Winter 1-31-2024

The Effect of ESG on Indices' and Firms' Performance. A Global and an Egyptian Context.

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Graduate Studies

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to the
Master of Science in Finance

Graduate Program

06 Sep 2023
In partial fulfillment of the requirements for the degree of

Master of Science in Finance

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1. Abstract

Over the years, ESG (environmental, social, and governance) investing has been increasingly adopted by the financial markets. In this paper, we aim to study the effect of ESG on Indices' and Firms' performance using Morgan Stanley Capital International (MSCI) Indices as a global reference and Egypt's indices as a national reference. We also study the effect of ESG scores on the Egyptian Firms' performance over the past 16 years using econometrical models and Fama-French Five Factors Model. Our research shows mixed results which are aligned with the existing literature review. However, one can conclude that there is a positive significant relationship between the total ESG score and the excess return of the Egyptian stocks, using Fama-French five factors model.

Keywords: ESG Investment, MSCI, Low Carbon Target, Egyptian Stock Exchange, Fama-French Five Factors Model.

2. Introduction and Background Information

Back in 2004, the United Nations Global Compact and the Swiss government published a report "Who Cares Wins" with total assets under management of more than 6 trillion USD since 20 financial institutions from 9 different countries have contributed to developing this report to provide recommendations to the various key players in the financial markets, including but not limited to, analysts, stock exchanges, consultants, investors/ asset managers, and regulators (United Nations Environment Programme Finance Initiative [UNEP FI], 2004). Accordingly, is it Who Cares Wins?

To answer the above question, several empirical studies have been conducted to determine whether environmental, social, and governance (ESG) investment outperforms the traditional investment; however, results show contradicting views as some researchers (Friede, et al. (2015), Hamdan (2020), Bahadori, et al. (2021), Ni & Sun (2023), and Bodhanwala & Bodhanwala (2018)) found a positive relationship between investing in ESG and stock returns while others found the exact opposite (Chang, et al. (2012), Climent & Soriano (2011)) or even neutral relationship (Ur Rehman, et al (2016) and Jain, et al. (2019)).

In this paper, we aim to study the effect of ESG on the financial performance not only on the global indices level but also on the national firms' level as the data from 9 different markets from Morgan Stanley Capital International (MSCI) indices will be analyzed in the first research question, in addition to, analyzing Egypt's ESG index (SP/EGX ESG index) versus its parent index (EGX EWI 100) in the second research question. Moreover, the last research question is studying the effect of ESG on Egyptian companies' performance over the past 16 years.

Background:

The New York-based American financial institution; Morgan Stanley Capital International (MSCI) offers a wide range of financial products, including ESG-related products, and provides services in several areas of the financial market (MSCI, n.d.). The purpose of this study is to determine whether investing in MSCI ESG Leaders indices, MSCI ESG Universal indices, and MSCI Low Carbon Target indices can outperform their benchmark indices.

With MSCI ESG Leaders indices are constructed to reflect the performance of businesses with strong Environmental, Social, and Governance (ESG) ratings in comparison to similar companies in their industry, they strive to include businesses with the highest MSCI ESG Ratings in each sector, with a target sector representation of 50% compared to the parent index. Hence, they are made for institutional investors who are seeking exposure to businesses with good sustainability profiles and minimal tracking error to the underlying equity market (MSCI, n.d.).

Meanwhile, the MSCI ESG Universal indices are a cutting-edge approach to indexing as they are made to cater for the interests of asset owners who want to increase their exposure to ESG while keeping a wide and varied universe to invest in as they increase exposure to those companies that exhibit both a higher MSCI ESG Rating and a positive ESG movement while sustaining a broad and diversified investment portfolio. This is being done as only firms judged to be in violation of international standards—for instance, those involved in extremely serious controversies with human rights, labor rights, and/or the environment—are excluded from the MSCI ESG Universal Indexes. The MSCI ESG Universal Indexes are the newest of several MSCI indices and tools created to assist institutional investors around the world in incorporating ESG into their investment decision-making processes (MSCI, n.d.).

Lastly, the purpose of the MSCI Low Carbon Indexes is to represent the performance of the overall equity market while assisting in the identification of potential risks related to the move to a low

carbon economy. As the first index series to address both carbon emissions and fossil fuel reserves, they were introduced in 2014. The MSCI Global Low Carbon Target Indexes reweight stocks according to their carbon exposure, which includes fossil fuel reserves and carbon emissions. The indexes are intended to minimize carbon exposure relative to their parent indexes while achieving a maximum reduction in carbon exposure (MSCI, n.d.).

Therefore, the first question of this study will focus on the above 3 ESG indices and it will study 9 markets, including All Country World Index (ACWI), World index, China, Europe, Australasia, and Far East (EAFE) index, Emerging Markets (EM) index, European Economic and Monetary Union (EMU) index, United States of America (USA) index, Japan index, and Europe index.

Meanwhile, as the existing literature focuses primarily on the emerged markets and/or the emerging markets as a whole, this paper takes Egypt as a pioneer in the emerging markets given the fact that Egypt launched its ESG index, partnering with S&P Dow Jones Indices, back in 2010 with first value date in 2007. SP/EGX ESG index includes the performance of the 30 companies with the highest ESG scores as each company in the parent index is given a score, and then the top 30 companies are being selected to be added to the SP/EGX ESG index with an annual rebalancing. According to S&P/EGX ESG Index Methodology (2023), the total composite ESG score of each company in the parent index is the summation of its qualitative ESG score and its quantitative ESG score.

The qualitative score is basically a qualitative assessment based on the available information on independent sources of information. This assessment has criteria for the corporate governance and criteria for the environmental and social conduct. While the corporate governance criteria cover areas like ownership structure, shareholders' rights, transparency, disclosure and audit, board effectiveness, and business ethics, the qualitative criteria for the environment and the social conduct (ES) include environmental pollution, natural resources use, employee relations, labor rights, employees' health and safety, equal opportunities, human rights and product safety and quality. In addition, the quantitative ESG score is calculated based on the disclosure and transparency of 2 variables: corporate governance and environmental practices & social governance (ES).

Hence, this study aims to analyze the effect of ESG on the financial performance as the second question of this paper will help to determine whether SP/EGX ESG index can outperform the parent index (EGX EWI 100 index). Not only it will cover data since the first value date of SP/EGX

ESG index, but it will also study the effect during the bull and the bear markets. In addition, the third question will thoroughly analyze the ESG effect on the individual companies' performance in Egypt from 2007 till 2022 using econometrical model and Fama-French five factors model.

3. Literature Review

Even though there is extensive research work done to study the effect of ESG on the financial performance of not only indices but also companies in different markets, the results are somehow inconsistent as some studies have found that ESG Investment outperformed the traditional investment (Friede, et al. (2015)), while other studies have found a negative relationship between ESG Investment and financial performance (Chang, et al. (2012), Climent & Soriano (2011)) or even neutral relationship (Ur Rehman, et al (2016) and Jain, et al. (2019)). In addition, Alareeni & Hamdan (2020), Bahadori, et al. (2021), Ni & Sun (2023), and Bodhanwala & Bodhanwala (2018) found a positive relationship between ESG scores and firms' performance. In contrast, Bannier, et al. (2019) show that there exists a significant negative relationship between ESG and the financial performance in companies in Europe and US.

3.1. ESG and Indices' Financial Performance

In research paper "Do Green Mutual Funds Perform Well?" published by Chang, C. E., Nelson, W. A., and Doug Witte, H. in 2012, the authors analyze the performance of green mutual funds and examine whether these funds generate positive financial outcomes. The study provides clarification on the relationship between green investment strategies and returns on investments by examining the financial performance of green mutual funds in the context of sustainable investing. The primary objective of the study is to determine whether green mutual funds, which take environmental factors first priority when making investment decisions, outperform conventional mutual funds in terms of financial performance. The authors aim to contribute to the continuing discussion about the hypothesis that green investments result in higher financial returns. The 131 green mutual funds in the United States were the subject of an analysis by the writers.The Sharpe ratio and expense ratio are just two of the performance criteria the authors rely on to evaluate fund performance while paired t-test was used to check the significance. The study's findings revealed that during the study period, green mutual funds did not outperform conventional mutual funds. In contrast to conventional mutual funds, the authors found that green mutual funds

had lower returns and comparable risks. According to the study, there is no sufficient evidence to prove that green mutual funds perform better than conventional mutual funds in USA.

Similarly, Soriano and Climent (2011) look at the performance of US environmental mutual funds, which invest in companies that are considered as being environmentally friendly in their paper "Green and Good? The Investment Performance of US Environmental Mutual Funds". Forty environmental mutual funds in the US were analysed by the authors between 1987 and 2009 using Capital Asset Pricing Model (CAPM) methodology. The study's findings revealed that during the study period, environmental mutual funds did not outperform conventional mutual funds. According to the authors, compared to conventional mutual funds, environmental mutual funds had lower returns and comparable risks during the study period. However, during the recent eight years of the research, the study results show that the returns of the green funds are not statistically different from benchmark mutual funds. Hence, there is no sufficient evidence to prove that environmental mutual funds outperform conventional mutual funds.

In contrast, Environmental, Social, and Governance (ESG) factors and financial performance are intricately related, as studied in the research paper "ESG and Financial Performance: Aggregated Evidence from more than 2000 Empirical Studies" by Friede, Gunnar; Busch, Timo; and Bassen, Alexander (2015). This 2015 article offers a thorough meta-analysis that aims to clarify the relationship between the effect of ESG factors on financial performance. The primary objective of the study is to study the results of multiple independent empirical research papers done on the relationship between ESG parameters and financial performance. In this meta-analysis, the authors look for broad trends and patterns that can provide information on whether businesses that give attention to ESG issues typically perform better financially. The authors systematically collect and evaluate data from over 2,000 different empirical research in order to fulfil their research objective. These studies include a wide range of geographic areas, industries, and sectors, enabling a thorough investigation of the relationship between ESG and financial performance. The methodology, criteria, and conclusions of each study are carefully examined by the authors, who subsequently employ precise statistical methods to combine the available data.The primary findings of this thorough meta-analysis suggest to an impressive consensus in the empirical literature. The articles focus on the significance of company size, industry sector, and geographic location in particular. Even with the diversity brought on by these factors acknowledged, the overall trend of a favourable relationship between ESG and financial performance remains

strongly in evidence. Nearly 90% of the research under consideration imply a nonnegative relationship between ESG factors and financial performance. These findings have important significance. Even though the majority of research shows a positive relationship between ESG and financial performance, there may be differences depending on industry dynamics, regional impacts, and particular firm practices.

Even though multiple research papers show the negative and the positive relationships between ESG and Financial Performance, some proved that there is no significant difference between ESG investment and traditional investment. For example, in “Are Environmental Social Governance Equity Indices a Better Choice for Investors? An Asian Perspective" the possibility of Environmental, Social, and Governance (ESG) stock indices as alternatives for investment from an Asian viewpoint was examined and this paper was published in "Business Ethics: A European Review." in 2016. The primary purpose of this study is to determine whether equity indices with an emphasis on ESG factors—environmental, social, and governance considerations—offer better financial performance than conventional market indices, particularly in the Asian context. The authors conduct a comprehensive quantitative study that covers a wide range of Asian nations and their different stock markets to accomplish their research goal. The research covers an extensive period from 2002 to 2014, enabling a thorough analysis of how ESG equity indices performed in comparison to their traditional equivalents. The authors evaluate performance using a variety of financial criteria, including risk-adjusted returns. Results show that ESG equity indexes in the Asian countries do not have any significant difference from their benchmark indices.

Similarly, in order to compare the financial performance of Environmental, Social, and Governance (ESG) indices and MSCI indices, the research study "Can Sustainable Investment Yield Better Financial Returns: A Comparative Study of ESG Indices and MSCI Indices" was done. The key objective of the study is to test if ESG indices, which consider ESG factors when choosing their member companies, outperform traditional MSCI indices in terms of financial performance. All benchmark indices' daily closing prices for a period of five years between January 2013 and December 2017 have been examined in the study using auto-regressive conditional heteroskedasticity (ARCH)-GARCH. Granger Causality has also been performed to study the link between the markets in scope. According to the study results, there is no significant difference in performance between conventional traditional indices and ESG indices (Jain, et al. 2019). This shows that investing sustainably can be a solid alternative to investing conventionally

and that investors can gain greater understanding about their investment choices by taking into account both types of indices. According to the study, investors should consider both indexes in order to diversify their risk and hedge their positions.

3.2. ESG and Firms' Financial Performance

Alareeni & Hamdan (2020), in their paper "ESG impact on performance of US S&P 500-listed firms" look at how Environmental, Social, and Governance (ESG) variables affect the performance of US S&P 500 index-listed corporations. The main objective is to find out if businesses that demonstrate strong ESG performance have greater financial performance.

The study assesses the relationship between ESG scores and key performance measures of S&P 500-listed companies through comprehensive analysis. It looks at how factors like stock returns, profitability, and market valuation are affected by factors like environmental sustainability, social responsibility, and solid governance practices. This has been applied using data from 2009 to 2018. The main results of the research provide clarification on the relationship between the financial performance of US companies listed on the S&P 500 and ESG performance. According to the study, good ESG performance is correlated positively with positive financial outcomes. However, ESG sub-components have a negative relationship associated with RoA and RoE.

Similarly, Bahadori, et al. (2021) in "Environmental, social, and governance factors in emerging markets: The impact on firm performance" investigate how Environmental, Social, and Governance (ESG) components affect the performance of businesses that operate in emerging markets. The primary objective is to investigate if businesses that focus on ESG factors in these developing economies experience different financial outcomes.

The paper examines the relationship between ESG metrics and key performance indicators of businesses in emerging regions through a thorough investigation using a sample of 600 companies in 24 markets. This sample covers the period from 2014 to 2018. It evaluates the effects of financial metrics, including profitability, stock returns, and market valuation on social responsibility, environmental sustainability, and effective governance practices. The primary results of the study provide an understanding of the relationship between emerging market firm performance and ESG performance. According to the paper, there is a positive relationship between high ESG performance and positive financial outcomes. This suggests that businesses that include ESG factors in their strategy typically enjoy better stock returns, higher profitability, and perhaps even higher market valuation in developing countries.

In China, Ni & Sun (2023) in “Environmental, social, and governance premium in Chinese stock markets” study whether there is a premium correlated with Environmental, Social, and Governance (ESG) variables in Chinese stock markets. The main goal is to examine if, in the Chinese context, organizations that prioritize environmental, social, and governance (ESG) concerns have improved financial performance and valuation.

