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Corporate environmental disclosure, corporate governance and earnings management

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Abstract

Purpose – The purpose of this paper is to examine the association between corporate environmental disclosure (CED) and earnings management (EM) and the impact of corporate governance (CG) mechanisms on that association.

Design/methodology/approach – The paper uses performance-matched discretionary accruals (DA) as a measure of EM. The paper also uses ordinary least square regression with robust standard errors to examine the association between CED and EM for a sample of 245 UK non-financial firms for the financial year ended on March 2007. Three different theoretical frameworks are used to identify the expected association between CER and EM. These include: signalling, agency and stakeholder-legitimacy theories.

Findings – The paper finds no significant statistical association between various measures of DA and environmental disclosure. The paper also finds that some CG attributes affect the relationship between CER and EM.

Practical implications – The result suggests that UK corporate managers are not using environmental disclosure as a technique to reduce the probability that public policy actions will be taken against their companies.

Originality/value – Since most empirical research is limited to the US setting, this paper provides a novel contribution to the existing literature, as one of the first to examine this issue in the UK.

Keywords Environmental management, Information disclosure, Earnings, Corporate governance, United Kingdom

Paper type Research paper

1. Introduction

Societal concern tends to be recognised as a significant corporate responsiveness to communicate between organisations and the society with regard to social responsibility and sustainability. According to Gray *et al.* (1995), corporate social and environmental disclosure might be treated as a legitimate and social contribution made by the organization. However, due to imperfect auditing in the real world of economy, managers have incentives to take discretionary actions over reported income to maximise their own benefit. Healy and Wahlen (1999, p. 366) argue that earnings management (EM) exists when managers either "mislead some stakeholders about

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the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers".

The purpose of this paper is to investigate the association between corporate environmental disclosure (CED) and EM. In particular, we are interested in answering the following *RQs*:

RQ1. What is the relationship between CED and EM?

RQ2. To what extent does corporate governance (CG) affect the relationship between CED and EM?

Prior research has concentrated either on the relationship between corporate social responsibility (CSR) and corporate financial performance (CFP), indicating that financial and economic performance of an entity has a positive relation with its social responsibility (Ullmann, 1985; McGuire *et al.*, 1988; Salama, 2005); or on the association between EM and CG, predicting that the reliability and quality of accounting earnings will be enhanced when managers' opportunistic EM behaviour is monitored by CG mechanisms (Wild, 1996; Dechow *et al.*, 1996; Klein, 2002). In other words, the research has failed to explore the direct link between CSR and EM and the impact of CG on the association between the two variables. Chih *et al.* (2008) and Prior *et al.* (2008) are considered the key articles that explore the relation between CSR and EM, based on international data.

Since most of the empirical research was limited to the US setting, we strongly believe that this paper provides a novel contribution to the existing literature as the authors are the first to examine this issue in the UK. The UK government has recently claimed that environmental reporting is deemed to be crucial in corporate reporting and companies must now report essential environmental issues in their annual reports and accounts under the amendment of the Companies Act 2006. Managers have incentives to voluntarily disclose environmental information in order to attract existing or potential investors and to enhance the corporate image of their company, especially when they attempt to engage in EM. Agency conflict exists when managers opportunistically manipulate EM in their own favour; hence, CED, which is a means to secure their jobs, can also be used to distract shareholders' attention from monitoring EM activities. It seems that managers involved in EM practice are motivated to behave in a proactive way by seeking perceptions from shareholders and diverse groups of stakeholders that they are taking actions to secure optimal performance. Thus, voluntary disclosure in annual reports, such as CED, is deemed necessary to demonstrate to stakeholders the company's awareness of wider interests and its accountability to behave in a socially responsible manner. Therefore, this paper informs ongoing efforts by UK government the managerial behaviour in managing earnings and the extent to which environmental reporting helps in reducing or increasing EM.

The rest of our paper is organised as follows. Section 2 critically reviews relevant literature, including the relation between CSR and CFP; the relation between EM and CG; and a detailed review of the two key papers on the exact association between CSR and EM. Section 3 presents the theoretical framework and the development of the research hypotheses. Section 4 describes sample selection, data collection and the research methodology. Descriptive analysis, correlation analysis and the empirical results are reported in Section 5. Section 6 concludes the discussion and provides suggestions for further research.

2. Literature review

Our paper aims to investigate the relationship between CED and EM. Therefore, we begin our literature review by discussing empirical studies that are concerned with the association between CSR and CFP and the association between EM and CG. There has been lively research since the 1960s on a firm's CSR coupled with its financial and economic performance. Early theoretical research concentrated on the trade-off between CSR and CFP. Bowman and Haire (1975) and Alexander and Buchholz (1978) argue that firms acting in a socially responsible way may give a positive impression to diverse groups of stakeholders. Early stakeholder theory cited that, although CSR activities are very costly, firms will obtain reductions in other explicit costs[1].

Following that, Ullmann's (1985) seminal paper pioneers legitimacy theory in relation to powerful stakeholders. CSR actions and activities are expected to improve relationships with shareholders and other groups of stakeholders. Building a satisfactory reputation for the enterprise is strategic to sustaining relationships with different stakeholders and to improving access of capital financing; in other words, the financial and economic performance of an entity has a positive connection with its social responsibility (Ullmann, 1985; McGuire *et al.*, 1988; Salama, 2005).

Based on the framework of the relationship between CSR and CFP, there are two groups of empirical research. The first group uses the event study approach; however, the results are mixed[2]. The second group examines the relation between CSR and profitability. For instance, Aupperle *et al.* (1985) argue that CSR actions have neutral effects on profitability. However, McGuire *et al.* (1988) find that prior year's profitability is more closely related to corporate social performance than to subsequent performance. However, McWilliams and Siegel (2000) find no relationship between CSR and CFP.

