Heterogeneity in CSR activities: is CSR investment monotonically associated with earnings quality?

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Abstract

Extant studies have investigated the relation between corporate social responsibility (CSR) endeavours and earnings quality based on monotonic models, showing mixed and inconclusive empirical evidence. We extend the prior literature to explore the potential nonmonotonic nature of this relation, by identifying the heterogeneity in CSR investments. We follow the model developed by Lys, Naughton, and Wang (2015) to classify firms into two sub-groups: (1) entities underinvesting in CSR activities, in which the level of CSR investments is lower than the theoretically optimal point; and (2) entities overinvesting in CSR activities, in which the level of CSR investments is higher than the theoretically optimal point. Our empirical results show that the level of underinvesting in CSR activities is positively associated with the magnitude of both accrual-based earnings management (AEM) and real earnings management (REM) and, hence, negatively related to earnings quality. For firms overinvesting in CSR activities, we do not find a significant relation between CSR overinvestment and AEM. The empirical analyses for real activities manipulation exhibit inconsistent results throughout the four REM proxies. However, the mixed evidence for firms with CSR overinvestment cannot fully exclude the possibility that overinvesting in CSR activities has a significant impact on future financial reporting quality. Varying incentives for CSR overinvestment in different firms could drive the mixed empirical results. The positive effect of CSR overinvestment by some firms may offset the negative effect brought about by other entities, making the overall effect minor and unnoticeable. Our empirical results, together with some other CSR-related research, emphasise the need for more transparent reporting regarding the detailed nature, aim and strategy of relevant CSR investments, to help investing communities and other constituents better understand the incentives behind CSR activities.

Keywords: CSR investment; earnings quality; AEM; REM

1. Introduction

Despite the intuitively non-financial nature, the financial impact of corporate social responsibility (CSR) is always an appealing topic for the academic community. Adding to the wide discussion of the effect of corporate social and environmental endeavours on financial performance and market value in the last few decades (e.g. Chang, Kim, & Li, 2014; Baboukardos, 2017; Brammer & Millington, 2008; Brooks & Oikonomou, 2018; Mahoney & Roberts, 2007; McGuire, Sundgren, & Schneeweis, 1988; Waddock & Graves, 1997; Walker, Zhang, & Ni, 2019), an emerging stream of literature has recently come out, which addresses earnings quality in light of CSR endeavours (e.g. Bozzolan, Fabrizi, Mallin & Michelon, 2015; Chih, Shen, & Kang, 2008; Grougiou, Leventis, Dedoulis, & Owusu-Ansah, 2014; Kim, Park, & Wier, 2012; Rezaee & Tuo, 2019; Wang & Tuttle, 2014). Similar to the diverse and even competing theoretical underpinnings and empirical results on the effect of CSR activities on financial performance, prior literature also exhibits mixed evidence on the relation between CSR investments and earnings quality.

To illustrate, based on ethical theory (Jones, 1995), firms with greater CSR endeavours are more likely to meet the ethical expectations of various stakeholders. A higher level of stakeholder satisfaction is conducive to strengthening the corporate image (Castro, Amores-Salvado, & Navas-Lopez, 2016; Lin, Zeng, Wang, Zou, & Ma, 2016; Pérez & Bosque, 2015). The enhanced reputation could boost the financial performance and provide the impetus for long-term value creation (Martínez-Ferrero, Banerjee, & García-Sánchez, 2016). Therefore, CSR-oriented firms are less incentivised to engage in such managerial opportunism as earnings management (Kim et al., 2012; Bozzolan et al., 2015).

Nonetheless, some scholars (e.g. Friedman, 1970; Jensen, 2002) contend that directors should put all weights on profit maximisation. Aupperle, Caroll, and Hatfield (1985) assert that any other forms of expenditures, such as social investments, will cause firms to deviate from the goal of shareholders' wealth maximisation. Furthermore, some CSR antagonists also argue that the motives of many social investments are suspicious (e.g. Barnea & Rubin, 2010; Hemingway & Maclagan, 2004; Jensen & Meckling, 1976). Resources allocated to CSR activities may be irresponsibly abused by management in pursuit of their personal interests, leading to stewardship problems. In other words, management may regard CSR investments as reputation insurance to dissimulate their opportunistic behaviour (Cai, Jo, & Pan, 2012; Hrasky, 2012; Jones, 2011). A plausible illustration is that managers make grandiose CSR investments to show they are ethical and trustworthy (Kuruppu & Milne, 2010; Petrovits, 2006). In reality, they use CSR investments as a cover for subsequent earnings manipulations, in pursuit of higher performance-related compensation (Prior, Surroca, & Tribó, 2008; Wang and Tuttle, 2014).

Two competing stories suggest that the relation between CSR investments and earnings quality may not be simply monotonic. To resolve the theoretical and empirical inconclusiveness in prior literature, this study sets out to characterise a more complete picture of the relation between CSR investments and earnings quality. Based on a cost-benefit analysis of CSR activities, there exists a theoretically optimal level of CSR investments, where net benefits of CSR endeavours are maximised. Before reaching the optimal level, the more a firm invests in CSR activities, the better it coordinates the social aims and its financial performance is (Wang, Choi, & Li, 2008). Therefore, directors are less likely to distort future earnings to dissimulate unsatisfactory financial performance. However, theories offer competing predictions on the relation between CSR investments and earnings quality for firms with CSR investments exceeding the optimal point. If directors excessively invest in CSR activities for their personal

benefits, the irresponsible use of firm resources is likely to deteriorate subsequent financial performance and become a catalyst for rent-seeking directors to distort future economic performance, triggering lower earnings quality (Chih et al., 2008). Conversely, if directors excessively invest in CSR activities due to the private information on promising future prospects, they are less incentivised to engage in subsequent earnings management given the desirable financial performance, leading to higher earnings quality (Lys et al., 2015).

To untangle the heterogeneity in CSR activities, we first derive the theoretically optimal level of CSR investments based on firm- and industry-specific determinants. Then, we follow the model developed by Lys et al. (2015) to classify firms into two sub-groups: (1) entities underinvesting in CSR activities, in which the level of CSR investments is lower than the theoretically optimal point and (2) entities overinvesting in CSR activities, in which the level of CSR investments is higher than the theoretically optimal point. We consider two aspects of earnings quality: accrual-based earnings management (AEM) and real earnings management (REM). Our empirical results show that before reaching the optimal investment point, firms with greater CSR investments are less likely to engage in earnings management. For firms overinvesting in CSR activities, we do not find a significant relation between CSR overinvestment and AEM. The empirical analyses of real activities manipulation exhibit inconsistent results throughout our REM proxies. However, the inconsistent evidence for firms with CSR overinvestment cannot fully exclude the possibility that overinvesting in CSR activities has a significant impact on future financial reporting quality. The mixed empirical results could be driven by the varying incentives for CSR overinvestment in different firms. Our empirical results, together with some other CSR-related research (e.g. Dhaliwal, Li, Tsang, & Yang, 2011; Ioannou & Serafeim, 2017; Plumlee, Brown, Hayes, & Marshall, 2015), emphasise the need for more transparent reporting regarding the detailed nature, aim, and strategy of relevant CSR investments, to help investing communities and other constituents better understand the incentives behind CSR activities.

This study contributes to the literature from the following perspectives. First, the extant studies (e.g. Bozzolan et al., 2015; Chih et al., 2008; Grougiou et al., 2014; Kim et al., 2012; Litt, D. S. Sharma, & V. D. Sharma, 2014; Rezaee & Tuo, 2019; Wang, Cao, & Ye, 2018) only attempt to uncover the role of CSR investments in shaping corporate reporting behaviour based on monotonic models, overlooking the potential heterogeneity in CSR investments and hence giving rise to mixed evidence. Also, academic communities have set foot on the non-monotonic relation between CSR investments and firm financial performance (e.g. Barnett & Salomon, 2012; Brammer & Millington, 2008; Wang et al., 2008), but provide little insight into the potential nonmonotonic association between CSR investments and financial reporting quality. We extend the prior literature by revealing the nonmonotonic nature of the relation between CSR investments and earnings quality. Our empirical evidence indicates that the results documented in previous research on the influence of CSR investments on earnings quality could be largely driven by the sub-sample that has the most significant effect on the examined relation. Furthermore, our study highlights the potentially heterogeneous incentives for a firm's CSR investments, which may have completely different effects on future earnings quality. Our empirical results, together with findings in previous research, could help various constituents have a better understanding of corporate reporting behaviour in light of CSR activities.

The remainder of this paper is organised as follows. The next section reviews the relevant literature and develops the hypotheses. Then, we specify the dataset and research models, followed by empirical analyses. Finally, we conclude.

2. Literature review and hypothesis development

2.1. Related literature

Compared to abundant literature on the relation between CSR activities and firm financial performance, studies on the relation between CSR endeavours and financial reporting quality are relatively few with mixed evidence.

One stream of research (e.g. Bozzolan et al., 2015; Chih et al., 2008; Kim et al., 2012; Litt et al., 2014) reveals that firms with better CSR performance usually report higher quality earnings. These scholars assert that firms with a stronger CSR orientation attaches greater importance to a wide group of constituents and focus more on long-term value creation rather than on short-term economic benefits. Financial misreporting would aggravate agency problems and expose firms to a higher level of detection and litigation risk (Ball & Shivakumar, 2008). The undermined credibility due to reputational penalties may result in higher cost of capital and lower present value of future cash flows (Karpoff, Lee, & Martin, 2008). Given the tremendous costs of earnings distortions, CSR-orientated firms are less likely to manipulate earnings in order to maintain high quality financial reporting (Choi, Lee, & Park, 2013). Empirical evidence supporting a positive relation between CSR investments and earnings quality started to emerge in the past few decades. Based on empirical results of 1,653 corporations in 46 countries during 1993 and 2002, Chih et al. (2008) find that firms with greater commitments to CSR endeavours engage less in earnings smoothing. Similarly, using sample firms from the U.S., Litt et al. (2014) document a negative association between corporate environmental initiatives and the level of earnings manipulations via accruals. In comparison to studies on the relation between CSR activities and the quality of accruals, Hong and Andersen (2011) and Kim et al. (2012) further investigate whether greater commitments to CSR activities also indicate lower levels of distorted financial performance through real activities manipulations. They both use the US samples and find that firms with greater CSR endeavours are less likely to deviate from the optimal operational strategies because such deviation is harmful to their long-term development and inconsistent with their wider stakeholder focus. Bozzolan et al. (2015) also finds similar relations in an international dataset. Moreover, the recent studies (Rezaee & Tuo, 2019; Wang et al., 2018) find that, apart from the evaluation of financial reporting quality in light of CSR activities, stakeholders may also expect higher earnings quality in firms with better CSR disclosures.[1] Their findings suggest that the improved non-financial disclosures are likely to help various constituents better infer future prospects of a firm and evaluate the faithfulness and relevance of financial reporting by means of more supporting information. Better CSR disclosures could play a monitoring role that limits managerial discretion and act as a deterrent to opportunistic reporting behaviour.

