000	6.000	8.000	10.000
Shareholder relations		0.542	0.498	0.000	0.000	1.000	1.000	1.000
Creditor relations		0.318	0.466	0.000	0.000	0.000	1.000	1.000
Employee relations		0.548	0.498	0.000	0.000	1.000	1.000	1.000
Supplier relations		0.374	0.484	0.000	0.000	0.000	1.000	1.000

Table 1 continued

Panel C	Mean	SD	Min	25 %	50 %	75 %	Max
Customer relations	0.523	0.500	0.000	0.000	1.000	1.000	1.000
Environmental protection	0.540	0.499	0.000	0.000	1.000	1.000	1.000
Public relations and charities	0.525	0.500	0.000	0.000	1.000	1.000	1.000
CSR policies	0.150	0.357	0.000	0.000	0.000	0.000	1.000
Work conditions	0.477	0.500	0.000	0.000	0.000	1.000	1.000
Deficiencies in CSR performance	0.080	0.272	0.000	0.000	0.000	0.000	1.000

Panel D	High *CSRscore*			Low *CSRscore*			Difference	
	N	Mean	50 %	N	Mean	50 %	t test	z test
|DA1|	678	0.051	0.035	677	0.055	0.041	1.380	1.646*
|DA2|	678	0.051	0.035	677	0.055	0.040	1.383	1.759*
SOE	678	0.583	1.000	677	0.739	1.000	6.141***	6.059***
Asset	678	23.340	23.330	677	22.580	22.490	−10.540***	−10.060***
ROA	678	0.053	0.044	677	0.039	0.036	−4.892***	−4.134***
MB	678	3.747	3.166	677	4.003	3.313	1.777*	1.168
Lev	678	0.540	0.545	677	0.542	0.546	0.172	−0.575
Big4	678	0.232	0.000	677	0.213	0.000	−0.835	−0.835
MSH	678	0.001	0.000	677	0.001	0.000	0.879	−3.490***
Indepen	678	0.371	0.364	677	0.367	0.333	−1.195	−1.688*
Ceodual	678	0.090	0.000	677	0.081	0.000	−0.574	−0.574

Panel E	|DA1|	|DA2|	MD	POST	SOE	Asset	ROA	MB	Lev	Big4	MSH	Indepen
|DA2|	0.973[a]											
MD	−0.046[a]	−0.043[a]										
POST	0.044[a]	0.042[a]	−0.046[a]									
SOE	−0.047[a]	−0.052[a]	0.146[a]	−0.164[a]								
Asset	−0.032[a]	−0.035[a]	0.457[a]	0.165[a]	0.162[a]							
ROA	0.059[a]	0.058[a]	0.153[a]	0.109[a]	0.000	0.201[a]						
MB	0.074[a]	0.073[a]	−0.004	0.132[a]	−0.045[a]	−0.012	−0.041[a]					
Lev	0.104[a]	0.103[a]	0.025[a]	−0.070[a]	−0.008	0.107[a]	−0.455[a]	0.162[a]				
Big4	−0.046[a]	−0.045[a]	0.291[a]	−0.076[a]	0.078[a]	0.322[a]	0.068[a]	−0.051[a]	−0.006			
MSH	0.004	0.004	−0.130[a]	0.185[a]	−0.144[a]	−0.121[a]	0.106[a]	−0.080[a]	−0.231[a]	−0.064[a]		
Indepen	0.027[a]	0.027[a]	0.014	0.191[a]	−0.085[a]	0.061[a]	0.024[b]	0.037[a]	0.000	0.033[a]	0.090[a]	

Table 1 continued

Panel E	|DA1|	|DA2|	MD	POST	SOE	Asset	ROA	MB	Lev	Big4	MSH	Indepen
Ceodual	0.017[c]	0.016[c]	−0.109[a]	0.091[a]	−0.110[a]	−0.138[a]	−0.000	−0.012	−0.085[a]	−0.054[a]	0.334[a]	0.071[a]

