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The Mediating Role of Foreign Investor Ownership in the Relationship Between Carbon Emissions Disclosure and Corporate Financial Performance: Applied to Companies Traded in the Saudi Market

الدور الوسيط لملكية المستثمر الاجنبي في العلاقة بين الافصاح عن انبعاثات الكربون والاداء المالي للشركات "بالتطبيق علي الشركات المتداولة في السوق السعودي"

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المستخلص:

هدفت الدراسة إلى اختبار أثر الافصاح عن انبعاثات الكربون علي الأداء المالي للشركات، ودور ملكية المستثمر الاجنبي في تعزيز هذه العلاقة علي الشركات المتداولة في السوق المالية السعودية. ولتحقيق ذلك الهدف تم الرجوع إلى الدراسات السابقة والبحوث ذات الصلة، مع إجراء دراسة تطبيقية لعينة مكونة من (٧٧) شركة من الشركات المساهمة الصناعية المدرجة في سوق المال السعودي خلال السلسلة الزمنية (٢٠١٦-٢٠٢٣م)، وقد تم تحليل البيانات من خلال برنامج (SPSS 17.0) باستخدام أسلوب تحليل الانحدار الخطي لاختبار العلاقة بين المتغيرات التي اقترحتها الباحثة، وتم قياس الأداء المالي للشركات بمعدل العائد على الأصول ومعدل العائد علي حقوق الملكية، وتم بناء مؤشر لقياس الإفصاح عن عن ابنعاثات الكربون، وتم قياس المتغيرات الرقابية بكلا من ربحية الشركة (CP)، نمو الشركة (CG)، كثافة الصناعة (HI)، الرافعة المالية (LEV). وبناءاً على نتائج تحليل الانحدار توصلت الدراسة إلى وجود علاقة معنوية ذات دلالة احصائية بين الإفصاح عن انبعاثات

الكربون والأداء المالي للشركات الصناعية السعودية، ووجود علاقة معنوية ذات دلالة احصائية بين ملكية المستثمر الأجنبي والإفصاح عن انبعاثات الكربون، وأن ملكية المستثمر الأجنبي تعزز العلاقة بين الإفصاح عن انبعاثات الكربون والأداء المالي للشركات الصناعية السعودية. وتوصي الدراسة بضرورة إصدار معيار محاسبي يختص بالإفصاح عن عن انبعاثات الكربون، وضرورة الزام جميع الشركات بتكوين لجان بيئية داخل مجالس الادارات مع إجراء المزيد من البحوث العلمية في هذا المجال في المستقبل.

الكلمات المفتاحية: ملكية المستثمر الاجنبي، الافصاح عن انبعاثات الكربون، الاداء المالي للشركات، السوق المالية السعودية.

ABSTRACT

The study aimed to test the impact of carbon emissions disclosure on Corporate ' financial performance, and the role of foreign investor ownership in enhancing this relationship on companies traded in the Saudi financial market. To achieve this goal, previous studies and related research were referred to, with an applied study conducted on a sample of (77) industrial joint-stock companies listed on the Saudi stock market during the time series (2016-2023). The data were analyzed using the statistical program IBM SPSS Version 29 depend on the linear regression analysis method to test the relationship between the variables proposed by the researcher. Corporate financial performance was measured by the return on assets rate (ROA) and the return on equity rate (ROE). An index was built to measure carbon emissions disclosure, Intermediary variable was measured by foreign investor ownership (FIO) and the control variables were measured by both company profitability (CP), company growth (CG), Heavy industry (HI), and financial leverage (LEV). Based on the results of the regression analysis, the study concluded that there is a statistically significant relationship between carbon emissions disclosure and the financial performance of Saudi industrial companies, and a statistically significant relationship between foreign investor ownership and carbon emissions

disclosure, and that foreign investor ownership enhances the relationship between carbon emissions disclosure and the corporate financial performance of Saudi industrial companies. The study recommends the need to issue an accounting standard specific to carbon emissions disclosure, and the need to oblige all companies to form environmental committees within their boards of directors, with more scientific research being conducted in this area in the future.

Keywords: Carbon Emissions Disclosure, Corporate Financial Performance, foreign investor ownership, and Saudi stock market.

First: The General Framework of The Study

1/1 Introduction:

In recent years, the topic of carbon emissions disclosure has received the attention of many researchers and international bodies due to its effects on corporate financial performance because the relationship between carbon emissions disclosure and financial performance is complex (Senna, et al., 2024). Carbon emissions disclosure contributes to improving the information environment and improving corporate transparency, integrity and environmental accountability, and emphasizes commitment to the social contract between the company and the community in which it operates. It contributes to improving the company's reputation and increasing investor confidence, which leads to increased attraction of capital and long-term investment, and works to reduce the cost of capital, reduce the risks to which the company is exposed as a result of climate change, improve the company's market value and support its competitive position, which in turn is reflected in improving corporate financial performance in the competitive environment. (Wu et al., 2024).

As global climate issues become more severe, carbon emissions and their risks have become a concern for companies and government regulatory bodies. Therefore, many international agreements and initiatives have emerged with the aim of

disclosing climate change and carbon emissions, such as the Paris Climate Agreement in 2015, the Carbon Disclosure Project, the Global Reporting Initiative (GRI), the Climate Risk Investor Network, and the International Integrated Reporting Commission (IRRC) (Islam, et al., 2024). At the level of Saudi Arabia, as one of the most important energy-producing countries in the world, it is committed to effectively contributing to global efforts to face climate change and reduce carbon emissions; His Royal Highness Prince Mohammed bin Salman bin Abdulaziz, Crown Prince and Prime Minister, announced the Kingdom's plans to achieve net-zero neutrality goals by 2060 by applying the circular carbon economy approach. Several pioneering initiatives have been launched to create a positive global impact with the aim of combating climate change, including the Saudi Green Initiative and the Middle East Green Initiative (Saudi & Middle East Green Initiatives, 2024).

As countries seek to maintain the environment and protect society, industrial companies must develop strict programs to monitor environmental pollution elements arising from their activities, and disclose information related to climate change and the returns and obligations they bear to disclose environmental information, especially carbon emissions, which have become necessary for society and stakeholders in companies. A study (Galama & Scholten, 2021) found that the relationship between greenhouse gas emissions and financial performance is clearer in companies operating in countries with strict carbon policies.

Studies have shown that carbon disclosure has multiple effects on corporate financial performance, as voluntary disclosure of carbon emissions has a positive impact on corporate financial performance, by improving the information environment and reducing information asymmetry. Companies that adopt carbon management policies achieve better financial performance, as good carbon performance enhances financial performance, and this effect is clearer in countries with strict carbon policies (Lu, et al., 2021). A study by (Lewandowski, 2017) confirmed that good

carbon performance is positively associated with good financial performance, as companies that achieve good carbon performance achieve better financial performance. A study by (Downar, et al., 2020) showed that mandatory disclosure of carbon emissions leads to reduced emissions without a negative impact on corporate' financial performance. The impact of carbon emissions disclosure shows a positive impact on accounting financial performance indicators such as return on assets (ROA), but it may show a negative impact on market financial performance indicators (Ganda, 2018). In contrast, other studies (Lu & Zhang, 2021; Rajesh, et al., 2021) found a negative relationship between carbon disclosure and corporate' financial performance.
The Kingdom of Saudi Arabia seeks to confront the risks of climate change and reach net zero by 2060, reduce the growing threat of biodiversity loss, and turbulence in energy markets. All these threats represent challenges for companies in the Saudi financial market. Investors in general and foreign investors in particular are looking for companies that apply ESG standards so that they adopt good environmental practices and commit to fair social operations with employees, suppliers, customers and their communities while practicing sound corporate governance. Therefore, foreign ownership plays an important role in monitoring the company's activities related to the environment, eliminating waste and emissions, and reducing practices that negatively affect natural resources. We find that foreign investors impose additional control over the policies set by management regarding the environment and sustainability. It is expected that companies with high foreign ownership will disclose more information related to the environment and climate change. The higher the percentage of foreign ownership in companies, the more it pushes management to make broader and more comprehensive disclosures regarding climate change and carbon emissions. Therefore, it is an essential element in influencing the disclosure of carbon emissions. On the other hand, we as

researchers must study the extent of the influence of foreign investor ownership on the relationship between carbon emissions disclosure and corporate financial performance. (Yang et al., 2024; Corgatelli & Michele, 2024)

Based on the above, the current study seeks to examine and analyze the relationship between carbon emissions disclosure and corporate financial performance, in addition to studying the mediating role of foreign investor ownership in influencing this relationship by applying it to companies traded in the Saudi Stock Market. To achieve this goal, the researcher divided the study into the general framework of the study, literature analysis and derivation of hypotheses, the applied study, and finally the results, recommendations and future studies.

