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DOES ESG PERFORMANCE HAVE AN IMPACT ON STOCK RETURN?
EVIDENCE FROM TURKEY

Nil TOMUL BENGİSU

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DOES ESG PERFORMANCE HAVE AN IMPACT ON STOCK RETURN?
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ESG PERFORMANSININ HİSSE SENEDİ GETİRİSİ ÜZERİNDE BİR ETKİSİ
VAR MI? TÜRKİYE ÖRNEĞİ

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ABBREVIATIONS

BaU:	Business as Usual
BIST:	Borsa Istanbul A.Ş.
CAPM:	The capital asset pricing model
CSR:	Corporate Social Responsibility
EMR:	Excess Market Return
ESG:	Environmental, Social, and Governance
GRI:	Global Reporting Initiative
M/B Value :	Market/Book Value
MCAP:	Market Capitalisation
OECD:	Organisation for Economic Co-operation and Development
P/E:	Price to Earnings Ratio
RNOA:	Return on Net Operating Assets
ROA:	Return on Assets
ROE:	Return on Equity
SDGs:	Sustainable Development Goals
SRI:	Socially Responsible Investment
UN:	United Nations

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ABSTRACT

In this study, the relationship between companies' sustainability index score and stock return has been analysed. The analysis has been performed for the years of 2016-2020 on the data of the companies that listed in Borsa İstanbul Sustainability Index in 2020 where include fifty-eight companies. The data has been retrieved from Reuters Eikon database.

Also, in this paper a panel data analysis has been conducted. In order to determine appropriate regression model for our panel data, the Correlated Random Effects - Hausman Test has been applied and according to the outputs fixed effect regression model or random effect regression model is used. Also, in this analysis yearly stock return change percentage has been used as dependent variable, overall ESG score and each pillar's (environmental, social and governance) scores and also other financial indicators which are ROE, ROA, P/E and MCAP data have been used as independent variables and EMR has been used as control variable.

The findings indicate that the relationship between stock return and ESG score is statistically insignificant. However, the test that we conducted by using ESG score and accounting base performance measurements indicators (ROA and ROE) show that there is statistically significant correlation between ESG and stock return.

ÖZET

Bu çalışmada şirketlerin sürdürülebilirlik endeks puanı ile hisse senedi getirisi arasındaki ilişki analiz edilmiştir. Analiz, 2020 yılında Borsa İstanbul Sürdürülebilirlik Endeksi'nde yer alan elli sekiz şirketin 2016 -2020 yılları verileri kullanılarak yapılmıştır. Veriler Reuters Eikon veri tabanından elde edilmiştir.

Ayrıca, bu çalışmada panel veri analiz yöntemi kullanılmıştır. Panel verilerimize uygun regresyon modelini belirlemek için korelasyonlu rastgele etkiler - Hausman testi uygulanmış ve çıktılarına göre sabit etkili regresyon modeli veya rastgele etki regresyon modeli kullanılmıştır. Ayrıca bu analizde, bağımlı değişken olarak yıllık hisse senedi getiri değişim yüzdesi kullanılmış, genel ESG puanı ve her bir kategorinin (çevresel, sosyal ve yönetim) puanları ile diğer finansal göstergeler olan ROE, ROA, P/E ve MCAP verileri bağımsız değişken olarak, EMR ise kontrol değişkeni olarak kullanılmıştır.

Bulgular, hisse senedi getirisi ile ESG puanı arasında istatistiksel açıdan anlamlı bir ilişki tespit edilemediğini; ancak, ESG skoru ve muhasebeye dayalı performans ölçüm göstergeleri (ROA ve ROE) kullanarak yaptığımız test, ESG puanı ile hisse senedi getirisi arasında istatistiksel olarak anlamlı bir ilişki olduğunu göstermektedir.

INTRODUCTION

Sustainability has become one of the keys and trend topic of the today's business world. Until very recently, only profitability- oriented investment approach was adopted, however, now increasing awareness of society pertaining to environmental, social and economic matters force companies to shape their investment decisions through a sustainable and resource efficient economy. In other words, in today's world companies are measured not only by their profitability, earnings and market performances but also their concern regarding the society Karaibrahimoğlu (2010).

It may not be wrong to say that acting socially responsible is a burden for the companies, however the moral pressure that comes from the communities forces companies to integrate sustainability into their investment decision process. In this study we try to find answer whether integrating sustainability indicators into decision making process is only burden to the firms or it also gives competitive advantages compare to others. In other words, does implementing sustainability criteria into investment decision financially reflect to the stock return of the companies?

For the sake of evaluating the relationship between companies' sustainability index score and stock return, we have performed an assessment on the data of the companies that listed in Borsa İstanbul Sustainability Index in 2020 where include fifty eight companies. Our data cover five- year period which is beginning with 2020 and counted backwards, ending with 2016. At the time of collecting data, the data of the 2020 was the latest available data, thus we started to collect it from 2020 and counted backwards. There are lots of studies considering the ESG in different aspects. However, there is no study in our knowledge that evaluates the relationship between ESG performance and stock return concerning the those fifty- eight listed Turkish companies with the last five years' data. Thus, aim of the this study to make a research with above mentioned data

and develop a point of view as to Turkish market in terms of listed Turkish companies and ESG.

In this paper a panel data analysis has been conducted. Percentage return of the stocks have been used as dependent variable, overall ESG score and each pillar's score and also other financial indicators which are ROE, ROA, P/E and MCAP data have been used as independent variables, and EMR has been used as control variable.

Our panel data regression results indicated that the relationship between stock return and ESG is statistically insignificant except the test that we conduct by using ESG score and accounting base performance measurements indicators (ROA and ROE).

In this study, the first part is introduction part; the following part is the section one, in section one we give an insight regarding the sustainability and its development; in section two we review the relevant previous studies that examine environmental, social and governance (ESG) performance of the companies in different aspects, and analyse its reflection to the financial figures of the firms. Data analysing and methodology will be explained in section three. And finally, it follows by the conclusion part which is overall assessment done.

SECTION ONE

SUSTAINABLE INVESTMENT

1.1. WHAT IS THE SUSTAINABLE INVESTMENT?

Sustainable investment is an approach which integrates environmental, social and governance concerns into investment decision process. With sustainable investment it is aimed to have a positive impact on social and environmental concerns along with long term financial returns. Sustainable investment is also known as ESG or referred as socially responsible investment.

There has been an enormous economic growth since industrial revolution. While past two decades rapid economic expansion had led to a huge technological progress, in the meantime it had culminated in irresponsible and illimitably fossil fuels and natural resource depletion Bergquist (2021) which induced global warming, excessive resource consumption, environmental degradation, poverty and growing gap of inequality within and among countries.

Such impact of the economic development had risen the concern for the future of the planet and also human being. Particularly in 1980s ESG gained a dramatic interest from all parties of the society from society to media, scholars (Breedt, Ciliberti, Gualdi, & Seager, 2019). To address these common concerns, in 1987 the World Commission on Environmental and Development (WCED) published a report, which is also known as Brundtland Report. In the report first time sustainable development had been defined and the definition emphasised importance of that while meeting today's needs not only today's needs should be taken into consideration also future generations ability to meet their own needs also to be considered and it also underlined dependency to the environment, and managing the environmental resources is vital for sustainable human

progress and human survival (World Commission on Environmental and Development [WCED], 1987).

In 2000s, interest in ESG increases far beyond the previous decades. Organisations and regulators set policies, strategies and principals for supporting and promoting sustainable development. At the beginning while these policies and principals were not compulsory, day by day they have become and is continuing to become obligatory not only for companies but also for countries through regulations, directives and protocols.

In 2000, UN Global Compact was established and launched ten principals relative to human rights, labor, the environment and anti-corruption. UN Global Compact, as a corporate sustainability initiative, aims and seeks participations and cooperation of the businesses to do business responsibly through implementing ten principals into their business strategies and operations. According to the UN Global Compact, today over the 14.670 companies and more than 162 countries participate to UN Global Compact.

