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Bank sustainability, climate change initiatives and financial performance: The role of corporate governance

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ABSTRACT

This study elucidates the interrelationships among corporate governance disclosure index (CORPGOVDISCIN), bank sustainability characteristics (BSCs), bank-based climate change initiatives (BCCIs) and financial performance (FP) through the lens of multi-theoretical framework. Based on a panel dataset of 2785 observations (220 banks) from 16 Sub-Saharan Africa countries between 2007 and 2022, we observe that bank sustainability reporting framework (BSRF) and board sustainability committee (BSCOM) are positively related to increased levels of BCCIs. Second, the study shows that the BSRF-BCCIs and BSCOM-BCCIs associations are positively moderated by CORPGOVDISCIN, indicating that these relationships are contingent on the quality of the bank's corporate governance mechanisms. Third, the study then provides evidence that BSCOM is positively related to FP, but BSRF has no effect on FP. Fourth, we also observe that BCCIs disclosure has positive impact on FP, but actual BCCIs investments do not seem to improve FP. Fifth, the study detects that the association between BCCIs and FP is significantly moderated by CG mechanisms. We identify CG disclosure as the possible channel through which BCCIs and FP are interlinked. Finally, we show that the predicted relationships vary across banks' operating periods. Our findings are robust to endogeneity and selection bias concerns.

1. Introduction

Over the past two decades, climate change has drawn increasing attention from academics, professionals, regulators and environmental activists (Haque & Ntim, 2020; Khurram, Chen, Abedin, Adu, & Lucey, 2024; Weerathunga, Xiaofang, Nurunnabi, Kulathunga, & Swarnapali, 2020), and has assumed a prominent position on the agendas of business, politics, and the economy (Orazalin, Ntim, & Malagila, 2023). In particular, global climate change, which is a result of the emission of greenhouse gas (GHG), is currently a top concern for organizations, governments, and other stakeholders (Adu, 2022; Bui, Houqe, & Zaman, 2020). Climate change has a negative impact on the environment, socioeconomic systems, and ultimately human lives (Orazalin et al., 2023; Sun, Yang, Huang, & Zou, 2020). In order to address global warming and climate change, international organizations and national governments are progressively implementing a number of projects, policies, and practices (Baboukardos, 2018). For instance, the Sustainable Development Goals (SDGs) are a set of 17 overarching objectives implemented by the United Nations for 2030. The SDGs are among the most crucial international initiatives that aim to mitigate GHG emissions and enhance resilience to climate change (Orazalin et al., 2023).

Such global concerns have become particularly important for banks, especially after the 2008–2009 global financial crisis, as the long-term decisions of banks are usually conditioned by growing economic challenges, such as climate change, and social inclusion (Alessi, Ossola, & Panzica, 2021), stressing the need for banks' environmental plans for sustainable business (Adu, 2022). In particular, Moufty, Clark, and Al-Najjar (2021) maintain that banks can play a crucial role in the context of sustainable economic development including protecting the planet. At the same time, banks are under enormous pressure from stakeholders to respond to climate change by reporting their environmental impacts and engage in substantial initiatives in order to reduce their GHG emissions (Haque & Ntim, 2020). In responding to this emerging global threat and pressure from stakeholders, banks are

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increasingly recognising climate change initiatives as means to increase their reputation, promote trust, credibility and improve their performance (Chiaramonte, Dreassi, Girardone, & Piserà, 2022; Schultz, Castelló, & Morsing, 2013).

Despite the steadily expanding body of literature on climate change, limited attention has so far been paid to bank climate change initiatives aimed at improving banks commitment to reduce GHG emissions (Chiaramonte, Dreassi, Goodell, Paltrinieri, & Piserà, 2024; Adu & Roni, 2024). In particular, prior research has focused largely on the effect of corporate governance (CG) on sustainable banking outcomes and yielded mixed results (e.g., Chiaramonte et al., 2024; Gold & Aifuwa, 2022; Nobanee & Ellili, 2016). For example, Gold and Aifuwa (2022) observe that board meetings have no impact of bank sustainability reporting and call for issues on sustainability to be discussed in corporate board meetings. In support, Adu (2022) finds that CG disclosure has beneficial impact of sustainable banking initiatives. Notwithstanding the importance of board sustainability committees, prior studies exploring the impact of board-level sustainability committees on sustainability outcomes have been limited and provided mixed results (Berrone & Gomez-Mejia, 2009; Biswas, Mansi, & Pandey, 2018; Orazalin, 2020; Orazalin et al., 2023; Rodrigue, Magnan, & Cho, 2013). In particular, some of the prior studies report that sustainability committees improve GHG emission reduction initiatives (Adu, Al-Najjar, & Sitthipongpanich, 2022; Biswas et al., 2018; Orazalin, 2020; Orazalin et al., 2023; Walls, Berrone, & Phan, 2012), whereas others find no association between sustainability committees and environmental performance (Berrone & Gomez-Mejia, 2009; Rodrigue et al., 2013).

Motivated by the growing debate on corporate climate change initiatives, this study sheds light on the role that bank sustainability characteristics (BSCs) may play in managing bank climate change action. In doing so, first, the study examines whether BSCs drive bank-based climate change initiatives (BCCIs) and explores whether the association between BSCs and BCCIs is moderated by corporate governance disclosure index (CORPGOVDISCIN). Second, we investigate the direct impact of BSCs on the financial performance (FP) of banks. In addition, the study examines whether CORPGOVDISCIN moderates the link between BSCs and FP. Third, the study investigates the effect of BCCIs on FP of banks. Further, the study distinctively explores the moderating role of CORPGOVDISCIN on the relationship between BCCIs and FP. We employ a sample of banks from 16 Sub-Saharan African (SSA) countries between 2007 and 2022.

Our focus on the relationship among CORPGOVDISCIN, BSCs, BCCIs and FP is motivated by several considerations. First, the importance of CG mechanisms in developing climate change initiatives and policies that increase shareholder value has been underlined in previous research (e.g., Luo & Tang, 2021; Orazalin et al., 2023; Orazalin & Mahmood, 2021; Orazalin and Mahmood, 2018). For instance, quality CG mechanisms can improve sustainable banking decisions, including those relating to involvement in BCCIs (Adu, 2022). Second, effective CG mechanisms can enhance the accountability for environmental impacts by encouraging sustainability reporting and promoting engagement in climate change initiatives with beneficial impact on FP (Orazalin et al., 2023; Adu & Roni, 2024). Third, several scholars maintain that BSCs such as bank sustainability reporting framework (BSRF) and board sustainability committee (BSCOM) can play vital role in the design of climate change initiatives and the implementation of BCCIs leading to enhance accountability, stakeholder engagement and addressing environmental challenges (Luo & Tang, 2021; Orazalin et al., 2023). Accordingly, BSRF and BSCOM are growing in popularity and importance as major governance tools to combat climate change and advance sustainability (Burke, Hoitash, & Hoitash, 2019). Regrettably, there is lack of research on the impact of BSRF and BSCOM on climate change initiatives (Orazalin, 2020; Orazalin et al., 2023). Nevertheless, no study has focused on the moderating effect of CG mechanisms on these relationships. We maintain that investigating the moderating effect of CG disclosure mechanisms on the associations among BSCs, BCCIs and FP may offer valuable insights into banks' climate change strategies across developing countries with similar regulatory structures and institutional frameworks. For instance, scholars maintain that CG mechanisms and bank responses to climate change are interdependent and interrelated, hence it is essential to examine them as a combined and interactive system instead of investigating each of them individually (Orazalin et al., 2023; Sullivan & Gouldson, 2017). Consequently, we seek to address this dearth of research by uniquely assessing the moderating effect of CORPGOVDISCIN on the relationships among BSCs, BCCIs and FP in a multi-country context.

To investigate these relationships, we adopt agency, resource dependence, stakeholder and neoinstitutional theoretical perspectives to form a dynamic multidimensional social-and economic-based theoretical framework. Briefly, agency theory (AT) contends that a net decline in agency costs (effective monitoring) from establishing good CG mechanisms can lead to an increase in BCCIs and improved FP (Ntim & Soobaroyen, 2013a). AT perspective provides a vital channel through which CG disclosure mechanisms can moderate the association among BSCs, BCCIs and FP. According to the stakeholder theory (SHT) perspective, improved CG disclosure mechanisms can enhance bank-stakeholder relationships by fostering climate change initiatives (Michelon & Parbonetti, 2012; Orazalin, 2020) and increased FP (Adu, 2022). In this case, the SHT calls for the enhancement of CG mechanisms, the implementation of climate change initiatives and the promotion of sustainability disclosures as credible ways of managing the conflicting interests of the diverse stakeholders (Orazalin, 2020). In this regards, SHT supports the implementation of BSRF and the establishment of BSCOM which may enhance climate change investments, and ultimately improve BCCIs and FP. Further, resource dependence theory (RDT) maintains that banks that engage in high levels of sustainable corporate decisions in the form of increased BCCIs may gain unique competitive advantage through access to vital resources (Branco & Rodrigues, 2006; Pfeffer & Salancik, 1978) with beneficial impact on FP. In support, neoinstitutional theory (NIT) posits that banks gain social legitimacy by voluntarily complying with recognized institutional norms, standards and rules (Scott, 2001). In this context, banks may introduce BSRF and BSCOM in order to improve their legitimacy (Suchman, 1995). The combined theoretical perspective therefore suggests that banks with effective CG mechanisms will introduce BSRF and implement BSCOM to improve the image of the bank and strengthen stakeholder relationships with positive impact on FP.

The study focused on 16 emerging economies in the SSA region. These countries are Botswana, Gambia, Ghana, Kenya, Lesotho, Liberia, Malawi, Mauritius, Namibia, Nigeria, Sierra Leone, South Africa, Tanzania, Uganda, Zambia, and Zimbabwe. The decision on the countries was influenced by the similar CG and integrated sustainability/climate change reforms carried out in each nation over the past ten years. This helps in assessing whether the CG and climate change reforms have helped in improving CG standards particularly with regards to influencing climate change initiatives in the region. Nevertheless, the 16 emerging economies have the most matured banking and capital markets in the region. For instance, the total GDP of the selected countries stood at US$1326 billion as of 2022 as compared to the GDP of the entire SSA of US$2011 billion and accounted for over 66% of the total GDP in the region. We also focused on these emerging economies because they all share English as their official language. Due to the hand-collection nature of the CORPGOVDISCIN and BCCIs variables, this helps data collection by removing the language barrier (e.g., Adu, 2022; Ntim & Soobaroyen, 2013a).

The study makes a number of new contributions to the extant banking literature. First, our study is among the first to investigate the effects of both BSRF and BSCOM on BCCIs. While previous studies have largely explored the link between CG mechanisms and environmental performance, there has been limited investigation on the impact of BSRF and BSCOM on BCCIs (Orazalin et al., 2023). Our findings suggest that the establishment of BSRF and BSCOM is associated with increased

levels of BCCIs. Second, our study is among the first to investigate the effect of BSRF and BSCOM, and then investigate the moderating effect of CORPGOVDISCIN on this association. Notwithstanding the growing calls for climate change studies (Wright & Nyberg, 2017), the moderating effect of CORPGOVDISCIN on the BSRF-BCCIs and BSCOM-BCCIs relationships have received limited attention. The evidence of our study shows that CG mechanisms positively moderate these key relationships. Our evidence implies that the beneficial impact of BSRF and BSCOM on BCCIs is contingent on quality CG mechanisms. Third, we offer insights on the effect of BSRF and BSCOM on FP of banks. The findings suggest that BSCOM enhances FP. Fourth, Our findings demonstrate that bank climate change initiatives have positive impact on FP, thus supporting the legitimation view of NIT. Finally, this study is among the first to examine the moderating impact of CG mechanisms on the BSCs-FP and BCCIs-FP relationships. While there is limited research on CG mechanisms, BSCs and BCCIs (Ntim & Soobaroyen, 2013a), research on the effect of CG mechanisms on the BSCs-FP and BCCIs-FP relationships in a single study remains uncommon. Considering that BSCs, BCCIs and CG mechanisms can act as complements and/or substitutes (Adu, Al-Najjar, & Sitthipongpanich, 2022), the study distinctively explores whether CORPGOVDISCIN moderates the BSCs-FP and BCCIs-FP associations. Evidence of the study shows that CORPGOVDISCIN has a positive moderating effect on these relationships. In a set of additional analyses, we assess whether the predicted relationships differ in (i) pre-SDGs and post-SDGs periods, (ii) global financial crisis and post-global financial crisis periods, and (iii) pre-COVID-19 sample and (ii) COVID-19 periods. The results of these additional investigations reveal that the impact of SDGs, global financial crisis and COVID-19 periods on these relationships differ. Together, the study contributes to our understanding of under-researched domain of the effect of CG mechanisms on these key relationships and guiding not only banking practitioners but also policy makers in the SSA region.

The rest of this paper is organised as follows. Section 2 provides the background to the study. Section 3 provides the theoretical framework, followed by a review of previous literature and hypotheses development in Section 4. Section 5 describes the research methodology. Section 6 provides the results, and Section 7 concludes the study.

2. Background: Climate change initiatives and corporate governance reforms in SSA context

The choice of SSA region for the study emanates from the fact that relative to developed economies, the region has weak institutional framework (Adu, 2022). In addition, the countries have highly bureaucratic and corrupt governments with low levels of "voice and accountability" as well as weak regulation (Adu, 2022). Besides, implementation of Basel accords remain limited in the region, with higher standards adopted in only a few countries (e.g., South Africa). In particular, a study by Mecagni, Marchettini, and Maino (2015) show that the countries in SSA operate at different phases of implementing international standards and have differing development levels when it comes to financial sector regulation and supervisory requirements. For example, while several nations have transitioned to international Financial Reporting Standards, just a few countries in SSA region have completed implementing Basel II standards (Mecagni et al., 2015). Different levels of implementation of Basel accords across the region complicate the assessment of the banks' overall situation (Adu, 2022; Brownbridge, 2015). The situation is complicated due to lack of financial safety nets in the region (Adu, Al-Najjar, & Sitthipongpanich, 2022). For example, most nations lack depositor insurance, which is a crucial component of depositor protection (Brownbridge, 2015; Mecagni et al., 2015). Therefore, in an event of bank failures, the banks cannot cover 80% of deposits as evidenced in the recent banking crises in the region (e.g., Bank of Ghana, 2018 and Central Bank of Kenya, 2016) and in Nigeria in 2009 (Sanusi, 2010). In particular, during Ghana's banking sector cleanup in 2018, some depositors lost their business capital and personal savings (Affum & Obiri, 2020). Meanwhile, the adoption of Basel III accords in the region leading to an increase in the minimum capital adequacy requirements can help the SSA countries in the long run by ensuring that their banking systems maintain high levels of capital to protect against the risks they face, which are typically larger than those faced by banks in developed economies (Brownbridge, 2015).

Many global banking failures in the 1990s and 2000s highlighted the need for quality internal governance, transparency, accountability, and responsible banking (Ntim, Lindop, & Thomas, 2013; Mallin, 2002). Subsequently, several countries have undertaken CG reforms (Nguyen, Ntim, & Malagila, 2020). It is worth noting that such CG reforms, mainly those carried out in Anglo-Saxon countries, have primarily concentrated on financial considerations (Ntim & Soobaroyen, 2013b). However, the CG reforms implemented in the SSA region have mainly focused on non-financial and financial aspects of CG, including integrated climate change initiatives (Ntim et al., 2013). The study reasons that, this produces a natural and unique climate for studying the interrelationship among CORPGOVDISCIN, BSCs, BCCIs and FP.

Since the late 1990s, and particularly following many significant financial failures, such as the collapse of Nedbank firms in South Africa, the need to enhance CG standards in the SSA countries has intensified (Adu, Al-Najjar, & Sitthipongpanich, 2022; Boateng, Adesi, Yeboah, Oduro, & Sackey, 2021; Ntim & Soobaroyen, 2013b). Weak CG mechanisms, including poor accountability, transparency, and climate change risk management were characteristics during that time (Ntim et al., 2013). The well-known Kings Report of South Africa, published in 1994 in response to recurrent concerns about the need for greater openness in financial reporting and accountability, marked the beginning of the region's CG reforms (Adu, 2023).

Manifestly, many countries in SSA have published their specific CG codes, including South Africa, Nigeria, Botswana, and Kenya. For example, the King Report on CG (1994) of South Africa, as well as those relating to Kenya (2002), Nigeria (2003), and Ghana (2010), were all issued to improve financial reporting (Adu, 2022). Revised CG codes have been published in the region to address the initial codes' limitations and incorporate international best practices especially the SDGs. The revised King Reports (2002, 2010, and 2016) of South Africa, as well as those relating to Nigeria (2011 and 2018), Kenya (2002 and 2014), and Ghana (2018 and 2022), are all inherently focused on promoting climate change initiatives (Adu, 2022). For instance, the revised codes (hereafter referred to as the Combined Code) have extensive sections on climate change initiatives. A fundamental expectation of the Combined Code is the prospect that effective CG mechanisms can improve sustainability reporting of banks and the involvement of banks in climate change initiatives and improved FP.

More importantly, to improve the quality of CG in the SSA region, the Combined Code focuses on four critical CG disclosures, namely: (i) director and board, (ii) audit, accounting, and transparency, (iii) risk management and internal control and (iv) compliance and shareholder enforcement. In summary, the SSA region has arguably and distinctively pursued a combination of CG and BCCIs reforms compared with other Anglo-American countries. Yet, crucial issues still exist around whether a voluntary compliance regime like the Combined Code can effectively enhance CG, BCCIs and FP standards in the SSA region. Within this context, the study investigates the interrelationships among BSCs, BCCIs and FP, consequently, ascertains whether CORPGOVDISCIN moderates these relationships.

