

A proposed Framework for measuring the effects of reporting of climate change on stock price (An applied study)

Research extracted from PhD thesis in accounting titled

A proposed Framework for measuring the disclosure and professional assurance about climate change and its impact on Firm Value (An applied study)

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Abstract

This research deals with presenting a proposed framework for reporting of climate change that is appropriate for the nature of companies listed on the Egyptian Stock Exchange. Also, the main objective of this study is to investigate the effect of reporting of climate change on the stock price. This research depends upon the two basic approaches in the research methodology: the inductive approach and the deductive approach. The author conducted an applied study to investigate the effect of reporting of climate change on the stock price. The researcher conducted an applied study on a sample of 80 companies listed on the Egyptian Stock Exchange after excluding banks and financial institutions due to their unique nature over the period from 2021 to 2024. The statistical results revealed that there is a significant effect of the reporting of information related to climate change on stock price. The researcher recommends that the Financial Regulatory Authority (FRA) require companies listed on the Egyptian Stock Exchange to disclose climate change and their performance in this regard through their annual report prepared by their board of directors and attached to the annual financial statements, or through a climate change disclosure report, in accordance with the Egyptian Corporate Responsibility Index and listing on the index

Key words: Reporting of Climate Change, Stock Price, Climate Change Risks, Climate Change Opportunities.

المستخلص

يتناول هذا البحث تقديم إطار مقترح للتقرير عن تغير المناخ يتناسب مع طبيعة الشركات المدرجة في البورصة المصرية. كما يهدف البحث بشكل رئيسي الى دراسة تأثير التقرير عن تغير المناخ على سعر السهم. يعتمد هذا البحث على منهجين أساسيين: المنهج الاستقرائي والمنهج الاستنباطي. أجرى الباحث دراسة تطبيقية لدراسة تأثير التقرير عن تغير المناخ على أسعار الأسهم للشركات المقيدة بالبورصة المصرية. أجرى الباحث دراسة تطبيقية على عينة من ٨٠ شركة مدرجة في البورصة المصرية بعد استبعاد البنوك والمؤسسات المالية نظرًا لطبيعتها الفريدة خلال الفترة من ٢٠٢١ إلى ٢٠٢٤. أظهرت النتائج الإحصائية وجود تأثير كبير للتقرير عن المعلومات المتعلقة بتغير المناخ على أسعار الأسهم. ويوصي الباحث بأن تلزم الهيئة العامة للرقابة المالية الشركات المقيدة في البورصة المصرية بالإفصاح عن تغير المناخ وأدائها في هذا الشأن من خلال تقريرها السنوي الذي يعده مجلس إدارتها ويرفق بالقوائم المالية السنوية، أو من خلال تقرير الإفصاح عن تغير المناخ، وذلك وفقا لمؤشر المسؤولية الاجتماعية للشركات المصري والإدراج في المؤشر.

الكلمات المفتاحية: التقرير عن تغير المناخ، مخاطر التغيرات المناخية، فرص التغيرات المناخية، سعر السهم.

1. Introduction:

Users of the firm's general purpose financial reports can evaluate the effects of significant climate-related risks and opportunities on the firm's value(stock price), as well as how the firm's use of resources, inputs, activities, outputs, and corresponding outcomes support the firm's response and strategy to manage significant climate-related risks and opportunities. This is in addition to requiring an entity to disclose information about its exposure to climate risks and opportunities. Additionally, it allows users to evaluate the firm's ability to adapt its planning, business model, and operations to significant climate-related risks and opportunities. (ISSB, 2022).

2. Research problem:

One of the biggest issues of our day is climate change. High social responsibility standards make an organization more appealing to the capital market since they are expected to generate higher returns during crises, like those brought on by climate change. Social responsibility can be used by organizations that are extremely vulnerable to crisis-related risks, such climate change, to enhance their climate performance, lower perceived risks, and increase their appeal. (Mbanye, W., & Muchenje, L. T., 2022).

In 2020, CalPERS, Schroders, and DWS mandated that accountants demonstrate auditor confidence in climate change and its financial effects on businesses in their audit reports and mention climate-related risks in their financial statements. This came after British Petroleum revealed risks associated with climate change in its financial reports.

According to the aforementioned, the scope of accounting disclosure has expanded from future information related to climate change to include other non-financial information such as the nature of the business, management objectives, resources, risks, and expected performance of the firm, along with future information related to financial forecasts, cash flows, and expected revenues of those companies. As a result, the demand for climate change disclosure has recently increased as one of the most important requirements for improving the quality of financial reports. Relatedly, one of the fundamental elements of improving stock market efficiency is climate change disclosure, particularly in relation to the phenomena of information asymmetry and, thus, the firm's worth.