Additionally, United Nations (UN) adopted the Sustainable Development Goals (SDGs) in 2015 by aiming ending poverty, saving the planet and ensuring that by 2030 all people enjoy peace and prosperity. Furthermore, UN with these goals recognize that a development in terms of business, technology and financial resources must balance the social, economic and environmental sustainability, and it should be made sure that the SDGs should be succeed in every aspect not only with one dimension.

Rising attention to sustainable development and experiencing the results of the global warming and climate change have been made everyone to deeply perceive the scarcity of resources. Thus, humankind has started to concern not only for future of the next generations but also their own and all other living species. That common concern emerged countries to cooperate and coordinate together in order to combat against climate change and global warning.

In this context, Paris Agreement, a legally binding international treaty, signed on 12 December 2015 and entered into force on 4 November 2016. Today 191 countries and

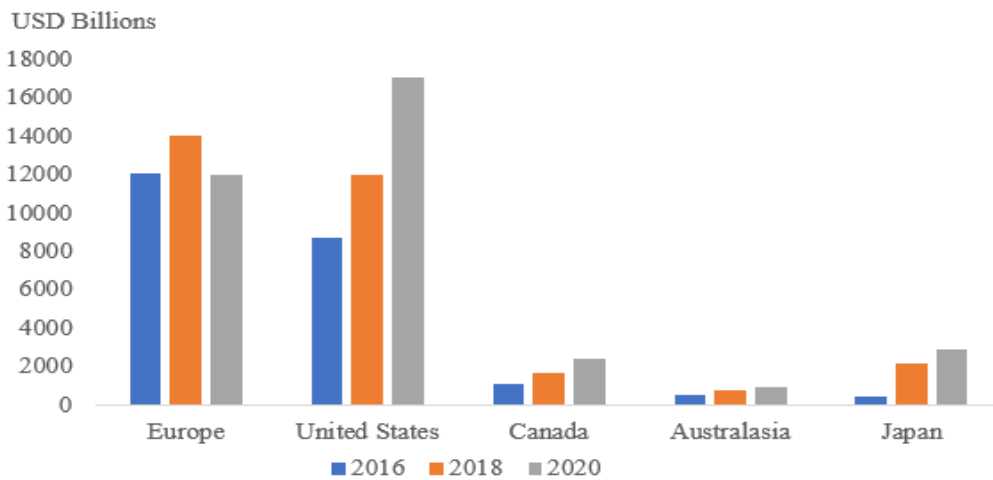
EU are party to the Paris Agreement and under this agreement all parties committed to limit the global temperature. Accordingly, the increase should be limited to 2 °C in this century, and for the future it should be limited with an increment of 1.5°C over pre-industrial level. Countries who are ratified the Agreement are expected to submit their action plan every 5 year. In this respect, in the action plan countries are expected to indicate their mitigation measurements to reduce greenhouse gas emission.

It is important to note that the Paris Agreement urges on bare necessity of economical and technological dimensions of the sustainable development and climate resilient investments. Without having economic and technological aspect it may not be possible to effectuate the goal of Paris Agreement. While the agreement promotes fund flow towards developing countries so as to make climate resilient investments, in parallel to that, the investment funds and financial institutions integrated environmental, social and governance related matter into their financing policies for financing only the technology that support the sustainable and climate resilient investment.

In fact, today all investment funds, financial institutions, banks are deeply scrutinizing where the borrowings will be used. The World Bank is one of the best examples of that. Given the fact that the damage given to the environment enhances the poverty and inequality. The World Bank promotes and supports developing countries' projects through utilising low interest rate loans. To be able to do so, it makes assessment for social and environmental risks, and accounts the matters of local community. By doing so, the World Bank aims to make progress in reducing the poverty; supporting the equality in terms of life standards, gender and race; and sharing prosperity in the developing countries. In the same vein, all international banks, financial institutions and funds have a similar prospectus to scrutinize whether the borrowings to be invested with an approach that sensible to sustainable investment and comply with the net zero emission commitments.

As matter of fact that ESG is a new jargon and expected to be included in all investment process. Considering environmental, social and governance related matters become a must for receiving financing for an investment. In fact, the figures published in the reports evidence to the emerging trend in sustainable investment and also increase importance of it. According to the data that revealed by Global Sustainable Investment Alliance (2020), sustainable investment has reached USD35.3 trillion in assets by 2020 with a 55% increase in last four years period, and according to Morningstar data, global sustainable fund assets reached to USD 3.9 trillion in third quarter of 2021 (Bioy, 2021). Below given Figure 1.1. also shows the increase in global sustainable investing asset.

Figure 1.1. Global Sustainable Investing Asset



Source: Global Sustainable Investment Review 2020

1.2. SUSTAINABILITY IN TURKEY

It is obvious and can be easily said that today's businesses are in a transition period. While today sustainability provides a competitive advantage to the companies, however in near future it would become a must for companies' robust operations and for continuation to their activities (Aras and Sarıoğlu, 2015).

While there is a global upward trend regarding ESG related issues and also growing interests in ESG data, Turkish market also endeavour to fare up with the global developments. According to the UN Global Compact Network Türkiye (2020) report, in 2020 total number of the companies and institutions participated to the UN Global Compact was in total 278 and those number of the participants has climb up to 334 in 2021.

Turkey had signed Paris Agreement in 2016, ratified the Agreement on October 6, 2021. With this ratification, Turkey committed that by 2030 it will reduce its greenhouse gas emissions up to 21% from Business as Usual (BaU) level.

Another development in Turkey in relation with the sustainability was launching of the BIST Sustainability Index in 2014. By doing so, it was aimed to increase awareness in relation with sustainability and to incorporate ESG related concerns into the practice and activities of the companies particularly for the companies trading in Borsa Istanbul markets.

Borsa İstanbul collaborates with Refinitiv Information Limited ("Refinitiv"). To be listed in sustainability index, firstly the company needs to be listed in BIST Stars market and secondly volunteer to be in BIST Sustainability Index. Assessments are based on international sustainability criteria, and in order to be listed in sustainability index, companies are expected to satisfy the all required conditions.

It shall be noted that, each day reporting non-financial indicators becomes more and more important. Not only it gives competitive advantage to the firms but also attracts investors as well. In fact, improvement in technology and communication avail consumers of watch out and put pressure on companies in order to act as socially responsible Sancar (2013).

In the same vein, investors evaluate the companies not only with their financial indicators, but also appraise whether the firm invests in technology to contribute sustainability and taking into consideration the ESG related matters. Again, like international financial entities and banks, Turkish Banks and financial entities are not financing the business which operates in the area of environmentally hazardous i.e . coal trade.

1.3. ENVIRONMENT, SOCIAL AND GOVERNANCE (ESG) PILLARS

The companies are under the huge pressure of incorporating their ESG related business policies and strategies into their reports Liesen, Figge and Hahn (2013). As a consequence of that companies take steps to measure their ESG performances. On the other hand, investors seek the companies that meet their requirements or investment criteria in respect of sustainability.

In Turkey, Borsa Istanbul aims to increase the awareness in respect of the ESG related matters and another goal of the Borsa Istanbul is to attract the investors particularly for the companies traded at Borsa Istanbul. With this respect, Borsa Istanbul cooperated with Refinitiv in order to measure the ESG scores of the companies that listed in BIST star market and volunteer to be assessed in relation of sustainability related matters. Therefore, in this study we use the data provided by Refinitiv Eikon.

For company assessment and scoring process, Refinitiv Eikon collects publicly reported information. According to the Refinitiv Eikon’s ESG data base is covering over 70% of market across the global market, and more than 500 company level ESG metrics which 186 of them most comparable and material per industry, are calculated to assess company score which is grouped in 10 categories, in 3 pillars and as final ESG score (Refinitiv, 2021). Table 1.1 shows ESG score structure below.