3. Theoretical framework

As the study explores the interrelationships among CORPGOVDISCIN, BSCs, BCCIs and FP, the study deems it appropriate to draw insights from agency, resource dependence, stakeholder and neoinstitutional theoretical perspectives to form a dynamic multi-dimensional theoretical framework to inform the analysis. In this case, agency theory (AT) suggests that CG mechanisms influence climate change initiatives (Adu,

2022). In brief, AT expects CG mechanisms to positively impact on BSCs, BCCIs and FP. In addition, AT contends that a net decline in agency costs (effective monitoring) from establishing good CG mechanisms can lead to an increase in BCCIs (Ntim & Soobaroyen, 2013a). In this case, AT perspective provides a vital channel through which CG disclosure mechanisms can moderate the BSCs-BCCIs and BCCIs-FP nexus. It argues that CG mechanisms can be considered as a strong dimension or pillar of BCCIs (Adu, 2022). The inference is that, in better-governed banks, corporate executives may pursue BCCIs as a credible way of limiting conflict with bank owners who may be keen on the long-term sustainable value creation of their investments (Adu, Al-Najjar, & Sitthipongpanich, 2022; Ntim & Soobaroyen, 2013a), with beneficial impact on FP. This implies that, in better-governed banks, corporate executives through BSCs channels may focus on BCCIs decisions as a win-win strategy, demonstrating that CG disclosure mechanisms may have moderating impact on the BSCs-BCCIs and BCCIs-FP relationships.

Second, and closely related to AT, resource-dependence theory (RDT) maintains that banks that engage in high levels of sustainable corporate decisions in the form of increased BCCIs may gain unique competitive advantage through access to vital resources (Branco & Rodrigues, 2006; Pfeffer & Salancik, 1978). Admittedly, it is costly to engage in BCCIs, at least in the short-term (Barnett & Salomon, 2006). However, benefits of BCCIs investments may accrue to the bank in the form of a flow of critical resources such as contracts, human capital, and reputation (Branco & Rodrigues, 2006; Ntim et al., 2013), as well as a cheaper cost of capital and deposit (Mallin, 2002), with beneficial impact on FP.

Third, stakeholder theory (SHT) stresses the need for banks to manage complex and conflicting relationships with their stakeholders. This theory maintains that banks can reduce transaction and agency costs by engaging in climate change initiatives that affect diverse stakeholders (Dam & Scholtens, 2012; Jones, 1995; Freeman & Reed, 1983). When a bank's climate change initiatives are interpreted as a sign of operating responsibly, there may also be an indirect benefit (Dam & Scholtens, 2012). For instance, this may strengthen the relationship between the bank and its various stakeholders. Noticeably, this approach lessens issues with agency conflicts (Dam & Scholtens, 2012). Hence, BCCIs can serve as a way of "neutralizing" agency concerns as it can be employed as a technique for resolving conflicts (Harjoto & Jo, 2011), and enhancing FP (Adu & Roni, 2024).

Finally, the NIT suggests that banks can achieve societal acceptance by voluntarily adhering to established institutional standards, rules, and norms (DiMaggio & Powell, 1983; Scott, 2001). For example, adhering to the climate change initiatives outlined in the Combined Code in the SSA region and the SDGs may enhance legitimacy by improving the banks' reputation and further economic efficiency by providing access to vital resources (Adu, 2022; Hamed, Al-Shattarat, Al-Shattarat, & Hussainey, 2022). In this setting, SSA banks may adhere to BCCIs policies established by their national authorities. In support, Haque and Ntim (2020) maintain that, to gain access to critical resources, banks may comply with international requirements or learn from peers' best practices. Critical resources in the banking sector include access to funding or deposits through establishing connections and securing the backing of numerous influential stakeholders (Adu & Roni, 2024). Banks can accomplish this in this regard by putting climate change strategies into practice (Adu, 2022; Orazalin et al., 2023). Based on the overlaps or interdependencies among the four theories, we maintain that a combined theoretical framework will provide a more prosperous basis for understanding and explaining the motivations for BCCIs in the SSA banking setting.

4. Literature review and hypotheses development

4.1. Bank sustainability characteristics and bank-based climate change initiatives

Scholars argue that the design of climate change initiatives starts with embracing sustainability characteristics (Adu, 2022; Orazalin et al., 2023). In this context, AT maintains that a net decline in agency costs through effective monitoring and accountability such as the establishment of BSRF and BSCOM can lead to an increase in BCCIs (Adu, Al-Najjar, & Sitthipongpanich, 2022; Ntim & Soobaroyen, 2013a). In support, SHT perspective proposes that BSRF and BSCOM improve a bank's relationships with all stakeholders (Orazalin, 2020; Orazalin et al., 2023). In particular, the demand from stakeholders for greater transparency on climate change issues is increasingly making BSRF and BSCOM a global agenda (Orazalin et al., 2023). The stakeholder perspective postulates that the existence of a BSCOM demonstrates the commitment of a bank to climate change initiatives and the establishment of greater stakeholder relationships (Al-Shaer & Zaman, 2019; Amran, Lee, & Devi, 2014; Orazalin et al., 2023). For instance, BSCOM may help the bank to design climate change strategies to improve the performance of the bank in GHG emission reduction (Orazalin, 2020), improve the management of BCCIs risks and environmental challenges (Burke et al., 2019; Orazalin & Mahmood, 2021). Other scholars also maintain that BSCOM tends to be associated with improved sustainability disclosures including GHG emission reduction initiatives (Adu, Al-Najjar, & Sitthipongpanich, 2022; Al-Shaer & Zaman, 2019; Kılıç, Uyar, Kuzey, & Karaman, 2021; Orazalin et al., 2023). In support, Luo and Tang (2021) argue that BSCOM tends to focus on the benefits of environmentally responsible initiatives and encourages banks to undertake climate change activities in response to the demand of stakeholders (SHT). Hence, based on the SHT, banks that have a BSCOM are more likely to undertake BCCIs to address the demands of stakeholders and promote sustainable banking initiatives (Orazalin et al., 2023).

Scholars such as Kumar and Prakash (2019) report that the demand for BSRF has grown substantially during the last 10 years. Similarly, recent studies highlight the existence of a sustainability committee as one of the crucial board governance tools, particularly in relation to climate change initiatives (Haque, 2017; Hussain, Rigoni, & Orij, 2018; Orazalin, 2020; Orazalin et al., 2023). In similar vein, NIT view suggests that banks may achieve societal acceptance by voluntarily embracing established institutional standards, rules, and norms (DiMaggio & Powell, 1983; Scott, 2001). In this case, adhering to the demand for BSRF and BSCOM outlined in the SSA region may enhance legitimacy by improving the banks' reputation. In addition, banks may comply with international best practices or learn from peers' best practices (Haque & Ntim, 2020). For instance, adhering to SDGs reporting standards may increase banks' legitimacy by boosting their reputation and economic efficiency because of access to vital resources (NIT).

Prior studies argue that sustainable banking initiatives can be influenced by sustainability characteristics such as BSRF and BSCOM (Adu, Flynn, & Grey, 2022; Kumar & Prakash, 2019; Moufty et al., 2021). Recent research has, however, not paid attention to what extent having BSRF and BSCOM in banks impact on BCCIs. Based on the crucial role of BSRF and BSCOM in promoting environmental activities (Adu, Al-Najjar, & Sitthipongpanich, 2022; Orazalin et al., 2023), promoting sustainable banking initiatives and addressing climate change challenges, we expect that BSRF and BSCOM are likely to impact on BCCIs. We thus formulate the first hypothesis of the study as follows:

H1. *Banks with sustainability reporting framework (BSRF) and board sustainability committee (BSCOM) are more likely to have higher bank-based climate change initiatives (BCCIs).*

4.2. Bank sustainability characteristics and financial performance

Although the existence of BSCs such as BSRF and BSCOM is vital CG arrangement, BSRF and BSCOM have been unexplored in prior studies, particularly in connection with FP. Banks establish BSRF and BSCOM to address the needs of stakeholders (SHT) (Burke et al., 2019), promote climate change action and enhance the efficiency of the monitoring role of the board (AT) (Dixon-Fowler, Ellstrand, & Johnson, 2017). In this case, BSRF and BSCOM can play critical role in implementing BCCIs and the promotion of best climate change initiatives that might enhance stakeholder engagement, address climate risks and improve FP (Luo & Tang, 2021; Peters & Romi, 2014). Under SHT framework, BSRF and BSCOM can serve as effective channels that can satisfy the interests of influential stakeholders (Kılıç et al., 2021), enhance climate change initiatives (Adu, 2022; Adu, Abedin, & Hasan, 2023) and increase FP (Burke et al., 2019). Hence, in the eyes of investors and other players, BSRF and BSCOM have become valuable lever for climate change initiatives that create shared values for both shareholders and stakeholders (Burke et al., 2019; Orazalin et al., 2023).

Synthesis of literature reveals that previous research has mainly argued that certain sustainability characteristics can impact on FP (Choi & Luo, 2021; Orazalin et al., 2023), without considering the effect of BSRF and BSCOM. For instance, Adu (2022) shows that CG mechanisms have beneficial impact on FP of banks. In addition, Choi and Luo (2021) reveal that good CG mechanisms have beneficial effect on market value. Noticeably, these prior studies do not investigate the direct impact of BSCs such as BSRF and BSCOM on FP. Based on the importance of BSRF and BSCOM in promoting sustainable board decisions and creating shareholder value (Orazalin et al., 2023), the study expects bank sustainability traits such as BSRF and BSCOM to positively impact on FP. Hence, we propose the hypothesis below:

H2. *Banks with sustainability reporting framework (BSRF) and board sustainability committee (BSCOM) are associated with higher financial performance.*

4.3. Bank-based climate change initiatives and financial performance

Agency theoretical perspective stresses the need for effective monitoring of corporate executives to prevent them from misappropriating the wealth of shareholders (Galaskiewicz, 1985). According to SHT, a bank's FP is mostly determined by its long-term relationships with stakeholders. In this case, maintaining relationship with key stakeholders may ensure that banks have access to critical resources (RDT) including deposit (Adu, 2022). Within this framework, banks may engage in BCCIs as a way of establishing and maintaining trusting and goodwill connection with stakeholders (Jizi, Salama, & Dixon, 2014). For example, banks with high BCCIs may generate valuable goodwill, that may protect them from sudden issues and open avenue for new businesses with positive impact on FP (Adu, 2022; Platonova, Asutay, Dixon, & Mohammad, 2018). The RDT perspective considers BCCIs as crucial projects that channel the flow of vital resources to the bank. In this regards, banks that invest in BCCIs such as recycling may attract and win businesses from pro-climate investors. In this context, RDT highlights the need for banks to consider BCCIs as intangible assets that may help in a more efficient utilisation of resources with beneficial effect on FP (Surroca, Tribó, & Waddock, 2010). According to NIT, taking part in BCCIs can boost a bank's reputation, which will increase legitimacy. By getting the support of several influential stakeholders, banks can improve their FP through economic efficiency due to the acquisition of vital resources (RDT), such as financing (Haque & Ntim, 2020).

Prior empirical studies have examined the effect of CSR/environmental initiatives on FP and have provided mixed results (e.g., Adu, 2022; Platonova et al., 2018; Maqbool & Zameer, 2018). For example, Adu (2022) and Platonova et al. (2018) document a positive link between CSR and FP. By contrast, Mukhibad, Muthmainah, and Andraeny (2020) find no relationship between CSR and FP. Consistent with the positive prediction of the multi-dimensional framework, and in line with the expectation of the climate change reforms that have been pursued in the SSA countries, our third hypothesis is as follows:

H3. *Banks with higher climate change initiatives (lower GHG emissions) are more likely to have higher financial performance.*

4.4. Bank sustainability characteristics and bank-based climate change initiatives: Moderating effect of corporate governance mechanisms

There is ample evidence that quality CG mechanisms can have beneficial effect on banks' environmental performance (e.g.,Adu, Al-Najjar, & Sitthipongpanich, 2022 ; Ntim & Soobaroyen, 2013a). This is consistent with AT's argument that CG mechanisms can be considered as strong dimension or pillar of BCCIs (Adu, 2022). Given that the decision for banks to include sustainability reporting in their annual reports originates from the board of directors, we propose that CG disclosure mechanisms will have moderating effect on the BSRF-BCCIs and BSCOM-BCCIs relationships. Our prediction is based on evolving theoretical and empirical evidence that indicate that even though both quality CG and BSCs such as BSRF and BSCOM are valued by the stock markets, however, CG mechanisms are valued much greater than BSRF and BSCOM (Adu, 2022; Ntim & Soobaroyen, 2013a). In this case, in better-governed banks, corporate executives through BSRF and BSCOM channels may focus on BCCIs decisions as a win-win strategy, indicating that CG disclosure mechanisms may have moderating impact on the BSRF-BCCIs and BSRF-BCCIs relationships.

The inference is that, in better-governed banks, corporate executives may pursue BCCIs as a credible way of minimizing conflict with bank owners (AT) who may be keen on the long-term sustainable value creation of their investments (Adu, Al-Najjar, & Sitthipongpanich, 2022; Ntim & Soobaroyen, 2013a). The reasoning is that BSRF and BSCOM can be theorised as extension of effective CG mechanisms (Adu, 2022). In this regard, CG disclosure mechanisms may serve as an effective tool for banks to manage the concerns of various stakeholder on climate change (SHT), leading to protecting their reputation, as well as improving the legitimacy of the bank (NIT) (Ashforth & Gibbs, 1990). Thus, the probable beneficial effect of BSRF and BSCOM on BCCIs can be as result of the positive impact of CG mechanisms on BCCIs, and thus, the increase in BCCIs may be driven by CG mechanisms rather than BSRF and BSCOM.

In particular, scholars maintain that although BSRF and BSCOM are crucial determinants of climate change strategies (Kumar & Prakash, 2019), the implementation of BSRF and BSCOM are mainly driven by good CG mechanism (Adu, Al-Najjar, & Sitthipongpanich, 2022). The extant literature has paid very limited attention to increasing our understanding of how CG mechanisms may impact on the relationship between BSCs such as BSRF and BSCOM, and BCCIs. For example, synthesis of literature reveals that prior studies have not yet explored the potential moderating effect of CG disclosure mechanisms on the relationship between BSCs and BCCIs. Hence, based on the above discussion, which stresses on the importance of CG disclosure mechanisms in encouraging sustainability reporting, addressing climate change issues, managing stakeholders demands and protecting legitimacy, we expect that the broad CORPGOVDISCIN is likely to influence the effect of BSCs on BCCIs. Accordingly, we propose the following hypothesis:

H4. *Corporate governance disclosure index moderates the relationship between bank sustainability characteristics (BSRF and BSCOM) and bank-based climate change initiatives.*

4.5. Bank sustainability characteristics, and firm performance: Moderating effect of corporate governance mechanisms

The AT perspective provides a vital channel through which CG mechanisms can influence the relationship between BSCs and FP. It

suggests that CG mechanisms can potentially strengthen the impact of various sustainability characteristics on FP (Ntim & Soobaroyen, 2013a). The theory predicts that CG mechanisms can be considered as strong dimension or pillar of sustainability characteristics (Adu, 2022). Within this context, in better-governed banks, corporate executives may leverage on sustainability characteristics such as BSRF and BSCOM to pursue sustainable value creation as a credible way of minimizing conflict with bank owners (AT) and influential stakeholders (SHT). This approach lessens issues with agency conflicts (Dam & Scholtens, 2012).

In addition, the establishment of sustainability characteristics such as BSRF and BSCOM can serve as an effective CG mechanisms that may satisfy the interests of stakeholders (Kılıç et al., 2021) who may be keen on the long-term sustainable value creation of businesses (Adu, Al-Najjar, & Sitthipongpanich, 2022; Ntim & Soobaroyen, 2013a), thereby improving the FP of the bank. In this context, the benefits of establishing BSRF and BSCOM may accrue to the bank in the form of a flow of critical resources such as contracts, human capital, corporate image, and reputation (NIT) (Branco & Rodrigues, 2006; Ntim et al., 2013), as well as a cheaper cost of capital and deposit (RDT) (Mallin, 2002), with beneficial impact on FP. The implication is that, in better-governed banks, corporate executives through BSRF and BSCOM channels may focus on climate action decisions as a win-win strategy, demonstrating that CG mechanisms may have a moderating impact on the BSRF-FP and BSCOM-FP relationships.

Emerging research suggests that CG mechanisms can serve as strong complement to sustainability characteristics (Ntim & Soobaroyen, 2013a; Orazalin et al., 2023). In this regards, the existence of BSRF and BSCOM can be considered as extension of effective CG mechanisms. The implication is that in better-governed banks (i.e., banks with high CORPGOVDISCIN scores), corporate executives through BSRF and BSCOM may design and implement climate change initiatives as a crucial way of minimizing conflicts with stakeholders (Jo & Harjoto, 2012). Within this context, BSRF and BSCOM will have beneficial effect on FP due to a reduction in conflicts of interests with the various shareholders through effective CG mechanisms (Ntim & Soobaroyen, 2013a).

However, prior research argues that various CG mechanisms may impact on the association between sustainability characteristics and FP (Ntim & Soobaroyen, 2013a; Orazalin, 2020; Orazalin et al., 2023), without taking into consideration the potential moderating role of CG mechanisms. Accordingly, based on the theoretical arguments and the discussion above, we construct the hypothesis below:

H5a. *Corporate governance disclosure index moderates the relationship between bank sustainability characteristics (BSRF and BSCOM) and financial performance.*

4.6. Bank-based climate change initiatives, and firm performance: Moderating effect of corporate governance mechanisms

The SHT and NIT perspectives maintain that effective sustainability CG mechanisms demonstrate a bank's commitment to climate change-related issues as a means of building stronger connection with stakeholders including shareholders (Orazalin et al., 2023). For instance, the implementation of good CG mechanisms such as (i) accounting, auditing and transparency disclosures; (ii) risk management disclosures; and (iii) compliance with the CG codes in the SSA region can play key role in the adoption of climate change strategies and the mitigation of climate change risks (Adu, Al-Najjar, & Sitthipongpanich, 2022; Adu, Abedin, & Hasan, 2023), as well as improving FP (Adu, 2022). In addition, increased managerial monitoring (AT) originating from good CG mechanisms can serve as crucial channels for banks to engage in increased commitment to improve energy /resource efficiency (NIT), product and service improvements, and R&D which can enhance the FP of banks.

