

Yasar, Alpaslan; Yalçın, Neriman

Article

Voluntary disclosure of scope 3 greenhouse gas emissions and earnings management: Evidence from UK companies

Cogent Business & Management

Provided in Cooperation with:

Taylor & Francis Group

Suggested Citation: Yasar, Alpaslan; Yalçın, Neriman (2023) : Voluntary disclosure of scope 3 greenhouse gas emissions and earnings management: Evidence from UK companies, Cogent Business & Management, ISSN 2331-1975, Taylor & Francis, Abingdon, Vol. 10, Iss. 3, pp. 1-18, <https://doi.org/10.1080/23311975.2023.2275849>

This Version is available at:

<https://hdl.handle.net/10419/294711>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<https://creativecommons.org/licenses/by/4.0/>

Voluntary disclosure of scope 3 greenhouse gas emissions and earnings management: Evidence from UK companies

Alpaslan Yasar & Neriman Yalçın

To cite this article: Alpaslan Yasar & Neriman Yalçın (2023) Voluntary disclosure of scope 3 greenhouse gas emissions and earnings management: Evidence from UK companies, Cogent Business & Management, 10:3, 2275849, DOI: [10.1080/23311975.2023.2275849](https://doi.org/10.1080/23311975.2023.2275849)

To link to this article: <https://doi.org/10.1080/23311975.2023.2275849>



© 2023 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.



Published online: 02 Nov 2023.



[Submit your article to this journal](#)



Article views: 1035



[View related articles](#)



[View Crossmark data](#)



Received: 05 September 2023
Accepted: 23 October 2023

*Corresponding author: Alpaslan Yaşar, Department of Business, Adana Alparslan Türkeş Science and Technology University, 01250, Adana, Türkiye
E-mail: ayasar@atu.edu.tr

Reviewing editor:
Collins G. Ntim, Accounting,
University of Southampton, United Kingdom

Additional information is available at
the end of the article

ACCOUNTING, CORPORATE GOVERNANCE & BUSINESS ETHICS | RESEARCH ARTICLE

Voluntary disclosure of scope 3 greenhouse gas emissions and earnings management: Evidence from UK companies

Alpaslan Yasar^{1*} and Neriman Yalçın¹

Abstract: Climate change information, especially greenhouse gas (GHG) emissions disclosures (Scopes 1, 2 and 3), has recently attracted considerable interest from investors, companies, regulators, and other stakeholders. This study examines the relationship between voluntary scope 3 GHG emissions disclosure and earnings management (EM), proxied by accruals-based earnings management (AEM) and real earnings management (REM). Based on a sample of 2,100 firm-year observations for 420 non-financial UK-listed firms over the period 2016–2020, we find a negative but insignificant relationship between voluntary scope 3 GHG emissions disclosure and EM. Our results are robust to alternative sensitivity tests. Our findings imply that voluntary environmental disclosure (scope 3 GHG emissions) is not a determining factor for UK firms to engage in EM.

Subjects: Business, Management and Accounting; Accounting; Corporate Social Responsibility; Business Ethics

Keywords: voluntary disclosure; scope 3 emissions disclosure; voluntary environmental disclosure; accrual-based earnings management; real earnings management; UK

1. Introduction

Climate and climate change-related issues (e.g., environment, energy, agriculture, food) are increasingly recognized as a global environmental threat to sustainable development. This issue has led to increased interest in corporate social responsibility, defined as voluntary activities undertaken by companies to operate in an economically, socially and environmentally sustainable manner (Riyadh et al., 2019), and pressure on companies to report on their environmental, social and governance performance (Bui et al., 2021). The growing interest in climate change-related issues is mainly due to the negative impacts of increasing GHG emissions on the environment, socio-economic systems and thus on human life (Orazalin et al., 2023). Since controlling these negative impacts of GHG emissions is essential for sustainable corporate development, there is a growing demand from investors and stakeholders for companies to provide carbon-related information (Luo & Tang, 2014). Depending on public interest in climate change and corporate social responsibility issues, several international agreements (1997 Kyoto Protocol, 2015 Paris Climate Agreement, 2021 Glasgow Climate Pact) have been signed to reduce the adverse effects of carbon emissions and combat climate change (Bilal Tan et al., 2022; Haque & Ntim, 2022). The growing interest from investors and stakeholders is putting pressure on companies to reduce their

GHG emissions (Sullivan, 2009) and is forcing them to disclose more information on climate change, in particular on GHG emissions (Albarak et al., 2019; Alsaifi et al., 2020; Flammer, 2013; Gerged et al., 2020; Sun et al., 2022; Velayutham, 2014). Therefore, companies are increasingly disclosing information on their GHG emissions (Scopes 1, 2 and 3),¹ voluntarily² or on a mandatory basis.

Despite increasingly mandatory requirements, companies continue to disclose information voluntarily, and much attention is paid to the motivations behind this behavior (Watson et al., 2002). According to the existing accounting literature, a company may use voluntary environmental disclosures either as a legitimising tool or in an opportunistic way to cover up unethical managerial behaviour such as EM (Gerged et al., 2020; Kim et al., 2012). The relationship between voluntary environmental disclosure and EM has been explained using several theoretical frameworks (e.g., legitimacy, agency, stakeholder, and signaling theory). Agency and stakeholder theories are the most popular (Velte, 2021). Based on the legitimacy theory, it is argued that companies will voluntarily disclose social and environmental information to maintain their legitimacy (Ofoegbu et al., 2018). Agency theory, based on the assumption that managers act in their own interest, suggests a positive relationship between corporate environmental disclosure and EM (Chih et al., 2008; Lemma et al., 2020; Prior et al., 2008; Sun et al., 2010; Velayutham, 2014), while stakeholder theory, based on the assumption that management acts in the interests of key stakeholder groups, suggests a negative relationship (Gerged et al., 2020; Kim et al., 2012).

According to Healy and Wahlen (1999), “EM occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers” (p. 368). EM practices may adversely affect the financial performance of the company by reducing the quality of information about profits presented in the financial statements (Maharani & Soewarno, 2018). Corporate social/environmental responsibility disclosures and good corporate governance play an important role in reducing the negative impact of EM practices (Ntim & Soobaroyen, 2013). Kim et al. (2012) argued that corporate social responsibility activities motivate managers to be honest, trustworthy and ethical. Companies committed to corporate social responsibility will endeavor to refrain from practicing EM to maintain long-term quality relationships with investors (Grass-Gil et al., 2016). On the other hand, consistent with the opportunistic view, managers involved in EM can be expected to make more corporate environmental disclosures to avoid shareholder scrutiny (Chih et al., 2008; Lemma et al., 2020; Prior et al., 2008; Sun et al., 2010). Therefore, examining whether companies make voluntary environmental disclosures in pursuit of shareholder interests or for their own opportunistic behaviour is important.

Numerous studies have investigated the relationship between voluntary environmental disclosures and EM based on opportunistic (agency theory) and ethical (stakeholder theory) arguments and have obtained positive, negative, or non-significant empirical results (Kumar et al., 2023; Velayutham, 2014; Velte, 2020). The conflicting results suggest that the relationship between voluntary disclosures and EM remains a significant research problem. Also, many studies have examined the relationship between corporate social responsibility disclosures and EM, but there needs to be more evidence on the relationship between GHG emissions disclosures and EM. On the other hand, existing literature provides no empirical evidence on the link between EM and voluntary Scope 3 GHG emissions disclosure, a particular type of voluntary environmental disclosure. Thus, the research question of this study is whether there is a relationship between the voluntary scope 3 GHG emissions disclosure and EM.

This study aims to investigate whether there is a relationship between voluntary environmental disclosures and EM. Specifically, using a sample of publicly listed UK firms, this study focuses on the association between scope 3 GHG emissions disclosure and EM (as measured via discretionary accruals and REM)

We are motivated to investigate this relationship for the following reasons: First, while there is a large body of evidence on the relationship between corporate social responsibility disclosures and EM, the existing literature on the relationship between GHG emissions disclosures and EM is limited and still evolving. Second, to the best of our knowledge, this is the first study investigating the link between voluntary disclosure of scope 3 GHG emission disclosure and EM. Third, carbon-related information, especially scope 3 GHG emissions, has become valuable for information users in recent years.

