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Assessing the Role of Sustainability Disclosure on Firms' Financial Performance: Evidence from the Energy Sector of Belt and Road Initiative Countries

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Abstract: This study examines the influence of sustainability disclosure on a firm's financial performance in the energy sector, taking into account the role of ownership concentration as a moderating factor. This study utilized secondary data from 239 energy companies from the Belt and Road Initiative (BRI) nations from 2009 to 2022. This study employed the Common Correlated Effect Mean Group and the Pooled Mean Group estimators for the analysis. To determine which component of sustainability disclosure influences a firm's financial performance, this study divided the measurement of sustainability into three themes: environment, social, and governance. The findings revealed a positive relationship between environmental disclosure and financial performance. Similarly, we found a positive relationship between social disclosure and financial performance. However, governance disclosure does not contribute to financial performance. Furthermore, we found that ownership concentration positively moderates the association between environmental disclosure and financial performance, as well as social disclosure and financial performance. The results suggest that energy firms in developing countries should prioritize disclosing their environmental and social policies to ensure long-term financial performance.

Keywords: sustainability disclosure; financial performance; ownership concentration; energy sector; Belt and Road Initiative countries

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1. Introduction

In a rapidly evolving world where environmental sustainability issues are prominent, companies are being urged to shift their focus towards a long-term sustainable growth strategy [1]. This increased attention to sustainability practices among businesses is due to the rising understanding of the urgent need for ecologically and socially responsible corporate practices in light of the severe climatic concerns facing the world. As developing countries in the Belt and Road Initiative (BRI) block grapple with the complex challenge of meeting their growing energy needs while minimizing environmental impact, the role of sustainability disclosure has come into sharp focus. Energy firms are pressured to adopt sustainability initiatives and practices to show their dedication to sustainability principles [2]. In response to this growing need, firms have begun to share their sustainability performance with their stakeholders, including investors, to ensure high financial performance in the long run. Hence, the need for firms to ensure both sustainability and financial performance growth.

The Belt and Road Initiative was introduced by China in 2013, and aims to build land and marine networks that connect Asia, Europe, and Africa [3]. More than 140 nations are part of the BRI as of August 2023. The BRI emphasizes development, intercultural communication, and sustainability for member countries of the block. This commitment is essential given the surroundings and developmental requirements of the participating countries. The energy sector plays a significant role in the BRI due to its impact on

sustainable development, environmental protection, and energy stability [4]. Considering these factors in light of the BRI's focus on sustainability calls for research into this area for effective policy implication.

Among the elements influencing corporate sustainability disclosure and decision-making processes is ownership structure. The aspect of ownership structure that effects reporting procedures is ownership concentration [5]. Thus, it is important for corporations to define a constructive ownership concentration to promote the sustainability reporting process. A high ownership concentration can impact on firms' strategic decisions. For instance, Mukhtar, Shad [6] argues that shareholders have more influence regarding sustainability disclosure when there is a large concentration of ownership. In addition, Nirino, Santoro [7] discovered that shareholders influence how businesses should tackle sustainability issues, which in turn affects the organization's entire strategy and sustainability objectives. All these point to the fact that ownership concentration has an indirect role on firms' sustainability practices.

Sustainability disclosure has gained prominence as a means for firms to communicate their commitment to environmental, social, and governance (ESG) principles to stakeholders. Despite the growing popularity of sustainability practices in developed economies, companies in developing economies often provide stakeholders with less information regarding their sustainability practices despite the increasing global emphasis on sustainability [8]. Prior studies used a variety of theoretical frameworks, including agency theory, legitimacy theory, resource-based approaches, and institutional theory [9–11] to examine the relationship between sustainability disclosure and firm performance [12–15]. In most of these studies, the role of concentrated ownership was left out in their models, especially for regional studies.

Hence, this study aims to evaluate how each component of sustainability disclosure influences firm performance in the energy sector, particularly in emerging nations in the BRI block, while also considering the role that concentrated ownership has on this connection. We consider stakeholder and signaling theories in this study. While the signaling approach suggests that disclosure operates as a credible signal impacting stakeholders' perception of a company's commitment to sustainability disclosure practices, stakeholder theory incorporates stakeholders' direct interests and influences regarding environmental and social issues. These frameworks provide insightful information on how sustainability disclosure affects stakeholders' attitudes and supports companies' performance.

The authors were motivated to conduct this empirical study due to the growing importance of sustainability and the need to understand its impact on firms' performance. None of the prior studies had considered the role that ownership concentration plays in the relationship between sustainability disclosure and firms' performance in the context of regional integration such as the BRI. Our study is relatively novel due to this unique focus.

Additionally, this study adopted a more robust method using the financial growth measure, departing from the typical practice of analyzing business performance simply through metrics like profitability or firm value. Utilizing the financial growth measure has several benefits, one of which is that it considers a company's capacity to develop and thrive over time, reflecting its resilience and sustainability, which profitability and firm value metrics could not adequately capture.

This study uses a quantitative method to investigate how sustainability disclosure affects business performance. This study categorizes sustainability evaluation into three themes: governance, social, and environmental. We used publicly accessible data from the annual reports and financial statements of 239 energy firms in the BRI block from 2009 to 2022. The Pooled Mean Group (PMG) and the Common Correlated Effect Mean Group (CCEMG) are the estimators used for the analysis. Our results revealed a positive relationship between environmental disclosure and financial performance. Similarly, we found a positive relationship between social disclosure and financial performance. However, governance disclosure does not contribute to financial performance. Furthermore, we found that ownership concentration positively moderates the association between environmental

disclosure and financial performance, as well as social disclosure and financial performance. The results suggest that energy firms in developing countries should prioritize disclosing their environmental and social policies to ensure long-term financial performance.

This study makes four essential contributions. First, it provides empirical evidence and deepens our understanding of the relationship between a company's performance and each aspect of sustainability disclosure from the perspective of regional integration. This is a significant addition since it provides evidence on how each aspect of sustainability disclosure impacts the financial performance of companies. Second, adding to the body of current literature, this study investigates the effect of concentrated ownership on the relationship between sustainability disclosure and financial performance in the energy sector. Evidence from this study will inform policy makers and shareholders on the role of ownership concentration in this dynamic. Third, we draw from stakeholder and the signaling theory. The theoretical frameworks offer a comprehensive theoretical perspective on how sustainability disclosure practices can shape the financial performance of energy firms in developing countries by considering broader impacts stakeholders and potential risk reduction, offering crucial guidance to policy makers, investors, and energy companies committed to promoting sustainable business practices in this essential sector. Lastly, this study contributes to the existing literature by focusing on developing countries in the BRI block, where the energy sector faces unique challenges. By exploring this context of developing countries' energy sectors, a phenomenon that needs to be added to the literature, this study expands the knowledge base, presents valuable implications for policy makers and investors, and guides energy sector companies in navigating the complexities of sustainability in developing economies.

