The adverse impact of corporate ESG controversies on sustainable investment

Rui Xue [a,*], Hongqi Wang [b], Yuhao Yang [b], Martina K. Linnenluecke [c], Kaifang Jin [d], Cynthia Weiyi Cai [b]

[a] *La Trobe Business School, La Trobe University, Melbourne, VIC, Australia*
[b] *Department of Applied Finance, Macquarie University, Sydney, NSW, Australia*
[c] *Centre for Climate Risk and Resilience, UTS Business School, University of Technology Sydney, Sydney, NSW, Australia*
[d] *Sydney Branch, Industrial and Commercial Bank of China, Sydney, NSW, Australia*

ARTICLE INFO

ABSTRACT

Global businesses are facing increasingly significant climate risks. Firms with ESG controversies will likely suffer from higher financing costs and inadequate investment capability, leading to investment inefficiency. We use a newly introduced ESG Controversy Score database to investigate the relationship between ESG controversies and corporate investment efficiency. The results show that ESG controversies significantly reduces firms' overall investment efficiency, and such adverse impact is manifest in underinvestment inefficiency. Further analysis indicates that such a negative effect is more pronounced in firms with larger size and higher analyst coverage. Our findings highlight the significant role of ESG misbehaviour in corporate sustainable development.

1. Introduction

Compared with traditional capital market metrics, environmental, social, and corporate governance (ESG) factors have received growing attention (Aouadi and Marsat, 2018; Capelle-Blancard and Petit, 2019; Giese et al., 2019; Liu et al., 2023). Existing studies show that ESG factors may impact firms' financial performance (Friede et al., 2015; Jahmane and Brahim, 2020; Khoury et al., 2022; Li et al., 2022; Cao et al., 2023), employee commitment (Edmans, 2011), brand value (Jeffrey et al., 2019; Tang et al., 2012), and innovation (Xu et al., 2020; Zhang and Vigne, 2021; Liu et al., 2022b). ESG metrics are crucial strategic drivers for a company's sustainability. Organizations that incorporate ESG standards into their investment decisions have the potential to impact sustainability positively. Researchers have suggested that this proactive approach might also allow organizations to be more resilient to future crises and risks, such as climate change (Chen et al., 2022). ESG metrics and corporate reputation risks are thus important issues that corporate executives can no longer ignore (Bruna and Nicolò, 2020).

Previous studies have emphasized the impact of corporate social responsibility (CSR) on financial performance (Bhandari and Javakhadze, 2017; Chen et al., 2023; Ferrell et al., 2016; Gillan et al., 2021; Miller et al., 2020; Msiska et al., 2021). However, the practical application of CSR remains challenging due to the breadth and diversity of the concept (Rezaee, 2016), thus making it difficult for managers to make ethical investment decisions based on this concept. In contrast, ESG is an enhanced version of the CSR framework and has a narrower and more precise structure (Widyawati, 2021). A better scoring structure provides more detailed and targeted information for managers to evaluate when making investment decisions. In addition, a systematic textual analysis reveals that ESG events encompass highly diverse informational content (Krüger, 2015). It is noteworthy that investors and consumers tend to be more sensitive to adverse events related to companies than to positive publicity (Groening and Kanuri, 2013). For instance, research by Capelle-Blancard and Petit (2017) suggests that positive ESG information does not typically evoke strong market reactions, whereas negative ESG news is considerably more compelling. Therefore, it might be more revealing to investigate the relationship between ESG and corporate performance from a negative perspective.

ESG scandals are often associated with reputation damages, leading to slumps in stock prices (Gao et al., 2022; Nirino et al., 2021; Walsh et al., 2009). For example, in 2014, the market value of Volkswagen lost

---

approximately 15 billion euros due to its emission manipulation scandal. The Volkswagen scandal began in early 2014 with the release of results from an investigation by the International Council on Clean Transportation Report (ICCT). ICCT test results showed that Volkswagen diesel cars had considerable discrepancies in pollutant emissions – mainly nitrogen oxides – between the lab tests and road (Siano et al., 2017). Within a few days of this information being released, Volkswagen shares lost more than 20% of their value (Aurand et al., 2018). The effects continued, with a reported net profit loss of 1.73 billion euros in the third fiscal quarter of 2015. These losses arising from the global recall significantly reduced Volkswagen's investment returns and corporate value.

ESG scandals have also affected other firms, causing substantial economic and financial losses. For instance, in November 2015, a catastrophic dam collapse occurred in Brazil, resulting in a devastating mudflow that claimed 19 lives and spilled approximately 40 million cubic meters of toxic sludge into the Rio Doce River and the Atlantic Ocean (Carmo et al., 2017). This dam project was jointly funded by two companies, mining giants Vale and BHP Billiton. It is disconcerting to note that this incident did not serve as a sufficient deterrent for these two companies. A similar event unfolded in Brumadinho, Brazil, in January 2019 (Rotta et al., 2020). In response to these two incidents, the Brazilian government's demands for compensation from Vale and BHP Billiton significantly reduced the investment returns for both companies in the mineral venture (Cionek et al., 2019; Fernandes et al., 2016). Another example is the Moncler scandal, despite receiving less public attention. According to a television report, there were allegations of mistreatment of geese during the harvesting process by the coat manufacturer Moncler (Gistri et al., 2018). Although Moncler denied the allegations of animal mistreatment, its market value fell by 6% following this scandal. Table 1 lists examples of ESG scandals affecting brands such as Neutrogena, Huggies, Aldi, Dasani, etc.

More worryingly, there has been a noticeable increase in negative corporate ESG information over the last decade, as depicted in Fig. 1a. In Fig. 1b, we list three high ESG impact industries that follow a similar trend (Galbreath, 2013). An ESG scandal can be highly costly to firms' investment returns, resulting in a substantial negative impact on investment efficiency (Aust et al., 2020). Basdeo et al. (2006) show that the corporate reputation development process is a signalling process. ESG scandals can send negative signals to the public, reducing public trust and thus damaging corporate reputation (Erdem et al., 2006; Lee et al., 2022). Specifically, a company with a poor reputation is less likely to obtain financial capital from external investors - a negative reputation reduces stock liquidity (Fernandez-Perez et al., 2022; Wang et al., 2012) and affects the rate of return in the future (Pfarrer et al., 2010). According to Landrum (2017), 81% of millennials expect the companies they invest in to have a positive reputation, and 66% of the public express their willingness to pay more for companies that make environmental efforts or sustainable development. Thus, companies with a lower reputation are more likely to suffer from inadequate financing, leading to a greater risk of underinvestment issues (Lemma et al., 2022). Moreover, a negative reputation can drive up the company's financing costs, such as loan interest rates (Andrieș and Sprincean, 2023; Gillan et al., 2021; Kim et al., 2014). For example, banks may demand higher interest rates for companies with ESG controversies to balance the risks (Crifo et al., 2017), which increases firms' operating costs and investment capacity. Inadequate financing and higher loan costs due to ESG scandals will eventually affect investment efficiency.

In addition, the theory of information asymmetry suggests that a high ESG rating may positively affect investment efficiency through reduced information asymmetry (Benlemlih and Bitar, 2018). Companies with high ESG scores and a strong ESG commitment are more likely to disclose transparent and reliable information to investors (Raimo et al., 2021; Yuan et al., 2022). For instance, Cho et al. (2013) and Velte (2019) show robust evidence that companies with a strong ESG commitment are less likely to engage in earnings management.

Table 1
Examples of ESG scandals.