Table 1. 1. ESG Score Structure



Source: Refinitiv, “Environmental, Social and Governance Scores From Refinitiv, February 2021”

The scores of the 10 categories and also ESG Controversies are calculated in terms of number of the companies that have worse value, have the same value and have a value (Refinitiv, 2021). The formula of the calculation methodology can be seen in Table 1.2. below.

Table 1. 2. Score Calculation Formula

$$score = \frac{\text{no.of companies with a worse value} + \frac{\text{no.of companies with the same value included in the current one}}{2}}{\text{no.of companies with a value}}$$

Source: Refinitiv, “Environmental, Social and Governance Scores From Refinitiv, February 2021”

ESG scoring is calculated for 3 pillars and 10 categories as percentage and letters. 3 pillars consist of environmental, social and governance. The environmental pillar includes emission, innovation and resource use; social pillar comprise workforce, human rights, community, product responsibility; and corporate governance pillar includes management, shareholders and corporate social responsibility (CSR) strategy score categories (Şeker, 2020). Table 1.3 shows 3 pillars, 10 category scores and their definitions.

Table 1. 3. Pillars, Category Scores and Definitions

Pillars	Categories Score	Definitions
Environmental	Emission	The emission reduction score measures a company’s commitment and effectiveness towards reducing environmental emissions in its production and operational processes.
	Innovation	The innovation score reflects a company’s capacity to reduce the environmental costs and burdens for its customers, thereby creating new

		market opportunities through new environmental technologies and processes, or eco-designed products.
	Resource use	The resource use score reflects a company's performance and capacity to reduce the use of materials, energy or water, and to find more eco-efficient solutions by improving supply chain management.
Social	Community	The community score measures the company's commitment to being a good citizen, protecting public health and respecting business ethics.
	Human Rights	The human rights score measures a company's effectiveness in terms of respecting fundamental human rights conventions
	Product Responsibility	The product responsibility score reflects a company's capacity to produce quality goods and services, integrating the customer's health and safety, integrity and data privacy.
	Workforce	The workforce score measures a company's effectiveness in terms of providing job satisfaction, a healthy and safe workplace, maintaining diversity and equal opportunities, and development opportunities for its workforce.
Governance	CSR Strategy	The CSR strategy score reflects a company's practices to communicate that it integrates economic (financial), social and environmental dimensions into its day-to-day decision-making processes.

	Management	The management score measures a company's commitment and effectiveness towards following best practice corporate governance principles.
	Shareholders	The shareholders score measures a company's effectiveness towards equal treatment of shareholders and the use of anti-takeover devices.

Source: Refinitiv, "Environmental, Social and Governance Scores From Refinitiv, February 2021"

1.3.1 Environmental Pillar

It may not be wrong to say that the environment is the most fundamental pillar among the ESG pillars. As per Global Reporting Initiative (GRI) indicate in their report, the impact of the companies on the living and non-living natural system including land, water, air and ecosystem is concerned by environmental pillar (GRI 307, 2016). Through ESG reporting, companies identify and declare their impact on the environment. Today many financial institutions fund the companies in according to their compliance to the international and local regulation relevant to the environment.

In Turkey, environmental law defines projects that require the environmental impact assessment. Without having such conformity certificate, the project cannot be executed. In the same vein, local and international financial institutions do not finance any project without having the certificate of that project does not have a negative impact on environment. In same way, the companies, which concern on environmental matter and transparent at their disclosures as to impact of their activities also have positive impression on their stakeholders, consumers and locals.

It could be said that positive or negative impact of the companies on environment would have been taken into account by the all stakeholders. Environmental pillar is assessed under three categories, namely;

- **Emission:** For the purpose of reducing green gas emissions of which is generated as consequences of business operation, the companies are taking measures in this respect. Under this subcategory it is evaluated that whether company develop any policy, mechanism, system or process to reduce emission in its core activities.
- **Innovation:** Innovation subcategory score reflects company's contribution to the environment through creating new technologies, designs or process. The products that saving energy, reducing the consumption or being non-hazardous to the nature are some examples. Even though innovation could be costly and risky, it also encourages the companies to have competitive advantage over the other traditional companies. While innovation provides economic and environmental benefits Xu, Liu and Shang (2020) it is also essential for promoting sustainable development.
- **Resource Use:** Resource use score reflects company's efficiency and implementing policies terms of using less materials, natural resources and being environment friendly. In this respect companies are being sensitive and create awareness for reducing consumption of water, energy and environmentally hazardous material and packages; and encourage using renewable energy and environment friendly materials.

1.3.2 Social Pillar

The social dimension basically aims to promote welfare of the society. In this respect, social pillar considers the effect of the company on society and measures if it implements any policies to take a part to make contribution to solve the social matters.

As behaviour of the companies effects its surrounding, the companies have responsibilities against their employees, stakeholders, customers and society. Behaving socially responsible is in long run increase reputation and credibility of the company, and also may attract investors.

Social pillar has four categories which are community, human rights, product responsibility and workforce.

- **Community:** While companies are creating an economical value, they are also under the responsibility of the protecting public health and their life standards in particular at the place they carry out their activities. In this respect community score reflect whether company act in conformity with the business ethic and if it has any principals in place and implements strategy to protect health, welfare and life standards of community, in particular the locals.
- **Human Rights:** Under this category it is considered that whether company respect and implement policy for the fundamental human right conventions, The Universal Declaration of Human Rights – United Nation, The United Nations Convention of the Rights of the Child.
- **Product responsibility:** It reflects companies approach for producing and serving products in good quality, and taking into consideration health and safety of the consumers, prioritising the data privacy.

- **Workforce:** The workforce score reflects company's approach to its employee with respect to their working conditions, health and safety measures, providing equal opportunities in terms of gender, nationality and race, promoting and maintaining diversity.

1.3.3 Governance Pillar

The corporate governance could be defined as a guideline or set of rules in relation with the management of the company in a transparent manner and by protecting interest of the all stakeholders. Corruption and bribery, tax strategy, political lobbying, and as such could be a set of examples for the corporate governance related issues.

As it is emphasised in OECD Principles of Corporate Governance, transparent and efficient market should be promoted, consistency with the rule of law should be ensured, and a clear division among different supervisory should be stipulated by the corporate governance framework OECD (2004). In the same vein, the Communique on Corporate Governance Principles was published which stipulates the corporate governance principals for the companies listed in Borsa Istanbul. Listed companies require to implement the principals that set forth by the Communique. Governance pillar is considered under 3 categories which are CSR strategy, management and shareholder.

- **CRS strategy:** It reflects company's efficiency in terms of integrating and putting other dimensions into decision making process while creating an economic value. Integrating the non-financial indicators into the annual reports, giving seat to independent board members, compliance to the GRI standards, publishing the sustainability report demonstrates the company's approach in terms of being transparent and responsible to the society and stakeholders.

- **Management:** Management score indicates company's approach in terms of implementing the corporate governance principals. As management rules and supervises the company, the indicators such as structure of the management, their capacity, independency and etc. are of the essence for evaluating correctly the compliance of the company to principals in relation with corporate governance.
- **Shareholders:** Shareholders score shows company's approach in terms of protecting interest and rights of shareholders, in particular minority shareholders. The equal treatment, protecting shareholders rights in an equal way and being transparent are few examples.

In light of above, with increasing awareness for the ESG concerning matters, and also because of growing interest of both investors and regulators to sustainable investment and impact finance La Torre, Mango, Cafaro, & Leo (2020) ESG score of the company is gaining more importance day by day. For having higher ESG scores companies are new implementing new policies, changing the way of doing their business, being more sensitive to social matters and invest to their employees; and adopting more transparent governance structure and protecting their stakeholders. By doing so, companies in long run benefiting from good reputation and access the financings easier than others.