1/2 Research Problem:

Financial performance is a key indicator of the success of companies in their investment plans and decisions. Companies aim to maximize their value by increasing the market value of shares, as stock prices are an important measure of investors' decisions. Therefore, the investor in the stock exchange needs a lot of information that helps him make the appropriate investment decision. Also, company managers face increasing pressure from shareholders to assess the risks and opportunities facing their companies regarding climate change and disclose it. Although accounting disclosure is an important means to increase the efficiency of the capital market and reduce the problem of information asymmetry, financial crises have recently increased due to the lack of disclosed information and the increase in the problem of information asymmetry, therefore, many parties required for the need to expand accounting disclosure. Although carbon disclosure is a strategic decision-making issue for organizations in today's competitive environment, it is still a topic of important discussion and not well studied in environmental accounting literature. This study derives its motivation from this

research gap and the growing interest in assessing the financial consequences of companies' participation in climate change.

Recently, the Kingdom of Saudi Arabia has become more interested in environmental issues and climate change, but the disclosure of carbon emissions is still optional for companies. Until now, there is no law or standard that requires companies to disclose this information. The absence of standards has led to a diversity of accounting practices, which makes companies' financial statements difficult to compare, in addition to the existence of many concerns about the true and fair picture presented by the financial statements.

Therefore, the researcher saw that it is necessary to conduct a study to analyze the relationship between carbon emissions disclosure and financial performance of industrial companies listed on the Saudi Stock Exchange to bridge the research gap of previous studies, which found a contradiction between their results. First: There is no relationship between carbon emissions disclosure and corporate financial performance. Second: There is a relationship between carbon emissions and corporate financial performance. Third: Lack of interest in carbon emissions disclosure, as the results of the studies were inconclusive and inconsistent. This requires researchers to conduct more research and analysis to identify the nature of the relationship. Therefore, the study problem can be formulated in the following main question: "What is the impact of carbon emissions disclosure on corporate' financial performance, with testing the impact of foreign investor ownership on the relationship between them, applied to companies traded on the Saudi Stock Exchange?" The following sub-questions branch out from this question:
(1) What is the impact of carbon emissions disclosure on corporate financial performance of Saudi industrial companies?
(2) Is there a relationship between foreign investor ownership and carbon emissions disclosure in the Saudi market?
(3) What is the impact of foreign investor ownership in strengthening the relationship between carbon emissions

disclosure and corporate financial performance of Saudi industrial companies?

1/3 Importance of the research:

Scientific importance of the study:

This research gains its scientific importance from the following:
1. Clarifying the importance of disclosing carbon emissions and testing its impact on corporate financial performance by applying it to Saudi companies.
2. The lack of accounting studies that are concerned with climate change and carbon emissions and that are still under research and need more study. The study is considered additional research in the field of testing the relationship between carbon emissions disclosure and corporate financial performance and knowing the role of foreign investor ownership as a mediating variable.
3. Necessary for local and foreign stakeholders to increase the level of carbon emissions disclosure in companies' financial reports, as it has positive effects on corporate financial performance and rationalizing investor decisions.

Practical importance of the study:

This research gains its practical importance from the following:
1. **At the level of investors:** Disclosure of climate information is of great importance to investors' investment decisions, and investors are expected to evaluate the performance of the company's pollution control program, so carbon emissions disclosure helps current and prospective investors make sound investment decisions.

2**. At the market level:** This research provides empirical evidence of the determinants of carbon emissions disclosure and its impact on corporate financial performance, which can be useful for organizations and regulatory bodies in determining the necessary policies that will provide practices and policies to face the challenges of climate change, manage greenhouse gas emissions, and reduce carbon emissions for companies in the Saudi financial market.

3. **At the state level:** Supports the Kingdom of Saudi Arabia's Vision 2030 and emphasizes the importance of the National Program for the Circular Carbon Economy launched by the Kingdom, the "Saudi Green Initiative," and the "Middle East Green Initiative" with the aim of achieving zero carbon neutrality by 2060, facing the challenges of climate change, and motivating institutions to manage and reduce their carbon emissions.

1/4 Research objective

The study seeks to "Test the impact of carbon emissions disclosure on corporate financial performance, while examining the impact of foreign investor ownership as a mediating variable in the relationship between these variables, applied to companies on the Saudi Stock Exchange." So, it seeks to achieve the following sub-objectives:

- Study and analyze the nature of carbon emissions disclosure, its importance, and the elements that must be disclosed.
- Test the relationship between carbon emissions disclosure and financial performance in the Saudi business environment.
- Test the impact of foreign investor ownership in enhancing the relationship between carbon emissions disclosure and financial performance in the Saudi business environment.

1/5 Study Hypotheses

This study relied on testing the following hypotheses:

Hypothesis 1: There is a statistically significant relationship between carbon emissions disclosure and corporate financial performance of Saudi industrial companies.

Hypothesis 2: There is a statistically significant relationship between foreign investor ownership and carbon emissions disclosure.

Hypothesis 3: Foreign investor ownership enhances the relationship between carbon emissions disclosure and the financial performance of Saudi industrial companies.

1/6 Study Limitations:

The study is limited to testing the impact of carbon emissions disclosure on financial performance, with testing and analyzing the impact of foreign investor ownership on the relationship between them by applying it to companies belonging to the industrial sectors traded in the Saudi stock market during the time series (2016-2023).

1/7 Study Methodology:

The study relies on the deductive and inductive approach to conduct two types of studies:

(1) Theoretical study: It includes studying and analyzing what is mentioned in accounting thought about carbon emissions disclosure and its relationship to corporate financial performance and knowing the role of foreign investor ownership in supporting the relationship between them through extrapolation and analysis of accounting literature related to the research variables through Arab and foreign books, periodicals and relevant scientific thesis.

(2) Applied study: It aims to test the impact of carbon emissions disclosure on financial performance in the Saudi stock, in addition to examining the role of foreign investor ownership in strengthening the relationship between them. The researcher relied on statistical methods to test the study hypotheses and reach the results.

1/8 Study plan:

This study was divided into the following topics:
First: General framework of the study

Second: The theoretical framework of the study

2/1 The concept and importance of carbon emissions disclosure

2/2 Elements of carbon emissions disclosure

3/3 Factors affecting carbon emissions disclosure

Third: Literature analysis and derivation of hypotheses

3/1 Studies examining the relationship between carbon emissions disclosure and corporate financial performance.

3/2 Studies examining the relationship between foreign investor ownership and carbon emissions disclosure.

3/3 Studies examining the role of foreign investor ownership in enhancing the relationship between carbon emissions disclosure and corporate financial performance.

Fourth: Applied study.

Fifth: Results, recommendations, Limitations and future studies.

Second: The Theoretical Framework of the Study

2/1 The concept of carbon emissions disclosure and its importance:

Carbon emissions disclosure refers to the practice of companies voluntarily disclosing information about carbon emissions, often as part of sustainability reports. (Sarvina, et al., 2024) This disclosure is key to facing climate change concerns and is linked to greenhouse gas (GHG) and climate change disclosures, which constitute an important area of research interest (Septiani, et al., 2024). (Rona, et al., 2024) defined it as "an institutional practice of disclosing information about a company's greenhouse gas emissions, with the aim of promoting environmental responsibility and transparency in operations." The study (Cintya, et al., 2024) indicated that carbon emissions disclosure is defined as "voluntary disclose of carbon emissions by companies, with the aim of being accountable for their environmental impact." The study (Destin et al., 2022) confirmed this definition when it stated that it is "a voluntary disclose mechanism in sustainability reports

by companies that reflects their environmental responsibility and includes direct and indirect emissions as part of corporate social responsibility efforts". while the study (Erwin et al., 2020) indicated that carbon emissions disclosure includes organizations that disclose their carbon footprint to stakeholders, in line with stakeholder theory and potentially as a symbolic or objective measure that depends on motivations and follow-up activities. The same concept was confirmed by the study (Putu, et al., 2024) when it was explained that it "represents the disclosure of information about the carbon footprint of companies." and (Husnah, et al., 2023) opined that it represents "disclosure of a firm's environmental impact associated with carbon emissions, and reflects transparency in disclose greenhouse gas emissions to stakeholders," as studied in environmental performance research.