Admittedly, both theoretical and empirical evidence show that greater CSR endeavours usually indicate higher earnings quality. However, holding the managerial opportunism view, some assert plausible competing arguments as well. Pursuant to agency theory (Jensen & Meckling, 1976), directors act in a stewardship role to manage the resources with which investors entrust them. If these resources are abused by management to simply build their personal reputation rather than create social values, it is difficult to meet the demand of various stakeholders and gain enough support for business activities (McWilliams, Siegel, & Wright, 2006). Instead, this may incur high agency costs if CSR investments are driven by vanity. Furthermore, Prior

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[1] As indicated in prior literature (Al-Tuwaijri, Christensen, & Hughes II, 2004; Li, Richardson, & Thornton, 1997; Wang et al., 2018), it is noteworthy that CSR investment and CSR disclosure are two completely different concepts, as firms with greater CSR investments may not necessarily make sufficient disclosures on such activities, and *vice versa*. This study keeps an eye on financial reporting behaviour in light of CSR investment.

et al. (2008) allege that CSR activities may be used by some directors to obtain reputation insurance and relax the vigilance of regulators, distracting stakeholders' attention away from their subsequent opportunistic behaviour, such as financial misreporting. This competing story is also supported by some empirical evidence. Calegari, Chotigeat, and Harjoto (2010) demonstrate that firms making more CSR investments are more likely to engage in income-increasing accrual-based manipulations. Under the facade of high levels of CSR investments, directors aim to leave an ethical impression and window-dress financial performance in order to earn higher compensation, exacerbating the principal-agent problem. Recent empirical evidence (Kyaw, Olugbode, & Petracci, 2017), based on sample data from European countries, also reveals that greater CSR endeavours are associated with more serious earnings management, especially in the coordinated market economies where corporate social investments are embedded in the articles of association according to the institutional settings. In these areas, CSR is not a discretionary activity but a corporate duty. For many entities, CSR activities may not manifest corporate philanthropy; rather, firms only make CSR investments to meet the regulatory requirements and stakeholder expectations. Greater commitments to CSR activities could show that management is ethical and trustworthy and, thus, provide a good cover for the subsequent opportunistic reporting behaviour (Grougiou et al., 2014; Martínez-Ferrero et al., 2016; Wang and Tuttle, 2014).

In addition, Liu, Shi, Wilson, and Wu (2017) reveal that CSR activities are not significantly associated with earnings quality after controlling for the family ownership. Considering the inconsistent evidence of the association between CSR endeavours and earnings quality in prior literature, the nature of this relation remains inconclusive. Apart from methodological problems and jurisdictional differences in the datasets, [2] prior studies do not explicitly take into account the potential heterogeneity in CSR investments. To illustrate, the myopia avoidance view is largely supported by value enhancing CSR activities, whereas the managerial opportunism view is usually accompanied with value decreasing CSR endeavours. We postulate that the relation between earnings quality and CSR performance may not be simply monotonic. To shed more light on the puzzling association in previous studies and provide new insights into this relation, this paper investigates the potentially nonmonotonic nature of the relation between CSR endeavours and earnings quality, by identifying the heterogeneity in CSR investments.

2.2. Theoretical Underpinnings and Hypotheses Development

In order to justify the heterogeneity in CSR investments, it is sensible to identify the optimal level of CSR expenditure. Lys et al. (2015) suggest a theoretically optimal level of corporate social investments based on firm specific determinants. In other words, the reasonable level of a firm's CSR investments depends on the economic resources owned or controlled by the entity. As CSR activities may generate positive externalities at the cost of investors (Chen, Hung, & Wang, 2018), a rational decision on CSR investments should make trade-offs between investors' wealth and social goals. Before elucidating how a firm engages in CSR activities to balance financial performance and the needs of various constituents, it is useful to firstly have a cost-benefit analysis of CSR investments.

For most organisations, motivations on CSR endeavours may stem from the augmented economic benefits that such activities could bring. First, pursuant to employee justice

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[2] Different jurisdictions differ in financial reporting standards, the legality of CSR activities and the extent of investor protection, giving rise to inconsistent earnings manipulation practices in light of CSR endeavours (Leuz, Nanda, & Wysocki, 2003; Reinhardt, Stavins, & Vietor, 2008).

perception theory (Cropanzano, Bryne, Bobocel, & Rupp, 2001), firms can diminish the employee turnover rate by creating a fair working environment. As increasing numbers of firms assert that human resources are their most valuable assets, (talented) employee retention has been perceived as a key success factor (Galbreath, 2010). A lower employee turnover rate demonstrates a desirable job opportunity, and also improve productivity and operational performance (Guthrie, 2001). Colquitt, Conlon, Wesson, Porter, and Ny (2001) show that there is an increase in employee welfare when a firm creates a fair working environment and demonstrates respect for human dignity. Such good citizenship can be achieved through employee-related CSR activities (Aguilera, Rupp, Williams & Ganapathi, 2007). Employees feeling sufficiently respected are less likely to leave their current firm (Greening & Turban, 2000). Instead, their morale is more likely to be boosted, which in turn may lead to an improvement in productivity and operational performance. The similar logic also applies to customers, suppliers, local communities and the general public. When the needs of these different stakeholders are well satisfied, there will be a higher level of customer satisfaction (Kaplan & Norton, 2007), lower procurement costs (Kaplan & Norton, 2007), lower cost of capital (Lins, Servaes, & Tamayo, 2017), better financial performance (Malik, 2015) and more access to natural resources (Gligor & Munteanu, 2015).

While benefits of CSR activities are widely discussed, such endeavours are also accompanied with various costs. Friedman (1970) argues that the only corporate responsibility is to make full use of various resources to maximise profits within the limit of rules. Firms investing in CSR activities will decrease funds for production and other business activities. The reduction in operational investments may be harmful to current operational efficiency and against the economic objective of profit maximisation. Moreover, some CSR projects might incur additional finance costs if firms do not have sufficient funds (Brammer & Millington, 2008). Such costs are likely to be borne by customers in the form of higher selling prices. If CSR endeavours are not well targeted towards related constituents, the potential loss of customer goodwill due to higher selling prices could also be a detrimental factor in profit maximisation.

Given the economic cost-benefit analysis, it is reasonable to assume that rational directors will not stop investing in CSR activities as long as the marginal benefits are greater than the marginal costs (Schipper, 2010). CSR investments, up to the point where marginal benefits are equal to marginal costs, usually have a twofold function for most firms, namely, maintaining the tacit social licence and enhancing firm value. Based on legitimacy theory (Suchman, 1995), firms are supplied with critical resources (e.g. labour and products) by each group of constituents, who in exchange asks for claims specified in explicit or implicit contracts (e.g. wages and salaries, job security, high quality products and services). If demands of various constituents are fully considered via CSR endeavours, these stakeholders are more willing to support business activities, therefore enhancing operational performance and firm value (Tang, Qian, Chen, & Shen, 2015). By contrast, firms are likely to breach the social contract and suffer from the legitimacy threats if they fail to identify and meet the needs of various stakeholders. CSR activities may function as a tool to manage the demands of different stakeholders so that various audiences can be convinced of the legitimacy of the entity's existence (Hahn & Lülfs, 2014). While achieving the social goals, firms are also better off as the economic benefits outweigh the relevant costs. We define the level of CSR investments at which the marginal benefits are equal to marginal costs as the theoretically optimal level of corporate social investments. At this point, the sum of the social and economic benefits of CSR activities is

maximised.[3] Arguably, this is also the CSR investment level that each firm pursues. We define the level of CSR investments below (above) the optimal level as CSR underinvestment (overinvestment). Based on the above analysis, before reaching the optimal level, the more (less) a firm invests in CSR activities, the better (worse) it coordinates the social aims and its financial performance is, and therefore, the less (more) likely directors are to manipulate future earnings to obfuscate any unsatisfactory operational performance. This gives rise to our first hypothesis:

H$_1$. *The level of CSR underinvestment is negatively associated with future earnings quality, ceteris paribus.*

On the contrary, if CSR investments exceed the optimal level, where the marginal costs are greater than marginal benefits, the relevant financial performance is likely to be adversely impacted. The higher the degree of CSR investments exceeds the optimal level, the worse off a firm is in terms of financial performance. Therefore, it is more likely that managerial incentives for future earnings manipulation arise, with the aim of camouflaging any possible undesirable performance.

Furthermore, due to the negative net economic benefits, the incentive for the portion of CSR overinvestment is worth questioning. One possibility is that directors aim at serving a wide range of stakeholders rather than simply pursuing shareholders' wealth maximisation. Jensen (2002) contends that directors are liable to be unaccountable for the allocated resources in the presence of "multiple objectives", leading to the stewardship problem. Also, directors may acquire huge space to divert the allocated resources for social investments in pursuit of their own interests since there is often a shortage of clear criteria to evaluate their performance in a reasonable way under the "multiple objective" strategy (Chih et al., 2008). The irresponsible use of firm resources is likely to deteriorate subsequent financial performance at the expense of investors, as the marginal costs exceed the marginal benefits. Consequently, CSR overinvestment may be a catalyst for rent-seeking directors to distort the future economic performance via various types of earnings manipulation in order to defend the outsider interference (Leuz et al., 2003). This results in lower future earnings quality. Therefore, we put forward the following hypothesis on the relation between CSR overinvestment and earnings quality:

H$_{2a}$. *The level of CSR overinvestment is negatively associated with future earnings quality, ceteris paribus.*

Nevertheless, Fazarri, Hubbard, and Petersen (1988) assert that firms are more likely to invest in special projects if they anticipate more financial slack in future periods. Lys et al. (2015) further document that abnormally high levels of CSR investments could be a signal of private information on future financial prospects. In other words, firms with an expectation of excessive financial resources in future periods are more likely to make additional expenditure in CSR activities. Therefore, CSR overinvestment may not be due to directors' opportunistic incentives but to their private access to information regarding an anticipated promising future financial prospect. Under such circumstances, directors are less likely to use earnings

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[3] It is assumed that directors make rational investment decisions, i.e. the "output" is proportional to the "input". This assumption is sensible, especially within the optimal CSR investment level, where the financial objectives are coordinated with the social goals. Admittedly, one could argue that some CSR investments might not lead to either good social or financial performance. The occurrence rate of such disproportionate investments could be acceptably low under the rational investment assumption.

management to disguise frustrating future financial performance, leading to higher earnings quality. This accounts for a competing hypothesis on the relation between CSR overinvestment and earnings quality.[4]

H$_{2b}$. *The level of CSR overinvestment is positively associated with future earnings quality, ceteris paribus.*

3. Research design

3.1. Data source and sample selection

We extract CSR related data from the Thomson Reuters Asset4 database (hereafter Asset4), which covers transparent and comparable environmental, social and governance (ESG) data on over 7,000 firms around the globe (Thomson Reuters, 2018). Asset4 analysts, with local language expertise, are trained to collect data on over 400 ESG measures per firm from various publicly available sources, ranging from corporate reports and firm websites to stock exchange filings and NGO websites. Of the over 400 measures, a subset of 178 most relevant and comparable fields is selected for the overall evaluation and scoring process. The information from these sources is further integrated and organised into 10 categories within three pillars (environmental, social, and governance).[5] Each year, every covered firm receives a percentage score for each category, which is weighted proportionately to the number of measures to formulate the scores of the three pillars and the overall ESG score (Thomson Reuters, 2018).[6] Following Lys et al. (2015), we employ the weighted average of social and environmental pillar scores as a proxy for CSR investments, based on the assumption that a firm's CSR score is highly relevant to the firm's investments in CSR activities (Servaes and Tamayo, 2013). The rationale behind this assumption is that disclosure is usually a necessary signal of investment (Lys et al., 2015).

We collect financial data from Datastream. The financial data are then matched with CSR investments data from Asset4. Our sample period ranges from 2010 to 2019.[7] Due to different reporting standards, we exclude firm-year observations of financial institutions (SIC codes: 6000–6799). Of the remaining data, we further eliminate observations with values missing

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[4] Prior studies also contend that some directors and investors are willing to appropriate some portions of funds for social investments simply due to their personal belief and ethical triggers. Bénabou and Tirole (2010) argue that firms may make charitable contributions through approved social investments. The philanthropic incentive indicates that some corporate social investments may not enhance firm value but aim at achieving social goals. One could argue that such charitable CSR investments may not stem from opportunistic incentives but have little impact on future financial performance and earnings quality. Even if the philanthropically motivated CSR investments may also have some financial effects, these are usually manifested by means of the aforementioned paths. In other words, some CSR expenditures could be incentivised by multiple factors. For example, some philanthropic directors may make charitable investments when they possess private information on desirable financial performance in future.

[5] The "Environmental" pillar covers 3 categories: (1) resource use, (2) emissions and (3) innovation. The "Social" pillar covers 4 categories: (1) workforce, (2) human rights, (3) community and (4) product responsibility. The "Governance" pillar covers 3 categories: (1) management, (2) shareholders, and (3) CSR strategy.