Panel A reports the descriptive statistics for the full sample, including mandatory disclosure firms and nondisclosure firms. Panel B presents descriptive statistics for mandatory disclosure firms listed on Shanghai Stock Exchange (SHSE) and Shenzhen Stock Exchange (SZSE), respectively. It also shows the univariate analysis on the mean and median differences for mandatory disclosure firms between SHSE and SZSE. Panel C reports the descriptive statistics on CSR disclosure content for mandatory disclosure firms. Panel D reports univariate analysis for mandatory disclosure firms partitioned by the median *CSRscore*. Panel E shows the Pearson correlation among the variables for the full sample. \|DA1\| is the absolute value of performance-adjusted discretionary accruals (Kothari et al. 2005), please refer to Appendix for the estimation of the performance-adjusted discretionary accruals; \|DA2\| is the absolute value of performance- and growth-adjusted discretionary accruals (Raman and Shahrur 2008), please refer to Appendix for the estimation of the performance- and growth-adjusted discretionary accruals; *MD* is an indicator variable that equals 1 for those firms that are mandated to disclose CSR reports and 0 for the remaining firms in our sample that do not disclose CSR reports during the sample period; *POST* is an indicator variable that equals 1 for the period of 2008–2012, and 0 for the period of 2003–2007; *SOE* is an indicator variable that equals 1 for state-owned enterprises and 0 otherwise; *Asset* is the natural logarithm of total assets at the fiscal year end; *ROA* is the net income during the fiscal year divided by total assets at the fiscal year end; *MB* is the ratio of market value of equity to book value of equity at the fiscal year end; *Lev* is the ratio of total liabilities to total assets at the fiscal year end; *Big4* is an indicator variable that equals 1 if the firm is audited by an international Big-4 audit firm and 0 otherwise; *MSH* is the percentage of shares held by the management at the fiscal year end; *Indepen* is the proportion of independent directors on the board at the fiscal year end; *Ceodual* is an indicator that equals 1 if the Chair of the Board also serves as the CEO and 0 otherwise. *CSRscore* is the sum of the following ten indicator variables; *Shareholder Relations* is an indicator that equals 1 if the firm's CSR report disclose information on shareholder relations and 0 otherwise; *Creditor Relations* is an indicator that equals 1 if the firm's CSR report disclose information on creditor relations and 0 otherwise; *Employee Relations* is an indicator that equals 1 if the firm's CSR report disclose information on employee relations and 0 otherwise; *Supplier Relations* is an indicator that equals 1 if the firm's CSR report disclose information on supplier relations and 0 otherwise; *Customer Relations* is an indicator that equals 1 if the firm's CSR report disclose information on customer relations and 0 otherwise; *Environmental Protection* is an indicator that equals 1 if the firm's CSR report disclose information on environmental protection and 0 otherwise; *Public Relations and Charities* is an indicator that equals 1 if the firm's CSR report disclose information on public relations and charities and 0 otherwise; *CSR Policies* is an indicator that equals 1 if the firm's CSR report disclose information on CSR policies and 0 otherwise; *Work Conditions* is an indicator that equals 1 if the firm's CSR report disclose information on work conditions and 0 otherwise; *Deficiencies in CSR performance* is an indicator that equals 1 if the firm's CSR report disclose information on deficiencies in CSR performance and 0 otherwise. All continuous variables are winsorized at the top and bottom 1 % of their distributions. In Panels B and D, the *t* values (*z* values) are for differences in means (medians), which are based on *t* tests (Wilcoxon tests). ***, **, and * indicate significance at the 1, 5, and 10 % levels, respectively. In Panel E, a, b, and c indicate significance at the 1, 5, and 10 % levels, respectively

Alternatively, we also use the propensity-score-matching approach to construct control sample.

SOE, Big-4 audited firms, and larger firms tend to have smaller earnings management (\|DA1\| and \|DA2\|), which is consistent with prior studies.[14] We also observe that *ROA*, *MB*, and leverage (*Lev*) are positively correlated with absolute discretionary accruals. Finally, the firms with more independent board directors (*Indepen*) seem to have higher \|DA1\| or \|DA2\|, indicating that independent directors are not effective in monitoring financial reporting in China.

Empirical Analyses

Baseline Test

We perform the multivariate difference-in-differences tests to control for the effects of both time-variant and time-invariant firm characteristics and the time effect, and to better isolate the impact, if any, of mandatory CSR disclosure on earnings management. The regression results estimating Model (1) without firm and year fixed effects are reported in the first two columns of Table 2. The coefficient estimate of interest is the DiD estimator on *MD*POST*, β_1, which is negative and significant at the 1 % level in both columns. The magnitude of the coefficient indicates that \|DA1\| is 1.2 percentage point lower for the treatment group than it is for the control group surrounding

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[14] Chen et al (2011) indicate that SOEs have fewer incentives to engage in earnings management. Hung et al. (2013) find that larger firms have smaller information asymmetry. Since mandatory disclosure firms tend to be larger firms and larger firms tend to have smaller earnings management, there is a valid concern that the negative relation between mandatory disclosure and earning management might be due to firms' size effect. We try to alleviate this concern in several ways. First, we run difference-in-differences (DiD) test to examine the same firm's earnings management changes before and after the mandatory CSR policy. That is, we examine whether or not the same firm reduces earnings management surrounding the policy. Such a difference-in-differences test can largely remove the size effect. Second, we run firm fixed-effect test to address the concern of omitted firm characteristics bias including firm size bias. Third, we generate a propensity-score-matching sample as the control firms to make sure that the control firms have similar firm characteristics as the treatment firms. As we can see from the Panel B of Table 3, firm size no longer affects the magnitude of earnings management when we employ the propensity-score-matching approach to construct the control group. Our findings remain valid in the above three tests.

Table 2 Difference-in-differences tests

	(1) |DA1|	(2) |DA2|	(3) |DA1|	(4) |DA2|
MD*POST	−0.012***	−0.010***	−0.014***	−0.012***
	(−3.55)	(−3.23)	(−4.62)	(−3.91)
MD	0.001	0.001		
	(0.34)	(0.26)		
POST	0.007*	0.006		
	(1.73)	(1.61)		
SOE	−0.002	−0.003	0.002	0.001
	(−0.62)	(−0.81)	(1.60)	(0.67)
Asset	−0.003***	−0.003***	0.003*	0.002
	(−3.03)	(−3.12)	(1.69)	(1.26)
ROA	0.131***	0.127***	0.117***	0.115***
	(7.65)	(7.58)	(8.76)	(8.98)
MB	0.001**	0.001**	0.000*	0.000*
	(2.09)	(2.04)	(1.80)	(1.69)
Lev	0.044***	0.043***	0.036***	0.033***
	(9.91)	(9.61)	(6.28)	(6.10)
Big4	−0.004*	−0.004*	−0.005	−0.005
	(−1.79)	(−1.70)	(−1.42)	(−1.38)
MSH	0.001	0.002	0.037	0.035
	(0.14)	(0.16)	(1.58)	(1.57)
Indepen	0.021*	0.021*	−0.010	−0.004
	(1.77)	(1.85)	(−0.60)	(−0.26)
Ceodual	0.002	0.002	0.001	0.002
	(0.96)	(0.92)	(0.42)	(0.62)
Intercept	0.084***	0.088***	−0.036	−0.016
	(4.57)	(4.84)	(−0.84)	(−0.41)
Firm fixed effects	No	No	Yes	Yes
Year fixed effects	No	No	Yes	Yes
N	11,619	11,619	11,619	11619
F	30.421	30.531	12.772	12.709
Adj-R^2	0.039	0.038	0.032	0.031

This table reports the regression results of the impact of mandate CSR disclosure on earnings management. Variables are defined in Table 1. The t-statistics in parentheses are calculated based on standard errors clustered by firm and year. ***, **, and * indicate significance at the 1, 5, and 10 % levels, respectively

the policy change. This result is not only statistically significant but also economically significant. The DiD effect is equivalent to around 20 % of the average |DA1|. We obtain a quantitatively and qualitatively similar result when using |DA2| as the dependent variable.