The following are this study's remaining sections: Section 2 looks at the background literature and the development of the hypotheses. The research methods were the focus of Section 3. The data analysis and a discussion are presented in Section 4. A summary of this study is provided in the final section, along with conclusions and recommendations.

2. Literature Review

2.1. Related Literature

This study builds on two literature streams: sustainability literature and firm performance literature.

Regarding the sustainability literature, studies have investigated sustainability disclosures and their influence on the performance of firms operating in the various sectors in developed and least developed economies. For example, Corrales-Estrada, Gómez-Santos [12] examined sustainability and financial resilience, Al-Hiyari, Ismail [16] researched on environmental performance and firm performance, Cordeiro, Profumo [17] also studied corporate social responsibility and business sustainability, Zarefar, Agustia [18] explored the link between corporate sustainability reporting and financial performance, and Wu, Li [19] also investigated the interplay between ESG performance and firm value. Again, Worokinasih and Zaini [20] explored CSR disclosure and firm performance. Furthermore, most studies discovered a positive association between sustainability disclosure and firm performance, including indicators of financial stability, financial resilience, and long-term viability, for instance, a study by Ahsan and Qureshi [21] found that sustainability disclosure in the manufacturing sector positively correlated with investor confidence and reduced the cost of capital in developing economies. This aligns with the signaling theory, suggesting that transparent disclosure of sustainability practices may positively influence stakeholders' perceptions and financial decisions, which enhance firm performance. Aifuwa [22] suggested that future studies can explore the interplay of each sustainability component on business performance for policy implication in various economies.

In firm financial performance literature, the prevailing focus of prior studies has predominantly centered on accounting management and organizational structure literature. Notably, studies have delved into domains such as strategic management and firm performance Vanichchinchai [23], Azadegan, Mellat Parast [24] looked at supply chain

management and firm performance, Corrales-Estrada, Gómez-Santos [12] examined organizational resilience and firm performance [25], corporate governance and firm financial performance, as well as ESG and firm performance [12].

However, the current study seeks to transcend the boundaries of traditional accounting perspectives by venturing into the domain of sustainability literature. Prior studies have primarily utilized profitability indicators, such as Return on Equity (ROE), Return on Assets (ROA), and Tobin's Q, as proxies for assessing firm performance [26]. Contrary to prior studies, this study introduces a novel dimension by incorporating a financial growth metric such as revenue growth rate and asset growth rate as a proxy or measure for firm financial performance. This strategic expansion of metrics aims to enhance the relevance and practical applicability of this study's findings in real-world business scenarios. This study seeks to give more nuanced views on corporate financial performance's theoretical and practical aspects by broadening the scope beyond traditional profitability metrics. Sustainability disclosure and its effects on company performance and overall sustainability have been the subject of much academic research. Attempts by energy companies in countries participating in the Belt and Road Initiative (BRI) to determine how sustainability disclosure affects their financial performance have shown inconsistent results. Research on how concentrated ownership influences this connection is also lacking. Due to the distinct advantages and disadvantages of the Belt and Road Initiative and the critical role played by the energy sector, this connection must be properly investigated. To better comprehend the complicated relationship between sustainability disclosure aspects and the financial performance of organizations and the potential impact of concentrated ownership on this connection, it is necessary to fill this literature gap. Therefore, this study benefits academics, policy makers and the energy industry in BRI countries.

2.2. Theoretical Review

2.2.1. Stakeholder Theory

A theoretical framework for comprehending how sustainability disclosure impacts a company's financial performance is provided by stakeholder theory [27]. The premise of this theory is that businesses operate inside complex networks of relationships with many kinds of stakeholders. Companies that are open and honest about their efforts to solve ESG challenges stand to acquire the respect and confidence of their stakeholders. In the long run, a more optimistic view from investors may benefit the company's financial performance. The improvement in shareholder mood may have a beneficial impact on the company's financial performance. Furthermore, transparency about sustainability might be an effective instrument for risk management. It lessens the possibility of crises that might impair operations or damage the company's financial performance and reputation by helping businesses identify and mitigate ESG-related risks and vulnerabilities. It also draws in moral investors searching for companies with solid reporting procedures.

According to stakeholders, ownership concentration significantly impacts the association between sustainability disclosure and a company's success. A small number of influential shareholders can significantly impact management and long-term strategy when they possess a disproportionate quantity of the company's shares [3]. Depending on the owner's viewpoint, this concentrated influence may or may not aid sustainability initiatives. However, a weaker relationship might jeopardize the company's financial performance if these owners prioritize short-term profits over long-term stability.

2.2.2. Signaling Theory

The signaling theory suggests that businesses may utilize sustainability disclosure to show their commitment to and care for social problems [12]. A company's reputation can be enhanced using sustainable business methods, which attract more investors and customers and increase financial performance. Signaling theory states that businesses use sustainability disclosure to interact with investors, clients, and authorities, demonstrating their commitment to moral and sustainable business practices [16]. In the long

run, this signaling mechanism may lessen uncertainty over the firm's financial success by fostering stakeholder trust and goodwill. Therefore, sustainability disclosure may significantly increase a business's profitability by drawing in moral investors, making it easier to obtain financing, enhancing their reputation, and lowering the risk associated with ESG concerns [28].

The idea also claims that concentrated ownership interests significantly impact a company's financial performance and sustainability disclosure. If a few well-known shareholders own most shares, their decisions and actions send significant signals to other stakeholders, including creditors and investors. In these situations, concentrated ownership and a strong focus on sustainability disclosure can convey a company's commitment to social and environmental responsibility [29]. The company's emphasis on sustainability disclosure suggests that reducing information asymmetry and perceived risks may improve its capacity to obtain funding and support for its ongoing financial success. This is particularly true in the case of a highly concentrated ownership structure since the demands of major shareholders align very closely with the company's transparency policies and strategic choices. This demonstrates how crucial sustainability is in maintaining the financial performance of businesses.

2.3. Empirical Review and Hypotheses Development

2.3.1. Environmental Disclosure and Corporate Financial Performance

Stakeholder theory suggests that in order for a corporation to earn the trust and support of its stakeholders, it should be open about its environmental policies and address their concerns and expectations. Establishing credibility with key constituents and eliciting their buy-in are crucial to the firm's bottom line. In addition, according to signaling theory, creditors and investors perceive less risk and less information asymmetry when environmental data are fully disclosed. To do this, the company's consistent commitment to sustainability must be clearly signaled. According to theoretical viewpoints, environmental disclosure boosts long-term financial success for firms by improving stakeholder relationships and acting as a critical signal.