Previous scholars maintain that CG mechanisms can impact on the link between environmental initiatives and FP (Choi & Luo, 2021; Orazalin et al., 2023). However, these studies do not consider the probable moderating effect of CG mechanisms. For instance, Haque and Ntim (2020) show that pay incentive CG mechanisms improve the link between carbon performance and market value. Further, Choi and Luo (2021) report that CG mechanisms reduce the detrimental effects of GHG emission on market value.

Evidently, the above studies do not examine whether CG disclosure index can moderate the BCCIs and FP association. Based on the importance of CG disclosure mechanisms in promoting climate change initiatives (Orazalin et al., 2023; Shaukat, Qiu, & Trojanowski, 2016) and creating shareholder value (Singh, Tabassum, Darwish, & Batsakis, 2018), the study expects CG disclosure index to influence the BCCIs-FP nexus. Accordingly, we formulate the final hypothesis of the study as follows:

H5b. *Corporate governance disclosure index moderates the relationship between bank-based climate change initiatives and financial performance.*

Fig. 1 presents the conceptual framework, outlining the predicted relationships among CORPGOVDISCIN, BSCs, BCCIs, and FP. It shows the direct effects of BSCs and BCCIs on FP, the direct effect of BSCs on BCCIs, and the moderating effects of CORPGOVDISCIN on these relationships.

5. Data and methodology

5.1. Sample selection

Our sample is based on all banks in 16 Sub-Saharan Africa (SSA) countries. These countries are Botswana, Gambia, Ghana, Kenya, Lesotho, Liberia, Malawi, Mauritius, Namibia, Nigeria, Sierra Leone, South Africa, Tanzania, Uganda, Zambia, and Zimbabwe. The decision on the countries was influenced by the similar CG reforms carried out in each country over the past ten years. In particular, a large number of SSA nations, including South Africa, Nigeria, Botswana, Ghana and Kenya, have undertaken CG reforms by issuing unique CG codes. To strengthen financial reporting, for instance, the King Report on CG (1994) of South Africa, as well as those pertaining to Kenya (2002), Nigeria (2003), and Ghana (2010), were all published (Adu, 2022). In order to remedy the shortcomings of the initial codes and include global best practices, revised CG codes have been issued in the SSA countries. The emphasis on fostering corporate climate change efforts can be found throughout the revised King Reports for South Africa (2002, 2010, and 2016), Nigeria (2011 and 2018), Kenya (2002 and 2014), and Ghana (2018 and 2022) (Adu, 2022).

Nevertheless, the 16 SSA countries have the most matured banking and capital markets in the region. For instance, the total GDP of the selected countries stood at US$1326 billion as of 2022 as compared to the GDP of the entire SSA of US$2011 billion and accounted for over 66% of the total GDP in the region. We also chose these countries because they all share English as their official language. Due to the hand-collection nature of the CG disclosure index, BSRF, BSCOM and BCCIs variables, this helps data collection by removing language barrier (e.g., Adu & Roni, 2023; Ntim & Soobaroyen, 2013a). The sampled banks' annual reports, obtained from the institutions' websites, were used to compile the CORPGOVDISCIN, BSCs and BCCIs. Bank financial information including FP was gathered from BankScope and supplemented with information from annual reports where necessary. The country-level data, including GDP, was collected from the website of the World Bank, while inflation came from the International Monetary Fund's website.

The study sample period starts in 2007 and ends in 2022. The sample timeframe spans the pre- and post-SDGs periods, during and post-global financial crises periods, pre-and post-COVID-19, as well as pre-, during, and post-CG reforms in the SSA countries. This helps assess whether the SDGs, global financial crises, COVID-19 and CG reforms have helped

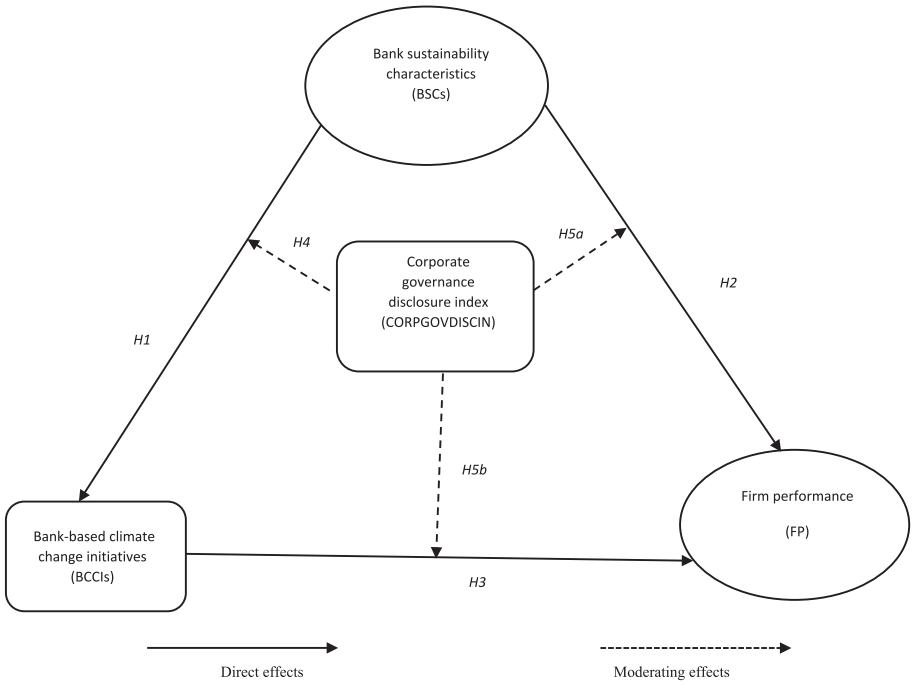

Fig. 1. Conceptual framework.

advance CG standards, particularly regarding influencing BSRF, BSCOM, BCCIs and FP in the SSA countries. The sample period ends in 2022, the most recent year for which data was available for the sampled banks during the study period. Table 1 provides the final dataset, which includes 220 banks with 2785 bank-year observations.

We excluded banks with missing data or whose annual reports were not published in line with prior banking literature (Adu, 2022). Next, consistent with existing studies, we removed foreign-owned banks that released their annual reports as consolidated financial statements globally (Adu, Al-Najjar, & Sitthipongpanich, 2022). Additionally, specialized financial institutions with characteristics and practices comparable to those of commercial banks were included in the study's sample. As in earlier research in the SSA countries, this was done to establish uniformity in the sampled banks (Adu, Al-Najjar, & Sitthipongpanich, 2022).

Table 1
Composition of the sample by countries.

Country	Bank Population	Sample	Representation (%)
Botswana	10	10	100
Gambia	12	8	67
Ghana	24	24	100
Kenya	41	30	73
Lesotho	4	4	100
Liberia	9	6	67
Malawi	9	5	56
Mauritius	21	15	71
Namibia	8	5	63
Nigeria	20	19	95
Sierra Leone	12	4	33
South Africa	21	20	95
Tanzania	38	25	66
Uganda	25	20	80
Zambia	17	13	76
Zimbabwe	13	12	92
Total	**284**	**220**	**77**

Notes: Population and Sample refer to count, and representation refers to sample as a percentage of population.

5.2. Definition of variables and model specification

We classify the variables into five main types, with full definitions provided in Table 2. First, consistent with Esteban-Sanchez, de la Cuesta-Gonzalez, and Paredes-Gazquez (2017), we employ return on assets (ROA), return on equity (ROE) and net interest margin (NIM) as the measures of FP. We exclude market-based measures of FP including Tobin's Q and Price-to-Earnings (PE) ratio because most of the banks in the SSA countries are not publicly listed. Second, following prior research (Eleftheriadis & Anagnostopoulou, 2015; Giannarakis, Zafeiriou, & Sariannidis, 2017; Orazalin et al., 2023), we develop the bank climate change initiative (BCCI) index to measure BCCIs. The index is constructed based on 40 bank-specific global climate change initiatives that assess BCCI.[1] Following prior studies, we develop the BCCI based on disclosures manually collected from the annual reports of the banks (Adu & Roni, 2023). This is because rating agencies have limited coverage of banks in the SSA region. We identified and selected the 40 bank-specific initiatives that capture BCCI based on areas set out by the Combined integrated sustainability codes and guidelines in the SSA countries (Ghana, 2010; Nigeria, 2011; South Africa, 2010; and Kenya, 2014). In addition, the BCCI dimensions were selected based on the 2016 Global Reporting Initiative and the SDGs. More importantly, the identification and selection procedure adopted in this study is also consistent with well-established line of scoring of sustainability disclosures (Orazalin et al., 2023; Adu, Al-Najjar, & Sitthipongpanich, 2022; Giannarakis et al., 2017; Eleftheriadis & Anagnostopoulou, 2015; Ntim & Soobaroyen, 2013a, 2013b). Appendix A provides the measurement of all the 40 BCCI. We follow well-established literature in the field (Orazalin et al., 2023; Adu & Roni, 2023) to assess the validity and reliability of the index by employing Cronbach's alpha of individual dimensions of

[1] As climate change represents a global environmental crisis, banks effect on the environment and ecosystems should be assessed at the planet level rather than at the national level (Atkins & Maroun, 2018; Dumay, Guthrie, & Farneti, 2010). Therefore, we assess BCCIs based on a wide range of climate change activities/initiatives designed to address ecological and environmental issues that are common in any part of the world.

Table 2
Variables definitions.

Variable	Symbols	Operationalization	Source
Financial performance measures			
Return on assets	ROA	Percentage of operating profit to total assets	Bankscope/ Annual report
Return on equity	ROE	Ratio of net income to shareholder's equity.	Bankscope/ Annual report
Net interest margin	NIM	The net interest income scaled by the total earning assets of the bank	Bankscope/ Annual report
Bank-based climate change initiatives			
Bank climate change initiatives	BCCI	The index is calculated based on 40 bank-specific items (see Appendix A) related to bank climate change initiatives. The index ranges between 0% (no climate change initiatives and practices) and 100% (fully instituted bank climate change initiatives)	Annual report
Bank investment in climate change initiatives	BICCI	The natural logarithm of the actual amount spent in executing climate change activities/ initiatives.	Annual report
Corporate governance variables			
CG disclosure index	CORPGOVDISCIN	CG index containing 100 provisions derived from the commonwealth CG code, individual country CG codes and annual report of the sampled banks. The CG provision take a value of 1 if is disclosed in the annual report, otherwise 0 and scaled to a value between 0% and 100%.	Annual report
Bank sustainability reporting framework	BSRF	A dummy value of 1 is assigned if the bank has a sustainability reporting in the annual reports, and 0 otherwise	Annual report
Board sustainability committee	BSCOM	A dummy value of 1 is assigned if the board of the bank has a sustainability committee, and 0 otherwise	Annual report
Bank control variables			
Board size	BSIZE	The natural logarithm of the number of board directors	
Board gender diversity	BGEN	The percentage of female directors on the board	
Firm size	FSIZE	Natural logarithm of total assets of the bank	Bankscope/ Annual report
Leverage	LEV	Ratio of total debt to total assets	Bankscope/ Annual report
Bank age	BAGE	Natural logarithm of the number of years since inception	Annual report
Capitalization	CAP	Equity capital divided by total assets	Bankscope/ Annual report
Audit firm size	BIG4	1 if a bank is audited by the big four audit firm (PricewaterCoopers, Deloitte & Touche, Ernest & Young and KPMG), 0 otherwise.	Annual report
Research and development	R&D	Natural logarithm of research and development cost of the bank scaled by total assets	Bankscope/ Annual report
Bank type	BTYPE	1 if a bank is publicly listed, 0 otherwise.	Stock Exchange in the SSA countries
Country Control variables			
Gross domestic product	GDP	Natural log of GDP relates to changes in national income	World Bank
Inflation	INFL	Natural log of annual rate of inflation as a percentage of GDP	IMF

Notes: This table provides the definitions of the main variables employed in the analysis.

the BCCI is estimated.[2] In addition, we follow Oyewumi, Ogunmeru, and Oboh (2018) and use the natural log of the actual amount invested in executing climate change activities (BICCI) as reported in the annual reports of the banks as second measure of BCCIs.

Third, we follow Zhou, Li, and Chen (2021) and compute CORPGOVDISCIN. We employ a binary CG disclosure index covering 100 CG provisions. The 100 CG provisions were selected based on the Combined Code, existing literature, and the banks' annual reports. Specifically, the provisions cover four extensive areas: (i) directors and board disclosures (43); (ii) accounting, auditing, and transparency disclosures (22); (iii) risk management, internal audit, and control disclosures (13); and (iv) compliance, shareholder rights, and enforcement disclosures (22). We apply a dichotomous approach where a bank is awarded a score of'1'if a CG item is disclosed; otherwise, '0' is assigned. This is in line with prior studies that employ either national or international codes of CG in computing the broad CG indices (e.g., Adu, Al-Najjar, & Sitthipongpanich, 2022; Zhou et al., 2021). The total score is then expressed as a percentage, ranging from a minimum (0%) to a maximum (100%) (Appendix B contains examples of CG disclosures and how they were categorised and coded).

Fourth, to measure the presence of BSCOM, we rely on disclosure in the annual report of the banks. Precisely, the SSA banks are assigned a binary score of 1 if the board has a sustainability committee, otherwise 0, if the board of the banks does not have sustainability committees. Our approach is consistent with a proxy for specialized board committees responsible for sustainability and climate issues as applied by prior studies (Adu, Flynn, & Grey, 2022; Dixon-Fowler et al., 2017; Orazalin, 2020; Orazalin et al., 2023). Similarly, to measure BSRF, banks are assigned a binary score of 1 if sustainability reporting framework is contained in the annual report, and 0 otherwise. This method is consistent with a proxy for banks that have specialized section in the annual report where sustainability and climate change issues are disclosed.

Fifth, we added several control variables to control for possible omitted variables bias (Adu, 2022). Following well-established literature (Abdelfattah & Aboud, 2020; Adu, Al-Najjar, & Sitthipongpanich, 2022; Ntim & Soobaroyen, 2013a), we control for board size (BSIZE),

[2] The obtained alpha coefficient of 0.845, which is greater in magnitude than the cut-off level of 0.700, indicating that the instrument is reliable and that the dimensions of the BCCIs have high internal consistency.

board gender diversity (BGEN), firm size (FSIZE), leverage (LEV), bank age (BAGE), capitalization (CAP), audit firm size (BIG4), research and development (R&D), and bank type (BTYPE). Finally, consistent with previous studies (Adu, 2022), we also control country-level variables such as GDP, and inflation (INFL). We also include country dummies (CDU) for the sixteen countries and year dummies (YDU) for the financial years from 2007 to 2022. Table 2 presents the abbreviations and definitions of the variables.

5.3. Empirical models

The association among CORPGOVDISCIN, BSCs, BCCIs and FP is jointly and dynamically determined (Guest, 2009). Hence, several endogenous problems could arise due to possible omitted variables that can simultaneously affect CORPGOVDISCIN, BSCs and BCCIs (Sarhan, Ntim, & Al-Najjar, 2019). Additionally, endogenous problems may arise from bank specific characteristics including managerial skills, challenges, opportunities and leverage, which change overtime (Guest, 2009; Sarhan et al., 2019). Hence, and given the panel nature of the data and following well-established literature (e.g., Gyapong, Monem, & Hu, 2016; Orazalin, 2020; Sarhan et al., 2019), we estimate a fixed-effects (FE) regression model in order to account for potential omitted variables and unobserved firm-specific heterogeneities. We carry out the Hausman test, which suggests that a fixed-effects model is appropriate for our unbalanced panel dataset. First, in order to assess the direct effects of BSCs on BCCIs, we employ FE regression model specified as follows:

$$\text{BCCIs}_{it} = \alpha_0 + \beta 1\text{BSCsit} + \beta 2\text{CONTROLit} + \beta 3\text{YDUit} + \beta 4\text{CDUit} + \varepsilon t \quad (1)$$

Where BCCIs denotes the bank-based climate change initiatives measures depending on the specification, which is either BCCI or BICCI. BSCs is the bank sustainability characteristics measures depending on the specification, which is either BSRF or BSCOM. All other variables are defined/measured in Table 2. Second, to examine the direct effects of BSCs on FP, we employ FE regression model specified as follows:

$$\text{FP}_{it} = \alpha_0 + \beta 1\text{BSCsit} + \beta 2\text{CONTROLit} + \beta 3\text{YDUit} + \beta 4\text{CDUit} + \varepsilon t \quad (2)$$

Where FP denotes the financial performance measures depending on the specification, which is either ROA, ROE or NIM. All other variables remain the same as specified in eq. (1). Third, to examine the direct effects of BCCIs on FP, we employ FE regression model specified as follows:

$$\text{FP}_{it} = \alpha_0 + \beta 1\text{BCCIsit} + \beta 2\text{CONTROLit} + \beta 3\text{YDUit} + \beta 4\text{CDUit} + \varepsilon t \quad (3)$$

All other variables remain the same as specified in eq. (1). Fourth, in order to assess the direct moderating effect of CORPGOVDISCIN on the BSCs-BCCIs relationship, we employ the following FE regression model:

$$\begin{aligned}\text{BCCIs}_{it}\alpha_0 &+ \beta 1\text{BSCsit} + \beta 2\text{BSCsit*CORPGOVDISCINit} \\ &+ \beta 3\text{CORPGOVDISCINit} + \beta 4\text{CONTROLit} + \beta 5\text{YDUit} \\ &+ \beta 6\text{CDUit} + \varepsilon_t\end{aligned} \quad (4)$$

Where BSCs_{it}*$\text{CORPGOVDISCIN}_{it}$ is the interaction variable between BSCs and CORPGOVDISCIN. All other variables remain the same as specified in eq. (1). Fifth, in order to assess the direct moderating effect of CORPGOVDISCIN on the BSCs-FP relationship, we use the following FE regression model:

$$\begin{aligned}\text{FP}_{it} = \alpha_0 &+ \beta 1\text{BSCsit} + \beta 2\text{BSCsit*CORPGOVDISCINit} \\ &+ \beta 3\text{CORPGOVDISCINIit} + \beta 4\text{CONTROLit} + \beta 5\text{YDUit} \\ &+ + \beta 6\text{CDUit} + \varepsilon_t\end{aligned} \quad (5)$$

Where BSCs_{it}*$\text{CORPGOVDISCIN}_{it}$ is the interaction variable between BSCs and CORPGOVDISCIN. All other variables remain the same as specified in eq. (1). Finally, in order to assess the direct moderating effect of CORPGOVDISCIN on the BCCIs-FP relationship, we employ the following FE model:

$$\begin{aligned}\text{FP}_{it} = \alpha_0 &+ \beta 1\text{BCCIsit} + \beta 2\text{BCCIsit*CORPGOVDISCINit} \\ &+ \beta 3\text{CORPGOVDISCINit} + \beta 4\text{CONTROLit} + \beta 5\text{YDUit} \\ &+ \beta 6\text{CDUit} + \varepsilon_t\end{aligned} \quad (6)$$

Where BCCIs_{it}*$\text{CORPGOVDISCIN}_{it}$ is the interaction variable between BCCIs and CORPGOVDISCIN. All other variables remain the same as specified in eq. (1).

