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Corporate sustainability disclosure and investment efficiency: an empirical analysis of East Africa Community listed firms

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Abstract

Purpose – This study examines the association between corporate sustainability disclosure (CSD) and investment efficiency.

Design/methodology/approach – The study uses a sample of 410 firm-year observations drawn from 41 nonfinancial firms listed in the East African Community (EAC) partner states' stock/securities exchanges between 2013 and 2022.

Findings – The study findings provide empirical evidence that high levels of CSD leads to improved investment efficiency. Based on the findings, high CSD firms benefit from reduced information asymmetry and strong stakeholder engagement.

Practical implications – The study highlights the importance of CSD in predicting a firm's investment efficiency; thus, it has both practical and policy implications. First, corporate managers can attract more investors through social and environmental disclosures. Second, regulators and financial reporting standards setters can enhance corporate investment efficiency through policies geared towards adoption of CSD.

Originality/value – This study is the first attempt to investigate the nexus between CSD and investment efficiency within the EAC. The results of this study demonstrate the impact of CSD on corporate investment efficiency. Furthermore, CSD is not only focused on maximizing shareholder value but also on promoting corporate social and environmental accountability aimed at mitigating climate change.

Keywords Corporate sustainability disclosure, Investment efficiency, East Africa Community, Nonfinancial firms

Paper type Research article

1. Introduction

Corporate entities are facing increasing pressure to embrace social and environmental initiatives. The public, regulatory bodies and investors expect that corporate bodies should synchronize their operational objectives with environmental, social and ethical principles (Kolsi and Al-Hiyari, 2024). Moreover, Singhania *et al.* (2023) contend that an increasing number of regulators worldwide are amending corporate laws to ensure that they are in harmony with broader societal concerns. Hsu *et al.* (2019) also noted a growing interest among analysts and institutional investors in firms' social and environmental performance. In support of this, a survey conducted by CFA Institute found that around 75% of investment professionals integrate ESG reports into their investment choices (CFA Institute, 2017). While a survey conducted by the Governance and Accountability Institute reported that the proportion of S&P 500 companies that published sustainability reports grew from 20% in 2011 to 85% in 2017 (Governance and Accountability Institute, 2018).

Arguably, a firm that effectively communicates a positive image and justifies its social actions may benefit from greater consumer loyalty (Puriwat and Tripopsakul, 2023). On the other hand, failure to meet societal concerns can lead to negative market reaction, a decrease in

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sales and ultimately a decline in firm value. Although CSD is not mandatory in many jurisdictions, it remains an important practice, particularly with the growing awareness of climate change (Li and Jia, 2022). Furthermore, CSD can improve a firm's reputation and foster employee and customer loyalty (Rudžionienė and Brazdžius, 2023). Studies also associate CSD with improved firm performance, reduced information asymmetry, enhanced access to external finance and better corporate governance mechanisms (Laskar, 2018; Ananzeh, 2022). On the contrary, CSD tends to deplete a firm's resources and may potentially put socially responsible entities at a competitive disadvantage compared with less socially responsible firms. For example, allocating resources to social and environmental initiatives is a waste of valuable resources that satisfy other stakeholders at the expense of equity owners (Cho *et al*., 2021).

In recent years, investment efficiency has emerged as a key factor for economic development across nations. In view of this, studies continue to explore determinants of investment efficiency. For example, it has been demonstrated that reducing information asymmetry can enhance investment efficiency. Biddle *et al*. (2009), Chen *et al*. (2011) and Gomariz and Ballesta (2014) argue that the integrity of financial reporting enhances investment efficiency. While Lai *et al*. (2020) reported a positive link between internal control quality and investment efficiency. Chen *et al*. (2017) found that companies with superior analyst projections tend to have improved investment efficiency. Al-Hadi *et al*. (2016) assert that augmenting market risk disclosures, both in quantity and quality, enhances a firm's investment efficiency. Research further demonstrate that enhancing corporate social responsibility disclosure may mitigate investment inefficiencies (Dutta and Nezlobin, 2017). While Guttman and Meng (2021) assert that managers may over invest in information acquisition and select high-risk initiatives when the cost of ignorance at the investment stage is increased, a consequence of the voluntary disclosure that results in these inefficiencies.

While studies continue to examine the link between CSD and investment efficiency, many of the studies have focused on developed markets (Benlemlih and Bitar, 2018; Bilyay-Erdogan *et al*., 2024; Ellili, 2022; Hammami and Hendijani Zadeh, 2020). As a result, these findings cannot be generalized in developing countries. Moreover, addressing corporate investment inefficiencies in developing markets is crucial since they face greater investment obstacles due to information asymmetry and agency conflicts than developed markets (Zamir *et al*., 2022). A study by the World Bank, which included over 26,000 companies from 53 developing countries, reported that the cost and access to debt and equity finance are among the top five challenges facing firms in developing nations (Chan, 2014). Developing countries are further characterized by few financial institutions, institutionalized corruption, weak shareholders protection and unattractive capital markets (Khan *et al*., 2022). While it is well documented that corporate sustainability practices are essential for attaining Sustainable Development Goals, empirical research on the relationship between CSD and organizational outcomes, such as investment efficiency, in developing regions is scarce (Bahadori *et al*., 2021).

