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# **The relationship between the ESG criteria and the financial performance of a company**

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I hereby declare that the work submitted is mine and that where I have made use of another's work, I have attributed the source(s) according to the Regulations set in the Student's Handbook.

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## **Abstract**

This dissertation was written as part of the MSc in Banking & Finance at the International Hellenic University.

This paper presents the impact of ESG (environmental, social, and governance) criteria on the financial performance of the large-capitalization companies listed in the S&P500. ESG scores are derived from Yahoo Finance for the years 2017 to 2020, while the financial performance is measured by the year-over-year change in revenues. The results show that there is a positive correlation only between the governance pillar and the financial performance. It is proved that there is a negative correlation between the financial performance and both ESG criteria and the Environmental Factor, while there is no relation at all between the financial performance and the social pillar.

**Keywords:** Environmental, Social, Governance, ESG, financial performance

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# **1. Introduction**

## **1.1 Background**

In recent years, environmental, social and governance issues have become increasingly important in society, since the sustainable responsibility of large firms is increasing (Robèrt et al., 2017). More and more investors are looking to invest in companies that are not only financially profitable but also sustainable in the long term for society. According to Robèrt et al. (2013), companies that have delayed implementing sustainable actions in their operations tend to have lost market value and share in contrary to other companies which offer sustainable solutions.

For these reasons, companies have started using the ESG criteria, which provide useful information to stakeholders about the sustainability of the company. In particular, ESG criteria consist of three pillars: the Environmental Pillar, the Social Pillar, and the Governance Pillar.

According to Clark et al. (2015), the Environmental Pillar describes the impacts of companies' operations on the environment, such as pollution, the use of natural resources, or CO2 emissions. The Social Pillar describes the relationship of companies with the society, which includes both internal (customers, employees, shareholders) and external (suppliers, government) factors. The Governance Pillar describes the corporate governance of the company. This aspect consists of the independence of the board of directors, the relationship with shareholders or the CEO.

## **1.2 Problem Discussion**

Over the years, ESG has become more popular and useful for stakeholders and more and more companies have started recording this kind of information. This situation has caused the need for investigation upon the context of ESG in order for companies, managers, and shareholders to have a clear view of what ESG can provide to them. For this purpose, there are several studies that are trying to explain the relationship between ESG and the company's financial performance.

For example, Arlow et al. (1982) examined the corporate social responsiveness in relation to the economic performance of a firm. They based their research on factors such as the organizational size, the relevance of a social issue, and several industry characteristics, but the results were vague. Brammer et al. (2006) tested the relation between corporate social



performance and the stock returns, using data from the United Kingdom and indicators such as environment, employment, and community activities. They found that there is a negative relationship between the social and financial performance of companies.

Then, Velte (2017) tried to indicate the relationship between the financial performance of the firm and the ESG criteria both in total terms and in terms of dividends. He used both accounted-based and market-based variables in the model for the financial performance in order to investigate the link of ESG-Financial Performance in the listing German firms, using information from 2010-2014. He found that both in total terms and each component of ESG, has a positive impact on the accounting financial performance, with the governance pillar being the strongest among all.

According to the above information, it is interesting to further investigate the relationship between the ESG criteria and the financial performance of companies.

### **1.3 Purpose and research questions**

The purpose of this dissertation is to identify if there is a positive, negative, or no relationship between the ESG criteria and the financial performance of the large-capitalization companies which operate in the S&P500.

### **1.4 Structure of the thesis**

The part of the theoretical framework provides the reader with significant information for the understanding of the context of this study and connects it with the existing literature, which is referring to the relationship of ESG criteria with the financial performance of a company.

The next part of the thesis describes thoroughly the method of analysis that has been used, the construction of the dataset, and the selection of the variables in order the whole procedure and the models used to be understandable for the reader.

In the results and analysis chapter, there is a description and comments of the results exported from the statistical procedure. This part will connect the theory with the practical results in order to come to some conclusions.

The final chapter contains the conclusions from all the other chapters, some eliminations that this thesis contains, and also some recommendations and future possibilities for extra analysis in the future. Also, this chapter highlights the contribution of this analysis to the specific field of study.

## **2. Theoretical Framework**

### **2.1 CSR**

Corporate Social Responsibility (CSR) is an upcoming issue that more and more companies have to include in their strategy. CSR refers to all the actions, strategies, and activities that a company tries to implement in its everyday operations in order to be sure that all of them are in line with the company's corporate governance procedures. Those operations and procedures are referred to as ethical and beneficial operations for the whole society.

Turner et al., (2019) supported that CSR indicates the company's obligation to internal and external stakeholders, such as the society and the whole community in which the company operates. Corporate Social Responsibility is referring to the incorporation of environmental, social, and governance concerns into companies' operations and the information they share with their stakeholders (European Commission, 2001). This is achieved through the recording of sustainability reports. Those reports can be separated into reports which stand-alone or even integrated into the classic annual reports that all companies announce (Mikołajek-Gocejna, 2018).