SECTION TWO

LITERATURE REVIEW

The language of investment has been changed over the last two decades. Not long time ago, in 1970 Milton Friedman was describing sole goal of the business to increase its profit Friedman (2007). In fact, during the investment decision process investors were mostly taking into consideration three components which were liquidity, risk and return. However nowadays increasing amount of investor incorporate sustainability component to their investment decision process Von Wallis and Klein (2015). It is commonly accepted that sustainability could be defined as integrating the non-financial values such as social, environmental, ethical matters into investment decision. According to the Global Sustainable Investment Alliance's (2020) report, beginning of the 2020 global sustainable investment reached USD 35.3 trillion by 15% and 55% increases in last 2 year and 4 year periods respectively. This transition lead many researchers and economist to study on influence of such non-financial concern on other financial indicators.

There is an increasing trend in socially responsible investment, and there is great numbers of paper evaluating the link between the ESG score and market return. As Capelle-Blancard and Monjon (2012) points out in his paper SRI's financial performance dimension become main discussion topic for many studies, articles and news. In fact, many related investors, academic studies focus on this topic by changing samples, geography or methods, or by investigating impact of a particular pillar of the ESG on financial performance.

In this study we reviewed and summarized both type of studies first from international papers and then followed by studies that focuses on Turkish market. While overall ESG score and financial performance related studies mostly do not find a statistically

significant result, however the statistically significant results mostly seen at the studies focus on one of E, S, or G pillar, or a particular sector.

Lundin and Olandersson (2019) in their paper analyses that whether being sustainable has any impact on profitability. Their study includes 303 individual Swedish firms which are registered on the Swedish stock exchange between the years of 2006 and 2013. In relation with the sustainability performance, the study uses the environmental and social score of the companies where assessed by Folksam index. In respect of measuring the firms' financial performance ROA, ROE and RNOA financial ratios are used and also panel regression model is conducted. The result of the study demonstrates that there is no correlation between sustainability and financial indicators. Also, the study suggests that RNOA is more accurate measurement for probability rather than ROA.

Another study is conducted by Afrooz and Kruusman (2019) at Nordic countries, Sweden, Finland, Denmark and Norway which are among the top five countries in terms of the ESG ratings for the last two years. The study covers the period of 2008 – 2017, and 105 firms listed Nordic Stock Exchange have been selected as sample. The results provide evidence that there is no significant link exist between firms overall ESG score and the number of stock price movement. Again, there is no significant relationship between E score and number of stock price jump. However, results differ at country level and for individual S, and G scores. It shows that there are statistically significant relation between S and G score and number of stock price jump.

Ahlklo and Lind (2018) examine the relationship between ESG score and financial performance by measuring both market and accounting based performances. Additional to that they investigate whether score of one of the E, S and G pillar has the strongest relationship with financial performance among others. Nordic stocks have been chosen as sample for the study and three dependent variables are used which are return on assets (ROA), Tobin's q and stock returns. The results provide evidence that

there is no significant relation exist between overall ESG score and financial performance. Besides that, it has been found that the strongest relation to the financial performance has been shown by E (environmental) factor which is slightly negative and only significant to Tobin's q dependent variable.

Celik, Aktan, Tvaronaviciene, and Bengitoz (2017) focus on correlation between corporate score and stock returns and perform their analysis both at firm level and portfolio level for the time interval between 2002-2015. The t-test, FF 3- Factor model and ICAPM conducted for portfolio analysis; for firm-level analysis cross sectional regression test conducted by including the control variables of market value, price-earnings ratio and price to book ratio and beta for the firms. Results of the portfolio level analysis revealed that there is no significant correlation between company scores and stock returns; on the other hand, firm level analysis showed that stock returns could be affected with the company score, however variable that used in the cross-sectional regression would have impact on significance and direction of these effects.

Pasquini-Descomps and Sahut (2014) analyse the impact of the ESG score on stock's monthly performance in Switzerland, the US and the UK by using liner and nonlinear models. The study covers the period of 2007 - 2011. By running linear regression they found that there is no significant link between the stock's monthly market return and rating of overall ESG categories for the US and Switzerland. However, there is a slight negative relationship with the overall ESG rating for the UK. Furthermore, they tested influence of sub-categories of ESG ratings on the market return of the stocks and they found that the link between sub-categories and stock's market return is highly depend on the year and sector. Lastly, they investigate non-liner influence of the ESG score on the monthly performance of the stock for Switzerland over the five year period by applying kernel regression. The outcome shows a non-liner correlation between the ratings and market performance.

Financial performance of the socially responsible firms and conventional firms are compared in the paper of Managi, Okimoto and Matsuda (2012) by using the socially responsible investment indexes and conventional indexes in the US, the UK and Japan. The Markov switching model is used to measure performance of the firms. They found that SRI index is not statically different than conventional one. On the contrary, Statman and Glushkov (2009) assert a return advantage for socially responsible portfolios by analysing return of the stocks that rated by KLD over the period of 1992-2007.

Another paper by Balatbat, Siew and Carmichael (2012) evaluates the influence of the ESG factors on financial performance of the companies. As sample top 300 companies that listed in Australian Securities Exchange and from various sectors are used during 2008-2010 period. In the study a multi-linear regression is performed. Their findings indicate existing of a weakly positive correlation between ESG factors and financial performance; and also, weak negative link between errors in analyst forecasts and ESG scores; nevertheless two sectors which are food and beverage and travel and leisure show statistically significant results. It worth to note that authors of the paper draw attention to the sample period of this study and global financial crises covers the same period. Therefore, results could be affected from the crisis.

Breedt, Ciliberti, Gualdi and Seager (2019) evaluate that whether ESG factors could take precedence over well-known investment factors as regards measuring abnormal return. They form a world-wide market neutral portfolio which comprises the most liquid 1000 stocks of the US and Europe, the most liquid 200 stocks of Australia and Canada, and lastly the most liquid 500 stocks of Japan over the 2007 – 2017 period. They indicate that any benefit could be derived from incorporating ESG information into a portfolio had been already obtained from other well known equity factors.

De and Clayman (2015) argue whether the companies have higher ESG score amount to higher market return. Their findings revealed that there is an ex post correlation. The

companies that have higher return also generally have higher ESG rating. Furthermore, a strong negative association is found between ESG and volatility. In other words, the companies have higher ESG rating are less volatile than the weakly rated one.

Saygili, Arslan and Birkan (2021) evaluate influence of the ESG disclosures on indicators of corporate financial performance. The samples are obtained from Turkish companies listed on Istanbul Corporate Governance Index. The results of the study provide evidence that disclosures associated with environmental factor have negative impact on financial performance indicators, on the contrary governance related improvements have positive effect.

Zehir and Aybars (2020) investigate impact of the ESG score on performance of the portfolio which consist of the companies from Turkey and also Europe. The companies that have 10% both highest and lowest scores generate the top and bottom portfolios respectively, and in total eight portfolios are composed. For measuring the performance, the capital asset pricing model (CAPM) and Fama-French three-factor model are used. Results of the both models are similar and demonstrate statistically insignificant results except that top ESG and top governmental portfolios underperform and also bottom ESG and bottom governmental portfolios outperform the market excess return according to the CAMP's and three-factor model's results respectively.

Another study on Turkish market done by (Çiftçi et. al, 2019). As Turkish firms mostly have majority family owned shareholder structure, this study try to find answer to that whether there is a relationship between corporate governance and firm performance. The findings point out that family owned shareholder structure in other words ownership concentration directly affect performance of the firm.

A similar study was conducted by (Yilmaz and Buyuklu, 2016). In order to reach a conclusion regarding impact of the corporate governance on financial performance of the firm, ownership structure, board structure and financial performance had been

tested by conducting the panel data analysis. Also, return on asset, financial ratios, leverage, net sales and asset size had been used to measure the financial performance. The results were similar to the study of Çiftçi et. al (2019). Corporate governance variables have impact on financial performance. While foreign ownership has positive influence on financial performance, the share of independent board member and leverage have negative impact.