In the UK, the Companies Act 2006 (Strategic Report and Directors' Reports) Regulations 2013 require listed companies to provide information on greenhouse gas (GHG) emissions in their Directors' Reports (Secretary of State, 2013). It requires mandatory disclosure of scope 1 and 2 emissions to reduce total carbon emissions and encourages voluntary disclosure of scope 3 emissions. This change in legislation is an indication of the particular importance that the UK attaches to environmental reporting. The UK, a member of the G7, is also one of Europe's largest emitters of greenhouse gasses, making it a very important country in terms of emissions and emissions disclosures (Alsaifi et al., 2020). The UK is also a leader in using the comply or explain approach and developing corporate governance codes (Hosny & Elgharbawy, 2022). Therefore, examining the relationship between voluntary Scope 3 GHG emissions disclosure and EM in a UK context that emphasizes environmental reporting is essential.

We support our claim using UK-listed companies for the period 2016 to 2020. For the empirical analysis, we use the performance-adjusted discretionary accruals model and the abnormal cash flows from the operations model of Roychowdhury (2006) to estimate AEM and REM, respectively. The empirical results show that voluntary scope 3 GHG disclosure has a negative but insignificant relationship with AEM or REM, in contrast to the significant negative or positive relationship found in previous studies. Our findings are robust to the alternative sensitivity test. The findings indicate that managers in the UK do not use voluntary environmental disclosures (scope 3 GHG emissions) to mask their EM practices.

The paper seeks to contribute to the existing voluntary disclosures and the EM literature. *First*, we contribute to the ongoing debate on the relationship between voluntary environmental disclosures and EM in previous studies by examining the relationship between scope 3 GHG emissions disclosure and EM. *Second*, this study contributes to the literature by providing new empirical evidence documenting the lack of relationship between voluntary scope 3 GHG emissions disclosure and EM. *Third*, unlike most previous studies on the relationship between corporate social responsibility disclosure or environmental disclosures and EM, we use AEM and REM to estimate EM. To the best of our knowledge, this is the first study to focus on the relationship of voluntary scope 3 GHG emissions disclosure with both AEM and REM for the UK environment, a strong legal setting where scope 1 and 2 GHG disclosure is mandatory.

The rest of the paper is structured as follows: Section 2 presents the theoretical framework, relevant literature, and development of hypotheses. Section 3 describes the research design. Section 4 discusses our empirical results, including descriptive statistics, bivariate, and regression analysis. Section 5 presents robustness checks, and the final section offers conclusions.

2. Background

Increasing concerns around the world about the negative impacts of climate change due to increasing greenhouse gas emissions on the environment, socio-economic systems and thus human life have led countries to reduce the adverse effects of carbon emissions and combat climate change by making various laws/regulations (Haque & Ntim, 2022; Orazalin et al., 2023). In this context, as an essential first step, The United Nations Framework Convention on Climate Change (UNFCCC) was signed at the European Summit held in Rio de Janeiro in 1992 to protect the Earth's climate system against the effects of greenhouse gases and global warming and entered into force in 1994 (Erdoğan, 2010). With the Kyoto Protocol signed in 1997 within the

scope of the United Nations Framework Convention on Climate Change, the countries ratifying the protocol committed to reducing greenhouse gases by 5% compared to 1990 levels between 2008 and 2012 (Revkin, 2001). In December 2015, the Paris Climate Agreement (to keep warming well below 2 °C and pursue efforts towards 1.5 °C) was adopted, a new global agreement to combat climate change (Rogelj et al., 2016). In November 2021, the 26th Conference of the Parties (COP 26) to the United Nations Framework Convention on Climate Change (UNFCCC) was held. The Glasgow Climate Pact (GCP) agreement developed at COP 26 changed the emphasis from “well below 2°C”, the other limit set in the Paris Agreement, to consolidate 1.5°C as the primary global temperature ceiling and put a new emphasis on near-term action up to 2030 (Depledge et al., 2022). The European Commission (EC) has set a greenhouse gas reduction target of 40% for 2030 and has developed a vision of an 80–95% decarbonised society by 2050 (Velte, 2021).

The United Kingdom is one of the principal signatories to the Kyoto Protocol, having announced various climate change legislation, including the International Emissions Trading Scheme (ETS) (Luo & Tang, 2014). In the UK, the Companies Act 2006 (Strategic Report and Directors’ Reports) Regulations 2013 require listed companies to provide information on greenhouse gas (GHG) emissions in their Directors’ Report since October 2013 (Secretary of State, 2013). The law has been updated to reflect the new simplified energy and carbon reporting requirements. It requires mandatory disclosure of scope 1 and 2 emissions to reduce total carbon emissions and encourages voluntary disclosure of scope 3 emissions.

The acceleration of regulatory efforts to reduce the adverse effects of increasing GHG emissions has led companies to disclose information on greenhouse gas emissions on a mandatory or voluntary basis. Of the emission scopes (Scopes 1, 2, and 3) that represent different sources of GHG emissions, scope 3 emissions are not mandatory in the GHG Protocol, but a robust carbon footprint requires all three components (Peters, 2010). Scope 3 emissions usually constitute a significant portion of a company’s total GHG footprint, 75 percent for many companies (Downie & Stubbs, 2013), making voluntary Scope 3 emissions disclosures important. However, considering that voluntary disclosures may be made for shareholder interests or opportunistic motives such as earnings management, it is important to understand the motivation behind companies’ scope 3 disclosures. Consequently, this study seeks to investigate whether a relationship between companies’ voluntary scope 3 GHG emissions disclosures and earnings management in the UK context.

3. Theoretical literature review

Meeting environmental responsibilities and disclosing this information can be either a responsible moral act or an opportunistic act (Shang & Chi, 2023). The relationship between voluntary disclosures and EM is often discussed from two conflicting perspectives: opportunistic or ethical (Kumar et al., 2023; Velayutham, 2018). This relationship has been explained based on several theoretical frameworks (e.g., agency theory, stakeholder theory, legitimacy theory, signaling theory), of which agency and stakeholder theory are the most popular (Velte, 2021). This section discusses these two theories and applies them to develop our hypotheses and interpret empirical findings.

3.1. Agency theory

Agency theory (Jensen & Meckling, 1976) explains the conflict between principals (shareholders) and agents (managers) due to agency costs (Eisenhardt, 1989; Fox, 1984; Jensen & Meckling, 1976). Agency conflicts between managers and shareholders arise when managers act in their own interests rather than optimizing the firm value from the stakeholders’ perspective (Watts & Zimmerman, 1986). Agency theory proposes that firms can mitigate this conflict of interest through various methods, including compensation plans or voluntary disclosures. Managers may voluntarily disclose information to convince shareholders that they are acting in their best interests, thereby reducing agency conflicts with owners (Barako et al., 2006; Watson et al., 2002). When managers are opportunistic, they use sustainability disclosures as a tool to cover up their

opportunistic behavior (Velayutham, 2014). Thus, it can be expected that managers involved in EM will disclose more corporate environmental disclosure for their own benefit in order to distract shareholders from monitoring EM (Chih et al., 2008; Lemma et al., 2020; Prior et al., 2008; Sun et al., 2010).

3.2. Stakeholder theory

Stakeholder theory (Freeman, 1994) argues that the success of an organization depends on management's ability to satisfy the interests of key stakeholder groups (e.g., employees, customers, suppliers, creditors, communities, and others) by managing their relationships well (Freeman & Phillips, 2002). According to this theory, companies aiming to meet the expectations of external stakeholders are expected to adopt corporate social responsibility practices to improve their social and environmental performance (Alatawi et al., 2023). Based on this approach, managers of environmentally responsible companies who wish to avoid potential conflicts with key stakeholders are less likely to engage in unethical behavior such as EM practices (Gerged et al., 2020; Kim et al., 2012). Stakeholder theory proposes that different stakeholder groups require companies to disclose information on GHG emissions to evaluate their climate change strategies (Velayutham, 2014). Thus, based on this theory, managers who disclose voluntary scope 3 emissions are less likely to engage in EM, as low earnings quality will not reflect stakeholders' interests (Velayutham, 2018; Velte, 2019).

4. Empirical literature review and hypothesis development

Several theories can be used to understand the relationship between voluntary disclosures and earnings management, such as agency, stakeholder, legitimacy, and signaling theories. Some of the most prominent theories are the agency and stakeholder theories. Based on the agency theory, to reduce agency conflicts with shareholders, managers may voluntarily disclose information to convince shareholders that they are acting in their best interests (Barako et al., 2006; Watson et al., 2002). In this regard, agency theory suggests a positive relationship between voluntary scope 3 GHG emissions disclosure and EM. On the other hand, based on the stakeholder theory (Freeman, 1994), which assumes that management acts in the interests of key stakeholder groups, managers of environmentally conscious companies who want to avoid potential conflicts with key stakeholders are less likely to engage in EM (Gerged et al., 2020; Kim et al., 2012). In this context, managers who disclose voluntary scope 3 emissions are less likely to engage in EM. Thus, opportunistic (agency theory) and ethical (stakeholder theory) arguments indicate that there may be a positive or negative relationship between a firm's voluntary disclosures and its EM practices.