Time	Event	Impact
June 2021	Johnson and Johnson failed to disclose Neutrogena and Aveeno sunscreens contain the carcinogen benzene, a cancer-causing chemical (Downs et al., 2021).	Johnson and Johnson announced a voluntary recall of selected Neutrogena and Aveeno aerosol spray sunscreens on July 14.
May 2021	Aldi's Atlantic salmon products were found to not be as sustainable as advertised and industrially farmed through unsustainable and environmentally damaging practices, including the use of toxic chemicals (Corrado, 2021).	Pending.
September 2015	Volkswagen installed defeat device software in their diesel engine (EA 189) to manipulate emission control. This software could identify when the vehicle was being tested and adjust the emission control system accordingly (Siano et al., 2017). By disabling the nitrogen oxide storage catalytic converter, the nitrogen oxide emissions would exceed the official limit by up to forty times.	The scandal led to a significant drop in Volkswagen's share value, losing over 20% within days. Additionally, a global recall of 11 million vehicles incurred a total cost of 6.7 billion euros.
November 2014	A television report said that geese had been mistreated during harvesting by coat manufacturer Moncler (Gistri et al., 2018).	After Moncler's market value fell by 6%, the company denied allegations of animal mistreatment.
September 2014	Huggies advertised their nappies as natural, organic and environmentally friendly, but only by putting a small piece of organic cotton on the outside of the ordinary nappy (Saxena, 2015).	Huggies responded to greenwashing concerns by discontinuing the diaper in 2015.
April 2011	Dasani Water advertised its bottles as "Plant Bottles," but these chemical-laden plastic bottles are only made with 30% plant-based ingredients (Larwood, 2011).	Dasani Water's green advertising received widespread opposition.
April 2010	The Deepwater Horizon oil spill was the largest marine oil spill in history, caused by the explosion of the Deepwater Horizon oil rig.	BP lost half its share value, representing tens of billions of dollars.

Firms manipulating earnings may have a seemingly favourable outcome for outside investors (McNichols and Stubben, 2008); however, this opaque information disclosure will likely increase companies' financing costs (Benlemlih and Bitar, 2018). Due to adverse selection, corporate managers possess a more comprehensive understanding of their company's true financial standing than external investors (Roychowdhury et al., 2019). Companies with this information advantage are more susceptible to being perceived by the public as overpriced, potentially prompting external investors to demand a reduction in security prices (Glosten and Milgrom, 1985). Moreover, companies with higher information asymmetry may give rise to the "lemons" problem (Whited, 1992), leading to a higher cost of external capital and a discounted share price. Consequently, higher costs of financing associated with ESG-related reputation risk can be expected to adversely affect investment efficiency.

In summary, existing research highlights the importance of corporate ESG performance for investment performance. This paper therefore aims to investigate the relationship between ESG performance and corporate investment (in)efficiency, focusing on ESG controversies. Using the Thomson Reuters ESG Controversy Score of US-listed firms from 2010 to 2020, we find that ESG controversies significantly lower firms'
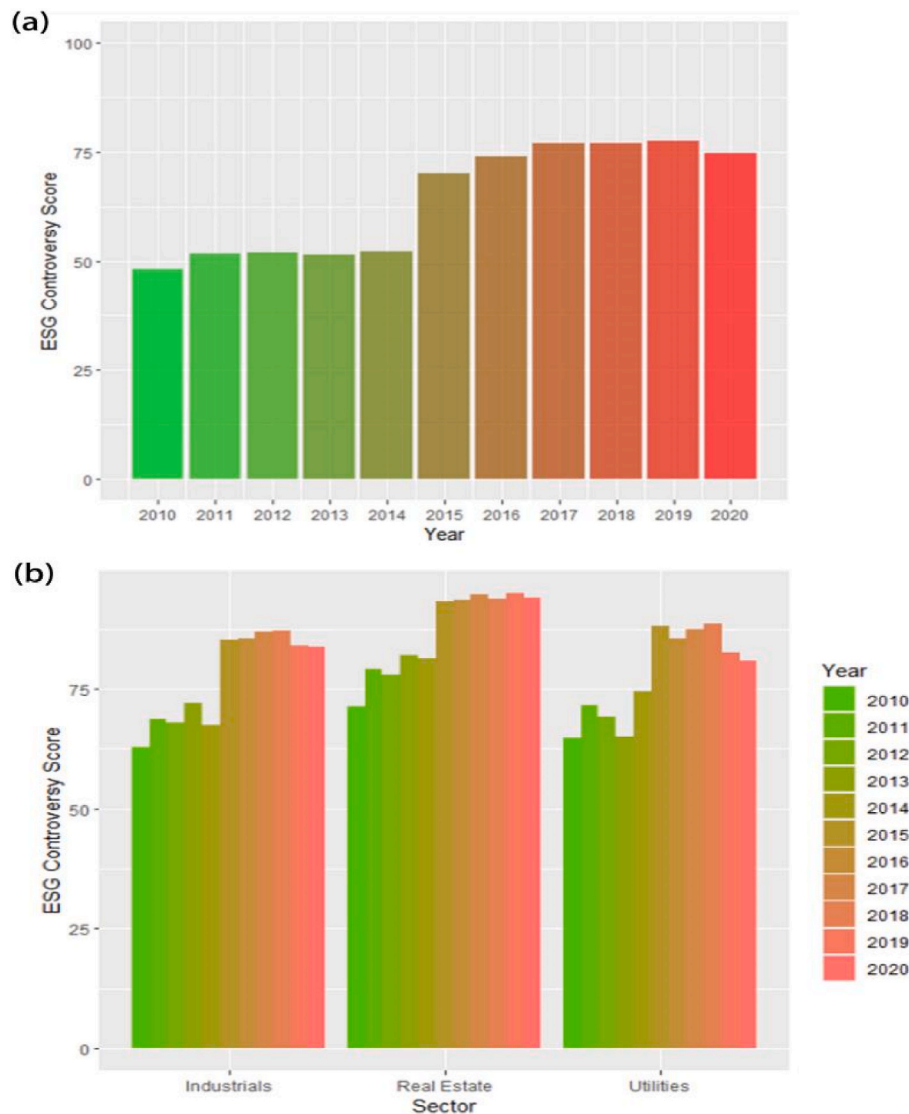
Fig. 1. (a) Average ESG Controversy Score for US listed firms from 2010 to 2020. (b) Average ESG Controversy Score for High-ESG-impact industries from 2010 to 2020.

investment efficiency. Such negative impacts manifest in underinvestment inefficiency, particularly for larger firms and firms with higher analyst coverage. The Thomson Reuters ESG Controversy Score employs an enhanced scoring methodology to deliver a more objective ESG rating. Specifically, in contrast to self-promotional corporate news releases, it is more difficult for companies to manipulate external negative information about themselves, given that third-party organizations typically disclose scandals. Thus, using the ESG Controversy Score will provide a more objective way to measure corporate ESG reputation. The company's Thomson Reuters ESG Controversy Score will increase when a corporate scandal occurs. In other words, the fewer scandals a company is involved in, the lower the Controversy Score.

2. Methods

2.1. Data

Our sample includes 3252 firm-year observations of 1177 US-listed firms from 2010 to 2020. The data used for this study are collected from the *Thomson Reuters DataStream* database, and all continuous variables are winsorized at 5% and 95% levels to remove the impacts of extreme values.