According to stakeholder theory, firms should prioritize stakeholder interests alongside their own financial and environmental responsibilities to maximize long-term financial performance. Based on the Indonesian textile firms from 2006 to 2019, Chen, Wang [30] revealed that companies with high ecological performance have a corresponding higher financial performance than those with low environmental performance. Similarly, Wang, Wang [31] discovered that companies with high environmental disclosure experience higher firm financial performance in the Turkish manufacturing industry which was measured by firm value. This was further supported by Cerciello, Busato [32], who used sample Malaysian-listed manufacturing firms from 2012 to 2022 and discovered that companies with higher environmental performance scores had high financial success status, suggesting that investors view sustainability performance as an indication of higher value and lower risk which leads to an enhanced viability and performance of the firms. However, Tawiah, Zakari [33] discovered that businesses with increased environmental sustainability disclosure levels had low staff productivity, leading to low profitability. The authors suggest that high levels of environmental disclosure may divert resources and attention away from core business activities, resulting in reduced productivity and negatively impacting firms' profitability. Based on the majority of earlier studies, we hypothesize that:

H1. *Environmental disclosure positively influences energy companies' financial performance in developing economies in the BRI block.*

2.3.2. Social Disclosure and Corporate Financial Performance

The signaling theory upholds that social disclosure is a critical communication tool that conveys a firm's commitment to social responsibility to external parties, including investors, creditors, and the general public. It is a compelling signal, reducing information

asymmetry by providing valuable insights into the firm's values and ethical practices. It attracts socially responsible investors and creditors, lowering perceived risks and enhancing access to the financial resources necessary for sustained firm financial performance. Also, following the theory of stakeholders, social disclosure acts as a conduit for meaningful engagement with many stakeholders, ranging from employees and customers to the broader community. Through this engagement, firms can foster trust, collaborative relationships, and positive perceptions. These, in turn, not only bolster internal cohesion and support but also directly contribute to nurturing the essential social capital required for long-term firm financial performance.

According to Ochi, Idiege [34], companies that provide relevant sustainability information to society generate economic benefits. The integration of social disclosure can thus enhance a firm's reputation by signaling its sustainability commitments and financial responsibility, thereby enhancing its reputation and social acceptance. Numerous studies indicate a favorable connection between social disclosure and firm financial performance. For instance, the study by Miles and Miles [35] used a sample of Chinese-listed companies spanning from 2008 to 2015, revealed a favorable link between corporate social performance and firms' financial performance measured by market value. Thus, businesses prioritizing social disclosure have a higher market value, leading to an enhanced firm performance. Also, the study by Angela and Handoyo [36] examined data from firms listed in the S&P 500, found a substantial positive connection between social sustainability disclosure and firm's performance. This findings underscore the notion that adopting socially responsible practices and disclosure can facilitate more accessible access to capital and promote the firms' overall financial well-being. Similarly, Al Amosh and Khatib [37], using a sample of 24 Islamic banks from 2000 to 2014, found that voluntary social disclosure positively impacts the financial performance. Thus, implementing social initiatives into company operations promotes long-term value creation and sustainability and reduces the firm's risks. The findings affirm that businesses are more likely to outperform their rivals when they disclose more sustainability information. Moreover, Cordeiro, Profumo [17] discovered that social disclosure positively links with financial success since organizations with high degrees of social responsibility have higher firm value, leading to enhanced financial performance. On the other hand, Fahad and Nidheesh [38] discovered that businesses with a high degree of corporate social sustainability disclosure had a higher risk of insolvency and financial distress among Indonesian firms, as indicated by the likelihood of declaring bankruptcy, leading to firm performance. In line with the majority of earlier studies, it is assumed that:

H2. *Social disclosure positively influences the financial performance of energy firms in developing economies in the BRI block.*

2.3.3. Governance Disclosure and Corporate Financial Performance

From a stakeholder theory perspective, a comprehensive governance disclosure demonstrates a firm's commitment to transparency and accountability to various stakeholders. Also, governance disclosure serves as a signal, echoing a firm's commitment to sound governance practices, reducing information asymmetry, building confidence, and enhancing access to capital.

Government and regulatory bodies have a significant role in enforcing company ethics and compliance. Thus, firms with more robust governance disclosure had higher levels of financial success in the Korean manufacturing industry. Similarly, Arayssi and Jizi [39] study affirmed that, Indian manufacturing firms that engage in extensive governance disclosure practices are patronized by a more diverse and governance-conscious customer base, which in turn boosts market share and profitability. Moreover, Albitar, Hussainey [40] established that improved governance disclosure practices in the United States resulted in a favorable financial growth of firms. Thus, companies that furnished more extensive data regarding their governance structures and operations experienced a notable upturn in their

stock prices which improves their financial performance. Similarly, in an investigation involving European firms, Bhimavarapu, Rastogi [41] uncovered a constructive link between corporate governance disclosure and firm value. Their study underscored the significance of clear governance practices, demonstrating that firms with superior governance disclosure practices witnessed increased valuations and better financial performance, ultimately benefiting both shareholders and stakeholders. On the contrary, the study by Gunawan, Permatasari [42] found that companies emphasizing high governance disclosure practices within the technology sector faced greater scrutiny from regulatory authorities, which, in turn, led to increased compliance costs and, ultimately, a negative impact on their financial performance. Hence, the following hypothesis is formulated in light of prior studies:

H3. *A positive association exists between governance disclosure and energy companies' financial performance in developing economies in the BRI block.*

2.3.4. Ownership Concentration, Environmental Disclosure and Corporate Financial Performance

From a signaling theory standpoint, concentrated ownership can magnify the impact of environmental disclosure as a signal to external parties, such as investors and creditors. When significant shareholders emphasize environmental disclosure, it signals a proactive approach to sustainability, potentially reducing information asymmetry and enhancing the firm's reputation and access to resources critical for its financial performance. The theory of stakeholders upholds that a highly concentrated ownership structure can influence the power dynamics and priorities within the firm, affecting the level to which environmental stakeholders' interests are taken into account. Thus, concentrated ownership may result in a more alignment of interests, potentially enhancing the commitment to environmental disclosure, which, in turn, can positively impact the firm's financial performance by fostering goodwill and support among environmentally conscious stakeholders [29].

Integrating environmental concerns into clearly defined business processes is critical for preserving society's legitimacy and improving the well-being of its members. Having fewer significant owners with a disproportionate number of shares improves a company's sustainability performance to the extent that it increases the company's financial performance. This is because large-scale ownership makes sustainability disclosure more effective in signaling the firm's dedication to sustainability and aligning stakeholder interests. Thus, corporate environmental performance and financial sustainability may be impacted by ownership concentration. In particular, Karajeh's [43] empirical study found that publicly listed companies' levels of corporate environmental disclosure were positively correlated with the concentration of their owners' ownership claims. Companies were less likely to engage in moral hazard activities because large shareholders with a vested interest served as effective monitors. This suggests that a more concentrated ownership structure might help the corporation be more open and accountable about how it handles the environment. For example, Buertey [44] found that firms with a more significant concentration of ownership and major block holders tend to provide more reliable and thorough environmental information in their reports. In the Korean context, Kholis [45] empirical evidence indicated a negative association between concentrated ownership and voluntary environmental performance, leading to high moral hazard. Thus, firms with highly concentrated ownership structures were found to disclose less environmental information and exhibit a higher propensity for moral hazard behaviors. Moreover, Liu and Bai [46] discovered that ownership structure negatively impacts the relationship between ecological performance disclosure and a company's profitability. The authors suggested that highly concentrated ownership may reduce shareholder pressure to engage in sustainable practices.