The importance of carbon emissions disclosure:

Carbon emissions disclosure is significant for organizations due to its multiple impacts on organizational performance, legitimacy, and stakeholder relationships. Studies (Septiani, et al., 2024); (Huiyuan, 2023); (Destin, et al., 2022); (Patrick, et al., 2022); (Ofeithzvnc. 2022) have indicated that carbon emissions negatively impact corporate performance, but companies use carbon disclosure as a communicative legitimacy process to manage threats and comply with institutional pressures, especially after the introduction of mandatory reporting regulations. In addition, studies emphasize the correlation between carbon emissions disclosure, greenhouse gas disclosure, and climate change disclosure, highlighting the importance of transparency in addressing environmental challenges and enhancing industry practices. Moreover, carbon emissions disclosure can increase the adequacy of disclosure of key audit issues, mitigate the risk of stock price collapse, and enhance environmental, social, and governance performance.

Many studies (Guoqing, et al., 2024); (Ajay, et al., 2021); (Atiqa, et al., 2023); (Yan, et al., 2022); (Yang, et al., 2023); (Hong, et

al., 2023); (Yongchao, et al., 2022) have shown the importance of corporate carbon emissions disclosure as follows:

- Disclosure of carbon emissions is critical for companies and stakeholders to sustainability reporting and demonstrate social and environmental responsibility, integrate sustainability into operations as it reflects the company's interest, supports government efforts.
- Voluntary disclosure of carbon emissions reduces information asymmetry in capital markets, reduces earnings management, a lower cost of capital, enhances transparency, and addressing climate change challenges.
- Disclosure of carbon information is critical to addressing climate change, enhancing company performance, key audit issues, and helping investors make informed investment decisions.
- Disclosure of carbon emissions impacts positively corporate value, improve environmental, social, and governance performance particularly in the context of low-carbon development goals.
- Disclosure of carbon emissions is critical to managing carbon footprint, mitigating climate change, and maintaining image and reputation, regardless of voluntary or mandatory reporting.
- It helps manage legitimacy threats, comply with institutional pressures, and enhance regulatory performance.
- Helping in voluntary carbon emissions disclosure reduces stock returns, risk of stock price collapse, while mandatory disclosure reduces uncertainty at the stock and impacts related markets, highlighting the importance of carbon emissions disclosure.
- It effectively mitigates carbon risks, benefiting investors globally by reducing carbon exposure in investment portfolios.
- It enhances corporate recycling performance by increasing consumers' willingness to recycle, it is an environmental

appeal, going beyond economic incentives in promoting sustainability.

- Disclosure is critical to energy conservation and helps to effectively reduce carbon emissions; it is a key step in managing carbon information and enhancing transparency in environmental impact assessments.
- Disclosure of carbon emissions is critical to evaluating low-carbon practices in organizations, helping to achieve national environmental goals such as carbon neutrality, and moving towards sustainable production and sustainability practices.
- Carbon emissions disclosure for public and private companies is critical to the transition to a carbon-free economy, helps manage risk, accelerates emission reductions.
- Carbon emissions disclosure is critical to signaling market information, reducing agency costs, and enhancing corporate financial transparency.
- Carbon emissions disclosure as a legitimization tool for companies, allowing them to strategically manage their green image. It can also serve as a governance tool, especially for low-carbon sector companies.
- Carbon emissions disclosure is critical for environmental accountability. Factors such as financial downturn, social reputation, and industry regulation can positively impact disclosure levels, helping to achieve emission reduction targets.

2/2 Elements of carbon emissions disclosure and how to measure it:

There is no accounting standard that organizes the methods of measuring and carbon emissions disclosure, but many initiatives and guidelines have emerged for disclosure. We will mention here the Carbon Disclosure Project (CDP) as the largest project in the world that provides a framework for preparing global warming reports. This project is a store of data and information that is kept for the purpose of rationalizing decisions at the corporate and investor levels. This project aims to encourage

companies to disclose the costs of greenhouse gases and reduce climate change. (Al-Jabali, 2023). (Choi et al., 2013) mentioned the elements of voluntary disclosure of climate change and carbon emissions, and he placed these elements in a list classified into five main groups, which are: (1) Climate change: risks and opportunities, (2) accounting for greenhouse gas emissions, (3) accounting for energy consumption, (4) costs of greenhouse gases and their reductions, (5) accounting for carbon emissions. These groups and the elements associated with them were explained in list (1) as follows:

List (1): Climate Change and Carbon Emissions Disclosure Elements

No.	Disclosure Categories	Code	Disclosure Elements
1	Climate change: risks and opportunities	CC1	Assess/describe the regulatory, physical or systemic risks associated with climate change and the actions taken or planned to manage the risks.
		CC2	Assess/describe the current and future financial impacts, business impacts, and opportunities of climate change.
2	Accounting for greenhouse gas emissions	GHG1	Description of the methodology used to calculate GHG emissions, such as the GHG Protocol or ISO.
		GHG2	External verification of the amount of GHG emissions and on what basis.
		GHG3	Total GHG emissions: Metric tons resulting from CO2 emissions.
		GHG4	Disclosure of GHG emissions by source, such as coal and electricity.
		GHG5	Disclosure of GHG emissions by facility or sector.
		GHG6	Comparison of GHG emissions to previous years.
3	Accounting for energy consumption	EC1	Total energy consumed.
		EC2	Estimate the amount of energy used from renewable sources.
		EC3	Disclosure by type, facility or sector.
4	costs of greenhouse gases and their reductions	RC1	Details of plans or strategies to reduce greenhouse gas emissions.
		RC2	Specifications of the target level of greenhouse gas reduction and target year.
		RC3	Emission reductions and associated costs or savings achieved to date due to the reduction plan.
		RC4	Future emissions costs considered in capital expenditure planning

5	Accounting for carbon emissions.	ACC1	Reference to the board committee or other executive body responsible for climate change action.
		ACC2	Describe how the board or other executive body reviews the company's progress on climate change.

Source: Prepared by the researcher

Measuring carbon emissions disclosure: According to (Choi, et al., 2013), a list was created based on the factors identified in the working papers submitted by CDP to determine the disclosure elements related to climate change and carbon emissions that should be disclosed in financial reports. This list was divided into five categories that include (17) elements. Accordingly, the researcher prepared an index to measure carbon emissions disclosure by giving a score of (1) to each of the elements shown above and disclosed by the company, and a score of (0) if it was not disclosed by the company. Carbon emissions disclosure (CEDI) was measured by the following equation:

$$CEDI = NEI / TEI$$

Where:
NEI: Number of items disclosed by the company.
TEI: Total number of items included in the carbon emissions disclosure.

٢/3 Factors affecting carbon emissions disclosure

The study (Maria, et al., 2024) showed that the factors influencing carbon emissions disclosure include media exposure, stakeholder pressure, corporate governance, and company-specific characteristics. It was found that governance and media exposure positively affect the level of disclosure of carbon emissions in developing countries, highlighting the importance of these determinants in enhancing transparency regarding carbon emissions. In addition, the impact of research and development (R&D) efforts and foreign ownership on carbon emissions disclosure, indicating a positive relationship between R&D and carbon emissions disclosure in Indonesian. Furthermore, the

study (Cintya et al., 2024) found that financial performance, advertising exposure, managerial ownership, institutional ownership, audit committee, and board of commissioners were identified as factors influencing carbon emissions disclosure in carbon-intensive industries. also company growth and gender diversity on the board of directors affect carbon emissions disclosure among energy sector companies, the most important factors affecting the extent of carbon emissions disclosure are industry type and profitability in Indonesian companies. Ambarwati, (2022) indicated that carbon emissions disclosure positively affects stock prices, while leverage, profitability, and company age for oil, gas, and coal companies are affected. Annisa et al., (2023) confirmed that the most important factors affecting carbon emissions disclosure in manufacturing companies on the Indonesia Stock Exchange are profitability, leverage, and the effect of industry type. This was supported by (Andini et al., 2023), which found that company size, profitability, and leverage significantly affect carbon emissions disclosure, while institutional and managerial ownership do not in Indonesian.