In addition, managers should use financial reporting to send relevant information about the firm's underlying economic performance to those outside the entity, if they act in the interests of the firm performance. However, due to imperfect auditing in the real world of economy, managers may have incentives to manage earnings opportunistically. Discretionary accruals (DA), therefore, capture the reliability of actual accounting earnings as an indicator of a firm's financial and economic performance.

According to Healy and Wahlen (1999, p. 366), EM exists when managers either "mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers". In other words, due to information asymmetry, managers may engage in EM or convey information about the firm's future performance to the insiders (management and directors) in the form of financial reporting (Christie and Zimmerman, 1994; Healy and Palepu, 1993; Leuz *et al.*, 2003).

It is argued that the reliability and quality of accounting earnings are enhanced when managers' opportunistic manipulation is monitored by CG (Wild, 1996; Dechow *et al.*, 1996; Klein, 2002). There are three major factors that influence corporate activities with respect to the link between CG and EM: managerial ownership, board composition and audit quality.

Governance regarding the compensation of directors and managers aims to motivate managers to behave in the best interests of shareholders and monitoring management leads to a reduction of agency conflicts. Looking back to Jensen and Meckling's (1976) agency theory, it is indicated that managers with lower firm ownership have more

motives to produce reliable accounting earnings that reflect the true economic value of the firm. Jensen (1989) additionally predicts that outside directors with little ownership stake in the firm have less incentive to constrain managers. Equity-based compensation is a governance device that attempts to reduce its potential to engage in EM. Warfield *et al.* (1995) also reports a negative relationship between stock ownership and abnormal accounting accruals[3].

Conversely, Klein (1998) argues that board compensations have no impact on a firm's performance but suggests that the structure of the committee does have an effect. The independence of boards is cited as having a negative association with earnings manipulation. The more independent the board, the less likely it is to report abnormal earnings[4]. Consistent with Davidson *et al.* (1998) and Xie *et al.* (2003) argue that independent outside directors are an important mechanism for dealing with agency conflicts. Also, audit committees with financial expertise are expected to have large composition should be large enough to effectively monitor EM[5].

The arguments put forward so far have typically concentrated either on the association between CSR and CFP or between CG and EM. However, most of the literature fails to explain the direct link between CSR and EM and the impact of CG on the association between the two variables. The following paragraphs review the key articles on the relationship between CSR and EM.

Recently, empirical studies by Chih *et al.* (2008) and Prior *et al.* (2008) have attempted to identify the exact link between CSR and EM. According to Chih *et al.* (2008), the principles of CSR reporting should be providing financial transparency and accountability to all levels of stakeholders, provided that EM is detected in terms of CSR practices. This is consistent with the view of Prior *et al.* (2008) that managers engaging in earnings manipulations, could compensate by involving in CSR activities. Given that there is informational asymmetry between insiders (managers and directors) and outsiders (shareholders and stakeholders); discretional accruals capture the reliability of a firm's financial and economic performance.

Chih *et al.* (2008) find that there is a negative relation between EM and CSR when earnings smoothing or earnings losses avoidance is an indicator of EM. They predict that these CSR companies not only concentrate on income increasing activities but also upon stakeholder management. They conclude that when EM proxies as earnings smoothing, firms with more CSR actions are expected to reduce the likelihood of earnings smoothing and they argue that this applies even in a poor country. They also find that large firms with better quality audit are more likely to make disclosures rather than to manipulate earnings. However, they find that when EM is measured by earnings aggressiveness, the multiple objectives hypothesis holds, which implies a positive relationship between CSR and EM. Further, the institutional hypothesis, which states that CSR is unrelated to EM, is rejected, even though there are non-ethical incentives to engage in EM, such as "auditor acquiescence and growth in equity-based compensation" (p. 79).

Another key article is Prior *et al.* (2008). They find that CFP is an important control variable when examining the association between CSR and EM. Prior *et al.* (2008) provide points of view that differ from those of Chih *et al.* (2008). They argue that when managers act in their own favour in opportunistically managing earnings, there are more motives to engage in more CSR activities. In addition, they suggest that CSR is viewed as an entrenchment device to garner support from other groups of stakeholders,

whose interests are damaged by EM practices. CG as a monitoring system is a strategic mechanism to reinforce or repair organisational legitimacy. Therefore, companies are motivated to commit to CSR practices, such as voluntary, corporate, social and environmental disclosure reactions; in turn, these will influence CFP. However, they comment that if firms engage in CSR activities as a consequence of earnings manipulation, the positive impact of CSR on CFP will be negatively mitigated.

3. Theoretical frameworks and hypotheses development

Three theoretical perspectives can be used to explain the potential association between CED and EM. These include signalling theory, agency theory and stakeholder-legitimacy theory.

Signalling theory

Market efficiency[6] assumes, to some extent, that, at any given time, investors are rational and that prices efficiently incorporate all the available information, depending upon a particular stock or market. Nonetheless, due to information asymmetry between management and stakeholders, managers act in their own favour to choose accounting methods and estimates and, in turn, might conceal the firm's true economic value. Prior *et al.* (2008) argue that managers may adopt discretionary actions to manage earnings in an attempt to convey favourable or unfavourable information about the firm's future prospects to the capital markets[7]. Earnings manipulation can indicate to investors the likelihood of better earnings and cash flows in the future.

As a result of market information asymmetry, companies may use corporate financial reporting to signal to investors that they hold some favourable information. Managers have incentives to voluntarily disclose additional accounting information as a signal to attract existing or potential investors and to enhance positive corporate images, especially when they attempt to engage in EM.

Gray (2005) comments that a company making CED as one of its CSR activities is predominantly concerned with signalling the quality of its management. High-quality organisations tend to use corporate social and environmental accounting as a diversion to traditional financial reporting; on the other hand, low-quality organisations choose non-disclosure, consistent with constrained accounting information. He further argues that the quality of financial reporting is a signal to financial markets and other stakeholders that the management can be perceived as able to control the social and environmental risks within the firm.