In contrast, Viana and Crisóstomo [47] identified a positive link between ownership concentration and firm performance. Thus, firms featuring concentrated ownership arrangements, enhanced operational performance and greater market valuation which leads to enhanced firm performance of the firms. The authors suggested that high institutional ownership promotes long-term decision making and enhances accountability towards

sustainable business practices. Therefore, environmental disclosure is essential to promote company sustainability through signaling and stakeholder engagement mechanisms. In line with earlier literature, we assume that:

H4. *Concentrated ownership positively impacts the relationship between environmental disclosure and financial performance in the energy sector of developing economies.*

2.3.5. Concentrated Ownership, Social Disclosure and Corporate Financial Performance

From a stakeholder theory view, concentrated ownership enhances the alignment of interests between shareholders and the firm, thereby intensifying the relevance of social disclosure in addressing stakeholder concerns. Simultaneously, grounded in signaling theory, ownership concentration magnifies the signaling impact of social disclosure by projecting a robust commitment to addressing societal issues. This, in turn, nurtures trust and support from investors and stakeholders, ultimately contributing to the firm's financial performance. Because of the increased signaling effect of sustainability disclosure, important shareholders can better align stakeholder interests and reinforce the firm's commitment to sustainability when ownership is highly concentrated.

According to Winit, Ekasingh [29], organizations with a high level of managerial ownership saw a considerable improvement in their financial performance when social disclosure procedures were increased. It is clear from that management ownership is an essential factor in maximizing the beneficial effect of social transparency on financial performance. Consequently, the business experiences a more stable and secure financial performance, underscoring the significance of ownership structures in mitigating the possible negative consequences linked to inadequate social disclosure practices in a company. Also, Albitar, Hussainey [40] discovered a favorable relationship between the degree of company social disclosure and ownership concentration. Thus, if a company's ownership is concentrated among a few powerful investors who have a big say in the long-run performance of the business, they may pressure the company to adopt more open and socially conscious business practices to safeguard their investment. However, Zhou [48] argued that a large ownership concentration often negatively impacts a firm's value, which can hurt minority shareholders and lower the firm's total worth. Based on the above literature, we assume the following:

H5. *Ownership concentration positively influences the impact of social disclosure and energy companies' financial performance in developing economies in the BRI block.*

2.3.6. Ownership Concentration, Governance Disclosure, and Corporate Financial Performance

Signaling theory suggests that concentrated ownership can signal a commitment to strong governance practices, enhancing investor confidence and contributing to firm financial performance. The net impact hinges on the balance between these influences, with the degree of concentration and the firm's strategic orientation playing a critical role in shaping the association between governance disclosure and firm financial performance. Furthermore, drawing from stakeholder theory, a firm with highly concentrated ownership tends to cater predominantly to the interests of its significant shareholders, potentially leading to less comprehensive governance disclosure. In this scenario, other stakeholders' interests, such as those of employees and the community, may receive less attention, potentially affecting firms' financial performance.

Compliance and governance disclosure practices in firms with highly concentrated ownership tend to be less effective in enhancing firms' financial performance. In these cases, major shareholders may prioritize their interests over broader stakeholder concerns, leading to weaker accountability mechanism [18]. Contrarily, Chen, Wang [30] discovered a favorable link between ownership concentration and corporate governance disclosure in Chinese firms. This suggests that concentrated ownership structures in Chinese companies may incentivize improved transparency. Furthermore, a study conducted in Italy

by Javeed, Latief [49] revealed that ownership concentration positively influenced voluntary corporate disclosure. This underscores how concentrated ownership can align the interests of dominant shareholders with the need for transparent governance practices. Winit, Ekasingh [29] examined Chinese businesses and discovered a favorable relationship between state shareholders' ownership concentration and business success. Thus, higher ownership concentration in state-owned enterprises (SOEs) may increase government control and better performance. In line with the majority of prior studies, it is hypothesized that:

H6. *Concentrated ownership positively influences the link between governance disclosure and energy companies' financial performance in developing economies in the BRI block.*

3. Methods

3.1. Sampling and Data Sources

We directed this study towards BRI nations in the Sub-Saharan Africa (SSA) region. We used purposive sampling to select the energy companies due to their associations with global warming, substantial emissions, and questionable business practices. The region's distinctive energy challenges, crucial role in economic development, and abundant energy resources support the decision to concentrate on the energy sector in BRI countries within developing economies in the SSA region. This study relied on the stock markets databases of the studied BRI countries in SSA and identified 239 listed energy firms. The data for this study were collected from the energy firm's annual report, financial statements, and sustainability reports. Majority of the data were readily available on the Refinitiv database. Due to data availability, the final sample was made up of 239 firms from 31 countries spanning from 2009 to 2022. We used unbalanced panel data with 2784 observations for this study. Table 1 presents the sample selection of countries and companies.

Table 1. Sample Selection of Countries and Companies.

S/No	Countries	Number of Energy Companies Selected
1	Nigeria	21
2	Angola	12
3	South Africa	24
4	Mozambique	7
5	Ghana	8
6	Kenya	9
7	Tanzania	11
8	Ethiopia	9
9	Cameroon	7
10	Sudan	9
11	Uganda	8
12	Cote d'Ivoire	11
13	Senegal	6
14	Zambia	8
15	Namibia	7

Table 1. *Cont.*

S/No	Countries	Number of Energy Companies Selected
16	Gabon	5
17	Equatorial Guinea	6
18	Republic of Congo	5
19	Mauritania	6
20	Sierra Leone	9
21	Botswana	6
22	Lesotho	7
23	Mali	4
24	Zimbabwe	5
25	Niger	4
26	Rwanda	6
27	Benin	4
28	Togo	3
29	Guinea	5
30	Malawi	4
31	Gambia	3
Total		239

3.2. Model Specification

This study adopted and modified a model by [50] due to its relevance in exploring the connection between sustainability disclosures and financial performance. The following is the presentation of this model, which has strong empirical support and serves as a solid framework for this study:

$$FP_{it} = f(ED_{it},\ SD_{it}, GD_{it}, LEV_{it}, PRO_{it}, AGE_{it}, SIZE_{it}, \varepsilon_{it}) \quad (1)$$

$$FP_{it} = \beta_0 + \beta_1 ED_{it}\ + \beta_2 SD_{it} + \beta_3 GD_{it} + \beta_4 LEV_{it} + \beta_5 PRO_{it}\ + \beta_6 AGE_{it} + \beta_7 SIZE_{it} + \varepsilon_{it} \quad (2)$$