Hence, this study aims to address the following question: What is the link between CSD and investment efficiency in a developing region? To address this question, this study examines nonfinancial firms listed in the East African Community (EAC) partner states: Kenya, Uganda, Tanzania and Rwanda. The EAC presents a unique setting, as most narrative elements of corporate annual reports are voluntary, providing a distinctive opportunity to analyse the association between CSD and corporate investment efficiency. This study's findings of this study may enhance corporate managers, equity owners and prospective investors' understanding of the important link between corporate social and environmental performance and the efficiency with which it invests its resources. The remainder of this paper is organized as follows: The next section discusses the institutional setting of EAC. Section 3 discusses the literature review and hypothesis development. Section 4 describes the research design of the study. Section 5 presents the results, while Section 6 concludes the paper.

2. Institutional setting

EAC comprises eight countries, namely, Kenya, Uganda, the United Republic of Tanzania, Rwanda, Burundi, the Democratic Republic of the Congo (DRC), South Sudan and the Federal Republic of Somalia. EAC has a population of approximately 300 m people. The region is endowed with abundant natural resources such as oil in South Sudan and Uganda, minerals in Burundi, Rwanda, the United Republic of Tanzania and Uganda and wildlife tourism in Kenya and Tanzania. Though the region's financial markets are relatively small and underdeveloped, Kenya has the most developed securities exchange. As of 31 December 2023, the markets market capitalizations were at US$14 bn, US$4.7 bn, US$4.5 bn and US$2.7 bn for the Nairobi Securities Exchange, Uganda Securities Exchange, Dar es Salaam Stock Exchange and Rwanda Stock Exchange, respectively. The EAC securities/stock markets lean heavily towards equity listing as opposed to corporate bonds since firms tend to borrow from banks. This can be attributed to the disclosure requirement imposed by the capital market regulators and the length of time taken to issue corporate bonds.

EAC partner states have undertaken reforms to attract FDI and improve resource exploitations. In the year 2021, the region witnessed a surge in foreign direct investment (FDI) inflows, rising from US$ 5.26 bn to US$ 7.59 bn. Uganda recorded the highest FDI inflow of US$ 3.2 bn, while Rwanda followed closely with US$ 2.1 bn, reflecting growth rates of 247 and 126%, respectively. In addition, Chinese investments in the region tripled in the same year (EAC trade and investment report 2022). EAC continues to face the challenges of climate change despite carbon emissions in Africa constituting less than 5% of the global total. It has been noted that climate change has affected Africa's rural livelihoods and food security disproportionately and severely compared to other continents (Lenshie *et al.*, 2022; John, 2024). Some of the factors that undermine EAC capacity to build climate resilience include lack of resources, corruption and global climate injustice. Nonetheless, there are initiatives by regulators and accounting professional bodies within EAC aimed at encouraging firms to incorporate SDG in their corporate strategies and to report on environmental and social performance (Khan *et al.*, 2023). Furthermore, environmental and social reporting is increasingly being mandated by industry-specific regulations. For instance, the Central Bank of Kenya (CBK) and the Bank of Uganda (BoU) recently launched the Sustainability Standards and Certification Initiative (SSCI), which aims to promote sustainable and responsible practices in the banking sector. In the context of stock/securities market regulation, the Nairobi Securities Exchange (NSE) and the Dar es Salaam Stock Exchange (DSE) lately issued manuals to guide listed firms in sustainability reporting.

In addition, accounting professional bodies in the region, such as the Institute of Certified Public Accountants of Kenya (ICPAK) and the Institute of Certified Accountants of Uganda (ICPAU) in collaboration with the International Sustainability Standards Board (ISSB), continue to support the adoption of the International Sustainability Standards Board (ISSB). Specifically, IFRS S1 that focusses on the General Requirements for Disclosure of Sustainability-related Financial Information. This is the core framework for the disclosure of material information about sustainability-related risks and opportunities across an entity's value chain. While IFRS S2 focuses on Climate-related Disclosures and sets out requirements for entities to disclose information about climate-related risks and opportunities.

Finance supports the transition to a low-carbon and climate-resilient economy. Generally, climate financing is classified as international support for climate action, private climate finance mobilized for climate action and domestic efforts by all parties. The EAC region receives around 5% of the total climate finance allocated to developing nations worldwide. Kenya, Tanzania and Uganda were the primary beneficiaries of this funding between 2013 and 2018, accounting for 41, 20 and 19%, respectively. The primary sources of climate finance in EAC have been bilateral agencies (36%), multilateral development banks (57%) and climate funds (7%), which are obtained through loans and grants (Mburu and Macheru, 2024). A significant proportion of climate finance is usually channelled to the agricultural, forestry, land-use change water and sanitation sector.