Prior empirical studies investigating the relationship between different types of voluntary disclosures (such as corporate social responsibility and environmental disclosures) and EM (such as AEM and REM) have found inconsistent empirical results that are positive, negative, and insignificant (Kumar et al., 2023; Velayutham, 2014; Velte, 2020). In this context, some previous studies provide evidence of a positive relationship between corporate social reporting disclosure and AEM, consistent with the opportunistic perspective (Choi et al., 2013; Gargouri et al., 2010; Martínez-Ferrero et al., 2016; Muttakin et al., 2015; Prior et al., 2008; Zhang et al., 2021). Conversely, some studies find a negative relationship between voluntary corporate social (environmental) disclosures and EM, consistent with the ethical perspective (Almahrog et al., 2018; Francis et al., 2008; Gerged et al., 2020; Grass-Gil et al., 2016; Hong & Andersen, 2011; Kim et al., 2012; Lobo & Zhou, 2001; Patten & Trompeter, 2003; Scholtens & Kang, 2013; Shang & Chi, 2023; Tran et al., 2022). For example, Lobo and Zhou (2001) reveal that firms with less corporate disclosure tend to engage in more EM and vice versa. Patten and Trompeter (2003) find a negative relationship between environmental disclosures and EM in the US. Kim et al. (2012) find that socially responsible firms are less likely to manage earnings with discretionary accruals, to manage real earnings, and to be subject to SEC investigations. However, some research has documented an insignificant relationship between voluntary disclosures and EM (Grougiou et al., 2014; Ibrahim et al., 2015; Liu et al., 2017; Moratis & van Egmond, 2018; Dianita, 2011; Sun et al., 2010). For example, Sun et al. (2010) examined the relationship between corporate environmental disclosure and EM and the

interaction effect of corporate governance mechanisms on this relationship in the United Kingdom. They find an insignificant relationship between corporate environmental disclosure and discretionary accruals, and some corporate governance attributes impact the relationship. Grougiou et al. (2014) reveal that, in the case of the U.S. banking sector, banks engaged in EM are also actively involved in corporate social responsibility reporting, while the reverse relationship is insignificant. Liu et al. (2017) indicate an insignificant relationship between corporate social responsibility performance and EM (either AEM or REM) when family involvement is considered. Moratis and van Egmond (2018) find no association between AEM and corporate social responsibility using a sample of US-listed firms.

Although many studies have examined the relationship between corporate social responsibility disclosures and EM, there is limited evidence on the relationship between GHG emissions disclosures and EM. The existing literature reveals that ESG disclosures, including carbon emissions, are negatively related to EM (Bilal Tan et al., 2022; Bui et al., 2021; Lemma et al., 2020; Luo & Wu, 2019; Velayutham, 2014; Velte, 2021; Yuan et al., 2022). For example, Velayutham (2014) finds a weak negative relationship between voluntary disclosure of GHG emissions and EM using a sample of Australian firms. Their findings indicate that managers are more likely to have an ethical orientation and disclose more GHG emissions to investors. Luo and Wu (2019) find that managerial propensity to disclose carbon information publically and the level and comprehensiveness of voluntary carbon disclosure are negatively associated with EM, consistent with the ethical perspective. Lemma et al. (2020) document evidence that firms with higher carbon risk exposure are associated with lower financial reporting quality and that this relationship is partially mediated by the quality of the firms' voluntary carbon disclosure.

Given the conflicting arguments above, to test the relationship between voluntary disclosure of scope 3 GHG emissions and EM (AEM and REM), we form the following hypotheses (stated in null form):

H1. There is no association between voluntary disclosure of scope 3 GHG emissions and AEM.

H2. There is no association between voluntary disclosure of scope 3 GHG emissions and REM.

5. Research design

5.1. Sample selection

The sample used in this study consists of non-financial publicly listed UK firms over the period 2016–2020. The initial sample includes 10,495 firm-year observations of 2,099 UK-listed firms. Consistent with previous EM studies, we first excluded financial sector firms (5,180 firm-year observations) because they are subject to different regulations and accounting requirements (Orazalin et al., 2023). We then deleted 3,215 observations with missing data. After excluding financial sector firms and missing values, a total of 1,679 firms were dropped from the sample. Our final sample contains 2,100 firm-year observations of 420 listed companies. For the 2016–2020 period, 349 firm-year observations had voluntary scope 3 GHG emissions disclosures, whereas 1,751 firm-year observations did not. The data are collected from the Thomson Reuters Eikon database in 2022 within the scope of our university subscription. Table 1 outlines the sample selection process.

5.2. Variables

5.2.1. Dependent variables

We used AEM and REM as dependent variables, which have been widely used in previous EM studies. This study uses Kothari et al. (2005) performance-adjusted discretionary accrual model to measure AEM, reducing the heteroskedasticity and misspecification

Table 1. Sample selection

		No. of observations
	Listed firms (2016–2020)	10,495
Less	Financial firms	5,180
Less	Observations with missing data	3,215
	Final sample	2,100

problems in other aggregate accrual models. We first calculate the total accruals based on the cash flow statement approach proposed by Hribar and Collins (2002) to estimate discretionary accruals. Second, we estimate non-discretionary accruals based on the Kothari et al. (2005) model in equation (1) and calculate non-discretionary accruals. Then, we obtained discretionary accruals (DA_{it}) as the difference between total accruals and the predicted value of non-discretionary accruals.

$$TA_{it}/A_{it-1} = \alpha_1(1/A_{it-1}) + \alpha_2(\Delta REV_{it} - \Delta REC_{it})/A_{it-1} + \alpha_3(PPE_{it})/A_{it-1} + \alpha_4ROA_{it}/A_{it-1} + \varepsilon_{it} \quad (1)$$

where, for fiscal year t and firm i , TA represents the total accruals measured by the difference between operating profit and operating cash flows, A_{it-1} represents the total assets in $t-1$, ΔREV represents the change in net revenues from the preceding year, ΔREC represents the change in net receivables from the preceding year, PPE represents the gross property, plant, and equipment, ROA represents the return on assets measured by the ratio of net income to lagged total assets, and ε it is the residual value used to measure discretionary accruals.

We also use REM as a dependent variable, which has received considerable attention in the accounting literature with the study of Roychowdhury (2006). In his study, he investigated the effects of three manipulation methods (sales manipulation, reduction of discretionary expenses, and overproduction) on abnormal CFO, abnormal cost of production, and abnormal discretionary expenses to detect REM. Previous studies provide empirical evidence of REM through sales manipulation, overproduction, and discretionary expenses (Cohen et al., 2008; Graham et al., 2005; Roychowdhury, 2006). Since REM directly affects cash flows (Roychowdhury, 2006; Sun et al., 2014), we measure REM only by the abnormal cash flows from operations (proxy for sales manipulation) model by Roychowdhury (2006). Thus, we use the following regression model to estimate the normal level of cash flows from operations:

$$CFO_t/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \alpha_2(S_t/A_{t-1}) + \alpha_3(\Delta S_t/A_{t-1}) + \varepsilon_{it} \quad (2)$$

where, CFO_t represents cash flow from operations in year t , A_{t-1} represents the total assets in $t-1$, S_t represents the sales in year t , ΔS_t represents the change in sales in year t , and ε it is the residual value, which is used to measure the abnormal cash flow from operations. Thus, the residual value (abnormal CFO) is used as the measure of REM and is measured as the actual CFO minus the estimated CFO from equation (2).

5.2.2. Independent variable

Our independent variable is the dummy variable DISC_Scope 3 GHG, which takes the value one if a firm makes a voluntary GHG emissions disclosure and 0 otherwise.