In columns (3) and (4) of Table 2, we include firm and year fixed effects to control for the impact of time-invariant firm characteristics and time effect on earnings management. As MD and POST are perfectly correlated with firm fixed effect and year effect, we remove MD and POST from the regression models. Again, we obtain results consistent with those in columns (1) and (2). For further analyses, we report only the results controlling for both firm and year

fixed effects as these regressions can provide more reliable results after purging out time-invariant firm fixed effect and time effect.

The coefficients on control variables are generally consistent with prior studies (e.g., Chen et al. 2011; Bergstresser and Philippon 2006). Leverage is positively related to the magnitude of earnings management because highly leveraged firms may engage in earnings management to avoid the violation of debt covenants. MB is positively associated with earnings management, which is consistent with Chen et al. (2011). International Big-4 auditors are negatively associated with earnings management in the DiD test, indicating that large audit firms in China can effectively constrain earnings management.

In summary, the results in Table 2 show that the firms mandated to disclose CSR activities tend to have a significant decrease in the absolute discretionary accruals after the mandatory CSR regulation becomes effective relative to control firms, which is not explained by firms' fundamentals or operational environment. This evidence supports our hypothesis, indicating that the mandatory CSR disclosure firms reduce opportunistic reporting behavior after the 2008 *Notice*.

Robustness Tests

The Propensity-Score-Matching Approach

Since the choice of the treatment firms is not perfectly random, we use the propensity-score-matching approach to construct a sample of control firms that are more comparable with the treatment firms. Following Hung et al. (2013), we first apply a Logit regression model to estimate the probability of being a treatment firm using the pre-regulation period data. Similar to Hung et al. (2013), we regress the probability of being a treatment firm on the following explanatory variables: firm size (*MVE*, defined as the natural logarithm of a firm's market value of equity), stock return (*Return*), return on total assets (*ROA*), government ownership (*GovOwn*), financial analyst coverage (*Analyst*, defined as the natural logarithm of 1 plus the number of financial analysts following a firm), and the firms' donations (*Donation*, defined as the natural logarithm of 1 plus donations). Panel A of Table 3 suggests that all explanatory variables except *Donation* are significantly correlated with the probability of being a treatment firm. The Pseudo-R^2 is 21.3 %. Next, we obtain the propensity score from this model and match each treatment firm to the control firms using the nearest neighbor matching approach. Similar to Hung et al. (2013), we require the difference in the propensity score to be <0.05*standard deviation of the propensity scores.[15] We obtain a final sample of 6738 observations, with 2549 observations in the treatment group and 4189 observations in the control group. Panel B of Table 3 presents the estimation results using the propensity-score-matched sample as the control group. Our main findings remain robust.

The Placebo Test

Another concern with our analysis is that the decrease in earnings management of the treatment group may simply reflect a time trend. Although we mitigate this time-trend concern with the design of the difference-in-differences test, we further perform a placebo test using the preregulation period data to provide an additional robustness test. We arbitrarily classify the years 2006 and 2007 as the postperiod and the years 2003–2005 as the preperiod, i.e., *POST-2005* takes the value of 1 for the years 2006 and 2007, and 0 for the years 2003–2005. If our results simply reflect a time trend, we should observe a similar decrease in earnings management for the treatment group from the period of 2003–2005 to the period of 2006–2007. Table 4 presents the estimation results. The insignificant coefficient on the interaction term of *MD*POST-2005* implies that the treatment firms do not experience a significant decrease in earnings management in 2006–2007. In other words, our results that mandatory CRS firms tend to reduce earnings management after the mandatory regulation are not simply due to a time trend.[16]

Including Voluntary CSR Reporting Firms

Because some firms voluntarily disclose CSR reports during the sample period, we reestimate Model (1) by including 363 voluntary CSR reporting firms in the control group. Since voluntary CSR reporting tends to bias against our results, we thus expect the effect of mandatory CSR disclosure on firms' absolute discretionary accruals to be weaker after including these voluntary CSR firms. Results reported in the first two columns of Table 5 confirm such an expectation. We document smaller but still significant coefficients on *MD*POST* after including voluntary CSR firms in the control group compared to the results shown in columns (3) and (4) of Table 2, again consistent with our hypothesis. We further include an interaction term between *VD* (equals one for voluntary disclosure firms and zero otherwise) and *POST_V* (equals one for years after voluntary disclosure and zero otherwise) in the regression to examine the effect of voluntary CSR disclosure on earnings management. The results shown in columns (3) and (4) of Table 5 suggest that compared to the non-CSR disclosure firms, both mandatory and voluntary disclosure firms seem to reduce earnings management after the CSR disclosure. While compared to voluntary disclosure firms, mandatory

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[15] We obtain similar results when we require the difference to be <0.01 or 0.025 times standard deviation of the propensity scores.