Kalash (2020) focuses on environmental dimension of ESG and investigates influence of the environmental disclosures on financial performance. 66 firms listed on Istanbul Stock Exchange are used as sample in the study and it covers the period of 2014-2018. The results provide a weak evidence to regarding correlation between environmental disclosure and financial performance of the firms.

Another study is conducted by Çıtak and Ersoy (2016), which authors analysis reaction of the investors to the announcement of the BIST 30 companies to be listed on BIST Sustainability Index by comparing with the companies listed on BIST 30 but not participated to the BIST Sustainability Index through evaluating both group companies' stock return and M/B value of equity. The results indicate that there is no significant difference between two group company's stock return. On the other hand, M/B value of equity of the companies listed on BIST Sustainability Index is significantly greater than the other group companies.

SECTION THREE

DATA AND METHODOLOGY

In this section we explained the data and method that we used for assessing whether ESG performances of the companies have any impact on stock return. In this respect, first of all we explained the data that we used for our analysis; and then we describe the method of analysing the relationship between ESG performance and stock return of the companies. Finally, we conducted a panel data regression and assessed our findings.

3.1. DATA COLLECTION

The companies listed in 2020 Borsa Istanbul Sustainability Index have been included in data set. As in 2020 fifty-eight companies have been ranked in terms of ESG score we have used these fifty eight companies' ESG score, E, S and G scores and also financial performance metrics for 5 year period beginning from the year of 2020 and counting backwards to 2016. The companies listed for 2020's Borsa Istanbul Sustainability is given in the Table 3.1.

Table 3. 1.Companies Listed in Borsa Istanbul Sustainability Index for 2020

No	Ticker	Shortened Name	No	Ticker	Shortened Name
1	AEFES	ANADOLU EFES	30	KRDMD	KARDEMIR (D)
2	AKENR	AK ENERJI	31	LOGO	LOGO YAZILIM
3	AKBNK	AKBANK	32	MGROS	MIGROS TICARET
4	AKSA	AKSA	33	NETAS	NETAS TELEKOM.

5	AKSEN	AKSA ENERJI	34	OTKAR	OTOKAR
6	ALBRK	ALBARAKA TURK	35	PETKM	PETKIM
7	AGHOL	ANADOLU GRUBU HOLDING	36	PGSUS	PEGASUS
8	ANHYT	ANADOLU HAYAT EMEK.	37	POLHO	POLISAN HOLDING
9	ANELE	ANEL ELEKTRIK	38	SAHOL	SABANCI HOLDING
10	ARCLK	ARCELIK	39	SISE	SISE CAM
11	ASELS	ASELSAN	40	SKBNK	SEKERBANK
12	AYGAZ	AYGAZ	41	SOKM	SOK MARKETLER TICARET
13	BIZIM	BIZIM MAGAZALARI	42	HALKB	T. HALK BANKASI
14	BRISA	BRISA	43	TSKB	T.S.K.B.
15	CIMSA	CIMSA	44	TATGD	TAT GIDA
16	CCOLA	COCA COLA ICECEK	45	TAVHL	TAV HAVALIMANLARI
17	DOHOL	DOGAN HOLDING	46	TKFEN	TEKFEN HOLDING
18	DOAS	DOGUS OTOMOTIV	47	TOASO	TOFAS OTO. FAB.
19	ENJSA	ENERJISA ENERJI	48	TUPRS	TUPRAS
20	ENKAI	ENKA INSAAT	49	THYAO	TURK HAVA YOLLARI
21	EREGL	EREGLI DEMIR CELIK	50	TTKOM	TURK TELEKOM
22	FROTO	FORD OTOSAN	51	TTRAK	TURK TRAKTOR
23	GARAN	GARANTI BANKASI	52	TCELL	TURKCELL
24	GLYHO	GLOBAL YAT. HOLDING	53	ULKER	ULKER BISKUVI
25	ISCTR	IS BANKASI (C)	54	VAKBN	VAKIFLAR BANKASI
26	ISDMR	ISKENDERUN DEMIR CELIK	55	VESTL	VESTEL
27	KERVT	KEREVITAS GIDA	56	VESBE	VESTEL BEYAZ ESYA
28	KCHOL	KOC HOLDING	57	YKBNK	YAPI VE KREDI BANK.
29	KORDS	KORDSA TEKNİK TEKSTİL	58	ZOREN	ZORLU ENERJI

Source: Borsa Istanbul Sustainability Index

While we were collecting the data, companies' ESG score, E, S and G scores for the year of 2021 had not been revealed yet; therefore, by considering the latest available data, we used last five years data from 2020 and counted backwards. It is important to note that as Borsa Istanbul Sustainable index had been launched in November 2014, and ESG raking and reporting is a new implementation for Turkish entities, it has been thought that first years' data may not had been more reliable. Therefore, we decided to employ only last five years' data.

The companies included in the data set operates in various business sectors, in below given Table 3.1 business sectors of the companies listed. Business sector's name have been retrieved from Refinitiv Eikon data base.

Table 3. 2. Business Sectors of Companies

No	Business Sector	Number Of Companies
1	Automobiles & Auto Parts	3
2	Banking & Investment Services	10
3	Chemicals	2
4	Consumer Goods Conglomerates	2
5	Cyclical Consumer Products	3
6	Energy & Fossil Fuels	2
7	Food & Beverages	5
8	Industrial & Commercial Services	3
9	Industrial Goods	3
10	Insurance	1
11	Investment Holding	2
12	Mineral Resources	4
13	Retailers	4
14	Software & IT Services	1
15	Technology Equipment	2
16	Telecommunications Services	2
17	Textiles & Leather Goods	1
18	Transportation	4
19	Utilities	4
	Total	58

Source: Refinitiv Eikon Database

3.2. DESCRIPTIVE STATISTIC

The dependent and independent variables descriptive statistic is submitted below in Table 3.3. Statistical Summary. As it can be seen at the below given table, mean value of the E, S, G and overall ESG scores are 56,41, 62,52, 52,07 and 58,03 respectively; and also mean of the return is 0.45. It can be also seen that mean of the ROE and ROA are 0.20 and 0.06 respectively. Lastly, mean of the MCAP is 9.879,75 and P/E is the 12.46. Moreover, where standard deviation of the E, S, G are 21,91, 20,32 and 19,98 respectively, standard deviation of the over all ESG score is 14,98. Also standard deviation of the Return is 2.18. When it is looked at the skewness values in Table 3.3., E, S, G and ESG's values and also ROE, ROA, Return and EMR values range between -0.5 and 0.05, therefore the data fairly symmetrical. On the other hand, as MCAP and P/E values are greater than 1, therefore the data are highly skewed. Since Kurtosis values of the E, S, G, ESG and EMR are less than zero, there is a platykurtic distribution. On the other hand, where other values are greater than zero there is a leptokurtic distribution.

Table 3. 3. Statistical Summary

	E	S	G	ESG	ROE	ROA	MCAP	P/E	Return	EMR
Mean	56,41	62,52	52,07	58,03	0,20	0,06	9.879,75	12,46	0,45	5,24
Standard Deviation	21,91	20,32	19,98	14,98	0,34	0,06	11.548,70	23,41	2,18	24,29
Skewness	-0,41	-0,57	-0,25	-0,51	0,45	0,31	1,63	7,96	0,45	-0,55
Kurtosis	-0,19	0,09	-0,61	-0,04	32,33	4,83	1,95	88,72	6,00	-0,63

In below given Table 3.4 it can be seen the correlation matrix for the independent variables. According to values given in below given table in general it could be said that there are low and very low positive and negative correlation between the independent variables.