EAC member countries continue to adopt green financing. Uganda formulated the "The Uganda Green Growth Development Strategy 2017/18–2030/31" as a reaffirmation of its dedication to the principles of sustainable development. The Ugandan government is also implementing measures to ensure that the transition aligns with the Sustainable Development Goals (SDGs), Paris Agreement of 2015 and African Union Agenda 2063. While, the government of Kenya allocated KES 414.23 bn and KES 427.24 bn to the climate change sector in the fiscal years 2017/2018 and 2019/2020, respectively. On average, 40% of these finances were generated from domestic sources and 60% from foreign sources. In 2017/2018, the investment into green projects was estimated to be KES 103 bn, while in 2018/2019 it reached KES 120 bn. In 2023, Rwanda initiated the Rwanda Climate Finance Partnership, in conjunction with the Paris Summit for a New Global Financing Pact, aimed at attracting private investment for climate action and building a resilient economy.

3. Literature review and hypothesis development

From a theoretical perspective, the institutional, legitimacy and stakeholder theories have been used to explain why corporations disclose their environmental, social and governance performance (Akhter *et al.*, 2023). Institutional theory suggests that pressure from stakeholders may compel organizations to adopt social and environmental practices (Bhuiyan *et al*., 2023). This may have a significant bearing on a firm's decision-making process and the nature and extent of nonfinancial disclosure (Rouf and Siddique, 2023). The legitimacy theory emphasizes the importance of societal acceptance in ensuring a firm's long-term sustainability (Akhter *et al*., 2023). According to this theory, the actions of any organization must adhere to and be compatible within a socially established system of standards, values and beliefs. Consequently, firm that lack legitimacy are more inclined to take proactive measures to address societal concerns (Saeed *et al*., 2022). Hence, CSD functions as a mechanism through which firms communicate their performance in meeting social and environmental goals. Arguably, firms that demonstrate a strong commitment to social and environmental concerns cultivate legitimacy, are more accessible to external finance and tend to report improved investment efficiency (Khan and Gupta, 2024).

The stakeholder theory, proposed by Freeman (1984), suggests that firms must address the needs of both primary and secondary stakeholders. In this context, CSD can be employed as a mechanism for conveying information to secondary stakeholders (Manita *et al*., 2018). Cornell and Shapiro (1987) argue that failure to meet stakeholders' expectations is more likely to generate market fears, which may adversely influence profitability. Consequently, firms with stronger social and environmental performance are more efficient in their investments (Bilyay-Erdogan *et al*., 2024).

The stakeholder theory posits that social and environmental performance practices positively influence firm investment efficiency, as addressing stakeholder needs and perspectives enhances their willingness to support organizational goals, resulting in improved investment efficiency (Benlemlih and Bitar, 2018). In alignment with this theory, Cook *et al*. (2019) assert that managers of firms with high social and environmental ratings are more inclined to prioritize long-term financial performance and face heightened scrutiny and oversight from diverse stakeholders, thereby enhancing their motivation to pursue positive NPV projects. Eliwa *et al*. (2021) assert that ESG policies can enhance corporate reputations and establish a competitive edge. Consequently, it is reasonable to anticipate that firms with higher ESG scores will experience a decrease in cost of capital and, therefore, an increase in investment efficiency. Based on these theories, it has been demonstrated that socially responsible firms are associated with reduced information asymmetry, lessened agency conflict, and increased stakeholder engagement (Romito and Vurro, 2021). Furthermore, empirical studies have also documented that CSD is positively connected to corporate investment efficiency. Ellili (2022) examined the link between financial reporting quality (FRQ), ESG disclosure and investment efficiency. The author analysed a sample of United

Arab Emirates (UAE) firms. The study found that ESG disclosure, FRQ and investment efficiency were positively related. Hammami and Hendijani Zadeh (2020) assessed the link between audit quality, media coverage, disclosure of environmental, social, and governance factors and investment efficiency using a sample of listed Canadian firms between 2008 and 2017. The authors reported that audit quality and media exposure were positively related to ESG disclosure. While ESG disclosure improved investment efficiency. Zeng *et al*. (2019) studied Chinese publicly traded companies between 2011 and 2016. The authors found a positive association between corporate environmental responsibility and investment efficiency. Using a cross-country sample of listed entities across seven emerging countries and panel data for the years 2011–2019, Al-Hiyari *et al.* (2023) reported a positive link between ESG performance and investment efficiency. While Bilyay-Erdogan *et al.* (2024), who employed a sample of 1,094 firms drawn from 21 countries in Europe and data from the period 2002 to 2019, found that ESG engagement was positively linked with investment efficiency. A study by Alobaid *et al*. (2024) that focused on non-financial companies listed on the Saudi Stock Exchange (Tadawul) from 2016 to 2021 documented that higher CSR disclosures are positively associated with investment efficiency. Based on the theoretical and empirical literature review, this study hypothesizes as follows.