We examine the moderating impact of concentrated ownership on the link between sustainability disclosure and firm financial performance using the regression model below:

$$\begin{aligned} FP_{it} = \beta_0 + \beta_1 ED_{it} \quad & + \beta_2 OC_{it} + \beta_3 (ED_{it}\ \times OC_{it}) + \beta_4 SD_{it}\ + \beta_5 OC_{it} \\ & + \beta_6 (SD_{it} \times OC_{it}) + \beta_7 GD_{it}\ + \beta_8 OC_{it}\ + \beta_9 (GD_{it} \times OC_{it}) \\ & + \beta_{10} LEV_{it} + \beta_{11} PRO_{it}\ + \beta_{12} AGE_{it} + \beta_{13} SIZE_{it} + \varepsilon_{it} \end{aligned} \quad (3)$$

where financial performance is represented by FP, ownership concentration by OC, environmental disclosure by ED, social disclosure by SD, governance disclosure by GD, firm size by SIZE, profitability by PRO, financial leverage by LEV, and firm age by AGE. The symbol ε represents the model's error term, the year is denoted by t, and i means the firm. The parameters or coefficients of the explanatory variables are denoted by β. The symbols used in the equation are indicated in Table 2.

Table 2. Sustainability Disclosure Scoring Criteria.

Disclosure Themes	Description of Scoring Items
Environmental	ED1. Disclosure of carbon intensity, greenhouse gas emissions, and reduction target. ED2. Consumption of renewable energy sources and energy efficiency disclosure. ED3. Disclosure of recycle creation, management techniques, and reduction goals. ED4. Disclosure of water use, water efficiency, and water risks. ED5. Disclosure of ecological hazards, conservation activities, and implications on biodiversity. ED6. Company's dedication to innovation and the creation of sustainable solutions. ED7. A company's efforts to promote and execute sustainable practices.
Social	SD1. Disclosure of human rights policies, risks, and performance, including labor laws, associational freedoms, and anti-discrimination. SD2. Disclosure of product safety procedures, dangers, and results. SD3. Initiatives for employee engagement, development, and retention are promoted via the sharing of policies, procedures, and other relevant information. SD4. Initiatives that reduce poverty, advance social development, and include the community in policy and practice disclosure. SD5. Company's control and management of its supply chain, taking into account social risks and repercussions. SD6. Company's involvement in politics and its possible effect on laws and regulations.
Governance	GD1. Full disclosure of the board's composition, qualifications, and independence. GD2. Executive compensation policies, regulations, and alignment with long-term performance should be open and transparent. GD3. Disclosure of anti-corruption performance, risks, and policies. GD4. Disclosure of stakeholder engagement policies, procedures, and performance, including investor relations, client feedback, and supplier reviews. GD5. Evaluates the distribution of voting rights inside a corporation, enabling shareholders to use their ballots more wisely. GD6. Award from local government for compliance with regulations. GD7. Company's strategy and dedication to tackling social and environmental concerns beyond of the requirements of the law.

3.3. Measurement of Variables

3.3.1. Financial Performance

This study's dependent variable is financial performance, abbreviated as FP. We used a growth rate index as a proxy for financial performance to evaluate the growth rate of sales revenue over a specified period. The growth rate index estimates how a firm's managed sales have grown over the past year. Using financial growth metrics for measuring firms' financial performance provides a forward-looking perspective, indicating the potential for adaptability in changing market conditions, considering a broader range of factors, and being less influenced by accounting choices and one-time events. Sales data from periods 2 and 1 are compared to calculate revenue increases, as indicated in Equation (4).

$$Revenue\ growth\ rate = \frac{period\ 2\ Net\ Sales - period\ 1\ Net\ sales}{Period\ 1\ Net\ Sales} \quad (4)$$

3.3.2. Environmental, Social and Governance Disclosure

Unlike other studies that used a single index to evaluate sustainability disclosure [9], this study suggests an alternative by independently creating a sustainability index that incorporates the three primary themes. Thus, environmental disclosure, social disclosure, and governance disclosure. We adopted and modified an index by [50]. The study utilized content analysis techniques to form the index to assess the extent of environmental, social, and governance disclosure. Codes were assigned to each metric under investigation. This approach integrated metrics and indicators aligned with the GRI and the SDGs. This index provides a standardized approach fostering alignment with broader sustainability principles. The firm's environmental disclosure procedures are evaluated

using seven dimensions. Social and governance disclosure are evaluated using six and seven dimensions, respectively.

For each theme's particular elements under assessment, scores of 3, 2, or 0 are given for full disclosure, partial disclosure, or non-disclosure. Full disclosure means providing detailed information about the theme element, partial disclosure means providing a reasonable number of relevant details, and non-disclosure means not providing any information that is relevant to the theme element. To attain a strong and clear scale, we modified the scoring by [51], using the score values 3, 2, and 0 instead of 3, 2, 1 or 2, 1, 0. With 3 signifying thorough disclosure, 2 representing partial disclosure, and 0 for no disclosure. This deliberate scoring technique provides clarity and improves the robustness and reliability of the findings for policy implications. This method makes distinguishing between different degrees of disclosure thoroughness easier and promotes an accurate and consistent evaluation process, reducing the likelihood of misunderstandings. Table 2 presents the scoring items for suitability disclosure.

Based on the scoring items in Table 2, environmental disclosure (ED), social disclosure (SD), and governance disclosure (GD) are measured as follows:

$$ED = \frac{Sum\ of\ Environmetal\ items\ reported\ in\ the\ firm's\ annual\ reports}{Optimal\ environmental\ disclosure\ scores} \quad (5)$$

$$SD = \frac{Sum\ of\ Social\ items\ disclosed\ in\ the\ firm's\ annual\ reports}{Optimal\ social\ disclosure\ scores} \quad (6)$$

$$GD = \frac{Sum\ of\ Governance\ items\ reported\ in\ the\ firm's\ annual\ reports}{Optimal\ governance\ disclosure\ scores} \quad (7)$$

3.3.3. Summary of Study Variables

Table 3 provides a detailed description of this study's variables.

Table 3. Study Variables in Summary.

Category of Variables	Names of Variables	Symbols	Measurement	Expected Sign
Dependent variable	Financial perfommance	FP	Difference in sales revenue compared to previous years sales.	
Independent variables	Environmental disclosure	ED	Sum of Environmental items reported in the company's annual report/optimal environmental disclosure scores.	+
	Social disclosure	SD	The total number of social items that the corporation discloses in its annual reports/optimal social disclosure scores.	+
	Governance disclosure	GD	The total number of governance-related items reported in the company's annual report/optimal governance disclosure scores.	+
Moderating Variable	Ownership concentration	OC	Shares held by the biggest shareholder as a proportion of all outstanding shares (%).	+
Control variables	Financial Leverage	LEV	Total debt to total assets ratio.	+
	Profitability	PRO	The ratio of net income to average shareholders equity.	
	Age of the company	AGE	Years from the inception of the company till the observation date.	+
	Firm size	SIZE	Total employees of the firm.	+/−

4. Results and Discussion

4.1. Correlation and Multicollinearity Analysis

The link between the dependent and independent variables was examined using the pairwise correlation coefficient analysis approach, as shown in Table 4. The results

showed a mixture of weak and moderate correlations between the variables. The other variables positively correlated with the dependent variable except for GD, LEV, and SIZE. The correlation matrix findings demonstrate that multicollinearity is absent in this study because all coefficients were lower than 0.8. A further confirmation that none of the research variables exceeded the minimum threshold of 10 for the presence of multicollinearity is provided by the VIF minimum and maximum values of 1.02 and 1.44.