There are four categories of CSR which are the company's environmental responsibility, Human rights responsibility, Philanthropic responsibility, and Economic responsibility. Companies that have decided to incorporate CSR in their operations reap great profits, such as stronger brand image and reputation, increased sales, or easier access to funding.

### **2.2 ESG Criteria**

One important goal of companies is to boost their investments and the way to succeed in that is by implementing environmental, social, and governance inputs. (Mikołajek-Gocejna, 2018).

The ESG criteria refer to environmental, social, and corporate governance factors that provide useful information for companies in terms of investing. The Environmental criteria refer to the repercussions of a company's activities to the environment, either directly or indirectly, such as pollution, the use of natural resources, or CO2 emissions. The Social criteria refer to the social community of a company and the effects that its operations have on it. For example, the relationship of companies with society, which includes both internal (customers, employees, shareholders) and external (suppliers, government) factors belong to the social pillar. The governance criteria refer to the corporate governance of a company, such as the independence, diversity, or the composition of the board of directors, the relationship with shareholders or the CEO, or even its policies according to public information.

The ESG scores of companies are estimated by third parties in order to ensure an unbiased and credible way of estimation. All the criteria are estimated through multiple estimations and measurements, and they constitute a total rating for each company (Mikołajek-Gocejna, 2018).

### **2.2.1 Environmental criteria & Corporate Performance**

Many studies have proved that the implementation of environmental practices can bring to companies a higher level of financial performance. For example, higher environmental ratings, the reduction of pollution levels, the implementation of waste prevention measures are proved to be only some of the factors that can provide companies with higher performance. There are some eco-friendly companies that support the exact result, by recording higher return-on-assets (ROA), which measures the financial performance of companies. According to Konar et al. (2001), a 10% reduction in emissions of toxic chemicals can provide a company with a \$34 million increase in its market value.

On the other hand, companies must deal with practices that negatively affect their performance. Companies that release toxic chemicals by their operations or have carbon emissions or even environmental lawsuits, see their businesses experience a significant decline in their value, a fact that definitely should be diminished.

### **2.2.2 Social criteria & Corporate Performance**

The social dimension of sustainability can provide companies with higher performance in cases that it is correctly used. In general, it describes the relationships between employees, customers, and the community.

Rogers et al. (2013) highlighted that the social indicators of sustainability are poverty levels, gender equality, nutrition measurements, child mortality, sanitation levels, and measurements of health, education, housing, crime, population, and employment. In addition, Calantonio et al. (2009) have used the term social sustainability to describe ten dimensions: demographic change, education and skills, employment, health and safety, housing and environmental health, identity, sense of place and culture, participation, empowerment, and access, social capital, social mixing and cohesion and well-being, happiness, and quality of life.

### **2.2.3 Governance criteria & Corporate Performance**

According to the research, good corporate governance can lead to better firm valuation, while companies with poor governance have lower levels of performance. Yermack (1995) highlighted that companies characterized by large boards seem to use their assets less efficiently. Also, there are studies that support that a smaller and more transparent structure in the board can provide a company with increased firm value, while evenly spaced structures may lead to lower firm value.

Another factor that can affect positively the firm performance is the executive compensation practices. In cases that the compensation is appropriate, there are many chances for enhancing the financial performance. For example, practices designed to motivate the managers without taking excessive risk are possible to increase the firm value, while cases characterized by higher executive pay are to be able to bring the opposite results.

### **2.3 Literature Review**

During the last years, there have been many studies trying to identify if there is any relationship between the ESG criteria and the financial performance of a firm and which is this relationship. The majority of those studies indicate that there is a positive relationship between ESG criteria and financial performance, but there are also some others who support that there is a negative relationship between them, or the results are not significant.

Velte (2017) tried to indicate the relationship between the financial performance of the firm and the ESG criteria both in total terms and in terms of dividends. He used both accounted-based and market-based variables in the model for the financial performance in order to investigate the link of ESG-Financial Performance in the listing German firms, using information from 2010-2014. He found that both in total terms and each component of ESG as well has a positive impact on the accounting financial performance, with the governance pillar to be the strongest among all.

Alareeni and Hamdan (2020) tried to analyze the impact of ESG on firm performance. They found that high assets and financial leverage led to higher ESG and CSR results, while high ESG and CSR provide higher financial performance. Also, they highlighted that firms' market performance is better when they have lower ESG and CSR scores.