2.2. Variables

Investment efficiency. Consistent with mainstream studies (e.g. Biddle et al., 2009), we measure the investment efficiency of each firm by first estimating a firm-specific model of total investment [1] as a function of growth opportunities (sales growth). The residuals *r* are then obtained as a firm-specific proxy for deviation from expected investment. The model is described below:

$$Investment_{i,t+1} = \beta_0 + \beta_1 * Sales\ Growth_{i,t} + \varepsilon_{i,t+1} \qquad (1)$$

where $Investment_{i,t+1}$ is the total investment in year *t+1*, and $Sales\ Growth_{i,t}$ is the percentage change of a firm's revenue from year *t-1* to *t*. We then classify firms according to the magnitude of the residuals. Specifically, we sort firms based on the residuals from Eq. (1) into quartiles. Observations in the bottom quartile are classified as underinvesting firms, and observations in the top quartile are classified as over-investing firms, and so these two groups are inefficient-investing

---

[1] We obtain the total investment of firms by calculating the sum of capital expenditures, R&D expenditures, and acquisitions minus sales of property, plant and equipment (PPE), scaled by lagged total assets (Biddle et al., 2009).

firms, and the rest of the firms are in the benchmark group.

According to the classification, we use three dummy variables to proxy firms' investment (in)efficiency in a given year. First, we use the variable $Overall_t$ to represent if a firm either overinvests or underinvests at a given year; so we code $Overall_t$ as 1 when a firm is in either the top or bottom quartile (i.e., their investment efficiency is low), and 0 otherwise. Second, we use $Over_t$ and $Under_t$ as proxies for overinvestment (in) efficiency and underinvestment (in)efficiency, respectively; so we code $Over_t$ ($Under_t$) as 1 when a firm is located at the top (bottom) quartile, and 0 otherwise.

ESG Reputation. We use the Thomson Reuters ESG Controversy Score ($Score_t$) as a proxy for ESG controversies. The Thomson Reuters ESG Controversy Score gives a balanced and thorough assessment of a company's ESG performance based on published data from the ESG pillars and a worldwide media overlay of ESG controversies. For example, if a scandal arises throughout the year, the corporation will be penalized, increasing their total ESG Controversy Score.

Control Variables. Following Biddle et al. (2009) and Wang et al. (2020), we use the following variables to control for their potential impacts on corporate investment efficiency: total assets ($Size_t$), market to book value (Mtb_t), firm age (Age_t), Altman's Z-score (Z_t), number of independent directors (Ind_t), total debts to total assets ($Leverage_t$), return on equity (ROE_t). We also control for year-fixed effects and industry-fixed effects. Appendix A details all variables used in this study, and Table 2 provides the summary statistics.

2.3. Model setting

We employ the following regression model to examine the relationship between ESG controversies and corporate investment (in)efficiency:

$$Efficiency_t = \beta_0 + \beta_1 Score_{i,t} + \sum \beta_j Control_{i,t} + YearFE + IndustryFE + \theta_{i,t}$$
(2)

where $Efficiency_t$ is the corporate investment efficiency at year t using $Overall_t$, $Over_t$, or $Under_t$. $Score_t$ is the ESG Controversy score at year t; in addition to the seven control variables mentioned above, we also control for year-fixed effects ($YearFE$) and industry-fixed effects ($IndustryFE$); $\theta_{i,t}$ is the error term.

3. The role of ESG controversies in investment efficiency

Table 3 presents the impact of the ESG controversies on corporate investment efficiency in a given year. Column (1) reports the results of overall investment efficiency with no control variables or fixed effects added. Columns (2) and (3) list the results of overall investment efficiency with all control variables added and without or with year fixed effects controlled. Columns (4) to (6) show the results of the baseline

Table 2
Summary statistics.
This table presents firm-level summary statistics for the main variables. The sample contains 3252 US firms over the 2010–2020 period. All variables are winsorized at the 5th and 99th percentiles, and are defined in Appendix A.

Variables	Obs.	Mean	St. Dev.	Min	Max
Score	3252	65.850	44.354	0	100
Overall	3252	0.500	0.500	0	1
Over	3252	0.250	0.433	0	1
Under	3252	0.250	0.433	0	1
Size	3252	6.418	0.802	0.301	8.876
Mtb	3252	2.989	2.819	0.232	11.766
Age	3252	2.999	0.989	0.693	5.258
Z	3252	1.364	1.185	−0.526	3.769
Ind	3252	7.634	2.417	1	16
Leverage	3252	1.814	1.022	0.981	5.173
ROE	3252	15.297	14.909	−9.807	55.955

model with the dependent variable of $Overall_t$, $Over_t$, and $Under_t$, respectively. The coefficients of $Score_t$ are positive and significant ($\beta_{overall} = 0.001$, $p < 0.05$ and $\beta_{under} = 0.001$, $p < 0.01$, respectively) in columns (4) and (6), but insignificant in column (5). The results indicate that ESG controversies have a significant and negative impact on corporate overall investment inefficiency, and such a negative impact is manifest in underinvestment inefficiency. The results are consistent with the signalling and information asymmetry theory that firms with ESG controversies will be punished by the market and have low investment efficiency.

To mitigate the reverse causality concern that corporate investment performance may alter firms' ESG commitment and performance, we adopt the one-year-ahead ($t+1$) investment (in)efficiency as the dependent variable in Eq. (2) and re-estimate the regression models. The results are reported in columns (1) to (3) of Table 4 and are consistent with the baseline findings. Moreover, following Richardson (2006) and Cook et al. (2019), we also control for additional financial factors, including return on assets (ROA), financial losses ($Loss$),[2] and the ratio of PPE to total assets ($Tangibility$). The results are presented in columns (4) to (6) of Table 4. Once again, our key findings remain unchanged.

Furthermore, following Richardson (2006) and Liu et al. (2022a), we also adopt a continuous measure of corporate investment efficiency as an additional robustness test. A firm with r higher than 0 indicate the firm has excessive investment, and the higher the value, the greater the degree of over-investment. Accordingly, firms with r smaller than 0 indicate the firm has an underinvestment issue, and r is then multiplied by −1 to measure the degree of underinvestment. The greater the value, the greater the degree of under-investment. The overall investment efficiency is calculated as the absolute value of r; the larger the value, the lower the overall investment efficiency. Using the continuous measure of corporate investment efficiency as the dependent variable, Columns (1), (2), and (3) in Panel B of Table 4 present the relationship between corporate ESG controversy score and overall investment inefficiency, over-investment, and under-investment, respectively. The results are consistent with our baseline findings.

We further employ an instrumental variable strategy to mitigate concerns around endogeneity due to omitted variables. According to Rubin (2008), firms with higher CSR ratings tend to be located in Democratic or blue states ,[3] and whether a firm is headquartered in a blue state cannot directly impact corporate investment efficiency. Therefore, we follow the method of Deng et al. (2013) and create a dummy variable ($Blue$), which is equal to one if a firm's headquarters is located in a blue or democratic state and zero otherwise, to instrument for $Score$. Table 5 provides the two-stage least squares (2SLS) regression results when $Blue$ is used as the instrument variable. We find that the coefficients of $Blue\ fitted$ in both columns (2) and (4) are negative and significant ($\beta = -0.027$, $p < 0.1$ and $\beta = -0.011$, $p < 0.05$, respectively), which provide further support for the reliability of our baseline findings, indicating that firms with ESG controversies are more likely to suffer from underinvestment and so overall investment inefficiency.

4. Heterogeneity analysis

The impact of ESG controversies on corporate investment efficiency may vary across firms. Therefore, this section explores the impact of ESG reputation on corporate investment efficiency contingent on firm size (Large/Small) and analyst coverage (High/Low). Tables 6 and 7 show the moderation results for firm size and analyst coverage, respectively.