[6] For details on the Asset4 ESG scoring methodology, refer to "Thomson Reuters ESG Scores (May 2018)" (available at: http://zeerovery.nl/blogfiles/esg-scores-methodology.pdf).

[7] Given the considerable impact of the 2008 global financial crisis on financial reporting quality (Altamuro & Beatty, 2010; Krishnan & Zhang, 2014), our sample period starts from 2010, when the effect of the financial crisis was gradually fading.

from the relevant variables for the subsequent empirical analyses. Finally, our sample data for empirical tests consist of 13,407 firm-year observations.[8]

3.2. Variable Measurement

3.2.1. CSR investment measurement

Our proxy for CSR investment level is the weighted average of social and environmental pillar scores produced by Asset4.[9] Corporate governance may be perceived as a distinct category since it may have an impact on both financial reporting quality and CSR investments simultaneously. Better corporate governance usually ensures that firms report higher quality earnings and the interests of various constituents are not impaired (Larcker, Richardson, & Tuna, 2007). As CSR activities are targeted at a wide group of stakeholders, one could argue that CSR and corporate governance may or may not be completely different categories, depending on the definition of stakeholders' best interests (Kim et al., 2012). In an effort to disentangle the impact of corporate governance and CSR investments, our measure of CSR investments does not take the governance factor into account. Instead, we add the governance pillar score as a control variable in our main regression models to control the effect of corporate governance quality on CSR investments and earnings quality respectively.

3.2.2. Earnings quality measurement

Earnings quality depends on the extent to which it can provide users with information relevant to decision making (Dechow, Ge, & Schrand, 2010). Prior literature on earnings quality constructs can be classified into two categories. One group of measures are based on the reliability of accounting treatments, such as AEM (e.g. Cohen, Dey, & Lys, 2008) and income smoothing (e.g. Tucker & Zarowin, 2006). Another type of measures is grounded on operational strategies and decisions, such as REM (e.g. Zang, 2012). In this paper, we use AEM and REM as proxies for two types of earnings quality measurement.

- AEM measurement

Numerous previous studies (e.g. Cohen et al., 2008; DeFond & Subramanyam, 1998; Zang, 2012) employ discretionary accruals (*DA*) as a proxy for the level of AEM. Due to fewer data restrictions and superiority in empirical testing, we take the cross-sectional version of the modified Jones (1991) model to estimate *DA*. As AEM may include both income-decreasing (negative) *DA* and income-increasing (positive) *DA* (Klein, 2002), we use the absolute value of *DA* (*DA_ABS*) as a surrogate for the full sample analyses, and negative *DA* (*DA_Negative*) and positive *DA* (*DA_Positive*) for sub-sample analyses. Following Kothari (2005) and Kim et al. (2012), our AEM regression model also includes return on assets (measured as earnings before extraordinary items divided by total assets) to control the performance effect on the

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[8] Our sample for the subsequent regression analyses will be further reduced because of the introduction of lag variables. The number of firm-year observations available for each regression model differs, due to the variation in data availability of different AEM and REM proxies.

[9] Thomson Reuters Eikon has updated the ESG score calculation methodology since 2018. The CSR related data (with the sample period between 2009 and 2019) used in this study are all based on the new scoring methodology introduced in 2018 (10 categories within 3 pillars). This is different from the data (with the sample period from 2002 to 2010) used in Lys et al. (2015), which are based on the old version of the ESG score methodology in Asset4 (18 categories within 4 pillars). We measure CSR investment level as the weighted average of social and environmental pillar scores produced by Asset4. The weights of social and environmental pillar scores (0.355:0.340) are consistent with the weights used in the new methodology of overall ESG score calculation (Thomson Reuters, 2018).

level of *DA* (see online Appendix A for more details). Based on the theoretical underpinnings clarified above, it is expected that the degree of under CSR investments is positively associated with *DA_ABS* and *DA_Positive*, but negatively associated with *DA_Negative*. However, the relations between the level of CSR overinvestment and three AEM surrogates remain to be empirically tested.

- REM measurement

REM may be defined as business activities deviating from normal practices for the purpose of meeting or even beating financial performance thresholds (Roychowdhury, 2006). Based on prior literature (Bozzolan et al., 2015; Cohen & Zarowin, 2010; Zang, 2012), we construct measures of real activities manipulation in three aspects: (1) abnormal production costs (*ABN_Prod*), (2) abnormal discretionary expenses (*ABN_DisExp*), and (3) abnormal cash flows from operating activities (*ABN_CFO*). Besides, following Cohen et al. (2008) and Kim et al. (2012), we also employ an aggregated REM measure (*Agg_REM*). Given the inclination to overproduce, reduce discretionary expenses and lower operating cash flows, under the three aforementioned REM measures respectively, the combined measure is calculated as *ABN_Prod − ABN_DisExp − ABN_CFO* (see online Appendix B for more details). Based on the theoretical underpinnings, it is expected that the extent of CSR underinvestment is positively associated with *ABN_Prod* and *Agg_REM*, and negatively associated with *ABN_DisExp* and *ABN_CFO*. The relations between the level of CSR overinvestment and four REM surrogates remain to be empirically tested however.[10]

3.3. Empirical Models

As discussed above, there exists an optimal level of CSR investments based on firm specific determinants. Even though directors make efforts to optimise their strategic corporate decisions, firms' CSR endeavours may still deviate from the optimal level due to many legitimate or illegitimate factors (Larcker, 2003). Some supporters of the extreme optimisation view insist that directors do not make sub-optimal strategic decisions, and any abnormal CSR investments might be attributable to measurement errors or insufficient statistical controls (Ittner & Larcker, 2001). This perspective, however, fails to identify the fact that sometimes it is difficult to react to the swift changes in the market or institutional environment and firm characteristics, and the motives of certain CSR activities are essentially not free from managerial opportunism. Therefore, we follow the insights of Ittner and Larcker (2001) and Hanlon, Rajgopal and Shevlin (2003) that directors are in the process of dynamic learning. A large dataset without sample selection bias will include observations distributed around the optimal level of CSR investments. Following Lys et al. (2015), we divide a firm's CSR investments into two parts: (1) the theoretically optimal level component, which can be explained by the firm and industry specific determinants, and (2) the component deviating from the optimal level, which is unrelated to the aforementioned factors. Specifically, we employ the following model to estimate the two components of CSR investments:

$$CSR_{i,t} = \alpha_0 + \alpha_1 PM_{i,t-1} + \alpha_2 ATO_{i,t-1} + \alpha_3 CFO_{i,t-1} + \alpha_4 Cash_{i,t-1} + \alpha_5 Lev_{i,t-1}$$
$$+ \alpha_6 Size_{i,t-1} + \alpha_7 M\_B_{i,t-1} + \alpha_8 Growth_{i,t} + \alpha_9 R\&D_{i,t} + \alpha_{10} CG_{i,t} + \varepsilon_{i,t} \qquad (1)$$

where,

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[10] The magnitude of our aggregated REM measure increases as firms engage more in real activities manipulations, consistent with the combined REM proxy defined by Cohen et al. (2008) but opposite to the one used by Kim et al. (2012).

$CSR_{i,t}$ = CSR investments (measured as the percentage of the weighted average of social and environmental pillar scores produced by Asset4) of firm i in year t;

$PM_{i,t-1}$ = profit margin (measured as earnings before extraordinary items divided by net sales) of firm i in year $t-1$;

$ATO_{i,t-1}$ = asset turnover (measured as net sales divided by total assets) of firm i in year $t-1$;

$CFO_{i,t-1}$ = lagged operating cash flows (measured as operating cash flows divided by total assets) of firm i in year $t-1$;

$Cash_{i,t-1}$ = lagged cash (measured as cash flows divided by total assets) of firm i in year $t-1$;

$Lev_{i,t-1}$ = leverage (measured as long-term debts divided by total assets) of firm i in year $t-1$;

$Size_{i,t-1}$ = firm size (measured as natural logarithm of total assets) of firm i in year $t-1$;

$M\_B_{i,t-1}$ = market to book value of equity of firm i in year $t-1$;

$Growth_{i,t}$= sales growth (measured as percentage change in net sales) of firm i in year t;

$R\&D_{i,t}$= research and development (R&D) intensity (measured as R&D expenditure divided by net sales) of firm i in year t;

$CG_{i,t}$ = governance score (measured as the overall governance score produced by Asset4) of firm i in year t;

The fitted value in model (1) is assumed to be the theoretically optimal level of a firm's CSR investments, and the residual is perceived as the level of CSR investments that deviates from the optimal point. Firms underinvesting in CSR activities will show a negative residual, whereas a positive residual indicates the level of CSR overinvestment.

To alleviate the correlated omitted variable bias, we conduct an extensive literature review to search for the factors that may have an impact on firms' CSR investments. First, we include return on assets to control the financial performance, as better performance could trigger greater demand for CSR expenditures (Campbell, 2007; Lys et al., 2015). Instead of directly putting it into our model, we decompose it into profit margin (*PM*) and asset turnover (*ATO*) since these two components measure profitability from different perspectives, and, hence, may have different persistence (Nissim & Penman, 2001). Following the similar logic, we also control the operational performance by including lagged operating cash flows (*CFO*). Additionally, CSR investments could also be restricted by the availability of funds. Thus, we employ the lagged cash (*Cash*) to control the adequacy of firms' financial resources for investing in CSR activities (Baumann-Pauly, Wickert, Spence, & Scherer, 2013). Moreover, we also include the leverage (*Lev*) control to measure the ability of a firm to raise financing. The rationale is that firms with a higher gearing are usually perceived to be riskier and have to bear the higher cost of capital. Therefore, it is more difficult for such entities to finance CSR investments (Orlitzky & Benjamin, 2001). Furthermore, prior literature also shows that CSR investments could be too costly for many small firms to afford; instead large firms normally have more resources to fuel CSR activities (Wu, 2006). Hence, we take the natural logarithm of total assets to control the firm size (*Size*). Also, firms with greater growth opportunities are usually more incentivised to make CSR investments as it is easier for them to raise funds to feed CSR activities. Following McWilliams and Siegel (2000) and Lys et al. (2015), we include market to book value of equity (*M_B*), sales growth (*Growth*), and R&D intensity (*R&D*) to control the growth prospect. Apart from financial capabilities, firms with stronger corporate governance are more likely to better protect the interests of various stakeholders (Jo & Harjoto,

2012). Therefore, we employ the overall governance score (*CG*) to control the quality of corporate governance.

In addition to firm characteristics, CSR endeavours are also influenced by industry features. Relying on Cho and Patten (2007), firms operating in mining (SIC codes: 1000-1099), oil exploration (SIC codes: 1300-1399), paper (SIC codes: 2600-2699), chemical and allied product (SIC codes: 2800-2899), petroleum refining (2900-2999), metals (SIC codes: 3300-3399) and utilities (SIC codes: 4900-4999) industries are often perceived to be socially and environmentally sensitive. Facing greater public exposures, these firms are more dedicated to CSR activities to maintain the social contract with the general public. Besides, CSR expenditures may also be influenced by the macro-level environment in different years. Therefore, we add industry and year fixed effects to our regression models to control industry or year specific factors that may affect a firm's CSR investments.

The regression results for the determinants of CSR investments are presented in the online Appendix C.