Batten et al. (2020) analyzed if the ESG criteria can add value to firms. For this study, Malaysian firms were used for the period from 2005-2018 and the results indicated that the presence of ESG can reduce the cost of capital of firms while it can increase Tobin's Q at the

same time. In particular, the researchers found that, on average, the reduction of cost of capital was at 1,2%, while the increase in Tobin's Q was at 31,9%. Also, they highlighted the benefits of the positive impact of ESG for stakeholders or possible investors and they suggested that regulators should take into consideration the mandatory implementation of ESG practices as a policy tool.

Yoo and Managi (2021) analyzed the impact of ESG rating in the financial performance by using Bloomberg scores for media disclosure and transparency of ESG actions according to published reports and MSCI scores for actions combining company-disclosed and third-party sources. They found that media disclosure is important for profits while the action is important for long-term financial performance. They supported that publishing reports and information would be a good solution for short-term profits while pro-ESG actions would also work for companies that focus on long-term profitability.

Gillan et al. (2021) created a review of ESG and CSR in corporate finance. The strongest result of this review was that a company's ESG profile is significantly related to the company's market, other elements such as risk, performance, and value need further research since there are still conflicting hypotheses and questions that have not been answered yet.

Kuo et al. (2021) analyzed if the presence of social responsibility practices can improve financial performance. In this study, the researchers used the short-term financial performance of 30 airlines across the world with 5-year data from the Thomson Reuters Eikon database in order to estimate the environmental, social, and governance indicators of performance. For this purpose, they used a multilevel quadratic growth model and they found that initially the implementation of ESG practices, led the companies to a declining ROA, which was increased after a specific period of its implementation. These results led to the conclusion that companies and airlines, should prioritize the selection of possible key performance indicators during the implementation of CSR.

Apart from the above literature, some other studies provide different results. This means that although the majority of the existing literature supports that there is a positive relationship between ESG information and the financial performance of companies, there are also some studies that highlight that there is a negative relationship between them or vague or no relationship at all.

Vance (1975) observed the link between social responsibility and corporate market performance. His study found a strong negative relationship between them. Arlow and Gannon (1982) examined the corporate social responsiveness concerning the economic performance of a firm. They based their research on factors such as the organizational size, the relevance

of a social issue, and several industry characteristics, but the results were vague. Hermalin & Weisbach (1991) examined the relationship between top management compensation and corporate performance, using data from the public utilities. Unlike most literature, they concluded that the composition of the board of directors (independent members) has no impact on financial performance.

Filbeck & Gorman (2004) analyzed the relationship between the environmental performance and the financial performance of the firms, using data from the Investor Responsibility Research Center for the electric utilities. Contrary to previous studies, they found that there is not a positive relationship between period returns and the environmental performance of a firm and also that regulatory climate does not appear to be able to explain the returns. They supported that although there are no clear conclusions about the relationship between the regulatory climate and the environmental performance of companies, there is evidence of their negative relation.

Brammer et al. (2006) tested the relation between corporate social performance and the stock returns, using data from the United Kingdom and indicators such as environment, employment, and community activities. They found that there is a negative relationship between the social and financial performance of companies. Also, Brammer & Millington (2008) analyzed the relationship between social and financial performance, using the context of corporate charitable giving. They found that companies with unusually high and low corporate social performance led to better financial performance in contrary to other firms, with high CSP to perform better in the short term, while low CSP to perform better in the long term.

Scholtens & Zhou (2008) analyzed if there is any relation between the performance of shareholders and the stakeholders' relations. They used community involvement, corporate governance, employee relations, environmental conduct, diversity of workforce, and human rights policies and they found that there is a negative, but a not significant, relationship for a panel of 289 American companies over 14 years between certain social activities and market financial performance.

Horváthová (2012) tested if there are effects of the environmental performance of a firm to its financial performance, using data from the Czech Republic. They found that the effect of environmental performance on financial performance becomes positive after two years, the effect after one year being negative.

Landi et al. (2019) investigated the relationship between the CSR performance of Italian listed firms with their financial performance, using the ESG criteria and abnormal returns. They

found that there is no statistically significant evidence of ESG criteria on Italian Blue Chips' abnormal returns. Also, they indicated that well-performing companies are not willing to invest in ESG and CSR.

Nirino et al. (2020) tried to explain the impact of corporate controversies on the financial performance of companies and proposed the positive moderating role of ESG practices. They used 356 listed companies from Europe and linear regression models which proved that there is a negative and significant association between the financial performance and corporate controversies. The study highlighted the negative consequences of controversies and indicated that ESG practices are vital for shareholders, although there were not found any mitigating effects of ESG practices in the relationship of financial performance and controversies.

Finally, Shakil (2021) analyzed the repercussions of environmental, social, and governance performance on oil and gas companies' financial risk and examined the moderating effect of ESG controversies and board gender diversity. The researcher used 70 international oil and gas firms with data from 2010 to 2018 and applied a two-stage least squares panel regression analysis. He found that board gender diversity adversely affects the total and systematic risk, with the lack of women participation on board and ESG controversies to moderate the association between ESG and financial risk.