The study (Virna, et al., 2023) stated that among the factors that negatively affect carbon emissions disclosure are corporate governance, while capital expenditures, profitability, company size, and corporate social responsibility have a positive impact on carbon emissions disclosure. While the study (Indah, et al., 2022) concluded that company size positively affects carbon emissions disclosure in Indonesian companies, while appropriate classification, profitability, leverage, and audit committee do not affect carbon emissions disclosure. Both (Abu Al-Ainain, Al-Jioshi, 2021) stated that among the factors that affect carbon emissions disclosure are stakeholders, company characteristics, corporate governance, environmental performance, and institutional characteristics.

Third: Literature analysis and derivation of hypotheses:

This study is an extension of previous studies that dealt with voluntary disclosure, but it is distinguished from them in that it dealt with the impact of carbon emissions disclosure on corporate performance, with an analysis of the impact of foreign investor ownership in the relationship between them, applied to industrial companies traded in the Saudi financial market, as previous foreign studies studied the relationship between carbon emissions disclosure and corporate performance, with a study of other intermediate variables other than the study variable, and the researcher also applies it to the Saudi stock market with a difference in the variables of the applied study, while Arab studies according to the researcher's knowledge, such as the study (Abu Al-Ainain & Al-Jioshi, 2021), dealt with the relationship between carbon emissions disclosure and its relationship to the costs of equity in light of corporate governance through a theoretical study and testing it in practical reality through the survey list in the Egyptian Stock Exchange and not an applied study, and the study (Al-Jabali, 2023) dealt with the mediating role of information asymmetry in the relationship between accounting disclosure of carbon emissions and firm value, an applied guide from the Arab Stock Exchange Index for low-carbon companies, but in this The study will examine the mediating role of foreign investor ownership in the relationship between carbon emissions disclosure and corporate performance by conducting an applied study on actual data of companies in the Saudi financial market.

The researcher reviewed the literature and previous research that focused on the disclosure of carbon emissions, focusing on studies related to the disclosure of carbon emissions and their impact on the financial performance of companies, to identify the trends of these studies, the methodology they followed, and the results they reached.

3/1 Studies examining the relationship between carbon emissions disclosure and corporate performance:

It is noted that the relationship between carbon emissions disclosure and corporate financial performance is complex, as evidenced by multiple research studies, with some studies indicating a negative impact of carbon emissions disclosure on financial performance in the short and long term, and others indicating a positive relationship between carbon disclosure and financial performance. In addition, factors such as carbon performance, green innovation, and female directors can influence carbon emissions disclosure, but they may not always directly affect financial performance. Overall, the findings of previous studies highlight the importance of understanding the interaction between carbon emissions disclosure and financial performance in different contexts to drive sustainable business practices and enhance overall performance. This is what we will explore in the next section of the study.

The study (Al-Jabali, 2023) aimed to show the effect of information asymmetry as an intermediate variable in the relationship between carbon emissions disclosure and firm value for Low-Carbon Emission Companies. The study reached a set of results, the most important of which is that there is an effect of accounting disclosure of carbon emissions on the firm value, there is also an effect of accounting disclosure of carbon emissions on the asymmetry of financial information. Also, the asymmetry of accounting information has a significant impact on the firm's value.

Thomas, et al., 2023 investigated the impact of mandatory carbon disclosure on corporate financial performance by applying to 45 cement and mining companies on the Johannesburg Stock Exchange during (2014 - 2021), the study found that all financial performance proxies are positively and significantly related to carbon disclosure. To improve financial performance, the sampled companies should continue to disclose carbon information extensively in their annual reports in accordance with the mandatory expectations.

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The study (Viulina & Ulupui, 2023) examined the impact of financial performance and carbon emissions disclosure on environmental performance, and the role of good corporate governance in moderating this relationship. This study applied on (132) of non-financial companies on the Indonesia Stock Exchange in the period 2019-2021. The results indicateed that financial performance and carbon emissions disclosure have a positive and significant impact on environmental performance, however, good corporate governance cannot moderate the relationship between financial performance and carbon emissions disclosure on environmental performance.

The study (Dina, Armanda, 2023) aimed to examine the impact of carbon emissions disclosure and corporate social responsibility on the financial performance of manufacturing companies in Indonesia during (2017 - 2019). It reached an understanding of the relationship between environmental disclosure, corporate social responsibility and financial performance, emphasizing the importance of managing and reducing carbon emissions to enhance financial results, and that carbon emissions disclosure has a negative impact on financial performance, and corporate social responsibility does not have a significant impact on financial performance. Moreover, when viewed simultaneously, carbon emissions disclosure and corporate social responsibility show an impact on financial performance.

Isaboke & Bagonza (2023) tested carbon disclosures and industry environmental sensitivity, and it impact on firm performance in China during (2010 - 2018). The results indicate that carbon disclosing companies experienced a decline in firm performance with a 4.13% decrease in return on assets and a 4.22% decrease in Q ratio compared to companies that did not disclose carbon, meaning that carbon disclosures negatively impact firm performance in China, while environmentally sensitive industries experience an increase in performance over the disclosure period.

Sun et al. (2022) examined the impact of voluntary carbon disclosure and carbon emissions on corporate value by applying it to companies listed in the Shanghai and Shenzhen 300 Index (CSI 300). The study results found that companies are taking more voluntary actions to disclose carbon information, and voluntary carbon disclosure reflects the company's initiative to bear social responsibility, and the increase in co2 emissions has a negative impact on corporate value, while the action companies choose to disclose carbon emissions has a positive impact on corporate value, and green financing had an effect on reducing corporate carbon emissions, leading to an increase in corporate value. Putu et al. (2024) confirmed that carbon emissions disclosure affects corporate value in addition to corporate size and profitability, while financial leverage does not affect corporate value.

Siddique et al. (2021) study explains how carbon performance affects carbon disclosure and how carbon disclosure affects financial performance in a sample of global companies. The study analyzes how the relationships between carbon disclosure, carbon performance, and financial performance differ in institutional contexts. The results of the study showed that carbon disclosure positively affects carbon performance in line with signaling theory, but negatively affects financial performance in the short and long term, which affects the management of investor impressions.
Lu & Zhang. (2021) investigated the impact of carbon disclosure on financial performance during 2011-2018, taking Fortune 500 companies as a sample. The results of the empirical study found that for carbon-intensive industries, carbon disclosure cannot significantly contribute to improving financial performance in the current period, but for non-carbon-intensive industries, carbon disclosure can significantly contribute to improving financial performance in the current period, and the positive impact of carbon disclosure on financial performance in the current period can extend to the next period. Rajesh, et al., (2021) examined the

impact of carbon emissions on accounting and market-based financial performance of Indian companies during the period (2013-2019) were analyzed using Heckman regression model to control for self-selection bias. The study found that there is a significant negative impact of carbon emissions on both financial performance measures, and that environmentally sensitive companies are more exposed to such negative emissions impact than non-sensitive companies.

The study of Lee & Kim (2021) aimed to examine the relationship between voluntary carbon emissions disclosure and firm value. In addition, it examines whether human resources of the internal control system affect the relationship between voluntary carbon emissions disclosure and firm value, applying to the Korean stock market from (2014 - 2019). This study finds that companies that voluntarily disclose information about carbon emissions increase their value, and this relationship is positively affected by the presence of sufficient internal control personnel in each department of accounting, finance, and information technology. In addition, we find an effect of the level of climate change awareness on firm value. That is, companies that are active in the field of climate change rather than just disclosing information. Finally, we find the positive role of environment, society, and governance (ESG), which means a superior management environment that leads to better disclosure practices.

Mohammad et al. (2021) examined the effects of carbon emissions on the accounting and market performance of financial and non-financial firms in emerging economies. Data were collected from 104 financial firms and 328 non-financial firms representing 2591 observations operating in 22 emerging economies from the Data stream database for the (2011-2020) time series using OLS and 2SLS regression techniques to analyze the data. The results of the analysis showed that financial firms give out less carbon than their non-financial counterparts, and that carbon emissions reduce firms' return on equity, Tobin's Q, Z-score, and credit rating.