To explore the heterogeneity in CSR investments in light of earnings quality, we divide the full dataset into two sub-samples, observations with a negative residual (CSR underinvestment) in model (1) and observations with a positive residual (CSR overinvestment) in model (1). Specifically, the following regression models are employed to test the relevant hypotheses.

$$AEM\_Proxy_{i,t} = \alpha_0 + \alpha_1 UnderCSR_{i,t-1} + \alpha_2 Agg\_REM_{i,t} + \alpha_3 PM_{i,t-1}$$
$$+\alpha_4 ATO_{i,t-1} + \alpha_5 Lev_{i,t-1} + \alpha_6 Size_{i,t-1} + \alpha_7 M\_B_{i,t-1}$$
$$+\alpha_8 Growth_{i,t} + \alpha_9 R\&D_{i,t} + \alpha_{10} CG_{i,t} + \varepsilon_{i,t} \qquad (2)$$

$$AEM\_Proxy_{i,t} = \alpha_0 + \alpha_1 OverCSR_{i,t-1} + \alpha_2 Agg\_REM_{i,t} + \alpha_3 PM_{i,t-1}$$
$$+\alpha_4 ATO_{i,t-1} + \alpha_5 Lev_{i,t-1} + \alpha_6 Size_{i,t-1} + \alpha_7 M\_B_{i,t-1}$$
$$+\alpha_8 Growth_{i,t} + \alpha_9 R\&D_{i,t} + \alpha_{10} CG_{i,t} + \varepsilon_{i,t} \qquad (3)$$

$$REM\_Proxy_{i,t} = \alpha_0 + \alpha_1 Under\_CSR_{i,t-1} + \alpha_2 DA\_ABS_{i,t} + \alpha_3 PM_{i,t-1}$$
$$+\alpha_4 ATO_{i,t-1} + \alpha_5 Lev_{i,t-1} + \alpha_6 Size_{i,t-1} + \alpha_7 M\_B_{i,t-1}$$
$$+\alpha_8 Growth_{i,t} + \alpha_9 R\&D_{i,t} + \alpha_{10} CG_{i,t} + \varepsilon_{i,t} \qquad (4)$$

$$REM\_Proxy_{i,t} = \alpha_0 + \alpha_1 Over\_CSR_{i,t-1} + \alpha_2 DA\_ABS_{i,t} + \alpha_3 PM_{i,t-1}$$
$$+\alpha_4 ATO_{i,t-1} + \alpha_5 Lev_{i,t-1} + \alpha_6 Size_{i,t-1} + \alpha_7 M\_B_{i,t-1}$$
$$+\alpha_8 Growth_{i,t} + \alpha_9 R\&D_{i,t} + \alpha_{10} CG_{i,t} + \varepsilon_{i,t} \qquad (5)$$

where,
$AEM\_Proxy_{i,t} = DA\_ABS_{i,t}, DA\_Positive_{i,t},$ or $DA\_Negative_{i,t}$:
　　$DA\_ABS_{i,t}$ = absolute value of discretionary accruals of firm i in year t
　　　　　　(used for the whole sample);
　　$DA\_Positive_{i,t}$ = positive discretionary accruals of firm i in year t
　　　　　　　(used for firm-year observations engaging in income-increasing *DA*);
　　$DA\_Negative_{i,t}$ = negative discretionary accruals of firm i in year t
　　　　　　　(used for firm-year observations engaging in income-decreasing *DA*);
$REM\_Proxy_{i,t} = ABN\_Prod_{i,t}, ABN\_DisExp_{i,t}, ABN\_CFO_{i,t},$ or $Agg\_REM_{i,t}$:
　　$ABN\_Prod_{i,t}$ = abnormal production costs of firm i at year t
　　　　　　(used for the whole sample);

$ABN\_DisExp_{i,t}$ = abnormal discretionary expenses of firm i at year t
             (used for the whole sample);

$ABN\_CFO_{i,t}$ = abnormal operating cash flows of firm i at year t
             (used for the whole sample);

$Agg\_REM_{i,t}$ = aggregated REM measure ($ABN\_Prod_{i,t} - ABN\_DisExp_{i,t} - ABN\_CFO_{i,t}$)
             of firm i at year t
             (used for the whole sample);

$Under\_CSR_{i,t-1}$ = the level of CSR underinvestment (measured as the absolute value of the
             negative residual in model (1)) for firm i in year $t-1$
             (used for firm-year observations underinvesting in CSR activities);

$Over\_CSR_{i,t-1}$ = the level of CSR overinvestment (measured as the positive residual in
             model (1)) for firm i in year $t-1$
             (used for firm-year observations overinvesting CSR activities).[11]

To control other effects on earnings management, we also introduce the following variables. As indicated by Cohen et al. (2008) and Zang (2012), it is probable that firms employ a mixed earnings manipulation strategy, encompassing both AEM and REM. Directors may make a trade-off between two manipulation techniques based on the relevant costs. Following Kim et al. (2012), we include Agg_REM (DA_ABS) as a control variable in the AEM (REM) regression models to control the substitutive nature of the two earnings management strategies. In addition, firms with better operational performance are less incentivised to distort their reported earnings (Bozzolan et al., 2015). We control the financial performance incentives by including profit margin (PM) and asset turnover (ATO).[12] Besides, if a firm has a relatively high level of gearing, directors are more tempted to engage in earnings management to show better performance and lower risks, especially when such entities are in the course of fundraising (Kim & Park, 2005). Therefore, the leverage level (Lev) is included to control the fundraising incentives for earnings manipulations. Moreover, empirical evidence also shows that firm size could explain the variation in the level of earnings management to a large extent (Roychowdhury, 2006). To control the firm size, we employ the natural logarithm of total assets ($Size$) as a proxy. The similar logic also applies to high growth firms. With greater growth opportunities, directors are more incentivised to disguise undesirable financial performance by means of AEM to mitigate the effect of negative earnings news (Skinner & Sloan, 2002), but are less motivated to distort financial performance via operational decisions departing from the optimal strategies due to the detrimental effect on long-term growth and prosperity (Barth, Landsman, & Lang, 2008). Based on Kim et al. (2012), we employ market to book value of equity (M_B), sales growth rate ($Growth$), and R&D intensity ($R\&D$), to control a firm's growing potential. Furthermore, firms' reporting behaviour may also be affected by the intensity of the internal and external monitoring. We use the overall governance score (CG), produced by Asset4, as a surrogate for the corporate governance quality, to control the internal and external supervision effects. Last but not least, corporate reporting may be affected by some industry factors and macro-level environment in different years as well. For instance, Bozzolan et al. (2015) contend that firms operating in industries with high litigation risks are more concerned about the exposure of their opportunistic reporting behaviour, and, hence, are more likely to maintain high quality earnings. Also, financial disclosure is likely to be affected by the changes in reporting standards and regulations in different years. Similar to the CSR determinants model, we also add industry

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[11] Other variables without illustrations here have the same meaning as the identical ones in model (1).

[12] Following the similar logic to financial performance controls in model (1), we decompose return on assets into profit margin and asset turnover due to their potentially different persistence (Nissim & Penman, 2001).

and year fixed effects to the AEM and REM models to control industry or year specific factors that may affect earnings quality.

4. Empirical Results

4.1. Descriptive Statistics and Univariate Analyses

Table 1 presents the sample distribution by industry based on the 2-digit SIC code. It can be seen that our sample encompasses a wide range of industries. The largest proportion is the Chemical & Allied Products industry (13.48%, SIC code 28), followed by the Electronic & Other Electric Equipment industry (12.25%, SIC code 36) and the Industrial Machinery & Equipment industry (9.60%, SIC code 35).

<Insert Table 1 Here>

Table 2 reports descriptive statistics for variables used for the main regression analyses. All continuous variables have been winsorized at the bottom and top one percentile. It indicates that our sample varies broadly in CSR scores. Firms with the most extensive CSR investments receive a CSR score of more than 90%, whereas firms with the least efforts in CSR activities only receive a score of 10% approximately.

<Insert Table 2 Here>

For the dependent variables, *DA* presents a negative mean value of -0.004, indicating that overall, our sample firms are more likely to engage in income-decreasing than income-increasing accruals. This is further proved by the fact that firms with negative *DA* account for around 53.4% of the full sample. As for REM proxies, the mean and median values of *ABN_Prod* (-0.034 and -0.033 respectively) are both negative, implying that on average, the sample firms tend not to engage in overproduction. As for *ABN_DisExp* and *ABN_CFO*, they both show positive mean and median values (0.003 and 0.001 for *ABN_DisExp*; 0.017 and 0.016 for *ABN_CFO*), indicating that in general, our sample firms do not seem to manipulate earnings via a reduction in discretionary expenses and acceleration of sales revenue through lenient discounts or credit terms. This is further proved by the negative mean and median values of the aggregated AEM measure (-0.060 and -0.056 respectively), suggesting that our sample firms tend not to distort earnings via real activities manipulations overall.

<Insert Table 3 Here>

Table 3 shows the Pearson correlation coefficients between variables. *CSR* is negatively correlated with *DA_ABS* and *Agg_REM*, indicating that firms with more investments in CSR activities are generally less inclined to engage in neither AEM nor REM. We will examine whether this relation still uniformly holds for all CSR investment levels in the multivariate analyses. Besides, we find *CSR* is positively correlated with *PM*, *ATO*, *CFO*, *Size* and *CG*. This indicates that firms, with better financial performance, greater size and better corporate governance quality usually invest more in CSR activities. However, we also find that *CSR* is negatively correlated with *Cash* and positively correlated with *Lev*, suggesting that firms making greater expenditure for CSR activities tend to show relatively worse liquidity and a higher level of gearing.

4.2. Multivariate Analyses
4.2.1. The association between Under_CSR and AEM

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Table 4 reports the results of multivariate analyses on the relation between the level of CSR underinvestment and AEM based on the observations with a negative residual. As the residuals may be correlated across firms, we present significance levels on the basis of robust standard errors clustered at the firm level.

<Insert Table 4 Here>

Under the *DA_ABS* model, the estimated coefficient on *Under_CSR* is positive and statistically significant, indicating that the lower a firm's CSR investment level is than the optimal point, the greater is the magnitude that the firm may engage in accrual-based earnings manipulations. The result accords with our first hypothesis that the level of CSR underinvestment is negatively associated with future earnings quality.

However, it is noteworthy that income-increasing and income-decreasing accrual-based earnings manipulations have totally different impacts on financial performance. Therefore, we further test the relation between *Under_CSR* and AEM by doing sub-sample analyses for firms with positive and negative discretionary accruals respectively. Specifically, we find that *Under_CSR* is positively and significantly related to *DA_Positive*, suggesting that, for firms intending to manipulate earnings upward through AEM, the greater the degree that a firm's CSR investments deviate downward from the optimal point, the more likely such entities exhibit income-increasing earnings manipulations through *DA*. This finding is also consistent with our first hypothesis. For firms underinvesting in CSR activities, the less a firm invests in CSR activities, the worse is its coordination of social aims and financial performance; therefore, the more likely directors are to manipulate future earnings upward to obfuscate any unsatisfactory operational performance on account of their compensation and career concerns.

While income-increasing AEM could help firms report better financial performance, there are also some firms manipulating earnings downward via accruals in order to lower the stock price prior to share repurchase or stock option grant (Gong, Louis, & Sun, 2008; McAnally, Srivastava, & Weaver, 2008), to build "cookie jar" reserves (Nelson, Elliott, & Tarpley, 2003), or even to reduce the political costs, e.g. the possibility of asset expropriation by governments (Zimmerman, 1983). We observe a negative and significant coefficient on *Under_CSR* for firms with negative discretionary accruals, suggesting that for firms intending to manipulate earnings downward through AEM, the greater degree of an *Under_CSR* firm's deviation from the optimal CSR investment level, the larger the extent of its manipulation of earnings via income-decreasing accruals and, therefore, its compromising of financial reporting quality. However, this relation only holds at the 10% significance level and is relatively weak. This might be because firms underinvesting in CSR activities have more difficulty meeting the needs of all relevant stakeholders, and, hence, they are less likely to fully acquire the tacit social licence to operate. As a consequence, such firms may find it hard to achieve financial performance goals and are more likely to engage in income-increasing rather than income-decreasing earnings manipulations. This tendency lends some measure of credibility to our empirical findings to some degree. Since firms with CSR underinvestment are more incentivised to improve their operational performance, it may be difficult to strongly link them to income-decreasing accruals. The incentive of downward AEM for *Under_CSR* firms could largely originate from other aforementioned sources, rather than CSR activities *per se*.