6. Empirical results and discussion

6.1. Descriptive statistics and univariate analysis

Table 3 summarises descriptive statistics of the variables included in our analysis. The mean of ROA is 3.52 with a minimum of 6.46 and maximum of 92.52, while ROE with a mean of 18.74 ranges from 1.23 to 98.86. In addition, NIM has a mean of 0.095 and spans from 0.03 to 0.68. The BCCI variable has a mean score of 36.55% and varies between 2.20% and 81.48%. The disclosure is relatively low compared to those documented in non-financial sector in developed countries. For example, Orazalin et al. (2023) report climate change initiatives of 50% in an international sample. The BICCI scores vary between 0 and US $8.12 million, with a mean value of US$3.80 million. The results in Table 3 also reveal that approximately 40% of the banks have a BSCOM, whereas 82% of the SSA banks have sustainability reporting framework embedded in their annual reports. Finally, Table 3 presents an overview of the CORPGOVDISCIN. The CORPGOVDISCIN score is an indicator of how well the banks are governed. The average CORPGOVDISCIN score is 66.73%, which indicates that most of the banks have high CORPGOVDISCIN scores, implying good CG mechanisms in several banks. This evidence is lower than the evidence of Ntim and Soobaroyen (2013a).

The correlation matrix for the variables used in the regression analysis is shown in Table 4. The correlation coefficients in Table 4 reveal that CORPGOVDISCIN, BSCs and BCCI are positively correlated with FP. Multicollinearity issues arise if correlation coefficients among predictors are above 0.80 (Gujarati, 2004). The matrix shows that none of the coefficients exceeds 0.80, suggesting the absence of any serious multicollinearity.

6.2. Multivariate results and discussion

6.2.1. Bank sustainability characteristics and bank climate change initiatives

Table 5 presents the estimated FE regression results of BCCIs on BSRF, and BSCOM. First, Table 5 provides the estimated FE regression results of BCCIs against BSRF. Model (1) reveals that BSRF is positively associated with BCCI ($p < 0.05$). This result suggests that banks with sustainability reporting framework engage in increased BCCI, thereby offering empirical support to H1. The findings reaffirm the notion that BSRF strategy is a significant predictor of BCCIs. Our findings appear to support the view that environmentally sensitive banks tend to encourage executives to disclose climate change related initiatives in their annual report, and hence, the establishment of sustainability reporting framework (Adu, 2022). This finding corroborates prior studies (Orazalin, 2020; Orazalin et al., 2023), that offer evidence that sustainability reporting has beneficial impact on firm's environmental performance. By contrast, Model (3) shows that the coefficient on BSRF is insignificant, suggesting that BSRF has no effect on BICCI (banks' actual cash investments in climate change initiatives). The evidence indicates that H1 is rejected. Our findings are consistent with the view that the establishment of sustainability reporting framework alone may be ineffective at helping banks to mitigate climate-related risks (Burke et al., 2019; Rodrigue et al., 2013). Given that the formation of BSRF is solely voluntary and that banks may establish such reporting frameworks for greenwashing purposes (Dixon-Fowler et al., 2017), thus the

Table 3
Descriptive Statistics.

Variable	Obs	Mean	Median	Std. Dev.	Minimum	Maximum
ROA	2785	3.52	2.07	0.22	6.46	92.52
ROE	2785	18.74	15.52	0.19	1.23	98.86
NIM	2785	0.095	0.087	0.84	0.03	0.68
BCCI (%)	2785	36.55	34.60	18.32	2.20	81.48
BICCI ($)	2722	3.80	3.57	4.12	0.00	8.12
BSRF (absolute)	2785	0.82	0.79	0.54	0.00	1.00
BSCOM (absolute)	2785	0.40	0.38	0.43	0.00	1.00
CORPGOVDISCIN (%)	2785	66.73	67.23	15.11	23.00	92.26
BSIZE	2785	9.80	9.00	3.20	4.00	24.00
BGEN	2785	26.74	25.00	14.45	0.00	84.34
FSIZE ($m)	2785	15.66	10.48	4.32	2.32	45.49
CAP	2785	0.27	0.19	0.46	0.05	0.98
LEV	2785	0.86	0.87	0.26	0.07	0.97
BAGE	2785	39.00	29.24	32.47	2.00	182
R&D ($m)	2785	2.67	1.75	2.73	4.78	15.76
BIG4	2785	0.95	1.00	0.26	0.00	1.00
BTYPE	2785	0.38	1.00	0.46	0.00	1.00
GDP	2785	8.65	7.08	3.62	−16.42	37.54
INFL	2785	9.78	10.67	19.43	3.08	78.56

This tables provides the summary statistics of all the variables used in the regression analysis. Notes: Please see Table 2 for variable definitions.

establishment of a BSRF can serves as an impression management tool (Adu, 2022; Rodrigue et al., 2013).

Second, Table 5 reports the FE regression results of BCCIs against BSCOM. The results in Model (2) reveal that BSCOM is positively associated with BCCI ($p < 0.01$), thereby offering strong empirical support to H1. Further, Model (4) shows that BSCOM has positive impact on BICCI ($p < 0.01$). The evidence provides empirical support to H1 and suggests that banks with a BSCOM are likely to have high climate change related initiatives (BCCI) and actual investments (BICCI). Collectively, these findings suggest that banks with BSCOM exhibit greater environmental and climate change related initiatives. The findings corroborate past studies (Orazalin, 2020; Orazalin et al., 2023), which reveal a positive association between a BSCOM and environmental performance and maintain that banks are more likely to use a BSCOM as an effective management tool to improve and protect their reputation. In addition, it offers empirical support to our multi-theoretical framework that incorporates insights from AT, SHT, RDT and NIT. In particular, the findings offer support to the theoretical reasoning that, banks that have a BSCOM are more likely to undertake BCCIs to address the demands of stakeholders and promote sustainable banking initiatives (Orazalin et al., 2023) to gain legitimacy (NIT), create shareholder value (AT), enabling the banks to access vital resources, such as external funding and deposits (RDT).

6.2.2. Bank sustainability characteristics, climate change initiatives and financial performance

Table 6 reports the FE regression results on the impact of BSCs and BCCIs on FP. Models (1), (5) and (9) show that BSRF has insignificant impact on ROA, ROE and NIM, respectively, implying that H2 is rejected. This evidence is consistent with the view that the establishment of sustainability reporting framework alone may be ineffective in terms of helping banks to mitigate climate-related risks and enhancing FP of banks (Adu, 2022). Given that the formation of BSRF is solely voluntary and that banks may establish such reporting frameworks for greenwashing purposes (Dixon-Fowler et al., 2017). Moving on, the estimated results in Models (2), (6) and (10) reveal that BSCOM is positively associated with ROA ($p < 0.01$), ROE ($p < 0.05$) and NIM ($p < 0.10$), respectively. These results offer empirical support to H2. In this case, BSCOM can serve as a key channel that can help banks to implement effective climate change strategies (Orazalin, 2020), in the management of bank climate change risks and environmental issues (Orazalin & Mahmood, 2021), and in enhancing the quality of climate change information (Kılıç et al., 2021). Theoretically, the evidence lends support to SHT and NIT perspectives that BSCOM can play critical role in implementing BCCIs and the promotion of best climate change initiatives that might enhance stakeholder engagement, creates shared values for shareholders and improve FP (Luo & Tang, 2021; Peters & Romi, 2014). This is consistent with previous studies (Adu, 2022; Orazalin et al., 2023) that offer evidence that CG mechanisms such as BSCOM have beneficial effect on FP. The results indicate that banks with a BSCOM have a higher FP and support the suggestion that BSCOM enhances corporate performance (Orazalin et al., 2023).

Further, Table 6 provides the FE estimated results of FP on BCCIs. Models (3), (7) and (11) show that BCCI is positively associated with ROA ($p < 0.1$), ROE ($p < 0.1$) and NIM ($p < 0.05$), respectively, indicating that banks with higher BCCIs have enhanced FP. These results offer empirical support to H3 and corroborate the findings of Adu (2022) and Platonova et al. (2018) that the engagement of banks in climate change activities can positively impact on FP. Our evidence also lends support to RDT that BCCIs can act as crucial initiatives that channel the flow of vital resources to the bank, and NIT's argument that BCCIs can boost a bank's reputation, which will increase legitimacy and FP. Furthermore, Models (4), (8) and (12) of Table 6 display negative relationship between BICCI and (i) ROA ($p < 0.05$), (ii) ROE ($p < 0.1$) and (iii) NIM ($p < 0.05$), respectively, contrary to expectations of H3. The results demonstrate that actual cash investment in climate change is associated with reduced FP. Our evidence offers empirical support to scholars who argue against climate change investments and contend that banks incur higher costs as a result of implementing climate change-related projects (Friedman, 1970; Preston & O'bannon, 1997; Simpson & Kohers, 2002). The findings appear to show that banks that are climate conscious and undertake actual GHG emission investments might be costly to the bank at least in the short-term (Adu, 2022; Barnett & Salomon, 2006).

6.2.3. Sustainability characteristics and climate change initiatives: The moderating effect of corporate governance disclosure index

We have argued that due to the crucial role of CG mechanisms in the SSA banking sector, the CORPGOVDISCIN may moderate the relationship between BSCs and BCCIs. To empirically test this, we include an interaction term between the CORPGOVDISCIN and BSCs variable (BSRF*CORPGOVDISCIN) by estimating Eq. 4. Table 7 provides the FE estimation results exploring the possible moderating impact of CORPGOVDISCIN on the BSRF-BCCIs link. Model (1) shows that the coefficient for the interaction term (BSRF*CORPGOVDISCIN) is positively associated with BCCI ($p < 0.01$), indicating that CORPGOVDISCIN has positive moderating role on the BSRF-BCCI nexus. The results offer strong empirical support to H4. Further, Model 3 shows that the

Table 4
Pearson's correlation matrix.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
ROA (1)	1.00																		
ROE (2)	0.05	1.00																	
NIM (3)	0.03	0.07	1.00																
BCCI (4)	0.04*	0.03*	0.09**	1.00															
BICCI (5)	−0.07*	−0.05*	−0.03**	0.03	1.00														
BSRF (6)	0.01	0.03*	0.08*	0.08**	0.03**	1.00													
BSCOM (7)	0.08**	0.06**	0.01**	0.16**	0.39***	0.06	1.00												
CORPGOVDISCIN (8)	0.02***	0.05***	0.03***	0.22**	0.04**	0.13*	0.18*	1.00											
BSIZE (9)	−0.05**	−0.09**	−0.02**	0.09**	0.07**	0.02*	−0.05*	0.08*	1.00										
BGEN (10)	0.07**	0.02*	0.05**	0.02**	0.05**	0.16	−0.04	0.08*	0.17	1.00									
FSIZE (11)	−0.01***	−0.06**	−0.03*	−0.09**	−0.06*	0.07*	−0.03	−0.06	0.05*	0.02**	1.00								
LEV (12)	−0.03**	−0.05*	−0.01*	0.08*	0.11**	−0.09*	0.07	0.15**	0.19*	−0.33	0.09*	1.00							
CAP (13)	−0.02*	−0.08**	−0.05**	−0.22*	−0.18**	−0.08*	−0.06	−0.13*	−0.02	0.08*	−0.17	−0.15*	1.00						
BAGE (14)	0.04***	0.02**	0.12*	−0.18***	−0.07	0.17*	0.13**	0.07	0.09	−0.21	0.16	0.08	0.15**	1.00					
BIG4 (15)	−0.01	0.02	0.03	0.12	0.09	0.28	0.15*	0.08	0.02	0.05**	0.13	0.07	−0.36	−0.06	1.00				
R&D (16)	0.08***	0.06**	0.09*	0.07***	0.05**	0.14	0.18*	−0.05**	0.08*	−0.01	0.06*	0.29*	−0.18	0.27*	−0.18*	1.00			
BTYPE (17)	0.05**	0.08**	0.01*	0.03*	0.01**	0.04	−0.06	0.08*	0.01	−0.04	0.05*	0.08	0.07*	−0.02	0.04	0.03*	1.00		
GDP (18)	0.02*	0.04	0.06	0.09	0.07*	0.04	−0.03	0.07	0.25	0.09*	0.11*	−0.02	−0.09**	0.27	0.06**	0.08	0.02	1.00	
INFL (19)	−0.03	−0.05	−0.04	−0.08**	−0.05*	−0.02	0.06*	0.09	0.27*	−0.19	0.07*	−0.05	0.02*	0.07	−0.06	0.08	0.04	−0.07*	1.00

Notes: The figures indicate the Pearson's correlation coefficients. ***, ** and * indicate that the correlation is respectively significant at 1%, 5% and 10% levels.

Table 5
Effect of bank sustainability characteristics on bank-based climate change initiatives.

Dependent variable Model	BCCI (1)	BCCI (2)	BICCI (3)	BICCI (4)
Independent variables				
BSRF	0.562**		0.050	
	(2.14)		(1.61)	
BSCOM		0.504***		0.020***
		(3.51)		(4.17)
Bank-level controls				
BSIZE	0.398***	0.367***	0.232***	0.218***
	(3.13)	(2.80)	(3.11)	(2.50)
BGEN	0.122***	0.130***	0.029**	0.024**
	(4.01)	(6.54)	(2.08)	(2.40)
FSIZE	−0.157*	−0.166*	−0.067	−0.061
	(−1.84)	(−1.71)	(−1.14)	(−1.05)
LEV	5.539**	5.843***	4.289***	4.325***
	(2.07)	(3.45)	(3.00)	(4.62)
BAGE	−2.485***	−2.468***	−0.965***	−0.990***
	(−2.90)	(−3.77)	(−5.31)	(−3.27)
CAP	−3.654***	−3.722***	−2.458***	−2.533***
	(−3.92)	(−2.75)	(−4.37)	(−3.47)
BIG4	0.982	0.974	0.522	0.528
	(0.64)	(1.53)	(1.44)	(1.45)
R&D	0.435***	0.528***	0.654***	0.720***
	(4.13)	(3.75)	(3.19)	(4.08)
BTYPE	0.045***	0.034**	0.017***	
	(3.42)	(2.07)	(3.46)	
Country-level controls				
GDP	0.360	0.374	0.342*	0.276**
	(1.40)	(1.09)	(1.74)	(2.22)
INFL	−0.824**	−0.830**	−0.132	−0.114
	(−2.32)	(−1.97)	(−1.28)	(−1.52)
Constant	5.042***	5.684***	4.895***	5.208***
	(3.74)	(2.90)	(3.24)	(4.41)
Year & country dummies	Yes	Yes	Yes	Yes
No. of observations	2785	2785	2722	2722
R-squared	0.56	0.61	0.64	0.65
F-value	33.4	35.1	46.5	46.6

Notes: All the variables used are fully defined in Table 2. *t*-statistics estimated using robust standard errors are reported in parentheses. ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

interaction term BSRF*CORPGOVDISCIN is positively associated with BICCI ($p < 0.05$), implying that H4 is empirically supported. Overall, the results demonstrate that CORPGOVDISCIN has moderating impact on the BSRF-BCCIs relationship. The findings suggest that the relationship between BSRF and BCCIs is contingent on the quality of the CG mechanisms. This is consistent with agency theoretical perspective argument that CG mechanisms can be considered strong dimension or pillar of BCCIs (Adu, 2022). In this case, in better-governed banks, corporate executives may pursue BCCIs as a credible way of minimizing conflict with bank owners (AT) who may be keen on the long-term sustainable value creation of their investments (Adu, Al-Najjar, & Sitthipongpanich, 2022; Ntim & Soobaroyen, 2013a). Theoretically, our results reaffirm the suggestion that CORPGOVDISCIN may serve as an important channel for banks to manage the concerns of various stakeholder on climate change action (SHT), which can enhance the reputation, as well as improving the legitimacy of the bank (NIT) (Ashforth & Gibbs, 1990).

Further, we maintain that due to the crucial role of CG mechanisms in the engagement of banks in climate change initiatives, the CORPGOVDISCIN will have moderating effect on the BSCOM-BCCIs relationship. To empirically test this, we include an interaction term between the CORPGOVDISCIN and BSCOM variable (BSCOM*CORPGOVDISCIN) by estimating Eq. 4. Specifically, Table 7 provides the FE estimation results exploring the possible moderating effect of CORPGOVDISCIN on the BSCOM-BCCIs nexus. Model (2) shows that the coefficients for the interaction term (BSCOM*CORPGOVDISCIN) is

Table 6
Effect of bank sustainability characteristics and bank-based climate change initiatives on financial performance.