Table 4. Pairwise Correlation Matrix and Multicollinearity Analysis.

Variables	FP	ED	SD	GD	OC	LEV	PRO	AGE	SIZE	VIF	1/VIF
FP	1.0000										
ED	0.5418 ***	1.0000								1.04	0.9632
SD	0.7250 **	0.0466	1.0000							1.06	0.9400
GD	−0.0948 **	−0.0054	0.2156 ***	1.0000						1.02	0.9594
OC	0.3475	0.0022	−0.0122	−0.1143 *	1.0000					1.03	0.9692
LEV	−0.0521	−0.1191 *	−0.1495 **	0.0188	−0.0343	1.0000				1.08	0.9233
PRO	0.4968 **	0.0634 **	−0.01	−0.0182	0.0567	0.0314	1.0000			1.44	0.9815
AGE	0.3834	0.0932 *	0.0861 *	−0.0922 *	0.0533	−0.1749 **	0.0830	1.0000		1.07	0.9351
SIZE	−0.0616 *	0.0763	0.0099	0.0154	0.1440 ***	0.0785	0.0595	0.0775	1.0000	1.04	0.9613

***, **, and * at 1%, 5%, and 10%, respectively.

4.2. Estimation Analysis

We used the CCEMG estimator as the main estimation strategy and PMG estimator as a robustness test to prevent diverging regression results that would have resulted from using an improper estimation approach. This study adopted CCEMG because it resists endogeneity, heterogeneity, and serial correlation biases [52,53]. The PMG estimator using panelists is consistent with heterogeneous inclination coefficients and is robust to endogeneity [54,55]. Since the variables were not of the same measurement unit, we used the natural logarithm of the data. Taking natural logarithms of data in regression straightens curvy relationships, normalizes distributions, and enhances the reliability of statistics by addressing issues of skewness and stabilizing variance.

This study utilized four models using the stepwise regression estimation approach. We divided the measurement of sustainability disclosure into three themes, namely the environment, social, and governance. Models 1 to 3 were run using one each of the independent variables. In Model 4, all the independent variables were used together. For each of the models, two estimators were used. This study used the CCEMG estimator as the primary estimator in R1, whereas the PMG estimator was used as a robustness estimator in R2.

Table 5 shows the results of the direct relationship between sustainability disclosure and the financial performance of energy firms in developing economies.

Table 5. Estimation Analysis.

Variables	Model 1		Model 2		Model 3		Model 4	
	R1	R2	R1	R2	R1	R2	R1	R2
LNED	0.3624 *	−0.0487 **					0.1542 *	0.0452 ***
LNSD			0.2368 **	0.0101 *			0.3243 **	0.0164 *
LNGD					−0.0845	−0.1147 *	−0.0465	−0.0384 **
LNLEV	−0.0643 *	−0.0025 **	0.0351	0.0192 *	−0.0708	−0.0052 **	−0.0842	−0.0542
LNPRO	0.5257 **	0.4806 ***	0.4675 ***	0.4588 **	0.6643 *	0.5477 **	0.4861 **	0.3641 *
LNAGE	−0.1157	0.0003	−0.0946	−0.0049 *	−0.0599 *	0.0011 *	−0.0461 *	−0.0348
LNSIZE	0.0529	0.0635 **	0.0869 *	0.0516	0.557	0.0506	0.0575 **	0.0462 **
Sargan Test/Wald chi2	34.27	345.51	24.5	245.51	43.24	423.41	79.4	1839.92
Adj. R^2/Prob > chi2	0.6231	0.0000	0.5378	0.0000	0.6321	0.0000	0.7542	0.0000
OBS	2784	2784	2784	2784	2784	2784	2784	2784

***, **, * for 1%, 5% and 10% respectively.

The Wald chi2 values of 2445.51, 4545.51, 5323.41, and 14,639.92 for models 1–4 given in R2, as shown in Table 5, indicate that the technique is statistically adequate for the empirical investigation. Additionally, the models 1- 4 adjusted R-squared values of 0.6231, 0.5378, 0.6321, and 0.7542 were similarly high, suggesting that the model fits well. Furthermore, the statistical significance of the regression model at the 1% level affirms the

fact that all of the models' *p* values for Prob > chi2 are less than 0.01. As a result, multiple regression analysis is possible since the empirical model's regression impact is believed to be better. The Sargan test results also show how effective and efficient the technique is for the empirical investigation. Therefore, the models appropriately capture a more significant proportion of the variety of effects that the various independent variables have on the dependent variable.

Using the primary estimator regarding the link between ED and financial performance, Model 1 (R1) results show a significant positive association at a 10% level. This implies that when the ED increases by one percent, the FP increases by 0.3624 units, and vice versa. Similarly, Model 4 (R1) findings revealed a positive slope link between ED and FP at 10% significance level. This suggests that a percentage increase in ED leads to a corresponding change of 0.1542 in firms' financial performance. The findings support H1. This mechanism can be attributed to the rising awareness that environmentally responsible practices help energy companies to secure long-term success by reducing risks and attracting investors in a sustainability-focused market, which improves the financial performance of firms.

In addition, Model 2 (R1) results show that at a 5% significance level, social disclosure has a favorable relationship with FP. This suggests that a one-percent rise in social disclosure will result in a 0.3268 increase in the FP. Also, in Model 4 (R1), our findings were similar to those in Model 2 (R1). A positive and significant link was found between social disclosure and a firm's financial performance. This implies that a percentage change in social disclosures influences a change of 0.3243 in the firm's financial performance of energy companies in developing countries. The results correspond with H2. The findings can be attributed to companies that actively engage in social responsibility are often viewed more favorably by customers and investors, which can enhance their long-term reputation and market competitiveness, enhancing a firm's financial performance.

Lastly, Model 3 (R1) results were shown to have a negative but insignificant connection with FP. A percentage shift in GD produces a decrease of 0.0845 in FP and vice versa. Similarly, when all the independent variables were used in Model 4, the findings from R1 suggest an inverse link between governance disclosure and a firm's financial performance. The results contradict H3. The authors suggest this mechanism be attributed to the potential impact of revealing governance weaknesses or inefficiencies in SSA, which may erode investor confidence, deter long-term investments, and lead to regulatory scrutiny, ultimately jeopardizing a company's sustainability disclosure and financial performance.