The study (Abu Al-Ainain, Al-Geoushi 2021) aimed to examine the impact of corporate governance on supporting the relationship between carbon emissions disclosure and the cost of equity. To achieve this goal, a survey list was relied upon and distributed to 425 individuals from the parties using the financial reports of companies listed on the Egyptian Stock Exchange. The research reached many results, the most important of which are: the existence of a fundamental correlation between corporate governance and the disclosure of carbon emissions, and that corporate governance contributes to strengthening the negative relationship between voluntary disclosure of carbon emissions and the cost of equity.

Downar et al. (2020) examined the impact of GHG emissions disclosure on subsequent corporate emissions levels and operational financial performance, by applyed it to UK-registered companies in 2013. They found that companies succeeded in reducing their emissions by 8% without negatively impacting operational financial performance. Alsaifi & Salama (2020) examined the relationship between voluntary carbon disclosure and corporate financial performance in the largest FTSE350 companies between (2007 - 2015) and found strong evidence that voluntary carbon disclosure is positively associated with corporate financial performance. While Qian, & Schaltegger (2017) finds that changes in carbon disclosure levels are positively associated with subsequent changes in carbon performance. Thus, regardless of whether disclosure is used as a tool to justify poor past performance, this study confirms that carbon disclosure motivates companies to improve their carbon performance, but the relationship is weaker for companies that consume large amounts of energy.

The study (Khattab et al., 2017) aimed to examine the relationship between environmental disclosure of the cost of greenhouse gas emissions and financial performance, applying it to a sample of 14 industrial companies listed on the Egyptian Stock Exchange during the period (2009 to 2016), the study found a statistically

significant relationship between environmental disclosure of the cost of emissions and financial performance. Lewandowski, (2017) used econometric techniques to examine the impact of corporate carbon performance on corporate financial performance applied to a sample of 1640 companies during (2003 to 2015), the results show that superior carbon performance positively affects financial performance, while poor carbon performance does not, and carbon mitigation positively affects return on sales. These contradictory results help us understand why companies are slow to respond with effective actions to address climate change, despite increasing regulatory pressures. Ramanathan, (2016) aimed to examine the nature of the relationship between environmental performance and corporate performance and empirically test it using survey data on UK manufacturing companies, the results of the study showed that improving environmental performance in UK manufacturing companies leads to higher levels of corporate performance, with a quadratic relationship in terms of sales and market share growth.

Matsumura, & Vera-Muñoz (2014) aimed to examine the effects on firm value of carbon emissions, and the effects of managers' decisions to disclose carbon emissions on firm value using hand-collected carbon emissions data during (2006 - 2008). The study found that firm value decreased by $212,000 for every additional thousand metric tons of carbon emissions, and the average value of companies that disclose their carbon emissions is about $2.3 billion higher than the value of similar companies that do not disclose, meaning that companies with higher carbon emissions have lower firm value, while companies that disclose their emissions have higher value, suggesting that markets penalize all companies for carbon emissions but impose other different penalty on companies that do not disclose emissions information. From the above, the first hypothesis can be derived:

The first hypothesis: There is a statistically significant relationship between carbon emissions disclosure and corporate financial performance.

3/2 Studies examining the relationship between foreign investor ownership and carbon emissions disclosure:

These studies suggest that foreign investor ownership generally improves carbon emissions disclosure and reporting quality, with some studies suggesting a positive effect on environmental transparency and performance, while others suggest a moderate effect on firm value and emissions management. The study (Bujor, et al., 2023) aimed to examine the global carbon performance of companies from the perspective of national diffusion according to the Paris Agreement and its association with foreign equity ownership by used quantitative and qualitative analysis. The study found that the diffusion of corporate CO2 emissions at the country level in the post-Paris Agreement period is inversely related to foreign equity ownership, and that advanced foreign investors from rich countries positively influence the improvement of the efficiency of local companies in developing countries in managing carbon emissions, and thus carbon emissions disclosure may lead to a healthier and more sustainable environment. The study (Asyari, & Arieftiara, 2022) aimed to examine the impact of carbon emissions disclosure and environmental performance on investor responses by applying to 48 manufacturing companies in the food and beverage industry sector as well as the cement sector listed on the Indonesia Stock Exchange in (2018-2020). The results of the study showed that carbon emissions disclosure has no effect on investor responses, while environmental performance affects their responses.

Ghachem et al. (2022) investigated the impact of the ownership structure on the level of corporate carbon emissions, the moderating effect of innovation on this relationship. Based on data from 32 OECD countries over the period (2015-2020), the results showed that foreign and institutional investors in SMEs have a significant negative impact on carbon emissions.

Conversely, strategic investors contribute to an increase in carbon emissions. Moreover, the results provide evidence of the mixed moderating effects of innovation on the relationship between owner types and carbon emissions.

Kordsachia, et al., (2021) analyzed the impact of ownership structure on environmental performance with a subsequent focus on corporate emission reduction, based on a European sample of 7384 during (2008-2017). It found a relationship between sustainable institutional investors and environmental performance. The results confirmed that sustainable institutional investor ownership is positively associated with environmental performance and with corporate willingness to respond to a carbon disclosure project, which leads to higher awareness of carbon risks with greater sustainable institutional investor ownership, which leads to greener practices in European.

The study (Kim, et al., 2021) aimed to analyze the relationship between foreign investors and voluntary disclosure of carbon emission, and the impact of environmental, social and governance activities on the relationship between foreign investors and voluntary disclosure by applying it to South Korean companies (2014-2019). The study concluded that foreign investors in South Korean companies are more likely to voluntarily disclose carbon emissions information, and thus foreign investors play a role in controlling the information gap and motivating companies to improve the environment for future environmental risks in the capital market.

The study (Mardini & Lahyani, 2021) aims to investigate whether the presence of foreign directors on the board of directors is associated with carbon emissions performance and carbon disclosure, by applied 67 non-financial company during (2010-2018), the analysis is based on carbon reports from the Carbon Disclosure Project. The study found that the presence of foreign directors has a significant positive impact on a company's carbon emissions performance and disclosure in France. The incentives

of foreign directors to disclose extensive sustainability information depend on the size of the directors' board. The results also indicate that foreign directors are more involved in enhancing environmental transparency and reducing information asymmetry, which enhances environmental transparency and maintains and improves corporate legitimacy.

Döring et al. (2020) analyzed how the legal origin of foreign institutional investors affects voluntary carbon disclosure using samples of firms from 36 countries. We show that foreign institutional ownership from civil law countries improves the scope and quality of a firm's GHG emissions reporting, with a more pronounced and larger effect in firms from non-climate sensitive countries and less international firms. The gap between corporate environmental standards and investors' environmental goals is likely to be larger in less international firms. Firms with a higher level of voluntary carbon disclosure also show higher valuations. From the above, the second hypothesis can be derived:

The second hypothesis: There is a statistically significant relationship between foreign investor ownership and carbon emissions disclosure.

3/3 Studies examining the role of foreign investor ownership in enhancing the relationship between carbon emissions disclosure and corporate financial performance:

Some studies indicate that carbon emissions disclosure can positively impact corporate performance by improving their public image and increasing investor confidence. Foreign investor ownership may also play a role in enhancing this relationship, as foreign investors can bring better environmental disclosure standards and practices, foreign investor ownership also positively impacts corporate financial performance by increasing compliance, R&D expenditures, and operational efficiency, while other studies indicate no relationship, a non-

linear relationship, or negative effects on investment efficiency and short-term profitability. Foreign investor ownership can moderate the relationship between carbon emissions disclosure and firm performance through: Knowledge transfer: Foreign investors can bring with them better environmental disclosure standards and practices. Pressure to improve performance: Foreign investors often pressure companies to improve their environmental and social performance. Access to new markets: Companies that keep to global environmental standards can find greater opportunities in international markets. Improved reputation: Foreign investor ownership can enhance a company's reputation, as companies invested in by foreign investors are seen as more transparent and responsible. This can increase investor and customer confidence. Risk reduction: Environmental disclosure supported by foreign investors can help companies better identify and manage environmental risks. (Annual Report, McKinsey, 2024)

Muhammad, & Aryani, (2021) examined the impact of carbon disclosure on firm value and examined the moderating effect of foreign ownership, it used all companies on the Indonesia Stock Exchange during (2016 - 2018). Data were collected from the annual report and sustainability report and analyzed using moderated regression analysis (MRA). The results showed that carbon disclosure negatively affects firm value, but foreign ownership significantly moderates this relationship between the two variables. The study (Wali et al., 2021) aimed to measure the impact of both foreign direct investment and corporate social responsibility disclosure on firm value, its conducted on (4) companies in the pharmaceutical sector on the Egyptian Stock Exchange during (2013-2020). The results showed: There is no correlation between foreign direct investment and firm value, and there is a correlation between corporate social responsibility disclosure and firm value, there is no impact of foreign direct investment on firm value, and there is an impact of social responsibility disclosure on firm value.