## **3. Method**

### **3.1 Method choice**

For this thesis, the main objective is to collect data and perform statistical research in order to determine the kind of relationship between the ESG criteria and the financial performance of the selected companies. This kind of research assumes the collection of a dataset in order to perform some tests with particular models, aiming to find out some relation between selected variables. The selected dataset needs to be reliable, making the consideration of variables and data design a critical matter (Martella & Martella, 1999).

In order to have a reliable dataset that will lead to significant results, it is vital to collect a large amount of numerical data. The method which is able to provide the above is the quantitative one. In addition to the above, the selected method is based also on previous studies within the same context. In general, the goal is to collect large amounts of historical data, in order to find a significant explanation of the relationship between the selected variables.

### **3.2 Data design**

#### **3.2.1 Data collection**

This thesis will use secondary data which are collected from Yahoo Finance. In this way of data collection, it is ensured that the data are presented in a standardized form and at the same time they are not biased, as it may be if there were collected through the financial and sustainability reports of each firm (Ghauri & Gronhaug, 2010).

#### **3.2.2 Data reduction**

The initial dataset from Yahoo Finance included all the companies which operate in the S&P500. This thesis focuses only on the large-capitalization companies, so the first elimination of the data was about the companies that are not considered as large-capitalization companies. The number of the large-capitalization companies was adequate, but not all of them had ESG information for the selected timespan. The next elimination of the data occurred in order to have all the large-capitalization companies of S&P500 which have records of ESG information. Finally, after those eliminations, 200 companies were left for analysis. Those companies belong to 11 different sectors as it is visible from Figure 1 that follows:



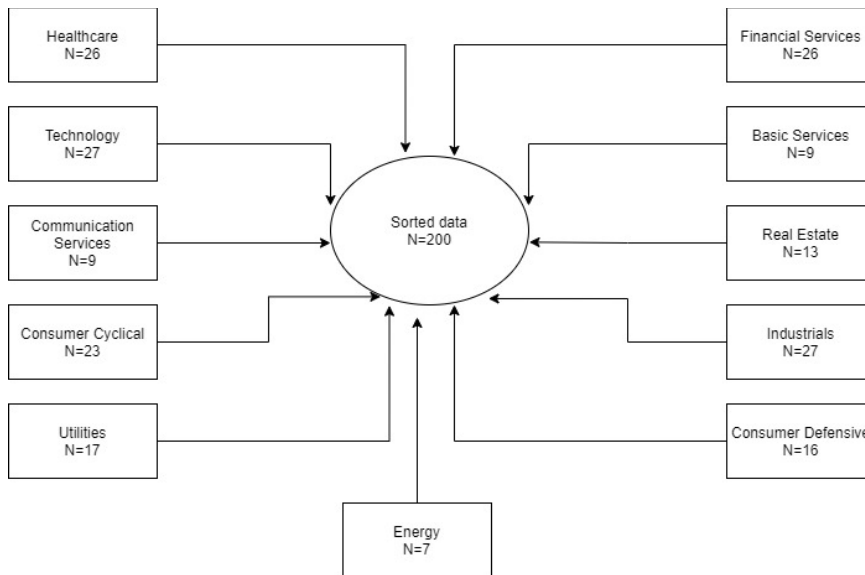


Figure 1: Illustration of the separation of Sectors (Source: draw.io)

In Figure 2 that follows, there is a depiction of the participation of each sector in the total amount of companies that have been used for the analysis. It is clear that there are no huge differences between the number of companies of each sector, but still, Industrials, Healthcare, Technology, and Financial Services included more information about ESG, and they were capable of providing the analysis with more observations. On the other hand, Basic Materials and Communication Services provided the analysis with less information.