Additionally, CED is signalling to investors and other powerful and economic stakeholders that the company is actively taking part in CSR practices and that its market value is in a good position. Good corporate social performance helps a company to gain a reputation for reliability from capital markets and debt markets. EM bears certain risks for the firm's future prospects; and outsiders (investors and stakeholders) will take disciplinary action against managers if EM is substantially detected. From a manager's point of view, CED is a signal that deflects shareholders' attention from issues on which managers might be punished.

Agency theory

It is argued that there are a number of overlaps between signalling theory and agency theory as a consequence of significant similarities between the two theories

(see Morris, 1987, for more details). Agency theory explains further signalling perspectives. Agency conflict exists when managers (agents) undertake opportunistic actions, such as EM, to maximise their own interests. Managerial actions can mislead stakeholders about the firm's corporate market value and financial position, and cause outsiders to make false economic decisions. EM is, therefore, an agency cost (Zahra *et al.*, 2005; Xie *et al.*, 2003)

On the other hand, Dechow *et al.* (1996) claim that when EM is suspected, the firm's value will immediately be reduced on the stock market. Hence, EM can have an effect on a firm's share price, and, in turn, the share price will be damaged as a consequence of EM disclosed in more transparent reporting. Agency theory suggests that firms may use different methods, such as compensation plans or voluntary disclosures, to reduce conflicting interests between managers and shareholders. CSR requires a company to be accountable to its multi-levels of stakeholders and to report sustainability for business development on a voluntary basis. CED, as a CSR action, is a signal which can aim to divert shareholders' attention from monitoring earnings manipulation to other issues, and share price will be enhanced as a result.

Managers are interested in short-term business performance, so they expect to achieve a positive share price effect. Furthermore, regarding CED, a satisfactory corporate reputation and improved relationships with different stakeholders can be converted into access to capital financing (McGuire *et al.*, 1988). Since, it is argued, building a satisfactory reputation is strategic to managing shareholders' impressions, investment in a good enterprise reputation may reinforce a firm's competitive advantage and thus maximise shareholders' wealth. It will additionally lead to retain superior profits in capital markets (Salama, 2005).

CSR activities provide a more accurate risk assessment for investors and this, in turn, will give access to external financing at the possible lowest cost. As attractions of potential shareholders through the increased transparency of information, the company is likely to be in a more healthy and liquid position in stock markets. In other words, managers involved in earnings manipulations can be expected to make more CED in an attempt to pursue their own benefit.

Stakeholder-legitimacy theory

Stakeholder theory explains the relationship between stakeholders and the information they receive. Managers can be employed not only as the owner's agent but also as an agent of other stakeholders (Hill and Jones, 1992). Managers can take certain EM actions in an attempt to obtain personal gains at the expense of other stakeholders. Nonetheless, stakeholders will respond to management in case their own interests are damaged by EM practices. Thus, managers may have incentives to use their controls to make financial reports more informative and extensive, so as to minimise threats of being dismissed.

Ullmann's (1985) seminal paper has pioneered legitimacy theory in relation to powerful stakeholders. There are two perspectives on CSR activities: first, it builds a positive image among stakeholders and gains support and trust from diverse groups of stakeholders; second, it has a positive impact on corporate reputation and brings economic benefit from the strategic perspective. CSR activities are expected to improve relationships with shareholders, suppliers, creditors and other groups of stakeholders.

In other words, the financial and economic performance of an entity has a positive connection with its social responsibility (Salama, 2005).

In line with Gray *et al.* (1995), information disclosed to the stakeholders might be regarded as a legitimate social contribution made by the organization. Managers engaged in EM tend to realise that voluntary environmental disclosures can be used to maintain organisational legitimacy, especially with social and political stakeholders. CED initiatives provide a channel to inform stakeholders of the firm's wider interests and of its accountability to behave in a socially responsible manner. On the other hand, legitimacy management can be viewed as a way of communicating, within the organisation-society relationship, to obtain societal support. Managers, who have control of the decision-making process, have incentives to use such strategies to fulfill the expectations of other groups of stakeholders. Hence, it is argued, the motivation for corporate social and environmental disclosures is to deflect stakeholders' attention from detection EM.

It seems that managers involved in EM are motivated to behave in a positive way to seek perceptions from shareholders and diverse groups of stakeholders that they are acting to assure optimal performance. Alternatively, organisations with a low level of EM are less likely to promote CED initiatives. Based on the above discussion, we form the following hypothesis:

H1. Firms that engage in EM have incentives to undertake CSR initiatives such as CED.

Prior research offers evidence that the reliability and the quality of accounting earnings is enhanced when managerial opportunistic behaviour is monitored by CG mechanisms (Klein, 2002). Thereby, CG will be improved due to the reduction of agency conflicts. From an agency perspective, a larger board is an effective mechanism in monitoring managers. Jensen (1993) suggests that board size is negatively related to the ability of the board to pursue long-term strategic goals. Nonetheless, increased board size leads to more experienced independent directors (Xie *et al.*, 2003), so it is likely to diminish managers' opportunistic manipulation such as EM by diverting attention to corporate social responsibilities. Therefore, we form the following hypothesis:

H2. Board size will moderate the relationship between EM and CSR.

We expect that the greater the board size, the lesser the positive effect of EM on CSR.

Ebrahim (2007) examines the relation between EM and the activity of both the board and the audit committee. Using a sample of US manufacturing companies for two years 1999 and 2000, he finds that EM, as measured by the modified Jones model, is negatively related to both board and audit committee independence and he documents that this relation is stronger when the audit committee is more active. Xie *et al.* (2003) also argue that an active audit committee is expected to have a large composition to effectively monitor discretionary current accruals. Both studies used audit committee meeting frequency as a proxy for the level of audit committee activities, and indicate that the number of audit committee meetings is negatively associated with EM. Therefore, we form the following hypothesis:

H3. The number of audit committee meetings will moderate the relationship between EM and CSR.

We expect that the greater the number of audit committee meetings, the lesser is the positive effect of EM on CSR.