We classify firms into large and small firms based on their total assets. Firms with total assets larger than the sample median are classified as large firm, while the rest are classified as small firms. Based on the

---

[2] *Loss* is a dummy variable that takes the value of 1 if the net income before the last financial year-end is negative and 0 otherwise.

[3] We collect the list of blue states from https://www.270towin.com/states/。

Table 3

Effect of ESG controversies on corporate investment inefficiency.

This table presents coefficients from OLS estimation of the relationship between corporate ESG controversy scores and corporate investment inefficiency. The dependent variable is designed according to the degree of unexplained investment in equation (1). In Columns (1) to (4), *Overall* equals to 1 when observations are in both the top and bottom quartile of unexplained investment in a given year, and 0 otherwise. In Column (5), *Over* equals to 1 if the firm is in the top-quartile of unexplained investment, and 0 otherwise. In Column (6), *Under* equals to 1 if the Firm-year observation is in the bottom quartile of unpredicted investment, and 0 otherwise. We include industry and year-fixed effects in all specifications, and all variables are defined in Appendix A. Robust standard errors are clustered by firms and are reported in parentheses, and ***, **, and * indicate significance at the 1%, 5%, and 10% levels.

Dependent variable	Overall				Over	Under
	(1)	(2)	(3)	(4)	(5)	(6)
Score	0.001***	0.001***	0.001**	0.001**	−0.0001	0.001***
	(0.0003)	(0.0003)	(0.0003)	(0.0004)	(0.0003)	(0.0003)
Size		−0.025	−0.025	−0.068***	−0.109***	0.041**
		(0.019)	(0.019)	(0.021)	(0.017)	(0.017)
Mtb		0.002	0.002	0.002	0.013***	−0.011***
		(0.003)	(0.003)	(0.004)	(0.003)	(0.003)
Age		−0.001**	−0.001**	−0.0001	0.0005*	−0.001**
		(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Z		−0.049***	−0.046***	−0.075***	−0.085***	0.009
		(0.009)	(0.009)	(0.013)	(0.010)	(0.010)
Ind		−0.004	−0.003	0.002	0.001	0.001
		(0.005)	(0.005)	(0.005)	(0.004)	(0.004)
Leverage		0.032***	0.033***	0.013	0.031***	−0.018*
		(0.011)	(0.011)	(0.013)	(0.011)	(0.011)
ROE		0.0004	0.0003	0.001	−0.0002	0.001*
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Industry FE	NO	NO	NO	YES	YES	YES
Year FE	NO	NO	YES	YES	YES	YES
Observations	3252	3252	3252	3252	3252	3252
R-squared	0.003	0.027	0.035	0.125	0.177	0.237

number of analysts following the firm, we categorize the sample as firms with high external monitoring and with low external monitoring, respectively. Firms with a higher number of analysts following than the sample median are classified as high external monitoring, while the rest are firms with low external monitoring.

The moderation analysis of firm size indicates that the negative impact of ESG controversies on corporate investment efficiency is more severe for large firms. This result can be explained by the finding of Watts and Zimmerman (1978) that larger firms are under higher social pressure and public exposure and are more likely to have higher political or societal costs due to their dominant position in the market. When a damaging ESG scandal is released, the company is more financially and sustainably affected than small companies (Gamerschlag et al., 2011).

The moderation results of external monitoring show that the negative impact of ESG controversies on corporate investment efficiency is more pronounced for firms with higher analyst coverage. According to Akhigbe et al. (2013), analysts are an important type of information source for investors, and as more analysts are following the firm, investors place more emphasis on analyst estimates. Meanwhile, analysts monitor firms by releasing private and public information to investors and directly interfacing with firms' management team. The information generated by financial analysts can serve as an important channel for market players and prominent outside stakeholders to deduce information about a company's real performance (Chen et al., 2017). Therefore, as the number of following analysts increases, the information transparency between firms and investors will increase. When firms have poor ESG performance, firms with a higher number of following analysts will suffer from quicker and higher exposure than other firms (Xu et al., 2013). Consequently, these firms will be punished by higher financing costs, negatively impacting their investment efficiency. This finding provides further empirical evidence supporting the findings of Kordsachia et al. (2021) who suggest that sustainable institutional investors can positively impact corporate environmental performance and carbon awareness.

5. Conclusion

In summary, this study uses a novel and more objective ESG metric to investigate the impact of ESG reputation on corporate investment (in) efficiency. The results show that ESG controversies can significantly reduce firms' investment efficiency, and such detrimental impacts are manifested in underinvestment inefficiency. Further analysis shows that the negative effects for ESG controversies are more pronounced for firms with larger size and higher analyst coverage.

Our study has several important implications. First, we provide a more objective view of ESG-based scandal effects on corporate investment efficiency. Previous ESG scoring methodologies, which rely on firms' self-disclosures, may be vulnerable to measurement issues due to the prevalence of "greenwashing" practices. Corporate managers are likely to adopt and disclose cost-effective yet superficial ESG initiatives to enhance their ESG scores and meet stakeholder expectations regarding ESG performance (Parguel et al., 2011). These initiatives are commonly referred to as "greenwashing," as they frequently lack substantial impacts on a company's operations and management. The volunteer-oriented paradigm of CSR/ESG lacks consistent standards and oversight, inadvertently fostering "greenwashing" practices and contributing to the proliferation of inflated ESG scores (Uyar et al., 2020). Such inaccurate ESG scores are likely to result in spurious empirical results. However, the Thomson Reuters ESG Controversy Score largely mitigates such concern, as companies can hardly disguise their released scandals. As such, we can test the impacts of the ESG signal by mitigating the concern of the positive ESG signal delivered by "greenwashing" practices.

More importantly, this study provides practical implications. Our findings suggest that companies with better ESG performance are more likely to be preferred by outside investors, thus avoiding underinvestment issues. The results provide a critical insight into the benefits of robust ESG performance for listed companies in financial markets. These benefits extend beyond enhancing transparency and reputation (Yuan et al., 2022) and include more effective management of investment decisions. Such findings could guide financial regulators in developing effective strategies to help firms improve their ESG performance and

Table 4

Results of robustness tests

This table reports the robustness tests on the link between corporate ESG controversy score and corporate investment efficiency. The dependent variable is designed according to the degree of unexplained investment in equation (1). In Columns (1) to (3) of Panel A, instead of using corporate investment efficiency in the current period as in Columns (4) to (6) of Table 3, we employ corporate investment efficiency in the next year as the dependent variable. In Columns (4) to (6) of Panel A, we also include ROA, financial losses in the previous year, and tangibility as control variables. In Columns (1) to (3) of Panel B, instead of using dummy variables to measure corporate investment efficiency as in Columns (4) to (6) of Table 3, we use a continuous measurement of corporate investment efficiency. We include industry and year-fixed effects in all specifications, and all variables are defined in Appendix A. Robust standard errors are clustered by firms and are reported in parentheses, and ***, **, and * indicate significance at the 1%, 5%, and 10% levels.