Table 3. 4. Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) E	1	.34	-.023	-.009	.007	-.025	-.024	-.047	-.024
(2) S	.340	1	-.033	.494	.154	-.009	-.043	-.022	-.00
(3) G	-.023	-.033	1	-.017	-.016	-.003	.011	-.081	-.05
(4) ESG	-.009	.494	-.017	1	.188	.032	-.022	-.015	.00
(5) ROA	.007	.154	-.016	.188	1	.401	-.095	-.072	-.01
(6) ROE	-.0258	-.009	-.003	.032	.401	1	.305	-.111	.02
(7) PE	-.024	-.043	.011	-.022	-.095	.305	1	-.157	.11
(8) MKTCAP	-.047	-.022	-.081	-.015	-.072	-.111	-.157	1	.02
(9)EMR	-.024	-.00	-.05	.00	-.01	.02	.11	.02	1

3.3. DEPENDENT VARIABLE

As we are trying to answer to the question of whether ESG performance of the company has any impact on stock return, percentage return of stock of the companies were used as sole dependent variable. It is considered that year-end stock closing price could be a misleading measurement indicator, therefore percentages return of the stocks were used. The percentage returns of the companies were retrieved from the Refinitiv Eikon database.

3.4. INDEPENT VARIABLES

3.3.1. ESG Score

As we explained earlier, ESG score represents whether companies take into consideration environmental, social and governance related matters during their operations.

The companies that volunteer to be included in Borsa Istanbul Sustainability index are required to meet at least below indicated scores, namely;

- Minimum 50 for ESG Combined Score
- Minimum 40 for each pillar score (environment, social and governance)
- Minimum 26 at least for eight categories out of ten

Our data set comprises the companies that listed in Borsa Istanbul Sustainability Index in 2020 and their last five years data which is beginning from the year of 2020. The data related with the ESG score, Environment pillar (E) score, Social pillar (S) score and Governance pillar (G) score were retrieved from Refinitiv Eikon database. In this study ESG score and E, S and G pillars scores were separately used as independent variable in order to assess not only the overall ESG scores impact on stock return and also evaluate the effect of each E, S and G pillar's scores.

3.3.2. Ratios for Measuring Financial Performance

In order to assess financial performance, we employed a range of financial ratios to measure financial performance of the companies in terms of accounting-based profitability and market-based equity valuation. The financial ratios we use in this study have been chosen based on extant literatures. Additionally, to have more accurate assessment and findings we have used four financial indicators which we consider they have impact on stock return.

Two accounting-based ratios have been employed to assess the profitability namely:

- Return on equity (ROE), and
- Return on asset (ROA)

Two financial indicators have been used for market-based valuation are as follows,

- Market capitalisation (MCAP), and
- Price to earnings (P/E).

3.3.2.1 Return on Assets (ROA)

Return on assets (ROA) is one of the most common used financial indicators for accounting financial performance. ROA measures efficiency of the company to use its own assets to make profit. In other words, it indicates how company is profitable relative to its total assets (Hargrave (2019) as cited in Afrooz & Kruusman, 2019). There is a significant number of studies that used ROA as an indicator to measure financial performance of the company (Afrooz & Kruusman, 2019; Ahlklo & Lind, 2018; Balatbat, Siew & Carmichael, 2012; Keçeli and Çankaya, 2020; Lundin & Olandersson, 2019; Muhammad, Scrimgeour, Reddy, and Abidin, 2015; Şeker, 2020). In this study, we retrieved the ROA ratio of the companies for the time interval 2020-2016 from Refinitiv Eikon database. ROA ratio could be calculated with the following formula, namely:

$$\text{ROA} = \frac{\text{Net Income}}{\text{Avg. Total Assets}}$$

3.3.2.2 Return on Equity (ROE)

Besides common usage of ROA, return on equity is also equally employed ratio for measuring the financial profitability of the company. ROE represents amount of profit

the company generates from the cash invested by its shareholders. A substantial number of scholars have used ROE ratio in their studies for assessing the financial performance of the companies (Afrooz & Kruusman, 2019; Balatbat, Siew & Carmichael, 2012; Keçeli and Çankaya, 2020; Lundin & Olandersson, 2019).

As ROE ratio is considered while making investment, we believe ROE has an impact on stock return. Refinitiv Eikon platform has been used to collect ROE ratios for our dataset for the time interval 2020-2016. ROE ratio could be calculated with the following formula, namely:

$$\text{ROE} = \frac{\text{Net Income}}{\text{Shareholders' Equity}}$$

3.3.2.3 Price to Earnings Ratio

Price to earnings ratio is a metric to measure company's share price relative to its earning per share. P/E ratio is one of the common used ratios for measuring company's performance in terms of equity valuation. In many studies it is one of the widely used ratios to measure companys' market based performance (Celik, Aktan, Tvaronaviciene, & Bengitoz, 2017; Balatbat, Siew & Carmichael, 2012; Keçeli and Çankaya, 2020).

As P/E ratio indicates whether companies' stock overvalued or expected to be increase, it is taken into consideration during the investment decision. Thus, we consider P/E ratio has impact on the stock return. The P/E ratio of the companies selected for this study, have been derived from Refinitiv Eikon platform for a five year period between 2020-2016. P/E ratio could be calculated with the following formula namely;

$$P/E = \frac{\text{Share price}}{\text{Earnings Per Share}}$$

3.3.2.4 Market capitalisation (MCAP)

Market capitalization is a common financial metric to indicate size of the company. It represents total market value of the company's outstanding shares. As MCAP is one of the metric to measure size of company and determine market value of the company through price of the per outstanding share it is used by investor and along with scholars (Afrooz & Kruusman, 2019; Keçeli and Çankaya, 2020). MCAP data has been collected from Refinitiv Eikon platform for the companies included in our list for this study. Data collected for a five year period beginning from 2020 and counted backwards. MCAP is calculated with the following formula, namely;

Market Capitalization=Current share price ×Total number of outstanding shares

3.3.2.5 Excess Market Return

To take into account the effect of market shocks on the stock returns, we have included excess market return in our estimation as a control variable. Excess market return is calculated by subtracting 10-year government bond yield from Bist100 annual return.

3.5. PANEL DATA ANALYSIS

In this study as research methodology we have used panel data analysis. Panel data could be defined as data set that comprises multiple observation on each sampling unit and cross-sectional data is generated by pooling time-series observations (Baltagi, 1998).

With panel data it is not only possible to test advance and more complex behavioural models without having lots of assumptions, but also it enables to study on sophisticated dynamic issues and ensures to obtain more reliable estimates (Baltagi, 1998).

Our data comprises cross-sectional data of the five years. Thus, we have used panel data models. In our dataset there was randomly missing ESG scores and few financial data, and therefore the panel was unbalanced. Where uncomplete panel is accepted like a norm in economic empirical settings (Baltagi, 2008) fixed and random effect models could be run to the unbalanced panel data with small adjustments (Cameron & Trivedi, 2005, p. 739, as cited in Lundin & Olandersson, 2019) which is made automatically by Eviews, the program that we used to run our panel data analysis. In order to determine whether fixed effect model or random effect model was appropriate for our panel data we conducted Correlated Random Effects -Hausman Test via Eviews program.

3.3.1. Regression Models and Findings

In order to find out whether ESG performance has any impact on stock return we have estimated the below given formula. While we have used percentage return of the stock as a dependent variable; the ESG score, ROE, ROA, P/E and MCAP have been used as independent variables, the EMR has been used as control variable.

Our panel data regression model is as follows:

$$Y = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \beta_6 X_{6it} + \mu_{it}$$

Where,

Y: Dependent variable, annual change percentage of the stock return of the companies.

α : Constant

$\beta_1 X_{1it}$: First independent variable which is ESG scores of the companies.

$\beta_2 X_{2it}$: Second independent variable, which is ROE data of the companies.

$\beta_3 X_{3it}$: Third independent variable which is ROA data of the companies

$\beta_4 X_{4it}$: Fourth independent variable which is MCAP data of the companies.

$\beta_5 X_{5it}$: Fifth independent variable, P/E data of the companies.

$\beta_6 X_{6it}$: Excess Market Return

μ_{it} : Error term.