H1. There is a positive relationship between CSD and investment efficiency.

4. Research design

4.1 Sample construction and data

The sample comprised nonfinancial firms listed across EAC partner states stock/securities exchanges: Nairobi Securities Exchange (29), Uganda Securities Exchange (three), Dar es Salam Stock Exchange (eight) and Rwanda Stock Exchange (one) over the period between 2013 and 2022. Financial firm are excluded since they operate in a highly regulated and disclosure environment (Elberry and Hussainey, 2020). Furthermore, these firms have a unique nature of investments and financing (Quah *et al*., 2021). Also, financial firms had significant differences in the application of accounting policies and the derivation of accounting estimates compared to nonfinancial firms (Chowdhury *et al*., 2024). The final sample comprised 41 firms over a 10-year period that yielded 410 firm-year observations. Table 1 below shows how the final sample was arrived at. To prevent the effect of outliers on the regression analysis, all continuous variables were winsorized at the 1st and the 99th percentiles.

4.2 Measurement of variables

4.2.1 Dependent variable. Investment efficiency was measured as proposed by Biddle *et al.* (2009). According to the authors, investment (in)efficiency denotes the deviations from the

Table 1. Sample selection

	Number of firms	Percentage	Observations
Target population	70	100	1,150
Newly listed	16	22.9	160
Cross listed	5	7.1	50
Suspended	6	8.6	60
Missing data	2	2.9	20
Sample	41	58.6	410

Source(s): Author's compilation

predicted level of investment. Consequently, firms that invest in negative NPV projects are considered as "overinvestment firms". On the other hand, those that fail to invest in positive NPV projects are classified as "underinvestment firms" (Al-Hiyari *et al.*, 2023). Following Biddle *et al.* (2009), the level of investment in the following year is a function of growth opportunities in the current year. The investment model is illustrated below:

$$Investment_{i,t} = \beta_0 + \beta_1 Salesgrowth_{i,t-1} + \varepsilon_{i,t}$$

Where investment $_{i,\,t}$ is the aggregate investment of firm i in year t, measured as the net increase in tangible and intangible assets deflated by the lagged total assets. Sales growth of $_{i,t-1}$, a proxy for investment opportunities, is the annual sales growth firm i from t−2 to year t. The residuals have negative and positive values. Therefore, to facilitate interpretation of empirical results, investment efficiency (INEF) is computed as the absolute values of the residuals from the investment model multiplied by −1. Therefore, a higher value implies better INEF and vice versa (Al-Hiyari *et al.*, 2023).

4.2.2 Independent variable. CSD was measured following the GRI-G4 reporting standards that consist of 91 items from three main GRI-based performance indicators, including economic contribution (nine items), environmental performance (34 items) and social responsibility (48 items). To measure the extent of CSD for sample companies, content analysis was done on the selected firms' annual financial reports. Content analysis was guided by GRI-G4 guidelines on sustainability reporting. The scoring was done as follows: 2 – fully reported, 1 – partially reported and 0 – not reported (Bhatia and Tuli, 2017). Consequently, the CSD index was a ratio of the scores awarded to the total possible score of 182 (91*2). If the item is just mentioned in a single sentence the scoring is "1" more than a sentence the scoring is "2".

$$CSD_{i,j} = \frac{\sum_{x=1}^{n} \mathrm{xi}}{\mathrm{n}}$$

Where xi = "1 or 2" if i item is disclosed by the firm in a particular year or otherwise "0", and n = total number of potential disclosure items included in the checklist. The maximum score denotes the highest achievable scores that a company can get in a given year, which is 182. CSD is interpreted as the ratio of the individual firm scores in a particular year to the maximum scores. A higher score indicates a higher level of CSD.

4.2.3 Control variables. The study incorporated several control variables to isolate the effect of CSD on investment efficiency. First, the study incorporated institutional ownership (INOW) (measured as the proportion of shares held by institutional shareholders to total shares). Second, the study controlled for firm size (FS), measured as the logarithm of total assets. Third, firm age (FA), measured as the natural logarithm value of the number of years since the incorporation of the firm, was added. Fourth, the study accounted for leverage (LEV), with the ratio of the book value of total liabilities and debt scaled by the book value of total assets as a proxy measure was incorporated. The study further incorporated firm profitability measured as return on assets (ROA). Finally, the study controlled for two board attributes: board financial expertise (BFE), computed as the ratio of board members with financial and accounting expertise to the total number of directors and board gender diversity (BGD), calculated as the ratio of female directors to the total number of directors.