Panel A: Additional robustness tests: Lead dependent variable and extra control variables

Dependent variable	T+1			Extra Controls		
	Overall	*Over*	*Under*	*Overall*	*Over*	*Under*
	(1)	(2)	(3)	(4)	(5)	(6)
Score	0.001**	−0.0001	0.001***	0.001*	−0.0001	0.001**
	(0.0004)	(0.0003)	(0.0003)	(0.0004)	(0.0003)	(0.0003)
Size	−0.068***	−0.109***	0.041**	−0.065***	−0.085***	0.019
	(0.021)	(0.017)	(0.017)	(0.023)	(0.019)	(0.019)
Mtb	0.002	0.013***	−0.011***	0.001	0.010***	−0.010***
	(0.004)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)
Age	−0.0001	0.0005*	−0.001**	−0.0001	0.0004	−0.001*
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Z	−0.075***	−0.085***	0.009	−0.079***	−0.047***	−0.032**
	(0.013)	(0.010)	(0.010)	(0.019)	(0.015)	(0.015)
Ind	0.002	0.001	0.001	0.0004	−0.0004	0.001
	(0.005)	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)
Leverage	0.013	0.031***	−0.018*	0.016	0.030***	−0.015
	(0.013)	(0.011)	(0.011)	(0.014)	(0.011)	(0.011)
ROE	0.001	−0.0002	0.001*	0.001	0.0001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
ROA				−0.014	−0.042	0.027
				(0.036)	(0.029)	(0.030)
Loss				−0.001	0.180***	−0.181***
				(0.034)	(0.027)	(0.028)
Tangibility				−0.322***	−0.129**	−0.194***
				(0.076)	(0.061)	(0.061)
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Observations	3252	3252	3252	3189	3189	3189
R-squared	0.125	0.177	0.237	0.134	0.189	0.253

Panel B: Additional robustness tests: Alternative measure of dependent variable

Dependent variable	*Overall*	*Over*	*Under*
	(1)	(2)	(3)
Score	0.007**	0.011	0.005*
	(0.003)	(0.009)	(0.003)
Size	−1.064***	−2.039***	0.065
	(0.276)	(0.552)	(0.215)
Mtb	0.082*	0.072	−0.041
	(0.042)	(0.092)	(0.030)
Age	0.098	0.475	−0.250*
	(0.204)	(0.434)	(0.130)
Z	−1.416***	−2.403***	−0.350***
	(0.188)	(0.384)	(0.127)
Ind	0.089	0.232	0.039
	(0.059)	(0.145)	(0.043)
Leverage	−0.192	−0.715**	0.039
	(0.158)	(0.296)	(0.140)
ROE	0.014	0.030*	0.010*
	(0.008)	(0.018)	(0.006)
Industry FE	YES	YES	YES
Year FE	YES	YES	YES
Observations	3252	1153	2099
R-squared	0.152	0.267	0.250

enhance their financial decision-making processes. Furthermore, these findings suggest that firms could be motivated to participate in low-carbon and sustainable investments (Wan et al., 2021; Tian et al., 2022, 2023; Yang et al., 2023) in their pursuit of easier access to equity financing.

Second, our study highlights how firm size and external monitoring moderate the negative relationship between ESG reputation and investment efficiency. Firstly, to test the moderating effects of firm size,

we categorize firms into large and small firms based on the market value of their assets. When there is negative news about firms' ESG performance, larger firms are more likely to suffer from underinvestment problems (Velte, 2020), eventually decreasing corporate investment efficiency. However, such a relationship is not observed in small firms. Our findings indicate that larger firms are more vulnerable to underinvestment issues arising from negative ESG events, emphasizing the significance of ESG reputation for these organizations. Scandals

Table 5

Results of instrumental variable approach

This table presents the results of IV regression for mitigating the endogeneity issue. We use *Blue* as an instrumental variable for corporate ESG controversy scores. *Blue* is a dummy variable equals to one if a firm's headquarters is located in a blue or democratic state, and zero otherwise. We include industry and year fixed effects in all specifications, and all variables are defined in Appendix A. Robust standard errors are clustered by firms and are reported in parentheses, and ***, **, and * indicate significance at the 1%, 5%, and 10% levels.

Dependent variable	First stage	Second stage		
	Score	Overall	Over	Under
	(1)	(2)	(3)	(4)
Blue	−1.958**			
	(0.667)			
Blue_fitted		−0.027*	−0.015	−0.011**
		(0.012)	(0.013)	(0.005)
Size	−19.939***	−0.571**	−0.387	−0.184*
	(2.546)	(0.250)	(0.249)	(0.091)
Mtb	−0.436*	−0.011	0.006	−0.017***
	(0.238)	(0.007)	(0.007)	(0.003)
Age	0.933	−0.0005	0.032	−0.033***
	(1.182)	(0.021)	(0.020)	(0.007)
Z	−2.188**	−0.105***	−0.115***	0.010
	(0.726)	(0.032)	(0.028)	(0.013)
Ind	−0.042	−0.005	0.003	−0.008
	(0.343)	(0.008)	(0.006)	(0.005)
Leverage	−0.515	0.016	0.047***	−0.031***
	(0.652)	(0.019)	(0.017)	(0.009)
ROE	−0.019	−0.0003	0.001	−0.001
	(0.035)	(0.001)	(0.001)	(0.001)
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	3252	3089	3089	3089
R-squared	0.237	0.036	0.068	0.042

involving large firms are more likely to receive public attention than those involving small firms (Barkemeyer et al., 2020; D'Amato and Falivena, 2020). The resulting reputational damage can have a negative impact on investment efficiency and ultimately reduce firm value, suggesting that firms should prioritize their ESG performance to achieve better investment outcomes and so sustainable development in the long run.

Lastly, we split firms into high and low external monitoring groups based on the number of analysts following the firm to explore the moderating effects of external monitoring. We find that the negative impact of ESG controversies on corporate investment efficiency is more pronounced in firms with higher analyst coverage. This is because higher analyst coverage may decrease the information transparency between firms and investors. This finding is consistent with the findings by Kordsachia et al. (2021), who found that higher external monitoring can help promote corporate sustainability awareness and performance. Our results suggest that external analysts may pressure senior management to alter environmental management to improve environmental performance. Regulators could consider implementing a mandatory ESG disclosure regime and integrating ESG performance into their regulatory structure. Enhanced corporate ESG regulation serves as a valuable tool in guiding firms towards environmentally responsible investment and financing practices while also facilitating the promotion of sustainable development under the guidance of financial regulators (Li et al., 2023).

This research has some limitations that might guide future studies. As per Heflin and Wallace's theory (2017), companies that have faced scandals often implement intensified strategic measures to enhance their corporate social responsibility in the aftermath. Nevertheless, it is worth noting that the Thomson Reuters ESG Controversy Score does not account for a company's subsequent efforts in this regard. Therefore, future research could comprehensively investigate how companies react to negative ESG incidents.

CRediT authorship contribution statement

Rui Xue: Conceptualization, Supervision, Project administration, Writing – original draft, Writing – review & editing. **Hongqi Wang:** Data curation, Formal analysis, Writing – original draft. **Yuhao Yang:** Data collection, Software, Writing – original draft, Writing – review & editing. **Martian K. Linnenluecke:** Supervision, Writing – review & editing. **Kaifang Jin:** Project administration, Writing – review & editing. **Cynthia Weiyi Cai:** Conceptualization, Data collection, Writing – review & editing.

Table 6

Moderating effect of firm size

This table reports regression analyses exploring the association between corporate investment efficiency, corporate ESG controversy scores, and firm size. Firms with total assets larger than the sample median are classified as large firms, while the rest are classified as small firms. Columns (1) to (3) report the relationship between corporate investment efficiency and corporate ESG controversy scores in large firms, and Columns (4) to (6) report the relationship among small firms. We include industry and year fixed effects in all specifications, and all variables are defined in Appendix A. Robust standard errors are clustered by firms and are reported in parentheses, and ***, **, and * indicate significance at the 1%, 5%, and 10% levels.