Dependent Variable	ROA	ROA	ROA	ROA	ROE	ROE	ROE	ROE	NIM	NIM	NIM	NIM
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Independent Variables												
BSRF	0.054				0.023				0.034			
	(1.23)				(1.61)				(1.47)			
BSCOM		0.185***				0.155**				0.162*		
		(3.20)				(2.32)				(1.78)		
BCCI			0.079*				0.032*				0.054**	
			(1.81)				(1.80)				(2.69)	
BICCI				−0.022**				−0.017*				−0.047**
				(−2.17)				(−1.82)				(2.75)
Bank-level controls												
BSIZE	−0.438*	−0.320*	−0.248**	−0.365*	−0.270*	−0.342**	−0.178**	−0.259*	−0.358**	−0.205**	−0.321*	−0.346**
	(−1.79)	(−1.78)	(−1.94)	(−1.78)	(−1.82)	(−2.15)	(−2.39)	(−1.70)	(−2.45)	(−2.06)	(−1.75)	(−2.03)
BGEN	0.051**	0.054**	0.051	0.067	0.041*	0.052*	0.057**	0.023	0.054**	0.012*	0.036**	0.054**
	(2.07)	(2.41)	(1.32)	(1.63)	(1.74)	(1.88)	(2.02)	(1.64)	(2.30)	(1.73)	(2.10)	(1.97)
FSIZE	−0.052**	−0.042**	−0.013***	−0.058**	−0.042**	−0.033**	−0.018**	−0.030**	−0.024**	−0.052**	−0.047*	−0.035*
	(−1.89)	(−2.36)	(−3.41)	(−2.20)	(−2.28)	(−2.50)	(−2.42)	(−2.63)	(−1.97)	(−2.05)	(−1.83)	(−1.70)
LEV	−0.627**	−0.542***	−0.330**	−0.582***	−0.431***	−0.498***	−0.380***	−0.442**	−0.286**	−0.350**	−0.275**	−0.456**
	(−2.30)	(−3.51)	(−2.17)	(−3.74)	(−3.25)	(−2.99)	(−3.51)	(−2.52)	(−2.43)	(−1.97)	(−2.65)	(−2.11)
AGE	0.438***	0.266***	0.261***	0.181***	0.278***	0.302***	0.253***	0.158***	0.247***	0.186***	0.238**	0.349**
	(4.34)	(3.59)	(4.78)	(2.87)	(2.92)	(3.36)	(3.20)	(2.77)	(3.06)	(4.12)	(1.97)	(2.23)
CAP	−0.311***	−0.301***	−0.243***	−0.162***	−0.323**	−0.420**	−1.848***	−1.314***	−1.673*	−1.357***	−1.456**	−1.363***
	(−3.68)	(−3.42)	(−3.55)	(−3.24)	(−2.08)	(−2.48)	(−3.33)	(−3.37)	(−1.78)	(−3.40)	(−2.05)	(−3.02)
BIG4	−0.048	−0.040	−0.047	−0.075	−0.091	−0.059	−0.048	−0.042	−0.052	−0.048	−0.027	−0.051
	(−0.95)	(−0.52)	(−1.40)	(−1.38)	(−1.55)	(−1.32)	(−1.03)	(−1.35)	(−1.46)	(−1.54)	(−1.58)	(−1.40)
R&D	0.038*	0.059***	0.086*	0.024**	0.044**	0.050***	0.067**	0.028**	0.078**	0.067**	0.054**	0.035**
	(1.82)	(3.73)	(1.72)	(1.95)	(2.53)	(3.11)	(1.95)	(2.17)	(2.34)	(1.99)	(2.35)	(1.99)
BTYPE	0.054*	0.046**	0.043**	0.031**	0.050*	0.025***	0.037**	0.028**	0.056**	0.045*	0.051**	0.032*
	(1.72)	(2.03)	(2.37)	(1.98)	(1.82)	(3.27)	(2.12)	(2.30)	(2.05)	(1.82)	(2.46)	(1.80)
Country-level controls												
GDP	0.275*	0.328*	0.452**	0.327*	0.182*	0.254*	0.320*	0.242*	0.178*	0.167	0.159	0.137
	(1.70)	(1.77)	(2.07)	(1.74)	(1.71)	(1.86)	(1.81)	(1.79)	(1.83)	(1.56)	(1.45)	(1.36)
INFL	−0.046	−0.058	−0.036	−0.061	−0.032	−0.038	−0.059	−0.038	−0.045	−0.029	−0.041	−0.035
	(−1.52)	(−1.37)	(−1.59)	(−1.42)	(−1.19)	(−0.84)	(−1.45)	(−1.43)	(−1.32)	(−1.40)	(−1.53)	(−1.61)
Constant	2.182***	−2.089***	−2.586***	−1.853***	−3.040***	−2.895***	−2.542***	−1.453***	−1.285***	−2.354***	−3.678***	−4.986***
	(3.40)	(−4.42)	(−4.27)	(−3.24)	(−3.36)	(−4.82)	(−3.74)	(−4.32)	(−3.46)	(−4.15)	(−3.87)	(−3.90)
Year & country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	2785	2785	2785	2722	2785	2785	2785	2722	2785	2785	2785	2722
R-squared	0.55	0.60	0.51	0.45	0.53	0.52	0.54	0.56	0.52	0.47	0.42	0.50
F-value	40.7	42.2	44.3	51.7	42.5	40.4	48.3	52.5	48.7	44.6	43.8	47.3

Notes: All the variables used are fully defined in Table 2. *t*-statistics estimated using robust standard errors are reported in parentheses. ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table 7
Bank sustainability characteristics on bank-based climate change initiatives: Moderating effect of corporate governance disclosure.

Dependent Variable Model	BCCI (1)	BCCI (2)	BICCI (3)	BICCI (4)
Independent Variables				
CORPGOVDISCIN	0.045*	0.108	0.074*	0.056*
	(1.82)	(1.50)	(1.82)	(1.84)
BSRF*CORPGOVDISCIN	0.073***		0.039**	
	(3.40)		(2.51)	
BSRF	0.572		0.345	
	(1.04)		(1.53)	
BSCOM*CORPGOVDISCIN		0.031***		0.055***
		(3.25)		(4.33)
BSCOM		0.320**		0.052*
		(2.47)		(1.85)
Bank-level controls				
BSIZE	0.507***	0.451***	0.376***	0.242***
	(3.32)	(3.43)	(3.20)	(4.55)
BGEN	0.138***	0.132***	0.041**	0.034**
	(3.21)	(2.90)	(2.35)	(2.37)
FSIZE	−0.153**	−0.157*	−0.062*	−0.058
	(−2.49)	(−1.88)	(−1.84)	(−1.43)
LEV	5.278**	5.375**	4.106***	4.267***
	(2.37)	(2.49)	(3.34)	(3.25)
BAGE	−2.630**	−2.586***	−1.237***	−1.143***
	(−2.09)	(−3.51)	(−2.46)	(−2.77)
CAP	−3.457***	−3.578***	−2.400***	−2.512***
	(−3.68)	(−5.63)	(−3.34)	(−4.68)
BIG4	1.055	1.067	0.689**	0.655**
	(0.83)	(0.99)	(2.25)	(2.39)
R&D	0.542***	0.535***	0.670***	0.716***
	(3.16)	(3.29)	(2.82)	(3.48)
BTYPE	0.056*	0.044*	0.013	0.027*
	(1.79)	(1.83)	(1.57)	(1.73)
Country-level controls				
GDP	0.460	0.471	0.356	0.352**
	(1.48)	(1.25)	(1.20)	(2.39)
INFL	−0.638*	−0.650*	−0.083	−0.087
	(−1.81)	(−1.83)	(−0.94)	(−0.65)
Constant	5.210***	6.418***	−3.672***	−3.671***
	(3.39)	(4.55)	(−3.96)	(−3.58)
Year & country dummies	Yes	Yes	Yes	Yes
No. of observations	2785	2785	2722	2722
R-squared	0.57	0.63	0.60	0.61
F-value	36.3	34.0	47.2	47.3

Notes: All the variables used are fully defined in Table 2. *t*-statistics estimated using robust standard errors are reported in parentheses. ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

positively associated with BCCI ($p < 0.01$), suggesting that CORPGOVDISCIN has positive moderating effect on the BSCOM-BCCI relationship. The results offer strong empirical support to H4. In addition, Model 4 shows that the interaction term BSCOM*CORPGOVDISCIN is positively associated with BICCI ($p < 0.01$), implying that H4 is empirically supported. These findings are consistent with the view that a BSCOM established in better-governed banks can generate value and serve as an effective way of reducing climate-related risks and BCCIs (Burke et al., 2019; Orazalin et al., 2023). The findings suggest that the BSCOM-BCCIs nexus is contingent on the quality of the CG mechanisms in the banks. Our findings are also consistent with the theoretical arguments that, in better-governed banks, corporate executives may leverage on BSCOM to pursue BCCIs as a credible way of minimizing conflict with bank owners (AT) and influential stakeholders (SHT) as this approach lessens issues with agency conflicts (Dam & Scholtens, 2012). Further, this finding supports stakeholder theoretical view that the establishment of BSCOM can serves as an effective CG mechanism that may satisfy the interests of stakeholders (Kılıç et al., 2021) who may be keen on the long-term sustainable value creation of businesses (Adu, Al-Najjar, & Sitthipongpanich, 2022; Ntim & Soobaroyen, 2013a). Noticeably, the benefits of BCCIs investments may accrue to the bank in the form of a flow of critical resources such as contracts, human capital (RDT), corporate image, and reputation (NIT) (Ntim et al., 2013; Branco & Rodrigues, 2006). Overall, these findings indicate that CG mechanism has a positive impact on BSCOM which in turn leads to superior BCCIs.

6.2.4. Sustainability characteristics, climate change initiatives and financial performance: Moderating effect of CG disclosure index

Table 8 presents the results of the moderating impact of CORPGOVDISCIN on BSCs, BCCIs and FP relationships. First, the results in Models (1), (5) and (9) of Table 8 demonstrate that the coefficient for the interaction variable (CORPGOVDISCIN*BSRF) is positively associated with ROA ($p < 0.05$), ROE ($p < 0.10$) and NIM ($p < 0.05$), respectively. The results offer empirical support to H5a. Similarly, the estimated results in Models (2) and (6) and (10) show that the interaction term (CORPGOVDISCIN*BSCOM) has positive impact on ROA ($p < 0.01$), ROE ($p < 0.01$) and NIM ($p < 0.05$), respectively, implying that H5a is empirically supported. Together, these results are consistent with the observation that BSRF and BSCOM can serve as an effective CG mechanisms that may satisfy the interests of stakeholders (Kılıç et al., 2021) who may be keen on the long-term sustainable value creation of businesses (Adu, Al-Najjar, & Sitthipongpanich, 2022; Ntim & Soobaroyen, 2013a), with beneficial impact on FP. Theoretically, the results support the prediction of RDT and NIT that in better-governed banks, corporate

Table 8
Bank sustainability characteristics, bank-based climate change initiatives, financial performance and the moderating effect of corporate governance disclosure.

Dependent Variable	ROA	ROA	ROA	ROA	ROE	ROE	ROE	ROE	NIM	NIM	NIM	NIM
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Independent Variables												
CORPGOVDISCIN	0.075**	0.061***	0.034**	0.082***	0.074***	0.053**	0.045**	0.068**	0.087**	0.057**	0.042***	0.094***
	(2.14)	(2.85)	(2.01)	(3.22)	(3.31)	(2.06)	(2.24)	(2.05)	(2.17)	(1.99)	(3.40)	(3.17)
CORPGOVDISCIN*BSRF	0.060**				0.046*				0.051**			
	(2.38)				(1.80)				(2.67)			
BSRF	0.050				0.014				0.048			
	(1.57)				(1.42)				(1.36)			
BSCOM		0.159*				0.153*				0.146		
		(1.78)				(1.74)				(1.03)		
CORPGOVDISCIN*BSCOM		0.237***				0.184***				0.325**		
		(2.94)				(3.12)				(2.47)		
BCCI			0.038				0.047				0.059*	
			(1.20)				(1.46)				(1.74)	
CORPGOVDISCIN*BCCI			0.159***				0.070**				0.068***	
			(3.77)				(2.43)				(4.25)	
BICCI				0.069*				0.037*				0.051
				(1.75)				(1.66)				(1.63)
CORPGOVDISCIN*BICCI				0.090**				0.057*				0.072**
				(2.31)				(1.88)				(2.64)
Bank-level controls												
BSIZE	−0.344*	−0.305*	−0.352*	−0.240**	−0.402**	−0.318*	−0.347**	−0.201**	−0.317*	−0.384**	−0.436*	−0.452**
	(−1.85)	(−1.79)	(−1.71)	(−2.08)	(−2.35)	(−1.74)	(−2.03)	(−2.24)	(−1.73)	(−2.07)	(−1.79)	(−1.98)
BGEN	0.048***	0.045**	0.072**	0.052	0.060**	0.053*	0.036*	0.059**	0.056**	0.043***	0.067**	0.046*
	(3.20)	(2.16)	(2.14)	(1.47)	(2.28)	(1.70)	(1.75)	(2.10)	(1.98)	(3.24)	(2.30)	(1.71)
FSIZE	−0.023**	−0.046**	−0.054**	−0.039***	-0.045**	−0.058**	−0.045**	−0.026**	−0.035**	−0.042*	−0.039**	−0.050**
	(−2.42)	(−2.10)	(−2.57)	(−3.14)	(−2.20)	(−2.47)	(−2.22)	(−2.63)	(−2.50)	(−1.81)	(−2.46)	(−2.08)
LEV	−0.389***	−0.462**	−0.402***	−0.380**	−0.415***	−0.453***	−0.432***	−0.350***	−0.421***	−0.032**	−0.050**	−0.041***
	(−3.15)	(−2.27)	(−2.74)	(−2.31)	(−3.09)	(−3.67)	(−2.90)	(−3.18)	(−3.54)	(−2.47)	(−2.08)	(−3.35)
BAGE	0.421***	0.483***	0.330***	0.289***	0.435***	0.270***	0.313***	0.297***	0.325***	0.429***	0.306***	0.254**
	(4.07)	(3.54)	(3.47)	(3.23)	(3.10)	(2.98)	(3.17)	(3.01)	(4.28)	(3.60)	(4.47)	(2.71)
CAP	−0.374***	−0.460***	−0.326***	−0.318**	−0.237***	−0.427**	−0.370**	−0.342***	−0.406**	−0.311***	−0.389***	−0.420**
	(−3.27)	(−4.17)	(−3.12)	(−2.53)	(−4.43)	(−2.41)	(−2.33)	(−2.77)	(−2.41)	(−3.94)	(−3.57)	(−2.45)
BIG4	−0.026	−0.055	−0.043	−0.054	−0.048	−0.076	−0.051	−0.069	−0.048	−0.055	−0.039	−0.034
	(−1.47)	(−0.78)	(−0.91)	(−1.16)	(−1.43)	(−1.55)	(−1.27)	(−1.32)	(1.49)	(−0.87)	(−1.20)	(−1.59)
R&D	0.049*	0.058**	0.074***	0.090*	0.070**	0.044**	0.072***	0.085**	0.067**	0.051***	0.082**	0.024***
	(1.82)	(1.90)	(3.18)	(1.74)	(2.06)	(2.13)	(3.08)	(2.31)	(2.46)	(3.40)	(2.35)	(4.57)
BTYPE	0.042*	0.039**	0.032*	0.048**	0.056*	0.042*	0.037*	0.040*	0.046**	0.033**	0.059**	0.030***
	(1.76)	(2.05)	(1.74)	(2.05)	(1.86)	(1.73)	(1.81)	(1.74)	(1.98)	(2.59)	(2.07)	(3.54)
Country-level controls												
GDP	0.418*	0.370*	0.428*	0.464**	0.382*	0.160*	0.254*	0.413*	0.395	0.400*	0.494*	0.587**
	(1.84)	(1.82)	(1.73)	(2.27)	(1.73)	(1.84)	(1.79)	(1.75)	(1.64)	(1.76)	(1.82)	(2.50)
INFL	−0.043	−0.047	−0.054	−0.040	−0.050	−0.037	−0.053	−0.067	−0.047	−0.051	−0.034	−0.047
	(−1.28)	(−1.56)	(−1.67)	(−1.59)	(−0.81)	(−1.32)	(−0.94)	(−1.45)	(−1.38)	(−1.07)	(−1.56)	(−1.43)
Constant	−2.875***	3.467***	−2.286***	−2.786***	−3.504***	−2.782***	−3.957***	−2.596***	4.325***	−3.521***	−4.365***	−3.681***
	(−3.57)	(4.16)	(−3.34)	(−3.19)	(−4.35)	(−3.41)	(−3.53)	(−3.07)	(4.50)	(−3.54)	(−3.76)	(−5.230)
Year & country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	2785	2785	2785	2722	2785	2785	2785	2722	2785	2785	2785	2722
R-squared	0.54	0.52	0.61	0.50	0.52	0.55	0.53	0.51	0.45	0.57	0.47	0.38
F-value	44.8	42.3	44.5	42.2	41.5	43.2	41.6	47.5	49.8	45.2	43.9	48.0

Notes: All the variables used are fully defined in Table 2. *t*-statistics estimated using robust standard errors are reported in parentheses. ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

executives through BSRF and BSCOM channels may focus on BCCIs decisions as a win-win strategy. Our findings also corroborate the suggestion by various scholars that CG mechanisms such as BSRF and BSCOM can impact on the link between environmental initiatives and FP (Choi & Luo, 2021; Orazalin et al., 2023).

Finally, Table 8 reports the estimated results of the moderating effect of CORPGOVDISCIN on the relationship between BCCIs (BCCI and BICCI) and FP (ROA, ROE and NIM) and the control variables. The results in Models (3), (7) and (11) show that the interaction term (CORPGOVDISCIN*BCCI) is positively associated with ROA ($p < 0.01$), ROE ($p < 0.05$) and NIM ($p < 0.01$), respectively. These findings offer empirical support to H5b. In a similar vein, the results in Models (4), (8) and (12) show that the interaction variable (CORPGOVDISCIN*BICCI) is positively associated with ROA ($p < 0.05$) and ROE ($p < 0.10$) and ($p < 0.05$), respectively. These findings support H5b. Together, these results suggest that CORPGOVDISCIN positively moderates the link between BCCIs and FP. Our findings are also consistent with the theoretical arguments of AT and NIT that CG mechanisms play key role in the adoption of climate change strategies and the mitigation of climate change risks (Adu, Al-Najjar, & Sitthipongpanich, 2022). For instance, our evidence is in line with AT prediction that increased managerial monitoring originating from good CG mechanisms can serve as crucial channel for banks to engage in increased commitment to improve energy /resource efficiency (NIT), product and service improvements, and R&D which can enhance the FP. The results also corroborate the suggestion by scholars who maintain that CG mechanisms can impact on the link between environmental initiatives and FP (Choi & Luo, 2021; Orazalin et al., 2023).