Taken together, our empirical results suggest that the level of CSR underinvestment is positively associated with the magnitude of AEM and negatively related to future earnings quality. This relation is mainly driven by income-increasing AEM.

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4.2.2. The association between Under_CSR and REM

Table 5 shows empirical results for the association between *Under_CSR* and REM. Similarly, significance levels are reported based on robust standard errors clustered at the firm level.

<Insert Table 5 Here>

We observe a positive and significant coefficient on *ABN_Prod*. Also, the estimated coefficients on both *ABN_DisExp* and *ABN_CFO* are significant with an expected negative sign. Given the rationale that lower (higher) abnormal production costs (abnormal discretionary expenses and abnormal cash flows) suggest more aggressive operational strategies, these empirical results indicate that the greater the degree of a firm's underinvestment in CSR activities, the less likely it is that such entities could gain enough support from various stakeholders. Accordingly, it is harder for them to achieve the targeted financial performance, and therefore, they are more incentivised to engage in real activities manipulations, such as overproduction, reduction in discretionary expenses and accelerating the timing of sales revenue, to achieve the desired operational performance. Besides, the coefficient on *Under_CSR* for the *Agg_REM* model also takes on a positive and significant sign, implying that the empirical evidence still holds when we take the aggregated REM measure. These findings also support our first hypothesis that the level of CSR underinvestment is negatively associated with future earnings quality.

4.2.3. The association between Over_CSR and AEM

Table 6 presents the multiple regression results for the relation between *Over_CSR* and AEM. Likewise, significance levels are presented based on robust standard errors clustered at the firm level.

<Insert Table 6 Here>

It is a little unexpected that none of the three models takes on a statistically significant sign for the estimated coefficient on *Over_CSR*, indicating that the level of CSR overinvestment does not seem to be related to accrual-based earnings manipulations. However, the insignificant empirical results cannot totally exclude the possibility that over investing in CSR activities is associated with opportunistic financial reporting behaviour via AEM due to the following reasons.

First, as elucidated before, the incentives for CSR overinvestment often vary. If directors divert the allocated resources for CSR investments in pursuit of their personal benefits rather than for the benefits of a wide range of stakeholders, the irresponsible use of firm resources, often at the expense of investors, is likely to deteriorate subsequent financial performance (Chih et al., 2008). Therefore, CSR overinvestment may be a catalyst for rent-seeking directors to distort future economic performance in order to defend the outsider interference, giving rise to lower earnings quality. Nevertheless, if directors overinvest in CSR activities due to the private information on promising future prospects (Lys et al., 2015), they are less incentivised to engage in earnings management subsequently given the desirable financial performance, leading to higher earnings quality. Our insignificant results could be driven by the varying incentives of CSR overinvestment in different firms. The positive effect of CSR overinvestment by some firms may offset the negative effect brought about by others, leaving the overall effect minor and insignificant.

Second, firms may manage earnings via accruals in different ways. Results and inferences of the accrual-related research may be critically impacted by the choice of accrual measures (Larson, Sloan, & Giedt, 2018). There are three roles for accounting accruals identified in previous research: (1) capturing investments relevant to the scale of business growth (Jones, 1991), (2) reflecting the asymmetric recognition of accounting losses (Ball & Shivakumar, 2006; Basu, 1997), and (3) mitigating the timing differences between economic events and the related cash flow impacts (Dechow, 1994). Our empirical results can only show that the sample firms over investing in CSR activities are not involved in AEM measured by the modified Jones (1991) model, but cannot confirm that these entities do not engage in other forms of AEM that have a negative effect on earnings quality, such as non-articulating accruals that cannot be explained by conditional conservatism (Larson et al., 2018). Also, opportunistic incentives behind CSR overinvestment might be reflected by real activities manipulations, which will be illustrated in the next section.

4.2.4. The association between Over_CSR and REM

Table 7 presents the regression results for the association between *Over_CSR* and REM. Also, we report significance levels based on robust standard errors clustered at the firm level.

<Insert Table 7 Here>

The results on the relation between *Over_CSR* and REM are inconsistent throughout the four AEM proxies. First, similar to the evidence on the effect of *Over_CSR* on AEM, we do not observe a significant coefficient on *Over_CSR* for the *ABN_Prod* model, indicating that overinvesting in CSR activities does not trigger subsequent real activities manipulation via overproduction. As we discussed in section 4.2.3, this cannot exclude the possibility that the level of CSR overinvestment is associated with REM through overproduction. It could also be the case that the effect of deteriorated financial performance for some firms offsets the impact of private information on desirable future financial performance for other entities, resulting in an overall insignificant relation. Besides, apart from overproduction, firms may engage in REM via other forms, such as reduction in discretionary expenses and acceleration of sales revenue. The impact of *Over_CSR* on REM may be manifested in these activities.

We find that *Over_CSR* is positively associated with *ABN_DisExp*, suggesting that overinvesting in CSR activities indicates greater discretionary expenditure in the subsequent period. This is consistent with the hypothesis concerning private information about promising future financial performance. However, this relation is only significant at the 10% level and is fairly weak. On the contrary, we observe a negative relation between *Over_CSR* and *ABN_CFO*, which implies that CSR overinvestment may lead to subsequent real activities manipulation through accelerating the timing of sales. This is consistent with the hypothesis concerning deteriorated future financial performance. Nevertheless, this relation is only significant at the 5% level and is also relatively weak.

The inconsistent relation throughout the individual REM measures is further revealed by the insignificant relation between *Over_CSR* and the aggregated REM proxy, suggesting that the level of CSR overinvestment is not significantly related to the aggressive operational strategies overall. Given the mixed evidence on the four REM proxy models, we may not be able to draw a conclusion that can provide a bird's eye view of this relation. What we may argue is that the incentives for CSR overinvestment play an overarching role in this relation. Therefore, more

transparent CSR reporting regarding the aim and strategy of CSR investments is imperative, to shed more light on the incentives of relevant CSR activities.

4.3. Further Discussion of Empirical Results

Combining the four groups of empirical evidence on the relation between the level of CSR under or overinvestment and earnings quality, we make the following inferences. For firms underinvesting in CSR activities, our empirical evidence indicates that overall, they engage less in earnings management via either accruals or aggressive operational strategies as the level of CSR investment draws closer to the optimal point. This is consistent with our first hypothesis, namely, that the level of CSR underinvestment is negatively associated with future earnings quality. However, for firms over investing in CSR activities, we do not obtain strong evidence of the relation between the level of CSR overinvestment and earnings quality. This may be due to the varying incentives for CSR overinvestment by different firms, which, in turn, make different impacts on the subsequent financial reporting quality.

The empirical results for *Under_CSR* firms are consistent with the prior literature that documents a negative relation between CSR endeavours and earnings management based on the full sample (e.g. Kim et al., 2012). The most noticeable difference between our study and the previous research lies in the research design. Instead of testing the relation between CSR activities and earnings quality using the full sample, we first divide a firm's CSR investments into two parts: (1) the theoretically optimal level component, which can be explained by the firm specific determinants and (2) the component deviating from the optimal level, which is unrelated to the aforementioned factors. Then, we divide the full sample into two sub-samples (firms underinvesting and overinvesting in CSR activities respectively) and test the relation between the level of CSR under or overinvestment and earnings quality for the two sub-samples separately. Our heterogeneous results for *Under_CSR* and *Over_CSR* firms suggest that the monotonic linear relation between CSR endeavours and earnings management documented in previous studies may be largely driven by the portion of firms underinvesting in CSR activities. Nevertheless, firms overinvesting in CSR activities may be more noteworthy for investors, regulators and other constituents, since the incentives of those firms are well worth questioning. Our empirical results, together with some other CSR-related studies (e.g. Dhaliwal et al., 2011; Ioannou & Serafeim, 2017; Plumlee et al., 2015), emphasise the imperative need of more transparent reporting on the detailed nature, aim and strategy of relevant CSR activities.

Furthermore, our empirical results are robust to AEM and REM proxy deformation, alternative earnings management controls and the endogeneity test. Details on all robustness checks are available in the online Appendix D.

5. Concluding Remarks

Previous inconsistent empirical evidence on the association between CSR endeavours and earnings quality overlooks the potential heterogeneity in CSR investments. We posit that CSR investments may not be monotonically associated with firms' earnings quality. Using CSR investment and financial data available between 2010 and 2019 from Asset4, our study provides the first evidence of the heterogeneity in CSR activities in light of financial reporting quality.

The potentially non-monotonic relation between CSR investments and earnings quality is first supported by the theoretical underpinnings. Given the cost-benefit analysis, there exists an optimal level of CSR investments based on the firm and industry factors. Before reaching the

optimal level, the more (less) a firm invests in CSR activities, the better (worse) is its coordination of the social aims and its financial performance, and, therefore, the less (more) likely directors are to manipulate future earnings to obfuscate any unsatisfactory operational performance on account of their compensation and career concerns. Hence, the level of CSR underinvestment is negatively associated with future earnings quality. However, theories offer competing predictions on the relation between CSR investments and earnings quality for firms over investing in CSR activities. If directors excessively invest in CSR activities in pursuit of their personal benefits rather than for the benefits of a wide range of stakeholders, the irresponsible use of firm resources is likely to deteriorate subsequent financial performance and may act as a catalyst for rent-seeking directors to distort future economic performance in order to defend the outsider interference, giving rise to lower earnings quality. By contrast, if directors overinvest in CSR activities due to the private information on promising future prospects, they are less incentivised to engage in subsequent earnings management given the desirable financial performance, leading to higher earnings quality.

Overall, our empirical results show that the level of underinvesting in CSR activities is positively associated with the magnitude of both AEM and REM, and, hence, negatively related to earnings quality, consistent with our first hypothesis. For firms overinvesting in CSR activities, we do not find a significant relation between CSR overinvestment and AEM. The empirical analyses for real activities manipulation exhibit inconsistent results throughout the four REM proxies. However, the mixed evidence for firms with CSR overinvestment cannot fully exclude the possibility that overinvesting in CSR activities has a significant impact on future financial reporting quality. The inconsistent empirical results could be driven by the varying incentives of CSR overinvestment in different firms, which are elucidated in the theoretical underpinnings. The positive effect of CSR overinvestment by some firms may offset the negative effect brought about by others, making the overall effect minor and unnoticeable.

Identifying the heterogeneity in CSR investments, the empirical evidence implies that greater CSR endeavours may be not an indicator of corporate philanthropy but a camouflaged tool to cover managerial opportunism. Therefore, investors should better control the resources for CSR investments allocated to management to better alleviate the stewardship problem. The incentive and feasibility of CSR investment projects should be more strictly examined before the relevant funds are granted. Moreover, this study also offers some implications to regulators. As the impact of CSR overinvestment largely depends on the incentives for such endeavours, our empirical results underline the need of more transparent reporting with respect to the nature, aim and strategy of CSR activities. In contrast to financial reporting, CSR disclosure still remains voluntary for most firms in most jurisdictions. Even if it is a mandatory requirement to include some CSR related information in the annual report for some firms in some countries, there is still a huge flexible space in terms of the contents of disclosure.[13] Regulators may consider further improving the current CSR reporting guidance on the detailed disclosure contents to help investing communities and other constituents better understand the incentives of relevant CSR activities.

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[13] For instance, the UK Companies Act (2013) requires all firms listed in the main market of the London Stock Exchange to make relevant disclosures about social and community issues, gender diversity, human rights and greenhouse gas emissions in their strategic report and directors' report. Nevertheless, the regulation follows a "comply or explain" approach. Firms may decide whether to make relevant disclosures or provide sound reasons why they do not disclose such information. Furthermore, there is still a lack of detailed and consistent guidance regarding the disclosure of CSR activities in terms of the nature, aim, strategy, etc.