In the light of the above discussion, the researcher seeks to study and analyze the effect of climate change reporting on the stock price of the company. So the study problem can be formulated in the following questions: **Does a firm's reporting of climate change affect the stock price of the firm?**

3. Research objective

“The main objective of this research is to study the effect of reporting of climate change the stock price of the Egyptian listed companies”. With the aim of achieving the following sub-objectives:

- Identify the conceptual framework for the reporting of climate change
- Studying the role of reporting of climate change in enhancing and creating firm value by affecting the stock price of the companies

4. Research importance:

The research derives its importance from its exposure to one of the most important research fields that has generated a lot of controversy in accounting thought locally and internationally recently, which is the reporting of climate change. The scientific and practical importance of the research is due to the study contributes to reducing the existing research gap resulting from the inconsistency of the results of previous studies on the nature of the relationship between climate change reporting and stock price, and then to determine the extent to which climate change reporting on stock price can be used.

5. Research Hypothesis:

In light of the research problem, and striving to achieve its objective, and based on the extrapolation and analysis of relevant previous studies related to the research variables, the research hypothesis can be theoretically derived as follows, which will be empirically tested later:

H1: Reporting of climate change by Firms listed on the Egyptian Stock Exchange significantly affects its stock price.

6. Research limitations:

The applied study is limited to a sample of companies listed on the Egyptian Stock Exchange for the period from 2021 to 2024. Therefore, companies not listed on the Egyptian Stock Exchange, banks, and non-banking financial companies are outside the scope of this research, given their unique nature, as they adhere to accounting rules and practices specific to this sector, in addition to the Basel Committee's decisions. Finally, the generalizability of the research results is conditional upon the selection criteria for the study sample.

7. Research plan

To achieve the research objective, address its problem, and within its scope, the research will proceed as follows:

7.1 The intellectual framework for reporting climate changes in the accounting thought literature

7.2 Proposed framework for climate change reporting and its effect on stock price

7.3 Research methodology

7.4 Research results and recommendations

7.1 The intellectual framework for reporting climate changes in the accounting thought literature:

Recently, the idea of climate change has drawn a lot of attention from both academic and professional circles. This is especially true since accounting has expanded beyond determining the firm's financial position and the outcomes of its operations during a given financial period to include mandatory or optional disclosures about governance and environmental and social responsibility in order to provide information that satisfies the needs and requirements of stakeholders and report users and aids in their decision-making regarding investments

Due to the varying interests and wants of stakeholders and report users, there are many varied perspectives on the idea, determinants, and requirements of disclosure, which presents a challenge for non-financial information disclosure in general and climate change disclosure in particular. Consequently, it is challenging to offer a disclosure idea that satisfies all party's needs.

Since the required information is revealed to satisfy the demands and specifications of stakeholders and report consumers, the proper disclosure standard is thus connected to reality to accomplish realistic disclosure (Halal, 2017). Since climate change has a major influence on all stakeholder decisions, particularly those of investors, it is one of the most important issues of our time. As a result, many parties and professional, governmental, and academic bodies are working to improve the quality of accounting disclosure and give users of financial reports information about climate change, including its positive and negative effects on the environment and the quality of financial reports. (Farag , 2023).

7.1.1 Categories related to climate change and carbon emissions:

To determine the components of voluntary disclosure pertaining to climate change and carbon emissions that must be included in publicly accessible reports, a list has been compiled based on the criteria included in the working papers submitted through the CDP. Climate change risks and opportunities (CC), greenhouse gas accounting (GHG), energy consumption

accounting (EC), and greenhouse gas reduction (RC) are the five broad categories associated with climate change and carbon emissions. Abu Al-Enein and Al-Gyoushi (2021); Choi et al. (2013)

1) Climate change: risks & opportunities:

- CC1: Evaluate and explain the "regulatory, physical, or general" hazards associated with climate change, as well as the steps that have been or will be done to mitigate those risks.
- CC2: Evaluate and explain the financial, business, and opportunity effects of climate change, both now and in the future.

2) Greenhouse gas emissions accounting:

- GHG1: Explain the approach (such as the Greenhouse Gas Protocol or ISO) used to calculate greenhouse gas emissions.
- GHG2: If there is external verification of the quantity of greenhouse gas emissions, which does it and how?
- GHG3: Total emissions of greenhouse gases, measured in metric tons of carbon dioxide.
- GHG4: Source-specific disclosure of greenhouse gas emissions (e.g., electricity, coal, etc.).
- GHG5: evaluating emissions of greenhouse gases in comparison to prior years.