In addition, the results for PMG robustness, as indicated by R2 for Models 1–4 in Table 5, were consistent with the results for the primary estimator. A negative and statistically significant connection with FP was seen at the 10% level in the results for ED. In addition, the correlation between SD and the organization's financial performance is positive. This indicates that a 10% increase in SD will lead to a 0.0101 increase in the firm's financial performance. Therefore, the PMG estimator's results confirm the CCEMG estimator's conclusions. However, GD and the firm's financial performance have a significant negative relationship at the 10% level. This indicates that a percentage increase in GD will decrease 0.1147 in the firm's financial performance.

Stakeholder theory emphasizes businesses' obligation to consider all stakeholders' interests and the possible advantages of striking a balance between their financial and social commitments [56]. Consequently, a company's environmental disclosure impacts how it discloses its environmental actions. Based on this, we hypothesized a positive association between sustainability and a firm's financial performance. The results of our analysis affirm that environmental disclosure is positively linked with financial performance. Hence, the first hypothesis is accepted. Our results are consistent with those of Al Amosh and Khatib [37], who found that firms with high levels of environmental disclosure had significantly higher returns on assets and equity than firms with low disclosure levels. This is in line with the findings of Agyemang, Yusheng [1], who found that firms with higher levels of environmental disclosure had higher profitability and success, indicating that environmental disclosure positively affects the firm's long-term sustainability status.

Contrary to our findings, the study by Dhar, Sarkar [57] revealed that ED negatively influenced a firm's long-term sustainability. Based on their premise, firms with a strong focus on environmental disclosure may exhibit less concern towards their sustained existence and long-term viability, potentially impacting their future operational capabilities.

Based on the signaling theory, companies that provide relevant sustainability information to society generate economic benefits [34]. The integration of business sustainability and equity social disclosure can thus enhance a firm's reputation by signaling its commitment to sustainability and financial responsibility, thereby enhancing its reputation and social acceptance. Our findings were similar to the study by Lazar and Chithra [58], who found that firms with higher levels of social disclosure had better stock market performance than firms with low disclosure levels, suggesting that non-financial disclosure enhances a firm's reputation and legitimacy and attracts investors. Therefore, our second hypothesis is accepted. Contrary to our findings, Li [59] discovered a negative association between social disclosure and financial performance. The study argued that higher social disclosure may increase the likelihood of business failure, which makes firms more vulnerable to reputational risk.

Government and regulatory bodies play a crucial role in upholding business ethics. Our research reveals an inverse relationship between governance disclosure and FP. This is attributed to the fact that, in developing economies, the government's primary focus is on fostering economic growth, often at the expense of environmental concerns. Consequently, regulators tend to adopt a lenient stance on environmental protection issues. As a result, our third hypothesis is not supported. Our findings align with those of Al Amosh and Khatib [37], indicating that companies with increased governance disclosure and transparency experience lower capital costs and higher valuations than counterparts with less disclosure.

4.3. Additional Robustness Analysis

Alternative robustness tests were conducted to assess the resilience of our results against external influences using Equation (1). By substituting asset growth for financial performance (revenue growth), the investigation aimed to determine if sustainability disclosure's effects on asset growth align with the outcomes presented in the primary estimation in Table 5. This study employed the asset growth which is measured as year-over-year percentage change in total assets. We utilized Equation (2) by replacing the original dependent variable with asset growth. The CCEMG estimator was used for the additional robustness test in Table 6 to address serial correlation heterogeneity and endogeneity bias in panel data models. Stepwise regression was applied for Models 1 through 3, considering each independent variable. Finally, all independent variables were combined into a single regression in this study's final model (4). Since the variables were not of the same measurement unit, we used the natural logarithm of the data.

Table 6. Sustainability Disclosure and Asset Growth.

Variables	Model 1	Model 2	Model 3	Model 4
LNED	0.0312 **			0.0648 **
LNSD		0.0137 ***		0.7241 **
LNGD			−0.0214 **	−0.0581 **
LNLEV	−0.0482	0.0362	−0.00543 *	−0.0662
LNPRO	0.0688 **	0.0482 **	0.0627 ***	0.0547 ***
LNAGE	0.2149 *	0.2524 **	0.2137	0.0221 *
LNSIZE	0.0416	0.0322	0.0649 **	0.0406 **
Sargant Test	53.12	61.51	48.5	75.21
Adj. R^2	0.523	0.664	0.571	0.785
OBS	2784	2784	2784	2784

***, **, * for 1%, 5% and 10% respectively.

The adjusted R-squared values for Models 1–4 were notably high at 0.523, 0.664, 0.571, and 0.785, indicating a strong fit for the model. The Sargan test results underscore the effectiveness and efficiency of the technique for empirical investigation, confirming that the models aptly capture a substantial proportion of the effects exerted by independent variables on the dependent variable.

Regarding the association between ED and financial performance in terms of asset growth in Table 6, Model 1 revealed a significant positive relationship between the two variables. The findings imply that a percentage increase in ED corresponds to a 0.0312 increase in asset growth among energy firms in the SSA of BRI block. Similarly, in Model 4, a positive and significant link was observed, suggesting that a percentage increase in ED reflects a 0.0648 increase in asset growth. These results align with the main estimation findings in Table 5.

Likewise, compared to SD results in Table 6, Model 2 indicates a positive connection between sustainability disclosure and asset growth at the 1% level. The outcomes imply that a percentage rise in SD results in a 0.0137 increase in asset growth. Moreover, when all variables were introduced together in Model 4, a positive and significant association was found between SD and the asset growth of the sampled energy firms.

In contrast, the outcomes of Model 3 revealed a negative but significant link at a 5% level between GD and asset growth. These results suggest a percentage rise in GD leads to reduced asset growth performance among listed energy companies. Similarly, in Model 4, a negative but significant association was found between GD and financial performance in terms of growth rate. These findings from the additional robustness test correspond with the main estimation results presented in Table 5.

4.4. Moderating Analysis

To further examine the link between sustainability disclosure and financial performance, this study employed a moderating analysis that took ownership concentration (OC) into account is seen in Table 7. The CCEMG estimator was the primary estimate in R1 of the research, while the PMG estimator served as a robust estimator in R2.

Table 7. The Moderating Analysis.