To determine the appropriate model for our panel data analysis we have conducted Correlated Random Effects- Hausman Test. Since the p-value is 0.0586 and less than 10% null hypothesis is rejected and fixed effect regression model is appropriate for our panel data.

Table 3. 5. Correlated Random Effects – Hausman Test

Correlated Random Effects- Hausman Test			
Test Summary	Chi-sq Statistic	Chi-Sq.d.f.	Prob.
Cross-section random	12.156458	6	0.0586

Table 3. 6. Fixed Effect Regression Model

Variable	Coefficient	Std. Error	t-Statistic	Prob
C	0.206519	0.162245	1.272879	0.2049
ESG	-0.001263	0.002471	-0.511119	0.6100
ROA	3.428.502	0.716248	4.786751	0.0000
ROE	-0.131297	0.108523	-1.209850	0.2281
PE	0.004492	0.002538	1.769877	0.0786
Mcap	-4.06E-06	3.01E-06	-1.350132	0.1789
EMR	0.012364	0.001270	9.73193	0.0000
Weighted Statistic				
R-squared	0.428882		Fstatistic	20.27566
Adjusted R-squared	0.407729		Prob(F-statistic)	0.000000

The output of our Fixed Effect Regression Model could be seen in table 3.6. Accordingly, 5 years and 53 companies and 169 observations are included into the analysis. Since p-value of the ESG is above the 0,1 it is statistically insignificant. In the model ROA and P/E independent variables' p-values are less than 0.1 and statistically significant.

We used above given equation only by replacing ESG independent variable with E, S and G independent variables and also keeping ROE, ROA, P/E and MCAP as independent variables and EMR as control variable. Accordingly, we used the following formula:

$$Y = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \beta_6 X_{6it} + \beta_7 X_{7it} + \beta_8 X_{8it} + \mu_{it}$$

Table 3. 7. Correlated Random Effects – Hausman Test

<u>Correlated Random Effects- Hausman Test</u>			
<u>Test Summary</u>	<u>Chi-sq Statisti</u>	<u>Chi-Sq.d.f.</u>	<u>Prob.</u>
<u>Cross-section random</u>	9.170555	8	0.3281

We have applied Correlated Random Effects -Hausman Test in order to identify whether fixed effect regression model or random effect regression model is appropriate for our panel data. As Table 3.7. shows, since the p-value is more than 0.10 which is 0.32 null hypothesis is accepted and random effect model is the appropriate model for our panel data regression.

Table 3. 8. Random Effect Regression Model

Variable	Coefficient	Std. Error	t-Statistic	Prob
C	0.161505	0.158734	1.107.452	0.0059
E	-0.006048	0.002328	-2.597709	0.0102
S	0.003717	0.002417	1.537.803	0.1260
G	0.001261	0.001929	0.653723	0.5142
ROA	3.405168	0.734495	4.636.067	0.0000
ROE	-0.131075	0.109290	-1.199325	0.2322
PE	0.003742	0.002608	1.424.885	0.1532
MCAP	-2.88E-06	2.96E-06	-0.972514	0.3322
EMR	0.012587	0.001285	9.795.922	0.0000
Weighted Statistic				
R-squared	0.450608		Fstatistic	16.60891
Adjusted R-sq	0.423477		Prob(F-statistic)	0.000000

Our test result is including 5-year period, 53 companies, 171 observations. Percentage return of the stock is dependent variable; and independent variables are E, S and G scores and also ROE, P/E, ROA and MCAP. While E independent variable's p value is less than 0.1 which is 0.01 it is statically significant, on the other hand S and G independent variables' p values (0.1260 and 0.5142 respectively) are greater than 0.10 at 10% significance level and therefore S and G independent variables are not significant. Again, ROA independent variable's p value is less than 0.1 and statistically significant.

We designed another equation by using ESG score and accounting base performance measurement independent variables which are ROA and ROE in order to see the interaction between ESG performance and stock return. In this respect we designed the below given formula, namely:

$$Y = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \mu_{it}$$

Where,

Y: Dependent variable, annual change percentage of the stock return of the companies.

α : Constant

$\beta_1 X_{1it}$: First independent variable which is ESG scores of the companies.

$\beta_2 X_{2it}$: Second independent variable, which is ROE data of the companies.

$\beta_3 X_{3it}$: Third independent variable which is ROA data of the companies

$\beta_4 X_{4it}$: Excess Market Return

μ_{it} : Error term.

We have applied Correlated Random Effects -Hausman Test in order to identify whether fixed effect regression model or random effect regression model is appropriate for our panel data. As Table 3.9. shows, since the p-value is greater than 0.10 which is 0.1437 null hypothesis is accepted and random effect model is the appropriate model for our panel data regression.

Table 3. 9. Correlated Random Effects – Hausman Test

Correlated Random Effects- Hausman Test			
Test Summary	Chi-sq Statisti	Chi-Sq.d.f.	Prob.
Cross-section random	6.855382	4	0.1437

Table 3. 10. Random Effect Regression Model

Variable	Coefficient	Std. Error	t-Statistic	Prob
C	0.441983	0.129689	3.408.012	0.0008
ESG	-0.004151	0.002142	-1.938128	0.0541
ROA	2.034561	0.537694	3.783.864	0.0002
ROE	-0.130028	0.074005	-1757007	0.0806
EMR	0.012410	0.001298	9.557.190	0.0000
Weighted Statistic				
R-squared	0.372409		Fstatistic	2.759.286
Adjusted R-squared	0.358913		Prob(F-statistic)	0.000000

Our test result is including 5-year period, 57 companies, 191 observations. Percentage return of the stock is dependent variable; and independent variables are ESG score and also ROA and ROE. Since ESG independent variable's p value (0.0541) is less than 0.10 at 10% significance level ESG independent variable is statistically significant. Again, ROA and ROE p-values are 0.0002 and 0.0806 respectively which are less than 0.10 and statistically significant at 0.10 significance level.

We used above given equation by replacing only ESG independent variable with E, S and G independent variables and also keeping accounting base performance indicators ROE and ROA as independent variables and also included EMR as control variable. Accordingly, we used the following formula:

$$Y = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \beta_6 X_{6it} + \mu_{it}$$

We have applied Correlated Random Effects -Hausman Test in order to identify whether fixed effect regression model or random effect regression model is appropriate for our panel data. As Table 3.11. shows, since the p-value is greater than 0.10 which is 0.2483 null hypothesis is accepted and random effect model is the appropriate model for our panel data regression.

Table 3. 11. Correlated Random Effects – Hausman Test

Correlated Random Effects- Hausman Test			
Test Summary	Chi-sq Statisti	Chi-Sq.d.f.	Prob.
Cross-section random	7.862726	6	0.2483

Table 3. 12. Random Effect Regression Model

Variable	Coefficient	Std. Error	t-Statistic	Prob
C	0.395705	0.128104	3.088.940	0.0023
E	-0.004054	0.001995	-2.031829	0.0436
S	0.000384	0.002084	0.184313	0.8540
G	0.000203	0.001654	0.122666	0.9025
ROA	2.031.173	0.544023	3.733.615	0.0003
ROE	-0.132524	0.074354	-1.782347	0.0763
EMR	0.012534	0.001290	9.717.727	0.0000
Weighted Statistic				
R-squared	0.387473		Fstatistic	1.960.999
Adjusted R-squared	0.367714		Prob(F-statistic)	0.000000

Our test result is including 5-year period, 57 companies, 193 observations. Percentage return of the stock is dependent variable; and independent variables are E, S and G scores and also ROA and ROE. Where E independent variables' p value is 0.0436 and less than 0.1, it is statistically significant. On the other hand, S and G independent variables' p values (0.8540 and 0.9025 respectively) are greater than 0.10 at 10% significance level, so that S, and G independent variables are not significant. Also, ROA and ROE independent variables' p-values are 0.0003 and 0.0763 respectively which are less than 0.10 and statistically significant at 0.10 significance level.