[16] There might be another competing argument that our results are due to the 2008 crisis effect, which might affect the calculation of discretionary accruals. In order to rule out this argument, we examine the mandatory firms' earnings management behavior surrounding the Asian financial crisis in 1997. Specifically, we define 1993–1997 as the precrisis period and 1998–2002 as the postcrisis period and rerun the baseline regression. The unreported results show that financial crisis in 1997 does not affect the earnings management activities for the mandated CSR firms. This suggests that economic crisis is least likely the cause of the reduction in mandatory firms' absolute discretionary accruals surrounding 2008.

Table 3 The propensity-score-matching approach

Panel A	Dependent variable: MD	
	Coefficients	z values
MVE	0.864***	(15.86)
Return	−0.441***	(−9.56)
ROA	2.963***	(3.97)
GovOwn	0.847***	(5.43)
Analyst	0.530***	(10.49)
Donation	0.009	(1.36)
Intercept	−14.367***	(−18.79)
N	5107	
Pesudo-R^2	0.213	

Panel B	(1) |DA1|	(2) |DA2|
MD*POST	−0.014***	−0.011***
	(−4.86)	(−4.21)
SOE	0.003	0.001
	(1.23)	(0.30)
Asset	0.002	0.001
	(1.13)	(0.76)
ROA	0.133***	0.135***
	(9.01)	(9.37)
MB	0.000	0.000
	(0.73)	(0.54)
Lev	0.046***	0.045***
	(6.63)	(6.55)
Big4	−0.005	−0.005
	(−1.24)	(−1.29)
MSH	0.219**	0.167**
	(2.57)	(2.01)
Indepen	−0.003	0.002
	(−0.15)	(0.09)
Ceodual	0.001	0.001
	(0.18)	(0.48)
Intercept	−0.013	0.002
	(−0.35)	(0.05)
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
N	6738	6738
F	11.643	11.200

Table 3 continued

Panel B	(1) |DA1|	(2) |DA2|
Adj-R^2	0.036	0.034

Panel A: Following Hung et al. (2013), we first apply a Logit regression model to estimate the probability of being a treatment firm using the preregulation period data. Similar to Hung et al. (2013), we regress the probability of being a treatment firm on the following explanatory variables: firm size (the natural logarithm of a firm's market value of equity, MVE), stock return (Return), return on total assets (ROA), government ownership (GovOwn), financial analyst coverage (Analyst, the natural logarithm of 1 plus the number of financial analysts following a firm), and donations (Donation, the natural logarithm of 1 plus donations). Panel A presents the estimation results using the Logit model. Next, we obtain the predicted probabilities from Panel A and match each treatment firm to the control firms that have predicted probabilities close to the treatment firm. Similar to Hung et al. (2013), we require the difference in the predicted probabilities to be < 0.05*standard deviation of the propensity scores. Panel B presents the estimation results using the propensity-score-matched sample as the control group. Variables are defined in Table 1. *** indicate significance at the 1 % levels. The t-statistics in parentheses are calculated based on standard errors clustered by firm and year

disclosure firms tend to reduce earnings management in a larger extent. The evidence indicates that mandatory CSR firms engage in less earnings management relative to either voluntary or non-CSR disclosure firms.

Alternative Measure of Earnings Management

In this subsection, we rerun the baseline regression using earnings smoothing as a measure of earnings management. Following Francis et al. (2004), earnings smoothing (ES) is measured as the standard deviation of earnings before interest and taxes (EBIT) over rolling 5-year window divided by the standard deviation of cash flow from operations (CFO) over rolling 5-year window, where a larger ES indicates less earnings management activities. Table 6 shows the results and suggests that mandated firms tend to reduce earnings smoothing after the mandatory policy (a positive coefficient on MD*POST indicates less earnings smoothing, i.e., less earnings management), which is consistent with our result using absolute discretionary accruals as the measure of earnings management.

Table 4 Placebo test

	(1) |DA1|	(2) |DA2|
MD*POST-2005	−0.003	−0.002
	(−0.72)	(−0.63)
SOE	−0.001	−0.002
	(−0.12)	(−0.46)
Asset	0.014***	0.015***
	(3.23)	(3.48)
ROA	0.062***	0.058***
	(3.48)	(3.36)
MB	0.001***	0.001***
	(2.79)	(2.65)
Lev	0.031***	0.031***
	(2.99)	(3.23)
Big4	−0.014**	−0.015**
	(−2.14)	(−2.40)
MSH	0.121	0.075
	(1.01)	(0.66)
Indepen	0.011	0.001
	(0.41)	(0.03)
Ceodual	0.002	0.004
	(0.60)	(0.95)
Intercept	−0.267***	−0.267***
	(−2.84)	(−3.00)
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
N	5124	5124
F	6.005	5.981
Adj-R^2	0.026	0.025

This table reports the regression results of placebo test. We arbitrarily classify the years 2006 and 2007 as the POST-period and the years 2003–2005 as the preperiod, i.e., POST-2005 takes the value of 1 for the years 2006 and 2007, and 0 for the years 2003–2005. POST-2005 is an indicator variable that equals 1 for the period of 2006–2007, and 0 for the period of 2003–2005. We then reestimate Model (1) using the subsample of the period 2003–2007. Variables are defined in Table 1. The t-statistics in parentheses are calculated based on standard errors clustered by firm and year. ***, **, and * indicate significance at the 1, 5, and 10 % levels, respectively

Mechanisms Through Which Mandatory CSR Reporting Affects Financial Reporting Quality

Our hypothesis suggests that CSR reporting may constrain earnings management by reducing information asymmetry. In this section, we investigate whether the deterring effect of CSR reports on earnings management is more prominent for firms with worse information environments, and whether this effect is due to CSR disclosure regulation (the regulation effect) or CSR information disclosure (the disclosure quality effect).