6.3. Additional analyses

First, the study estimates Eq. (1) for two subsample, namely SDGs (2015–2022) and pre-SDGs (2007–2014), to ascertain the impact of global climate change initiatives/reforms such as the SDGs. The results in Table 9 show that the BSCs variables (BSRF and BSCOM) have positive and significant impact on BCCIs (BCCI and BICCI) in the SDGs subsamples in Models (1) and (2), respectively, and no association in the pre-SDGs subsample in Models (3) and (4). These results demonstrate the importance of global reforms/ initiatives in raising awareness in the banking system concerning the detrimental effect GHG emissions and climate change threat (Orazalin et al., 2023).

Second, we estimate Eq. (4) for two subsamples, namely SDGs (2015–2022) and pre-SDGs (2007–2014), to establish the effect of SDGs reforms on the moderating relationships. The estimated FE results in Table 10 reveal that CORPGOVDISCIN has a strong positive moderating effect on the BSRF-BCCIs and BSCOM-BCCIs relationships in the SDGs subsamples. By contrast, the results in Table 8 show that the CORPGOVDISCIN has positive but weak moderating impact on the BSRF-BCCIs and BSCOM-BCCIs relationships in the pre-SDGs subsample. These results offer additional support to the crucial role of global climate change reforms (especially SDGs) in raising awareness of the need to protect the planet in the SSA banking sector.

Third, we re-estimate Eqs. (2)–(3) and (5)–(6) for the two subsamples, SDGs (2015–2022) and pre-SDGs (2007–2014). The estimated results in Panels A, B and C of Table 11 show significant associations among CORPGOVDISCIN, BSCs, BCCIs and FP in the SDGs subsamples (Models 1–4), and no significant associations in the pre-SDGs sample (Models 5–8). Overall, our findings demonstrate the importance of the SDGs in promoting climate change initiatives in the banking sector in the region.

Fourth, we estimate Eqs. (2)–(3) and (5)–(6) for the two subsamples, namely post-global financial crisis (2011−2022) and global financial crisis (2007–2010), to consider the effects of global financial crises on the association among CORPGOVDISCIN, BSCs, BCCIs and FP. The estimated results in Table 12 show significant associations among CORPGOVDISCIN, BSCs, BCCIs and FP in the post-global financial crisis subsamples (Models 1–4), and no significant associations in the global financial crisis sample (Models 5–8). Altogether, our findings indicate that in the period after the global financial crisis, banks are more concerned about the economic consequences of their environmental impacts.

Finally, we follow emerging literature in the field such as Jellason et al. (2024) and divide our sample into two subsamples namely, (i) pre-COVID-19 sample (2007–2019), and (ii) COVID-19 sample

Table 9
Additional analysis: Bank sustainability characteristics and bank-based climate change initiatives in different periods.

Additional analysis	SDGs (2015–2022)		PRE-SDGs (2007–2014)	
Panel A: Impacts of BSRF and BSCOM on BCCI	BCCI (1)	BCCI (2)	BCCI (3)	BCCI (4)
BSRF	1.834**		0.318	
	(2.49)		(1.46)	
BSCOM		0.250***		−0.213
		(4.94)		(−1.56)
Controls	Yes	Yes	Yes	Yes
Year & country dummies	Yes	Yes	Yes	Yes
No. of observations	1473	1473	1312	1312
R-squared	0.52	0.54	0.56	0.53
Panel B: Impacts of BSRF and BSCOM on BICCI				
	BICCI (1)	BICCI (2)	BICCI (3)	BICCI (4)
BSRF	0.639*		0.042	
	(1.86)		(1.45)	
BSCOM		0.180**		0.049
		(2.34)		(1.02)
Controls	Yes	Yes	Yes	Yes
Year & country dummies	Yes	Yes	Yes	Yes
No. of observations	1468	1468	1254	1254
R-squared	0.60	0.62	0.55	0.57

Notes: All the variables used are fully defined in Table 2. *t*-statistics estimated using robust standard errors are reported in parentheses.
***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table 10
Additional analysis: corporate governance disclosure, bank sustainability characteristics and bank-based climate change initiatives in different periods.

Additional analysis	SDGs (2015–2022)	PRE-SDGs (2007–2014)
Panel B: Impact of CORPGOVDISCIN on BSRF-BCCI nexus	BCCI	BCCI
CORPGOVDISCIN	0.015* (1.77)	0.023 (1.47)
BSRF*CORPGOVDISCIN	0.108*** (6.30)	0.091* (1.65)
BSRF	0.338 (0.84)	0.124 (0.89)
Year & country dummies	Yes	Yes
No. of observations	1473	1312
R-squared	0.55	0.52
Panel B: Impact of CORPGOVDISCIN on BSCOM-BICCI nexus		
	BICCI	BICCI
CORPGOVDISCIN	0.046* (1.81)	0.035 (1.07)
BSCOM*CORPGOVDISCIN	0.092** (2.45)	0.057 (1.51)
BSCOM	0.063 (0.52)	0.024 (0.68)
Year & country dummies	Yes	Yes
No. of observations	1468	1254
R-squared	0.54	0.50

Notes: All the variables used are fully defined in Table 2. *t*-statistics estimated using robust standard errors are reported in parentheses. ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table 11
Additional analysis: corporate governance disclosure, sustainability reporting, board sustainability committees and bank-based climate change initiatives in different periods.

Additional analysis	SDGs (2015–2022)				PRE-SDGs (2007–2014)			
Panel A: Impact of BSRF, BSCOM, BCCI and BICCI on ROA	ROA (1)	ROA (2)	ROA (3)	ROA (4)	ROA (5)	ROA (6)	ROA (7)	ROA (8)
BSRF	0.088*				0.043			
	(1.74)				(0.92)			
BSCOM		0.453***				0.127		
		(3.72)				(1.63)		
BCCI			0.109**				0.094	
			(2.24)				(1.56)	
BICCI				−0.097**				−0.007
				(2.36)				(1.31)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year & country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	1473	1473	1473	1468	1312	1312	1312	1254
R-squared	0.54	0.56	0.49	0.40	0.46	0.47	0.43	0.35

Panel B: Impact of BSRF, BSCOM, BCCI and BICCI on ROE	ROE (1)	ROE (2)	ROE (3)	ROE (4)	ROE (5)	ROE (6)	ROE (7)	ROE (8)
BSRF	0.012				0.022			
	(1.61)				(1.38)			
BSCOM		0.325**				0.105		
		(2.46)				(1.44)		
BCCI			0.098*				0.029	
			(1.87)				(1.54)	
BICCI				−0.050*				−0.006
				(1.77)				(1.59)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year & country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	1473	1473	1473	1468	1312	1312	1312	1254
R-squared	0.56	0.58	0.55	0.49	0.51	0.42	0.37	0.40

Panel C: Impact of BSRF, BSCOM, BCCI and BICCI on NIM	NIM (1)	NIM (2)	NIM (3)	NIM (4)	NIM (5)	NIM (6)	NIM (7)	NIM (8)
BSRF	0.067				0.045			
	(1.59)				(1.08)			
BSCOM		0.465***				0.235		
		(3.51)				(1.56)		
BCCI			0.189**				0.059	
			(2.65)				(1.54)	
BICCI				−0.027**				−0.011
				(2.04)				(1.43)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year & country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	1473	1473	1473	1468	1312	1312	1312	1254
R-squared	0.45	0.51	0.46	0.39	0.48	0.42	0.44	0.38

Panel D: Moderating effects of CORPGOVDISCIN	ROA (1)	ROA (2)	ROA (3)	ROA (4)	ROA (5)	ROA (6)	ROA (7)	ROA (8)
CORPGOVDISCIN	0.045**	0.063**	0.043*	0.069**	0.033*	0.051*	0.032**	0.058*
	(2.30)	(2.14)	(1.85)	(2.19)	(1.70)	(1.84)	(2.53)	(1.70)
CORPGOVDISCIN*BSRF	0.372**				0.044			
	(2.13)				(1.55)			
BSRF	0.037 (1.60)				0.017			
					(1.06)			
BSCOM		0.099* (1.72)				0.057		
						(1.63)		
CORPGOVDISCIN*BSCOM		1.218***				0.070		
		(3.45)				(1.56)		
BCCI			0.049*				0.040 (1.59)	
			(1.78)					
CORPGOVDISCIN*BCCI			1.860**				0.138 (1.00)	
			(2.47)					
BICCI				0.053*				0.028
				(1.76)				(1.23)
CORPGOVDISCIN*BICCI				1.068**				0.087
				(2.31)				(1.58)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

(*continued on next page*)

Table 11 (*continued*)

Panel D: Moderating effects of CORPGOVDISCIN	ROA (1)	ROA (2)	ROA (3)	ROA (4)	ROA (5)	ROA (6)	ROA (7)	ROA (8)
Year & country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	1473	1473	1473	1468	1312	1312	1254	1254
R-squared	0.51	0.54	0.57	0.44	0.46	0.47	0.55	0.40

Panel E: Moderating effects of CORPGOVDISCIN	ROE (1)	ROE (2)	ROE (3)	ROE (4)	ROE (5)	ROE (6)	ROE (7)	ROE (8)
CORPGOVDISCIN	0.081**	0.043***	0.058**	0.050**	0.062*	0.025*	0.037**	0.035*
	(2.42)	(3.27)	(2.11)	(2.39)	(1.74)	(1.80)	(2.14)	(1.73)
CORPGOVDISCIN*BSRF	0.168**				0.045			
	(2.10)				(1.19)			
BSRF	0.004 (1.54)				0.007			
					(1.62)			
BSCOM		0.132* (1.81)				0.008		
						(1.47)		
CORPGOVDISCIN *BSCOM		1.463***				0.016		
		(3.22)				(1.59)		
BCCI			0.038 (1.64)				0.033 (0.92)	
CORPGOVDISCIN*BCCI			1.087**				0.014 (1.60)	
			(2.56)					
BICCI				0.054*				0.045
				(1.78)				(0.89)
CORPGOVDISCIN*BICCI				1.198**				0.032
				(2.47)				(0.64)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year & country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	1473	1473	1473	1468	1312	1312	1312	1254
R-squared	0.47	0.50	0.48	0.42	0.45	0.38	0.41	0.49

Panel F: Moderating effects of CORPGOVDISCIN	NIM (1)	NIM (2)	NIM (3)	NIM (4)	NIM (5)	NIM (6)	NIM (8)	NIM
CORPGOVDISCIN	0.075**	0.044*	0.060**	0.081***	0.058*	0.037*	0.045**	0.061*
	(2.30)	(1.81)	(2.49)	(3.65)	(1.69)	(1.77)	(2.85)	(1.72)
CORPGOVDISCIN*BSRF	0.254**				0.087			
	(2.06)				(1.37)			
BSRF	0.051 (1.47)				0.025			
					(1.45)			
BSCOM		0.156 (1.30)				0.148		
						(1.01)		
CORPGOVDISCIN*BSCOM		0.892**				0.030		
		(2.37)				(1.29)		
BCCI			0.072 (1.38)				0.050 (0.98)	
CORPGOVDISCIN*BCCI			0.159**				0.042 (1.57)	
			(2.34)					
BICCI				0.043 (1.59)				0.020
								(1.34)
CORPGOVDISCIN*BICCI				0.267***				0.042
				(3.24)				(1.56)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year & country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	1473	1473	1473	1468	1312	1312	1312	1254
R-squared	0.49	0.52	0.43	0.42	0.40	0.48	0.44	0.37

Notes: All the variables used are fully defined in Table 2. *t*-statistics estimated using robust standard errors are reported in parentheses. ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

(2020−2022) and assessed the predicted associations among CORPGOVDISCIN, BSCs, BCCIs and FP. The results (for brevity, not reported but available on request) show no significant differences between the pre-COVID-19 subsample and COVID-19 subsample. Our findings imply that COVID-19 did not substantially influence the estimated results.

6.4. Robustness tests

We conduct additional investigations to address endogeneity concerns in the results. We follow prior studies and use an instrumental variable regression approach to account for endogeneity (Orazalin, 2020; Orazalin et al., 2023). However, it is problematic to identify variables that can serve as valid instruments in our setting for the independent variables as the relevant theory is scant (Zhou, Kara, & Molyneux, 2019). First, and consistent with prior literature (Zhou et al., 2019),[3] we apply the two-stage least squares (2SLS) approach and use lagged independent variables as instruments in estimating the 2SLS models. The 2SLS estimation results (supporting information 1, 2, 3 and

[3] We employ the lag of the independent variables as instruments. To make sure that the 2SLS research design is appropriate, and in line with Sarhan et al. (2019), we first carry out Durbin–Wu–Hausman exogeneity test to determine whether the CORPGOVDISCIN, BSRF and BSCOM variables are endogenously associated with BCCI and BICCI. Applied in our analysis, the results reject the null hypothesis of exogeneity, and therefore, we conclude that the 2SLS technique is appropriate.

Table 12
Additional analysis: corporate governance disclosure, sustainability reporting, board sustainability committees and bank-based climate change initiatives in different periods.

Additional analysis	Post-Global Financial Crisis (2011–2022)				Global Financial Crisis (2007–2010)			
Panel A: Impact of BSRF, BSCOM, BCCI and BICCI on ROA	ROA (1)	ROA (2)	ROA (3)	ROA (4)	ROA (5)	ROA (6)	ROA (7)	ROA (8)
BSRF	0.103*				0.070			
	(2.62)				(1.45)			
BSCOM		0.383**				0.209		
		(2.89)				(1.30)		
BCCI			0.056**				0.063	
			(2.30)				(1.49)	
BICCI				−0.067**				−0.003
				(−2.48)				(−1.07)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year & country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	1976	1976	1976	1926	809	809	809	796
R-squared	0.50	0.54	0.43	0.37	0.42	0.45	0.40	0.32
Panel B: Impact of BSRF, BSCOM, BCCI and BICCI on ROE	ROE (1)	ROE (2)	ROE (3)	ROE (4)	ROE (5)	ROE (6)	ROE (7)	ROE (8)
BSRF	0.006				0.010			
	(1.43)				(1.28)			
BSCOM		0.420**				0.083		
		(2.47)				(1.37)		
BCCI			0.153**				0.025	
			(1.98)				(1.38)	
BICCI				−0.046*				−0.035
				(−1.74)				(−1.41)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year & country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	1976	1976	1976	1926	809	809	809	796
R-squared	0.53	0.54	0.58	0.42	0.46	0.37	0.35	0.38
Panel C: Impact of BSRF, BSCOM, BCCI and BICCI on NIM	NIM (1)	NIM (2)	NIM (3)	NIM (4)	NIM (5)	NIM (6)	NIM (7)	NIM (8)
BSRF	0.052				0.029			
	(1.30)				(0.97)			
BSCOM		0.382***				0.345		
		(4.47)				(1.18)		
BCCI			0.140**				0.047	
			(2.51)				(1.39)	
BICCI				−0.059**				−0.024
				(−2.36)				(−1.57)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year & country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	1976	1976	1976	1926	809	809	809	796
R-squared	0.42	0.47	0.43	0.48	0.45	0.37	0.40	0.32
Panel D: Moderating effects of CORPGOVDISCIN	ROA (1)	ROA (2)	ROA (3)	ROA (4)	ROA (5)	ROA (6)	ROA (7)	ROA (8)
CORPGOVDISCIN	0.056**	0.048**	0.031*	0.051**	0.047*	0.058*	0.042**	0.042*
	(2.54)	(2.39)	(1.80)	(2.46)	(1.78)	(1.71)	(2.37)	(1.76)
CORPGOVDISCIN*BSRF	0.420**				0.031			
	(2.19)				(1.64)			
BSRF	0.053 (1.42)				0.020			
					(1.19)			
BSCOM		0.194*				0.040		
		(1.80)				(1.53)		
CORPGOVDISCIN*BSCOM		1.237**				0.039		
		(2.14)				(1.58)		
BCCI			0.047*				0.030 (1.61)	
			(1.71)					
CORPGOVDISCIN*BCCI			1.702**				0.131 (1.37)	
			(2.65)					
BICCI				0.060*				0.035
				(1.79)				(1.48)
CORPGOVDISCIN*BICCI				1.074**				0.097
				(2.40)				(1.61)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

(*continued on next page*)

Table 12 (*continued*)

Panel D: Moderating effects of CORPGOVDISCIN	ROA (1)	ROA (2)	ROA (3)	ROA (4)	ROA (5)	ROA (6)	ROA (7)	ROA (8)
Year & country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	1976	1976	1976	1926	809	809	809	796
R-squared	0.47	0.50	0.55	0.42	0.45	0.46	0.53	0.41

Panel E: Moderating effects of CORPGOVDISCIN	ROE (1)	ROE (2)	ROE (3)	ROE (4)	ROE (5)	ROE (6)	ROE (7)	ROE (8)
CORPGOVDISCIN	0.075**	0.050***	0.053**	0.048**	0.067*	0.036*	0.040**	0.021*
	(2.10)	(3.69)	(2.47)	(2.56)	(1.82)	(1.73)	(2.34)	(1.78)
CORPGOVDISCIN*BSRF	0.171**				0.052			
	(2.36)				(1.23)			
BSRF	0.013 (1.48)				0.014			
					(1.50)			
BSCOM		0.138* (1.72)				0.065		
						(1.32)		
CORPGOVDISCIN *BSCOM		1.475***				0.026		
		(3.48)				(1.43)		
BCCI			0.047 (1.59)				0.047 (0.86)	
CORPGOVDISCIN*BCCI			1.090**				0.029 (1.55)	
			(2.62)					
BICCI				0.043*				0.037
				(1.72)				(1.05)
CORPGOVDISCIN*BICCI				1.188**				0.048
				(2.59)				(0.93)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year & country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	1976	1976	1976	1926	809	809	809	796
R-squared	0.45	0.53	0.47	0.40	0.43	0.32	0.44	0.46

Panel F: Moderating effects of CORPGOVDISCIN	NIM (1)	NIM (2)	NIM (3)	NIM (4)	NIM (5)	NIM (6)	NIM (7)	NIM (8)
CORPGOVDISCIN	0.060**	0.052*	0.069**	0.089***	0.043*	0.048*	0.053**	0.068*
	(2.51)	(1.71)	(2.37)	(3.51)	(1.74)	(1.79)	(2.66)	(1.83)
CORPGOVDISCIN*BSRF	0.238**				0.070			
	(2.47)				(1.42)			
BSRF	0.045 (1.30)				0.036			
					(0.97)			
BSCOM		0.148 (1.54)				0.152		
						(1.47)		
CORPGOVDISCIN*BSCOM		0.860**				0.040		
		(2.49)				(1.38)		
BCCI			0.094 (1.46)				0.057 (1.20)	
CORPGOVDISCIN*BCCI			0.162**				0.049 (1.38)	
			(2.58)					
BICCI				0.048 (1.47)				0.034
								(1.49)
CORPGOVDISCIN*BICCI				0.232***				0.051
				(3.80)				(1.60)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year & country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	1976	1976	1976	1926	809	809	809	796
R-squared	0.47	0.54	0.41	0.38	0.43	0.45	0.40	0.33

Notes: All the variables used are fully defined in Table 2. *t*-statistics estimated using robust standard errors are reported in parentheses. ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

4) regarding the effect of BSRF and BSCOM on BCCIs are similar qualitatively similar to those reported in Tables 5, 6 and 7, demonstrating the robustness of the main findings to endogeneity and sample selection bias. Similarly, we carried out further estimations of the moderating impact of CORPGOVDISCIN on the BSCs-FP and BCCIs-FP relationships to check the robustness of our results. Specifically, we estimated 2SLS models, which for brevity not reported, but will be available upon request. The results of these robust checks were consistent with the FE findings.