The study investigates the relationship between ESG scores and several financial metrics of companies listed on Chinese stock markets through a thorough examination. It aims to comprehend how stock returns, market valuation, and other financial performance measures are impacted by environmental sustainability, social responsibility, and solid governance practices. The primary findings of the study provide information about the ESG premium that is present in Chinese equity markets. The study's conclusions are in line with a growing body of proof that links financial performance to ESG performance in a constructive way. According to the study, firms that exhibit great ESG performance may actually benefit from higher stock returns and market valuation. This suggests that businesses that prioritize ESG factors in their operations may see stronger financial results and possibly higher investor favor.

The positive relationship is also aligned with the results from India; as Bodhanwala & Bodhanwala (2018) in “Does Corporate Sustainability Impact Firm Profitability? Evidence from India" thoroughly study how corporate sustainability and business profitability relate to each other in the Indian setting. The study's main goal is to determine whether businesses that prioritize sustainability practices experience different effects on their financial performance, especially in terms of profitability. The authors selected 58 Indian companies covering the period from 2008 to 2016 in their sample. The study investigates the relationship between corporate sustainability strategies and company profitability across Indian enterprises through empirical analysis. It aims to comprehend how social responsibility, environmental sustainability, and good governance practices affect these organizations’ financial performance, with a focus on profitability metrics. The main conclusion of the study explains the relationship in India between corporate sustainability and business profitability. According to the findings, there is a strong correlation between effective corporate sustainability initiatives and good effects on business profitability. This suggests that businesses that have a strong emphasis on environmental concerns in their operations see an improvement in their financial performance in terms of profitability.

However, these results are in contrast with Bannier, et al. (2019) found in "Doing safe by doing good: ESG investing and corporate social responsibility in the U.S. and Europe". This research paper investigates the financial performance of investing, adopting environmental, social, and governance (ESG) standards in the United States and Europe. The study's main goal is to find out whether businesses with an emphasis on ESG and CSR have lower financial risk and better financial performance. The companies listed on stock exchanges in the two regions between 2003 and 2017 make up the authors' sample. They discover that a portfolio that is long in companies with the highest ESG scores and short in those with the lowest scores produces a significantly negative abnormal return after accounting for firm size, leverage, and other variables. To attract investors, companies with lower ESG scores have to offer a proportional risk premium. This is because of concerns raised by investors about the possible hazards related to investing in companies with poor ESG performance.

4. Research Methodology

This section covers the 3 research questions that are in scope of this study.

4.1. Question One

Do MSCI ESG Leaders, MSCI ESG Universal, and MSCI Low Carbon Target Indices deliver higher returns than their benchmark Indices?

4.1.1. Objectives and Hypotheses

Objectives:

1. To evaluate and compare the performance of MSCI ESG Leaders, MSCI ESG Universal, MSCI Low Carbon Target, and MSCI benchmark/parent Indices.

2. To find the relation between MSCI ESG Leaders, MSCI ESG Universal, MSCI Low Carbon, and MSCI Parent Indices.

Hypotheses:

1. Ho 1: There is no significant difference in mean returns of MSCI ESG Leaders indices.
2. Ho 2: There is no significant difference in mean returns of MSCI ESG Universal indices.
3. Ho 3: There is no significant difference in mean returns of MSCI Low Carbon.
4. Ho 4: MSCI ESG Leaders and benchmark indices do not granger each other.
5. Ho 5: MSCI ESG Universal and benchmark indices do not granger each other.
6. Ho 6: MSCI ESG Low Carbon and benchmark indices do not granger each other.

4.1.2. Data

Sample: Nine MSCI Markets have been selected for this study, including All Country World Index (ACWI), World index, China, Europe, Australasia, and Far East (EAFE) index, Emerging Markets (EM) index, European Economic and Monetary Union (EMU) index, United States of America (USA) index, Japan index, and Europe index. MSCI ESG Leaders, MSCI ESG Universal, MSCI Low Carbon Target indices data has been collected, in addition to their benchmark indices.

Study Period: Daily data of all the in scope indices has been collected from September 2019 to June 2023 and the daily returns have been calculated for the study period.

Data Sources: All data has been collected from Refinitiv Financial Database available at the American University in Cairo.

Methodology: Daily closing prices and returns have been collected for all the nine markets for the four MSCI indices. Then, descriptive statistics have been calculated and the comparison has been done among all MSCI Indices. To test the statistical significance between the means and the medians of each pair, paired t-test and Mann-Whitney U have been conducted. Also, Granger Causality test has been used to check whether traditional MSCI indices can granger cause MSCI ESG indices, MSCI Low Carbon indices or not, or vice versa. This has been applied using the daily returns as they are stationary data.

4.1.3. Results and Interpretation

The following table provides the descriptive statistics of MSCI ESG Leaders, MSCI ESG Universal, and MSCI Low Carbon Target indices against their respective benchmark indices.

		Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Sum	Sum Sq. Dev.	Observations
ACWI	ESG LEADERS	0.00034	0.0006	0.0852	(0.0938)	0.0117	(0.8069)	16.2514	0.3353	0.1343	981
ACWI	ESG UNIVERSAL	0.00036	0.0007	0.0844	(0.0958)	0.0117	(0.8060)	16.0042	0.3500	0.1348	981
ACWI	LOW CARBON	0.00035	0.0008	0.0794	(0.0910)	0.0113	(0.8787)	16.4315	0.3468	0.1247	981
ACWI	PARENT	0.00033	0.0007	0.0839	(0.0951)	0.0118	(0.8641)	16.1305	0.3262	0.1356	981
CHINA	ESG LEADERS	(0.00004)	(0.0004)	0.1694	(0.0918)	0.0204	0.6856	9.5600	(0.0359)	0.4084	980
CHINA	ESG UNIVERSAL	(0.00009)	0.00	0.1538	(0.0862)	0.0179	0.6834	10.4308	(0.0898)	0.3124	980
CHINA	LOW CARBON	(0.00015)	(0.0002)	0.1459	(0.0805)	0.0174	0.6237	9.7871	(0.1447)	0.2958	980
CHINA	PARENT	(0.00014)	(0.0003)	0.1454	(0.0818)	0.0174	0.6040	9.7343	(0.1384)	0.2960	980
EAFE	ESG LEADERS	0.00020	0.0007	0.0694	(0.1021)	0.0111	(0.6700)	13.0333	0.1913	0.1214	981
EAFE	ESG UNIVERSAL	0.00021	0.0005	0.0711	(0.1048)	0.0113	(0.7316)	13.4690	0.2034	0.1255	981
EAFE	LOW CARBON	0.00018	0.0005	0.0694	(0.1023)	0.0111	(0.7107)	13.1958	0.1765	0.1213	981
EAFE	PARENT	0.00017	0.0005	0.0715	(0.1037)	0.0112	(0.7370)	13.6165	0.1668	0.1231	981
EM	ESG LEADERS	(0.00015)	0.0001	0.0581	(0.0453)	0.0115	0.2040	5.2019	(0.1131)	0.0964	733
EM	ESG UNIVERSAL	(0.00005)	0.0004	0.0540	(0.0423)	0.0103	0.1518	5.3070	(0.0330)	0.0782	733
EM	LOW CARBON	(0.00010)	0.0004	0.0524	(0.0421)	0.0104	0.1480	5.1966	(0.0722)	0.0786	733
EM	PARENT	(0.00009)	0.0004	0.0528	(0.0431)	0.0104	0.1326	5.2106	(0.0627)	0.0792	733
EMU	ESG LEADERS	0.00027	0.0007	0.0905	(0.1357)	0.0152	(0.6800)	12.9292	0.2638	0.2253	979
EMU	ESG UNIVERSAL	0.00028	0.0007	0.0894	(0.1399)	0.0152	(0.7438)	13.7200	0.2755	0.2271	979
EMU	LOW CARBON	0.00026	0.0007	0.0874	(0.1397)	0.0152	(0.7677)	13.7222	0.2522	0.2258	979
EMU	PARENT	0.00024	0.0007	0.0893	(0.1406)	0.0152	(0.7833)	13.8923	0.2355	0.2270	979
EUROPE	ESG LEADERS	0.00026	0.0007	0.0846	(0.1277)	0.0136	(0.8882)	13.9779	0.2514	0.1799	979
EUROPE	ESG UNIVERSAL	0.00027	0.0008	0.0853	(0.1289)	0.0137	(0.8950)	14.1517	0.2617	0.1825	979
EUROPE	LOW CARBON	0.00023	0.0007	0.0870	(0.1296)	0.0136	(0.9027)	14.5200	0.2290	0.1818	979
EUROPE	PARENT	0.00022	0.0007	0.0890	(0.1312)	0.0137	(0.9209)	14.8567	0.2148	0.1842	979
JAPAN	ESG LEADERS	0.000119	(0.0001)	0.0723	(0.0622)	0.0118	0.1330	6.1818	0.1154	0.1347	966
JAPAN	ESG UNIVERSAL	0.000142	-	0.0718	(0.0629)	0.0117	0.1014	6.1383	0.1373	0.1323	966
JAPAN	LOW CARBON	0.000134	(0.0000)	0.0735	(0.0629)	0.0118	0.1124	6.2222	0.1299	0.1340	966
JAPAN	PARENT	0.000137	(0.0001)	0.0736	(0.0631)	0.0118	0.1115	6.2411	0.1324	0.1335	966
USA	ESG LEADERS	0.000518	0.0005	0.0992	(0.1212)	0.0148	(0.4432)	14.5929	0.5030	0.2126	971
USA	ESG UNIVERSAL	0.000514	0.0004	0.0952	(0.1198)	0.0147	(0.4521)	14.3927	0.4989	0.2102	971
USA	LOW CARBON	0.000498	0.0006	0.0934	(0.1203)	0.0148	(0.5031)	14.2631	0.4837	0.2111	971
USA	PARENT	0.000512	0.0006	0.0940	(0.1212)	0.0148	(0.5232)	14.4223	0.4969	0.2115	971
WORLD	ESG LEADERS	0.00039	0.0006	0.0901	(0.0976)	0.0124	(0.6934)	15.7659	0.3856	0.1500	981
WORLD	ESG UNIVERSAL	0.00039	0.0006	0.0874	(0.0992)	0.0123	(0.7260)	15.6230	0.3858	0.1475	981
WORLD	LOW CARBON	0.00038	0.0007	0.0861	(0.0982)	0.0124	(0.7428)	15.2674	0.3735	0.1504	981
WORLD	PARENT	0.00037	0.0008	0.0877	(0.0991)	0.0124	(0.7725)	15.6433	0.3659	0.1513	981

Table 1: Descriptive statistics of MSCI ESG Leaders, MSCI ESG Universal, MSCI Low Carbon Target Vs Benchmark Indices for the nine markets.

T- Test and Mann-Whitney Results:

The paired t-test and the Mann-Whitney have been conducted on each pair with respect to the parent index for each market of the nine markets to test the null hypotheses below.

Ho 1: The true mean difference between the paired samples (ESG and Traditional indices Returns) equals to zero.

Ho 2: There is no difference between the medians of the paired samples (ESG and Traditional indices Returns).

Both tests show high p-values that are statistically insignificant to reject the above null hypotheses which indicate no significant difference between the returns of MSCI benchmark indices and MSCI ESG indices for the study period.

Interpretation:

MSCI ESG Leaders indices outperformed their benchmark indices in ACWI, EAFE, EMU, Europe, USA, and World indices while MSCI ESG Universal indices outperformed their counterparts in ACWI, EAFE, EMU, Europe, Japan, USA, and World indices. For Low Carbon Target indices, they outperformed their benchmark indices in ACWI, EAFE, EMU, Europe, and the World indices. Even though, the mean of the above ESG/Low Carbon Target indices is higher than their parent indices, the paired T-test and the Mann Whitney Test show no significance in the difference of the mean returns of the pair's indices. The reason can be that the data for this study covers the recent 4 years, which can be considered as a small sample to provide a difference in the mean returns.

Granger Causality Test:

To study the causal relationship between MSCI parent and ESG/Low Carbon Target indices to predict the future using past values, Granger Causality test has been done and the null hypothesis states that past returns of MSCI Parent indices cannot be used to predict the future returns of MSCI ESG/Low Carbon Target indices, and vice versa.

P-values of the Granger Causality test are summarized in table 2 that show significance to reject the null hypothesis as results show unidirectional relationships between ACWI parent and ACWI ESG Leaders indices and ACWI parent and ESG Universal indices, bidirectional between EM parent and ESG Leaders and between EM parent and ESG Universal indices, bidirectional between World parent and World ESG Universal indices, bidirectional between World parent and World Low Carbon Target indices, bidirectional between China parent and China ESG Leaders indices, bidirectional between USA parent and USA Low Carbon Target indices, and bidirectional between EAFE parent and EAFE Low Carbon Target indices.

Interpretation:

Given that the null hypothesis of Granger Causality is that variable X do not granger cause variable Y and variable Y does not granger cause variable X, and if the p-value is greater than 0.05 in both statements, then, the null hypothesis is not rejected. If the p-value is less than 0.05 in both statements, then bidirectional causality exists and variable X granger causes variable Y and vice versa while if the p-value is less than 0.05 in only one statement of the pairs, then there is only unidirectional causality. This means that past values of the parent index can be used to predict the future of ESG/Low Carbon Target indices and vice versa as shown in table 2.