This paper, however, is not free from limitations. First, we measure CSR investment based on the weighted average of social and environmental pillar scores produced by Asset4. Even though the rationale and reliability of such a measure has been widely justified in the previous research (Lys et al., 2015), one may still argue that this proxy may not accurately capture the true level of CSR investment. With increasingly transparent CSR reporting available, future research may obtain more reliable CSR investment data to strengthen the empirical evidence documented in this paper. Second, we use the magnitude of the residual, calculated from the regression of CSR investment determinants, to measure the level of CSR under or overinvestment. Despite our efforts to encompass related CSR determinants as far as possible, there could be other factors not included in our model. This may result in endogeneity concerns, making the measure of CSR under and overinvestment less reliable. Future studies may further investigate the factors that could affect CSR endeavours to obtain a more complete set of determinants, reducing the bias in CSR under and overinvestment proxies. Last but not least, given the increasing complexity in economic transactions, the ways to manage earnings are also diverse. We only consider several types of earnings management proxies. Future research may consider other surrogates of earnings quality to further examine this topic.

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Appendices

Appendix A. AEM Measurement

Based on DeFond and Subramanyam (1998) and Cohen et al. (2008), accruals are innately related to operational fundamentals, such as fixed assets and revenue. The proportion of total accruals that could be explained by these operational capabilities and performance is perceived as normal accruals. Any deviation from normal accruals is regarded as discretionary accruals. Following Kothari (2005) and Kim et al. (2012), we also control operational performance by introducing a regressor of return on assets (measured as earnings before extraordinary items divided by total assets) to enhance the reliability of *DA* estimation. Specifically, we employ the following model (A-1) to estimate *DA*, which is measured as the residual of the regression result. The higher the absolute value of the residual is, the higher the level of *DA* is.

$$\frac{TA_{i,t}}{Ass_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{Ass_{i,t-1}} + \alpha_2 \frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{Ass_{i,t-1}} + \alpha_3 \frac{PPE_{i,t}}{Ass_{i,t-1}} + \alpha_4 \frac{EBEI_{i,t-1}}{Ass_{i,t-1}} + \varepsilon_{i,t} \qquad (A-1)$$

where,
$TA_{i,t}$ = total accruals of firm i in year t;[14]
$Ass_{i,t-1}$= total assets of firm i in year $t-1$;
$\Delta REV_{i,t}$ = change in revenue for firm i from year $t-1$ to year t;
$\Delta REC_{i,t}$ = change in net account receivables for firm i from year $t-1$ to year t;
$PPE_{i,t}$ = total amount of property, plant and equipment of firm i in year t;
$EBEI_{i,t-1}$ = earnings before extraordinary items of firm i in year $t-1$.

Appendix B. REM Measurement

Prior literature mainly shows three types of REM: (1) abnormal production costs (*ABN_Prod*), (2) abnormal discretionary expenses (*ABN_DisExp*) and (3) abnormal cash flows from operating activities (*ABN_CFO*).

First, directors are sometimes incentivised to increase the level of production in order to spread fixed costs over more volumes (Cohen & Zarowin, 2010). With a lower fixed costs per unit, total costs per unit will be reduced as long as the decrease in total costs per unit is not offset by the growth in marginal costs per unit. Accordingly, firms could report a lower cost of sales and a higher operating profit margin. Nevertheless, the increase in production units relative to sales volume may incur additional holding costs and result in lower operating cash flows given the operating profit levels (Cohen et al, 2008), leading to lower earnings quality. This gives rise to our first REM proxy, *ABN_Prod*. The rationale behind this surrogate is that the normal level of production costs is innately associated with the level of sales and changes in the level of sales in recent years, and, therefore, any deviation from the theoretically normal production level may be perceived as overproduction (Athanasakou, Strong, & Walker, 2011; Badertscher, 2011). Following Cohen et al. (2008), we use the following model (A-2) to estimate *ABN_Prod*, which is measured as the residual of the regression result. The higher the residual is, the higher the level of overproduction is.

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[14] Following Jones (1991) and Kim et al. (2012), total accruals are calculated as follows: $TA_{i,t}$= $(\Delta Current\ Asset_t - \Delta Cash_t) - (\Delta Current\ Liabilities_t - \Delta Current\ Portion\ of\ Long\ Term\ Debts_t) - Depreciation\ and\ Amortisation\ Expenses_t$.

$$\frac{Prod_{i,t}}{Ass_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{Ass_{i,t-1}} + \alpha_2 \frac{REV_{i,t}}{Ass_{i,t-1}} + \alpha_3 \frac{\Delta REV_{i,t}}{Ass_{i,t-1}} + \alpha_4 \frac{\Delta REV_{i,t-1}}{Ass_{i,t-1}} + \varepsilon_{i,t} \qquad \text{(A-2)}$$

where,

$Prod_{i,t}$ = production costs of firm i in year t, which is calculated as the sum of changes in inventory and costs of sales;

$REV_{i,t}$ = net revenue of firm i in year t;

$\Delta REV_{i,t-1}$ = change in revenue for firm i from year $t-2$ to year $t-1$.

Directors may also reduce the expenditure in discretionary activities (e.g. R&D, advertising and sales and administration) to boost the operational performance (Roychowdhury, 2006). However, the temporary earnings growth and increase in operating cash flows are usually at the cost of future performance since the delayed expenditure has to be paid off in the subsequent periods (Cohen et al., 2008). Hence, normal discretionary expenses should be based on normal sales level and the deviation is attributed to *ABN_DisExp*. Following Roychowdhury (2006) and Cohen et al. (2008), we use the following model (A-3) to estimate *ABN_DisExp*, which is measured as the residual of the regression result. The lower the residual is, the higher the level of *ABN_DisExp* is.

$$\frac{DisExp_{i,t}}{Ass_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{Ass_{i,t-1}} + \alpha_2 \frac{REV_{i,t-1}}{Ass_{i,t-1}} + \varepsilon_{i,t} \qquad \text{(A-3)}$$

where,

$DisExp_{i,t}$ = discretionary expenses of firm i in year t, which is calculated as the sum of R&D expenses, selling, administrative and other general expenses.

Last but not least, real activities manipulations may also be achieved through accelerating the timing of sales by excessive credit terms and price discounts (Cohen et al., 2008). This could temporarily boost sales revenue but may be vulnerable to recession when firms return to normal sales strategies in future periods. Even though the lenient credit terms and discounts may lead to better operational performance, firms may suffer from lower operating cash flows and, therefore, lower earnings quality. This gives rise to our third REM construct, *ABN_CFO*. Arguably, the normal level of operating cash flows is consistent with the level of sales revenue and changes in sales revenue, and, hence, the deviation is brought about by REM. Following Roychowdhury (2006) and Cohen and Zarowin (2010), we use the following model (A-4) to estimate *ABN_CFO*, which is measured as the residual of the regression result. The lower the residual is, the higher the level of *ABN_CFO* is.

$$\frac{CFO_{i,t}}{Ass_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{Ass_{i,t-1}} + \alpha_2 \frac{REV_{i,t}}{Ass_{i,t-1}} + \alpha_3 \frac{\Delta REV_{i,t}}{Ass_{i,t-1}} + \varepsilon_{i,t} \qquad \text{(A-4)}$$

where,

$CFO_{i,t}$ = operating cash flows of firm i in year t.

Similar to Kim et al. (2012) and Bozzolan et al. (2015), we also combine the above three proxies of real activities manipulations to construct an aggregated REM measure (*Agg_REM*), which is calculated as *ABN_Prod – ABN_DisExp – ABN_CFO*.

Appendix C. Determinants of CSR investments

Table C-1 exhibits the results for the determinants of CSR investments based on the regression analyses of the full sample. We also perform several robustness checks to ensure that the results of our subsequent regression analyses are not driven by the specific model design choice.

Table C-1. Determinants of CSR Investments

	1	2	3	4	5
PM	0.040	0.066**	0.088**	0.034	0.026
	(0.032)	(0.032)	(0.035)	(0.033)	(0.032)
ATO	0.039***	0.033***	0.045***	0.028***	0.026***
	(0.009)	(0.009)	(0.010)	(0.009)	(0.009)
CFO	0.186***	0.174***	0.192***	0.235***	0.222***
	(0.053)	(0.053)	(0.060)	(0.053)	(0.052)
Cash	-0.215***	-0.215***	-0.259***	-0.212***	-0.202***
	(0.032)	(0.032)	(0.035)	(0.032)	(0.031)
Lev	0.106***	0.121***	0.139***	0.101***	0.100***
	(0.021)	(0.021)	(0.023)	(0.020)	(0.020)
Size	0.016***		0.020***	0.016***	0.015***
	(0.001)		(0.002)	(0.001)	(0.001)
M_B	0.003	-0.006**	0.003	0.001	0.002
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)
Growth	-0.036***	-0.043***	-0.060***	-0.033***	-0.032***
	(0.012)	(0.012)	(0.013)	(0.012)	(0.012)
R&D	0.289***	0.191***	0.400***	0.278***	0.278***
	(0.071)	(0.072)	(0.079)	(0.066)	(0.066)
CG	0.373***	0.400***		0.379***	0.381***
	(0.017)	(0.016)		(0.017)	(0.017)
Constant	-0.007	0.284***	0.097***	0.014	0.016
	(0.029)	(0.017)	(0.032)	(0.027)	(0.027)
Industry fixed effects	Yes	Yes	Yes	No	No
Year fixed effects	Yes	Yes	Yes	Yes	No
N	13,252	13,252	13,252	13,252	13,252
Adjusted R-squared	0.281	0.245	0.151	0.251	0.250

***, **, and * on the top right of coefficients indicate statistical significance at 1%, 5%, and 10% levels respectively, based on two-tailed tests. The robust standard errors (reported in parentheses) are clustered at the firm level. Industry (classified based on the first two-digit SIC codes) and year fixed effects are included in some models, but results are not reported for succinctness.

Column 1 of Table C-1 presents the regression results based on all variables specified in model (1). Consistent with prior literature (Lys et al., 2015), our results show that the positive relation between CSR investments and return on assets is mainly driven by *ATO*, the more persistent component of return on assets, rather than *PM*. Regarding the remaining variables, the results in column 1 of Table C-1 imply that higher levels of CSR investments are related to higher levels of operating cash flows (the coefficient on *CFO* is positive and statistically significant); larger firm sizes (the coefficient on *Size* is positive and statistically significant); better growth prospects (the coefficients on *M_B* and *R&D* are positive, and the coefficient on *R&D* is also statistically significant); stronger corporate governance (the coefficient on *CG* is positive and statistically significant). A little surprisingly, the coefficient on *Cash* takes on a significant and negative sign, indicating that more expenditures in CSR activities are associated with lower levels of spare funds. Although this seems inconsistent with our expectation, the positive and

significant sign on the coefficient of *Lev* lends some credibility to this. The results of the availability of funds and leverage level suggest that our sample firms tend to raise additional debt financing, rather than use spare funds, to feed CSR investments. Another unexpected result occurs for sales growth. The significant and negative coefficient of *Growth* indicates that our selected firms with more promising sales growth prospects seem to invest less in CSR activities. The result is sensible to some degree, in that directors may appropriate more funds for the investments that have a more direct impact on the firm's short-term financial performance if they see better growth prospects in the foreseeable future based on the recent sales performance. This is consistent with the empirical evidence documented by Brammer and Millington (2008) that firms with better financial performance in the short run usually perform worse in CSR activities.