Variables	Model 1		Model 2		Model 3		Model 4	
	R1	R2	R1	R2	R1	R2	R1	R2
LNED	0.7431 *	0.6301 *					0.8434 **	0.7845 **
LNOC	0.8926 **	0.5253 *					0.5285 *	0.7602 ***
LNED × OC	1.6413 ***	1.4628 *					2.7646 ***	1.5052 ***
LNSD			0.6864 *	0.8434 **			0.7180 *	0.5230 *
LNOC			−0.5271 *	−0.4364 *			0.3565 *	0.5542
LNSD × OC			2.5052 *	3.4011 *			3.6902 *	3.4634 *
LNGD					−0.4631	−0.5306 **	−0.825 **	−0.0843 **
LNOC					0.8106 ***	−0.5099 *	0.0410 *	−0.6341
LNGD × OC					−0.7995	−0.4147	−0.1884	−0.1384 *
LNLEV	1.4726	2.3525 **	−0.7418 ***	1.0192	2.5246	−0.0752	2.6385	−0.5542
LNPRO	2.7824 **	1.7806 ***	1.9542 *	−1.4588 **	0.5690 *	0.4377 **	1.8106 **	0.6341
LNAGE	1.0942 *	−1.0367	0.4752	−0.0849 *	0.6438 **	−0.5411 *	0.1738 *	−0.3348
LNSIZE	2.5631	1.4635 **	−0.2851	0.0516	0.8516	0.3506	−0.5099	0.6422 **
Sargan Test/Wald chi2	43.27	243.25	32.5	243.25	35.24	343.15	86.4	2407.92
Adj. R^2 Test/Prob > chi2	0.6201	0.0000	0.6378	0.0000	0.5763	0.0000	0.7868	0.0000
OBS	2784	2784	2784	2784	2784	2784	2784	2784

***, **, * for 1%, 5% and 10% respectively.

The results presented in Table 7 using the primary estimator (R1) indicate that a high ownership concentration causes ED and SD to record positive associations with FP, as shown by models 1, 2 and 4. This implies that a high OC positively moderates the association between ED and FP, as well as SD and FP. The findings emphasize the significance of considering effective and high ownership concentration when implementing environmental and social disclosure policies for energy firms in developing economies in the BRI block. However, a negative but insignificant association was discovered between governance disclosure and financial performance. This suggests that when a few groups own much of the shares of businesses in developing countries, they can neutralize the

negative and significant impact between governance disclosure and a firm's financial performance in developing economies.

Comparing the direct link results in Table 5 and the moderating results in Table 7, it can be noted that the moderating results recorded higher coefficient values. This suggests that a high ownership concentration has significant influence on the impact of sustainability disclosure and financial performance as compared to the direct link between sustainability disclosure and financial performance. Hence, firms in developing economies should integrate higher ownership concentration to improve sustainability reporting and promote long-term sustainability practices.

Regarding the PMG robustness findings, as shown in R2 for Models 1, 2, and 4 in Table 5, the results align with those reported in Models 1, 2, and 4 for the primary estimator (R1). This means that OC positively moderates the impact of ED, SD, and FP, causing a more substantial increase in the coefficients than that of Table 5. Contrary to models 3 and 4, GD had a statistically insignificant and negative relationship with FP. The base variables produced results that align with the direct relationship, and the moderating variable OC also yielded positive and statistically significant values across all models.

The moderating analysis findings imply a stronger relationship between high ownership concentration and environmental and company financial performance, as well as social disclosure and firm financial performance. Therefore, energy companies should implement policies that include adequate ownership holdings to improve their financial performance and sustainability.

To safeguard the credibility of society, it is crucial to embed environmental considerations into well-defined corporate systems. When fewer large shareholders hold a disproportionate percentage of a company's shares, the company's sustainability performance improves [60]. This is because concentrated ownership strengthens the signaling effect of sustainability disclosure, allowing influential shareholders to align stakeholder interests and enhance the firm's commitment to sustainability. This alignment positively influences the firm's reputation and stakeholder support. Hence, this study hypothesized that firms with a higher ownership concentration will likely have a stronger incentive to signal their commitment to ESG practices to external stakeholders, including investors and customers. Our estimation results confirmed a significant positive connection between the moderating role of environmental disclosure and financial performance, as well as social disclosure and financial performance. Hence, we accept our fourth and fifth hypotheses since our results affirmed the findings of Hasbiah [61], who found that environmental disclosure benefits from institutional ownership concentration and influences a high firm value. This was further backed by Hantono [62], who found that ownership concentration positively moderates the relationship between ESG disclosure and financial performance.

In contrast, it was found that a negative but insignificant link exists between GD and FP, which is caused by the neutralizing impact of the moderation factor (ownership concentration). Our findings are similar to those of Gunarsih, Setiyono [63], who discovered an insignificant link between ESG and firm value, with ownership structure moderating the relationship. Our results indicate that firms with greater ownership structures can influence government policies in implementing a sustainable strategy. This is because governments in developing economies have significant shares in most energy firms. Hence, the government can use the ownership concentration advantage to influence the level of government disclosures. Therefore, with the influence of ownership concentration, the negative and significant impact between governance disclosure and the firm's financial performance was neutralized. Notwithstanding, the moderating results revealed a negative but insignificant link with the firm's financial performance. Since the results contradict our assumption, our last hypothesis is rejected.

5. Conclusions and Policy Implication

Sustainability disclosure is spreading across various industries in both developed and developing countries. This is an effort to satisfy a wide range of constituents as businesses

are emphasizing social responsibility. However, until recently, corporate performance has mostly ignored environmental and social concerns in favor of financial gains. Hence, empirical studies need to be conducted on the impact of sustainability disclosure and financial performance of firms in the energy sector in the SSA region's Belt and Road Initiative countries, with emphasis on how each sustainability component influences a firm's financial performance and the potential moderating role that ownership concentration plays in this dynamic.

Using a quantitative methodology, this study extracted data from the annual reports and financial statements of 239 energy companies across BRI countries in SSA from 2009 to 2022 due to data availability. This study employed the CCEMG as the primary estimator and the PMG as the robustness estimator. The findings revealed that environmental and social disclosures influence firms' financial performance. In contrast, energy companies in emerging countries do not see a change in their financial performance when their governance procedures are disclosed. Furthermore, the link between environmental disclosure, social disclosure, and the financial performance of the energy firms is favorably influenced by the concentration of ownership. The findings suggest that social and environmental disclosures must be highly emphasized in policy makers' sustainability plans. That is, when implementing sustainability disclosure practices, ownership concentration must be taken into account since it significantly impacts the relationship between firms' financial performance and sustainability disclosure. Hence, developing countries' governments should acquire a more significant stake in energy businesses to control ownership concentration and influence the governance disclosures included in the ESG framework.

In terms of the policy implications, policy makers and industry should collaborate to create strict regulations requiring companies to disclose their sustainability initiatives. By doing this, the benefits of social and environmental disclosures will be maximized. Such regulations can also increase openness, promote responsibility, strengthen company longevity, and build confidence among interested parties, which will promote firm financial performance. Also, lawmakers must realize that concentrated ownership is a significant factor on how sustainability disclosure affects companies' financial performance. Consequently, efforts should be directed towards enacting governance reforms that address this aspect, effectively facilitating long-term value creation.

Regarding limitations, this study used revenue growth as a measurement of corporate financial performance, which does not take into account more economic categories. Future studies can consider using more complex synthetic measures that take into account more economic categories. In addition, future studies can consider using previous year $(t-1)$ and financial results of the current year (t) for their empirical analysis. This can provide further robust findings for policy making.

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