Table 2: Granger Causality Test Results (Yes means there is a causality and No means there is no causality):

Null Hypothesis:	Obs	Prob.	Yes/No
CHINA_PARENT_INDEX_RETURN does not Granger Cause CHINA_ESG_LEADERS_INDEX_RETURN	972	0.00	Yes
WORLD_PARENT_INDEX_RETURN does not Granger Cause WORLD_LOW_CARBON_INDEX_RETURN	977	0.00	Yes
WORLD_LOW_CARBON_INDEX_RETURN does not Granger Cause WORLD_PARENT_INDEX_RETURN	977	0.00	Yes
CHINA_ESG_LEADERS_INDEX_RETURN does not Granger Cause CHINA_PARENT_INDEX_RETURN	972	0.00	Yes
EM_ESG_LEADERS_INDEX_RETURN does not Granger Cause EM_PARENT_INDEX_RETURN	977	0.00	Yes
EM_PARENT_INDEX_RETURN does not Granger Cause EM_ESG_LEADERS_INDEX_RETURN	977	0.01	Yes
EAFE_PARENT_INDEX_RETURN does not Granger Cause EAFE_LOW_CARBON_INDEX_RETURN	977	0.01	Yes
WORLD_PARENT_INDEX_RETURN does not Granger Cause WORLD_ESG_UNIVERSAL_INDEX_RETURN	977	0.01	Yes
EM_ESG_UNIVERSAL_INDEX_RETURN does not Granger Cause EM_PARENT_INDEX_RETURN	729	0.01	Yes
EAFE_LOW_CARBON_INDEX_RETURN does not Granger Cause EAFE_PARENT_INDEX_RETURN	977	0.02	Yes
USA_PARENT_INDEX_RETURN does not Granger Cause USA_LOW_CARBON_INDEX_RETURN	931	0.02	Yes
USA_LOW_CARBON_INDEX_RETURN does not Granger Cause USA_PARENT_INDEX_RETURN	931	0.02	Yes
WORLD_ESG_UNIVERSAL_INDEX_RETURN does not Granger Cause WORLD_PARENT_INDEX_RETURN	977	0.02	Yes
EM_PARENT_INDEX_RETURN does not Granger Cause EM_ESG_UNIVERSAL_INDEX_RETURN	729	0.03	Yes
ACWI_PARENT_INDEX_RETURN does not Granger Cause ACWI_ESG_UNIVERSAL_INDEX_RETURN	977	0.07	Yes
ACWI_PARENT_INDEX_RETURN does not Granger Cause ACWI_ESG_LEADERS_INDEX_RETURN	977	0.09	Yes
ACWI_ESG_UNIVERSAL_INDEX_RETURN does not Granger Cause ACWI_PARENT_INDEX_RETURN	977	0.10	No
EMU_ESG_UNIVERSAL_INDEX_RETURN does not Granger Cause EMU_PARENT_INDEX_RETURN	967	0.14	No
EUROPE_PARENT_INDEX_RETURN does not Granger Cause EUROPE_LOW_CARBON_INDEX_RETURN	967	0.15	No
EUROPE_LOW_CARBON_INDEX_RETURN does not Granger Cause EUROPE_PARENT_INDEX_RETURN	967	0.15	No
EMU_PARENT_INDEX_RETURN does not Granger Cause EMU_ESG_UNIVERSAL_INDEX_RETURN	967	0.17	No
USA_PARENT_INDEX_RETURN does not Granger Cause USA_ESG_UNIVERSAL_INDEX_RETURN	931	0.17	No
JAPAN_PARENT_INDEX_RETURN does not Granger Cause JAPAN_ESG_UNIVERSAL_INDEX_RETURN	967	0.19	No
EMU_PARENT_INDEX_RETURN does not Granger Cause EMU_ESG_LEADERS_INDEX_RETURN	967	0.19	No
USA_ESG_UNIVERSAL_INDEX_RETURN does not Granger Cause USA_PARENT_INDEX_RETURN	931	0.19	No
ACWI_ESG_LEADERS_INDEX_RETURN does not Granger Cause ACWI_PARENT_INDEX_RETURN	977	0.20	No
CHINA_ESG_UNIVERSAL_INDEX_RETURN does not Granger Cause CHINA_PARENT_INDEX_RETURN	972	0.24	No
JAPAN_ESG_UNIVERSAL_INDEX_RETURN does not Granger Cause JAPAN_PARENT_INDEX_RETURN	967	0.25	No
EAFE_PARENT_INDEX_RETURN does not Granger Cause EAFE_ESG_LEADERS_INDEX_RETURN	977	0.26	No
ACWI_PARENT_INDEX_RETURN does not Granger Cause ACWI_LOW_CARBON_INDEX_RETURN	977	0.28	No
JAPAN_ESG_LEADERS_INDEX_RETURN does not Granger Cause JAPAN_PARENT_INDEX_RETURN	1080	0.31	No
EMU_ESG_LEADERS_INDEX_RETURN does not Granger Cause EMU_PARENT_INDEX_RETURN	967	0.31	No
EM_PARENT_INDEX_RETURN does not Granger Cause EM_LOW_CARBON_INDEX_RETURN	977	0.32	No
EM_LOW_CARBON_INDEX_RETURN does not Granger Cause EM_PARENT_INDEX_RETURN	977	0.36	No
CHINA_PARENT_INDEX_RETURN does not Granger Cause CHINA_ESG_UNIVERSAL_INDEX_RETURN	972	0.37	No
EAFE_ESG_LEADERS_INDEX_RETURN does not Granger Cause EAFE_PARENT_INDEX_RETURN	977	0.38	No
JAPAN_PARENT_INDEX_RETURN does not Granger Cause JAPAN_ESG_LEADERS_INDEX_RETURN	1080	0.40	No
WORLD_PARENT_INDEX_RETURN does not Granger Cause WORLD_ESG_LEADERS_INDEX_RETURN	977	0.52	No
JAPAN_PARENT_INDEX_RETURN does not Granger Cause JAPAN_LOW_CARBON_INDEX_RETURN	972	0.54	No
JAPAN_LOW_CARBON_INDEX_RETURN does not Granger Cause JAPAN_PARENT_INDEX_RETURN	972	0.55	No
ACWI_LOW_CARBON_INDEX_RETURN does not Granger Cause ACWI_PARENT_INDEX_RETURN	977	0.59	No
USA_PARENT_INDEX_RETURN does not Granger Cause USA_ESG_LEADERS_INDEX_RETURN	931	0.62	No
EAFE_ESG_UNIVERSAL_INDEX_RETURN does not Granger Cause EAFE_PARENT_INDEX_RETURN	977	0.69	No
EAFE_PARENT_INDEX_RETURN does not Granger Cause EAFE_ESG_UNIVERSAL_INDEX_RETURN	977	0.71	No
WORLD_ESG_LEADERS_INDEX_RETURN does not Granger Cause WORLD_PARENT_INDEX_RETURN	977	0.73	No
EUROPE_ESG_UNIVERSAL_INDEX_RETURN does not Granger Cause EUROPE_PARENT_INDEX_RETURN	967	0.77	No
EMU_LOW_CARBON_INDEX_RETURN does not Granger Cause EMU_PARENT_INDEX_RETURN	967	0.78	No
EMU_PARENT_INDEX_RETURN does not Granger Cause EMU_LOW_CARBON_INDEX_RETURN	967	0.80	No
EUROPE_PARENT_INDEX_RETURN does not Granger Cause EUROPE_ESG_UNIVERSAL_INDEX_RETURN	967	0.82	No
USA_ESG_LEADERS_INDEX_RETURN does not Granger Cause USA_PARENT_INDEX_RETURN	931	0.86	No
CHINA_PARENT_INDEX_RETURN does not Granger Cause CHINA_LOW_CARBON_INDEX_RETURN	972	0.95	No
CHINA_LOW_CARBON_INDEX_RETURN does not Granger Cause CHINA_PARENT_INDEX_RETURN	972	0.96	No
EUROPE_ESG_LEADERS_INDEX_RETURN does not Granger Cause EUROPE_PARENT_INDEX_RETURN	967	0.97	No
EUROPE_PARENT_INDEX_RETURN does not Granger Cause EUROPE_ESG_LEADERS_INDEX_RETURN	967	0.99	No

4.2. Question Two

Does SP/EGX ESG index deliver higher returns than its benchmark Index (EGX EWI 100)?

4.2.1. Objectives and Hypotheses

Objective:

1. To compare the performance of SP/EGX ESG index against its benchmark/parent Index.
2. To evaluate SP/EGX ESG index and EGX100 index during the bull and bear markets.

Hypothesis:

1. Ho 1: There is no significant difference in mean returns of SP/EGX ESG index.
2. Ho 2: There is no significant difference in the mean returns of SP/EGX ESG index during the bull and bear markets.

4.2.2. Data

Sample: This analysis is applied on the daily returns of two indices in Egypt; EGX EWI 100 (being the parent index) and SP/EGX ESG index

Study Period: Daily data of the two indices has been collected since the inception of SP/EGX ESG index (From July 2007 till August 2023) and the daily returns have been calculated for the study period.

Data Sources: All data has been collected from The Egyptian Stock Exchange (EGX) official website.

Methodology: Daily prices have been collected and the daily returns have been calculated for the two indices. Then, descriptive statistics have been calculated and the comparison has been done between the two indices. To test the statistical significance between the means and the medians of this pair, paired t-test and Mann-Whitney U have been conducted. In addition, the daily returns have been divided into two groups based on the year market performance (bull market and bear market). Then, the paired t-test and Mann-Whitney U test have been computed to check the significance.

4.2.3. Results and Interpretation

During the study period, SP/EGX ESG index mean return is lower than the mean return of its parent index; however, after conducting the paired t-test and the Mann-Whitney U test, the p-value is greater than 0.05, hence, the null hypothesis is not rejected. This means that there is no significant difference between the mean return of the parent index and SP/EGX ESG index.

This has been also analyzed during the bull market and the bear market as both indices have been divided into two groups according to the market performance. Then, descriptive statistics have been done for both groups which show that SP/EGX ESG outperformed the parent index in the bull market while it underperformed the parent index in the bear market as shown in table 4. However, paired T-test and Mann-Whitney U test show high p-value, hence, the null hypothesis is not rejected which means that there is no statistically significant difference in the mean return of SP/EGX ESG index.

Table 3: Descriptive Statistics of EGX parent index and SP/EGX ESG index for the study period.

	EGX100RETURN	SP/EGXESGRETURN
Mean	0.0005	0.0004
Median	0.0017	0.0012
Maximum	0.0916	0.1095
Minimum	-0.1672	-0.1966
Std. Dev.	0.0170	0.0173
Observations	3894	3894

Table 4: Descriptive Statistics of EGX EWI 100 parent index and SP/EGX ESG index for bull market and the bear market.

	EGX100R BULL	SP/EGXESGR BULL	EGX100R BEAR	SP/EGXESGR BEAR
Mean	0.00045	0.00052	0.0004	0.0003
Median	0.0016	0.0011	0.0018	0.0013
Maximum	0.0781	0.0988	0.0916	0.1095

Minimum	-0.0764	-0.0761	-0.1672	-0.1966
Std. Dev.	0.0136	0.0143	0.0199	0.0199
Observations	1971	1971	1923	1923

4.3. Question Three

In Egypt, do ESG scores affect the companies returns? do poor ESG performance firms deliver higher returns than well-performing firm?

4.3.1. Objective and Hypotheses

Objectives:

1. To study the effect of the total ESG scores on the companies' performance in the Egyptian Stock market.

2. To study the effect of the quantitative and the qualitative ESG scores on the companies' performance in the Egyptian Stock market.

Hypotheses:

1. Ho 1: ESG scores (Total ESG, Individual Qualitative and Quantitative) have no impact on the companies' performance in the Egyptian Stock market.
2. Ho 2: Poor ESG performance firms do not deliver higher returns than companies with high ESG scores.
3. Ho 3: There is no linear relationship nor heterogeneity between the ESG scores and the companies' performance measures at quantiles.

4.3.2. Data

This study is based on panel data of listed firms in Egypt and it was chosen for convenience and the accessibility of ESG scores through the Egyptian Stock Exchange (EGX) due to the fact that the existing literature mainly focuses on Developed Markets and/or Emerging countries as a whole. Hence, choosing Egypt will not only add value to the researcher's country of origin the but also to

the existing literature. The sample consists of 200 companies listed on EGX EWI 100 index covering the previous 16 years.

The data is collected on an annual basis from 2007 to 2022. This is because EGX reconstitutes the index annually since its inception. Meanwhile, the reason why the data was collected from 2007 is to study the whole period since the first value date of SP/EGX ESG Index.

After collecting the ESG scores from EGX, we collected the financial data for the respective companies through Refinitiv Eikon using a screener to gather the data using the ISIN which is a unique code for each company. To extract the data for a specific group of companies, the ISIN codes have been used to extract the data from Refinitiv DataStream which is an add-on in excel.

Independent Variables

As this paper aims to study the effect of ESG scores on the companies' financial performance, the independent variables, representing 7 ESG scores/sub scores have been collected from EGX. The definition of each score is in the appendix. As per the index methodology and the scoring process that EGX follows, they're divided into 3 main scores as follows:

1) Quantitative Score: This is a quantitative ranking that is based on the disclosure and transparency of two groups (1.1 Governance (G) and 1.2 Environmental practices & Social governance (ES)). Hence, this will result in 3 Quantitative Scores (Total ESG Quantitative Score, Total ES Quantitative Score, and Total G Quantitative Score.
2) Qualitative Score: This is a qualitative assessment that is based on independent sources of news and CSR. It is divided into (2.1 Total Governance (G) and 2.2 Environmental practices & Social governance, combining all subtotal qualitative scores, (ES)). Hence, this will result in 3 Qualitative Scores (Total ESG Qualitative Score, Total ES Qualitative Score, and Total G Qualitative Score).
3) Composite Score: This is the summation of the above Quantitative and Qualitative scores.

In summary, this study aims to study the effects of the 7 ESG-related independent variable corporate performance. These variables are Total Composite Score, Total ESG Quantitative

Score, Total ES Quantitative Score, Total G Quantitative Score, Total ESG Qualitative Score, Total ES Qualitative Score, and Total G Qualitative Score.

Table 5: Summary of independent variables

Independent Variable	COMPOSITE_SCORE	ESG_SCORE_QUAN	ES_SCORE_QUAN	G_SCORE_QUAN	ESG_SCORE_QUAL	ES_SCORE_QUAL	G_SCORE_QUAL
Mean	118.940	19.974	7.089	32.859	98.966	64.758	34.208
Median	116.281	17.198	2.475	30.387	100.000	65.000	35.000
Maximum	161.535	61.535	54.167	79.558	100.000	65.000	35.000
Minimum	100.000	0.000	0.000	0.000	88.000	56.000	23.000
Std. Dev.	9.309	9.206	9.795	10.972	1.604	0.929	1.301
Observations	1493	1493	1493	1493	1493	1493	1493

Dependent variable

As the purpose of this study is to capture the effect of ESG scores on the company's financial performance, the independent variable is the stock return which will be used as a proxy, and it has been calculated with the equation $r_{j,t} = \frac{P_{t+1} - P_t}{P_t}$ where r_j is the return on stock j at time t and P_{t+1} is the stock price at time $t+1$ while P_t is the stock price at time t. The price represents the opening price since this was the available price for the respective companies.

Meanwhile, accounting performance measures will be measured by three proxies: return on sales (ROS), return on assets (ROA), and return on equity (ROE), being net earnings divided by sales, assets, and equity, respectively.

All the companies' financial data has been collected from Refinitiv Eikon source, which is available at the American University in Cairo (AUC).