5.2.3. Control variables

We add several control variables commonly used in previous EM studies, including firm size ($SIZE$), leverage (LEV), operating cash flows (OCF), return on assets (ROA), audit firm size ($BIG4$), and sales growth ($GROWTH$). First, we include the control variable firm size ($SIZE$, measured by the natural logarithm of total assets). Firm size can have an ambiguous effect on EM. Some previous studies have found that larger firms manage earnings more than smaller firms (Burgstahler & Dichev, 1997; Dechow & Skinner, 2000; Kim et al., 2003; Velte, 2021). Other findings show that larger firms

Table 2. Definition of variables

Variable	Operationalization
<i>Dependent variables</i>	
$ DA $	Absolute value of discretionary accruals estimated by the Kothari et al. (2005) model
$ REM $	Absolute value of real earnings management estimated by abnormal cash flows from operations by the Roychowdhury (2006) model
<i>Independent variables</i>	
Scope 3 GHG	Dummy variable which equal to 1 if a firm makes a voluntary disclosure of scope 3 GHG emissions, and 0 otherwise.
<i>Control variables</i>	
SIZE	Natural logarithm of total assets
LEV	The ratio of total debts to total assets
CFO	Cash flow from operations scaled by lagged total assets
ROA	The ratio of net income to beginning total assets
BIG4	Dummy variable which equal to 1 if the auditor is a Big4 firm, and 0 otherwise
GROWTH	Annual change in net sales

have lower discretionary accruals than smaller firms (e.g., Dechow & Dichev, 2002; Myers et al., 2003). Second, leverage (LEV, measured by total debts to total assets) is included to control the risk of debt covenant violations. Third, operating cash flows (OCF, cash flow from operations scaled by lagged total assets) are included to control the negative relationship between discretionary accruals and cash flows from operations (Becker et al., 1998; Dechow et al., 1995; Francis & Wang, 2008). Fourth, we include return on assets (ROA, measured as the ratio of net income to beginning total assets) to control firm performance (Barua et al., 2010; McNichols, 2000; Velte, 2021). Fifth, we add audit firm size (BIG4, a dummy variable that takes 1 if a firm's auditor is BIG4 auditor, and 0 otherwise) as a measure of audit quality based on prior studies findings that Big4 auditors constrain the EM practices of their clients (Becker et al., 1998; DeFond & Jiambalvo, 1994; Francis et al., 1999; Jiang et al., 2008). In addition, we include sales growth (GROWTH, calculated as the annual change in net sales) to control the potential effect of firm growth on accruals (Chen et al., 2008). All variables (except for indicator variables) are winsorized at the 1% level to control for outliers and are defined in Table 2.

5.3. Research model

To test our hypotheses (H_1 and H_2), we use the following regression models to determine the relationship between voluntary disclosure of scope 3 GHG emissions and EM measured by AEM and REM proxies. The ordinary least squares (OLS) regression method is used to estimate the following equations:

$$|DA_{it}| = \beta_0 + \beta_1 \text{SCOPE 3 GHG}_{it} + \beta_2 \text{SIZE}_{it} + \beta_3 \text{LEV}_{it} + \beta_4 \text{OCF}_{it} + \beta_5 \text{ROA}_{it} + \beta_6 \text{BIG4}_{it} + \beta_7 \text{GROWTH}_{it} + \varepsilon_{it} \quad (3)$$

$$|REM_{it}| = \beta_0 + \beta_1 \text{SCOPE 3 GHG}_{it} + \beta_2 \text{SIZE}_{it} + \beta_3 \text{LEV}_{it} + \beta_4 \text{OCF}_{it} + \beta_5 \text{ROA}_{it} + \beta_6 \text{BIG4}_{it} + \beta_7 \text{GROWTH}_{it} + \varepsilon_{it} \quad (4)$$

In equation (3), $|DA_{it}|$ represents the magnitude of absolute discretionary accruals estimated using the Kothari et al. (2005) model. Since firms may manage earnings through

income-increasing or income-decreasing, we use the unsigned (absolute) value of discretionary accruals ($|DA_{it}|$) to measure the magnitude of AEM (Reynolds & Francis, 2000; Warfield et al., 1995). A higher magnitude of absolute discretionary accruals indicates a greater level of AEM.

In equation (4), because we are not interested in the direction of REM, we use only the absolute value of real earnings management $|REM_{it}|$. Larger absolute values of abnormal CFO indicate greater REM.

6. Empirical results and discussion

6.1. Descriptive statistics

Table 3 presents the descriptive statistics of the dependent variables (Panel A) and control variables (Panel B) for the full sample, disclosing, and non-disclosing sub-samples categorized on the basis of whether the firm discloses scope 3 GHG emissions or not. The mean (median) values of $|DA|$ for the full sample, disclosing, and non-disclosing sub-samples are 0.1022 (0.0677), 0.0923 (0.0700), and 0.1041 (0.0674), respectively. The mean (median) values of $|REM|$ for the full sample, disclosing, and non-disclosing sub-samples are 0.1422 (0.0836), 0.1061 (0.0656), and 0.1494 (0.0869), respectively. The mean (median) values of $|DA|$ and $|REM|$ are lower for disclosing firms than for non-disclosing firms. The results show

that firms that disclose voluntary scope 3 GHG emissions may engage in less EM practices through discretionary accruals and REM than non-disclosing firms.

6.2. Bivariate analysis

Table 4 presents the Pearson correlation matrix for the variables used in our analyzes. The correlation coefficients between Scope 3 GHG emissions and the two proxies of EM ($|DA|$ and $|REM|$) are weak and negative. We found no significant correlations between voluntary scope 3 GHG emissions and EM, whereas a significant correlation with REM.

Regarding absolute discretionary accruals ($|DA|$) and control variables, firm size ($SIZE$) and audit firm size ($BIG4$) are negatively and significantly correlated with absolute discretionary accruals ($|DA|$). Absolute discretionary accruals ($|DA|$) are positively and

Table 3. Descriptive statistics

	Full Sample		Disclosing firms		Non-disclosing firms	
Variables	Mean	Median	Mean	Median	Mean	Median
Panel A: Dependent Variables						
$ DA $	0.1022	0.0677	0.0923	0.0700	0.1041	0.0674
$ REM $	0.1422	0.0836	0.1061	0.0656	0.1494	0.0869
Panel B: Control Variables						
$SIZE$	19.5692	19.3640	21.8057	21.6740	19.1235	18.9601
LEV	0.2413	0.2100	0.2644	0.2670	0.2361	0.1996
CFO	0.1033	0.0894	0.1825	0.1132	0.0875	0.0836
ROA	0.6491	0.0609	1.1992	0.1702	0.5395	0.0419
$BIG4$	0.6222	1.0000	0.9300	1.0000	0.5500	0.1978
$GROWTH$	0.1788	0.0370	0.0831	0.0363	1.0000	0.0371

Notes: This table reports the mean and median values of the variables for the full sample, disclosing and non-disclosing firms. Variable definition is presented section 3.2 and Table 2. All variables are winsorized at the 1% and 99% levels to mitigate the effect of possible outliers.

Table 4. Correlation coefficients

Variables	DA	REM	SCOPE 3 GHG	SIZE	LEV	OCF	ROA	BIG4	GROWTH
DA	1								
REM	0.162**	1							
SCOPE 3 GHG	-0.036	-0.053*	1						
SIZE	-0.114**	-0.132**	.395**	1					
LEV	-0.049	-0.009	.058*	0.038**	1				
CFO	0.096**	0.319**	.065**	0.144**	0.004	1			
ROA	0.089**	0.016	.092**	0.191**	0.030	0.187**	1		
BIG4	-0.107**	-0.068**	.287**	0.503**	0.113**	0.143**	0.127**	1	
GROWTH	0.038	0.042	-.025	-0.072**	-0.069*	-0.045*	-0.027	-0.062**	1

All variables are as defined before.

*indicate significance at the 5% and 1% level, respectively (two-tailed).

significantly (at a 1% level) related to cash flow from operations (CFO) and return on assets (ROA). However, we did not find significant correlations between financial leverage (LEV) and sales growth (GROWTH). Regarding real earnings management (*|REM|*) and control variables, we find similar results (except for ROA) in the same direction. The results indicate that firms with larger size and being audited by Big Four auditors engage in less EM, whereas firms with higher cash flow from operations and higher return on assets engage in more EM.

The correlation coefficients between variables are relatively low (most of the correlation coefficients below 0.40), indicating no multicollinearity problem among the variables.

6.3. Multiple regression analysis

Table 5 summarizes the multivariate regression analyzes of EM using AEM and REM proxies as dependent variables, and SCOPE 3 GHG and other control variables are considered as the independent variables.

To test hypothesis H1, we use the absolute value of discretionary accruals (*|DA|*) as a proxy for AEM as the dependent variable in equation (3). After controlling for factors potentially influencing discretionary accruals, we found a negative but insignificant association between Scope 3 GHG and AEM. The regression result is consistent with hypothesis H1. This finding is consistent with previous research on voluntary disclosures and EM for the UK (Sun et al., 2010) and the US (Grougiou et al., 2014; Moratis & van Egmond, 2018).