3) Energy consumption accounting:

- EC1: Total energy used (in petajoules or terajoules, for example).
- EC2: Calculating how much energy is consumed from renewable sources

4) Reducing greenhouse gases and costs:

- RC1: information about tactics or plans to cut greenhouse gas emissions
- RC2: details of the year, target cost, and target amount of GHG emission reduction.
- RC3: reductions in emissions and related expenses or savings that the reduction plan has so far produced.
- RC4: The cost of future emissions is considered while planning capital expenditures.

5) Accountability for carbon emissions:

- ACC1: Allusion to the Board Committee (or equivalent executive body) that is ultimately in charge of climate change-related initiatives.
- ACC2: Explain the process by which the company's climate change progress is audited by the board of directors (or another executive body).

7.1.2 Objectives of climate change reporting:

The Climate Disclosure Standards Board created the Climate Change Reporting Framework (CCRF). The following disclosure obligations are part of this framework: (CDSB, 2012).

- **Strategic analysis, risk and governance:** This demonstrates how the organization's short- and long-term strategic goals are affected by climate change.
- **Risks:** An explanation and qualitative evaluation of the organization's exposure to major present and projected hazards (both short-term and long-term) related to climate change should be part of the risk disclosure.
- **Opportunities:** An explanation and qualitative evaluation of the noteworthy present and projected (long-term and short-term) possibilities related to climate change should be included of the opportunities disclosure.
- **Future outlook:** Both long-term and short-term expectations should be covered in disclosures, including climate change trends and factors that may affect management's perception of the organization's strategy or the timeframe over which the strategy is normally expected to be implemented.
- **Governance:** Disclosures ought to outline the organizational resources and governance procedures devoted to recognizing, handling, and supervising the governing body's climate change-related concerns.

7.2 Proposed framework for climate change reporting and its effect on stock price:

7.2.1 Proposed framework for climate change reporting:

The most significant issue facing investors and businesses is the absence of clear information content, which makes it challenging to compile and compare information. This conclusion is based on the researcher's findings from prior research and theoretical analysis. In order to make wise investment decisions, stakeholders and investors require both financial and non-financial information, which is also included in climate information. By helping to create a framework that will allow businesses to report climate change information in a way that satisfies investor demands, the researcher is attempting to address this issue.

1- Objectives: By demonstrating how to enhance the firm's worth and the quality of financial reports, the researcher meets the goals of the suggested framework.

Quality financial reporting: The most common critique of financial reports as they currently exist is that they fail to demonstrate the performance of the company. Conventional financial data does not demonstrate the firm's performance. Even if financial reports offer the necessary qualities, they are

not a good way to gauge a company's performance on their own. They don't offer a comprehensive enough picture of the company's overall performance, nor do they make clear the causal links between the different facets of this performance. The financial report is also focused on the short-term time frame and aims to maximize profits for one group at the expense of the other stakeholder groups (Mohumd, 2017).

By increasing transparency and decreasing information asymmetry, corporate reporting is essential to controlling legitimacy (Milne MJ, et al., 2011). Legitimacy theory has long been used to explain why businesses report on their social and environmental performance, according to Deegan (2019) and Dumay et al. (2018). The growing emphasis on openness by the public, authorities, and market has led to the development of integrated accountability systems, which show the connections between strategy, governance, operations, financial performance, social performance, and environmental performance (Bewley, 2000).

Management is in charge of preparing the entity's financial statements in accordance with the applicable financial reporting framework. The appropriateness of disclosures and the potential impact of climate-related issues on the financial statements should be taken into account by management when implementing financial reporting standards. It is the duty of management to guarantee that the financial statements' estimates and conclusions about climate-related matters are appropriate and supported by logic.

Because climate change has a beneficial impact on the firm's financial and non-financial performance, the proposed framework helps to improve the quality of financial reporting by disclosing it. Additionally, it helps to improve understanding of the many risks and how to manage them, which makes it easier to show how the firm's short-, medium-, and long-term economic, environmental, and social performance are all interconnected

Firm value: Generally speaking, one of the elements influencing a company's market value is disclosure. As a result, a lot of earlier research was interested in examining how financial transparency about climate change, one of the most significant environmental practices at the moment, affected the firm's market value. Numerous studies have demonstrated that a company's market value is concentrated since it is determined by its finance, operations, and investment choices. The management of the company takes numerous actions to maximize the business value when the market value of its shares rises. (EL deeb et al., 2022).