Table 6: Summary of dependent variables

Dependent Variable	STOCK RETURN	ROA	ROE	ROS
Mean	0.165247	5.221144	8.155480	5.221144
Median	-0.078848	4.415000	9.330000	4.415000
Maximum	38.00000	107.5800	243.1200	107.5800
Minimum	-0.921956	-133.8600	-2040.630	-133.8600
Std. Dev.	1.286961	12.92657	63.35596	12.92657

Observations	1433	1504	1469	1504

In summary, this research aims to study the effect of ESG investment on companies' performance.

Control variables

To mitigate the omitted variable bias, the control variables, such as the leverage and log(market cap), which is the natural logarithm of the firm's market capitalization, have been incorporated in this study (Ni & Sun, 2023). These control variables have been added in all the models, including the Fixed Effects regression and the quantile regressions. The data has been downloaded from Refinitiv DataStream for the companies-in-scope for the respective study period.

Table 7: Summary of control variables

Control Variable	LEVERAGE	MARKETCAP
Mean	-15.39401	4318014.
Median	22.02500	773983.5
Maximum	22556.50	1.24E+08
Minimum	-117171.4	11408.00
Std. Dev.	3072.659	10461879
Observations	1518	1540

Variables transformation

The first transformation in this research paper is a logarithmic transformation in which the log of the market capitalization has been generated to remove the skewness of the original data. By using the logarithmic form, it is expected to have more valid results.

In addition, the second transformation that has been done to the original data is creating new lagged data the independent variables. This has been done to remove the autocorrelation effect which could exist (Ni & Sun, 2023).

Quantitative and empirical methodology

We use a quantitative and an empirical approach to estimate the results of the effect of ESG scores on the companies' performance of the listed firms in Egypt. This will be done by using stock returns as a proxy variable of performance, return on sales (ROS), return on assets (ROA), and

return on equity (ROE), as an accounting performance measures of the firm. The data is panel data as it varies over time and between companies.

Tests

Hausman Test

To use the most appropriate model and given the fact that this data is panel data, the Hausman Test has been used to decide whether to use Fixed Effects regression or Random Effects regression. The null hypothesis of Hausman test implies the usage of Random Effects methods. To do the Hausman test, it requires running the model twice; using the Fixed Effects and the Random effects, then doing the test to check the significance. If the test results in getting a p-value less than 0.05, then means that the null hypothesis is rejected and Fixed Effects method should be used for accurate results. Hausman test has been done on Rstudio and below is a summary of the test results, noting that *Ld_StockReturn* refers to stock return at time *t+1* and *logmkcap* refers to the natural logarithm of market capitalization. The table shows that the p-value of the 7 models is smaller than 0.05 which is significant to reject the null hypothesis. This means that the Fixed Effects should be used.

Table 8: Hausman test results

Description	eqn	p-value Hausman Test	Null Hypothesis (RE)	RE /FE
eqn1 = Ld_StockReturn ~ compesg + logmkcap + Leverage	equ1	1.80E-05	Rejected	FE
eqn2 = Ld_StockReturn ~ totalesgqual + logmkcap + Leverage	equ2	5.09E-06	Rejected	FE
eqn3 = Ld_StockReturn ~ esscorequal + logmkcap + Leverage	equ3	4.32E-06	Rejected	FE
eqn4 = Ld_StockReturn ~ gscorequal + logmkcap + Leverage	equ4	3.44E-06	Rejected	FE
eqn5 = Ld_StockReturn ~ normesgscore + logmkcap + Leverage	equ5	1.95E-05	Rejected	FE
eqn6 = Ld_StockReturn ~ normesscore + logmkcap + Leverage	equ6	1.56E-05	Rejected	FE

eqn7 = Ld_StockReturn ~ normGscore + logmkcap + Leverage	equ7	5.24E-06	Rejected	FE

Chow test

Since the data is panel, it is important to run Chow test to determine which econometric method to use; it helps to decide whether to use Fixed Effects or Pooled OLS.

To run the test, we had to run the Fixed Effects and the Pooled OLS on the models and then check for the significance. If the test results in getting a p-value less than 0.05, then means that the null hypothesis is rejected and Fixed Effects method should be used for accurate results. Chow test has been done on Rstudio and below is a summary of the test results, noting that *Ld_StockReturn* refers to stock return at time *t+1* and logmkcap refers to the natural logarithm of market capitalization.

The table shows that the p-value of the 7 models is smaller than 0.05 which is significant to reject the null hypothesis. This means that the Fixed Effects should be used.

Table 9: Chow test results

Description	eqn	p-value Chow Test	Null Hypothesis (Pooled)	Final
eqn1 = Ld_StockReturn ~ compesg + logmkcap + Leverage	equ1	2.20E-16	Rejected	FE
eqn2 = Ld_StockReturn ~ totalesgqual + logmkcap + Leverage	equ2	2.20E-16	Rejected	FE
eqn3 = Ld_StockReturn ~ esscorequal + logmkcap + Leverage	equ3	2.20E-16	Rejected	FE
eqn4 = Ld_StockReturn ~ gscorequal + logmkcap + Leverage	equ4	2.20E-16	Rejected	FE
eqn5 = Ld_StockReturn ~ normesgscore + logmkcap + Leverage	equ5	2.20E-16	Rejected	FE
eqn6 = Ld_StockReturn ~ normesscore + logmkcap + Leverage	equ6	2.20E-16	Rejected	FE

eqn7 = Ld_StockReturn ~ normGscore + logmkcap + Leverage	equ7	2.20E-16	Rejected	FE

Econometric Model and Empirical Results

4.3.3. Fixed Effects Regression Results and Interpretation

This section focuses on the analysis of the third research question in this paper, which is the effect of ESG scores on the companies' performance. Given the above test results (Hausman & Chow), Fixed Effects method has been used to study the relationship between ESG and companies' performance. The analysis includes 7 models for the 7 ESG scores which are total ESG score (composite score), total ESG Quantitative Score, total ES Quantitative Score, total G Quantitative Score, total ESG Qualitative Score, total ES Qualitative Score, and total G Qualitative Score. The null hypotheses are listed below:

H01: ESG Composite Score does not affect the stock returns in Egypt.

$$model\ 1: Stock\ Return_{i,t+1} = \alpha_i + \beta_1 Composite\ ESG\ score_{i,t} + \beta_2 \log(market\ capitalization)_{i,t} + \beta_3 leverage_{i,t} + \theta_i + \lambda_t + \varepsilon_{i,t}$$

H02: ESG Quantitative Score does not affect the stock returns in Egypt.

$$model\ 2: Stock\ Return_{i,t+1} = \alpha_i + \beta_1 \text{ESG Quantitative Score}_{i,t} + \beta_2 \log(market\ capitalization)_{i,t} + \beta_3 leverage_{i,t} + \theta_i + \lambda_t + \varepsilon_{i,t}$$

H03: ES Quantitative Score does not affect the stock returns in Egypt.

$$model\ 3: Stock\ Return_{i,t+1} = \alpha_i + \beta_1 \text{ES Quantitative Score}_{i,t} + \beta_2 \log(market\ capitalization)_{i,t} + \beta_3 leverage_{i,t} + \theta_i + \lambda_t + \varepsilon_{i,t}$$

H04: G Quantitative Score does not affect the stock returns in Egypt.

$$model\ 4: Stock\ Return_{i,t+1} = \alpha_i + \beta_1 \text{G Quantitative Score}_{i,t} + \beta_2 \log(market\ capitalization)_{i,t} + \beta_3 leverage_{i,t} + \theta_i + \lambda_t + \varepsilon_{i,t}$$

H05: ESG Qualitative Score, does not affect the stock returns in Egypt.

$$model\ 5: Stock\ Return_{i,t+1} = \alpha_i + \beta_1 \text{ESG Qualitative Score}_{i,t} + \beta_2 \log(market\ capitalization)_{i,t} + \beta_3 leverage_{i,t} + \theta_i + \lambda_t + \varepsilon_{i,t}$$

H06: ES Qualitative Score, does not affect the stock returns in Egypt.

$$model\ 6: Stock\ Return_{i,t+1} = \alpha_i + \beta_1 \text{ES Qualitative Score}_{i,t} + \beta_2 \log(market\ capitalization)_{i,t} + \beta_3 leverage_{i,t} + \theta_i + \lambda_t + \varepsilon_{i,t}$$

H07: G Qualitative Score, does not affect the stock returns in Egypt.

$$model\ 7: Stock\ Return_{i,t+1} = \alpha_i + \beta_1 \text{G Qualitative Score}_{i,t} + \beta_2 \log(market\ capitalization)_{i,t} + \beta_3 leverage_{i,t} + \theta_i + \lambda_t + \varepsilon_{i,t}$$

Table 10: Fixed Effects Results (Stock Return)

Fixed Effects StockReturn

	Dependent variable:						
	Ld_StockReturn						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
compesg	-0.0001						
	(0.0035)						
totalesgqual		-0.0012					
		(0.0137)					
esscorequal			0.0271				

			(0.0180)				
gscorequal				-0.0408*			
				(0.0213)			
normesgscore					0.00002		
					(0.0036)		
normesscore						0.0010	
						(0.0027)	
normGscore							-0.0015
							(0.0033)
logmkcap	-0.2005***	-0.2006***	-0.2020***	-0.2047***	-0.2006***	-0.2010***	-0.1996***
	(0.0378)	(0.0378)	(0.0378)	(0.0378)	(0.0378)	(0.0378)	(0.0378)
Leverage	-0.000002	-0.000002	-0.000002	-0.000002	-0.000002	-0.000002	-0.000002
	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.00001)
Observations	1,139	1,139	1,139	1,139	1,139	1,139	1,139
R^2	0.0287	0.0287	0.0310	0.0324	0.0287	0.0289	0.0289
Adjusted R^2	-0.1538	-0.1537	-0.1510	-0.1494	-0.1538	-0.1536	-0.1535
F Statistic (df = 3; 958)	9.4485***	9.4508***	10.2209***	10.7006***	9.4484***	9.4900***	9.5195***
Note:	*p<0.1; **p<0.05; ***p<0.01						

The above Fixed Effects regression analysis studies the relationship between Ld_StockReturn and 7 independent ESG-related variables using logmkcap and Leverage as control variables. Each coefficient estimates the impact of its corresponding variable on Ld_StockReturn. Results show that only one coefficient has statistical significance at 0.1 which is the negative coefficient for gscorequal. This means that only the null hypothesis of model 4 is rejected as the p-value of model 4 is less than 0.1. There is no statistical significance to reject the null hypothesis of the other 6 models, meaning that there is no effect of ESG scores on the stock return of the companies, except that the G qualitative score has a negative effect on the stock return at a significance level of 0.1.

The same 7 models have been further run 3 times with the other 3 dependent variables (RoA, RoE, and RoS).

Table 11: Fixed Effects Results (RoA)

Fixed Effects RoA

	Dependent variable:						
	Ld_RoA						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
compesg	0.0266						
	(0.0412)						
totalesgqual		0.1386					
		(0.1553)					
esscorequal			-0.1197				
			(0.2040)				
gscorequal				0.5315**			
				(0.2478)			
normesgscore					0.0179		
					(0.0425)		
normesscore						-0.0120	
						(0.0321)	
normGscore							0.0478
							(0.0380)
logmkcap	1.4941***	1.5133***	1.5047***	1.5520***	1.4956***	1.5049***	1.4742***
	(0.4325)	(0.4324)	(0.4323)	(0.4320)	(0.4327)	(0.4324)	(0.4327)
Leverage	-0.00002	-0.00001	-0.00002	-0.00001	-0.00002	-0.00001	-0.00002
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Observations	1,188	1,188	1,188	1,188	1,188	1,188	1,188
R^2	0.0124	0.0127	0.0123	0.0165	0.0121	0.0121	0.0135
Adjusted R^2	-0.1688	-0.1684	-0.1689	-0.1640	-0.1691	-0.1691	-0.1675
F Statistic (df = 3; 1003)	4.1829***	4.3114***	4.1589***	5.5949***	4.1024***	4.0900***	4.5765***
Note:	*p<0.1; **p<0.05; ***p<0.01						

For the accounting performance measures, the above Fixed Effects regression analysis studies the relationship between RoA and 7 independent variables using logmkcap, and Leverage as control variables. Each coefficient estimates the impact of its corresponding variable on RoA. Results

show that only one coefficient has statistical significance at 0.5 which is the positive coefficient for gscorequal. This means that only the null hypothesis of model 4 is rejected as the p-value of model 4 is less than 0.5. There is no statistical significance to reject the null hypothesis of the other 6 models, meaning that there is no effect of ESG scores on the RoA of the companies, except that the G qualitative score has a positive effect on the RoA at a significance level of 0.5. This is robust as it is the same for RoS. However, the analysis has no significance on the RoE. (Results for RoS and RoE in appendix)

Interpretation

As per the above results, one can note that the Qualitative Governance score has a negative significance for stock returns, yet it shows a positive significance for the accounting measures such as RoA. This can be interpreted given the guidelines and criteria of the Qualitative Assessment that S&P and EGX have explained in SP/EGX ESG Index Methodology. It basically assesses the companies' corporate governance performance, including but not limited to transparency of ownership structure and shareholders' rights, audits and business ethics. This means that companies with higher Qualitative G score perform better with regards to the corporate governance criteria, meaning that they tend to abide more by business ethics, board structure effectiveness, and disclosure of accounting statements and audits as described in (SP/EGX ESG Index Methodology). Even though the analysis results may seem contradicting, yet it is consistent with the above criteria description as companies with higher Qualitative G score tend to prioritize long-term stability and value creation which might not be attractive to investors who seek rapid profits as long-term stability is less likely to generate short-term profits which can lead to price volatility over a short period of time. Hence, lower stock returns are associated with higher G scores. However, companies who invest in their corporate governance tend to make responsible decisions which lead to effective use of assets which explains the positive significance on RoA.

ESG Portfolios:

We have divided the dataset into two groups to further study the effect of ESG scores on companies' performance. The data has been divided according to the ESG Composite score into two portfolios: High ESG portfolio (Top 30 Firms with high ESG scores) and Low ESG portfolio

(remaining 70 Firms). The tables below show the descriptive statistics of the independent variables of the two portfolios.