Partition on Firms' Information Environment

If the mandatory CSR reporting tends to discourage earnings management activities due to an improvement in the information environment of the firm, the effect should be more pronounced among firms with worse information environments. Following previous studies (e.g., Hung et al. 2013), we use analyst coverage on the firm as our proxy for the information environment. The firm's own disclosure becomes more important in the absence of information from financial analysts. We therefore predict that the negative relation between CSR report and earnings management should be more significant for firms with less analyst coverage.

To test this conjecture, we partition the sample into two subsamples based on whether a firm's analyst coverage is above or below the sample median. Table 7 reports the results from reestimating Model (1) using the two subsamples. Consistent with our conjecture, the impact of mandatory CSR reporting on absolute discretionary accruals is only significant and more pronounced for firms with less analyst coverage. Specifically, the magnitude of the coefficient on MD*POST for the firms with below median analyst coverage is more than twice [for example, −0.013 in column (3)] of that for the firms with above median analyst coverage [for example, −0.004 in column (1)] and the difference is statistically significant [F value = 3.253, $p = 0.071$, when comparing the coefficient on MD*POST between column (1) and column (3), and F value = 2.981, $p = 0.086$, when comparing the coefficient on MD*POST between column (2) and column (4)]. Overall, the results in Table 7 indicate that the disciplinary effect of mandatory CSR disclosure regulation on earnings management is more pronounced among firms with worse information environments.

Association Between Discretionary Accruals and Regulators' Enforcement Actions

We further examine the association between discretionary accruals and regulators' enforcement actions for mandatory CSR firms and non-CSR firms around the policy change. If mandatory CSR disclosure action attracts more attention from investors and regulators, one would expect that earnings management in mandatory reporting firms will be more likely to be caught by regulators after the CSR disclosure mandate. We employ the following Probit model to test this prediction:

$$\begin{aligned} Punish_{it} = {} & \gamma_0 + \gamma_1 DA_{it} + \gamma_2 DA_{it} * MD_{it} + \gamma_3 DA_{it} * POST_{it} \\ & + \gamma_4 DA_{it} * MD_{it} * POST_{it} + \gamma_5 MD_{it} \\ & + \gamma_6 POST_{it} + \gamma_7 MD_{it} * POST_{it} \\ & + Control\ Variables + \varepsilon_{it} \end{aligned}$$

(2)

Table 5 Regression results with control group including both the voluntary CSR disclosure firms and nondisclosure firms

	(1) |DA1|	(2) |DA2|	(3) |DA1|	(4) |DA2|
MD*POST	−0.012***	−0.010***	−0.014***	−0.011***
	(−4.23)	(−3.56)	(−4.59)	(−3.86)
VD*POST_V			−0.009***	−0.007**
			(−2.72)	(−2 .33)
SOE	0.002	0.001	0.002	0.001
	(1.42)	(0.41)	(1.44)	(0.43)
Asset	0.003*	0.002	0.004**	0.002
	(1.76)	(1.21)	(2.00)	(1.42)
ROA	0.116***	0.116***	0.116***	0.115***
	(9.38)	(9.73)	(9.32)	(9.68)
MB	0.001**	0.001**	0.001**	0.000**
	(2.34)	(2.17)	(2.28)	(2.11)
Lev	0.030***	0.028***	0.030***	0.028***
	(5.71)	(5.47)	(5.60)	(5.38)
Big4	−0.006*	−0.006*	−0.006*	−0.006*
	(−1.82)	(−1.78)	(−1.82)	(−1.79)
MSH	0.036*	0.031	0.036*	0.031
	(1.70)	(1.57)	(1.71)	(1.58)
Indepen	0.003	0.007	0.003	0.007
	(0.20)	(0.48)	(0.18)	(0.46)
Ceodual	0.001	0.001	0.001	0.001
	(0.35)	(0.45)	(0.36)	(0.46)
Intercept	−0.036	−0.013	−0.044	−0.019
	(−0.93)	(−0.35)	(−1.12)	(−0.52)
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
N	13,890	13,890	13,890	13,890
F	13.838	14.166	13.463	13.645
Adj-R^2	0.030	0.029	0.031	0.029

This table reports the regression results with control group including both the voluntary CSR disclosure firms and nondisclosure firms. Variables are defined in Table 1. VD*POST_V is the interaction term of VD and POST_V; VD is an indicator variable that equals 1 for those firms that are voluntary to disclose CSR reports and 0 for the remaining firms in our sample that do not disclose CSR reports during the sample period; POST_V is an indicator variable that equals 1 for the years after voluntary disclosure and 0 otherwise. The t-statistics in parentheses are calculated based on standard errors clustered by firm and year. ***, **, and * indicate significance at the 1, 5, and 10 % levels, respectively

where *Punish* is an indicator variable that equals 1 if firm *i* is caught by China Securities Regulation Committee (CSRC) to have an accounting fraud in year *t* and 0 otherwise. *DA* is the signed discretionary accruals. We use the signed *DA* in Model (2) instead of the absolute value of *DA* because stakeholders are more sensitive to upward earnings management (Kim et al. 2003; Watts 2003). Furthermore, there are 330 accounting frauds in our sample, among which we could explicitly identify the impact of fraud on accounting earnings for 57 frauds. All of the 57 frauds are related to upward earnings management and none of them is related to downward earnings management, suggesting that China's regulators pay more attention to

upward earnings management, confirming Watts (2003). A positive coefficient on *DA* suggests that firms with upward earnings management are more likely to be punished by regulators. *POST* and *MD* are defined as in Model (1). The coefficient of interest is the interaction term *DA*MD*-POST*, which examines whether the upward earnings management in mandatory CSR reporting firms is more likely to be detected and punished by regulators after the 2008 *Notice*.