To test our second hypothesis H2, we use the absolute values of abnormal CFO as a proxy for REM as the dependent variable in equation (4). We found a negative but insignificant association between Scope 3 GHG and REM. The regression result is consistent with hypothesis H2. This finding is consistent with the finding of Liu et al. (2017), which suggests an insignificant relationship between corporate social responsibility performance and EM (AEM or REM).

Overall, the empirical results are contrary to the predictions of agency and stakeholder theories, indicating that voluntary scope 3 disclosures have no significant association with AEM or REM. Thus, contrary to previous studies, we find that managers in the UK do not use voluntary disclosures (scope 3 emissions) to mask their EM practices. Our findings have important implications for shareholders, investors and other stakeholders who may view voluntary environmental disclosures as ethical or EM.

Regarding control variables, the coefficients on *SIZE* and *BIG4* (*LEV*, *CFO* and *ROA*) are negatively (positively) and significantly (at 1 percent level) related to the AEM, which indicates that firms with larger sizes and clients audited by *BIG4* auditors have lower absolute value of discretionary accruals or less AEM. However, firms with higher financial leverage, greater operating cash flows, and greater profitability have a higher absolute value of discretionary accruals or higher AEM. On the other hand, the coefficients on *SIZE* and *ROA* (*CFO* and *GROWTH*) are negatively (positively) associated with REM, which indicates that firms with larger sizes and greater profitability have less REM. In contrast, firms with greater operating cash flows and sales growth have more REM.

6.4. Robustness analysis

Robustness analysis is crucial to empirical research as it ensures the results are reliable and invariant to various estimation assumptions, conditions and methods (Elmghamez et al., 2023).

We performed several robustness tests. First, we use the modified Jones model (Dechow et al., 1995) to measure discretionary accruals and rerun regression analysis on the discretionary accruals model in equation (3). The regression coefficient of *SCOPE 3 GHG* in Table 6 shows evidence that *SCOPE 3 GHG* is negatively and insignificantly associated with the absolute value of discretionary accruals, which is consistent with the results of the first column of Table 5.

Second, we re-estimate the models using one-year lagged values of the independent variables to control for endogeneity, as both the dependent and independent variables may be simultaneously affected by a third unobservable variable (simultaneity) (Al-Jaifi, 2017).

Table 5. Multiple regression results of voluntary scope 3 GHG emissions on EM

Variables	AEM	REM
<i>SCOPE 3 GHG</i>	−0.009 (−1.016)	−0.010 (−0.407)
<i>SIZE</i>	−0.004*** (−2.509)	−0.016*** (−3.925)
<i>LEV</i>	0.046*** (2.676)	0.024 (0.532)
<i>CFO</i>	0.016*** (2.827)	0.280*** (8.982)
<i>ROA</i>	0.005*** (4.526)	−0.009*** (−2.889)
<i>BIG4</i>	−0.026*** (−3.426)	−0.013 (−0.673)
<i>GROWTH</i>	0.005 (1.370)	0.018** (1.994)
Constant	0.179*** (6.321)	0.427*** (5.780)
Observations	2,100	2,100
Adjusted R^2	0.045	0.216
F-statistics	10.016	54.018

Notes: All variables are defined as Table 2.

t-statistics are presented in parentheses.

*, **, *** Indicate significant at the 10%, 5%, and 1% levels, respectively (two-tailed).

Table 7 presents the results of re-estimating the one-year lagged values of the independent variables. The results in Table 7 show that the results are robust, even after controlling for lagged dependent variables.

Finally, to test the robustness of the results, instead of an unbalanced sample, we also use a matched control sample (by year and size) of 349 firms with voluntary scope 3 GHG emissions disclosure and 349 firms without voluntary scope 3 GHG emissions disclosure. As shown in Table 8, the coefficient of scope 3 GHG is negatively and insignificantly related to both AEM and REM. Thus, the robustness test results support the above regression results and show that voluntary scope 3 GHG emissions disclosure has a negative but insignificant association with EM. 1999

7. Summary and conclusion

The increasing attention of the media, policymakers, investors, and social and environmental activists to social and environmental issues related to climate change has led many companies to improve their environmental performance through strategic environmental investments (El Ghoul et al., 2018). The increasing interest of investors and stakeholders makes it important for companies to disclose their GHG emissions (Scopes 1, 2 and 3), especially Scope 3, either voluntarily or mandatorily. However, the debate remains on whether managers use voluntary disclosure opportunistically to distort earnings information for their benefit or ethically to provide transparent and reliable information. To our knowledge, there is no empirical evidence on the relationship between voluntary scope 3 GHG emissions disclosures and EM.

We investigate whether there is a relationship between scope 3 GHG emissions disclosures and EM using a sample of publicly traded UK firms during the 2016–2020 period. The performance-adjusted discretionary accruals model (Kothari et al., 2005) and the abnormal cash flows from the

Table 6. Robustness test results using the modified Jones model

Variables	AEM
SCOPE 3 GHG	−0.012 (−0.780)
SIZE	−0.011*** (−4.181)
LEV	0.046 (1.572)
CFO	0.413*** (4.314)
ROA	−0.010*** (−5.109)
BIG4	−0.043*** (−3.307)
GROWTH	0.011 (1.895)
Constant	0.315*** (6.569)
Observations	2,100
Adjusted R^2	0.582
F-statistics	269.110

Notes: All variables are defined as Table 2.

t-statistics are presented in parentheses.

*, **, *** Indicate significant at the 10%, 5%, and 1% levels, respectively (two-tailed).

Table 7. Robustness test using lagged dependent variables

Variables	AEM	REM
$ DA_{t-1} $	0.439***	0.436***
$ REM_{t-1} $	(19.905)	(29.580)
SCOPE 3 GHG	−0.003	0.011
	(−0.359)	(0.615)
SIZE	−0.002	−0.009***
	(−1.404)	(−2.947)
LEV	0.028***	0.015
	(1.829)	(0.419)
CFO	0.010*	0.155***
	(1.962)	(12.640)
ROA	0.003***	−0.006**
	(3.033)	(−2.477)
BIG4	−0.020***	−0.016
	(−2.987)	(−1.026)
GROWTH	0.003	0.011
	(0.902)	(1.613)
Constant	0.096***	0.234***
	(3.800)	(4.047)
Observations	2,100	2,100
Adjusted R^2	0.262	0.526
F-statistics	60.875	187.491

Notes: All variables are defined as Table 2.

t-statistics are presented in parentheses.

Indicate significant at the 10%, 5%, and 1% levels, respectively (two-tailed).

operations model (Roychowdhury, 2006) are used as measures of EM. Contrary to agency theory and stakeholder theory expectations, we found an insignificant association between voluntary scope 3 GHG disclosures and EM. The results indicate that managers in the UK do not use voluntary environmental disclosures (scope 3 GHG emissions) to mask their earnings management practices. In other words, these results imply that voluntary environmental disclosure is not a determining factor for UK firms to engage in EM. Our findings are robust to the alternative sensitivity test.

The main contribution of this paper is twofold. First, this is the first (to the best of our knowledge) study to focus on the relationship of voluntary scope 3 GHG emissions disclosure with both AEM and REM for the UK environment. Second, using voluntary scope 3 disclosures, we provide new evidence of no relationship between voluntary environmental disclosures and EM.

This study has several implications for researchers, regulators, policymakers, investors, and other stakeholders. *First*, as recent empirical research has focused on the relationship between social responsibility performance and EM (using accrual models), we also encourage researchers to focus on the association between carbon emissions disclosures (such as voluntary GHG emissions disclosures) and EM (using accrual and REM models). *Second*, while prior research has shown that voluntary GHG emissions disclosures can be used for EM with opportunistic and ethical motives, our results indicate that firms may not voluntarily use carbon disclosure as a signal of financial reporting quality in the presence of national carbon regulations (such as the Scope 1 and 2 regulations in our UK sample). This evidence could benefit policymakers and regulators in considering the importance of the interaction between GHG emissions disclosures and EM in setting future carbon emissions regulations. *Third*, as our findings can provide insights into the

Table 8. Robustness test results based on matched sample

Variables	AEM	REM
SCOPE 3 GHG	−0.009 (−0.886)	−0.008 (−0.690)
SIZE	−0.001 (−0.428)	−0.001 (−0.169)
LEV	0.084*** (3.155)	0.004 (0.128)
CFO	0.016** (2.213)	0.026*** (2.830)
ROA	0.006*** (3.777)	−0.001 (−0.793)
BIG4	−0.048*** (−3.090)	−0.042** (−2.241)
GROWTH	0.012 (1.329)	0.010 (0.903)
Constant	0.131** (2.116)	0.153** (2.030)
Observations	698	698
Adjusted R^2	0.071	0.017
F-statistics	6.371	2.243

Notes: All variables are defined as Table 2.

t-statistics are presented in parentheses.