Bhatia, & Kumari (2024) examined the moderating effect of corporate governance on the relationship between capital structure and firm performance, using the Business Today-500 companies over a 10-year period. A fixed-effect regression model was used, it found that board independence, board size, and family ownership improve the relationship between leverage and firm performance in Indian companies. Li et al. (2020) examined the impact of qualified foreign institutional investors on the social responsibility in China, it finds that qualified foreign institutional investors in Chinese improve corporate social responsibility, which leads to increased compliance with the GRI guidelines and longer sustainability reports, which leads to better company performance and easier access to finance.

The study (Son, P., & Truong, D., 2023) tested the relationship between foreign ownership and the efficiency of company operations and relied on 100 companies on the Vietnamese Stock Exchange (2015 to 2022) using a dynamic data model. it found that foreign ownership has a nonlinear relationship with corporate financial performance, and with a certain percentage of foreign ownership (0-40%), the financial efficiency of Vietnamese companies will increase, but exceeding the upper limit leads to the opposite effect. The study (Setiawan, & Kurniawati, 2023) aimed to prove foreign ownership can affect financial performance on the Indonesian IDX during (2017-2020) with the help of EViews 10. The results were that foreign ownership by foreign companies, individuals and nationals has no positive impact on the financial performance of manufacturing companies. On contrast, the study (Badollahi, et al., 2022) confirmed the role of foreign ownership in improving financial performance, increasing productivity, and environmental performance.

The study (Gupta, et al., 2021) aims to test the impact of foreign ownership on the performance of Indian firms. The fixed effect estimation method was used to examine the relationship during the period (2009/2010) to (2018/2019). The results showed that

foreign institutional shareholders and foreign corporate bodies have a larger ownership stake than foreign individual investors, and that foreign institutional investors and foreign corporate bodies have a positive relationship with the performance of Indian firms, with a non-linear relationship between foreign ownership and firm performance.

The study (Al-Gamrh, et al., 2020) examined the impact of two different types of foreign ownership on the financial and social performance of companies, and it study how the degree of board independence affects this relationship in companies on the Dubai Financial Market and the Abu Dhabi Securities Exchange during (2008 - 2012). It concluded that while Arab foreign ownership negatively affects the financial and social performance of companies, non-Arab foreign ownership does so positively. The results confirmed that board independence weakens the negative relationship between Arab foreign ownership and corporate performance. The study (Abdul Latif, 2020) analyzed the impact of the size of foreign institutional investor ownership on corporate governance. It concluded that the institutional investor is characterized by transparency and efficiency, and that strengthening the role of governance, activating its mechanisms, and monitoring management behavior leads to an increase in the quality of financial statements and the financial performance of companies, and that increasing ownership of investment institutions in the company's shares enhances the role played by these institutions in corporate governance and monitoring the behavior of executive management.

The study (Nguyen, et al., 2020) tested the relationship between foreign investor ownership and financial performance in the Vietnamese stock market. The study relied on analyzing data from 427 companies during (2014 to 2018) using Pool OLS least squares method, the study found that company size and foreign ownership ratio have a positive impact on financial performance, while foreign management, company age, liquidity, and leverage have a negative impact on financial performance. Lindemanis et

al. (2019) investigated the relationship between domestic-to-foreign ownership change and firm performance using data from 850 European companies during (2008–2014). The results show that foreign investors acquire larger, less profitable and come from larger, wealthier countries. After matching companies on propensity scores for country, industry, size, return on assets, and leverage, we find that in the short run, domestic-to-foreign ownership change in Europe is associated with higher sales growth but lower return on assets and profit margin. Bentivogli, & Mirenda, 2017 examined the impact of foreign ownership on a firm's economic performance in Italian firms. The results showed that foreign ownership leads to an increase in the size, profitability and financial soundness of Italian firms. From the above, the third hypothesis can be derived:

The third hypothesis: Foreign investor ownership enhances the relationship between carbon emissions disclosure and corporate financial performance.

Fourth: Applied study:

The applied study aims to test the impact of carbon emissions disclosure on corporate performance, while analyzing the impact of foreign investor ownership on this relationship on the Saudi Stock Exchange. To achieve this goal, the researcher relied on the Content Analysis method, where the financial reports and board of directors' reports.

4/1 Study community and sample:

The study community is represented by all companies listed on the Saudi Stock Market; numbering (232) companies distributed over (21) sectors during the period (2016-2023) according to data from the website https://www.saudiexchange.sa. Several (77) companies representing 33.19% of the community were selected to be the research sample with (616) views to test the study hypotheses, as the industrial joint-stock companies listed on the Saudi Stock Market were selected for the following sectors: the petrochemical industries sector, cement, energy and service

facilities, construction and building, agriculture and food industries.

These sectors represent the most important sectors influencing the Saudi economy, and play a vital role in the Saudi financial market for several reasons, including: These sectors enhance economic stability, create job opportunities, attract investments, which enhances economic growth and increases the size of the financial market, support technology and innovation, which enhances production efficiency and product quality, support the Kingdom's Vision 2030 and achieve its goals, and finally, it is responsible for preserving the environment due to its negative effects on the environment. The data of the reports and financial statements during the study period for these companies were obtained from the websites of these companies, or the website of www.tdawul.com, or www.argaam.com, or website www.mubasher.info.

4/2 Study hypotheses:

Hypothesis 1: There is a statistically significant relationship between carbon emissions disclosure and the financial performance of Saudi industrial companies.
Hypothesis 2: There is a statistically significant relationship between foreign investor ownership and carbon emissions disclosure.
Hypothesis 3: Foreign investor ownership enhances the relationship between carbon emissions disclosure and the financial performance of Saudi industrial companies.

4/3 Study variables and their measurement:

We will explain the study variables and their measurement methods

Table (1): Study variables and their measurement

Variables		Symbol	Measurement
Dependent Variable	Corporate Financial Performance	ROA	ROA = Net Profit After Interest and Tax / Total Assets.
	Return on equity	ROE	ROE =Net Profit After Interest and Tax / Total Equity

Independent Variable	Carbon Emissions Disclosure	CED	It is a dummy variable that takes the value (0) if the company does not disclose carbon emissions, and the value (1) if the company discloses, as explained in the theoretical part of the study.
Mediator Variable	Foreign Investor Ownership	FIO	It is measured by the ownership ratio (Oh, et al., 2011), and is calculated according to the following equation: Total shares owned by the foreign investor / Total number of shares of existing companies during the period x 100
Control Variables	Company Profitability	CP	This variable is measured by dividing net income / total equity, and (Abdullah, et al., 2015) stated that companies that achieve high profits tend to achieve good performance, good prospects, and lower risks.
	Company Growth	CG	This variable is measured by the growth rate in sales according to the following equation: (current year sales - last year sales) / last year sales.
	Industry Density	HI	A dummy variable that takes the value (1) if the company belongs to an emissions-intensive sector, and the value (0) if the company belongs to a sector other than that.
	Financial Leverage	LEV	It is measured by the ratio of long-term debt / total assets

* Table prepared by the researcher

4/4 Building the study model and regression equations:

4/4/1 Study model:

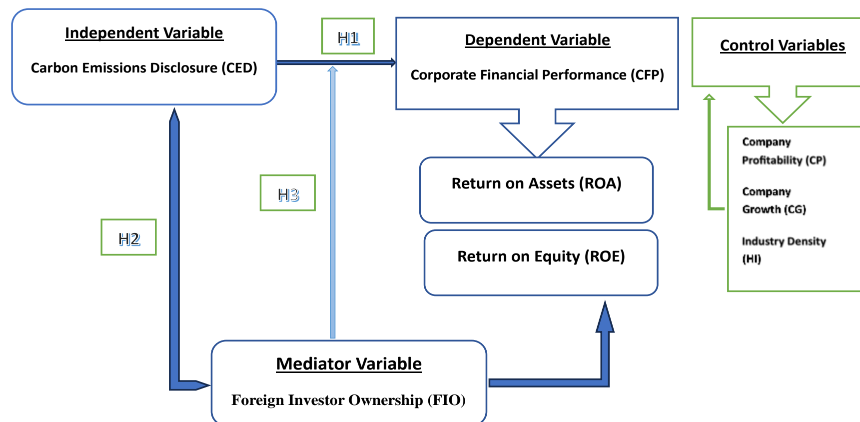

Figure No. (1): Study model and variables

This study is of two models to test the impact of carbon emissions disclosure and foreign investor ownership on corporate financial performance using the variables of return on assets and return on equity. The researcher relied on the simple and multiple regression model in formulating the study hypotheses to measure the relationship between carbon emissions disclosure and corporate financial performance, while measuring the impact of the mediating variable and the control variables on the

relationship between these variables according to the following regression equations:

$$Y_{it} = B_0 + B_1 X_{it} + \varepsilon_{it}$$

$$Y_{it} = B_0 + B_1 X_{it} + \sum \boldsymbol{control} + \varepsilon_{it}$$

4/4/2: Formulating regression equations based on return on assets:

Models for testing the first hypothesis:

States: There is a statistically significant moral relationship between the disclosure of carbon emissions and the financial performance represented by the return on assets of Saudi industrial companies.

$$ROA_{it} = B_0 + B_1 CED_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots(1)$$

$$ROA_{it} = B_0 + B_1 CED_{it} + B_{٢} CP_{it} + B_{٣} CG + B_{٤} HI_{it} + B_{٥} LEV + \varepsilon_{it} \ldots.(2)$$

Models for testing the second hypothesis:

States: There is a statistically significant moral relationship between foreign investor ownership and carbon emissions disclosure.

$$FIO_{it} = B_0 + B_1 CED_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots..(3)$$

$$FIO_{it} = B_0 + B_1 CED_{it} + B_2 CP_{it} + B_3 CG + B_4 HI_{it} + B_5 LEV + \varepsilon_{it} \ldots(4)$$

Models for testing the third hypothesis:

States: Foreign investor ownership enhances the relationship between carbon emissions disclosure and financial performance represented by return on assets for Saudi industrial companies.

$$ROA_{it} = B_0 + B_1 CED_{it} + B_2 FIO_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots(5)$$

$$ROA_{it} = B_0 + B_1 CED_{it} + B_2 FIO_{it} + B_3 CP_{it} + B_4 CG + B_{٥} HI_{it} + B_{٦} LEV + \varepsilon_{it} \ldots(6)$$

4/4/3 Formulating regression equations based on return on equity:

First hypothesis test models:

States: There is a statistically significant moral relationship between carbon emissions disclosure and financial performance represented by return on equity for Saudi industrial companies.

$$ROE_{it} = B_0 + B_1\ CED_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots (7)$$

$$ROE_{it} = B_0 + B_1\ CED_{it} + B_{٢}\ CP_{it} + B_{٣}\ CG + B_{٤}\ HI_{it} + B_{٥}\ LEV + \varepsilon_{it} \ldots (8)$$

Second hypothesis test models:

<u>States</u>: There is a statistically significant moral relationship between foreign investor ownership and carbon emissions disclosure.

$$FIO_{it} = B_0 + B_1\ CED_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

$$FIO_{it} = B_0 + B_1\ CED_{it} + B_2\ CP_{it} + B_3\ CG + B_4\ HI_{it} + B_5\ LEV + \varepsilon_{it} \ldots\ldots (4)$$

Models for testing the third hypothesis:

<u>States</u>: Foreign investor ownership enhances the relationship between carbon emissions disclosure and financial performance represented by return on equity for Saudi industrial companies.

$$ROE_{it} = B_0 + B_1\ CED_{it} + B_2\ FIO_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots (9)$$

$$ROE_{it} = B_0 + B_1\ CED_{it} + B_2\ FIO_{it} + B_3\ CP_{it} + B_4\ CG + B_{٥}\ HI_{it} + B_{٦}\ LEV + \varepsilon_{it} \ldots (10)$$

Where:

B_0: The value of regression constant.

B1: The regression coefficient for the independent variable, which is carbon emissions disclosure.

B2: Regression coefficient for the mediating variable, which is foreign investor ownership.

B3, B4, B5, B6: Regression coefficients for the control variables, company profitability, company growth, industry intensity, and financial leverage, respectively.

Ɛit: The value of the random error in the regression model.

To test the hypotheses, simple and multiple regression analysis of the data was used to explain the relationship between the dependent variable represented by the financial performance of companies CFP, and the independent variables CED and the intermediate and control variables represented by FIO, CP, CG, HI, LEV.

4/5 Statistical processing to analyze the results:

4/5/1 Statistical method used

The researcher can present the statistical analysis plan used in this study with the aim of testing the statistical hypotheses, and its steps in the following points:

1. The computer was used to calculate the study variables through Excel, whose actual data were extracted from the financial statements of the companies representing the study sample.

2. Running the previously identified data on the computer through the (IBM SPSS Version 29) program.

3. Using the Linear Regression Analysis method for the data with the aim of building a model that explains the relationship between the variables and studying the significance of the model using the F and T tests and determining the value of R and R^2 at 95%.

4/5/2: Hypothesis Test Results

First: Regression Analysis Results Based on Return on Assets Index

The following table No. (2) shows the most important results reached from the regression analysis of the data during the period

(2016 - 2023), where the value of the correlation coefficients R, the coefficient of determination R^2, and the adjusted coefficient of determination Adjusted R^2 were determined to determine the degree of correlation between the study variables.

Table No. (2): Regression Analysis Results for the Data During (2016 - 2023)

Source: Prepared by the researcher, from the outputs of the SPSS statistical program.

Table No. (3) shows the most important results reached through

Hypothesis	el Number	R	R^2	Adjusted R^2	Analyze results
Testing (3) hypotheses Without control variables	**1**	.539	.290	.277	There is a medium correlation between carbon emissions disclosure and return on assets at a significance level of 5% without control variables.
	3	.715	.511	.480	There is a high correlation between foreign investor ownership and carbon emissions disclosure at a significance level of 5% without control variables.
	5	.658	.432	.411	The correlation coefficient between carbon emissions disclosure and return on assets increased when the mediating variable of foreign investor ownership was included, but slightly increased at a significance level of 5% without control variables.
Testing (3) hypotheses With Control variables	**2**	.775	.600	.569	There is a high correlation between carbon emissions disclosure and return on assets at a significance level of 5% in the presence of control variables.
	4	.799	.639	.591	There is a high correlation between foreign investor ownership and carbon emissions disclosure at a significance level of 5% in the presence of control variables.
	6	.820	.672	.639	The correlation coefficient between carbon emissions disclosure and return on assets increased when the mediating variable of foreign investor ownership was included at a significance level of 5% in the presence of control variables.

simple and multiple linear regression during the period (2016 - 2023), where the value of F, T was determined to judge the significance of the model and each variable separately at a confidence level of 95%.