4.3 Model specification

The model below was used to test the link between CSD and investment efficiency.

$$INEF_{it} = \beta_0 + \beta_1 CSD_{it} + \beta_2 INOW_{it} + \beta_3 FS_{it} + \beta_4 FA_{it} + \beta_5 LEV_{it} + \beta_6 ROA_{it} + \beta_7 BFE_{it} + \beta_8 BGD_{it} + \varepsilon_{it}$$

Where:

INEF is investment efficiency; CSD, corporate sustainability disclosure; INOW, institutional ownership; FS, firm size; FA, firm age; LEV, leverage; BFE, board financial expertise; BGD, board gender diversity. $\beta_0 \ldots \beta_8$, beta coefficients. ε_{it} is an error term.

5. Result

5.1 Descriptive statistics

Table 2 shows the descriptive statistics for the research variables from 2013 to 2022. Investment efficiency (INEF) had a mean value of −0.042. The mean INEF is close to that reported by Al-Hiyari *et al.* (2023). The average corporate sustainability disclosure (CSD) was 26.0%, which is closer to 20.16. Reported by Zahid *et al.* (2020) in Malaysia. The average CSD is an indicator of low disclosure on social and environmental performance among listed firms in EAC. The mean institutional ownership (INOW) was 72.1%. This implies that the selected firms are largely owned by institutional investors. The mean leverage (LEV) of 43.8% suggests judicious use of debt financing by the selected firms. The mean firm size (FS) was 7.832. The average firm age (FA) was 38.40 years (e^3.648). Table 2 further revealed that the mean board financial expertise was 58.5%. This shows that a large proportion of board members have knowledge in accounting and finance. While the mean board gender diversity of 14.44% is an indicator of low female presence on corporate boards. The mean financial performance (ROA) of the selected firms over the study period was 5.9%, suggesting low profitability.

5.2 Correlation analysis

Table 3 presents the Pearson's pairwise correlation coefficients of the research variables. The table demonstrates that investment efficiency is positively correlated with CSD, institutional ownership, firm age, leverage, board financial expertise, board gender diversity and return on assets. However, investment efficiency is negatively correlated with firm size. In addition, all the coefficients are less than 0.8. This confirms that the explanatory variables are not strongly correlated, which confirms the absence of multicollinearity.

5.3 Regression results

Table 4 presents the regression results for ordinary least squares (OLS), random effect, fixed effect and the system generalized method of moments. OLS regression results confirm that

Table 2. Descriptive statistics

Variable	Obs	Mean	p50	Std. dev.	Min	Max
INEF	410	−0.042	−0.026	0.047	−0.258	0.000
CSD	410	0.260	0.247	0.152	0.003	0.629
INOW	410	0.721	0.739	0.079	0.550	0.899
FS	410	9.879	9.942	1.159	6.945	12.284
FA	410	3.648	3.912	0.912	0.000	5.017
LEV	410	0.438	0.422	0.182	0.074	0.841
ROA	410	0.059	0.048	0.071	−0.209	0.298
BFE	410	0.585	0.585	0.191	0.000	1.000
BGD	410	0.144	0.143	0.129	0.000	0.750

Source(s): Author's own computation

Table 3. Correlation matrix

	INEF	CSD	INOW	FS	FA	LEV	ROA	BFE	BGD
INEF	1.0000								
CSD	0.1474*	1.0000							
INOW	0.2051*	0.1417*	1.0000						
FS	−0.0668	0.2676*	0.0419	1.0000					
FA	−0.0032	−0.3210*	−0.0767	−0.0776	1.0000				
LEV	−0.1980*	0.0303	−0.1049*	0.2677*	0.0161	1.0000			
ROA	0.2424*	−0.0015	0.0425	−0.0596	0.0865	−0.1836*	1.0000		
BFE	0.1764*	−0.1406*	0.2848*	−0.0247	−0.0056	−0.2466*	0.0780	1.0000	
BGD	0.2398*	0.3013*	0.2243*	0.1276*	0.0002	−0.0403	−0.0148	0.1226*	1.0000