Dependent variable	Large Firm			Small firm		
	Overall	Over	Under	Overall	Over	Under
	(1)	(2)	(3)	(4)	(5)	(6)
Score	0.001**	0.0002	0.001*	0.0002	−0.001	0.001
	(0.0004)	(0.0003)	(0.0003)	(0.001)	(0.001)	(0.001)
Mtb	−0.002	0.008**	−0.010***	0.003	0.014**	−0.011**
	(0.004)	(0.003)	(0.004)	(0.007)	(0.006)	(0.005)
Age	−0.0001	0.0002	−0.0003	−0.002	−0.001	−0.0004
	(0.0004)	(0.0003)	(0.0003)	(0.001)	(0.001)	(0.001)
Z	−0.088***	−0.061***	−0.027*	−0.038*	−0.099***	0.061***
	(0.018)	(0.014)	(0.014)	(0.023)	(0.019)	(0.019)
Ind	−0.002	−0.002	0.0003	0.017	0.008	0.009
	(0.006)	(0.005)	(0.005)	(0.012)	(0.010)	(0.010)
Leverage	0.045**	0.060***	−0.015	−0.004	0.011	−0.015
	(0.022)	(0.017)	(0.018)	(0.020)	(0.016)	(0.016)
ROE	0.002*	0.001	0.001	−0.001	−0.002**	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Observations	2416	2416	2416	836	836	836
R-squared	0.146	0.158	0.274	0.249	0.362	0.278

Table 7

Moderating effect of analyst coverage

This table reports regression analyses exploring the association between corporate investment efficiency, corporate ESG controversy scores, and analyst coverage. Firms with higher institutional analysts than the sample median are classified as firms with high analyst coverage, while the rest are firms with low analyst coverage. Columns (1) to (3) report the relationship between corporate investment efficiency and corporate ESG controversy scores in firms followed by more institutional analysts, and Columns (4) to (6) report the relationship among firms with fewer institutional analysts. We include industry and year fixed effects in all specifications, and all variables are defined in Appendix A. Robust standard errors are clustered by firms and are reported in parentheses, and ***, **, and * indicate significance at the 1%, 5%, and 10% levels.

	High Analyst Coverage			Low Analyst Coverage		
	Overall	Over	Under	Overall	Over	Under
	(1)	(2)	(3)	(4)	(5)	(6)
Score	0.001*	0.0001	0.001**	0.001	0.001	−0.0003
	(0.0004)	(0.0003)	(0.0003)	(0.001)	(0.001)	(0.001)
Size	−0.069**	−0.078***	0.009	−0.065	−0.270***	0.205***
	(0.029)	(0.023)	(0.023)	(0.047)	(0.037)	(0.040)
Mtb	0.0001	0.013***	−0.012***	0.007	0.016***	−0.009
	(0.004)	(0.003)	(0.003)	(0.007)	(0.006)	(0.006)
Age	−0.0003	0.0005	−0.001**	−0.001	−0.0002	−0.001
	(0.0004)	(0.0003)	(0.0003)	(0.001)	(0.001)	(0.001)
Z	−0.081***	−0.069***	−0.013	−0.040*	−0.102***	0.062***
	(0.016)	(0.013)	(0.013)	(0.023)	(0.018)	(0.020)
Ind	−0.0003	−0.001	0.001	0.005	−0.003	0.008
	(0.007)	(0.005)	(0.005)	(0.010)	(0.008)	(0.008)
Leverage	0.042**	0.050***	−0.008	−0.050**	−0.010	−0.040*
	(0.017)	(0.014)	(0.013)	(0.024)	(0.019)	(0.020)
ROE	0.001	−0.0004	0.002**	−0.001	−0.0005	−0.0005
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Industry fixed	YES	YES	YES	YES	YES	YES
Year fixed	YES	YES	YES	YES	YES	YES
Observations	2253	2253	2253	999	999	999
R-squared	0.141	0.186	0.286	0.228	0.305	0.286

Declaration of competing interest

The authors declare that they have no known competing interests that could have appeared to influence the work reported in this paper. MKL acknowledges funding from the Australian Reserach Council (ARC), Grant Number DP200102332.

Data availability

Data will be made available on request.

Appendix A. Variable definitions

Variables	Definitions
Dependent Variables	
Overall	A dummy variable takes the value of one if the residual from Eq. (1) is in the top or bottom quartile after sorting and zero otherwise.
Over	A dummy variable takes the value of one if the residual from Eq. (1) is in the top quartile after sorting and zero otherwise.
Under	A dummy variable takes the value of one if the residual from Eq. (1) is in the bottom quartile after sorting and zero otherwise.
Independent Variable	
Score	Thomson Reuters ESG Controversy Score
Moderating Variables	
Firm size	A dichotomous variable that takes the value of one if total assets are greater than the sample median, and zero otherwise.
Analyst coverage	A dichotomous variable takes the value of one if the number of institutional anaysts is greater than the sample median, and zero otherwise.
Control Variables	
Age	Listed years
Size	The log of total assets
Ind	The number of independent directors
Leverage	Total debts divided by total assets
ROE	Returns on total equity
Mtb	Market-to-book value
Z	Altman's Z-score

References

Akhigbe, A., McNulty, J.E., Stevenson, B.A., 2013. How does transparency affect bank financial performance? Int. Rev. Financ. Anal. 29, 24–30.

Andrieș, A.M., Sprincean, N., 2023. ESG performance and banks' funding costs. Finance Res. Lett. 54, 103811.

Aouadi, A., Marsat, S., 2018. Do ESG controversies matter for firm value? Evidence from international data. J. Bus. Ethics 151 (4), 1027–1047.

Aurand, T.W., Finley, W., Krishnan, V., Sullivan, U.Y., Abresch, J., Bowen, J., Rackauskas, M., Thomas, R., Willkomm, J., 2018. The VW Diesel Scandal: a case of corporate commissioned greenwashing. J. Organ. Psychol. 18 (1), 34–35.

Aust, V., Morais, A.I., Pinto, I., 2020. How does foreign direct investment contribute to Sustainable Development Goals? Evidence from African countries. J. Clean. Prod. 245, 118823.

Barkemeyer, R., Faugère, C., Gergaud, O., Preuss, L., 2020. Media attention to large-scale corporate scandals: hype and boredom in the age of social media. J. Bus. Res. 109, 385–398.

Basdeo, D.K., Smith, K.G., Grimm, C.M., Rindova, V.P., Derfus, P.J., 2006. The impact of market actions on firm reputation. Strat. Manag. J. 27 (12), 1205–1219.

Benlemlih, M., Bitar, M., 2018. Corporate social responsibility and investment efficiency. J. Bus. Ethics 148 (3), 647–671.

Bhandari, A., Javakhadze, D., 2017. Corporate social responsibility and capital allocation efficiency. J. Corp. Finance 43, 354–377.

Biddle, G.C., Hilary, G., Verdi, R.S., 2009. How does financial reporting quality relate to investment efficiency? J. Account. Econ. 48 (2–3), 112–131.

Bruna, M.G., Nicolò, D., 2020. Corporate reputation and social sustainability in the early stages of start-ups: a theoretical model to match shareholders' expectations through corporate social commitment. Finance Res. Lett. 35, 101508.

Capelle-Blancard, G., Petit, A., 2017. The weighting of CSR dimensions: one size does not fit all. Bus. Soc. 56 (6), 919–943.