4. Research method

Sample

Our sample is retrieved from the second report of environmental reporting in the annual reports and accounts of companies in *Financial Times* and the London Stock Exchange (FTSE) All-share Index for the year ending 31 March 2007. This report is published by the UK's Environment Agency, Trucost. It examines CED on waste, water, climate change (and energy use), and the EU emissions trading scheme in companies' annual reports and accounts. We exclude financial companies (i.e. insurance, banks and investments funds) and utilities companies because of the unique characteristics of their financial statements. Financial data were collected for FTSE All-share non-financial companies from Thomson database. Control variables such as the total number of board committee members and the number of audit committee meetings are manually collected from each company's annual report. Firms with missing data are removed from the analysis. This gives us a final sample of 245 firms for the year between 1 April 2006 and 31 March 2007.

Measurement of variables

Dependent variable- CED. We use CED as a proxy for CSR. The UK government has recently claimed that environmental reporting is a significant element of corporate reporting. Under the amendment of the Companies Act 2006, companies must now report on essential environmental issues within the business review or operating and financial review in their annual reports and accounts. Companies are required to employ the UK Government's *Environmental Key Performance Indicators (KPI) – Reporting Guidelines for UK Business*. Companies need to disclose quantitative environmental information for most of its recommended KPIs such as waste, water and energy use including climate change. Disclosure scores are given to UK firms based on the degree to which the firms are disclosing the core KPIs in accordance with Government Guidelines are as follows:

- 0 – no quantification;
- 1 – general quantification;
- 2 – data that could be derived to meet Government Guidelines; and
- 3 – disclosure that meets Government Guidelines.

Independent variable

Earnings management. The most widely used method to measure DA in the literature are the Jones (1991) and the modified Jones (Dechow *et al.*, 1995) models. However, Kothari *et al.* (2005) argue that measuring DA without controlling for firm performance will produce misspecification in the EM model, therefore, they propose a model that includes an intercept and control for the firm performance using return on assets (ROA) to mitigate the problematic heteroskedasticity and mis-specified issues that exist in other aggregate accruals models. We use Kothari *et al.* (2005) performance adjusted DA model with a two-digit standard industrial classification code to estimate the DA.

Total accruals (TA_{it}) are measured by the difference between net income (NI_{it}) and net cash flows from operating activities (CFO_{it}) as follows: $TA_{it} = NI_{it} - CFO_{it}$. DA ($DA_{it}$), which is the proxy to detect EM, is the residuals of the following model:

$$\frac{TA_{it}}{A_{it-1}} = a_i\left[\frac{1}{A_{it-1}}\right] + \beta_{1i}\left[\frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}}\right] + \beta_{2i}\left[\frac{PPE_{it}}{A_{it-1}}\right] + \beta_{3i}\left[\frac{ROA_{it}}{A_{it-1}}\right] + \varepsilon_{it}$$

where:

TA_{it} the total accruals of firm i in year t.

ΔREV_{it} the change in revenues of firm i between years t and $t - 1$.

ΔREC_{it} the change in receivables of firm i between years t and $t - 1$.

PPE_{it} the level of gross property, plant, and equipment of firm i in year t.

ROA_{it} ROA of firm i in year t.

A_{it-1} the total assets of firm i at the end of year $t - 1$.

Finally, since managers might have incentives to engage in either income-increasing or income-decreasing EM, we use unsigned (absolute value of) abnormal accruals as a proxy for the mixed effect of upward or downward earnings[8].

In addition to applying Kothari *et al.* (2005) model of estimating DA, this study also applies the same model using only the current accruals instead of long-term accruals. Becker *et al.* (1998) suggest that management have greater discretion over current accruals than long-term accruals.

Control variables

CG attributes are important as a signal to the shareholders of the level of EM behavior; and they also have impacts on the degree of earnings reliability (Dechow *et al.*, 1996). In our paper, we use board size as a measure of CG to indicate the effect of EM on CSR. Shareholders have incentives to perceive large boards as having greater monitoring competence over managers' discretionary accounting choices[9]. Klein (2002) argue that the role of board audit committee is to monitor the firm's financial reporting process and to resolve conflicts between internal financial managers and outside auditors. Audit committee meeting frequency is used as a proxy for the level of audit committee activities, as in Xie *et al.* (2003).

Given that CG is not the unique factor in influencing opportunistic earnings manipulation, firm size, profitability and financial leverage are incorporated as controls, since these variables may influence DA, as indicated by previous studies (Xie *et al.*, 2003; Press and Weintrop, 1990). We follow the specification shown in Prior *et al.* (2008) and Chih *et al.* (2008). Firm size is measured by total assets. Debt-to-equity ratio is used to measure a firm's leverage, as it is an indicator of the firm's financial structure. Profitability is measured using the accounting-based ROA.

Method

Our main research hypothesis is that firms that engage in EM have more incentives to undertake CSR initiatives, such as CED. In order to explain CED and investigate the expected positive relationship, we use the following ordinary least square (OLS) regression with robust standard errors on a basis of cross-sectional analysis:

$$\mathrm{CED}_{it} = \lambda_1 + \lambda_2(\mathrm{DA})_{it} + \lambda_3(\mathrm{Size})_{it} + \lambda_4(\mathrm{LEV})_{it} + \lambda_5(\mathrm{ROA})_{it} + \lambda_6(\mathrm{CG})_{it} + \lambda_7(\mathrm{AUDIT})_{it} + \lambda_8(\mathrm{INDUSTRY})_{it} + \varepsilon_{it} \quad (1)$$

where:

EM (DA)	absolute performance adjusted DA.
Size (SIZE)	total assets.
Leverage (LEV)	debt-to-equity ratio.
Profitability (ROA)	return on total assets.
CG	board size, i.e. total number of board committee members.
Audit (AUDIT)	total number of audit committee meetings.
Industry (INDUSTRY)	indicator, 1 for regulated sectors, and 0 for unregulated sectors.