Table 12: Summary of Independent Variables of High ESG Portfolio

	COMPOSITE_ESG_SCORE	TOTAL_ESG_SCORE_QUAL	ES_SCORE_QUAL	G_SCORE_QUAL	NORMALISED_ESG_SCORE	NORMALISED_E_S_SCORE	NORMALIZED_G_SCORE
Mean	129.4795	98.55	33.7187	64.831	30.9294	18.6166	43.2922
Median	129.1662	100	35	65	30.6934	17.3611	43.0939
Max	181	100	35	65	81	82	92
Min	111.7442	84	23	59	11.7441	0	20.4419
Obs	480	480	480	480	480	480	480

Table 13: Summary of Independent Variables of Low ESG Portfolio

	COMPOSITE_ESG_SCORE	TOTAL_ESG_SCORE_QUAL	ES_SCORE_QUAL	G_SCORE_QUAL	NORMALISED_ESG_SCORE	NORMALISED_E_S_SCORE	NORMALIZED_G_SCORE
Mean	114.6891	98.2502	33.528	64.722	16.4388	2.8356	30.0421
Median	113.4726	99	35	65	15.1072	1.2376	28.1768
Max	128.8028	100	35	65	37.9220	27.7777	56.3535
Min	100	82	19	56	0	0	0
Obs	1119	1119	1119	1119	1119	1119	1119

Regression for High and Low ESG Portfolios:

The previous regressions have been repeated for the two portfolios to further study the effects of ESG scores on the companies' performance of firms with high ESG scores and for those with low ESG scores. Results show insignificant coefficients for the 7 ESG scores (independent variables) for the 5 dependent variables for both high and low portfolios, except for the below:

Negative coefficient for the qualitative governance score with respect to the stock return of firms with low ESG scores at 0.05 significance level.

Interpretation:

The above negative coefficient means that in the portfolio that consists of firms with low total ESG scores, the lower the qualitative Q score, the higher the stock return. This can be explained as investors who invest in low ESG firms, where the qualitative G score is low. This means that these companies don't abide by the criteria set by SP/EGX for the qualitative assessment of the corporate governance, including but not limited to, transparency and disclosure of corporate governance, business ethics, and shareholder's rights. This can be translated to investing in riskier companies than those with high ESG scores, which will require extra compensation for the risk, hence the negative relationship.

Table 14: Fixed Effects for High ESG Portfolio (Stock Return)

Fixed Effects SR Low

	Dependent variable:						
	Ld_StockReturn						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
compesg	-0.0071						
	(0.0098)						
totalesgqual		-0.0104					
		(0.0199)					
esscorequal			0.0347				
			(0.0266)				
gscorequal				-0.0617**			
				(0.0285)			
normesgscore					-0.0057		
					(0.0109)		
normesscore						0.0120	
						(0.0110)	
normGscore							-0.0087

							(0.0067)
logmkcap	-0.1791***	-0.1805***	-0.1782***	-0.1916***	-0.1777***	-0.1779***	-0.1762***
	(0.0579)	(0.0581)	(0.0578)	(0.0580)	(0.0579)	(0.0579)	(0.0578)
Leverage1	-0.000000	-0.000001	-0.000000	-0.000000	-0.000000	-0.000001	-0.000000
	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.00001)
Observations	663	663	663	663	663	663	663
R^2	0.0194	0.0189	0.0216	0.0273	0.0189	0.0206	0.0216
Adjusted R^2	-0.2779	-0.2785	-0.2750	-0.2676	-0.2785	-0.2763	-0.2750
F Statistic (df = 3; 508)	3.3446**	3.2583**	3.7439**	4.7521***	3.2583**	3.5679**	3.7382**
Note:	*p<0.1; **p<0.05; ***p<0.01						

4.3.4. Quantile Regression Results and Interpretation

As the above Fixed Effects regression show the relationship between the dependent variables and the independent variables on the overall sample. We use the quantile regression to further study the effects of the independent variables on the dependent variables at the low (10^{th} percentile of the dependent variable), medium (50^{th} percentile of the dependent variable), and the high (90^{th} percentile of the dependent variable). All the above models (7 models for the 4 dependent variables) for the 3 levels of the percentiles have been repeated using the quantile regression method.

Quantile Regression for Stock Return:

At the 10% percentile, there is no statistical significance to reject the null hypotheses for the 7 model. In contrast, for the highest percentile, results show a high positive significance of the Quantitative total ESG score at a significance level of 0.01, which means that this is a positive effect of the total Quantitative ESG score on the top 90% of the companies with respect to the stock return. In addition, companies in the 50^{th} percentile of the stock return show significant positive coefficients of the total composite ESG at a significance level of 0.1 and at significance level of 0.05 for total quantitative ESG, and quantitative G scores.

Table 15: Quantile Regression at 0.1 level (Stock Return)

Quantile Regression at 0.1 Level

	Dependent variable:						
	Ld_StockReturn						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
compesg	0.0013						
	(0.0016)						
totalesgqual		0.0079					
		(0.0111)					
esscorequal			0.0111				
			(0.0115)				
gscorequal				-0.0093			
				(0.0232)			
normesgscore					0.0012		
					(0.0016)		
normesscore						0.0014	
						(0.0014)	
normGscore							0.0008
							(0.0013)
logmkcap	0.0093	0.0146**	0.0146**	0.0118*	0.0100	0.0089	0.0097
	(0.0083)	(0.0059)	(0.0061)	(0.0064)	(0.0084)	(0.0076)	(0.0082)
Leverage1	-0.00001	-0.00001	-0.00001	-0.00001	-0.00001	-0.00001	-0.00001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Constant	-0.7200***	-1.4193	-1.0161**	0.0062	-0.5955***	-0.5652***	-0.5921***
	(0.1553)	(1.1034)	(0.4092)	(1.5090)	(0.1071)	(0.1049)	(0.1016)
Observations	1,139	1,139	1,139	1,139	1,139	1,139	1,139
Note:	*p<0.1; **p<0.05; ***p<0.01						

Table 16: Quantile Regression at 0.5 level (Stock Return)

Quantile Regression at 0.5 Level

	Dependent variable:

	Ld_StockReturn						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
compesg	0.0035*						
	(0.0019)						
totalesgqual		-0.0092					
		(0.0076)					
esscorequal			-0.0117				
			(0.0088)				
gscorequal				-0.0005			
				(0.0169)			
normesgscore					0.0040**		
					(0.0019)		
normesscore						0.0016	
						(0.0016)	
normGscore							0.0033**
							(0.0016)
logmkcap	0.0008	0.0126	0.0127	0.0123	-0.0003	0.0062	-0.0005
	(0.0092)	(0.0079)	(0.0078)	(0.0079)	(0.0092)	(0.0091)	(0.0085)
Leverage1	-0.00001	-0.00001	-0.00001	-0.00001	-0.00001	-0.00001	-0.00001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0002)
Constant	-0.5225***	0.6426	0.1311	-0.2314	-0.1682	-0.1906	-0.1932*
	(0.1867)	(0.7563)	(0.3193)	(1.1017)	(0.1152)	(0.1225)	(0.1079)
Observations	1,139	1,139	1,139	1,139	1,139	1,139	1,139
Note:	*p<0.1; **p<0.05; ***p<0.01						

Table 17: Quantile Regression at 0.9 level (Stock Return)

Quantile Regression at 0.9 Level

	Dependent variable:						
	Ld_StockReturn						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
compesg	0.0067						
	(0.0049)						

totalesgqual		-0.0286					
		(0.0411)					
esscorequal			-0.0392				
			(0.0410)				
gscorequal				0.0238			
				(0.0681)			
normesgscore					0.0069***		
					(0.0020)		
normesscore						0.0023	
						(0.0054)	
normGscore							0.0064
							(0.0054)
logmkcap	-0.0633	-0.0431	-0.0366	-0.0414	-0.0644*	-0.0495	-0.0648
	(0.0417)	(0.0341)	(0.0328)	(0.0335)	(0.0345)	(0.0376)	(0.0412)
Leverage1	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002
	(0.0004)	(0.0006)	(0.0004)	(0.0005)	(0.0004)	(0.0005)	(0.0005)
Constant	0.7829**	4.1597	2.5778*	-0.2373	1.4557***	1.3939**	1.3799***
	(0.3664)	(4.0833)	(1.4575)	(4.4226)	(0.4921)	(0.5449)	(0.5319)
Observations	1,139	1,139	1,139	1,139	1,139	1,139	1,139
Note:	*p<0.1; **p<0.05; ***p<0.01						

Quantile Regression for RoA and RoS

At the lowest and medium percentiles, results show negative significant coefficients of the total ESG composite scores at a significance level of 0.1. However, significant positive coefficients of total qualitative ESG have been captured at a significance level of 0.05. In addition, ES qualitative scores show positive coefficients at all levels at a significance level of 0.05 for the top and low quantiles and at 0.01 for the medium percentile. However, the quantitative G scores capture negative significant coefficients at the medium and top percentiles with a high level of significance of 0.01. Total ESG quantitative score has also a negative coefficient for the medium percentile at a significance level of 0.05. The same results have been captured for the dependent variable (RoS) (Results of RoS are in the appendix).

Table 18: Quantile Regression at 0.1 level (RoA)

Quantile Regression at 0.1 Level RoA

	Dependent variable:						
	Ld_RoA						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
compesg	-0.0370*						
	(0.0194)						
totalesgqual		0.7787**					
		(0.3308)					
esscorequal			0.8918**				
			(0.3970)				
gscorequal				0.3748			
				(0.8164)			
normesgscore					-0.0405		
					(0.0293)		
normesscore						-0.0430	
						(0.0423)	
normGscore							-0.0350
							(0.0267)
logmkcap	1.3975***	1.0747***	1.0907***	1.1826***	1.3775***	1.3838***	1.3838***
	(0.2060)	(0.2076)	(0.2102)	(0.1851)	(0.1598)	(0.2313)	(0.2483)
Leverage1	-0.00002	-0.00001	-0.00001	-0.00001	-0.00001	-0.00002	-0.00001
	(0.0005)	(0.0044)	(0.0046)	(0.0004)	(0.0006)	(0.0007)	(0.0005)
Constant	-16.9325***	-94.1455***	-47.7753***	-42.6050	-20.1737***	-20.9424***	-19.8337***
	(2.3155)	(32.5596)	(13.6312)	(52.8298)	(2.5612)	(3.6157)	(3.3086)
Observations	1,188	1,188	1,188	1,188	1,188	1,188	1,188
Note:	*p<0.1; **p<0.05; ***p<0.01						

Table 19: Quantile Regression at 0.5 level (RoA)

Quantile Regression at 0.5 Level RoA

	Dependent variable:						
	Ld_RoA						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
compesg	-0.0443*						
	(0.0242)						
totalesgqual		0.2363**					
		(0.1063)					
esscorequal			0.4514***				
			(0.1012)				
gscorequal				-0.0821			
				(0.2255)			
normesgscore					-0.0544**		
					(0.0237)		
normesscore						0.0046	
						(0.0253)	
normGscore							-0.0690***
							(0.0201)
logmkcap	0.7821***	0.6679***	0.6918***	0.6552***	0.7815***	0.6107***	0.8867***
	(0.1394)	(0.1206)	(0.1179)	(0.1214)	(0.1367)	(0.1362)	(0.1368)
Leverage1	0.00004	0.00005	0.00005	0.00004	0.00005	0.00005	0.00004
	(0.0013)	(0.0017)	(0.0016)	(0.0018)	(0.0012)	(0.0017)	(0.0012)
Constant	-1.1043	-28.2570***	-20.6628***	0.6061	-5.2704***	-4.1026**	-5.4429***
	(2.4317)	(10.6510)	(3.6802)	(14.7174)	(1.6295)	(1.7798)	(1.6340)
Observations	1,188	1,188	1,188	1,188	1,188	1,188	1,188
Note:	*p<0.1; **p<0.05; ***p<0.01						

Table 20: Quantile Regression at 0.9 level (RoA)

Quantile Regression at 0.9 Level RoA

	Dependent variable:						
	Ld_RoA						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
compesg	-0.0891						
	(0.0752)						
totalesgqual		0.3245					
		(0.4309)					
esscorequal			0.9151**				
			(0.4402)				
gscorequal				-0.0465			
				(0.2851)			
normesgscore					-0.1058		
					(0.0676)		
normesscore						0.1373	
						(0.1000)	
normGscore							-0.2000***
							(0.0513)
logmkcap	1.9509***	1.8897***	1.7966***	1.7892***	1.9504***	1.5589***	2.1492***
	(0.3675)	(0.3761)	(0.3395)	(0.3187)	(0.3361)	(0.3256)	(0.3669)
Leverage1	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	(0.0031)	(0.0055)	(0.0050)	(0.0052)	(0.0022)	(0.0063)	(0.0022)
Constant	-1.9528	-43.7796	-41.9838***	-7.3293	-10.4480***	-8.1204**	-8.6626**
	(7.5515)	(43.4726)	(15.9956)	(18.3472)	(3.3381)	(3.9489)	(4.2485)
Observations	1,188	1,188	1,188	1,188	1,188	1,188	1,188
Note:	*p<0.1; **p<0.05; ***p<0.01						

Quantile Regression for RoE

The quantile regression for the low percentile of the dependent variable (RoE), results show positive significant coefficients at 0.05 significance level for the total composite ESG scores, total Quantitative ESG scores and total ES scores. However, for the high percentile of the RoE, results

show negative strong significant coefficients at a significance level of 0.01 for the total composite ESG score, total quantitative ESG score, and quantitative G scores. Yet, a positive significant coefficient was captured for the total qualitative ESG score at a significance level of 0.1. Moreover, for the medium percentile, positive strong significant coefficients have been noted for the total qualitative ESG score and the total ES score at a significance level of 0.01.