Note(s): *$p < 0.05$

Source(s): Author's own computation

Table 4. Regression results

INEF	OLS Coef.	FEM Coef.	REM Coef.	SGMM Coef.
CONSTANT	−0.060 (0.046)	0.511 (0.185)**	−0.065 (0.059)	0.654 (0.262)**
L1.		–		0.004 (0.051)
CSD	0.068 (0.026)**	0.200 (0.053)**	0.096 (0.031)**	0.241 (0.089)**
INOW	0.098 (0.045)**	0.168 (0.079)**	0.105 (0.054)**	0.278 (0.128)**
FS	−0.008 (0.003)**	−0.073 (0.168)**	−0.010 (0.004)**	−0.096 (0.021)**
FA	0.002 (0.004)	−0.002 (0.020)	0.004 (0.005)	0.010 (0.037)
LEV	−0.036 (0.018)**	−0.130 (0.032)**	−0.055 (0.022)**	−0.298 (0.045)**
ROA	0.156 (0.049)**	0.354 (0.055)**	0.220 (0.052)**	0.532 (0.072)**
BFE	0.040 (0.019)**	0.087 (0.031)**	0.056 (0.022)**	0.113 (0.044)**
BGD	0.098 (0.028)**	0.127 (0.040)**	0.108 (0.032)**	0.123 (0.054)**
R-squared	0.1650	0.1024	0.1635	
F/wald χ^2	9.91	20.12	92.07	237.60
Prob > *F*/Wald χ^2	0.000	0.000	0.000	0.000
Hausman χ^2	–		85.46	
Prob > χ^2	–		0.000	
AR(1)	–	–	–	0.03
AR(2)	–	–	–	0.937
Sargan	–	–	–	0.335
Hansen	–	–	–	0.349

Note(s): **$p < 0.05$, standard error (Std. Err.) in parentheses

Source(s): Author's own computation

CSD has a positive and significant effect on investment efficiency ($b = 0.062$, $p < 0.05$); hence, H1 is supported. These findings imply that high CSD firms are more likely to achieve an optimal level of investment. This can be attributed to judiciously use of capital, enhanced financial capabilities, greater profitability and greater growth opportunities (Zamir *et al.*, 2022; Hammami and Hendijani Zadeh, 2020). Firm engaging in social and environmental initiatives are generally characterized by reduced agency problems, improved access to capital, better transparency and information quality and improved investment efficiency (Lin *et al.*, 2021; Al-Hiyari *et al.*, 2023). Furthermore, socially responsible firms exhibit a higher degree of managerial professionalism and report fewer instances of corporate fraud (Nguyen, 2022). Overall, the findings contradict the managerial opportunism hypothesis that link social and environmental activities with "green washing." Nevertheless, they provide evidence that a firm's social and environmental performance influences its reputation and competitive advantage. In addition, the findings further establish that CSD functions as a barometer of corporate executives' commitment to shareholders expectations through improved investment efficiency.

Turning to the control variables, the study documents several significant associations. The estimated coefficient on firm size (FS) is negative and statistically significant. Large firms have fewer growth opportunities and tend to reduce investment activities. The findings also demonstrated a positive and significant association between firm age (FA) and investment efficiency. Older firms have reached the maturity stage and have more resources, implying that they are experienced and enjoy improved investment efficiency. Institutional ownership (INOW) has a positive and significant effect on investment efficiency. Hence, a higher proportion of institutional investors leads to higher investment efficiency that can be attributed to increased managerial monitoring. The results confirmed a positive link between board financial expertise (BFE) and investment efficiency. Board members with finance and accounting knowledge exercise independent monitoring and provide the board with technical knowledge on a firm's investment decisions, which is likely to improve investment efficiency.

Finally, the results confirmed that board gender diversity (BGD) had a positive and significant effect on investment efficiency. Female directors are more conservative and risk-averse as compared to their male counterparts. Female directors also tend to be more sensitive to potential reputation risk and are less aggressive. Consequently, firms with female-dominated boards are less likely to face over-under investment problems.

5.4 Robustness check

The pooled ordinary least square (OLS) is the simplest and most widely used regress technique (Gujarati *et al.*, 2012). Nevertheless, OLS suffers from certain shortcomings and inherit biases. OLS does not consider the heterogeneity among the cross-sectional units and potential endogeneity. To handle these problems, three additional panel data analysis method were employed: the random effect model (REM), the fixed effect model (FEM) and the system generalized method of moments (S-GMM). REM assumes that the unobserved, time-invariant individual effects are uncorrelated with the predictor variables. On the other hand, the fixed effect does not require such a strict assumption; which, allows unobserved effects and explanatory variables to be correlated. The results of the REM and FEM, presented in Table 4, are consistent with those of the OLS. However, the link between firm age and investment efficiency was insignificant. In addition, OLS may provide biased results if the variables suffer from endogeneity. As a result, S-GMM was employed, and the validity of the model and instruments used was confirmed through postestimation tests (Wintoki *et al.*, 2012). The Arellano and Bond (1991) test is conventionally used to assess the presence of autocorrelation in the residuals. The results of AR (1) and AR (2) shown in Table 4 confirmed that residual terms are autocorrelated in the first order, AR (1), but not in the second order, AR (2). Further, the Sargan and Hansen tests were applied to check for overidentification restrictions. As shown in Table 4, the value of the Sargan test (0.335) and that of the Hansen test (0.349) are more than 0.05. Hence, the results fail to reject the null hypothesis. This implies that the instruments used in the model were valid. Going by the regression results of the S-GMM, CSD had a positive effect on investment efficiency, which further supports the OLS.