Cao, W., Linnenluecke, M., Tian, J., Xue, R., Yang, H., 2023. How Does Investor Attention Affect Energy Firms' Managerial Opportunistic Behavior? New Evidence from China. Business Strategy and the Environment. https://doi.org/10.1002/bse.3406.

Capelle-Blancard, G., Petit, A., 2019. Every little helps? ESG news and stock market reaction. J. Bus. Ethics 157 (2), 543–565.

Carmo, F. F. do, Kamino, L.H.Y., Junior, R.T., Campos, I. C. de, Carmo, F. F. do, Silvino, G., Castro, K J da S. X. de, Mauro, M.L., Rodrigues, N.U.A., Miranda, M.P. de S., Pinto, C.E.F., 2017. Fundão tailings dam failures: the environment tragedy of the largest technological disaster of Brazilian mining in global context. Perspect. Ecol. Conserv. 15 (3), 145–151.

Chen, C., Jiang, D., Li, W., 2023. Keeping up with the CSR Joneses: the impact of industry peers on focal firms' CSR performance. Hum. Soc. Sci. Commun. 10 (1), 106.

Chen, H.-M., Kuo, T.-C., Chen, J.-L., 2022. Impacts on the ESG and financial performances of companies in the manufacturing industry based on the climate change related risks. J. Clean. Prod. 380, 134951.

Chen, T., Xie, L., Zhang, Y., 2017. How does analysts' forecast quality relate to corporate investment efficiency? J. Corp. Finance 43, 217–240.

Cho, S.Y., Lee, C., Pfeiffer Jr., R.J., 2013. Corporate social responsibility performance and information asymmetry. J. Account. Publ. Pol. 32 (1), 71–83.

Cionek, V.M., Alves, G.H.Z., Tófoli, R.M., Rodrigues-Filho, J.L., Dias, R.M., 2019. Brazil in the mud again: lessons not learned from Mariana dam collapse. Biodivers. Conserv. 28, 1935–1938.

Cook, K.A., Romi, A.M., Sánchez, D., Sánchez, J.M., 2019. The influence of corporate social responsibility on investment efficiency and innovation. J. Bus. Finance Account. 46 (3–4), 494–537.

Corrado, R., 2021. Class action alleges aldi's 'sustainable' atlantic Salmon farmed in ways that 'shock the conscience.' ClassAction.Org. https://www.classaction.org/news/class-action-alleges-aldis-sustainable-atlantic-salmon-farmed-in-ways-that-shock-the-conscience.

Crifo, P., Diaye, M.-A., Oueghlissi, R., 2017. The effect of countries' ESG ratings on their sovereign borrowing costs. Q. Rev. Econ. Finance 66, 13–20.

D'Amato, A., Falivena, C., 2020. Corporate social responsibility and firm value: do firm size and age matter? Empirical evidence from European listed companies. Corp. Soc. Responsib. Environ. Manag. 27 (2), 909–924.

Deng, X., Kang, J.-k., Low, B.S., 2013. Corporate social responsibility and stakeholder value maximization: evidence from mergers. J. Financ. Econ. 110 (1), 87–109.

Downs, C.A., DiNardo, J., Stien, D., Rodrigues, A.M.S., Lebaron, P., 2021. Response to the letter to the editor by Dr. Christian Surber. Chem. Res. Toxicol. 34 (9), 1938–1943.

Edmans, A., 2011. Does the stock market fully value intangibles? Employee satisfaction and equity prices. J. Financ. Econ. 101 (3), 621–640.

Erdem, T., Swait, J., Valenzuela, A., 2006. Brands as signals: a cross-country validation study. J. Market. 70 (1), 34–49.

Fernandes, G.W., Goulart, F.F., Ranieri, B.D., Coelho, M.S., Dales, K., Boesche, N., Bustamante, M., Carvalho, F.A., Carvalho, D.C., Dirzo, R., 2016. Deep into the mud: ecological and socio-economic impacts of the dam breach in Mariana, Brazil. Nat. Conserv. 14 (2), 35–45.

Fernandez-Perez, A., Garel, A., Indriawan, I., 2022. In the mood for sustainable funds? Econ. Lett. 217, 110691.

Ferrell, A., Liang, H., Renneboog, L., 2016. Socially responsible firms. J. Financ. Econ. 122 (3), 585–606.

Friede, G., Busch, T., Bassen, A., 2015. ESG and financial performance: aggregated evidence from more than 2000 empirical studies. J. Sustain. Finance Invest. 5 (4), 210–233.

Galbreath, J., 2013. ESG in focus: the Australian evidence. J. Bus. Ethics 118 (3), 529–541.

Gamerschlag, R., Möller, K., Verbeeten, F., 2011. Determinants of voluntary CSR disclosure: empirical evidence from Germany. Rev. Manag. Sci. 5 (2), 233–262.

Gao, J., Chu, D., Zheng, J., Ye, T., 2022. Environmental, social and governance performance: can it be a stock price stabilizer? J. Clean. Prod. 379, 134705.

Giese, G., Lee, L.-E., Melas, D., Nagy, Z., Nishikawa, L., 2019. Foundations of ESG investing: how ESG affects equity valuation, risk, and performance. J. Portfolio Manag. 45 (5), 69–83.

Gillan, S.L., Koch, A., Starks, L.T., 2021. Firms and social responsibility: a review of ESG and CSR research in corporate finance. J. Corp. Finance 66, 101889.

Gistri, G., Corciolani, M., Pace, S., 2018. The interaction effect between brand identification and personal crisis relevance on consumers' emotional reactions to a fashion brand crisis. J. Glob. Fash. Market. 9 (3), 252–269.

Glosten, L.R., Milgrom, P.R., 1985. Bid, ask and transaction prices in a specialist market with heterogeneously informed traders. J. Financ. Econ. 14 (1), 71–100.

Groening, C., Kanuri, V.K., 2013. Investor reaction to positive and negative corporate social events. J. Bus. Res. 66 (10), 1852–1860.

Heflin, F., Wallace, D., 2017. The BP oil spill: shareholder wealth effects and environmental disclosures. J. Bus. Finance Account. 44 (3–4), 337–374.

Jahmane, A., Brahim, G., 2020. Corporate social responsibility, financial instability and corporate financial performance: linear, non-linear and spillover effects - the case of the CAC 40 companies. Finance Res. Lett. 34, 101483.

Jeffrey, S., Rosenberg, S., McCabe, B., 2019. Corporate social responsibility behaviors and corporate reputation. Soc. Responsib. J. 15 (3), 395–408.

Khoury, R.E., Nasrallah, N., Harb, E., Hussainey, K., 2022. Exploring the performance of responsible companies in G20 during the COVID-19 outbreak. J. Clean. Prod. 354, 131693.

Kim, M., Surroca, J., Tribó, J.A., 2014. Impact of ethical behavior on syndicated loan rates. J. Bank. Finance 38, 122–144.

Kordsachia, O., Focke, M., Velte, P., 2021. Do sustainable institutional investors contribute to firms' environmental performance? Empirical evidence from Europe. Rev. Manag. Sci. 1–28.

Krüger, P., 2015. Corporate goodness and shareholder wealth. J. Financ. Econ. 115 (2), 304–329.

Landrum, S., 2017. Millennials Driving Brands to Practice Socially Responsible Marketing retrieved from. https://www.forbes.com/sites/sarahlandrum/2017/03/17/millennials-driving-brands-to-practice-socially-responsible-marketing/?sh=4228d49e4990.