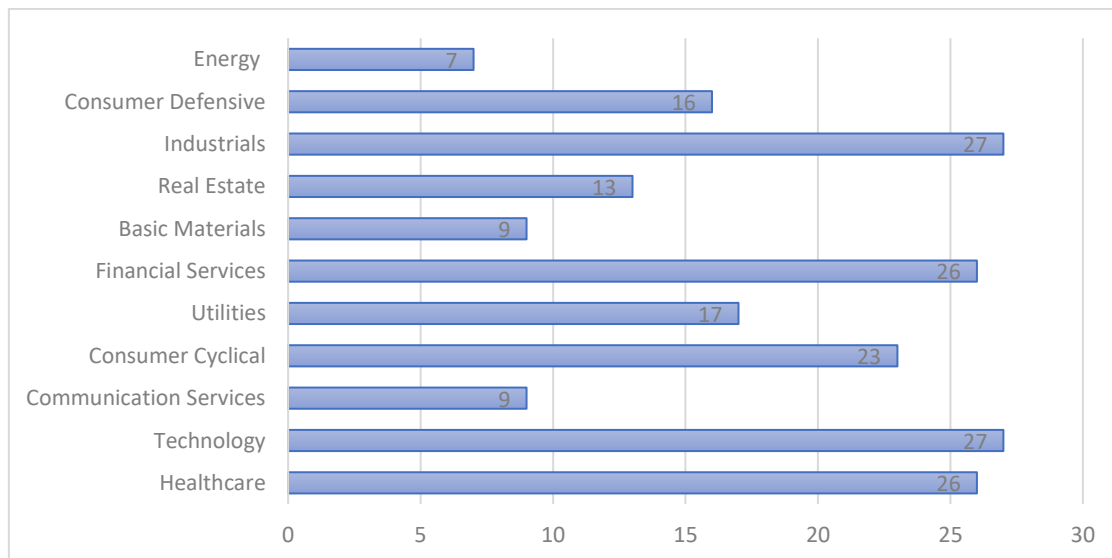


Figure 2: Data separation among the Sectors (Source: Excel)

### 3.2.3 Pooled Cross-Sectional data

In order to examine the relationship of the firms' performance over the time period, I have

used pooled cross-sectional data. The pooled cross-sectional data refer to a database that provides multivariate statistical history for each observation of individual entities (Dielman, 1983). In fact, several researchers have used this technique in order to test the main hypothesis in terms of institutional determinants of macroeconomic performances (Alvarez et al. 1991, Hicks 1991, Swank 1992).

### **3.3 Variables**

#### **3.3.1 Dependent Variables**

For this thesis, the aim of the dependent variable is to explain the financial performance of the selected companies. According to the theory and previous studies, the measurement of the performance of the companies is going to be the firms' Year over Year change in Revenues. This measurement allows the identification of improving, static, or deteriorating revenues and gives the opportunity for comparisons across the years and the companies. The dependent variable is not going to be unbalanced, as there are no missing observations in the case of revenues.

#### **3.3.2 Independent Variables**

The independent variable for this thesis will be the ESG criteria. I will use this information as a total and then each pillar of ESG separately, in particular the Environmental Pillar, the Social Pillar, and the Governance Pillar. All of this information will be derived from Yahoo Finance.

The ESG scores of the selected companies are estimated by third parties in order to ensure an unbiased and credible way of estimation. All the criteria are estimated through multiple estimations and measurements, and they constitute a total rating for each company (Mikołajek-Gocejna, 2018). ESG scores range from 0 to 100, with 0 being the lowest possible and 100 being the highest possible. In general, a score of 30 or lower indicates that the company scores two standard deviations below average in its group.

### 3.3.3 Control Variables

The Control Variables represent several variables that may affect the financial performance of the selected companies. For this purpose, I will use Gross Profit Margin, Net Profit Margin, Working Capital, Leverage, ROA, and ROE. Both Gross Profit Margin and Net Profit Margin are measures of a firm's profitability. The working capital indicates if a company can deal with its short-term liabilities. Leverage indicates how the company uses its debt to buy assets and it is a measurement of its total risk. Finally, both ROA and ROE are measurements of profitability, and they indicate how well a company uses its assets and its equity investments to acquire higher profits.

The Control Variables are calculated as follows:

$$\text{Gross Profit Margin} = \frac{\text{Gross Profit}}{\text{Revenue}} \times 100$$

$$\text{Net Profit Margin} = \frac{\text{Net Income}}{\text{Revenue}} \times 100$$

$$\text{Working Capital} = \text{Current Assets} - \text{Current Liabilities}$$

$$\text{Leverage} = \frac{\text{Total Debt}}{\text{Shareholders' Equity}}$$

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

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

### 3.4 Regression Models

In order to test if there is a positive, negative, or no relationship between the financial performance and ESG or at least one of ESG's pillars, I will test the following 4 hypotheses:

(H<sub>1</sub>): ESG has a positive impact on Financial Performance

$$FP = \alpha + \beta_1 \text{ESG} + \beta_2 \text{Control} + e_i$$

(H<sub>2</sub>): Environmental Pillar has a positive impact on Financial Performance

$$FP = \alpha + \beta_1 \text{Environmental} + \beta_2 \text{Control} + e_i$$

(H<sub>3</sub>): Social Pillar has a positive impact on Financial Performance

$$FP = \alpha + \beta_1 \text{Social} + \beta_2 \text{Control} + e_i$$

(H<sub>4</sub>): Governance Pillar has a positive impact on Financial Performance

$$FP = \alpha + \beta_1 Governance + \beta_2 Control + e_i$$

where FP = Financial Performance

Control = Control Variables

## 4. Results and Analysis

### 4.1 Correlation Matrix & Multicollinearity

#### 4.1.1. Correlation Matrix

Table 1 below represents the correlation matrix of the selected variables of the thesis.