5.5 Additional analysis

5.5.1 Firm size and firm age. Corporate disclosure procedures and investment efficiency may be contingent upon firm size. For example, large corporations with greater access to capital are less prone to under-investment issues. Large firms are less prone to overinvest due to their established and mature governance mechanisms that mitigate excessive investment (Cao *et al.*, 2020). Large firms generally garner greater scrutiny in financial markets compared to smaller organizations, so diminishing their capacity to diverge from the best investment strategy (Eisdorfer *et al.*, 2013). Smaller enterprises result in reduced investment levels and increased operating costs, leading to a subsequent decline in efficiency within these firms (Poudineh and Jamasb, 2016). Research indicates that younger and smaller firms are more likely to capitalize on important growth prospects, resulting in more efficient investments (Wu *et al.*, 2024). Large corporations have superior corporate governance and disclosure standards relative to smaller enterprises, as they offer more voluntary disclosures (Boshnak, 2022). Large corporations possess intricate structures and relationships with diverse stakeholders, necessitating greater information sharing (Santamaria *et al.*, 2021).

Given the significance of firm-size bias when assessing corporate sustainability and governance concerns, the study conducted a further analysis by splitting the sample into two subsamples – large and small – based on the median firm size, which was measured as the logarithm of assets. The link between CSD and investment efficiency was subsequently estimated for the two subsamples. The regression results presented in Table 5 confirmed that the relation between CSD and INEF remained consistent.

Prior research indicates that corporate disclosure and investment efficiency may differ based on firm age. Older firms tend to engage in social and environmental initiatives and have

Table 5. Regression results for firm size and firm age

	Panel A (FS)		Panel B (FA)	
	LM	UM	LM	UM
INEF	Coef.	Coef.	Coef.	Coef.
CONSTANT	−0.215 (0.065)	0.253 (0.145)	−0.094 (0.084)	0.072 (0.074)
CSD	0.113 (0.042)**	0.089 (0.039)**	0.103 (0.039)**	0.042 (0.037)
INOW	0.199 (0.061)**	−0.054 (0.085)	0.190 (0.080)**	0.049 (0.053)
FSS	−0.001 (0.006)	−0.027 (0.012)**	−0.006 (0.005)	−0.012 (0.005)**
FA	0.006 (0.006)	−0.001 (0.006)	0.010 (0.008)**	−0.015 (0.013)
LEV	−0.067 (0.023)**	−0.056 (0.038)	−0.104 (0.039)**	−0.023 (0.020)
BFE	0.073 (0.024)**	0.067 (0.032)**	−0.025 (0.033)	0.089 (0.026)**
BGD	0.078 (0.037)**	0.132 (0.046)**	0.034 (0.053)	0.102 (0.034)**
R-squared	0.1429	0.1361	0.1653	0.2057
F-value	5.89	5.59	5.32	7.62
Prob > *F*	0.000	0.000	0.000	0.000

Note(s): *$p < 0.05$; standard error (Std Err) in parentheses
Source(s): Author's own computation

the requisite expertise and resources for voluntary disclosure (Arkoh *et al*., 2024). Conversely, young firms may seek to validate their legitimacy to stakeholders and cultivate their market reputation (Akhter *et al*., 2023). Moreover, larger and older companies generally own greater retained earnings, which alleviates financing constraints and hence diminishes the necessary amount of transparency (Östberg, 2006). Younger firms may experience a greater disparity between the costs of external and internal capital owing to challenges in accessing external financing. Therefore, younger firms are expected to have greater growth prospects, prompting increased investment (Hovakimian, 2009). Wu *et al*. (2024) contend that younger and smaller organizations possess a superior capacity to capitalize on important growth prospects, hence rendering financial flexibility more advantageous for them. Wu *et al*. (2024) assert that established firms prioritize the valuation of current assets, but younger enterprises are inclined to seek uncertain development prospects, indicating that financial flexibility is more appealing to the latter. Consequently, the sample was further categorized into younger and older subgroups based on the median of the natural logarithm of firm age. The OLS results displayed in Table 5 demonstrate that the link between CSD and investment efficiency is significant for younger firms. This aligns with the idea that the longer a corporation operates, the more probable it is to enter a declining phase of the business life cycle, thereby diminishing investment activity.

5.5.2 Profitability and institutional ownership. Corporate disclosures and investment decisions may be affected by profitability and the level of institutional ownership. Profitable firms typically pursue business expansion (growth choices), while unprofitable enterprises must decide whether to downsize or cease operations (abandonment options), a process known as capital following profitability (Hui *et al*., 2022). The significance of corporate disclosure may vary based on whether the corporation reports a profit or a loss. For instance, profitable companies may refrain from allocating resources to voluntary disclosure due to the unclear outcomes in an evolving scenario (Halimah and Yanto, 2018). Conversely, existing findings can be corroborated if less profitable companies utilize disclosure to legitimize their economic activities (Yanto and Muzzammil, 2016).