Accordingly, the researcher thinks that the suggested framework for climate change disclosure helps to increase the firm's value by enhancing sustainability performance, which in turn improves the firm's financial performance by achieving transparency, enhancing the firm's reputation,

enhancing the competitive position, raising stock prices and returns, and meeting investor and stakeholder expectations.

2- Elements of reporting of climate change: Given the growing legal advancements and international norms controlling this industry, climate change disclosure has become crucial to ensuring sustainability and openness. Among the most well-known frameworks that establish the guidelines and criteria for revealing how businesses affect the climate are the International Sustainability Financial Reporting criteria (ISSB), the Global Reporting Initiative (GRI) standards, and the Carbon Disclosure Program (CDP). A judgment regarding the implementation of the Climate Change Framework Agreement (CCFA) for 2015 has also been released by the Financial Stability Board (FASB).

Using the climate change data that the regulatory agencies, including the ISSB, GRI, CDP, and FASB, have mandated for climate information disclosure, it is as follows:

1) The firm's strategy to confront the risks of climate change and take advantage of available opportunities:

- Through a strategy and financial plan, the company informs investors and stakeholders about its intention to address current and potential climate change risks and to invest in the confirming possibilities over a variety of time periods (near, medium, and long).
- Determining how much climate change will affect the company's business and financial plans and the opportunities that will arise
- Disclosure of the adaptability of the company's approach to various climatic scenarios

2) Governance and Legislative Obligations

In order to identify and manage the risks of climate change and its various impacts, companies must describe the governance processes that have been allocated. They must also disclose the governance of the company by describing how the company will address the legal legislation upon its issuance, how climate considerations will be included throughout the value chain, what the risk assessment frameworks are, where the information for the climate risk disclosure framework comes from, how the company's organizational capabilities to address climate change are, and how cooperation with other organizations is occurring in this regard. These recommendations are made by organizations that are concerned with climate disclosure.

3) Business Model and Risk Management:

The following question should be addressed and clarified by the company in its annual report:

Is the company aware of the dangers posed by climate change? If it acknowledges them, does it view them as a crucial component of its business strategy?

Risk management's function within the company and across the business model is to help the company accomplish its goals and strategy in order to generate value for its stakeholders.

4) Targets and Metrics:

How the company uses the metrics in relation to the targets should be explained in the report.

- **Identifying the risks and opportunities that must be disclosed:** These risks are reported in light of the responsibilities, laws, and legally enforceable agreements and they are classified as material and transitional risks based on their relative relevance to the company.
- **Organize data by type of climate information :** Separating disclosure data into financial and non-financial (narrative) categories is one of the generally recognized methods. Investors may make wise judgments with greater ease and transparency thanks to this classification.

-Performance and Results: How the company has accomplished its strategic goals should be detailed in its annual report.

-Future outlook and prospects: The annual report should explain the opportunities, risks and uncertainties that the organization will inevitably face in its pursuit of achieving the strategic objectives? What are the consequences for its strategy and future performance?

A suggested model for climate change disclosure is shown in the table below:

Table (1) Examples of some of the information proposed to be disclosed in the annual climate change report Guided by FASB, GRI, and CDP

Disclosure elements	Description	Examples
Climate governance	A-Disclosure of the Board of Directors' responsibility to supervise climate change-related matters	-How is information about climate-related issues communicated to the Board of Directors? -Which management committee (Audit, Risk, or Other) is cognizant of climate risk issues? Which ones are they
	B-Disclosure Outlining management's responsibilities for evaluating and controlling	-Which committee at the management level has been given responsibility for climate risks? Is evaluating

	climate change risks and opportunities	and managing climate risks part of the assignment? -Which procedures are used to inform management about issues related to climate change?
Strategy	A- Disclosure of the short-term climate change risks and possibilities that the company has recognized	-When are the hazards associated with climate change considered material? -Considering the productive life of its assets, what time horizons—short, medium, and long term—does the company take into account? -For each time frame (short, medium, and long term), which particular climate-related risks have a significant financial impact on the company?
	B-Disclosure of how climate change possibilities and threats affect the company's financial and business planning	-What effects do climate change risks and opportunities have on the company's operations, value chain, goods, services, R&D investment, and adaptation and mitigation efforts? -Has the company based its financial planning and strategy on climate scenarios?
	C-The firm's strategy's adaptability to various climate scenarios, such as those with temperatures of 2°C or below, is disclosed.	-What climatic scenarios does the company take into account, together with the corresponding time horizons? -Which assumptions, key input parameters, and analytical decisions underpin these climatic scenarios?
Risk management	A-Explain the company's procedures for determining and evaluating climate change risks and possibilities.	-How does the company detect and evaluate the risks associated with climate change? -How does the company evaluate the extent and scale of identified climate change risks?
	B- An explanation of how the company manages climate risks	-How does the company decide whether to absorb,