As is indicated in the empirical model specification, the residual values generated based on model (1) are of great importance to our subsequent regression analyses. Therefore, we conduct some robustness checks for model (1). Specifically, we rerun model (1) by omitting each of the independent variables one at a time. The most conspicuous change takes place when we drop *Size* and *CG*, consistent with Lys et al. (2015). As such, we present the regression results that eliminate these two variables in columns 2 and 3 of Table C-1. The results of the most explanatory variables are qualitatively similar to the results based on the full set of variables if we omit the variable of firm size, except for the coefficients on *PM* and *M_B*. Neither does the overall fit of the model vary significantly. When we omit *CG*, the adjusted R-squared drops around 13% and the overall fit is weakened. Nevertheless, the coefficients on other explanatory variables generally retain the same signs and significance levels, compared with the results in column 1. We further test the sensitivity of our model design by eliminating year fixed effect only, industry fixed effect only and both year and industry fixed effects. Likewise, the coefficients on all explanatory variables for all three situations show signs and significance levels similar to the results in column 1. The relatively obvious changes in the adjusted R-squared occur when we exclude industry fixed effect only and both year and industry fixed effects, with an approximately 3% reduction for each situation. We tabulate the results for these two situations in column 4 and 5. The adjusted R-squared for the result of the model without year fixed effect, which is untabulated, is almost the same as that for the model with the full set of variables.

For the regression results of the original model (1) and all robustness tests specified above, we derive the residual values used for the calculation of CSR under or overinvestment level in the subsequent analyses. The results of each specification are qualitatively similar. For succinctness, we therefore only present results of further regressions based on the residual value generated from the original model (1).

Appendix D. Robustness Checks

D-1. Alternative measures of AEM and REM

Bozzolan et al. (2015) develop AEM and REM measures based on the decile distribution of the original proxies. To test the robustness of our findings to the chosen measures of earnings management, we re-run the empirical analyses based on AEM and REM measures calculated by sorting the original proxies into deciles (*DA_ABS_*Decile, *DA_Positive_Decile* and *DA_Negative_Decile* for AEM; *ABN_Prod_Decile*, *ABN_DisExp_Decile*, *ABN_CFO_Decile* and *Agg_REM_Decile* for REM). For AEM decile proxies, the higher (lower) the values of *DA_ABS_Decile* and *DA_Positive_Decile* (*DA_Negative_Decile*) are, the greater the level of AEM is respectively. For REM decile proxies, the higher (lower) the values of

ABN_Prod_Decile and *Agg_REM_Decile* (*ABN_DisExp_Decile* and *ABN_CFO_Decile*) are, the greater the degree of REM is.

In the untabulated results, we find a significant and positive (negative) relation between *Under_CSR* and *DA_ABS_Decile*, as well as *DA_Positive_Decile* (*DA_Negative_Decile*), but we do not observe a significant relation between *Over_CSR* and AEM decile proxies, consistent with our prior empirical findings. As for the results of REM decile proxies, the coefficients on *Under_CSR* are significant for all four models with an expected sign, whereas *Over_CSR* firms still show inconsistent results, similar to the previous results. Therefore, our empirical findings are robust to the earnings management proxy deformation.

D-2. Alternative measures of control variables

As discussed before, motivation to engage in earnings manipulations is usually subject to financial performance. Considering the different persistence of profitability and operational efficiency (Nissim & Penman, 2001), we decompose return on assets into two components (*PM* and *ATO*) to control the financial performance effect on earnings management. More profitable and operationally efficient firms are arguably less incentivised to engage in earnings manipulation activities, through either AEM or REM. We further consider some industry adjusted financial performance to further test the robustness of our empirical results. As Kim et al. (2012) document, the effect of financial performance on earnings management depends not only on firm performance *per se* but also on the gap between it and industry average level. Hence, we re-estimate the regressions by substituting industry adjusted profit margin (*Ind_PM*) and asset turnover (*Ind_ATO*) for *PM* and *ATO*. *Ind_PM* (*Ind_ATO*) is calculated by the difference between firm *PM* (*ATO*) and the industry median based on the first two-digit SIC codes. The untabulated results, after controlling industry average adjusted financial performance, are qualitatively similar to our prior findings. Therefore, our empirical evidence is robust to the industry adjusted financial performance controls as well.

In addition, although prior literature (e.g. Cheng, Lee, & Shevlin, 2016; Larcker et al., 2007; Wells, 2020) demonstrates that corporate governance has a significant effect on firms' reporting behaviour, we only consider the overall quality of corporate governance by adding a net governance score control to our models. In order to disentangle the corporate governance effects, we further consider some specific governance components as control variables. The extant studies reveal that independent directors have a monitoring effect on financial reporting quality (e.g. Chen, Cheng, & Wang, 2015; Marra, Mazzola, & Mazzola, 2011). We control board independence by adding the proportion of independent directors (*Proportion_ID*) to our regression models. Cohen et al. (2008) reveal that the level of remuneration could induce opportunistic reporting behaviour since directors are incentivised to manipulate earnings to achieve or even beat the financial targets and, therefore, get higher compensation. We control this effect by adding to our regression models in turn, total directors' compensation (*Compensation*), the value of total equity held (*Equity*), the intrinsic value of options held (*Option*) and the value of long-term incentive plans held (*Long_Incentive_Plan*). The data on board independence and remuneration are collected from the BoardEx database. After matching data of these new control variables with our initial dataset, our sample size is reduced. Nevertheless, the untabulated regression results of our explanatory variables are still similar to the models with the overall corporate governance control. Hence, our empirical evidence is robust to the use of board independence and directors' remuneration to control the specific governance aspects.

D-3. Test of endogeneity

Earnings quality and the level of CSR investments might be endogenously determined by some unobservable factors. For instance, one could argue that better financial reporting quality may be motivated by directors' ethical belief. Also, some firms regard CSR endeavours as an ethical obligation (Carroll, 1979). Therefore, the ethical belief, as an unobservable factor, could have an influence on both CSR investments and earnings quality. This could bias our empirical results. Moreover, as better financial reporting quality enhances the credibility of a firm, firms with better earnings quality are likely to attract more capital investments to fund social and environmental projects. As a consequence, earnings quality may affect CSR investment strategy, indicating a reverse causality problem. In an effort to alleviate the potential endogeneity concerns, we employ the two-stage least squares (2SLS) regression model to further test the robustness of our previous results.

As for the instrument of *Under_CSR* (*Over_CSR*), we use the average level of CSR underinvestment (overinvestment) for all firms with the same first two-digit SIC code as firm i in year $t-1$, excluding firm i. The rationale of the selected instruments (*Under_CSR_IV* for *Under_CSR*; *Over_CSR_IV* for *Over_CSR*) is that the level of CSR under or overinvestment for a specific firm tends to be motivated by other firms' CSR endeavours in the same industry, but arguably the industry average level of CSR under or overinvestment is unrelated to the financial reporting behaviour of that individual firm (Bozzolan et al., 2015; Fabrizi, Mallin, & Michelon, 2014). To mitigate the endogeneity concerns about our explanatory variables, we re-run the regression models in Tables 4, 5, 6, and 7, using the standard 2SLS model with other control variables the same in the two stages.

For firms underinvesting in CSR activities, the untabulated 2SLS regression results show that *Under_CSR_IV* is significantly and positively associated with *Under_CSR* in all first stage regressions. The corresponding Sanderson-Windmeijer (2016) multivariate F test of excluding instruments shows that the F-statistics of both AEM and REM models are larger than the cut-off point, indicating that these models do not suffer from the weak instrument problem. The similar results also appear in all of the *Over_CSR_IV* testing, suggesting that models for *Over_CSR* firms are not liable to the weak instrument problem as well.

For the second stage regression results, the coefficients on the fitted value of *Under_CSR* are significant with expected signs for all AEM and REM models, consistent with the results reported in Tables 4 and 5. As for entities overinvesting in CSR activities, the coefficients on the fitted value of *Over_CSR* take on insignificant signs for AEM models, but exhibit mixed results for REM models, similar to the results presented in Tables 6 and 7. Overall, our empirical evidence documented in Tables 4, 5, 6, and 7 is robust to the endogeneity test.

Tables

Table 1. Sample Distribution by Industry

Industry	2-digit SIC	N	Percentage (%)	Cumulative Percentage (%)
Agricultural Production – Crops	01	47	0.35	0.35
Agricultural Production – Crops	02	18	0.13	0.48
Agricultural Services	07	27	0.20	0.69
Fishing, Hunting, & Trapping	09	4	0.03	0.72
Metal, Mining	10	248	1.85	2.57
Coal Mining	12	57	0.43	2.99
Oil & Gas Extraction	13	289	2.16	5.15
Nonmetallic Minerals, Except Fuels	14	19	0.14	5.29
General Building Contractors	15	296	2.21	7.50
Heavy Construction, Except Building	16	132	0.98	8.48
Special Trade Contractors	17	3	0.02	8.50
Food & Kindred Products	20	649	4.84	13.34
Tobacco Products	21	29	0.22	13.56
Textile Mill Products	22	43	0.32	13.88
Apparel & Other Textile Products	23	104	0.78	14.66
Lumber & Wood Products	24	43	0.32	14.98
Furniture & Fixtures	25	39	0.29	15.27
Paper & Allied Products	26	171	1.28	16.54
Printing & Publishing	27	69	0.51	17.06
Chemical & Allied Products	28	1,807	13.48	30.54
Petroleum & Coal Products	29	230	1.72	32.25
Rubber & Miscellaneous Plastics Products	30	227	1.69	33.94
Leather & Leather Products	31	34	0.25	34.20
Stone, Clay, & Glass Products	32	241	1.80	36.00
Primary Metal Industries	33	560	4.18	40.17
Fabricated Metal Products	34	271	2.02	42.19
Industrial Machinery & Equipment	35	1,287	9.60	51.79
Electronic & Other Electric Equipment	36	1,643	12.25	64.05
Transportation Equipment	37	942	7.03	71.07
Instruments & Related Products	38	892	6.65	77.73
Miscellaneous Manufacturing Industries	39	128	0.95	78.68
Railroad Transportation	40	25	0.19	78.87
Local & Interurban Passenger Transit	41	39	0.29	79.16
Trucking & Warehousing	42	24	0.18	79.34
U.S. Postal Service	43	1	0.01	79.35
Water Transportation	44	77	0.57	79.92
Transportation by Air	45	54	0.40	80.32
Pipelines, Except Natural Gas	46	1	0.01	80.33
Transportation Services	47	12	0.09	80.42
Communications	48	368	2.74	83.17
Electric, Gas, & Sanitary Services	49	501	3.74	86.90
Wholesale Trade – Durable Goods	50	101	0.75	87.66
Wholesale Trade – Nondurable Goods	51	104	0.78	88.43
Building Materials & Gardening Supplies	52	11	0.08	88.51
General Merchandise Stores	53	64	0.48	88.99
Food Stores	54	36	0.27	89.26
Automotive Dealers & Service Stations	55	32	0.24	89.50
Apparel & Accessory Stores	56	28	0.21	89.71
Furniture & Home furnishings Stores	57	22	0.16	89.87
Eating & Drinking Places	58	19	0.14	90.01

Table 1 (continued)

Industry	2-digit SIC	N	Percentage (%)	Cumulative Percentage (%)
Miscellaneous Retail	59	49	0.37	90.38
Hotels & Other Lodging Places	70	20	0.15	90.53
Personal Services	72	4	0.03	90.56
Business Services	73	998	7.44	98.00
Auto Repair, Services, & Parking	75	9	0.07	98.07
Miscellaneous Repair Services	76	12	0.09	98.16
Motion Pictures	78	14	0.10	98.26
Amusement & Recreation Services	79	31	0.23	98.49
Health Services	80	57	0.43	98.92
Educational Services	82	22	0.16	99.08
Engineering & Management Services	87	123	0.92	100.00
Total		**13,407**	**100**	