Table 6 presents the regression results subsequent to the segmentation of the sample into profit and loss firms. The results indicate that statistical significance is present for both profit and loss firms. This indicates that the correlation between CSD and investment efficiency is independent of profitability. The findings are corroborated by studies asserting that profitable entities possess greater resources to dedicate to socially and ecologically responsible initiatives and exhibit superior performance in voluntary corporate governance disclosure

Table 6. Regression results for profitability and institutional ownership

	Panel A (ROA)		Panel B (INOW)	
	LM	UM	LM	UM
INEF	Coef.	Coef.	Coef.	Coef.
CONSTANT	−0.271 (0.143)	−0.030 (0.047)	−0.104 (0.108)	−0.160 (0.087)
CSD	0.170 (0.078)**	0.057 (0.027)**	0.049 (0.053)	0.123 (0.042)**
INOW	0.073 (0.046)	0.352 (0.136)**	0.157 (0.107)	0.249 (0.108)**
FSS	−0.002 (0.009)	−0.011 (0.003)**	−0.008 (0.006)	−0.010 (0.004)**
FA	0.006 (0.011)	0.007 (0.004)	0.005 (0.007)	0.002 (0.005)
LEV	−0.105 (0.056)	−0.045 (0.019)**	−0.065 (0.029)**	−0.020 (0.025)
BFE	0.031 (0.051)	0.056 (0.020)**	0.043 (0.034)	0.054 (0.023)**
BGD	0.056 (0.072)	0.086 (0.030)**	0.054 (0.048)	0.124 (0.034)**
R-squared	0.1604	0.1811	0.1340	0.1591
F-value	2.24	9.86	4.16	5.57
Prob > *F*	0.000	0.000	0.000	0.000

Note(s): *$p < 0.05$; standard error (Std Err) in parentheses
Source(s): Author's own computation

(Özcan, 2020). Less profitable firms utilize nonfinancial reporting to enhance investor confidence and establish legitimacy (Desai, 2022). The existing corporate investment literature indicates that information asymmetry and agency issues are the primary variables contributing to inefficiency in corporate investment. Myers and Majluf (1984) contend that the information asymmetry between managers and shareholders determines a firm's investment efficiency.

Empirical studies demonstrate that institutional investors may mitigate conflicts of interest between managers and shareholders and shape corporate governance decisions through mechanisms such as executive oversight, expressing their opinions (Shleifer and Vishny, 1986) and advocating for divestment (Admati and Pfleiderer, 2009). Institutional investors persist in pursuing environmental and ethical legitimacy, striving to adhere to the ongoing climate-related regulatory discourse while urging their portfolio companies to reduce their carbon emissions (Benlemlih *et al*., 2023). These data consistently support our primary hypothesis that institutional owners exert pressure on enterprises to address climate change concerns. However, enterprises with strong institutional ownership in our sample exhibit differences from those with low institutional ownership across several dimensions, including size, profitability and governance variables. Facilitating a favourable correlation between institutional ownership and CSD (Wicaksono *et al*., 2024). The results in panel B of Table 6 indicate that the link between CSD and INEF is more significant at higher levels of institutional ownership, aligning with the efficient monitoring hypothesis, as institutional investors possess greater experience and are thus better positioned to effectively oversee corporate management (Shah *et al*., 2023).

6. Conclusion

This study provides one of the first attempts to investigate the link between CSD and investment efficiency in the developing regions. Using a sample of 41 listed nonfinancial firms representing 410 firm-year observations over the 2013–2022 period, the study found empirical evidence that CSD is positively related to investment efficiency. The findings remained robust for alternative panel data estimation models and analysis. The study concluded that high CSD firms enjoy low information asymmetry, particularly in a region of weak legal and institutional framework and highly level of investment efficiency. Based on the findings, the study concluded that adopting CSD can lessen agency cost, boost investors' confidence and maximize shareholder's wealth through efficient capital allocation. Overall, the findings can

provide useful insights to corporate managers, policymakers and stock markets regulators. First, owing to the existence of information asymmetry between corporate executives and outsiders, potential financier may consider paying attention to a firm's sustainability disclosure practices before allocating capital. Second, corporate managers can reap the benefits of CSD. In particular, management should endeavour to enhance social and environmental disclosure quality of their companies, with an aim of promoting investment efficiency and lowering the cost of capital. Finally, policymakers may consider developing CSD policies to tackle investment inefficiency. This is especially crucial in developing regions characterized by low investor confidence but requiring a robust capital market to effectively stimulate socioeconomic development. There are multiple possibilities for expanding this research in the future. First, conducting a comparative study across developed and developing regions would be valuable. Secondly, integrating different proxy indicators of investment efficiency, together with examining corporate governance and ownership factors that might shape the relationship between CSD and investment efficiency, will provide valuable insights.

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