Additionally, industry sector is considered as a dummy variable in an attempt to test whether it is effective in explaining the effect of EM on CED. As reported in Trucost's second review of environmental reporting in 2007, industry classification benchmark, industry sectors are comprised of financials, industries, consumer services, consumer goods, oil and gas, health care, basic materials, technology, utilities, and telecommunications. As mentioned before, we exclude financial and utilities firms. Then, following Prior *et al.* (2008), we classify industry sectors into two groups: regulated and unregulated sectors. Regulated sectors (i.e. oil and gas, health care, technology and telecommunications) are given a dummy value of 1; a value of 0 is given to the other sectors (the unregulated sectors). Robust regression for the regulated sectors is also conducted in the paper.

5. Results

Descriptive statistics

Table I represents descriptive statistics. CED is calculated as number of core KPIs disclosed with respect to Government Guidelines. It shows that the minimum score is 0 out of 3, and the mean score is 0.278. DA as a proxy for EM has a mean value of around 0.06, which is comparable with the findings of prior studies such as 0.06 for Canadian companies and 0.03 for French companies, as reported by Othman and Zeghal (2006).

Table I.
Descriptive statistics

Variable	Mean	Median	SD	Max	Min
CED	0.278	0.000	0.727	3.000	0.000
DA	0.064	0.047	0.064	0.534	0.000
SIZE	3.581	0.618	13.628	126.598	0.034
LEVERAGE	92.317	44.620	248.876	3027.140	−679.370
ROA	7.147	7.770	10.673	38.580	−75.650
BOARDSIZE	9.420	9.000	2.685	19.000	4.000
AUDIT	3.698	4.000	1.289	14.000	2.000
INDUSTRY	0.216	0.000	0.413	1.000	0.000

The total number of board committee members has a mean value of 9 on a scale between four and 19 while the number of audit committee meetings ranges from two to 14. Remarkably, the standard deviations of SIZE and LEVERAGE are the highest of the seven independent variables; hence they represent the widest dispersion of these values.

Correlation analysis

Table II presents the correlation analysis. It shows that the variations in DA are negatively correlated with variations in CED. The positive relationship between firm size and CED is consistent with prior research. Large companies are expected to make more CED as a consequence of accountability and visibility to legitimise their business (Cormier and Gordon, 2001; Carven and Marston, 1999). It is notable that variations in board size are positively correlated with variations in both firm size and the number of audit committee meetings, suggesting that large firms have large boards. It also shows that, as the size of the board increases, the more active the audit committee becomes. ROA shows the highest correlation with DA at 40 per cent, which enhances the argument that it is important to consider firm performance when measuring the DA.

OLS regression with robust standard errors

Table III, Panel A provides the OLS regression with robust standard errors, and CED is regarded as the dependent variable and EM (DA) and other control variables are considered as the independent variables.

CED is unrelated to DA (for both long-term and current DA) since its p value in both models is about 0.67 with a robust standard error around 0.66[10]. Similarly, financial leverage, ROA and board size are also unrelated. The number of audit committee meetings is also unrelated to CED. However, firm size has a positive coefficient that is significant at the 0.01 level. This is consistent with the prior studies that reported that large companies are likely to face an increased pressure from external groups and they may undertake more CSR activities (e.g. CED) for the sake of external funds. We also find that industry sector, as a dummy variable, is negatively related to CED.

Managers may have motives to manage either income-increasing or income-decreasing earnings; hence in regression (1) following prior studies on EM, we comparably use absolute value of both long-term and current DA as a proxy of the issue of both upward and downward EM. As noted in Table III, Panel A, the CED variable is also insignificantly associated with neither directions of positive nor negative absolute value of discretionary and current accruals, though it converts into a positive relationship with negative DA.

Number of audit committee meetings is related to CED in the singed DA samples, audit committee meetings seems to positively impact the CED when managers imply upward EM practice while it has a negative effect on CED in firms with downward EM. This is in line with previous findings that suggest audit committees have different effect based on the type and directions of EM, which in turn may have reflected in the relationship between audit committee number of meetings and CED.

In the signed DA test, the firm size is not significant in the signed DA models but remain significant in the current DA models. This result raises the question of the possible effect of the type of EM strategy on the relationship between CED and firm size. The relationship between CED and industry type remain significantly negative in most of the tested models.

Table II.
Correlation matrix

	CED	DA	SIZE	LEVERAGE	ROA	BOARDSIZE	AUDIT	INDUSTRY
CED	1							
DA	−0.043	1						
SIZE	0.1507	0.0265	1					
LEVERAGE	−0.0651	0.0526	−0.0225	1				
ROA	−0.0412	−0.4083	0.0047	0.0402	1			
BOARDSIZE	0.1121	−0.008	0.4865	0.1151	0.0319	1		
AUDIT	0.1378	−0.0085	0.4	0.0199	0.0637	0.3031	1	
INDUSTRY	−0.078	0.4046	0.1955	0.0992	−0.1642	0.1432	0.1233	1