Table 21: Quantile Regression at 0.1 level (RoE)

Quantile Regression at 0.1 Level RoE

	Dependent variable:						
	Ld_RoE						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
compesg	0.1684**						
	(0.0770)						
totalesgqual		1.1062					
		(0.7902)					
esscorequal			0.9430				
			(1.1761)				
gscorequal				2.1406			
				(1.3370)			
normesgscore					0.1211**		
					(0.0583)		
normesscore						0.1351**	
						(0.0583)	
normGscore							0.0352
							(0.0489)
logmkcap	2.5400***	3.0258***	3.0078***	3.0502***	2.6432***	2.6720***	2.8844***
	(0.3988)	(0.3583)	(0.4390)	(0.2427)	(0.3643)	(0.3849)	(0.4281)
Leverage1	-0.1313***	-0.1306***	-0.1349***	-0.1452***	-0.1324***	-0.1336***	-0.1341***
	(0.0274)	(0.0358)	(0.0367)	(0.0332)	(0.0289)	(0.0268)	(0.0314)
Constant	-55.7688***	-152.2881*	-74.7266*	-181.4782**	-39.4646***	-38.4683***	-41.8393***
	(9.2399)	(77.8455)	(40.5709)	(86.6566)	(5.7221)	(6.0979)	(5.7388)
Observations	1,159	1,159	1,159	1,159	1,159	1,159	1,159

Note: *p<0.1; **p<0.05; ***p<0.01

Table 22: Quantile Regression at 0.5 level (RoE)

Quantile Regression at 0.5 Level RoE

	Dependent variable:						
	Ld_RoE						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
compesg	-0.0052						
	(0.0317)						
totalesgqual		0.9772***					
		(0.2793)					
esscorequal			1.0437***				
			(0.3246)				
gscorequal				0.5526			
				(0.4833)			
normesgscore					-0.0215		
					(0.0334)		
normesscore						0.0034	
						(0.0428)	
normGscore							-0.0409
							(0.0296)
logmkcap	2.7529***	2.7766***	2.8254***	2.7311***	2.8228***	2.7413***	2.8652***
	(0.2337)	(0.2290)	(0.2211)	(0.2292)	(0.2348)	(0.2475)	(0.2198)
Leverage1	-0.0068	-0.0089	-0.0077	-0.0071	-0.0066	-0.0069	-0.0063
	(0.0069)	(0.0078)	(0.0084)	(0.0077)	(0.0068)	(0.0062)	(0.0055)
Constant	-27.4421***	-124.7611***	-64.6038***	-63.5164**	-28.5040***	-28.0020***	-28.0814***
	(3.7290)	(27.9898)	(11.6168)	(31.5500)	(2.7943)	(3.0680)	(2.7474)
Observations	1,159	1,159	1,159	1,159	1,159	1,159	1,159

Note: *p<0.1; **p<0.05; ***p<0.01

Table 23: Quantile Regression at 0.9 level (RoE)

Quantile Regression at 0.9 Level RoE

	Dependent variable:						
	Ld_RoE						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
compesg	-0.3147***						
	(0.0462)						
totalesgqual		0.6604					
		(0.5792)					
esscorequal			1.2330*				
			(0.6982)				
gscorequal				0.1905			
				(0.9018)			
normesgscore					-0.3423***		
					(0.0770)		
normesscore						-0.1300	
						(0.1389)	
normGscore							-0.3562***
							(0.0628)
logmkcap	4.8990***	4.3321***	4.4478***	4.2737***	5.0293***	4.5619***	5.1800***
	(0.4726)	(0.5207)	(0.5081)	(0.5225)	(0.4793)	(0.5180)	(0.5185)
Leverage1	0.0063	0.0016	0.0035	0.0026	0.0062	0.0034	0.0145
	(0.0125)	(0.0175)	(0.0076)	(0.0121)	(0.0097)	(0.0119)	(0.0128)
Constant	-1.6691	-96.4923*	-74.9414***	-42.8495	-34.0717***	-33.3159***	-31.7181***
	(5.8006)	(58.0769)	(25.0003)	(58.9701)	(5.5161)	(6.6940)	(6.3176)
Observations	1,159	1,159	1,159	1,159	1,159	1,159	1,159
Note:	*p<0.1; **p<0.05; ***p<0.01						

To summarize the above quantile regressions for the 4 dependent variables, companies in the 10th percentile show no significance between the 7 ESG scores and the stock return, yet there is a positive significance between the RoE and the total composite ESG score, total quantitative ESG

score, and total quantitative ES score and between the RoA and the total qualitative ESG and ES scores which is consistent with the RoS results.

However, for companies in the 90th percentile, stock return has a positive significant coefficient only with the quantitative ESG score. Meanwhile, composite ESG Score shows a positive significant coefficient with RoA, RoE, and RoS. However, Total Quantitative G Score shows a negative significant coefficient with RoA, RoE, and RoS. In addition, the RoE has a negative significant coefficient with the composite ESG score and the total quantitative ESG score.

These quantile regressions help with understanding the effect of ESG scores on the companies' performance as companies in the 50th percentile show a positive significance between the stock return and the total composite ESG score, total quantitative ESG score and total quantitative G score. Even though the RoA and the RoS have negative significant coefficients with the total composite ESG score, total quantitative ESG score, and quantitative G score, they have positive significant coefficients with the total qualitative ESG score, and total qualitative ES score which is the same for RoE. Below are the summary for the effect of ESG scores on companies' performance in the 10th, 50th, and the 90th percentile.

Table 24: summary for the effect of ESG scores on companies' performance in the 10th percentile.

10th	StockReturn	RoA	RoE	RoS
Composite ESG Score	no effect	negative	positive	negative
Total Qualitative ESG Score	no effect	positive	no effect	positive
Total Qualitative ES Score	no effect	positive	no effect	positive
Total Qualitative G Score	no effect	no effect	no effect	no effect
Total Quantitative ESG Score	no effect	no effect	positive	no effect
Total Quantitative ES Score	no effect	no effect	positive	no effect
Total Quantitative G Score	no effect	no effect	no effect	no effect

Table 25: summary for the effect of ESG scores on companies' performance in the 50th percentile.

50th	StockReturn	RoA	RoE	RoS
Composite ESG Score	positive	negative	no effect	negative
Total Qualitative ESG Score	no effect	positive	positive	positive
Total Qualitative ES Score	no effect	positive	positive	positive

Total Qualitative G Score	no effect	no effect	no effect	no effect
Total Quantitative ESG Score	positive	negative	no effect	negative
Total Quantitative ES Score	no effect	no effect	no effect	no effect
Total Quantitative G Score	positive	negative	no effect	negative

Table 26: summary for the effect of ESG scores on companies' performance in the 90th percentile.

90th	StockReturn	RoA	RoE	RoS
Composite ESG Score	no effect	no effect	negative	no effect
Total Qualitative ESG Score	no effect	no effect	no effect	no effect
composite ESG Score	no effect	positive	positive	positive
Total Qualitative G Score	no effect	no effect	no effect	no effect
Total Quantitative ESG Score	positive	no effect	negative	no effect
Total Quantitative ES Score	no effect	no effect	no effect	no effect
Total Quantitative G Score	no effect	negative	negative	negative

Interpretation:

As shown in the above table, the effect of the ESG scores varies between the different quantiles of the different performance variables and between the different ESG scores. The quantile regression provides a thorough analysis to better understand the complexity between ESG scores and firms' performance. As a result, one can note that the only conflict above (with regards to the positive and the negative effect in the 10th and 90th percentile) exists between the RoE and the total composite ESG score, as it has a positive significance in the 10th percentile and a negative effect in the 90th percentile. This can be explained as companies in the 10th percentile have lower RoE tend to have operational inefficiencies which cost them more, so abiding by ESG protocols and processes can lead to better management and cost-saving strategies, yielding to higher RoE. This is the exact opposite with regards to companies in the 90th percentile as they have already established their competitive processes, so abiding by ESG practices will result in higher costs that yield to lower RoE. This is also applied on the contradiction with the quantitative ESG score.

4.3.5. Fixed Effects Regression (Fama – French Five Factors Model) Results and Interpretation

To thoroughly study the effect of ESG scores on the companies' performance, including other factors such as Size, Value, Profitability, Investment, and Market Risk, we constructed Fama and French Five Factors Model for Egypt as the available data published by the authors are not specific for Egypt. Hence, Fama and French methodology for constructing the model has been followed and applied on Egypt to get valid and accurate values.

Fama and French Five Factors Model Construction for Egypt:

Inspired by Fama and French (2015), the 5 factors have been calculated for Egypt as the Egyptian stocks were divided into two groups (following the 2 x 2 sorting technique, Fama & French (2015)) with EGX EWI 100 being the reference index.

Below is a summary of the 5 factors calculation:

1) Small Minus Big (SMB): This pertains to the size factor, and it has been calculated using the below equation of Fama and French which is the difference in return of the average six small portfolios and the big portfolios. This means that the companies have been sorted using the market capitalization and divided into 2 groups (either Small (S) or Big (B) using the median value. The market capitalization data for the respective companies has been collected from Refinitiv DataStream for the whole study period.
2) High Minus Low (HML): This pertains to the value factor, and it has been calculated using the below equation of Fama and French which is the difference in return of the average six high portfolios and the low portfolios. This means that the companies have been sorted using the book-to-market ratio and divided into 2 groups (either High (H) or Low (L) using the median value. The book-to-market ratio was not available at Refinitiv DataStream, yet we were able to collect the price-to-book ratio and calculated its inverse for the respective companies for the whole study period.
3) Robust Minus Weak (RMW): This pertains to the operating profitability (OP) factor, and it has been calculated using the below equation of Fama and French which is the difference

in return of the average six Robust portfolios and the Weak portfolios. This means that the companies have been sorted using the operating profitability and divided into 2 groups (either Robust (R) or Weak (W) using the median value. To calculate the OP factor, we followed the same calculation as Fama and French, which is equal to revenues minus cost of goods sold minus selling, general and administrative expenses, minus interest expenses and dividing all by the book equity. Given that the book equity value was not available at Refinitiv DataStream, we substituted it by the difference between total assets and total liabilities. All the data has been collected from Refinitiv DataStream for the respective companies for the whole study period.

4) Conservative Minus Aggressive (CMA): This refers to the investment factor, and it has been calculated by the change in total assets from *t-2* to *t-1*, divided by the total assets of *t-2*. The data has been collected from Refinitiv DataStream for the respective companies for the whole study period.
5) Market Rate less Risk-Free Rate:

   The first factor of Fama French Five Factors Model is the market rate less the risk-free rate, which pertains to the market return that is above the risk-free rate. EGX EWI 100 has been used as a proxy for the Egyptian market rate. The annual returns of EGX EWI 100 have been collected from Refinitiv Eikon while the Egyptian t-bill rates have been collected on a monthly basis and have been annualized using the geometric mean. The data has been collected for the whole study period (16 years). Then, the first factor has been calculated by subtracting the annualized t-bill rates from the market rates for the respective year.

For the calculation of SMB, HML, RMW, and CMA we followed the the following steps to use the same methodology as Fama and French:

1- Data Collection: The needed data (described above for each factor) has been collected from Refinitiv DataStream at AUC.
2- Categorization: Using the needed data and following Fama and French's description of each factor, all the companies in scope have been divided into two groups for each factor of the 4 factors, as follows: either Small (S) or Big (B) for SMB, High(H) or Low(L) for HML, Robust (R) or Weak (W) for RMW, and Conservative (C) or Aggressive (A) for CMA.

3- Portfolio Formation: After assigning the relevant stocks to the respective letter (S, B, H, L, R, W, C, and A), we constructed the 6 portfolios with respect to the S, resulting in having SH, SL, SR, SW, SC, and SA. The same has been done with respect to B which results in having 6 portfolios (BH, BL, BR, BW, BC, and BA).
4- Returns Calculation: Then, the averages of the 6 S portfolios and the 6 B portfolios have been calculated to be used in calculating the 4 factors, using the below equations.

$$SMB=(SH + SL + SR + SW + SC + SA)/6 - (BH + BL + BR + BW + BC + BA)/6$$
$$HML=(SH + BH)/2 - (SL + BL)/2=[(SH - SL) + (BH - BL)]/2$$
$$RMW=(SR + BR)/2 - (SW + BW)/2=[(SR - SW) + (BR - BW)]/2$$
$$CMA=(SC + BC)/2 - (SA + BA)/2=[(SC - SA) + (BC - BA)]/2$$

Source: Fama and French (2015)

Regression using FFFFM:

Then, Fama and French five factors model have been used to examine the effect of ESG scores on the excess return of the firms in scopes over the study period. The Excess Return represents the Stock Return of stock *i* at time *t* less the Risk-Free rate at *t.* The lagged value has been used to avoid forward issues. This has been tested with the same control variables that have previously used. The null hypotheses entail that there is no effect of the respective ESG score on the excess return. The below 7 models represent the different ESG scores in scope.

$$model\ 1: Excess\ Return_{i,t+1} = \alpha_i + \beta_1 Composite\ ESG\ score_{i,t} + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 RMW_t + \beta_5 CMA_t + \beta_6 (Market\ R - RFR)_t + \beta_7 \log(market\ capitalization)_{i,t} + \beta_8 leverage_{i,t} + \theta_i + \varepsilon_{i,t}$$

$$model\ 2: Excess\ Return_{i,t+1} = \alpha_i + \beta_1 Total\ ESG\ Qualitative\ Score_{i,t} + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 RMW_t + \beta_5 CMA_t + \beta_6 (Market\ R - RFR)_t + \beta_7 \log(market\ capitalization)_{i,t} + \beta_8 leverage_{i,t} + \theta_i + \varepsilon_{i,t}$$

$$model\ 3: Excess\ Return_{i,t+1}$$
$$= \alpha_i + \beta_1 ES\ Qualitative\ Score_{i,t}$$
$$+ \beta_2 SMB_t + \beta_3 HML_t + \beta_4 RMW_t + \beta_5 CMA_t + \beta_6 (Market\ R - RFR)_t$$
$$+ \beta_7 \log(market\ capitalization)_{i,t} + \beta_8 leverage_{i,t} + \theta_i + \varepsilon_{i,t}$$

$$model\ 4: Excess\ Return_{i,t+1}$$
$$= \alpha_i + \beta_1 G\ Qualitative\ score_{i,t}$$
$$+ \beta_2 SMB_t + \beta_3 HML_t + \beta_4 RMW_t + \beta_5 CMA_t + \beta_6 (Market\ R - RFR)_t$$
$$+ \beta_7 \log(market\ capitalization)_{i,t} + \beta_8 leverage_{i,t} + \theta_i + \varepsilon_{i,t}$$

$$model\ 5: Excess\ Return_{i,t+1}$$
$$= \alpha_i + \beta_1 Total\ Quantitative\ ESG\ score_{i,t}$$
$$+ \beta_2 SMB_t + \beta_3 HML_t + \beta_4 RMW_t + \beta_5 CMA_t + \beta_6 (Market\ R - RFR)_t$$
$$+ \beta_7 \log(market\ capitalization)_{i,t} + \beta_8 leverage_{i,t} + \theta_i + \varepsilon_{i,t}$$

$$model\ 6: Excess\ Return_{i,t+1}$$
$$= \alpha_i + \beta_1 ES\ Quantitative\ score_{i,t}$$
$$+ \beta_2 SMB_t + \beta_3 HML_t + \beta_4 RMW_t + \beta_5 CMA_t + \beta_6 (Market\ R - RFR)_t$$
$$+ \beta_7 \log(market\ capitalization)_{i,t} + \beta_8 leverage_{i,t} + \theta_i + \varepsilon_{i,t}$$

$$model\ 7: Excess\ Return_{i,t+1}$$
$$= \alpha_i + \beta_1 G\ Quantitative\ score_{i,t}$$
$$+ \beta_2 SMB_t + \beta_3 HML_t + \beta_4 RMW_t + \beta_5 CMA_t + \beta_6 (Market\ R - RFR)_t$$
$$+ \beta_7 \log(market\ capitalization)_{i,t} + \beta_8 leverage_{i,t} + \theta_i + \varepsilon_{i,t}$$