Table 1: Correlation matrix (Source: Excel)

	YoY	ESG	E	S	G	Gross Profit Margin	Net Profit Margin	Leverage	ROA	ROE	WORKING CAPITAL
YoY	1										
ESG	-0,06854	1									
E	-0,12127	0,721225	1								
S	0,000349	0,62757	0,003082	1							
G	0,073798	0,383323	-0,16663	0,37409	1						
Gross Profit Margin	0,147973	-0,17337	-0,18889	0,026035	-0,12764	1					
Net Profit Margin	0,25002	-0,16361	-0,20281	-0,06821	0,079811	0,460329	1				
Leverage	-0,00482	-0,00841	-0,01439	-0,01436	0,030941	0,01683	0,006624	1			
ROA	0,092064	-0,18834	-0,15079	-0,03056	-0,17206	0,277117	0,531739	-0,0099	1		
ROE	0,018361	0,034427	-0,01299	0,066274	0,031531	-0,00445	0,050657	0,596786	0,046932	1	
WORKING CAPITAL	0,020675	0,07006	-0,07031	0,102245	0,224092	0,056398	0,032818	0,050095	0,096215	0,028535	1

According to the correlation matrix, it is visible that both ESG criteria as total and the Environmental Pillar itself seem to affect the YoY change in Revenues in a negative way. In terms of the Social Factor, the correlation matrix supports that it can affect in a positive way the financial performance, which is measured by the YoY change in Revenues. Finally, the correlation matrix supports that the Governance factor has a positive impact on the YoY change in Revenues.

#### 4.1.2. Multicollinearity

Multicollinearity is referring to the high level of correlation between the independent variables of the regression model. Although in the majority of regressions, there is a correlation between the response variable and the predictors, this is not acceptable and useful in the case of the correlation among the predictors (Alin, 2010). The presence of multicollinearity may cause serious problems and difficulties in the reliability and utility of the estimates and the parameters of the regression models (Daoud, 2017). This is the reason why in the cases of the existence of multicollinearity, researchers need to take actions in order to diminish or even eliminate it.

It is visible from Table 1 above that ESG, E, S, and G have issues of multicollinearity, but this is not something that affects the credibility of the results because these variables are not used in the same equations. After all, this fact is rational, since E, S, and G are parts of the total ESG variable.

Also, ESG seems not to have any multicollinearity issues with Gross Profit Margin, Net Profit Margin, ROE, ROA, Leverage, or Working Capital. In addition, neither E, S, or G seems to have multicollinearity issues with the same variables. The correlation between them is quite low and in fact, it is not higher than 0.22 which is a quite low amount.

Between gross profit margin and net profit margin, there is a correlation of 0.46 and between net profit margin and ROA, there is a correlation of 0.53. This is a little higher correlation than in the previous cases, but it is not high enough in order to cause problems in the results of the following regressions. On the other hand, leverage and ROE have the highest correlation above all variables, which is 0.59. In this case, it would be better if one of these two variables was extracted from the equations in order not to have any issues with the results. So, if those variables are statistically significant in the analysis section that follows, one of them should not be included in the analysis.

## **4.2 First results**

Initially, I used the regression models described in the part 3.4 and I imported all the data in E-Views in order to start having some results. During the first approach, I used the data of each year of observations separately. This means that I created separate datasets for 2017, 2018, 2019, and 2020 and then, I ran the regression models, using firstly ESG as the independent variable and then the Environmental factor, the Social factor, and the Governance factor in the same way. This procedure was followed four different times in order to have results for all the years of the dataset.

After the extraction of the results, I tried to analyze them in order to have some indications or even conclusions according to the question of this thesis; if the ESG criteria both as total and each one factor separately can affect or improve the financial performance of the selected companies. Those results were not satisfying enough in order to be able to reach a conclusion, so I decided to continue with another approach in terms of the construction of the dataset used.

## **4.3 Regression results from the compounded data**

During the second attempt, I created a compounded dataset, without taking into consideration the specific years that each observation is referring to, in order to test if the results of this approach are able to lead me to a more fulfilled conclusion.