Table 2. Descriptive Statistics

Variables	N	Mean	Std. Dev.	P1	P25	Median	P75	P99
CSR variable								
CSR	13407	0.546	0.213	0.113	0.371	0.563	0.721	0.919
Dependent variables								
DA	11126	-0.004	0.076	-0.244	-0.036	-0.003	0.028	0.231
DA_ABS	11126	0.050	0.059	0.001	0.014	0.032	0.063	0.309
DA_Positive	5181	0.049	0.062	0.001	0.013	0.031	0.061	0.337
DA_Negative	5945	-0.051	0.057	-0.295	-0.065	-0.033	-0.015	-0.001
ABN_Prod	13234	-0.034	0.159	-0.442	-0.118	-0.033	0.044	0.470
ABN_DisExp	11277	0.003	0.160	-0.487	-0.062	0.001	0.068	0.450
ABN_CFO	13283	0.017	0.075	-0.193	-0.022	0.016	0.054	0.233
Agg_REM	11243	-0.060	0.329	-0.894	-0.234	-0.056	0.097	0.991
Other variables								
PM	13407	0.108	0.118	-0.229	0.049	0.093	0.158	0.491
ATO	13407	0.838	0.461	0.140	0.530	0.770	1.030	2.550
CFO	13407	0.090	0.065	-0.076	0.054	0.085	0.123	0.284
Cash	13407	0.111	0.105	0.000	0.039	0.081	0.150	0.506
Lev	13407	0.311	0.212	0.000	0.145	0.312	0.459	0.787
Size	13407	17.294	2.872	12.154	14.992	16.981	19.574	23.611
M_B	13407	2.450	1.626	0.410	1.210	1.990	3.300	7.380
Growth	13407	0.070	0.172	-0.375	-0.013	0.052	0.133	0.668
R&D	13407	0.042	0.060	0.000	0.004	0.019	0.050	0.276
CG	13407	0.520	0.214	0.087	0.351	0.526	0.692	0.921

Table 3. Pearson Correlation Matrix

	1	2	3	4	5	6	7
1. *CSR*	1.000						
2. *DA*	-0.023***	1.000					
3. *DA_ABS*	-0.139***	0.085***	1.000				
4. *DA_Positive*	-0.145***	0.994***	0.998***	1.000			
5. *DA_Negative*	0.132***	0.997***	-0.999***	n/a	1.000		
6. *ABN_Prod*	-0.029***	0.051***	-0.040***	-0.022***	0.064***	1.000	
7. *ABN_DisExp*	-0.028***	0.049***	0.338***	0.402***	-0.281***	-0.455***	1.000
8. *ABN_CFO*	0.014***	-0.094***	-0.111***	-0.166***	0.049***	-0.416***	-0.322***
9. *Agg_REM*	-0.020**	-0.001	-0.202***	-0.240***	0.176***	0.862***	-0.785***
10. *PM*	0.020***	0.088***	-0.080***	-0.041***	0.121***	-0.226***	-0.229***
11. *ATO*	0.058***	-0.024***	-0.090***	-0.104***	0.076***	0.227***	-0.239***
12. *CFO*	0.082***	-0.056***	-0.213***	-0.246***	0.180***	-0.229***	-0.324***
13. *Cash*	-0.126***	-0.131***	0.229***	0.135***	-0.316***	-0.102***	0.286***
14. *Lev*	0.019***	-0.012**	-0.023***	-0.027***	0.016**	-0.001	0.004
15. *Size*	0.263***	0.029***	-0.233***	-0.228***	0.239***	0.044***	-0.172***
16. *M_B*	-0.001	0.024***	0.140***	0.173***	-0.105***	-0.144***	0.184***
17. *Growth*	-0.067***	0.046***	0.102***	0.137***	-0.069***	-0.020***	0.154***
18. *R&D*	-0.036***	-0.049***	0.265***	0.275***	-0.266***	-0.338***	0.480***
19. *CG*	0.409***	-0.015**	-0.104***	-0.108***	0.101***	-0.035***	-0.062***

Table 3 (continued)

	8	9	10	11	12	13
8. *ABN_CFO*	1.000					
9. *Agg_REM*	-0.246***	1.000				
10. *PM*	0.480***	-0.110***	1.000			
11. *ATO*	-0.177***	0.277***	-0.188***	1.000		
12. *CFO*	0.707***	-0.118***	0.471***	0.241***	1.000	
13. *Cash*	-0.075***	-0.214***	-0.086***	0.018***	-0.217***	1.000
14. *Lev*	-0.005	0.028***	0.001	0.005	-0.002	-0.019***
15. *Size*	0.077***	0.129***	0.131***	-0.122***	0.174***	-0.271***
16. *M_B*	0.111***	-0.260***	0.176***	0.141***	0.173***	0.192***
17. *Growth*	0.068***	-0.149***	0.116***	0.030***	0.121***	0.030***
18. *R&D*	0.069***	-0.444***	-0.164***	-0.203***	-0.090***	0.356***
19. *CG*	0.050***	0.008	0.059***	-0.004	0.089***	-0.097***

Table 3 (continued)

	14	15	16	17	18	19
14. *Lev*	1.000					
15. *Size*	0.010**	1.000				
16. *M_B*	-0.014***	-0.199***	1.000			
17. *Growth*	0.005	-0.040***	0.147***	1.000		
18. *R&D*	-0.022***	-0.263***	0.218***	0.144***	1.000	
19. *CG*	0.008	0.155***	0.004	-0.059***	-0.012	1.000

Table 3 shows the Pearson correlation coefficients between variables for the full sample. ***, **, and * on the top right of correlation coefficients indicate statistical significance at 1%, 5%, and 10% levels respectively, based on two-tailed tests.

Table 4. The Relation Between *Under_CSR* and AEM

	DA_ABS	*DA_Positive*	*DA_Negative*
Under_CSR	0.029***	0.022***	-0.034*
	(0.010)	(0.013)	(0.014)
Agg_REM	0.001	0.007	0.002
	(0.005)	(0.008)	(0.006)
PM	-0.012	-0.001	0.019
	(0.012)	(0.020)	(0.016)
ATO	-0.005	-0.006	0.005
	(0.003)	(0.004)	(0.004)
Lev	0.002	0.012	0.007
	(0.006)	(0.009)	(0.007)
Size	-0.002***	-0.003***	0.001*
	(0.000)	(0.001)	(0.001)
M_B	0.004***	0.004***	-0.004***
	(0.001)	(0.002)	(0.001)
Growth	0.012	0.012	-0.011
	(0.008)	(0.013)	(0.010)
R&D	0.114***	0.134**	-0.098***
	(0.035)	(0.053)	(0.036)
CG	-0.010*	-0.017**	0.004
	(0.006)	(0.007)	(0.007)
Constant	0.069***	0.086***	-0.059***
	(0.010)	(0.015)	(0.013)
Industry fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
N	3,532	1,664	1,868
Adjusted R-squared	0.065	0.061	0.061

***, **, and * on the top right of coefficients indicate statistical significance at 1%, 5%, and 10% levels respectively, based on two-tailed tests. The robust standard errors (reported in parentheses) are clustered at the firm level. Industry (classified based on the first two-digit SIC codes) and year fixed effects are included, but results are not reported for succinctness.

Table 5. The Relation Between *Under_CSR* and REM

	ABN_Prod	*ABN_DisExp*	*ABN_CFO*	*Agg_REM*
Under_CSR	0.079***	-0.067***	-0.017**	0.195***
	(0.026)	(0.025)	(0.008)	(0.052)
DA_ABS	0.045	0.009	0.009	0.015
	(0.046)	(0.042)	(0.034)	(0.082)
PM	-0.185***	-0.063	0.210***	-0.356***
	(0.031)	(0.038)	(0.017)	(0.068)
ATO	0.144***	-0.111***	-0.056***	0.314***
	(0.013)	(0.015)	(0.005)	(0.025)
Lev	0.114***	-0.075***	-0.055***	0.242***
	(0.018)	(0.018)	(0.007)	(0.036)
Size	0.004***	0.003*	-0.002***	0.004
	(0.001)	(0.001)	(0.001)	(0.003)
M_B	-0.018***	0.011***	0.009***	-0.040***
	(0.003)	(0.003)	(0.001)	(0.006)
Growth	0.061***	0.108***	0.013	-0.086**
	(0.018)	(0.017)	(0.009)	(0.036)
R&D	-0.720***	1.430***	0.063**	-2.139***
	(0.081)	(0.089)	(0.029)	(0.173)
CG	-0.013	0.036**	-0.006	-0.054*
	(0.015)	(0.015)	(0.006)	(0.031)
Constant	-0.177***	-0.035	0.076***	-0.217***
	(0.033)	(0.033)	(0.012)	(0.067)
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
N	4,094	3,536	4,099	3,532
Adjusted R-squared	0.422	0.477	0.414	0.515

***, **, and * on the top right of coefficients indicate statistical significance at 1%, 5%, and 10% levels respectively, based on two-tailed tests. The robust standard errors (reported in parentheses) are clustered at the firm level. Industry (classified based on the first two-digit SIC codes) and year fixed effects are included, but results are not reported for succinctness.

Table 6. The Relation Between *Over_CSR* and AEM

	DA_ABS	*DA_Positive*	*DA_Negative*
Over_CSR	-0.005	-0.003	0.004
	(0.010)	(0.014)	(0.012)
Agg_REM	-0.005	0.004	0.009
	(0.006)	(0.005)	(0.009)
PM	-0.005	0.022	0.025
	(0.017)	(0.025)	(0.021)
ATO	0.003	-0.003	-0.007
	(0.004)	(0.004)	(0.005)
Lev	0.005	0.006	-0.004
	(0.006)	(0.008)	(0.007)
Size	-0.002***	-0.002***	0.002***
	(0.000)	(0.001)	(0.001)
M_B	-0.001	-0.002	0.001
	(0.001)	(0.001)	(0.002)
Growth	0.016**	0.026*	-0.011
	(0.008)	(0.014)	(0.009)
R&D	0.105***	0.141***	-0.081**
	(0.029)	(0.033)	(0.040)
CG	-0.007	-0.012*	0.003
	(0.005)	(0.006)	(0.006)
Constant	0.080***	0.085***	-0.070***
	(0.012)	(0.015)	(0.015)
Industry fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
N	3,872	1,746	2,126
Adjusted R-squared	0.055	0.048	0.059

***, **, and * on the top right of coefficients indicate statistical significance at 1%, 5%, and 10% levels respectively, based on two-tailed tests. The robust standard errors (reported in parentheses) are clustered at the firm level. Industry (classified based on the first two-digit SIC codes) and year fixed effects are included, but results are not reported for succinctness.

Table 7. The Relation Between *Over_CSR* and REM

	ABN_Prod	*ABN_DisExp*	*ABN_CFO*	*Agg_REM*
Over_CSR	-0.014	0.060*	-0.021**	-0.073
	(0.034)	(0.036)	(0.011)	(0.071)
DA_ABS	-0.026	-0.044	0.098***	-0.113
	(0.068)	(0.038)	(0.038)	(0.130)
PM	-0.201***	-0.176***	0.245***	-0.294***
	(0.035)	(0.040)	(0.021)	(0.081)
ATO	0.122***	-0.090***	-0.055***	0.260***
	(0.015)	(0.018)	(0.004)	(0.034)
Lev	0.099***	-0.089***	-0.070***	0.273***
	(0.019)	(0.021)	(0.007)	(0.041)
Size	0.002	0.001	0.001	-0.000
	(0.002)	(0.002)	(0.001)	(0.003)
M_B	-0.026***	0.020***	0.010***	-0.059***
	(0.003)	(0.004)	(0.001)	(0.008)
Growth	0.087***	0.094***	-0.003	-0.010
	(0.017)	(0.017)	(0.009)	(0.035)
R&D	-0.739***	1.424***	0.038	-2.088***
	(0.083)	(0.089)	(0.029)	(0.175)
CG	-0.021	0.005	0.004	-0.014
	(0.017)	(0.018)	(0.005)	(0.036)
Constant	-0.080**	-0.002	0.019	-0.088
	(0.034)	(0.035)	(0.012)	(0.072)
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
N	4,614	3,878	4,618	3,872
Adjusted R-squared	0.382	0.412	0.463	0.456

***, **, and * on the top right of coefficients indicate statistical significance at 1%, 5%, and 10% levels respectively, based on two-tailed tests. The robust standard errors (reported in parentheses) are clustered at the firm level. Industry (classified based on the first two-digit SIC codes) and year fixed effects are included, but results are not reported for succinctness.