		transmit, mitigate, or control the risks associated with climate change? -How does the company rank the dangers associated with climate change, and how does it decide which information is most important?
	C- Explain how the firm's entire risk management incorporates the methods for identifying, evaluating, and managing climate risk.	Does the company's strategy for managing climate risk fit within a larger program for risk management? How, if at all?
Targets and Metrics	A- Disclosure of the metrics the company employs in accordance with its strategy and risk management to evaluate the opportunities and hazards related to climate change	-What performance metrics does the company employ to evaluate and control significant financial risks and opportunities associated with waste management, energy, water, and land use? -Which climate-related performance metrics are included in the company's compensation guidelines? How, too?
	B- Disclosure of the extent of emissions Are there associated risks and scope 1-2-3?	Are the company's greenhouse gas emissions computed using the GHG Protocol approach, which permits comparison and aggregation between businesses and geographical areas?
	C- An explanation of the company's goals for managing climate-related risks and opportunities, together with performance in relation to those goals	Has the company established and shared climate-related performance goals that are in line with anticipated legal requirements, market limitations, or other goals like financial or operational aims or Decrease

Source: the researcher

7.2.2 Analyzing the relationship between reporting of climate change and the stock price:

Most people agree that one of the elements affecting a company's market value is disclosure. The effect of financial disclosure on climate change, one

of the most significant environmental practices of our day, on a company's market value has thus been the subject of numerous prior researches. Numerous studies have demonstrated that a company's market value is concentrated since it is the outcome of its finance, operations, and investment choices. A company's management will take a number of steps to increase the firm's value as the market value of its shares rises (EL Deeb et al., 2022)

As a result, companies are required to include in their financial reports how laws and policies pertaining to climate change affect business patterns. Additionally, they have to reveal any possible opportunities brought about by laws and legislation. Additionally, companies whose operations are susceptible to unfavourable weather patterns and climate change-related incidents are required to reveal the substantial and essential risks as well as the repercussions in the event that those risks come to pass. (Ibrahim, 2020)

Previous studies have found a direct correlation between climate change disclosure and stock prices (Liu et al., 2024). Similarly, a study by (Lin & Wu , 2023) showed that revealing climate change information can lessen the likelihood of a stock value decline. In light of the above, the researcher can see that climate changes can affect the value of the firm. If companies do not move towards confronting the phenomenon of climate change, they may face several challenges and negative impacts on their performance and sustainability.

According to the study (Caby et al., 2022), there is a positive and significant correlation between investors' decisions and climate change disclosure. This means that the more climate change disclosure there is, the more effective and efficient investors' decisions are. The direction of various investors determines the stock market's activity, and securities trading activity causes variations in stock price fluctuations.

This was confirmed by a study Vestrelli., R, et al., 2024, which indicated that disclosure of climate change positively affects stock prices.

The results of (Taiwo et al., 2022) support this, as stakeholders frequently see environmental reporting as a means of enhancing a firm's ethical standing, which in turn raises demand for the company's stock. Information sharing, according to signaling theory, improves a firm's reputation by sending a good signal to market participants.

According to a study by (Guo et al., 2022), companies that minimize the risks associated with climate change reveal more information about it in order to convey a positive message to the market. By eliminating doubt regarding a possible source of risk, this aids investors in evaluating the company's capacity to handle climate change threats, boosting the company's market value.

So, and in the light of the previous presentation of previous studies and the study problem, the study hypothesis can be formulated as follows:

H1: Reporting of climate change by Firms listed on the Egyptian Stock Exchange significantly affects its stock price..

7.3 Research method:

This part discusses the selection process of the research sample, the criteria that affect the sample selection process. Also, it includes the sources of data that are used in this research. In addition, it contains the main research variables and how to measure these variables as well as the research models applied to test the hypotheses in order to achieve the research objectives.

7.3.1 Data and sample selection

Sample contains 80 firms listed on the Egyptian Stock Exchange (ESE), 400 firm-year observations covering the periods from 2020 to 2024. The researcher manually collected data from corporate websites and firms' annual reports. Table (1) shows the list of the firms included in the final sample of the research as well as their industry classification. The final sample is collected from 11 different industries.