### 4.3.1 The first regression model

The first regression model I used is the following and it is referring to the ESG criteria as total:

(H<sub>1</sub>): ESG has a positive impact on Financial Performance

$$FP = \alpha + \beta_1 ESG + \beta_2 Control + e_i$$

According to the part 3.3, the above equation can be rewritten as follows:

$$YoY = \alpha + \beta_1 ESG + \beta_2 GPM + \beta_3 NPM + \beta_4 ROE + \beta_5 ROA + \beta_6 LEV + \beta_7 WC + e_i$$

where GPM = Gross Profit Margin

NPM = Net Profit Margin

LEV = Leverage

WC = Working Capital

In the following picture, there are the results of the regression which are exported by E-Views:

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.038624	0.024201	1.595951	0.1110
ESG	-0.001463	0.000794	-1.843555	0.0657
GROSS_PROFIT_MARGIN	0.064073	0.030539	2.098050	0.0363
NET_PROFIT_MARGIN	0.174695	0.040061	4.360706	0.0000
ROE	0.004105	0.002943	1.394713	0.1636
LEVERAGE	-0.000562	0.000480	-1.171198	0.2419
WORKING_CAPITAL	7.75E-10	4.99E-10	1.552775	0.1210
R-squared	0.081730	Mean dependent var		0.057093
Adjusted R-squared	0.073457	S.D. dependent var		0.155647
S.E. of regression	0.149821	Akaike info criterion		-0.948401
Sum squared resid	14.94931	Schwarz criterion		-0.901473
Log likelihood	326.1368	Hannan-Quinn criter.		-0.930228
F-statistic	9.879487	Durbin-Watson stat		1.757778
Prob(F-statistic)	0.000000			

Figure 3: Regression Results from the compounded dataset-ESG (Source: E-Views)

Initially, the only coefficients that are useful for interpretation are the statistically significant ones. In order to find out which coefficients are statistically significant, and which are not, I look at the probability. At significance level = 10%, if the Probability is lower than 0.10, the coefficient is statistically significant, and it can explain the dependent variable in a good way. As follows, if the Probability is higher than 0.10, the coefficient is not statistically significant, and it does not actually exist or it is equal to 0. So, according to the above model, the variables that are statistically significant are the ESG, the GROSS\_PROFIT\_MARGIN, and the NET\_PROFIT\_MARGIN. This means that the regression equation can be rewritten as follows:

$$YoY = -0.0014 ESG + 0.0640 GPM + 0.1746 NPM + e_i$$

It is clear that apart from ESG, the variables that can affect the financial performance of a firm, which is measured by the Year over Year change in Revenues, are the gross profit margin and the net profit margin. According to the results of E-Views, the ESG criteria seem to affect in a negative way the financial performance of the firms, while, on the other hand, the gross profit margin and the net profit margin affect it in a positive way. In particular, the model supports that if ESG increases by 1%, the YoY change will be decreased by 0.0014%, while the YoY change is increased by 0.0640% and 0.1746% in the case of an increase of gross profit margin and net profit margin respectively.

The measure of goodness of fit of a model is the  $R^2$  and the Adjusted  $R^2$ , especially in cases where there is more than one coefficient. It seems how successful the independent variable is interpreting the dependent one and in general the closer the  $R^2$  to 1, the better the model. In this model, both  $R^2$  and Adjusted  $R^2$  are very low and close to 0 and this is an indication that the regression model is not a good one.

The Standard Error is the standard deviation of the error term and is the square root of the Mean Square Residual. It represents the average distance that the observed values fall from the regression line, and it shows how wrong the regression model is on average using the units of the response variable. In general, smaller values are better because they indicate that the observations are closer to the fitted line. The Standard Error in this regression is 0.1498, which is quite small.

The F-Value is the Mean Square Regression divided by the Mean Square Residual, yielding  $F=9,8794$ . In general, the F statistic must be used in combination with the p-value. Here, the P-Value associated with F-Value (Significance F) is very small and in particular 0. We can use these values to answer the question "If ESG can really affect the YoY change in Revenues". Since this p-value is less than the significance level ( $\alpha=0,10$ ), we can conclude that ESG can really predict YoY. Standard Errors are associated with coefficients. They are used for testing whether the parameters are significantly different from 0 by dividing the parameter estimate by the standard errors to obtain the t-value. Also, standard errors can be used to form a confidence interval for the parameter.

Another important feature that comes out from E-Views is the presence or not of autocorrelation, which is measured by the Durbin-Watson (DW). In general, if the DW is equal to 2, there is no autocorrelation, which is a good sign for the model, while it has negative autocorrelation if the DW is higher than 2 and positive autocorrelation if the DW is less than 2. In the particular model, the DW is equal to 1.7577, which means that the model has positive autocorrelation.