*, **, *** Indicate significant at the 10%, 5%, and 1% levels, respectively (two-tailed).

reporting quality of UK-listed firms, our results could be helpful for investors and other stakeholders in their decision-making processes.

Our study has some limitations: *First*, our study only includes observations of UK-listed companies, which reduces the generalisability of the results. Different results may be obtained for firms with regulatory differences from the UK in other countries. Therefore, future research could examine the voluntary GHG emissions disclosures-EM relationship using cross-country data to control for the potential effects of different legal, cultural, and institutional settings. *Second*, given the small sample size that voluntarily reports Scope 3 emissions, a larger sample size would allow for more definitive conclusions. *Third*, another limitation of our research is that we use scope 3 GHG disclosures, which are specific carbon-related disclosures. As voluntary environmental disclosures are not limited to scope 3 GHG emissions, analyzing the relationship between different types of environmental disclosures and EM may provide different findings. Finally, in this study, we used discretionary accruals, an essential indicator of EM in the literature. However, since discretionary accruals may be a noisy indicator of EM, it can be considered a limitation of the study.

Future research can explore various avenues to understand better the relationship between earnings management and voluntary environmental disclosure. First, EM by classification shifting can be an alternative tool in future studies, as we used two EM tools (AEM and REM). Second, future research should consider various corporate governance factors affecting the relationship between voluntary scope 3 GHG disclosures and EM. Additionally, the relationship between the quality of voluntary scope 3 GHG disclosures and EM can be explored in future research. Finally, EM practices after and before mandatory carbon disclosures can be addressed in future research. In summary,

voluntary carbon emissions disclosures and EM leave many questions unanswered for future empirical research.

Acknowledgments

The authors thank the editors and anonymous reviewers for their valuable comments.

Author details

Alpaslan Yasar¹

E-mail: ayasar@atu.edu.tr

ORCID ID: <http://orcid.org/0000-0002-7960-9665>

Neriman Yalçın¹

¹ Department of Business, Adana Alparslan Türkeş Science and Technology University 01250, Adana, Türkiye.

Citation information

Cite this article as: Voluntary disclosure of scope 3 greenhouse gas emissions and earnings management: Evidence from UK companies, Alpaslan Yasar & Neriman Yalçın, *Cogent Business & Management* (2023), 10: 2275849.

Notes

1. Scope 1 emissions are the emissions from sources under the company's control, Scope 2 emissions are offsite emissions from purchased electricity, heat, or steam and Scope 3 emissions are offsite emissions from the company's supply chain or products sold by the company (Luo & Tang, 2014; Peters, 2010).
2. Voluntary disclosure of GHG emissions information includes disclosure of GHG emissions information in corporate reports such as annual reports, sustainability reports, participation in voluntary disclosure programs, and press releases (Velayutham, 2014).

Disclosure statement

No potential conflict of interest was reported by the authors.

Data availability statement

Data will be made available on reasonable request.

References

- Alatawi, I. A., Ntim, C. G., Zras, A., & Elmagrhi, M. H. (2023). CSR, financial and non-financial performance in the tourism sector: A systematic literature review and future research agenda. *International Review of Financial Analysis*, 89, 102734. <https://doi.org/10.1016/j.irfa.2023.102734>
- Albarak, M. S., Elnahass, M., & Salama, A. (2019). The effect of carbon dissemination on cost of equity. *Business Strategy and the Environment*, 28(6), 1179–1198. <https://doi.org/10.1002/bse.2310>
- Al-Jaifi, H. A. (2017). Ownership concentration, earnings management and stock market liquidity: Evidence from Malaysia. *Corporate Governance*, 17(3), 490–510. <https://doi.org/10.1108/CG-06-2016-0139>
- Almahrog, Y., Ali Aribi, Z., & Arun, T. (2018). Earnings management and corporate social responsibility: UK evidence. *Journal of Financial Reporting and Accounting*, 16(2), 311–332. <https://doi.org/10.1108/JFRA-11-2016-0092>
- Alsaifi, K., Elnahass, M., & Salama, A. (2020). Carbon disclosure and financial performance: UK environmental policy. *Business Strategy and the Environment*, 29(2), 711–726. <https://doi.org/10.1002/bse.2426>
- Barako, D. G., Hancock, P., & Izan, H. Y. (2006). Factors influencing voluntary corporate disclosure by Kenyan companies. *Corporate Governance an International Review*, 14(2), 107–125. <https://doi.org/10.1111/j.1467-8683.2006.00491.x>
- Barua, A., Davidson, L. F., Rama, D. V., & Thiruvadi, S. (2010). CFO gender and accruals quality. *Accounting Horizons*, 24(1), 25–39. <https://doi.org/10.2308/acch.2010.24.1.25>
- Becker, C. L., DeFond, M. L., Jiambalvo, J., & Subramanyam, K. R. (1998). The effect of audit quality on earnings management. *Contemporary Accounting Research*, 15(1), 1–24. <https://doi.org/10.1111/j.1911-3846.1998.tb00547.x>
- Bilal Tan, D., Komal, B., Ezeani, E., Usman, M., Salem, R., & Salem, R. (2022). Carbon emission disclosures and financial reporting quality: Does ownership structure and economic development matter? *Environmental Science & Policy*, 137, 109–119. <https://doi.org/10.1016/j.envsci.2022.08.004>
- Bui, B., Houque, M. N., & Zaman, M. (2021). Climate change mitigation: Carbon assurance and reporting integrity. *Business Strategy and the Environment*, 30(8), 3839–3853. <https://doi.org/10.1002/bse.2843>
- Burgstahler, D., & Dichev, I. (1997). Earnings management to avoid earnings decreases and losses. *Journal of Accounting and Economics*, 24(1), 99–126. [https://doi.org/10.1016/S0165-4101\(97\)00017-7](https://doi.org/10.1016/S0165-4101(97)00017-7)
- Chen, C. Y., Lin, C. J., & Lin, Y. C. (2008). Audit partner tenure, audit firm tenure, and discretionary accruals: Does long auditor tenure impair earnings quality? *Contemporary Accounting Research*, 25(2), 415–445. <https://doi.org/10.1506/car.25.2.5>
- Chih, H. L., Shen, C. H., & Kang, F. C. (2008). Corporate social responsibility, investor protection, and earnings management: Some international evidence. *Journal of Business Ethics*, 79(1–2), 179–198. <https://doi.org/10.1007/s10551-007-9383-7>
- Choi, B. B., Lee, D., & Psaros, J. (2013). An analysis of Australian company carbon emission disclosures. *Pacific Accounting Review*, 25(1), 58–79. <https://doi.org/10.1108/01140581311318968>
- Cohen, D. A., Dey, A., & Lys, T. Z. (2008). Real and accrual-based earnings management in the pre- and post-Sarbanes-Oxley periods. *The Accounting Review*, 83(3), 757–787. <https://doi.org/10.2308/accr.2008.83.3.757>
- Dechow, P. M., & Dichev, I. D. (2002). The quality of accruals and earnings: The role of accrual estimation errors. *The Accounting Review*, 77(s–1), 35–59. <https://doi.org/10.2308/accr.2002.77.s-1.35>
- Dechow, P. M., & Skinner, D. J. (2000). Earnings management: Reconciling the views of accounting academics, practitioners, and regulators. *Accounting Horizons*, 14(2), 235–250. <https://doi.org/10.2308/acch.2000.14.2.235>
- Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1995). Detecting earnings management. *The Accounting Review*, 70(2), 193–225. <https://www.jstor.org/stable/248303>
- DeFond, M. L., & Jiambalvo, J. (1994). Debt covenant violation and manipulation of accruals. *Journal of Accounting and Economics*, 17(1–2), 145–176. [https://doi.org/10.1016/0165-4101\(94\)90008-6](https://doi.org/10.1016/0165-4101(94)90008-6)
- Depledge, J., Saldivia, M., & Peñasco, C. (2022). Glass half full or glass half empty?: The 2021 Glasgow climate conference. *Climate Policy*, 22(2), 147–157. <https://doi.org/10.1080/14693062.2022.2038482>
- Dianita, P. S. (2011). Analysis of the effect of corporate social responsibility on financial performance with earnings management as a moderating variable. *Journal of Modern Accounting and Auditing*, 7(10), 1034–1045. <https://doi.org/10.17265/1548-6583/2011.10.002>