Following Chen et al. (2006) and Loebbecke et al. (1989), we include *Asset*, *Lev*, *InsHold*, *Return*, *Growth*, *SOE*, *OwnCon*, and *Indepen* as control variables. *InsHold* is the percentage of ownership by institutional investors;

Table 6 Earnings smoothing (*ES*) as an alternative measure of earnings management

	(1) ES	(2) ES
*MD*POST*	0.086**	0.054*
	(1.97)	(1.87)
MD	−0.011	
	(−0.26)	
POST	0.067***	
	(3.24)	
SOE	0.009	0.016
	(0.41)	(0.94)
Asset	−0.096***	−0.131***
	(−5.86)	(−8.15)
ROA	−1.943***	−1.109***
	(−5.95)	(−8.58)
MB	0.013***	0.006**
	(3.18)	(2.13)
Lev	0.024	0.338***
	(0.28)	(5.36)
Big4	0.249***	0.085**
	(5.27)	(2.09)
MSH	−0.395	0.504
	(−1.00)	(0.95)
Indepen	0.169	0.108
	(0.76)	(0.63)
Ceodual	0.011	−0.030
	(0.35)	(−1.14)
Intercept	2.711***	3.443***
	(8.17)	(9.77)
Firm fixed effects	No	Yes
Year fixed effects	No	Yes
N	8684	8684
F	41.924	16.040
Adj-R^2	0.070	0.040

This table reports the regression results of the impact of mandate CSR disclosure on earnings management, which is measured by earnings smoothing (*ES*). Following Francis et al. (2004), earnings smoothing (*ES*) is measured as *SD(EBIT)/SD(CFO)*, where a larger *ES* indicates smaller earnings smoothing activities. *SD(EBIT)* is the standard deviation of earnings before interest and tax calculated over rolling 5-year windows, *SD(CFO)* is the standard deviation of cash flow from operations calculated over rolling 5-year windows. Other variables are defined in Table 1. The t-statistics in parentheses are calculated based on standard errors clustered by firm and year. ***, **, and * indicate significance at the 1, 5, and 10 % levels, respectively

Growth is the revenue growth rate from year $t − 1$ to year t. *OwnCon* is the percentage of ownership by the top five largest shareholders. Other variables are defined the same as in Model (1).

Table 8 presents the estimation results, with column (1) using *DA1* as the earnings management measure and column (2) using *DA2*. The results are similar using either measure. For example, the coefficient on *DA1*MD*POST* is significantly positive, indicating that upward earnings management in mandatory CSR reporting firms is associated with higher probability of being detected by regulators after the 2008 *Notice*, consistent with the argument that the mandatory CSR firms attract more attention and scrutiny on their financial reports from regulators after the disclosure action.

The Impact of the Disclosure Quality of CSR Reports on Earnings Management

The effect of the mandatory CSR disclosure regulation on earnings management might have two components, i.e., the (direct) regulation effect and the (indirect) disclosure

Table 7 Partition on firms' information environment

	(1) |DA1| Analyst coverage > sample median	(2) |DA2| Analyst coverage > sample median	(3) |DA1| Analyst coverage < sample median	(4) |DA2| Analyst coverage < sample median
MD*POST	−0.004	−0.003	−0.013***	−0.011**
	(−1.05)	(−0.72)	(−2.90)	(−2.46)
SOE	0.003	0.001	0.002	0.001
	(1.45)	(0.64)	(0.95)	(0.63)
Asset	0.001	−0.000	0.006***	0.004***
	(0.16)	(−0.07)	(3.23)	(2.64)
ROA	0.126***	0.125***	0.101***	0.101***
	(4.27)	(4.34)	(8.67)	(8.85)
MB	0.001*	0.001*	0.000	0.000
	(1.68)	(1.91)	(0.79)	(0.48)
Lev	0.067***	0.063***	0.033***	0.030***
	(5.07)	(4.84)	(6.17)	(5.78)
Big4	0.000	0.000	−0.010*	−0.010*
	(0.01)	(0.05)	(−1.84)	(−1.95)
MSH	0.042	0.042	0.039	0.032
	(1.32)	(1.33)	(0.96)	(0.83)
Indepen	−0.031	−0.028	−0.003	0.004
	(−1.13)	(−1.04)	(−0.15)	(0.19)
Ceodual	0.002	0.001	0.001	0.001
	(0.40)	(0.20)	(0.29)	(0.50)
Intercept	0.001	0.021	−0.086**	−0.062*
	(0.02)	(0.29)	(−2.29)	(−1.69)
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
N	4858	4858	6761	6761
F	6.113	5.748	11.384	10.848
Adj-R^2	0.032	0.030	0.039	0.037

This table shows the impact of analyst coverage on the relation between mandate CSR disclosure and earnings management. We measure analyst coverage as the natural logarithm of 1 plus the number of financial analysts following the firm. Other variables are defined in Table 1. The t-statistics in parentheses are calculated based on standard errors clustered by firm and year. ***, **, and * indicate significance at the 1, 5, and 10 % levels, respectively

quality effect. The regulation effect is that the government may impose greater monitoring on those regulated firms and therefore constrains their earnings management behavior. The disclosure quality effect is that mandatory firms increase CSR disclosure after the regulation, which in turn improves transparency and thus curbs earnings management activities. Hence, our results in Table 2 capture the combined effect of both the regulation effect and the disclosure quality effect.