Table (1): Sample structure.

Industry sector	No. of firms	No. of observations	%
Communications, Media and Information Technology	5	25	6.2
Food and beverages	18	90	22.5
Basic Resources	5	25	6.2
Chemicals	5	25	6.2
Construction and building materials	8	40	10
Healthcare and Medicines	6	30	7.5
Gas and oil	3	15	4
Real estate	12	60	15
Facilities	1	5	1.2
Industrial services and products	5	25	6.2
Household and personal products	8	40	10
Tourism and entertainment	2	10	2.5
Distributors and Retailers	2	10	2.5
Total	80	400	100

7.3.2 Variables' measurement

7.3.2.1 Dependent variables

The dependent variable in this research is stock prices which is the market price of the share or the closing price of the share as a determinant of the

financial consideration estimated as a fair price for the entity being evaluated (Financial Regulatory Authority, 2017)

7.3.2.2 Independent variables

The independent variable this research reporting of information related to climate change (DCC), (DCC)score since it is often employed to measure environmental disclosure quality (e.g. Gnanaweera & Kunori, 2018; Yu, et al, 2017) DCC should cover the most pertinent risks and opportunities the businesses facing(Iriyadi & Antonio , 2021) .

When preparing the current study, the researcher relied on measuring climate change disclosure based on four basic dimensions of the proposed framework, in accordance with what was addressed in the presentation draft of the International Sustainability Financial Reporting Standards (IFRS) issued by the International Sustainability Standards Board (ISSB) (IFRS S1-2022).

7.3.2.3 Control variables

The researcher control for a set of variables that have previously been found to affect stock price , namely firm size (has been one of the main variables that had a significant on stock price), firm profitability (It is an important measure of firm's financial performance because it reflects the firm's ability to generate profit that will be used to finance profitable investment opportunities thereby, enhancing the firm growth), firm leverage (shows the firm's ability to meet its long term liabilities), and audit quality (Dutta et al., 2021 : Salehi et al ., 2020 : Le ,Maux ,2015).

7.3.3 The study models

This section focuses on introducing the research models that are presented to examine the research hypothesis (illustrated in Figure 1) thus this research includes one model. The model is developed to test the association between DCC and SP

In this study, multivariate regression analysis using the Ordinary Least Squares (OLS) method is employed. The model utilized are presented as follows:

Research model:

The linear regression model focuses on testing the hypothesis H1 which investigate the association between DCC and SP. The first research model is developed as follows:

$$SP_{it} = \beta_0 + \beta_1 DCC_{it} + \beta_2 Size_{it} + \beta_3 LEV_{it} + \beta_4 ROA_{it} + \beta_5 Big4_{it} + \varepsilon_{it}$$

(Model 1)

Where:

SPit, the market price of the share or the closing price of the share as a determinant of the financial consideration estimated as a fair price for the entity being evaluated;

DCCit, disclosure of information related to climate change of firm (i) at year (t);

ROAit, profitability of firm (i) at year (t);

LEVit, leverage of firm (i) at year (t);

Sizeit, firm size of firm (i) at year (t);

Big4it, audit quality of firm (i) at year (t);

εit, error term.

Research model:

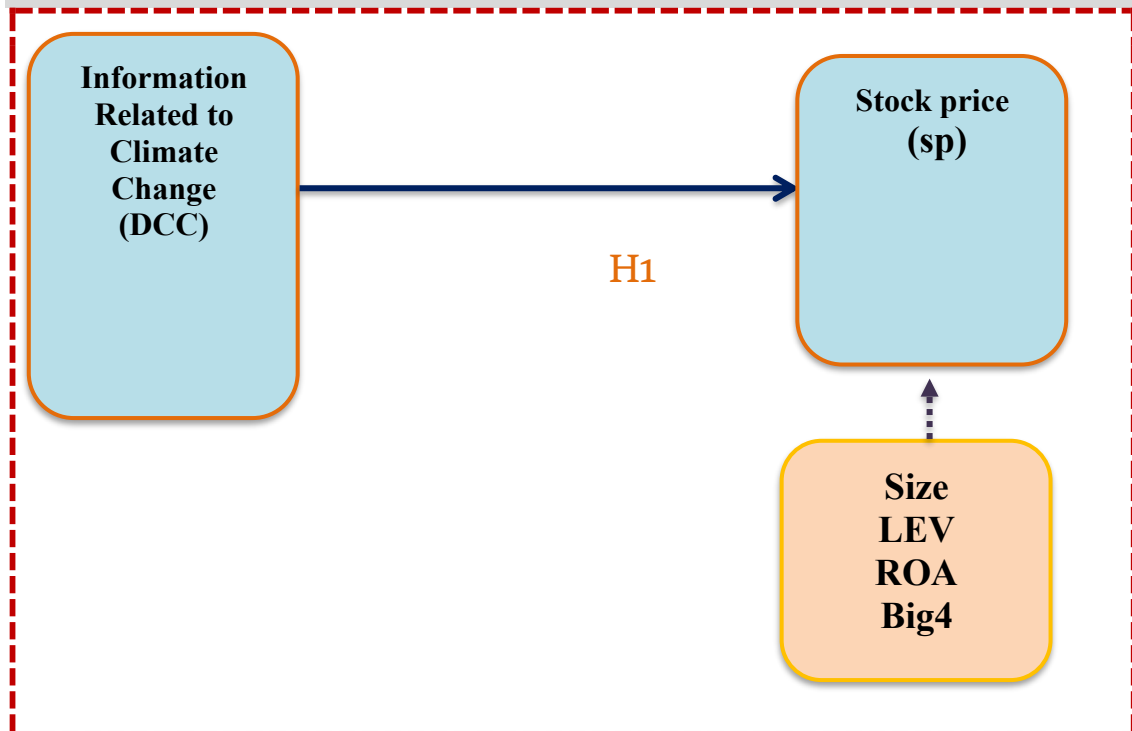


Figure (1): Research model

Source: personal work

7.3.4 Data analysis and Hypotheses testing:

Table (3): Descriptive statistics

Variables	N	Min.	Max.	Mean	Std. Dev
SP	400	0.301	2.805	0.811	0.335
DCC	400	0.00	1.00	0.544	0.385
Size	400	11.500	24.100	18.335	1.681
LEV	400	0.040	1.201	0.505	0.247
ROA	400	-0.261	0.432	0.068	0.187
Big4	400	0.00	1.00	0.425	0.495

Table 3 presents the descriptive statistics for the examined variables. The average of Stock prices (SP), for the full sample is (0.811), with a range from (0.301) to (2.80) and has a standard deviation of (0.335). The average level of disclosure of information related to climate change (DCC) for the full sample is 54.4%, with values ranging from 0.00 to 1.00 and a standard deviation of 0.385. This indicates that, on average, firms disclose just over half of the possible climate-related information. The full range from no disclosure (0.00) to complete disclosure (1.00) suggests significant variability among firms in terms of their transparency regarding climate change issues. The relatively high standard deviation implies a substantial dispersion around the mean, reflecting differing levels of commitment or regulatory pressure among firms.

The **Stock Price** shows a standard deviation of (1.681) which is very small relative to the mean (18.33) due to the use of logarithm which caused smoothing in firm size among firms. The firm size shows a small range between the minimum value (11.50) and the maximum value (24.10), reflecting the high concentration around the mean and the homogeneity in firm size among the sampled firms. The average leverage ratio is approximately 0.505, indicating that, on average, firms finance about 50.5% of their assets through debt. The leverage values range from 0.040 to 1.201, suggesting a considerable variation in debt usage across firms. The standard deviation of 0.247 reflects a moderate level of dispersion around the mean, implying differences in capital structure strategies among the sampled firms. The average return on assets is 0.068, or 6.8%, indicating that, on average, firms generate a modest return on their total assets. The ROA values range from -0.261 to 0.432, showing a widespread in profitability levels, the standard deviation of 0.187 confirms this variability, highlighting differences in operational efficiency and profitability among the firms in the sample.

Table 3 also presents the mean values of the study's categorical variables. The mean of **audit quality (BIG4)** is 0.425, indicating that 42.5% of the

sampled firms (172 observations) were audited by one of the Big Four audit firms.

7.3.5 Diagnostic statistics

7.3.5.1. Pearson's Correlation Test

The Pearson's correlation coefficient shows the direction and the strength of the linear association between any two variables included in this research. Moreover, the Pearson's correlation coefficients are used to detect the multicollinearity between any two independent variables included in the same regression model. Table (4) shows the Pearson's correlation coefficients for all the study variables.