Table III.
Regression estimates of CED on DA with robust standard errors

CED	Coefficient	SE	t	$p > t$	95% Confidence	Interval	CED	Coefficient	SE	t	$p > t$	95% Confidence	Interval
Panel (A): absolute value measures													
Variable		Discretionary long-term accruals					Variable		Current accruals				
DA	−0.300	0.700	−0.430	0.669	−1.680	1.080	DA	−0.295	0.666	−0.440	0.659	−1.607	1.017
SIZE	0.006	0.002	2.440	0.015	0.001	0.010	SIZE	0.006	0.002	2.480	0.014	0.001	0.010
LEVERAGE	0.000	0.000	−1.010	0.312	0.000	0.000	LEVERAGE	0.000	0.000	−1.000	0.317	0.000	0.000
ROA	−0.005	0.004	−1.270	0.205	−0.013	0.003	ROA	−0.005	0.004	−1.260	0.208	−0.014	0.003
BOARDSIZE	0.015	0.016	0.910	0.362	−0.017	0.047	BOARDSIZE	0.015	0.016	0.910	0.364	−0.017	0.047
AUDIT	0.055	0.048	1.160	0.245	−0.038	0.149	AUDIT	0.055	0.048	1.150	0.252	−0.039	0.149
INDUSTRY	−0.204	0.111	−1.840	0.067	−0.421	0.014	INDUSTRY	−0.210	0.103	−2.040	0.043	−0.412	−0.007
_cons	0.027	0.182	0.150	0.884	−0.332	0.385	_cons	0.029	0.185	0.160	0.875	−0.336	0.394
No. of obs	245						No. of obs	245					
$F(7, 237)$	4.590						$F(7, 237)$	4.600					
Prob > F	0.000						Prob > F	0.000					
R^2	0.053						R^2	0.053					
Root MSE	0.718						Root MSE	0.718					
Panel (B): signed measures (discretionary long term accruals)													
DA −	−0.212	0.616	−0.340	0.731	−1.429	1.004	DA +	2.176	3.152	0.690	0.493	−4.131	2.176
SIZE	0.004	0.003	1.600	0.112	−0.001	0.009	SIZE	0.033	0.030	1.110	0.273	−0.027	0.033
LEVERAGE	0.000	0.000	−0.650	0.514	0.000	0.000	LEVERAGE	−0.001	0.000	−2.110	0.039	−0.002	−0.001
ROA	−0.005	0.005	−0.920	0.357	−0.015	0.005	ROA	−0.019	0.010	−1.920	0.060	−0.038	−0.019
BOARDSIZE	0.009	0.018	0.480	0.634	−0.027	0.044	BOARDSIZE	0.043	0.051	0.840	0.405	−0.059	0.043
AUDIT	0.101	0.055	1.830	0.070	−0.008	0.211	AUDIT	−0.161	0.053	−3.040	0.004	−0.266	−0.161
INDUSTRY	−0.197	0.120	−1.650	0.101	−0.433	0.039	INDUSTRY	−0.588	0.203	−2.900	0.005	−0.994	−0.588
_cons	−0.091	0.222	−0.410	0.681	−0.529	0.346	_cons	0.521	0.446	1.170	0.247	−0.371	0.521
No. of obs	178						No. of obs	67					67
$F(7, 237)$	3.140						$F(7, 237)$	1.660					1.660
Prob > F	0.004						Prob > F	0.136					0.136
R^2	0.076						R^2	0.115					0.115
Root MSE	0.696						Root MSE	0.775					0.775

(*continued*)

Table III.

CED	Coefficient	SE	t	$p > t$	95% Confidence	Interval	CED	Coefficient	SE	t	$p > t$	95% Confidence	Interval
Panel (C): signed measures (current accruals)													
DA −	−0.737	0.648	−1.140	0.257	−2.016	0.541	DA +	0.864	2.666	0.320	0.747	−4.461	6.189
SIZE	0.007	0.003	2.400	0.018	0.001	0.013	SIZE	0.009	0.004	2.570	0.012	0.002	0.017
LEVERAGE	0.000	0.000	−0.760	0.449	0.000	0.000	LEVERAGE	−0.001	0.000	−2.250	0.028	−0.001	0.000
ROA	−0.007	0.005	−1.480	0.142	−0.017	0.002	ROA	0.001	0.006	0.140	0.887	−0.012	0.014
BOARDSIZE	0.013	0.018	0.700	0.486	−0.024	0.049	BOARDSIZE	0.016	0.039	0.410	0.684	−0.062	0.093
AUDIT	0.110	0.073	1.500	0.136	−0.035	0.254	AUDIT	−0.030	0.046	−0.650	0.520	−0.121	0.062
INDUSTRY	−0.235	0.126	−1.870	0.064	−0.483	0.013	INDUSTRY	−0.185	0.180	−1.030	0.307	−0.544	0.174
_cons	−0.076	0.268	−0.290	0.776	−0.605	0.452	_cons	0.165	0.282	0.580	0.562	−0.399	0.728
No. of obs	173						No. of obs	72					
$F(7, 237)$	3.340						$F(7, 237)$	4.370					
Prob > F	0.002						Prob > F	0.001					
R^2	0.067						R^2	0.089					
Root MSE	0.761						Root MSE	0.613					
Panel (D): raw measures													
Variable			Raw long term DA							Raw current accruals			
DA	0.073	0.559	0.130	0.896	−1.028	1.174	DA	−0.113	0.499	−0.230	0.821	−1.096	0.870
SIZE	0.006	0.002	2.440	0.015	0.001	0.010	SIZE	0.006	0.002	2.420	0.016	0.001	0.010
LEVERAGE	0.000	0.000	−1.030	0.304	0.000	0.000	LEVERAGE	0.000	0.000	−1.060	0.290	0.000	0.000
ROA	−0.005	0.004	−1.160	0.249	−0.013	0.003	ROA	−0.004	0.004	−1.020	0.310	−0.013	0.004
BOARDSIZE	0.015	0.016	0.930	0.352	−0.017	0.048	BOARDSIZE	0.015	0.016	0.930	0.355	−0.017	0.047
AUDIT	0.055	0.048	1.160	0.247	−0.038	0.149	AUDIT	0.056	0.048	1.180	0.238	−0.037	0.150
INDUSTRY	−0.214	0.111	−1.940	0.054	−0.432	0.004	INDUSTRY	−0.224	0.101	−2.220	0.027	−0.423	−0.025
_cons	0.007	0.181	0.040	0.969	−0.350	0.364	_cons	−0.003	0.184	−0.020	0.988	−0.365	0.359
No. of obs	245						No. of obs	245					
$F(7, 237)$	4.620						$F(7, 237)$	4.690					
Prob > F	0.000						Prob > F	0.000					
R^2	0.052						R^2	0.052					
Root MSE	0.719						Root MSE	0.719					

Following Myers *et al.* (2003), we also tested the raw DA. Table III, Panel D, shows that raw long-term DA and raw current DA have no significant effect on CED. In addition, neither board size, nor audit committee diligence is significantly associated with CED. However, firm size and industry type still show significant associations with CED in these models.