Table 27: Fixed Effects Regression for Excess Return with Fama French Five Factors model

Fixed Effects SRRf Fama

	Dependent variable:						
	Ld_SRRf1						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)

compesg	0.0100***						
	(0.0031)						
totalesgqual		-0.0025					
		(0.0144)					
esscorequal			0.0050				
			(0.0184)				
gscorequal				-0.0137			
				(0.0225)			
normesgscore					0.0105***		
					(0.0032)		
normesscore						0.0042	
						(0.0028)	
normGscore							0.0098***
							(0.0025)
logmkcap	-0.2160***	-0.1994***	-0.1993***	-0.2000***	-0.2172***	-0.2035***	-0.2227***
	(0.0395)	(0.0394)	(0.0394)	(0.0394)	(0.0395)	(0.0394)	(0.0395)
Leverage1	-0.000004	-0.000004	-0.000004	-0.000004	-0.000005	-0.000004	-0.000004
	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.00001)
MktRF1	0.2728***	0.2684***	0.2680***	0.2709***	0.2752***	0.2692***	0.2794***
	(0.0776)	(0.0781)	(0.0780)	(0.0782)	(0.0776)	(0.0780)	(0.0775)
SMB1	0.3296***	0.3137***	0.3120***	0.3076***	0.3295***	0.3270***	0.3115***
	(0.0957)	(0.0961)	(0.0964)	(0.0967)	(0.0957)	(0.0964)	(0.0954)
HML1	0.6238***	0.6366***	0.6373***	0.6350***	0.6210***	0.6398***	0.5992***
	(0.1288)	(0.1295)	(0.1294)	(0.1295)	(0.1288)	(0.1293)	(0.1288)
RMW1	0.0314	0.0288	0.0302	0.0290	0.0294	0.0295	0.0290
	(0.0258)	(0.0261)	(0.0261)	(0.0259)	(0.0258)	(0.0259)	(0.0257)
CMA1	-0.8983***	-0.8909***	-0.8906***	-0.8897***	-0.8986***	-0.8940***	-0.8969***
	(0.1142)	(0.1148)	(0.1148)	(0.1148)	(0.1142)	(0.1147)	(0.1139)
Observations	1,139	1,139	1,139	1,139	1,139	1,139	1,139
R^2	0.1625	0.1537	0.1537	0.1540	0.1631	0.1555	0.1667
Adjusted R^2	0.0144	0.0040	0.0040	0.0044	0.0150	0.0062	0.0193

F Statistic (df = 8; 967)	23.4501***	21.9466***	21.9529***	21.9968***	23.5484***	22.2620***	24.1817***

Note: *p<0.1; **p<0.05; ***p<0.01

As shown above, results show a strong positive significance between the excess return and the total ESG score at a significance level of 0.01. It also shows strong positive coefficients with the total qualitative ESG scores and the qualitative G score.

Interpretation:

The above analysis is crucial in studying the effect of ESG on the Egyptian firms' performance, as the excess return of the Egyptian stocks can be influenced by multiple factors, so controlling the Size, Value, Profitability, Investment and Market Risk factors helps us better study the relationship between ESG and excess return. Having strong positive significance, as shown above, between the total ESG score and the excess return indicates that ESG has indeed a positive effect on the excess return after controlling for these 5 factors. In addition, we can see that this result is robust as we get the same result (positive significance) using the quantile regression at 0.5 level (Table 16). This implies that as we exclude the outliers in the quantile regression and/or as we add the above 5 factors as control variables, we can see the ESG effect that may have been isolated. Hence, companies that abide by ESG practices (particularly the governance practices) and have higher ESG scores tend to have positive excess returns which can be explained as companies who have better scores for transparency and disclosure of their practices tend to have better excess returns.

To summarize the above analysis, the relationship between ESG and the financial performance is complex, and it cannot be generalized. It does not only vary from indices level to firms level but it also varies from one dependent variable to another. In addition, it varies from ESG score to another. Hence, depending on the need, the time constraint, and the data availability, one can decide which model to use. For example, a foreign investor/analyst would like to study the overall market trend, hence using Fixed Effects model including Fama-French 5 factors model as control variables will be better to study the effect of ESG on all the companies as this will give them the overall trend so they can decide whether to enter or exit the market, while for a policy maker/ stock exchange, the quantile regression can be suitable to study the effect of ESG on companies at

specific quantile, so they can publish/release respective policies accordingly to encourage the companies to abide by ESG practices.

5. Conclusion

The ESG investing has been increasingly adopted by the financial markets, hence, we aim to study the effect of ESG on Indices' and Firms' performance globally and nationally; therefore, this paper follows a quantitative approach to answer 3 questions; the first question aims to evaluate and compare the performance of MSCI ESG Leaders, MSCI ESG Universal, MSCI Low Carbon Target, and MSCI benchmark/parent Indices and it also aims to find the relation between MSCI ESG Leaders, MSCI ESG Universal, MSCI Low Carbon, and MSCI Parent Indice. Daily data of all Nine MSCI Markets has been collected from September 2019 to June 2023 and the daily returns have been calculated for the study period. The markets selected for this study are All Country World Index (ACWI), World index, China, Europe, Australasia, and Far East (EAFE) index, Emerging Markets (EM) index, European Economic and Monetary Union (EMU) index, United States of America (USA) index, Japan index, and Europe index. MSCI ESG Leaders, MSCI ESG Universal, MSCI Low Carbon Target indices data has been collected, in addition to their benchmark indices. Descriptive statistics have been calculated and the comparison has been done among all MSCI Indices. To test the statistical significance between the means and the medians of each pair, paired t-test and (Mann-Whitney U) have been conducted. Also, Granger Causality test has been used to check whether traditional MSCI indices can granger cause MSCI ESG indices, MSCI Low Carbon indices or not, or vice versa. Both test results show high p-values that are statistically insignificant to reject the above null hypotheses which indicate no significant difference between the mean (median) returns of MSCI benchmark indices and MSCI ESG indices for the study period. Meanwhile, P-values of the Granger Causality test show significance to reject the null hypothesis as results show unidirectional relationships between ACWI parent and ACWI ESG Leaders indices and ACWI parent and ESG Universal indices, bidirectional between EM parent and ESG Leaders and between EM parent and ESG Universal indices, bidirectional between World parent and World ESG Universal indices, bidirectional between World parent and World Low Carbon Target indices, bidirectional between China parent and China ESG Leaders indices,

bidirectional between USA parent and USA Low Carbon Target indices, and bidirectional between EAFE parent and EAFE Low Carbon Target indices.

The purpose of the second question is to compare the performance of SP/EGX ESG index against its benchmark/parent Index and to evaluate SP/EGX ESG index and EGX100 index during the bull and bear markets. Daily data of the two indices has been collected from July 2007 till August 2023 and the daily returns have been calculated for the study period. Descriptive statistics have been calculated and the comparison has been done between the two indices. To test the statistical significance between the means and the medians of this pair, paired t-test and (Mann-Whitney U) have been conducted. In addition, the daily returns have been divided into two groups based on the year market performance (bull market and bear market). Then, the paired t-test and (Mann-Whitney U) test have been done again to check the significance during the bull and the bear markets. The p-value of the paired t-test and (Mann-Whitney U) is greater than 0.05. Hence, there is no significant difference between the mean (median) return of the parent index and SP/EGX ESG.

In addition, the last question seeks to study the effect of the total ESG scores on the companies' performance in the Egyptian Stock market and to study the effect of the quantitative and the qualitative ESG scores on the companies' performance in the Egyptian Stock market. This study is based on panel data of listed firms in Egypt and it was chosen for convenience and the accessibility of ESG scores through the Egyptian Stock Exchange (EGX) and due to the fact that the existing literature mainly focuses on Developed Markets and/or Emerging countries as a whole. Hence, choosing Egypt will not only add value to the country of origin of the researcher but also to the existing literature. The data consists of 200 companies listed on EGX EWI 100 index covering the previous 16 years and it is collected on an annual basis from 2007 to 2022. This is because EGX reconstitutes the index annually since inception in 2007. Meanwhile, the reason why the data was collected from 2007 is to study the whole period since the inception of SP/EGX ESG Index. After collecting the 7 ESG-related independent variable corporate performance. These variables are Total Composite Score, Total ESG Quantitative Score, Total ES Quantitative Score, Total G Quantitative Score, Total ESG Qualitative Score, Total ES Qualitative Score and Total G Qualitative Score scores from EGX, we collected the financial data for the respective companies through Refinitiv Eikon. Stock return, and accounting performance measures (RoA, RoE, and RoS) have been used as the independent variables with the market capitalization and the leverage

being the control variables. Since the data is panel, Hausman test and Chow test were conducted and the p-values were significant, hence, the fixed effects method was used. For the stock return, results show that only one coefficient has statistical significance at 0.1 which is the negative coefficient for gscorequal while for the accounting performance measures, results show that only one coefficient has statistical significance at 0.5 which is the positive coefficient for gscorequal for the RoA and the RoS. However, the analysis has no significance on the RoE. Then, the dataset has been divided into two groups to further study the effect of ESG scores on the performance of companies with high ESG scores versus the low ESG scores. The data has been divided according to the ESG Composite score into two portfolios: High ESG portfolio (Top 30 Firms with high ESG scores) and Low ESG portfolio (remaining 70 Firms). The same regressions have been repeated for the two portfolios and results show insignificant coefficients for the 7 ESG scores (independent variables) for the 5 dependent variables for both high and low portfolios, except for the negative coefficient for the qualitative governance score with respect to the stock return of firms with low ESG scores at 0.05 significance level. Later, the quantile regression has been used to further study the effects of the independent variables on the dependent variables at the low (10^{th} percentile of the dependent variable), medium (50^{th} percentile of the dependent variable) and the high (90^{th} percentile of the dependent variable). Results show that companies in the 10^{th} percentile show no significance between the 7 ESG scores and the stock return, yet there is a positive significance between the RoE and the total composite ESG score, total quantitative ESG score, and total quantitative ES score and between the RoA and the total qualitative ESG and ES scores which is consistent with the RoS results.

However, for companies in the 90^{th} percentile, stock return has a positive significant coefficient only with the quantitative ESG score. Meanwhile, composite ESG Score shows a positive significant coefficient with RoA, RoE and RoS. However, Total Quantitative G Score shows a negative significant coefficient with RoA, RoE and RoS. In addition, the RoE has a negative significant coefficient with the composite ESG score and the total quantitative ESG score. This quantile regressions help with understanding the effect of ESG scores on the companies' performance as companies in the 50^{th} percentile show a positive significance between the stock return and the total composite ESG score, total quantitative ESG score and total quantitative G score. Even though the RoA and the RoS have negative significant coefficient with the total composite ESG score, total quantitative ESG score, and quantitative G score, they have positive

significant coefficients with the total qualitative ESG score, and total qualitative ES score which is the same for RoE. Finally, to thoroughly study the effect of ESG scores on the companies' performance, including other factors such as Size, Value, Profitability, Investment and Market Risk, we constructed Fama and French Five Factors Model for Egypt as the available data published by the authors are not specific for Egypt. Then, Fama and French five factors model have been used to examine the effect of ESG scores on the excess return of the firms in scopes over the study period. The Excess Return represents the Stock Return of stock i at time t less the Risk-Free rate at t. This has been tested with the same control variables that have previously used. Results show a strong positive significance between the excess return and the total ESG score at a significance level of 0.01. It also shows strong positive coefficients with the total qualitative ESG scores and the qualitative G score. To summarize, the existing debate about whether Who Cares Wins is subjective to many factors as it depends on the question at hand. The answer is complex as shown in this paper, it varies from a global level to a national level and from an index level to a firm level, depending on the tools/methods and the variables used in the analysis. However, one can conclude that there is a positive significant relationship between the total ESG score and the excess return for the Egyptian stock market, using Fama & French five factors model.

To summarize, the relationship between ESG and the financial performance is complex, and it cannot be generalized. It does not only vary from indices level to firms level but it also varies from dependent variable to another. In addition, it varies from ESG score to another. Hence, depending on the need, the time constraint, and the data availability, one can decide which model to use. For example, a foreign investor/analyst would like to study the overall market trend, hence using Fixed Effects model including Fama-French 5 factors model as control variables will be better to study the effect of ESG on all the companies as this will give them the overall trend, while for a policy maker/ stock exchange, the quantile regression can be suitable to study the effect of ESG on companies at specific quantile, so they can publish/release respective policies accordingly to encourage the companies to abide by ESG practices.