Larwood, J., 2011. Rhetoric: naturally deceptive. Fresh Voices: Compos. Cal. Poly 4 (1), 26.

Lee, M.T., Raschke, R.L., Krishen, A.S., 2022. Signaling green! Firm ESG signals in an interconnected environment that promote brand valuation. J. Bus. Res. 138, 1–11.

Lemma, T.T., Muttakin, M., Mihret, D., 2022. Environmental, social, and governance performance, national cultural values and corporate financing strategy. J. Clean. Prod. 373, 133821.

Li, Y., Hu, S., Zhang, S., Xue, R., 2023. The power of the imperial envoy: the impact of central government onsite environmental supervision policy on corporate green innovation. Finance Res. Lett. 52, 103580.

Li, Z., Feng, L., Pan, Z., Sohail, H.M., 2022. ESG performance and stock prices: evidence from the COVID-19 outbreak in China. Hum. Soc. Sci. Commun. 9 (1), 242.

Liu, H., Jiang, J., Xue, R., Meng, X., Hu, S., 2022a. Corporate environmental governance scheme and investment efficiency over the course of COVID-19. Finance Res. Lett., 102726.

Liu, H., Wang, Y., Xue, R., Linnenluecke, M., Cai, C.W., 2022b. Green commitment and stock price crash risk. Finance Res. Lett. 47, 102646.

Liu, M., Luo, X., Lu, W.-Z., 2023. Public perceptions of environmental, social, and governance (ESG) based on social media data: evidence from China. J. Clean. Prod. 387, 135840.

McNichols, M.F., Stubben, S.R., 2008. Does earnings management affect firms' investment decisions? Account. Rev. 83 (6), 1571–1603.

Miller, S.R., Eden, L., Li, D., 2020. CSR reputation and firm performance: a dynamic approach. J. Bus. Ethics 163 (3), 619–636.

Msiska, M., Ng, A., Kimmel, R.K., 2021. Doing well by doing good with the performance of united nations global compact climate change champions. Hum. Soc. Sci. Commun. 8 (1), 321.

Nirino, N., Santoro, G., Miglietta, N., Quaglia, R., 2021. Corporate controversies and company's financial performance: exploring the moderating role of ESG practices. Technol. Forecast. Soc. Change 162, 120341.

Parguel, B., Benoît-Moreau, F., Larceneux, F., 2011. How sustainability ratings might deter 'greenwashing': a closer look at ethical corporate communication. J. Bus. Ethics 102 (1), 15–28.

Pfarrer, M.D., Pollock, T.G., Rindova, V.P., 2010. A tale of two assets: the effects of firm reputation and celebrity on earnings surprises and investors' reactions. Acad. Manag. J. 53 (5), 1131–1152.

Raimo, N., Caragnano, A., Zito, M., Vitolla, F., Mariani, M., 2021. Extending the benefits of ESG disclosure: the effect on the cost of debt financing. Corp. Soc. Responsib. Environ. Manag. 28 (4), 1412–1421.

Rezaee, Z., 2016. Business sustainability research: a theoretical and integrated perspective. J. Account. Lit. 36, 48–64.

Richardson, S., 2006. Over-investment of free cash flow. Rev. Account. Stud. 11 (2–3), 159–189.

Rotta, L.H.S., Alcântara, E., Park, E., Negri, R.G., Lin, Y.N., Bernardo, N., Mendes, T.S.G., Souza Filho, C.R., 2020. The 2019 Brumadinho tailings dam collapse: possible cause and impacts of the worst human and environmental disaster in Brazil. Int. J. Appl. Earth Obs. Geoinf. 90, 102119.

Roychowdhury, S., Shroff, N., Verdi, R.S., 2019. The effects of financial reporting and disclosure on corporate investment: a review. J. Account. Econ. 68 (2–3), 101246.

Rubin, A., 2008. Political views and corporate decision making: the case of corporate social responsibility. Financ. Rev. 43 (3), 337–360.

Saxena, S., 2015. Are they really green: flipping the second side of green marketing coin- a critical analysis using selected cases. Amity Glob. Bus. Rev. 10 (4), 110–113.

Siano, A., Vollero, A., Conte, F., Amabile, S., 2017. "More than words": expanding the taxonomy of greenwashing after the Volkswagen scandal. J. Bus. Res. 71, 27–37.

Tang, A.K., Lai, K.h., Cheng, T., 2012. Environmental governance of enterprises and their economic upshot through corporate reputation and customer satisfaction. Bus. Strat. Environ. 21 (6), 401–411.

Tian, J., Cheng, Q., Xue, R., Han, Y., Shan, Y., 2023. A dataset on corporate sustainability disclosure. Sci. Data 10, 182.

Tian, J., Yu, L., Xue, R., Zhuang, S., Shan, Y., 2022. Global low-carbon energy transition in the post-COVID-19 era. Appl. Energy 307, 118205.

Uyar, A., Karaman, A.S., Kilic, M., 2020. Is corporate social responsibility reporting a tool of signaling or greenwashing? Evidence from the worldwide logistics sector. J. Clean. Prod. 253, 119997.

Velte, P., 2019. The bidirectional relationship between ESG performance and earnings management–empirical evidence from Germany. J. Glob. Respons. 10 (4), 322–338.

Velte, P., 2020. Determinants and consequences of corporate social responsibility assurance: a systematic review of archival research. Soc. Bus. Rev. 16 (1), 1–25.

Walsh, G., Mitchell, V.W., Jackson, P.R., Beatty, S.E., 2009. Examining the antecedents and consequences of corporate reputation: a customer perspective. Br. J. Manag. 20 (2), 187–203.

Wan, D., Xue, R., Linnenluecke, M., Tian, J., Shan, Y., 2021. The impact of investor attention during COVID-19 on investment in clean energy versus fossil fuel firms. Finance Res. Lett. 43, 101955.

Wang, H., Luo, T., Tian, G.G., Yan, H., 2020. How does bank ownership affect firm investment? Evidence from China. J. Bank. Finance 113, 105741.

Wang, Y., Berens, G., Van Riel, C.B., 2012. Competing in the capital market with a good reputation. Corp. Reput. Rev. 15 (3), 198–221.

Watts, R.L., Zimmerman, J.L., 1978. Towards a positive theory of the determination of accounting standards. Account. Rev. 53 (1), 112–134.

Whited, T.M., 1992. Debt, liquidity constraints, and corporate investment: evidence from panel data. J. Finance 47 (4), 1425–1460.

Widyawati, L., 2021. Measurement concerns and agreement of environmental social governance ratings. Account. Finance 61, 1589–1623.

Xu, J., Liu, F., Shang, Y., 2020. R&D investment, ESG performance and green innovation performance: evidence from China. Kybernetes 50 (3), 737–756.

Xu, N., Jiang, X., Chan, K.C., Yi, Z., 2013. Analyst coverage, optimism, and stock price crash risk: evidence from China. Pac. Basin Finance J. 25, 217–239.

Yang, Y., Xue, R., Zhang, X., Cheng, Y., Shan, Y., 2023. Can the marketization of urban land transfer improve energy efficiency? J. Environ. Manag. 329, 117126.

Yuan, X., Li, Z., Xu, J., Shang, L., 2022. ESG disclosure and corporate financial irregularities – evidence from Chinese listed firms. J. Clean. Prod. 332, 129992.

Zhang, B., Vigne, S.A., 2021. How does innovation efficiency contribute to green productivity? A financial constraint perspective. J. Clean. Prod. 280, 124000.