Table No. (3): Regression models and model significance testing during (2016 - 2023)

Hypothesis	Model No.		B	T	Sig.	F	Sig.	Analyze results	Decision
Testing (3) hypotheses without control variables	1	(Constant)	34.236	2.198	.032	22.078	.000	There is a statistically significant relationship between carbon emissions disclosure and return on assets without control variables, which indicates the significance of the model as the significance of F is less than 5%, and the significance of the independent variable CED as the significance of T is less than (α= 5%), which indicates the existence of a significant effect of this variable on ROA.	Accept
		CED	7.642	4.699	.002				
	3	(Constant)	1.246	10.792	.000	16.719	.001	There is a statistically significant relationship between foreign investor ownership and carbon emissions disclosure without control variables, as the significance of F is less than 5%, and the significance of T is less than (α= 5%).	Accept
		CED	.010	4.089	.001				
	5	(Constant)	14.766	.982	.331	20.180	.000	The existence of a statistically significant relationship between foreign investor ownership as an intermediate variable strengthens the relationship between carbon emissions disclosure and return on assets without control variables.	Accept
		FIO	7.685	5.234	.000				
		CED	4.699	3.642	.001				
Testing (3) hypotheses with control variables	2	(Constant)	19.101	1.461	.150	19.162	.001	There is a statistically significant relationship between carbon emissions disclosure and return on assets in the presence of control variables, as the significance of F is less than 5%, and the significance of T is less than (α= 5%).	Accept
		CED	8.054	6.647	.000				
		CP	4.870	2.963	.005				
		CG	19.456	3.828	.000				
		HI	-17.989	-4.297	.000				
		LEV	-4.228	-3.309	.002				
	4	(Constant)	2.125	16.643	.000	13.258	.000	There is a statistically significant relationship between foreign investor ownership and carbon emissions disclosure in the presence of control variables, as the significance of F is less than 5%, and the significance of T is less than (α= 5%).	Accept
		CED	.008	7.034	.001				
		CP	.028	6.371	.001				
		CG	.193	5.495	.003				
		HI	-4.305	-5.929	.014				
		LEV	-.013	-4.764	.000				
	6	(Constant)	2.892	.213	.832	20.511	.000	The existence of a statistically significant relationship between foreign investor ownership as an intermediate variable strengthens the relationship between carbon emissions disclosure and return on assets in the presence of control variables. Where the significance of F is less than 5%, and the significance of T is less than (α= 5%)	Accept
		CED	8.433	7.362	.000				
		FIO	3.880	2.451	.018				
		CP	12.739	4.503	.000				
		CG	17.401	4.422	.000				
		HI	-4.643	-3.843	.000				
		LEV	-3.373	-2.784	.008				

* Significant at a significance level of less than 0.05

The researcher finds from the previous tables (2), (3) the

Hypothesis	Model Number	R	R^2	Adjusted R^2	Analyze results
Testing (3) hypotheses <u>without</u> control variables	7	.807	.651	.644	The correlation coefficient between carbon emissions disclosure and return on equity is high without control variables
	3	.715	.511	.480	The correlation coefficient between foreign investor ownership and carbon emissions disclosure is high without control variables
	9	.853	.727	.707	The correlation coefficient between carbon emissions disclosure and return on equity increases when the mediating variable of foreign investor ownership is included without control variables
Testing (3) hypotheses <u>with</u> control variables	8	.874	.764	.756	The correlation coefficient between carbon emissions disclosure and return on equity is high in the presence of control variables
	4	.799	.639	.591	The correlation coefficient between foreign investor ownership and carbon emissions disclosure is high in the presence of control variables
	10	.925	.855	.829	The correlation coefficient between carbon emissions disclosure and return on equity increases when the mediating variable of foreign investor ownership is included in the presence of control variables

significance of all models, as it was proven according to the F test that it is less than 5%, and the significance of the estimated parameters was proven according to the T test, as the significance level for all variables was less than 5%. From the above, we conclude that the following study hypotheses are accepted:

1- There is a statistically significant relationship between carbon emissions disclosure and the financial performance represented by the return on assets for Saudi industrial companies.

2- There is a statistically significant relationship between foreign investor ownership and carbon emissions disclosure.

3- Foreign investor ownership enhances the relationship between carbon emissions disclosure and the financial performance represented by the return on assets for Saudi industrial companies.

<u>Second</u>: Results of multiple regression analysis based on the return on equity index

Table No. (4): Results of regression analysis of data during (2016-2023)

Source: Prepared by the researcher, as the data for this table were obtained from the outputs of the SPSS statistical program.

Table No. (5): Regression model and model significance test during (2016-2023)

Hypothesis	Model No.		B	T	Sig.	F	Sig.	Analyze results	Decision
Testing (3) hypotheses without control variables	7	Constant	14.493	1.124	.267	82.249	.000	There is a statistically significant relationship between carbon emissions disclosure and return on equity without control variables	Accept
		CED	10.382	9.069	.000				
	3	Constant	1.246	10.792	.000	16.719	.001	There is a statistically significant relationship between foreign investor ownership and carbon emissions disclosure without control variables	Accept
		CED	.010	4.089	.001				
	9	Constant	20.684	1.664	.103	49.264	.0٢٧	There is a statistically significant relationship between foreign investor ownership as an intermediate variable that enhances the relationship between carbon emissions disclosure and return on equity without control variables	Accept
		FIO	10.711	9.835	.000				
		CED	10.593	2.515	.016				
Testing (3) hypotheses With control Variables	8	Constant	25.561	5.842	.001	97.307	.000	There is a statistically significant relationship between carbon emissions disclosure and return on equity with control variables	Accept
		CED	68.267	23.282	.012				
		CP	16.189	4.945	.004				
		CG	2.264	10.725	.000				
		HI	-7.860	-6.618	.000				
		LEV	-1.245	-6.499	.012				
	4	Constant	2.125	16.643	.000	13.258	.0٢١	There is a statistically significant relationship between foreign investor ownership and carbon emissions disclosure in the presence of control variables	Accept
		CED	.008	7.034	.001				
		CP	.028	6.371	.001				
		CG	.193	5.495	.003				
		HI	-4.305	-5.929	.014				
		LEV	-.013	-4.764	.000				
	10	Constant	27.226	2.673	.011	35.062	.000	There is a statistically significant relationship between foreign investor ownership as an intermediate variable that enhances the relationship between carbon emissions disclosure and return on equity	Accept
		CED	20.701	11.336	.000				
		FIO	1.686	6.330	.000				
		CP	1.664	5.080	.000				
		CG	6.876	4.268	.000				
		HI	-.102	-2.784	.008				
		LEV	-1.208	-2.429	.020				

* Significant at a significance level of less than 0.05

The researcher finds from the previous tables (4), (5) the significance of all models, as it was proven according to the F test that it is less than 5%, and the significance of the estimated parameters was proven according to the T test, as the significance level for all variables was less than 5%. From the above, we conclude that the study hypotheses are accepted, which state:

1- There is a statistically significant moral relationship between carbon emissions disclosure and the financial performance represented by the return on equity for Saudi industrial companies.

2- There is a statistically significant moral relationship between foreign investor ownership and the disclosure of carbon emissions.

3- Foreign investor ownership enhances the relationship between carbon emissions disclosure and the financial performance represented by the return on equity for Saudi industrial companies.

Fifth: Results, recommendations, limitations and future studies:

The results of the applied study concluded that there is an impact of carbon emissions disclosure on the financial performance of companies, and some companies use carbon disclosure as part of impression management and helping investors make investment decisions. It also concluded that foreign investor ownership has a role in enhancing the relationship between carbon emissions disclosure and the financial performance of companies in the Saudi market.

The research provides practical implications and important insights that help management, financial stakeholders, and regulators understand the importance of carbon disclosure and know the impact of carbon disclosure on the financial performance of the company. It also contributes to providing empirical evidence on the impact of carbon emissions disclosure on the financial

performance of companies and the role of foreign investor ownership in influencing this relationship. The results show that foreign investors play a vital role as one of the main pillars of the carbon model for sustainable carbon activities. The greater the share of foreign investors in the company's ownership, the stronger the incentive to pressure management to disclose carbon. The research helps standard setters, and policy makers in the Kingdom of Saudi Arabia to improve the implementation and enforcement of current regulations related to carbon accounting because accounting standard setters urge consideration of the financial implications of risks arising from climate change, including carbon risks in financial reports. as evidence confirms the value of foreign investors as a critical resource that enhances the strategic decisions of Saudi companies.

The researcher recommends the necessity of having a standard for mandatory disclosure of carbon emissions, as mandatory disclosure is a source of better financial performance and sustainability. It is necessary to oblige all companies to form environmental committees within the boards of directors to increase the level and quality of carbon emissions disclosure and reduce the problem of information asymmetry. This study came to emphasize the necessity of having a complete system for disclosing on climate change and carbon emissions in Saudi Arabia to enhance effective carbon management and respond to the national policy to reduce carbon emissions and focus on sustainable development. Among the limitations of the study, future studies may expand the scope of the study by including other countries in the region and other sectors and academic years. The study only tests foreign ownership as an intermediate variable, future research can examine other variables, such as the size and type of board of directors, and corporate governance.

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