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7. Appendix

ESG Scores Definitions as per SP/EGX ESG Methodology Report

Score	Definition
Total ESG Composite Score	This score is the sum of the total ESG Qualitative score and the total ESG Quantitative score
Total ESG Quantitative Score	It represents the score of the quantitative assessment based on two factors (The transparency and the disclosure) of the environmental and social practices and corporate governance. It is the summation of the ES quantitative score and the G quantitative score
ES Quantitative Score	This score represents the company's score based on the company's disclosure and transparency of the environmental and social practices
G Quantitative Score	This score represents the company's score based on the company's disclosure and transparency of corporate governance practices
Total ESG Qualitative Score	It represents the company's total qualitative score which is based on the available data from independent sources of information. This is the summation of the individual ES qualitative score and the G qualitative score
ES Qualitative Score	This is calculated based on the company's available data in independent sources of information related to the company's environmental and social practices
G Qualitative Score	This is calculated based on the company's available data in independent sources of information related to the company's corporate governance

Appendix: Results

Fixed Effects RoE

	Dependent variable:						
	Ld_RoE						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
compesg	-0.2336						
	(0.3897)						
totalesgqual		1.9764					
		(1.4764)					
esscorequal			2.9363				
			(1.9325)				
gscorequal				0.6752			
				(2.3653)			
normesgscore					-0.3951		
					(0.4019)		
normesscore						-0.4919	
						(0.3052)	
normGscore							0.0562
							(0.3564)
logmkcap	4.1719	4.2976	4.0662	4.1492	4.2873	4.2113	4.0267
	(4.1807)	(4.1776)	(4.1731)	(4.1869)	(4.1818)	(4.1734)	(4.1872)
Leverage	-0.0370**	-0.0362*	-0.0372**	-0.0370**	-0.0366**	-0.0371**	-0.0375**
	(0.0186)	(0.0186)	(0.0186)	(0.0187)	(0.0186)	(0.0186)	(0.0187)
Observations	1,159	1,159	1,159	1,159	1,159	1,159	1,159
R^2	0.0063	0.0078	0.0083	0.0060	0.0069	0.0086	0.0060
Adjusted R^2	-0.1802	-0.1785	-0.1778	-0.1805	-0.1795	-0.1775	-0.1806
F Statistic (df = 3; 975)	2.0624	2.5428*	2.7160**	1.9692	2.2659*	2.8129**	1.9502
Note:	*p<0.1; **p<0.05; ***p<0.01						

Fixed Effects RoS

	Dependent variable:

	Ld_RoS						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
compesg	0.0266						
	(0.0412)						
totalesgqual		0.1386					
		(0.1553)					
esscorequal			-0.1197				
			(0.2040)				
gscorequal				0.5315**			
				(0.2478)			
normesgscore					0.0179		
					(0.0425)		
normesscore						-0.0120	
						(0.0321)	
normGscore							0.0478
							(0.0380)
logmkcap	1.4941***	1.5133***	1.5047***	1.5520***	1.4956***	1.5049***	1.4742***
	(0.4325)	(0.4324)	(0.4323)	(0.4320)	(0.4327)	(0.4324)	(0.4327)
Leverage	-0.00002	-0.00001	-0.00002	-0.00001	-0.00002	-0.00001	-0.00002
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Observations	1,188	1,188	1,188	1,188	1,188	1,188	1,188
R^2	0.0124	0.0127	0.0123	0.0165	0.0121	0.0121	0.0135
Adjusted R^2	-0.1688	-0.1684	-0.1689	-0.1640	-0.1691	-0.1691	-0.1675
F Statistic (df = 3; 1003)	4.1829***	4.3114***	4.1589***	5.5949***	4.1024***	4.0900***	4.5765***
Note:	*p<0.1; **p<0.05; ***p<0.01						

Quantile Regression at 0.1 Level RoS

	Dependent variable:						
	Ld_RoS						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
compesg	-0.0370*						

	(0.0194)						
totalesgqual		0.7787**					
		(0.3308)					
esscorequal			0.8918**				
			(0.3970)				
gscorequal				0.3748			
				(0.8164)			
normesgscore					-0.0405		
					(0.0293)		
normesscore						-0.0430	
						(0.0423)	
normGscore							-0.0350
							(0.0267)
logmkcap	1.3975***	1.0747***	1.0907***	1.1826***	1.3775***	1.3838***	1.3838***
	(0.2060)	(0.2076)	(0.2102)	(0.1851)	(0.1598)	(0.2313)	(0.2483)
Leverage1	-0.00002	-0.00001	-0.00001	-0.00001	-0.00001	-0.00002	-0.00001
	(0.0005)	(0.0044)	(0.0046)	(0.0004)	(0.0006)	(0.0007)	(0.0005)
Constant	-16.9325***	-94.1455***	-47.7753***	-42.6050	-20.1737***	-20.9424***	-19.8337***
	(2.3155)	(32.5596)	(13.6312)	(52.8298)	(2.5612)	(3.6157)	(3.3086)
Observations	1,188	1,188	1,188	1,188	1,188	1,188	1,188
Note:	*p<0.1; **p<0.05; ***p<0.01						

Quantile Regression at 0.5 Level RoS

	Dependent variable:						
	Ld_RoS						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
compesg	-0.0443*						
	(0.0242)						
totalesgqual		0.2363**					
		(0.1063)					
esscorequal			0.4514***				

			(0.1012)				
gscorequal				-0.0821			
				(0.2255)			
normesgscore					-0.0544**		
					(0.0237)		
normesscore						0.0046	
						(0.0253)	
normGscore							-0.0690***
							(0.0201)
logmkcap	0.7821***	0.6679***	0.6918***	0.6552***	0.7815***	0.6107***	0.8867***
	(0.1394)	(0.1206)	(0.1179)	(0.1214)	(0.1367)	(0.1362)	(0.1368)
Leverage1	0.00004	0.00005	0.00005	0.00004	0.00005	0.00005	0.00004
	(0.0013)	(0.0017)	(0.0016)	(0.0018)	(0.0012)	(0.0017)	(0.0012)
Constant	-1.1043	-28.2570***	-20.6628***	0.6061	-5.2704***	-4.1026**	-5.4429***
	(2.4317)	(10.6510)	(3.6802)	(14.7174)	(1.6295)	(1.7798)	(1.6340)
Observations	1,188	1,188	1,188	1,188	1,188	1,188	1,188
Note:	*p<0.1; **p<0.05; ***p<0.01						

Quantile Regression at 0.9 Level RoS

	Dependent variable:						
	Ld_RoS						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
compesg	-0.0891						
	(0.0752)						
totalesgqual		0.3245					
		(0.4309)					
esscorequal			0.9151**				
			(0.4402)				
gscorequal				-0.0465			
				(0.2851)			
normesgscore					-0.1058		

				(0.0676)			
normesscore					0.1373		
					(0.1000)		
normGscore							-0.2000***
							(0.0513)
logmkcap	1.9509***	1.8897***	1.7966***	1.7892***	1.9504***	1.5589***	2.1492***
	(0.3675)	(0.3761)	(0.3395)	(0.3187)	(0.3361)	(0.3256)	(0.3669)
Leverage1	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	(0.0031)	(0.0055)	(0.0050)	(0.0052)	(0.0022)	(0.0063)	(0.0022)
Constant	-1.9528	-43.7796	-41.9838***	-7.3293	-10.4480***	-8.1204**	-8.6626**
	(7.5515)	(43.4726)	(15.9956)	(18.3472)	(3.3381)	(3.9489)	(4.2485)
Observations	1,188	1,188	1,188	1,188	1,188	1,188	1,188
Note:	*p<0.1; **p<0.05; ***p<0.01						

Fixed Effects High SR

	Dependent variable:						
	Ld_StockReturn						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
compesg	0.0055						
	(0.0050)						
totalesgqual		0.0042					
		(0.0238)					
esscorequal			0.0213				
			(0.0297)				
gscorequal				-0.0363			
				(0.0466)			
normesgscore					0.0055		
					(0.0051)		
normesscore						0.0030	
						(0.0034)	
normGscore							0.0035

							(0.0047)
logmkcap	-0.1326*	-0.1418*	-0.1413*	-0.1474*	-0.1336*	-0.1368*	-0.1368*
	(0.0755)	(0.0753)	(0.0751)	(0.0753)	(0.0754)	(0.0753)	(0.0754)
Leverage1	-0.00002	-0.00002	-0.00002	-0.00002	-0.00003	-0.00002	-0.00003
	(0.00002)	(0.00002)	(0.00002)	(0.00002)	(0.00002)	(0.00002)	(0.00002)
Observations	286	286	286	286	286	286	286
R^2	0.0251	0.0196	0.0218	0.0223	0.0250	0.0233	0.0221
Adjusted R^2	-0.3358	-0.3434	-0.3403	-0.3397	-0.3360	-0.3383	-0.3399
F Statistic (df = 3; 208)	1.7875	1.3831	1.5473	1.5787	1.7753	1.6527	1.5658
Note:	*p<0.1; **p<0.05; ***p<0.01						

Fixed Effects RoA High

	Dependent variable:						
	Ld_RoA						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
compesg	-0.0119						
	(0.0533)						
totalesgqual		0.1502					
		(0.2493)					
esscorequal			0.0577				
			(0.3048)				
gscorequal				0.4522			
				(0.5015)			
normesgscore					-0.0196		
					(0.0545)		
normesscore						-0.0275	
						(0.0364)	
normGscore							0.0166
							(0.0497)
logmkcap	0.9056	0.9555	0.9316	0.9886	0.8939	0.8701	0.9572
	(0.7992)	(0.7930)	(0.7925)	(0.7937)	(0.7982)	(0.7952)	(0.7967)

Leverage1	-0.0002	-0.0002	-0.0002	-0.0001	-0.0002	-0.0002	-0.0002
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Observations	295	295	295	295	295	295	295
R^2	0.0115	0.0129	0.0114	0.0150	0.0118	0.0139	0.0118
Adjusted R^2	-0.3518	-0.3498	-0.3518	-0.3470	-0.3513	-0.3485	-0.3514
F Statistic (df = 3; 215)	0.8315	0.9370	0.8267	1.0888	0.8584	1.0067	0.8523
Note:	*p<0.1; **p<0.05; ***p<0.01						

Fixed Effects RoA Low

	Dependent variable:						
	Ld_RoA						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
compesg	0.0159						
	(0.1089)						
totalesgqual		0.0999					
		(0.2137)					
esscorequal			-0.2089				
			(0.2864)				
gscorequal				0.4685			
				(0.3140)			
normesgscore					-0.0128		
					(0.1232)		
normesscore						-0.1501	
						(0.1203)	
normGscore							0.0485
							(0.0749)
logmkcap	0.6240	0.6444	0.6147	0.7158	0.6218	0.5985	0.6087
	(0.6360)	(0.6376)	(0.6355)	(0.6376)	(0.6358)	(0.6351)	(0.6358)
Leverage1	-0.00001	-0.00001	-0.00001	-0.00001	-0.00001	-0.000004	-0.00001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Observations	694	694	694	694	694	694	694

R^2	0.0018	0.0022	0.0028	0.0059	0.0018	0.0047	0.0026
Adjusted R^2	-0.2930	-0.2925	-0.2917	-0.2877	-0.2930	-0.2893	-0.2920
F Statistic (df = 3; 535)	0.3264	0.3924	0.4970	1.0627	0.3230	0.8386	0.4593
Note:	*p<0.1; **p<0.05; ***p<0.01						

Fixed Effects RoE High

	Dependent variable:						
	Ld_RoE						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
compesg	-1.6275						
	(1.4962)						
totalesgqual		6.5470					
		(7.2483)					
esscorequal			12.4464				
			(8.9595)				
gscorequal				-5.9098			
				(14.1461)			
normesgscore					-1.9823		
					(1.5236)		
normesscore						-1.6192	
						(1.0109)	
normGscore							-0.2358
							(1.4105)
logmkcap	18.8364	24.8881	25.2399	21.2941	18.8888	18.2273	21.9714
	(24.5483)	(24.5415)	(24.3984)	(24.5127)	(24.4543)	(24.3970)	(24.4718)
Leverage1	0.1544	0.1634	0.1673	0.1525	0.1571	0.1532	0.1552
	(0.1411)	(0.1416)	(0.1412)	(0.1415)	(0.1410)	(0.1407)	(0.1416)
Observations	290	290	290	290	290	290	290
R^2	0.0133	0.0116	0.0168	0.0085	0.0157	0.0197	0.0079
Adjusted R^2	-0.3579	-0.3603	-0.3531	-0.3644	-0.3546	-0.3491	-0.3654
F Statistic (df = 3; 210)	0.9423	0.8189	1.1931	0.6034	1.1134	1.4067	0.5542

Note: *p<0.1; **p<0.05; ***p<0.01

Fixed Effects RoE Low

	Dependent variable:						
	Ld_RoE						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
compesg	0.3953						
	(0.2989)						
totalesgqual		0.5642					
		(0.5895)					
esscorequal			0.2297				
			(0.7790)				
gscorequal				0.9680			
				(0.8818)			
normesgscore					0.3224		
					(0.3396)		
normesscore						-0.1527	
						(0.3312)	
normGscore							0.2954
							(0.2054)
logmkcap	-0.9632	-0.8429	-0.9801	-0.7675	-1.0496	-0.9933	-1.1149
	(1.7601)	(1.7678)	(1.7629)	(1.7722)	(1.7627)	(1.7626)	(1.7617)
Leverage1	-0.0551***	-0.0540***	-0.0543***	-0.0537***	-0.0551***	-0.0541***	-0.0554***
	(0.0068)	(0.0067)	(0.0067)	(0.0068)	(0.0068)	(0.0067)	(0.0068)
Observations	682	682	682	682	682	682	682
R^2	0.1142	0.1128	0.1114	0.1133	0.1128	0.1116	0.1148
Adjusted R^2	-0.1512	-0.1530	-0.1548	-0.1524	-0.1530	-0.1545	-0.1505
F Statistic (df = 3; 524)	22.5260***	22.2134***	21.9025***	22.3219***	22.2078***	21.9496***	22.6454***

Note: *p<0.1; **p<0.05; ***p<0.01

Fixed Effects RoS High

	Dependent variable:

	Ld_RoS						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
compesg	-0.0119						
	(0.0533)						
totalesgqual		0.1502					
		(0.2493)					
esscorequal			0.0577				
			(0.3048)				
gscorequal				0.4522			
				(0.5015)			
normesgscore					-0.0196		
					(0.0545)		
normesscore						-0.0275	
						(0.0364)	
normGscore							0.0166
							(0.0497)
logmkcap	0.9056	0.9555	0.9316	0.9886	0.8939	0.8701	0.9572
	(0.7992)	(0.7930)	(0.7925)	(0.7937)	(0.7982)	(0.7952)	(0.7967)
Leverage1	-0.0002	-0.0002	-0.0002	-0.0001	-0.0002	-0.0002	-0.0002
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Observations	295	295	295	295	295	295	295
R^2	0.0115	0.0129	0.0114	0.0150	0.0118	0.0139	0.0118
Adjusted R^2	-0.3518	-0.3498	-0.3518	-0.3470	-0.3513	-0.3485	-0.3514
F Statistic (df = 3; 215)	0.8315	0.9370	0.8267	1.0888	0.8584	1.0067	0.8523
Note:	*p<0.1; **p<0.05; ***p<0.01						

Fixed Effects RoS Low

	Dependent variable:						
	Ld_RoS						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
compesg	0.0159						
	(0.1089)						
totalesgqual		0.0999					

		(0.2137)					
esscorequal			-0.2089				
			(0.2864)				
gscorequal				0.4685			
				(0.3140)			
normesgscore					-0.0128		
					(0.1232)		
normesscore						-0.1501	
						(0.1203)	
normGscore							0.0485
							(0.0749)
logmkcap	0.6240	0.6444	0.6147	0.7158	0.6218	0.5985	0.6087
	(0.6360)	(0.6376)	(0.6355)	(0.6376)	(0.6358)	(0.6351)	(0.6358)
Leverage1	-0.00001	-0.00001	-0.00001	-0.00001	-0.00001	-0.000004	-0.00001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Observations	694	694	694	694	694	694	694
R^2	0.0018	0.0022	0.0028	0.0059	0.0018	0.0047	0.0026
Adjusted R^2	-0.2930	-0.2925	-0.2917	-0.2877	-0.2930	-0.2893	-0.2920
F Statistic (df = 3; 535)	0.3264	0.3924	0.4970	1.0627	0.3230	0.8386	0.4593
Note:	*p<0.1; **p<0.05; ***p<0.01						