- Downie, J., & Stubbs, W. (2013). Evaluation of Australian companies' scope 3 greenhouse gas emissions assessments. *Journal of Cleaner Production*, 56, 156–163. <https://doi.org/10.1016/j.jclepro.2011.09.010>
- Eisenhardt, K. M. (1989). Agency theory: An assessment and review. *Academy of Management Review*, 14(1), 57–74. <https://doi.org/10.2307/258191>
- El Ghoul, S., Guedhami, O., Kim, H., & Park, K. (2018). Corporate environmental responsibility and the cost of capital: International evidence. *Journal of Business Ethics*, 149, 335–361. <https://doi.org/10.1007/s10551-015-3005-6>
- Elmghaamez, I. K., Nwachukwu, J., & Ntim, C. G. (2023). ESG disclosure and financial performance of multinational enterprises: The moderating effect of board standing committees. *International Journal of Finance & Economics*. <https://doi.org/10.1002/ijfe.2846>
- Erdoğan, E. (2010). Turkish support to Kyoto Protocol: A reality or just an illusion. *Renewable and Sustainable Energy Reviews*, 14(3), 1111–1117. <https://doi.org/10.1016/j.rser.2009.10.020>
- Flammer, C. (2013). Corporate social responsibility and shareholder reaction: The environmental awareness of investors. *Academy of Management Journal*, 56(3), 758–781. <https://doi.org/10.5465/amj.2011.0744>
- Fox, R. (1984). Agency theory: A new perspective. *Management Accounting*, 62(2), 36–38.
- Francis, J. R., Maydew, E. L., & Sparks, H. C. (1999). The role of big 6 auditors in the credible reporting of accruals. *Auditing: A Journal of Practice & Theory*, 18(2), 17–34. <https://doi.org/10.2308/aud.1999.18.2.17>
- Francis, J., Nanda, D., & Olsson, P. (2008). Voluntary disclosure, earnings quality, and cost of capital. *Journal of Accounting Research*, 46(1), 53–99. <https://doi.org/10.1111/j.1475-679X.2008.00267.x>
- Francis, J. R., & Wang, D. (2008). The joint effect of investor protection and big 4 audits on earnings quality around the world. *Contemporary Accounting Research*, 25(1), 157–191. <https://doi.org/10.1506/car.25.1.6>
- Freeman, R. E. (1994). The politics of stakeholder theory: Some future directions. *Business Ethics Quarterly*, 4(4), 409–421. <https://doi.org/10.2307/3857340>
- Freeman, R. E., & Phillips, R. A. (2002). Stakeholder theory: A libertarian defense. *Business Ethics Quarterly*, 12(3), 331–349. <https://doi.org/10.2307/3858020>
- Gargouri, R. M., Shabou, R., & Francoeur, C. (2010). The relationship between corporate social performance and earnings management. *Canadian Journal of Administrative Sciences/Revue Canadienne Des Sciences De L'Administration*, 27(4), 320–334. <https://doi.org/10.1002/cjas.178>
- Gerged, A. M., Al-Haddad, L. M., & Al-Hajri, M. O. (2020). Is earnings management associated with corporate environmental disclosure? Evidence from Kuwaiti listed firms. *Accounting Research Journal*, 33(1), 167–185. <https://doi.org/10.1108/ARJ-05-2018-0082>
- Graham, J. R., Harvey, C. R., & Rajgopal, S. (2005). The economic implications of corporate financial reporting. *Journal of Accounting and Economics*, 40(1–3), 3–73. <https://doi.org/10.1016/j.jacceco.2005.01.002>
- Grass-Gil, E., Manzano, M. P., & Fernández, J. H. (2016). Investigating the relationship between corporate social responsibility and earnings management: Evidence from Spain. *BRQ Business Research Quarterly*, 19(4), 289–299. <https://doi.org/10.1016/j.brq.2016.02.002>
- Grougiou, V., Leventis, S., Dedoulis, E., & Owusu-Ansah, S. (2014). Corporate social responsibility and earnings management in US banks. *Accounting Forum*, 38(3), 155–169. <https://doi.org/10.1016/j.acfor.2014.05.003>
- Haque, F., & Ntim, C. G. (2022). Do corporate sustainability initiatives improve carbon performance? Evidence from European firms. *Business Strategy and the Environment*, 31(7), 3318–3334. <https://doi.org/10.1002/bse.3078>
- Healy, P. M., & Wahlen, J. M. (1999). A review of the earnings management literature and its implications for standard setting. *Accounting Horizons*, 13(4), 365–383. <https://doi.org/10.2139/ssrn.156445>
- Hong, Y., & Andersen, M. L. (2011). The relationship between corporate social responsibility and earnings management: An exploratory study. *Journal of Business Ethics*, 104(4), 461–471. <https://doi.org/10.1007/s10551-011-0921-y>
- Hosny, K., & Elgharabawy, A. (2022). Board diversity and financial performance: Empirical evidence from the United Kingdom. *Accounting Research Journal*, 35(4), 561–580. <https://doi.org/10.1108/ARJ-02-2020-0037>
- Hribar, P., & Collins, D. W. (2002). Errors in estimating accruals: Implications for empirical research. *Journal of Accounting Research*, 40(1), 105–134. <https://doi.org/10.1111/1475-679X.00041>
- Ibrahim, M. S., Darus, F., Yusoff, H., & Muhammed, R. (2015). Analysis of earnings management practices and sustainability reporting for corporations that offer Islamic products & services. *Procedia Economics and Finance*, 28, 176–182. [https://doi.org/10.1016/S2212-5671\(15\)01098-9](https://doi.org/10.1016/S2212-5671(15)01098-9)
- Jensen, M. C., & Meckling, W. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305–360. [https://doi.org/10.1016/0304-405X\(76\)90026-X](https://doi.org/10.1016/0304-405X(76)90026-X)
- Jiang, W., Lee, P., & Anandarajan, A. (2008). The association between corporate governance and earnings quality: Further evidence using the GOV-Score. *Advances in Accounting*, 24(2), 191–201. <https://doi.org/10.1016/j.adiaac.2008.08.011>
- Kim, J. B., Chung, R., & Firth, M. (2003). Auditor conservatism, asymmetric monitoring, and earnings management. *Contemporary Accounting Research*, 20(2), 323–359. <https://doi.org/10.1506/J29K-MRUA-0APP-YJ6V>
- Kim, Y., Park, M. S., & Wier, B. (2012). Is earnings quality associated with corporate social responsibility? *The Accounting Review*, 87(3), 761–796. <https://doi.org/10.2308/accr-10209>
- Kothari, S. P., Leone, A. J., & Wasley, C. E. (2005). Performance matched discretionary accrual measures. *Journal of Accounting and Economics*, 39(1), 163–197. <https://doi.org/10.1016/j.jacceco.2004.11.002>
- Kumar, S., Sharma, A., Mishra, P., & Kaushik, N. (2023). Corporate social responsibility disclosures and earnings management: A bibliometric analysis. *International Journal of Disclosure & Governance*, 20(1), 27–51. <https://doi.org/10.1057/s41310-022-00156-2>
- Lemma, T. T., Shabestari, M. A., Freedman, M., & Mlilo, M. (2020). Corporate carbon risk exposure, voluntary disclosure, and financial reporting quality. *Business Strategy and the Environment*, 29(5), 2130–2143. <https://doi.org/10.1002/bse.2499>
- Liu, M., Shi, Y., Wilson, C., & Wu, Z. (2017). Does family involvement explain why corporate social responsibility affects earnings management? *Journal of Business Research*, 75, 8–16. <https://doi.org/10.1016/j.jbusres.2017.02.001>