The correlation coefficients in the Pearson correlation matrix presented in table (4) are used to detect the multicollinearity between any two independent variables. Where the multicollinearity exists if the Pearson correlation coefficient is greater than 70% between any two independent variables. There is no multicollinearity detected between independent variables used to test the moderating effect of type of sector and implementing environmental management system on the association between DCC and FV. because the highest correlation coefficient is (0.366) which is found between the audit quality and disclosure of information related to climate change as shown in table (4)

Table 4. Pearson's correlation Matrix

Variables	FV	DCC	Size	LEV	ROA	Big4
SP	1					
DCC	0.214***	1				
Size	0.245***	0.081	1			
LEV	-0.124**	0.093*	0.048	1		
ROA	0.364***	0.079	0.154* **	- 0.127* *	1	
Big4	0.175***	0.366** *	0.222* **	0.102* *	- 0.006	1

Table 4 displays the findings of the Pearson correlation analysis for the models' variables. Stock price has a significant positive correlation with disclosure of information related to climate change (DCC) $R=0.214$, at 1%

significance level. This indicates that firms with higher disclosure of information related to climate change are expected to have higher stock price. Similarly, Stock price (SP) exhibits significant positive correlations with Size, ROAA and Big4, with correlation coefficients of 0.245, 0.364, and 0.175, respectively, all significant at the 1% level. Also, the independent variables exhibited a lower correlation, indicating the absence of multicollinearity issues in the sample.

7.3.6 Empirical results and Hypotheses Testing

7/3/6/1 First hypothesis: Disclosure of information related to climate change and stock price:

To testing the validity of the first research hypothesis (H1) concerning the association between DCC and SP, which states That “reporting of information related to climate change by Firms listed on the Egyptian Stock Exchange significantly affects its stock price”. begins by conducting a Multivariate OLS regression model as shown in table (5).

Table 5: The relationship between DCC and SP

Dependent variable (Stock Prices)				
Predictor	Coefficient	t-value	P-value	VIF
DCC	<u>0.116</u> **	2.234	<u>0.026</u>	1.217
Size	0.187***	3.889	0.000	1.049
LEV	0.018	0.362	0.718	1.059
ROA	0.173***	3.569	0.000	1.067
Big4	0.078	1.517	0.130	1.203
Constant	-11.6**	-2.117	0.035	-----
R ²	0.118			
Adjusted R ²	0.107			
F-value	10.675 <i>p=0.000</i>			
Durbin-Watson	1.995			
Notes: ***, **, and *denote statistical significance at the 1, 5, and 10 percent levels.				

Table 5 shows the findings of the OLS regression analyse to examine the association between DCC and SP. From above table (table 5), the value of calculated F was 10.675 at a significant level 0.000 less than the approved level of significant 0.05 which indicated that the model was deemed fit and

statistically significant. And Adjusted R² (10.7%) was used to measure the ability of independent variables to interpret the dependent variable, which indicated that the variations in the independent variables explain almost 10.7% of the variation in the dependent variable (stock price).

The results in table (5) indicate a **positive significant** relationship between disclosure of information related to climate change and stock price, where (β) value of the DCC is positive and equals to 0.116, the value of (t) = 2.234 at a significance level (Sig) = 0.026 less than the approved level of significance 5%. This result means that disclosure of information related to climate change have a positive and significant impact on stock price. Consequently, these results support the study's first research hypothesis (H1), we can accept the first hypothesis (H1).

7.4.7 Research results and Recommendations

7.4.7.1 Research results

The study concluded, in its theoretical aspect, that disclosure limited to financial disclosure is no longer sufficient to meet stakeholders' needs for non-financial information. Consequently, the scope of accounting disclosure has expanded to include non-financial information, such as financial information, the nature of the business, management objectives, and risks related to climate change, along with information related to the firms' financial position and performance, as well as its cash flows and, consequently, the stock price.

Also, whether the information from climate disclosure is sufficiently reliable or credible to affect investor expectations, or how such information would affect stock price. The researcher concludes that the importance of disclosing climate change to stakeholders as it enables them to rationalize their decisions and determine the extent of firms' ability to create and maintain value. In addition, the proposed framework contributes to improving the quality of financial reports and the market value of firms (stock price).

7.4.2 Research Recommendations

In light of the study's findings, the researcher recommends the following:

- The need to work on developing an accounting standard for climate change accounting, in light of Egypt's commitment to the Paris Climate Agreement, its adoption of climate change issues, and the holding of the Climate Summit on its soil in November 2022.
- The researcher recommends that the Financial Regulatory Authority (FRA) require companies listed on the Egyptian Stock Exchange, regardless of the nature of their activity, to disclose climate change and their performance in this regard through their annual report prepared by their board of directors and attached to the annual financial statements, or through a climate change disclosure report, in

accordance with the Egyptian Corporate Responsibility Index and listing on the index

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