Second, in order to confirm the absence of endogeneity, the study also employs a dynamic two-step system generalized method of moments (GMM), developed by Arellano and Bond (1991) and Blundell and Bond (1998).[4] The validity of the instruments is tested using Arellano-Bond test of the absence of serial autocorrelation and Hansen test of overidentifying restrictions (Haque & Ntim, 2020). In all our GMM models, the values of AR and Hansen tests imply that all the model specifications pass the autocorrelation test for the validity of the instruments. The results from the GMM estimations (in supporting

[4] The first lag of the explanatory variables are used as instruments, whereas year dummies and country specific variables are classified as exogenous variables, consistent with Orazalin et al. (2023) and Wintoki, Linck, and Netter (2012).

information 1, 2, 3 and 4) are also similar to those reported in Tables 5, 6 and 7, indicating robustness of the FE results to sample selection bias and endogeneity. Again, the study carried out further GMM estimations of the moderating effect of CORPGOVDISCIN on the BSCs-FP and BCCIs-FP relationships to check the robustness of our results. The un-tabulated results support the main findings. Overall, the results of these robust analyses show that our results do not appear to be driven by any potential endogenous sample selection problems.

7. Conclusion

Over the past few decades, academics, banking practitioners, and regulators have become increasingly concerned in climate change due to the rising levels of GHG emissions and their negative effects on the planet, and ultimately human lives. For instance, a UN report at COP 28 in Dubai in 2023 pronounces that aggressive action must be taken to avoid catastrophic global warming by as much as 3 °C before 2100. Regrettably, there is limited research regarding the role of CG structures such as CG disclosure mechanisms and sustainability characteristics in addressing climate change challenges especially in the banking sector. Accordingly, this study sought to bridge this gap in literature by empirically exploring the interrelationships among CORPGOVDISCIN, BSRF, BSCOM, BCCIs and FP based on a data of 220 banks operating in 16 SSA countries from 2007 to 2022. Based on insight from multi-theoretical socio-economic framework, the study offers new contributions to the banking literature. First, we offer new evidence that shows that BSRF and BSCOM have positive effect on BCCIs in the SSA region. Second, the findings of the study offers new insight that BSCOM is positively related to FP. Third, the study contributes to CG and climate change literature (Orazalin, 2020; Orazalin et al., 2023) by establishing that bank climate change initiatives have beneficial impact of FP. Distinct from prior research that examines the direct relationships, we identify and test possible moderators of these relationships. We observe that broad CORPGOVDISCIN positively moderates these relationships. The results of the study also show that the predicted associations vary across different operating periods. Overall, our study shows the key role CORPGOVDISCIN can play in driving bank executives to engage in climate change-related activities.

The study also offers crucial practical and policy implications. First, we call for banks to adopt and implement good governance disclosures as such CG mechanisms are proven to improve BCCIs. Second, banking practitioners and regulators need to establish guidelines/policies on sustainability reporting framework and BSCOM in the SSA region. For example, our findings can help corporate executives in designing climate change strategies to enhance GHGs emission reduction performance and to signal to stakeholders that banks value and promote BCCIs. Third, based on our results of the positive moderating effect of CORPGOVDISCIN on the BSRF-BCCIs and BSCOM-BCCIs relationships, this should serve as a strong motivation for banking practitioners to adopt quality CG mechanisms as a critical tool to drive BCCIs. For instance, world leaders and policymakers reaffirmed their commitment to taking decisive action to counter global warming and avert 2° scenarios at the COP26 meeting in Glasgow and more recently COP28 in Dubai. Indeed, the institution of quality CG mechanisms including BSRF and BSCOM can drive corporate executives to take action in support of banking investments, and therefore should be considered when developing and implementing climate change-related reforms (Adu, 2022). Given that GHG abatement projects demand large financial outlay, voluntary legislative actions will likely not be sufficient. In this case, there is a need for mandatory GHGs targets at the global, national, and corporate levels. Finally, because CORPGOVDISCIN appears to moderate the link between BCCIs and FP, banks in the region are encouraged to learn from their peers and establish high CG mechanisms, as such initiatives will lead to improved FP.

The study has some limitations. First, the research focused on internal CG mechanisms due to data restrictions. Yet, future studies may enhance their analysis by examining how external CG mechanisms, like regulation and media, influence BCCI practices. Second, due to lack of data, the study focused on BSCOM instead of considering the individual attributes of the BSCOM members (skills, education, gender, expertise and culture). Thus, future studies may provide additional insights by investigating the impact of such characteristics of BSCOM on BCCIs. In terms of improvement in the BCCIs-FP nexus investigation, we encourage future studies to examine other FP measures such as market-based indicators as and when data become available in the banking sector in the region. The final limitation of the study is that the data is limited to SSA banks and hence, the findings should be interpreted within this context. For example, the findings may or may not compare with that of developed economies with different climate-related policies and institutional settings.

Data availability

Data will be made available on request.

Appendix A. Assessment scales for bank climate change initiatives (BCCI)

General issues	Specific issues
Commitment to emission reduction	1. Does the bank have a policy to enhance emission reduction?
	2. Has the company set targets or objectives to be achieved on emission reduction?
	3. Does the bank report on its effect on biodiversity or on activities to reduce its impact on the native ecosystems and species, as well as the biodiversity of protected and sensitive areas?
	4. Does the bank report on initiatives to reduce, reuse, recycle, substitute, or phase out SOx (sulfur oxides) or NOx (nitrogen oxides) emissions?
	5. Does the bank report on initiatives to reduce, substitute, or phase out volatile organic compounds?
	6. Does the bank report on initiatives to recycle, reduce, reuse, substitute, treat or phase out total waste?
	7. Does the bank report on initiatives to reduce, substitute, or phase out particulate matter less than ten microns in diameter?
	8. Does the bank report on initiatives to recycle, reduce, reuse, substitute, treat or phase out e-waste?
	9. Does the bank have a policy for reducing the use of natural resources or to lessen the environmental impact of its supply chain?
Commitment to improve energy/resource efficiency	10. Does the bank have a policy to improve its water efficiency?
	11. Does the bank have a policy to improve its energy efficiency?
	12. Does the bank have a policy to improve its use of sustainable packaging?
	13. Does the bank set specific objectives to be achieved on resource efficiency?
	14. Has the bank set targets or objectives to be achieved on water efficiency?
	15. Has the bank set targets or objectives to be achieved on energy efficiency?
	16. Does the bank make use of renewable energy?
	17. Does the bank report about environmentally friendly or green sites or offices?

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General issues	Specific issues
Product and service improvement	18. Does the bank report on at least one product line or service that is designed to have positive effects on the environment, or which is environmentally labelled and marketed?
	19. Does the bank report on specific products which are designed for reuse, recycling or the reduction of environmental impacts?
	20. Does the bank develop new products that are marketed as reducing noise emissions?
	21. Does the bank develop products and services that improve the energy efficiency of buildings?
	22. Does the bank report about take-back procedures and recycling programmes to reduce the potential risks of products entering the environment or does the company report about product features or services that will promote responsible and environmentally preferable use?
	23. Is the bank aware that climate change can represent commercial risks and/or opportunities?
	24. Does the bank report about product features and applications or services that will promote responsible, efficient, cost-effective and environmentally preferable use?
Process and supply improvement	25. Does the bank use environmental criteria (ISO 14000, energy consumption, etc.) in the selection process of its suppliers or sourcing partners?
	26. Does the bank conduct surveys of the environmental performance of its suppliers?
	27. Does the bank report or show to be ready to end a partnership with a sourcing partner, if environmental criteria are not met?
	28. Does the bank have a policy to include its supply chain in the company's efforts to lessen its overall environmental impact?
Organizational involvement/Environmental management	29. Does the bank have an environmental management team?
	30. Does the bank train its employees on environmental issues?
Initiatives and practices/organizational involvement	31. Does the bank report or provide information on company-generated initiatives to restore the environment?
	32. Does the bank report on initiatives to reduce the environmental impact on land owned, leased or managed for production activities or extractive use?
	33. Does the bank report on initiatives to reduce, reuse, substitute or phase out toxic chemicals or substances?
Research and development	34. Does the bank develop products or technologies for use in the clean, renewable energy (such as wind, solar, hydro and geo-thermal and biomass power)?
	35. Does the bank develop products or technologies that are used for water treatment, purification or that improve water use efficiency?
	36. Does the bank report on its environmental expenditures?
	37. Does the bank report on making proactive environmental investments or expenditures to reduce future risks or increase future opportunities?
Carbon pricing and trading	38. Does the bank have an internal price on carbon?
	39. Does the bank report on its participation in any emissions trading initiative?
External relationship	40. Does the bank report on partnerships or initiatives with specialized NGOs, industry organizations, governmental or supra-governmental organizations, which are focused on improving environmental issues?

Source: Based on global climate change initiatives (Kyoto Protocol, Paris Agreement, SDGs and CG codes in SSA region).

Appendix B. Corporate governance disclosure index scoring method

Corporate governance disclosures (CG) index

CG theme	CG item: information on or reference to	Range of scores	Total score per theme
	Director and board disclosures		
(i) Director and board	1. In case the roles of chairperson and MD/ CEO are split is disclosed	0–1	43
	2. Whether the chairperson of the board is an independent, non-executive director	0–1	
	3. If majority of non-executive directors (NEDs) constitute the board of the bank	0–1	
	4. Does the board meet at least four times in a year	0–1	
	5. Does the bank disclose records of individual directors' meetings	0–1	
	6. Whether the responsibilities of the board of directors is disclosed	0–1	
	7. Classification of board of directors into executive, NED, and independent	0–1	
	8. Disclosure of the performance of the chairperson	0–1	
	9. Disclosure of the effectiveness and performance of the CEO/MD	0–1	
	10. Disclosure of the board's performance and effectiveness.	0–1	
	11. Disclosure of directors' biography, experience and responsibilities	0–1	
	12. Disclosure of a narrative with regards to a policy on the issue of diversity of the board	0–1	
	13. Disclosure of the position of a company secretary filled by a competent person	0–1	
	14. Disclosure of the performance of the company's secretary	0–1	
	15. As to whether directors have access to free independent professional legal advice	0–1	
	16. Narrative relating to induction, training and personal development of directors.	0–1	
	17. Whether the size of the board in terms of number is disclosed	0–1	
	18. Disclosure of the performance of individual board members	0–1	
	19. Narrative on board charter, leadership duties and roles	0–1	
	20. Disclosure of policy on staggered appointment and rotation of directors	0–1	
	21. Disclosure of policy on multiple and alternate directorship of board members	0–1	
	22. Disclosure on board independence, skills, experience and knowledge of the bank	0–1	
	23. If the bank has established remuneration committee	0–1	
	24. If the remuneration committee is made up of independent NEDs	0–1	
	25. If the chairperson of the remuneration committee is an independent NED	0–1	
	26. Disclosure of the remit of the remuneration committee	0–1	
	27. Disclosure of the performance of the remuneration committee	0–1	
	28. Disclosure of the membership of the remuneration committee	0–1	
	29. If the remuneration committee meets at least four times in a year	0–1	
	30. Disclosure of the establishment of nomination committee	0–1	

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Corporate governance disclosures (CG) index			
CG theme	**CG item: information on or reference to**	**Range of scores**	**Total score per theme**
	31. If the nomination committee is made up of majority of independent NEDs is disclosed	0–1	
	32. As to whether the remit of the nomination committee and performance is disclosed.	0–1	
	33. Whether the nomination committee chairperson is an independent member is disclosed	0–1	
	34. Whether the membership of the nomination committee of the board is disclosed	0–1	
	35. Disclosure meeting attendance records of members of the nomination committee	0–1	
	36. As to whether nomination committee meets at least four times in a year is disclosed	0–1	
	37. Disclosure relating to the issue of technological failure and breakdown	0–1	
	38. Whether share ownership by directors and officers is <50% of the total bank shareholdings	0–1	
	39. Whether the performance of all board sub committees' performance and effectiveness is disclosed	0–1	
	40. Whether there is a board statement on the going-concern status of the bank is disclosed	0–1	
	41. Whether directors who hold directorships in other companies is disclosed	0–1	
	42. Whether directors made statements regarding internal controls is disclosed	0–1	
	43. Whether a narrative s relating to directors review of internal controls privately with auditors	0–1	
	Accounting, auditing and transparency disclosures		
(ii) Accounting, auditing and transparency	44. Disclosure of the performance and evaluation of the audit committee	0–1	22
	45. As to whether an audit committee has been established	0–1	
	46. As to if the audit committee is made up of at least three independent NEDs	0–1	
	47. As to whether the chairperson of the audit committee is an independent NED	0–1	
	48. Disclosure of the remit of the audit committee	0–1	
	49. Disclosure of the membership of the audit committee	0–1	
	50. Disclosure of the audit committee members meeting attendance record	0–1	
	51. At least one member of the audit committee has relevant financial training and experience	0–1	
	52. Disclosure of the performance of the individual members of the audit committee	0–1	
	53. Disclosure of director's remuneration, interests, and share options	0–1	
	54. Disclosure of directors' philosophy and procedure	0–1	
	55. Disclosure of a policy on timely and balanced information concerning the bank	0–1	
	56. Disclosure of evaluation of risk management and governance of internal control and audit system	0–1	
	57. Disclosure of a policy on risk management and governance strategy	0–1	
	58. As to whether the audit committee meets at least four times in a year	0–1	
	59. Disclosure of related party transactions or offers such as subsidiaries	0–1	
	60. Policy to inhibits insider share trade before announcement of price sensitive information	0–1	
	61. Existence of policies for appointing and disengaging external auditors	0–1	
	62. Disclosure of annual financial performance of the bank	0–1	
	63. Disclosure of policy on staggered appointment and rotation of directors	0–1	
	64. Disclosure relating to the review of corporate operations	0–1	
	65. Whether a narration relating to audit committees' full access to information is disclosed	0–1	
	Risk management, internal audit and control disclosures		
(iii) Risk management, internal audit and control disclosures	66. As to if a risk management committee has been established	0–1	13
	67. Disclosure of the remit of the risk committee	0–1	
	68. As to whether there is a disclosure of risk committee members' meeting attendance	0–1	
	69. Disclosure of the membership of the risk committee	0–1	
	70. As to whether risk management committee meets at least four times a year	0–1	
	71. Disclosure of future systematic and non- systematic risk	0–1	
	72. Disclosure of an existing internal systems	0–1	
	73. Disclosure of how current and future evaluated bank risk will be managed	0–1	
	74. Disclosure on issues relating to IT	0–1	
	75. Disclosure on issues with regards to management and governance	0–1	
	76. Disclosure relating to risk management, governance strategy and policy	0–1	
	77. Disclosure on issues with regards to internal control and audit systems	0–1	
	78. If the risk management committee membership is made up of executives and independent directors	0–1	
	Compliance, shareholder rights and enforcement disclosures		
iv) Compliance, shareholder rights and enforcement	79. Disclosure of the existence of one-share-one vote policy	0–1	22
	80. Disclosure of on how the bank encourages shareholder activism (proxy vote)	0–1	
	81. Positive statements with regards to compliance with national CG code	0–1	
	82. Disclosure on shareholder right to attend and also vote at annual general meetings	0–1	
	83. Disclosure of how the bank is contributing to the development of financial journalism	0–1	
	84. Disclosure of shareholders 'right to have their views on pay	0–1	

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Corporate governance disclosures (CG) index			
CG theme	**CG item: information on or reference to**	**Range of scores**	**Total score per theme**
	85. Disclosure of the issue of general compliance	0–6	
	86. Disclosure of the existence of right of shareholders to call extraordinary meetings	0–1	
	87. Disclosure of right of shareholders to have timely information regards to AGM	0–1	
	88. Disclosure of shareholders right to receive annual report, other relevant communications	0–1	
	89. Shareholders 'right to receive dividends and residual income out of liquidation	0–1	
	90. Disclosure of a narrative with respect to equal treatment of all shareholders	0–1	
	91. Disclosure of the use of modern ways of communication	0–1	
	92. Narrative with regards to shareholders' right to transfer and registration of share ownership	0–1	
	93. Disclosure of provisions of corporate governance	0–1	
	94. Whether a narrative that indicates that the board is accountable to shareholders is disclosed	0–1	
	95. Whether governance committee is established is disclosed	0–1	
	96. Narrative that states that all shareholders have equal access information about the bank is disclosed	0–1	
	97. Narrative indicating that voting responsibility increases with size of shareholding is disclosed	0–1	
	98. Whether there is disclosure of policy to ensure no block persons have unfettered power	0–1	
	99. Narrative relating to communication among shareholders and other stakeholders is disclosed	0–1	
	100. Narrative relating to policy on how the bank should relate with internal and external stakeholders	0–1	

Appendix C. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.irfa.2024.103438.