- Lobo, G. J., & Zhou, J. (2001). Disclosure quality and earnings management. *Asia-Pacific Journal of Accounting & Economics*, 8(1), 1–20. <https://doi.org/10.1080/16081625.2001.10510584>
- Luo, L., & Tang, Q. (2014). Does voluntary carbon disclosure reflect underlying carbon performance? *Journal of Contemporary Accounting & Economics*, 10(3), 191–205. <https://doi.org/10.1016/j.jcae.2014.08.003>
- Luo, L., & Wu, H. (2019). Voluntary carbon transparency: A substitute for or complement to financial transparency? *Journal of International Accounting Research*, 18(2), 65–88. <https://doi.org/10.2308/jiar-52421>
- Mahrani, M., & Soewarno, N. (2018). The effect of good corporate governance mechanism and corporate social responsibility on financial performance with earnings management as mediating variable. *Asian Journal of Accounting Research*, 3(1), 41–60. <https://doi.org/10.1108/AJAR-06-2018-0008>
- Martínez-Ferrero, J., Banerjee, S., & García-Sánchez, I. M. (2016). Corporate social responsibility as a strategic shield against costs of earnings management practices. *Journal of Business Ethics*, 133(2), 305–324. <https://doi.org/10.1007/s10551-014-2399-x>
- McNichols, M. F. (2000). Research design issues in earnings management studies. *Journal of Accounting and Public Policy*, 19(4–5), 313–345. [https://doi.org/10.1016/S0278-4254\(00\)00018-1](https://doi.org/10.1016/S0278-4254(00)00018-1)
- Moratis, L., & van Egmond, M. (2018). Concealing social responsibility? Investigating the relationship between CSR, earnings management and the effect of industry through quantitative analysis. *International Journal of Corporate Social Responsibility*, 3(1), 1–13. <https://doi.org/10.1186/s40991-018-0030-7>
- Muttakin, M. B., Khan, A., & Azim, M. I. (2015). Corporate social responsibility disclosures and earnings quality: Are they a reflection of managers' opportunistic behavior? *Managerial Auditing Journal*, 30(3), 277–298. <https://doi.org/10.1108/MAJ-02-2014-0997>
- Myers, J. N., Myers, L. A., & Omer, T. C. (2003). Exploring the term of the auditor-client relationship and the quality of earnings: A case for mandatory auditor rotation? *The Accounting Review*, 78(3), 779–799. <https://doi.org/10.2308/accr.2003.78.3.779>
- Ntim, C. G., & Soobaroyen, T. (2013). Corporate governance and performance in socially responsible corporations: New empirical insights from a Neo-institutional framework. *Corporate Governance an International Review*, 21(5), 468–494. <https://doi.org/10.1111/corg.12026>
- Ofoegbu, G. N., Odoemalam, N., Okafor, R. G., & Ntim, C. G. (2018). Corporate board characteristics environmental disclosure quantity: Evidence from South Africa (integrated reporting) and Nigeria (traditional reporting). *Cogent Business & Management*, 5(1), 1551510. <https://doi.org/10.1080/23311975.2018.1551510>
- Orazalin, N. S., Ntim, C. G., & Malagila, J. K. (2023). Board sustainability committees, climate change initiatives, carbon performance, and market value. *British Journal of Management*. <https://doi.org/10.1111/1467-8551.12715>
- Patten, D. M., & Trompeter, G. (2003). Corporate responses to political costs: An examination of the relation between environmental disclosure and earnings management. *Journal of Accounting and Public Policy*, 22(1), 83–94. [https://doi.org/10.1016/S0278-4254\(02\)00087-X](https://doi.org/10.1016/S0278-4254(02)00087-X)
- Peters, G. P. (2010). Carbon footprints and embodied carbon at multiple scales. *Current Opinion in Environmental Sustainability*, 2(4), 245–250. <https://doi.org/10.1016/j.cosust.2010.05.004>
- Prior, D., Surroca, J., & Tribó, J. A. (2008). Are socially responsible managers really ethical? Exploring the relationship between earnings management and corporate social responsibility. *Corporate Governance an International Review*, 16(3), 160–177. <https://doi.org/10.1111/j.1467-8683.2008.00678.x>
- Revkin, A. (2001). Global warming impasse is broken. *New York Times*, (November 11), 1A, 8. <https://www.nytimes.com/2001/11/11/world/global-warming-impasse-is-broken.html>
- Reynolds, J. K., & Francis, J. R. (2000). Does size matter? The influence of large clients on office-level auditor reporting decisions. *Journal of Accounting and Economics*, 30(3), 375–400. [https://doi.org/10.1016/S0165-4101\(01\)00010-6](https://doi.org/10.1016/S0165-4101(01)00010-6)
- Riyadh, H. A., Sukoharsono, E. G., & Alfaiza, S. A. (2019). The impact of corporate social responsibility disclosure and board characteristics on corporate performance. *Cogent Business & Management*, 6(1), 1647917. <https://doi.org/10.1080/23311975.2019.1647917>
- Rogelj, J., Den Elzen, M., Höhne, N., Fransen, T., Fekete, H., Winkler, H., Schaeffer, R., Sha, F., Riahi, K., & Meinshausen, M. (2016). Paris Agreement climate proposals need a boost to keep warming well below 2 °C. *Nature*, 534(7609), 631–639. <https://doi.org/10.1038/nature18307>
- Roychowdhury, S. (2006). Earnings management through real activities manipulation. *Journal of Accounting and Economics*, 42(3), 335–370. <https://doi.org/10.1016/j.jacceco.2006.01.002>
- Scholtens, B., & Kang, F. C. (2013). Corporate social responsibility and earnings management: Evidence from Asian economies. *Corporate Social Responsibility & Environmental Management*, 20(2), 95–112. <https://doi.org/10.1002/csr.1286>
- Secretary of State. (2013). Companies Act 2006. Strategic Report and Director's Report Regulations 2013. UK.
- Shang, Y., & Chi, Y. (2023). Corporate environmental information disclosure and earnings management in China: Ethical behaviour or opportunism motivation? *Sustainability*, 15(11), 8896. <https://doi.org/10.3390/su15118896>
- Sullivan, R. (2009). The management of greenhouse gas emissions in large European companies. *Corporate Social Responsibility & Environmental Management*, 16(6), 301–309. <https://doi.org/10.1002/csr.187>
- Sun, J., Lan, G., & Liu, G. (2014). Independent audit committee characteristics and real earnings management. *Managerial Auditing Journal*, 29(2), 153–172. <https://doi.org/10.1108/MAJ-05-2013-0865>
- Sun, N., Salama, A., Hussainey, K., & Habbash, M. (2010). Corporate environmental disclosure, corporate governance and earnings management. *Managerial Auditing Journal*, 25(7), 679–700. <https://doi.org/10.1108/02686901011061351>
- Sun, Z. Y., Wang, S. N., & Li, D. (2022). The impacts of carbon emissions and voluntary carbon disclosure on firm value. *Environmental Science and Pollution Research*, 29(40), 60189–60197. <https://doi.org/10.1007/s11356-022-20006-6>
- Tran, N. M., Tran, M. H., & Phan, T. D. (2022). Corporate social responsibility and earnings management: Evidence from listed Vietnamese companies. *Cogent Business & Management*, 9(1), 2114303. <https://doi.org/10.1080/23311975.2022.2114303>
- Velayutham, E. (2014). Voluntary disclosure of greenhouse gas emissions, corporate governance and earnings

- management: *Australian evidence* (Doctoral dissertation), University of Southern Queensland.
- Velayutham, E. (2018). Sustainability disclosure and earnings management. In S. Boubaker, D. Cumming, & D. K. Nguyen (Eds.), *Research handbook of finance and sustainability* (pp. 532–549). Edward Elgar Publishing.
- Velte, P. (2019). The bidirectional relationship between ESG performance and earnings management – empirical evidence from Germany. *Journal of Global Responsibility*, 10(4), 322–338. <https://doi.org/10.1108/JGR-01-2019-0001>
- Velte, P. (2020). Corporate social responsibility and earnings management: A literature review. *Corporate Ownership & Control*, 17(2), 8–19. <https://doi.org/10.22495/cocv17i2art1>
- Velte, P. (2021). Environmental performance, carbon performance and earnings management: Empirical evidence for the European capital market. *Corporate Social Responsibility & Environmental Management*, 28(1), 42–53. <https://doi.org/10.1002/csr.2030>
- Warfield, T. D., Wild, J. J., & Wild, K. L. (1995). Managerial ownership, accounting choices, and informativeness of earnings. *Journal of Accounting and Economics*, 20(1), 61–91. [https://doi.org/10.1016/0165-4101\(94\)00393-J](https://doi.org/10.1016/0165-4101(94)00393-J)
- Watson, A., Shives, P., & Marston, C. (2002). Voluntary disclosure of accounting ratios in the UK. *The British Accounting Review*, 34(4), 289–313. <https://doi.org/10.1006/bare.2002.0213>
- Watts, R. L., & Zimmerman, J. L. (1986). *Positive Accounting theory*. Prentice-Hall.
- Yuan, X., Li, Z., Xu, J., & Shang, L. (2022). ESG disclosure and corporate financial irregularities-evidence from Chinese listed firms. *Journal of Cleaner Production*, 332, 129992. <https://doi.org/10.1016/j.jclepro.2021.129992>
- Zhang, Z., Yap, T. L., & Park, J. (2021). Does voluntary CSR disclosure and CSR performance influence earnings management? Empirical evidence from China. *International Journal of Disclosure & Governance*, 18(2), 161–178. <https://doi.org/10.1057/s41310-021-00104-6>