To disentangle the disclosure quality effect from the regulation effect, we modify our empirical modeling by including an interaction term between CSR disclosure level (CSRscore) and the indicator variable for mandatory firms

(MD) into the main regression. CSRscore is defined as in Table 1 Panel C. We also include the interaction term between CSRscore and the indicator variable for voluntary firms (VD). In this case, the coefficient on MD*CSRscore reflects the disclosure quality effect, while the coefficient on MD*POST captures the regulation effect. Table 9 presents the regression results. The coefficients on both the MD*POST and MD*CSRscore are significantly negative, suggesting that both the regulation effect and the disclosure quality effect contribute to the reduction in earnings management activities. Specifically, the direct effect of the regulation on earnings management is −0.009, which is the coefficient on MD*POST, and the indirect disclosure

Table 8 The association between discretionary accruals and enforcement by regulators

	(1) Punish	(2) Punish
DA1	0.457	
	(1.24)	
DA1*MD	−0.546	
	(−0.54)	
DA1*POST	−1.394***	
	(−2.60)	
DA1*MD*POST	2.805***	
	(4.09)	
DA2		0.502
		(1.43)
DA2*MD		−0.883
		(−0.85)
DA2*POST		−1.449***
		(−2.61)
DA2*MD*POST		3.300***
		(3.70)
MD	−0.569***	−0.570***
	(−3.24)	(−3.20)
POST	0.167***	0.165***
	(2.62)	(2.62)
MD*POST	0.283**	0.289**
	(2.02)	(2.05)
Asset	−0.028	−0.028
	(−0.71)	(−0.73)
Lev	0.073	0.072
	(0.64)	(0.63)
InsHold	−0.123	−0.122
	(−0.67)	(−0.67)
Return	0.030***	0.031***
	(3.35)	(3.88)
Growth	−0.039	−0.038
	(−0.49)	(−0.48)
SOE	−0.007	−0.007
	(−0.08)	(−0.08)
OwnCon	−0.027	−0.030
	(−0.11)	(−0.12)
Indepen	0.451	0.453
	(0.56)	(0.56)
Intercept	−1.518*	−1.503*
	(−1.81)	(−1.80)
N	11,437	11,437

Table 8 continued

	(1) Punish	(2) Punish
Pseudo R^2	0.025	0.025

This table reports the results on the relation between discretionary accruals and enforcement by regulators. *Punish* is an indicator variable that equals 1 if a firm is caught by the China Securities Regulation Committee (CSRC) to have an accounting fraud in year *t* and 0 otherwise. $DAi(i = 1, 2)$ is the signed discretionary accruals; *MD* is an indicator variable that equals 1 for those firms that are mandated to disclose CSR reports and 0 for the remaining firms in our sample that do not disclose CSR reports during the sample period; *POST* is an indicator variable that equals 1 for the period of 2008–2012, and 0 for the period of 2003–2007; $DAi(i = 1, 2)*MD$ is the interaction term of $DAi(i = 1, 2)$ and *MD*; $DAi(i = 1, 2)*POST$ is the interaction term of $DAi(i = 1, 2)$ and *POST*; $DAi(i = 1, 2)*MD* POST$ is the interaction term of $DAi(i = 1, 2)$, *MD* and *POST*; *MD*POST* is the interaction term of *MD* and *POST*; *Asset* is the natural logarithm of total assets at the fiscal year end; *Lev* is the ratio of total liabilities to total assets at the fiscal year end; *InsHold* is the percentage of ownership by institutional investors; *Return* is the stock return for firm *i* in year *t*; *Growth* is the revenue growth rate from year *t* − 1 to year *t*; *SOE* is an indicator variable that equals 1 for state-owned enterprises and 0 otherwise; *OwnCon* is the percentage of ownership by the top five largest shareholders; *Indepen* is the proportion of independent directors on the board at the fiscal year end. The t-statistics in parentheses are calculated based on standard errors clustered by firm and year. The number of observations is < 11,619 due to missing reports for variables *InsHold*, *Growth*, and *OwnCon*. ***, **, and * indicate significance at the 1, 5, and 10 % levels, respectively

quality effect is −0.004, which is −0.001, the coefficient on *MD*CSRscore*, multiplied by 4.078, the average CSR disclosure level for mandatory CSR firms. Taken together, after controlling for the direct regulation effect, we still find a significantly negative effect of the disclosure channel on earnings management, corroborating our hypothesis.

Voluntary disclosure firms with high *CSRscore* also have smaller earnings management compared to voluntary disclosure firms with lower *CSRscore* (i.e., significantly negative coefficient on *VD*CSRscore*). Moreover, the coefficient on *VD*CSRscore* is similar in magnitude as that on *MD*CSRscore*, suggesting that the disclosure quality effect is similar for both mandatory and voluntary disclosure firms. This evidence confirms that the actual disclosure quality does play an important role in reducing earnings management. Furthermore, this evidence also suggests that the reduction on earnings management is smaller for mandatory disclosure firms with a lower *CSRscore* compared to voluntary disclosure firms with a higher *CSRscore*, captured by the similar coefficients on *MD*CSRscore* and *VD*CSRscore*.