We designed another equation by using ESG score and market-based performance measurement independent variables which are P/E and MCAP in order to see the interaction between ESG performance and stock return. In this respect we designed the below given formula, namely:

$$Y = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \mu_{it}$$

Where,

Y: Dependent variable, annual change percentage of the stock return of the companies.

α : Constant

$\beta_1 X_{1it}$: First independent variable which is ESG scores of the companies.

$\beta_2 X_{2it}$: Second independent variable, which is P/E data of the companies.

$\beta_3 X_{3it}$: Third independent variable which is MCAP data of the companies

$\beta_4 X_{4it}$: Excess Market Return

μ_{it} : Error term.

We have applied Correlated Random Effects -Hausman Test in order to identify whether fixed effect regression model or random effect regression model is appropriate for our panel data. As Table 3.13. indicates, since the p-value is less than 0.10 which is 0.0076 null hypothesis is rejected and fixed effect model is the appropriate model for our panel data regression.

Table 3. 13. Correlated Random Effects – Hausman Test

Correlated Random Effects- Hausman Test			
Test Summary	Chi-sq Statisti	Chi-Sq.d.f.	Prob.
Cross-section random	13.892.932	4	0.0076

Table 3. 14. Fixed Effect Regression Model

Variable	Coefficient	Std. Error	t-Statistic	Prob
C	0.477022	0.159803	2.985.067	0.0033
ESG	-0.002003	0.002598	-0.771068	0.4418
PE	0.001684	0.002291	0.735105	0.4633
Mcap	-4.64E-06	3.17E-06	-1.464866	0.1449
EMR	0.012644	0.001310	9.649.295	0.0000
Weighted Statistic				
R-squared	0.351128		Fstatistic	2.232.185
Adjusted R-squared	0.335398		Prob(F-statistic)	0.000000

Our test result is including 5-year period, 53 companies, 170 observations. Percentage return of the stock is dependent variable; and independent variables are

ESG score and also P/E and MCAP. Since ESG independent variable's p value (0.4418) is higher than 0.10 at 10% significance level ESG is statistically insignificant. Again, MCAP and PE p-values are also greater than 10% which means they are also statistically insignificant at 0.10 significance level.

We used above given equation only by replacing ESG independent variable with E, S and G independent variables and also keeping market base performance indicators P/E and MCAP as independent variables. Accordingly, we used the following formula:

$$Y = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \beta_6 X_{6it} + \mu_{it}$$

We have applied Correlated Random Effects -Hausman Test in order to identify whether fixed effect regression model or random effect regression model is appropriate for our panel data. As Table 3.15. indicates, since the p-value is greater than 0.10 which is 0.1058 null hypothesis is accepted and random effect model is the appropriate model for our panel data regression.

Table 3. 15. Correlated Random Effects – Hausman Test

<u>Correlated Random Effects- Hausman Test</u>			
<u>Test Summary</u>	<u>Chi-sq Statisti</u>	<u>Chi-Sq.d.f.</u>	<u>Prob.</u>
Cross-section random	10.482.148	6	0.1058

Table 3. 16. Random Effect Regression Model

Variable	Coefficient	Std. Error	t-Statistic	Prob
C	0.3864486	0.158844	2.433.117	0.0160
E	-0.005855	0.002455	-2.384425	0.0182
S	0.002222	0.002521	0.881234	0.3795
G	0.002882	0.001996	1.444.349	0.1505
PE	0.000681	0.002330	0.292329	0.7704
Mcap	-3.36E-06	3.12E-06	-1.074878	0.2840
EMR	0.012938	0.001323	9.777.763	0.0000
Weighted Statistic				
R-squared	0.377913		Fstatistic	1.670.605
Adjusted R-square	0.355292		Prob(F-statistic)	0.000000

Our test result is including 5-year period, 53 companies, 172 observations. Percentage return of the stock is dependent variable; and independent variables are E, S and G scores and also P/E and MCAP. Only E independent variable p value (0.0182) is less than 0.10 at 10% significance level and statistically significant. However, S and G independent variables' p values are greater than 0.10 and therefore insignificant. On the other hand, P/E and MCAP p-values are 0.7704 and 0.2840 respectively which are greater than 0.10 and statistically insignificant at 0.10 significance level.

CONCLUSION

It may not be wrong to say that it is a transition period, business world is standing up at the edge of the new world which all business strategy and structure will be shaped according to the ESG related concerns.

Sustainability and responsible investment, sustainable development and ESG related risk analysis are not only today's business world's jargon; it also lies at the heart of the society. It became widespread that the society protest against companies' activities or products where companies do not concern regarding the environmental or social matters. Again, financial institutions, asset managements, investors do not willing to finance or invest in the activities where the companies do not take into consideration the sustainability. While these developments lead the companies to act in a socially responsible manner and take ESG related matters into consideration at each stage of the doing their business, it also raises the question of whether investing or doing business by taking ESG related issues reflect to the figures of the companies. That conduces scholars, academicians, investors and financiers towards evaluating the ESG matter in different aspects.

In this study we analysed that whether ESG performance of the companies have any impact on their stock return. For doing that, as sample we used companies listed in year 2020 in Borsa Istanbul Sustainability Index and their five-year data which is beginning from year 2020 and counting backwards. A panel data analysis has been conducted. In our estimation we have used percentage return of the stocks as dependent variable, ESG, E, S and G scores and also ROE, ROA, P/E and MCAP as independent variables, the EMR as control variable. To determine whether fixed effect model or random effect model is appropriate to our panel data we have conducted Correlated Random Effects-Hausman Tests. In accordance with the test results we have tested our equations with appropriate model.

We conduct test for six estimations. While in the first one we have used ESG score, ROE, ROA, P/E and MCAP indicators as independent variables, in second one we performed test by replacing ESG score and using E, S, and G independent variables along with other financial indicators. In third and fourth tests, we used ESG score and account base performance measurement indicators which are ROE and ROA as independent variables, following that we used E, S, and G scores instead of ESG score and retest the model along with the other two indicators. We used market-based performance indicators which are P/E and MCAP as independent variables along with ESG score and then replaced ESG with E, S, and G independent variables for our fifth and sixth tests. In all estimations we have included EMR as control variable.

Our panel data regression results indicated that the relationship between stock return and ESG is statistically insignificant at 0.10 significance level except the test that we conduct by using ESG score and accounting base performance measurements indicators (ROA and ROE). At this test ESG p value (0.0541) is less than 0.10 and at 10% significance level significant. Moreover, E pillar is significant in the tests where it is used as independent variable. On the other hand, since p value of the S and G scores are greater than 0.10, they are statistically insignificant. Besides that, all in our tests p value of the ROA is less than 0.10 and statistically significant at 10% significance level. If we look at accounting base performance indicators' correlation with stock return, both ROA and ROE p-values significant at the tests that we used accounting base indicators along with ESG and also E, S, and G, without including P/E and MCAP data.

Regardless of the results, we would like to emphasis that even sustainable development and ESG related matters are today's hot topics and increasingly becoming more and more important, still it is a new area for Turkish market and open for improvements. Since most of measurements have been taken in terms of ESG are more likely for the reporting purposes. We believe that there are some fundamental developments which

will force companies to change their mind and the way of doing business concerning with the ESG. These developments are that Turkey ratified Paris Agreement and to be able to fulfil its commitment under the Paris Agreement, the regulations will be amended and implemented in this respect. Besides, like international finance institutions, Turkish banks also promote the sustainable investments and do not finance the environmentally hazardous project, trades, etc. Again, foreign investors evaluate companies not only with their financial indicators but also measure in terms of their ESG performance. Lastly, society has power to use on companies either negative or positive in accordance with their ESG concerning behaviours.

We believe these improvements will lead increase in the number of the companies to be included in sustainability index and developments at ESG related implementations. And that might in long run have impact on stock return. Therefore, further analyses should be performed on that topic to have more reliable results.

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