In summary, the above results show that there is no statistically significant association between CED and EM. Therefore, we reject *H1*.

In order to test hypotheses two and three of the moderating role of CG in the relationship between DA and CSR, we introduce two interaction variables of large boards with EM, and active audit committee with EM.

We employ the following cross-sectional regression model, which includes the interaction terms of CG attributes and EM:

$$\text{CED} = b0 + b1\ \text{EM} + b2\ \text{EM*CG} + b3\ \text{EM*AUDIT} + bj\ \text{control variables}\ j + e$$

where:

EM	performance-matched DA, measured in absolute, positive, and negative values.
EM*CG	interaction term between the DA variable and the BOARDSIZE dummy variable.
EM*AUDIT	interaction term between the DA variable and the AUDIT dummy variable.

The results in Table IV (Panel: A) show that the coefficient for board size is significantly negative at 0.10 level, whereas the coefficient for the interaction term EM*CG is positive (coefficient = 0.47 with $t = 2.9, p = 0.01$). In contrast, the coefficient for audit committee is significantly positive at 0.05 level, whereas for the interaction term EM*AUDIT is negative (coefficient = −0.39 with $t = -2, 18, p = 0.05$).

When the interaction effect between EM and CG variables are included within the regression model, the effect of board size and audit committee becomes statistically significant, whereas the interaction effect is highly significant. These results also provide support for *H2* concerning the negative moderating effect of audit committee in the relationship between EM practices and CED. Even though, this research has not documented a direct effect of the EM variable on CED, we provide evidence of the importance of considering the interaction and joint effect of EM and CG variables on CED.

Furthermore, when we replace the absolute EM measure with signed EM measures (DA + and DA −) in Table IV Panel (B) to test the moderating role of CG attributes in the relationship between signed DA and CSR, the findings are similar in the negative DA sample. However, in the positive DA sample, there is no significant interaction effect in both EM*CG and EM*AUDIT. This is may be due to the relatively small sample in this group or the weak effect of both board size and audit committee in effecting positive DA that is also found in the previous analysis.

Robustness check

In the main test, the relationship between CED and DA is insignificant; this finding might be reflected when all the seven independent variables are included simultaneously.

Table IV.

Panel (A): regression of the interaction effect of CG attributes on the relationship of absolute DA and CSR

CED	Coefficient	SE	t	$p > t$	(95% Confidence	Interval)
DA (absolute)	−0.324	0.705	−0.460	0.646	−1.714	1.065
EMCG	0.294	0.122	2.410	0.017	0.054	0.535
EMAUD	−0.202	0.112	−1.800	0.074	−0.424	0.019
BOARDSIZE	−0.025	0.022	−1.150	0.253	−0.067	0.018
AUDIT	0.103	0.063	1.630	0.104	−0.021	0.228
SIZE	0.008	0.003	2.910	0.004	0.003	0.013
LEVERAGE	0.000	0.000	−0.900	0.367	0.000	0.000
ROA	−0.005	0.004	−1.150	0.252	−0.014	0.004
INDUSTRY	−0.238	0.106	−2.240	0.026	−0.447	−0.028
_cons	−0.324	0.705	−0.460	0.646	−1.714	1.065
No. of obs	245					
F(9, 163)	2.76					
Prob > F	0.0044					
R^2	0.0788					
Root MSE	0.71147					

Panel (B): the interaction effect of CG attributes on the relationship of signed DA and CSR

CED	Coefficient	SE	t	$p > t$	(95% Confidence	Interval)
DA −	−0.400	0.599	−0.670	0.505	−1.583	0.783
EMCG	0.367	0.145	2.540	0.012	0.081	0.653
EMAUD	−0.247	0.134	−1.850	0.066	−0.512	0.017
BOARDSIZ	−0.041	0.025	−1.630	0.105	−0.090	0.009
AUDIT	0.160	0.077	2.070	0.040	0.008	0.313
SIZE	0.007	0.003	1.970	0.050	0.000	0.013
LEVERAGE	0.000	0.000	−0.540	0.587	0.000	0.000
ROA	−0.005	0.005	−0.960	0.339	−0.015	0.005
INDUSTRY	−0.210	0.112	−1.880	0.062	−0.430	0.011
_cons	−0.002	0.244	−0.010	0.995	−0.484	0.481
No. of obs	178					
F(7, 237)	2.000					
Prob > F	0.042					
R^2	0.120					
Root MSE	0.683					

CED	Coefficient	SE	t	$p > t$	(95% Confidence	Interval)
DA +	1.471	3.261	0.450	0.654	−5.048	7.990
EMCG	−0.015	0.181	−0.080	0.934	−0.376	0.346
EMAUD	−0.070	0.135	−0.520	0.605	−0.340	0.199
BOARDSIZ	0.015	0.046	0.320	0.752	−0.077	0.106
AUDIT	−0.012	0.053	−0.240	0.815	−0.118	0.093
SIZE	0.009	0.004	2.450	0.017	0.002	0.017
LEVERAGE	−0.001	0.000	−2.180	0.033	−0.001	0.000
ROA	0.001	0.007	0.070	0.946	−0.014	0.015
INDUSTRY	−0.206	0.186	−1.110	0.273	−0.577	0.166
_cons	0.164	0.336	0.490	0.627	−0.507	0.835
No. of obs	72					
F(7, 237)	7.370					
Prob > F	0.000					
R^2	0.094					
Root MSE	0.622					

In order to check outliers of these variables, a normality test is conducted in Table V. Considering the number of observations, the probability of χ^2 being higher than 140.169 is 0.5 per cent (see statistic table). Therefore, SIZE, LEVERAGE and AUDIT are found to be not normally distributed. A cross-sectional analysis using regression (2), is run after dropping these three variables from the initial model:

$$\text{CED}_{it} = \lambda_1 + \lambda_2(\text{EM})_{it} + +\lambda_3(\text{ROA})_{it} + \lambda_4(\text{CG})_{it} + \lambda_5(\text{INDUSTRY})_{it} + \varepsilon_{it} \quad (2)$$

The results in Table V are qualitatively similar to the main regression results of no significant relationship between DA and CED, however, there is a positive significant relationship between board size and CED.