Table 9 The impact of CSR disclosure quality on earnings management

	(1) |DA1|	(2) |DA2|
MD*POST	−0.009***	−0.007**
	(−2.79)	(−2.20)
MD*CSRscore	−0.001***	−0.001**
	(−2.60)	(−2.52)
VD*CSRscore	−0.001***	−0.001**
	(−2.63)	(−2.31)
SOE	0.002	0.000
	(1.28)	(0.28)
Asset	0.004**	0.003
	(2.06)	(1.49)
ROA	0.115***	0.115***
	(9.27)	(9.63)
MB	0.001**	0.000**
	(2.23)	(2.06)
Lev	0.030***	0.028***
	(5.61)	(5.38)
Big4	−0.006*	−0.006*
	(−1.78)	(−1.75)
MSH	0.037*	0.032
	(1.74)	(1.61)
Indepen	0.003	0.007
	(0.20)	(0.47)
Ceodual	0.001	0.001
	(0.37)	(0.47)
Intercept	−0.046	−0.022
	(−1.18)	(−0.58)
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
N	13,890	13,890
F	13.211	13.411
Adj-R^2	0.032	0.031

This table reports the results of the impact of CSR disclosure content on earnings management. MD*CSRscore is the interaction term of MD and CSRscore; CSRscore is the sum of the ten CSR report content indicator variables; VD*CSRscore is the interaction term of VD and CSRscore; VD is an indicator variable that equals 1 for those firms that are voluntary to disclose CSR reports and 0 for the remaining firms in our sample that do not disclose CSR reports during the sample period. Other variables are defined in Table 1. The t-statistics in parentheses are calculated based on standard errors clustered by firm and year. ***, **, and * indicate significance at the 1, 5, and 10 % levels, respectively

Conclusion

This paper exploits a quasi-natural experiment to shed light on the effect of mandatory Corporate Social Responsibility (CSR) report on firms' financial reporting practices. The Shanghai and Shenzhen stock exchanges in China required a subset of listed Chinese firms to disclose CSR reports since 2008. With the setting of the unique exogenous regulatory shock, we find that mandatory CSR disclosure firms' absolute discretionary accruals decrease substantially relative to nondisclosure firms. This drop is not explained by the differences in firm characteristics between the two groups of firms. Our findings are robust to the propensity-score-matching approach, the placebo test, the use of alternative control groups, and alternative measure of earnings management.

We also explore the possible mechanisms through which mandatory CSR reporting affects managers' earnings-management behavior. The impact of the mandatory CSR policy on absolute discretionary accruals is more prominent among firms with less analyst coverage, i.e., firms that are subject to worse information environments. We also

find that the mandatory CSR firms with upward earnings management are more likely to be caught by regulators after the mandate. These results suggest that the mandatory CSR reporting may constrain earnings management by reducing firms' information asymmetry. We further analyze the disclosure quality of the CSR reports and find that both the CSR disclosure regulation (the regulation effect) and the CSR information content (the disclosure quality effect) have significant impacts on firms' financial reporting quality.

Our findings have important implications for both policy makers and stakeholders. The results suggest that regulators can improve firms' financial reporting quality by mandating them to disclose nonfinancial information (e.g., CSR-related information), while stakeholders could use the disclosed CSR information to infer firms' future prospects and evaluate the firms' financial reporting with more supporting information.

Nevertheless, our findings should be interpreted with caution. Our findings suggest that mandatory disclosure firms substantially reduce earnings management after the mandatory disclosure policy. However, those mandatory disclosure firms with low CSR score may still exhibit more earnings management than firms with high CSR score. Further, our findings are subject to several limitations. First, this study primarily focuses on the CSR disclosure effect and ignores the CSR performance effect as we could not evaluate a firm's CSR performance reliably. Second, our results may not generalize to the developed markets due to the great institutional differences between China and developed markets. Future research may utilize the mandatory CSR disclosure regulation in other markets to complement the findings in this study.

Appendix: Estimation of the Magnitude of Earnings Management

Performance-Adjusted Discretionary Accrual Measure

The performance-adjusted discretionary accrual measure is derived from the modified Jones (1991) model as follows (Kothari et al. 2005):

$$
\begin{aligned}
TA_{i,t}/A_{i,t-1} = {} & \phi_1\left(1/A_{i,t-1}\right) + \phi_2 \\
& \times \left[\left(\Delta REV_{i,t} - \Delta REC_{i,t}\right)/A_{i,t-1}\right] + \phi_3\left(PPE_{i,t}/A_{i,t-1}\right) \\
& + \phi_4 ROA_{i,t} + \varepsilon_{i,t},
\end{aligned}
\tag{3}
$$

where $TA_{i,t}$ denotes the total accruals calculated as earnings less cash flows from operations for company i at year t; $A_{i,t-1}$ is the total assets of company i at year $t-1$; $\Delta REV_{i,t}$ is the change in sales revenue; $\Delta REC_{i,t}$ is the change in accounting receivables; $PPE_{i,t}$ represents property, plant, and equipment; $ROA_{i,t}$ is net income divided by the total assets at year $t-1$; and $\varepsilon_{i,t}$ denotes the residual term. The model (A1) is estimated cross-sectionally by each industry-year group. We require each industry-year group to have at least 10 observations to ensure reliable estimation. The fitted values from Model (A1) are the normal accruals (or nondiscretionary accruals) that arise from companies' normal operating activities, and the residual term (DA1) denotes the performance-adjusted discretionary accruals that are assumed to be opportunistically chosen by management.

Performance- and Growth-Adjusted Discretionary Accrual Measure

We first estimate the following model for each year-industry group (Raman and Shahrur 2008):

$$
\begin{aligned}
TA_{i,t}/A_{i,t-1} = {} & \alpha_1\left(1/A_{i,t-1}\right) + \alpha_2 \Delta REV_{i,t}/A_{i,t-1} \\
& + \alpha_3\left(PPE_{i,t}/A_{i,t-1}\right) + \alpha_4 ROA_{i,t} + \alpha_5 BM_{i,t} + \varepsilon_{i,t},
\end{aligned}
\tag{4}
$$

where $BM_{i,t}$ is the ratio of book value to market value of equity. Other variables are defined as in Model (A1). The residual term (DA2) denotes the performance- and growth-adjusted discretionary accruals that are assumed to be opportunistically chosen by management.

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