References

Abdelfattah, T., & Aboud, A. (2020). Tax avoidance, corporate governance, and corporate social responsibility: The case of the Egyptian capital market. *Journal of International Accounting, Auditing and Taxation, 38*, Article 100304.

Adu, D. A. (2022). Sustainable banking initiatives, environmental disclosure and financial performance: The moderating impact of corporate governance mechanisms. *Business Strategy and the Environment, 31*(5), 2365–2399.

Adu, D. A. (2023). How do board and ownership characteristics affect bank risk-taking? New evidence from sub-Saharan Africa. *Journal of Banking Regulation*, 1–25.

Adu, D. A., Abedin, M. Z., & Hasan, M. (2023). Bank ownership structures and sustainable banking initiatives: The moderating effect of governance mechanism. *International Review of Financial Analysis, 89*, 102736.

Adu, D. A., Al-Najjar, B., & Sitthipongpanich, T. (2022). Executive compensation, environmental performance, and sustainable banking: The moderating effect of governance mechanisms. *Business Strategy and the Environment, 31*(4), 1439–1463.

Adu, D. A., Flynn, A., & Grey, C. (2022). Executive compensation and sustainable business practices: The moderating role of sustainability-based compensation. *Business Strategy and the Environment, 31*(3), 698–736.

Adu, D. A., & Roni, N. N. (2024). Bank climate change initiatives, ownership structures, and corporate governance mechanisms: Evidence from emerging economies. *Business Strategy and the Environment, 33*(4), 3039–3077.

Affum, F., & Obiri, K. A. (2020). Ghana's banking sector cleanup: Its repercussions on customer attitudes towards banking. *Journal of Management Marketing and Logistics, 7*(4), 234–248.

Alessi, L., Ossola, E., & Panzica, R. (2021). What greenium matters in the stock market? The role of greenhouse gas emissions and environmental disclosures. *Journal of Financial Stability, 54*, Article 100869.

Al-Shaer, H., & Zaman, M. (2019). CEO compensation and sustainability reporting assurance: Evidence from the UK. *Journal of Business Ethics, 158*, 233–252.

Amran, A., Lee, S. P., & Devi, S. S. (2014). The influence of governance structure and strategic corporate social responsibility toward sustainability reporting quality. *Business Strategy and the Environment, 23*(4), 217–235.

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies, 58*(2), 277–297.

Ashforth, B. E., & Gibbs, B. W. (1990). The double-edge of organizational legitimation. *Organization Science, 1*(2), 177–194.

Atkins, J., & Maroun, W. (2018). Integrated extinction accounting and accountability: Building an ark. *Accounting, Auditing & Accountability Journal, 31*, 750–786.

Sanusi, L.S. (2010). The Nigerian Banking Industry: what went wrong and the way forward. Delivered at Annual Convocation Ceremony of Bayero University, Kano held on, 3(1), 2010.

Baboukardos, D. (2018). The valuation relevance of environmental performance revisited: The moderating role of environmental provisions. *The British Accounting Review, 50*(1), 32–47.

Barnett, M. L., & Salomon, R. M. (2006). Beyond dichotomy: The curvilinear relationship between social responsibility and financial performance. *Strategic Management Journal, 27*(11), 1101–1122.

Bank of Ghana (2018). Government Establishes New Indigenous Bank; Bank Of Ghana Revokes Licences of Five Banks and Appoints Receiver In Respect Of Their Assets and Liabilities, Available at https://www.bog.gov.gh/wp-content/uploads/2019/07/PRESS-RELEASE-Grand-Final-August-2018.pdf. Date Retrieved 5th August 2020.

Berrone, P., & Gomez-Mejia, L. R. (2009). Environmental performance and executive compensation: An integrated agency-institutional perspective. *Academy of Management Journal, 52*(1), 103–126.

Biswas, P. K., Mansi, M., & Pandey, R. (2018). Board composition, sustainability committee and corporate social and environmental performance in Australia. *Pacific Accounting Review, 30*(4), 517–540.

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics, 87*(1), 115–143.

Boateng, F., Adesi, M., Yeboah, E., Oduro, L. M., & Sackey, M. M. (2021). Customer satisfaction and customer loyalty in the post-crisis banking sector of Ghana. *Journal of Marketing and Customer Research, 76*, 20–25.

Branco, M. C., & Rodrigues, L. L. (2006). Corporate social responsibility and resource-based perspectives. *Journal of Business Ethics, 69*, 111–132.

Brownbridge, M. (2015). How relevant are the Basel capital reforms for sub-Saharan Africa? *Journal of Risk Management in Financial Institutions, 8*(2), 153–162.

Bui, B., Houqe, M. N., & Zaman, M. (2020). Climate governance effects on carbon disclosure and performance. *The British Accounting Review, 52*(2), Article 100880.

Burke, J. J., Hoitash, R., & Hoitash, U. (2019). The heterogeneity of board-level sustainability committees and corporate social performance. *Journal of Business Ethics, 154*, 1161–1186.

Central Bank of Kenya (2016). Bank Supervision Annual Report 2016, Nairobi, Kenya, Available at: https://www.centralbank.go.ke/2017/08/25/2016-bank-supervision-annual-report/. Date Retrieved 20 September 2021.

Chiaramonte, L., Dreassi, A., Girardone, C., & Piserà, S. (2022). Do ESG strategies enhance bank stability during financial turmoil? Evidence from Europe. *The European Journal of Finance, 28*(12), 1173–1211.

Chiaramonte, L., Dreassi, A., Goodell, J. W., Paltrinieri, A., & Piserà, S. (2024). Banks' environmental policies and banks' financial stability. *Journal of International Financial Markets Institutions and Money, 91*, Article 101927.

Choi, B., & Luo, L. (2021). Does the market value greenhouse gas emissions? Evidence from multi-country firm data. *The British Accounting Review, 53*(1), Article 100909.

Dam, L., & Scholtens, B. (2012). Does ownership type matter for corporate social responsibility? *Corporate Governance: An International Review, 20*(3), 233–252.

DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 147–160.
Dixon-Fowler, H. R., Ellstrand, A. E., & Johnson, J. L. (2017). The role of board environmental committees in corporate environmental performance. *Journal of Business Ethics, 140*, 423–438.
Dumay, J., Guthrie, J., & Farneti, F. (2010). GRI sustainability reporting guidelines for public and third sector organizations: A critical review. *Public Management Review, 12*(4), 531–548.
Eleftheriadis, I. M., & Anagnostopoulou, E. G. (2015). Relationship between corporate climate change disclosures and firm factors. *Business Strategy and the Environment, 24*(8), 780–789.
Esteban-Sanchez, P., de la Cuesta-Gonzalez, M., & Paredes-Gazquez, J. D. (2017). Corporate social performance and its relation with corporate financial performance: International evidence in the banking industry. *Journal of Cleaner Production, 162*, 1102–1110.
Freeman, R. E., & Reed, D. L. (1983). Stockholders and stakeholders: A new perspective on corporate governance. *California Management Review, 25*, 88–106.
Friedman, M. (1970). A Friedman doctrine: The social responsibility of business is to increase its profits. *The New York Times Magazine, 13*, 32–33.
Galaskiewicz, J. (1985). Interorganizational relations. *Annual Review of Sociology, 11*(1), 281–304.
Giannarakis, G., Zafeiriou, E., & Sariannidis, N. (2017). The impact of carbon performance on climate change disclosure. *Business Strategy and the Environment, 26*(8), 1078–1094.
Gold, N. O., & Aifuwa, H. O. (2022). Board meetings and sustainability reporting of banks in Nigeria. *Copernican Journal of Finance and Accounting, 11*(3), 49–67.
Guest, P. M. (2009). The impact of board size on firm performance: Evidence from the UK. *The European Journal of Finance, 15*(4), 385–404.
Gujarati, D. N. (2004). *Basic econometrics* (4th ed.). New York, NY: McGraw-Hill.
Gyapong, E., Monem, R. M., & Hu, F. (2016). Do women and ethnic minority directors influence firm value? Evidence from post-apartheid South Africa. *Journal of Business Finance and Accounting, 43*(3–4), 370–413.
Hamed, R. S., Al-Shattarat, B. K., Al-Shattarat, W. K., & Hussainey, K. (2022). The impact of introducing new regulations on the quality of CSR reporting: Evidence from the UK. *Journal of International Accounting, Auditing and Taxation, 46*, Article 100444.
Haque, F. (2017). The effects of board characteristics and sustainable compensation policy on carbon performance of UK firms. *The British Accounting Review, 49*(3), 347–364.
Haque, F., & Ntim, C. G. (2020). Executive compensation, sustainable compensation policy, carbon performance and market value. *British Journal of Management, 31*(3), 525–546.
Harjoto, M. A., & Jo, H. (2011). Corporate governance and CSR nexus. *Journal of Business Ethics, 100*, 45–67.
Hussain, N., Rigoni, U., & Orij, R. P. (2018). Corporate governance and sustainability performance: Analysis of triple bottom line performance. *Journal of Business Ethics, 149*, 411–432.
Jellason, N. P., Ambituuni, A., Adu, D. A., Jellason, J. A., Qureshi, M. I., Olarinde, A., & Manning, L. (2024). The potential for blockchain to improve small-scale Agri-food business' supply chain resilience: A systematic review. *British Food Journal*. https://doi.org/10.1108/BFJ-07-2023-0591
Jizi, M. I., Salama, A., & Dixon, R. (2014). Corporate governance and corporate social responsibility disclosure: Evidence from the US banking sector. *Journal of Business Ethics, 125*, 601–615.
Jo, H., & Harjoto, M. A. (2012). The causal effect of corporate governance on corporate social responsibility. *Journal of Business Ethics, 106*(1), 53–72.
Jones, T. M. (1995). Instrumental stakeholder theory: A synthesis of ethics and economics. *Academy of Management Review, 20*, 404–437.
Khurram, M. U., Chen, L., Abedin, M. Z., Adu, D. A., & Lucey, B. (2024). ESG disclosure and internal pay gap: Empirical evidence from China. *International Review of Economics and Finance, 92*, 228–244.
Kılıç, M., Uyar, A., Kuzey, C., & Karaman, A. S. (2021). Drivers and consequences of sustainability committee existence? Evidence from the hospitality and tourism industry. *International Journal of Hospitality Management, 92*, Article 102753.
Kumar, K., & Prakash, A. (2019). Examination of sustainability reporting practices in Indian banking sector. *Asian Journal of Sustainability and Social Responsibility, 4*(1), 1–16.
Luo, L., & Tang, Q. (2021). Corporate governance and carbon performance: Role of carbon strategy and awareness of climate risk. *Accounting and Finance, 61*(2), 2891–2934.
Mallin, C. (2002). The relationship between corporate governance, transparency and financial disclosure. *Corporate Governance: An International Review, 10*, 253–255.
Maqbool, S., & Zameer, M. N. (2018). Corporate social responsibility and financial performance: An empirical analysis of Indian banks. *Future Business Journal, 4*(1), 84–93.
Mecagni, M., Marchettini, D., & Maino, R. (2015). Banking in sub-Saharan Africa: Key features and challenges. *Recent Trends in Banking in Sub-Saharan Africa, 9*.
Michelon, G., & Parbonetti, A. (2012). The effect of corporate governance on sustainability disclosure. *Journal of Management and Governance, 16*(3), 477–509.
Moufty, S., Clark, E., & Al-Najjar, B. (2021). The different dimensions of sustainability and bank performance: Evidence from the EU and the USA. *Journal of International Accounting, Auditing and Taxation, 43*, Article 100381.
Mukhibad, H., Muthmainah, M., & Andraeny, D. (2020). The role of corporate social responsibility disclosure in improving financial performance (case study in Indonesian Islamic Bank). *al-Uqud: Journal of Islamic Economics, 4*(2), 162–173.
Nguyen, T. H. H., Ntim, C. G., & Malagila, J. K. (2020). Women on corporate boards and corporate financial and non-financial performance: A systematic literature review and future research agenda. *International Review of Financial Analysis, 71*, Article 101554.
Nobanee, H., & Ellili, N. (2016). Corporate sustainability disclosure in annual reports: Evidence from UAE banks: Islamic versus conventional. *Renewable and Sustainable Energy Reviews, 55*, 1336–1341.
Ntim, C. G., Lindop, S., & Thomas, D. A. (2013). Corporate governance and risk reporting in South Africa: A study of corporate risk disclosures in the pre-and post-2007/2008 global financial crisis periods. *International Review of Financial Analysis, 30*, 363–383.
Ntim, C. G., & Soobaroyen, T. (2013a). Corporate governance and performance in socially responsible corporations: New empirical insights from a neo-institutional framework. *Corporate Governance: An International Review, 21*(5), 468–494.
Ntim, C. G., & Soobaroyen, T. (2013b). Black economic empowerment disclosures by south African listed corporations: The influence of ownership and board characteristics. *Journal of Business Ethics, 116*(1), 121–138.
Orazalin, N. (2020). Do board sustainability committees contribute to corporate environmental and social performance? The mediating role of corporate social responsibility strategy. *Business Strategy and the Environment, 29*(1), 140–153.
Orazalin, N., & Mahmood, M. (2018). Economic, environmental, and social performance indicators of sustainability reporting: Evidence from the Russian oil and gas industry. *Energy Policy, 121*, 70–79.
Orazalin, N., & Mahmood, M. (2021). Toward sustainable development: Board characteristics, country governance quality, and environmental performance. *Business Strategy and the Environment, 30*(8), 3569–3588.
Orazalin, N. S., Ntim, C. G., & Malagila, J. K. (2023). Board sustainability committees, climate change initiatives, carbon performance, and market value. *British Journal of Management, 00*, 1–30.
Oyewumi, O. R., Ogunmeru, O. A., & Oboh, C. S. (2018). Investment in corporate social responsibility, disclosure practices, and financial performance of banks in Nigeria. *Future Business Journal, 4*(2), 195–205.
Peters, G. F., & Romi, A. M. (2014). Does the voluntary adoption of corporate governance mechanisms improve environmental risk disclosures? Evidence from greenhouse gas emission accounting. *Journal of Business Ethics, 125*, 637–666.
Pfeffer, J., & Salancik, G. R. (1978). *The external control of organizations: A resource dependence perspective*. New York: Harper and Row.
Platonova, E., Asutay, M., Dixon, R., & Mohammad, S. (2018). The impact of corporate social responsibility disclosure on financial performance: Evidence from the GCC Islamic banking sector. *Journal of Business Ethics, 151*(2), 451–471.
Preston, L. E., & O'bannon, D. P. (1997). The corporate social-financial performance relationship: A typology and analysis. *Business & Society, 36*(4), 419–429.
Rodrigue, M., Magnan, M., & Cho, C. H. (2013). Is environmental governance substantive or symbolic? An empirical investigation. *Journal of Business Ethics, 114*(1), 107–129.
Sarhan, A. A., Ntim, C. G., & Al-Najjar, B. (2019). Board diversity, corporate governance, corporate performance, and executive pay. *International Journal of Finance and Economics, 24*(2), 761–786.
Schultz, F., Castelló, I., & Morsing, M. (2013). The construction of corporate social responsibility in network societies: A communication view. *Journal of Business Ethics, 115*, 681–692.
Scott, W. R. (2001). *Institutions and organizations*. Sage Publications.
Shaukat, A., Qiu, Y., & Trojanowski, G. (2016). Board attributes, corporate social responsibility strategy, and corporate environmental and social performance. *Journal of Business Ethics, 135*, 569–585.
Simpson, W. G., & Kohers, T. (2002). The link between corporate social and financial performance: Evidence from the banking industry. *Journal of Business Ethics, 35*(2), 97–109.
Singh, S., Tabassum, N., Darwish, T. K., & Batsakis, G. (2018). Corporate governance and Tobin's Q as a measure of organizational performance. *British Journal of Management, 29*(1), 171–190.
Suchman, M. C. (1995). Managing legitimacy: Strategic and institutional approaches. *Academy of Management Review, 20*(3), 571–610.
Sullivan, R., & Gouldson, A. (2017). The governance of corporate responses to climate change: An international comparison. *Business Strategy and the Environment, 26*(4), 413–425.
Sun, Y., Yang, Y., Huang, N., & Zou, X. (2020). The impacts of climate change risks on financial performance of mining industry: Evidence from listed companies in China. *Resources Policy, 69*, Article 101828.
Surroca, J., Tribó, J. A., & Waddock, S. (2010). Corporate responsibility and financial performance: The role of intangible resources. *Strategic Management Journal, 31*(5), 463–490.
Walls, J. L., Berrone, P., & Phan, P. H. (2012). Corporate governance and environmental performance: Is there really a link? *Strategic Management Journal, 33*(8), 885–913.
Weerathunga, P. R., Xiaofang, C., Nurunnabi, M., Kulathunga, K. M. M. C. B., & Swarnapali, R. M. N. C. (2020). Do the IFRS promote corporate social responsibility reporting? Evidence from IFRS convergence in India. *Journal of International Accounting, Auditing and Taxation, 40*, Article 100336.
Wintoki, M. B., Linck, J. S., & Netter, J. M. (2012). Endogeneity and the dynamics of internal corporate governance. *Journal of Financial Economics, 105*(3), 581–606.
Wright, C., & Nyberg, D. (2017). An inconvenient truth: How organizations translate climate change into business as usual. *Academy of management journal, 60*(5), 1633–1661.
Zhou, M., Li, K., & Chen, Z. (2021). Corporate governance quality and financial leverage: Evidence from China. *International Review of Financial Analysis, 73*, Article 101652.
Zhou, Y., Kara, A., & Molyneux, P. (2019). Chair-CEO generation gap and bank risk-taking. *The British Accounting Review, 51*(4), 352–372.