Following Prior *et al.* (2008), we run robust regression for the regulated and unregulated industries sectors and find that the *p* value of ROA and leverage are significant at 0.01 and 0.05 levels, respectively, (Table VI). Nevertheless, regulated industries sectors results indicate a positive and significant relationship between firm size and CED. Table VI also shows that the relation between CED and EM is still insignificant in both regulated and unregulated industries sectors. These results indicate that the impact of firm size, leverage and ROA on CED are different based on industries sectors' characteristics, whereas CED and EM are not related regardless the sector type.

6. Conclusions

Our study examined the association between CED and EM and the influence of CG mechanisms on that association.

We use the UK Government's environmental KPI for the year ending 31 March 2007, as reported by Trucost, a respected environmental research company. Performance adjusted DA model (Kothari *et al.*, 2005) is used to capture DA as a measure of EM. We find insignificant association between CED and EM, when we run OLS with robust errors. And this result is counterintuitive, even when some variables that are not normally distributed have been removed from the regression model.

In essence, managers are in a control of decision-making processes, they are motivated to engage in either income-increasing or income-decreasing EM for their own benefit. Given that we comparably use absolute value of DA, signed accruals and raw accruals for both long-term accruals and current accruals as proxies for the mixed effect of earnings manipulation, and hence find insignificant relationship between CED and EM.

CED	Coefficient	SE	*t*	$p > t$	95% Confidence	Interval
DA (absolute)	−0.387	0.737	−0.530	0.600	−1.839	1.065
BOARDSIZE	0.035	0.015	2.350	0.020	0.006	0.064
ROA	−0.005	0.004	−1.210	0.226	−0.013	0.003
INDUSTRY	−0.167	0.116	−1.440	0.150	−0.395	0.061
_cons	0.049	0.144	0.340	0.734	−0.235	0.334
No. of obs	245					
$F(4, 240)$	2.020					
Prob > *F*	0.092					
R^2	0.026					
Root MSE	0.724					

Table V.
Excluding outliers and non normally distributed variables

Table VI.
Robustness regression of different sectors

Variable	Unregulated sectors						Regulated sectors					
CED	Coefficient	SE	t	$p > t$	95% Confidence	Interval	Coefficient	SE	t	$p > t$	95% Confidence	Interval
DA (absolute)	0.098	1.417	0.070	0.945	−2.698	2.893	−0.062	0.309	−0.200	0.843	−0.684	0.561
SIZE	0.014	0.018	0.790	0.433	−0.022	0.051	0.006	0.002	2.870	0.006	0.002	0.010
LEVERAGE	−0.001	0.000	−2.040	0.043	−0.001	0.000	0.000	0.000	−0.040	0.972	0.000	0.000
ROA	−0.019	0.006	−3.190	0.002	−0.031	−0.007	0.004	0.004	1.090	0.283	−0.003	0.011
BOARDSIZE	0.018	0.020	0.890	0.376	−0.022	0.058	0.011	0.030	0.370	0.716	−0.050	0.072
AUDIT	0.033	0.068	0.480	0.630	−0.101	0.166	0.061	0.065	0.940	0.352	−0.070	0.192
_cons	0.199	0.271	0.730	0.464	−0.336	0.733	−0.245	0.217	−1.130	0.264	−0.682	0.191
No. of obs	192							53				
$F(7, 237)$	2.320							7.310				
Prob > F	0.035							0.000				
R^2	0.063							0.253				
Root MSE	0.756							0.501				

We also examined the interaction effect of CG mechanisms (i.e. board size and audit committee diligence) on the relationship between EM and CED. We find that audit committee diligence but not board size, effect the relationship between EM and CED.

Robust regression is a confirmatory method in econometric models. More specifically, additional robustness check shows an insignificant association between CED and EM in regulated and unregulated industries. Despite that, firm size as a control variable is significantly positively related to CED. This is consistent with previous disclosure studies that report that large companies are likely to face an increased pressure from external groups and they may undertake more CSR activities for the sake of external funds. Another explanation for the association is that large companies are expected to make more CED as a consequence of accountability and visibility to legitimise their business (Cormier and Gordon, 2001; Carven and Marston, 1999).

Other CG mechanisms (i.e. board composition and sub-committees characteristics) need to be considered in the future research as factors that may influence the relationship between EM and CED.

Notes

1. For example, Moskowitz (1972) suggests that benefit from employee ethical credibility and reliability will offset minimal costs of CSR.
2. For example, Posnikoff (1997) finds that CSR activities in terms of divestment from South Africa have enhanced shareholder wealth, indicating CSR and its financial performance are positively correlated. Wright and Ferris (1997) report a negative relationship; and Teoh *et al.* (1999) confirm no relationship between the two variables.
3. Their results have been consistent with the prior theory that managerial shareholding is viewed as an effective mechanism in aligning the interests of executives and shareholders.
4. Klein (2002) also provides evidence with respect to the importance of audit committee. The independent outside directors on audit committee efficiently prevent opportunistic manipulation of the financial reporting process.
5. They consider EM as an agency cost.
6. See market efficient hypothesis in Fama (1970).
7. The opportunity to manage reported earnings captures the firm's cash flows and changes in corporate market value, which are discretionary from current cash flows.
8. Other EM studies use this measure. See for example Warfield *et al.* (1995), DeFond and Park (1997) and Bartov *et al.* (2000).
9. Relevant prior studies regarding board size: see Xie *et al.* (2003) and Dechow *et al.* (1996).
10. Robust standard errors exist if they are autocorrelated or heteroskedastic.

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