### 4.3.2 The second regression model

The second regression model I used is the following, which is based on the Environmental Pillar of ESG:

(H<sub>2</sub>): Environmental Pillar has a positive impact on Financial Performance

$$FP = \alpha + \beta_1 Environmental + \beta_2 Control + e_i$$

According to the part 3.3, the above equation can be rewritten as follows:

$$YoY = \alpha + \beta_1 E + \beta_2 GPM + \beta_3 NPM + \beta_4 ROE + \beta_5 ROA + \beta_6 LEV + \beta_7 WC + e_i$$

where E = Environmental Factor

GPM = Gross Profit Margin

NPM = Net Profit Margin

LEV = Leverage

WC = Working Capital

In the following picture, there are the results of the regression which are exported by E-Views:

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.024946	0.018276	1.364928	0.1727
E	-0.003154	0.001092	-2.889366	0.0040
GROSS_PROFIT_MARGIN	0.052225	0.031436	1.661335	0.0971
NET_PROFIT_MARGIN	0.128208	0.048524	2.642177	0.0084
ROE	0.003518	0.002920	1.204613	0.2288
ROA	0.200139	0.112280	1.782497	0.0751
LEVERAGE	-0.000488	0.000477	-1.024655	0.3059
WORKING_CAPITAL	4.94E-10	4.97E-10	0.993529	0.3208
R-squared	0.095309	Mean dependent var		0.057093
Adjusted R-squared	0.085786	S.D. dependent var		0.155647
S.E. of regression	0.148821	Akaike info criterion		-0.960327
Sum squared resid	14.72824	Schwarz criterion		-0.906696
Log likelihood	331.1501	Hannan-Quinn criter.		-0.939558
F-statistic	10.00826	Durbin-Watson stat		1.745910
Prob(F-statistic)	0.000000			

Figure 4: Regression Results from the compounded dataset-Environmental Factor (Source: E-Views)

At significance level = 10%, if the Probability is lower than 0.10, the coefficient is statistically significant, and it can explain the dependent variable in a good way. As follows, if the Probability is higher than 0.10, the coefficient is not statistically significant, and it does not actually exist or it is equal to 0. So, according to the above model, the variables that are statistically significant are the E, the GROSS\_PROFIT\_MARGIN, the

NET\_PROFIT\_MARGIN, and the ROA. This means that the regression equation can be rewritten as follows:

$$\text{YoY} = -0.0031E + 0.0522 \text{ GPM} + 0.1282 \text{ NPM} + 0.2001 \text{ ROA} + e_i$$

It is clear that apart from the Environmental factor, the variables that can affect the financial performance of a firm, which is measured by the Year over Year change in Revenues, are the gross profit margin, the net profit margin, and the ROA. According to the results of E-Views, the Environmental factor seems to affect in a negative way the financial performance of the firms, while, on the other hand, the gross profit margin, the net profit margin, and the ROA affect it in a positive way. In particular, the model supports that if the Environmental factor increases by 1%, the YoY change will be decreased by 0.0031%, while the YoY change is increased by 0.0522%, 0.1282%, and 0.2001% in the case of an increase of gross profit margin, net profit margin or ROA respectively.

The measure of goodness of fit of a model is the  $R^2$  and the Adjusted  $R^2$ , especially in cases where there is more than one coefficient. It seems how successful the independent variable is interpreting the dependent one and in general the closer the  $R^2$  to 1, the better the model. In this particular model, both  $R^2$  and Adjusted  $R^2$  are very low and close to 0 and this is an indication that the regression model is not a good one.

The Standard Error is the standard deviation of the error term and is the square root of the Mean Square Residual. It represents the average distance that the observed values fall from the regression line, and it shows how wrong the regression model is on average using the units of the response variable. In general, smaller values are better because they indicate that the observations are closer to the fitted line. The Standard Error in this regression is 0.1488, which is quite small.

The F-Value is the Mean Square Regression divided by the Mean Square Residual, yielding  $F=10.0082$ . In general, the F statistic must be used in combination with the p-value. Here, the P-Value associated with F-Value (Significance F) is very small and in particular 0. Actually, we can use these values to answer the question "If the Environmental factor can really affect the YoY change in Revenues". Since this p-value is less than the significance level ( $\alpha=0,10$ ), we can conclude that the Environmental factor can really predict YoY. Standard Errors are associated with coefficients. They are used for testing whether the parameters are significantly different from 0 by dividing the parameter estimate by the standard errors to obtain the t-value. Also, standard errors can be used to form a confidence interval for the parameter

Another important feature that comes out from E-Views is the presence or not of autocorrelation, which is measured by the Durbin-Watson (DW). In general, if the DW is equal

to 2, there is no autocorrelation, which is a good sign for the model, while it has negative autocorrelation if the DW is higher than 2 and positive autocorrelation if the DW is less than 2. In the particular model, the DW is equal to 1.7459, which means that the model has positive autocorrelation.

### 4.3.3 The third regression model

Then, I used the following regression model, which is based on the Social Pillar of ESG:

(H<sub>3</sub>): Social Pillar has a positive impact on Financial Performance

$$FP = \alpha + \beta_1 Social + \beta_2 Control + e_i$$

According to the part 3.3, the above equation can be rewritten as follows:

$$YoY = \alpha + \beta_1 S + \beta_2 GPM + \beta_3 NPM + \beta_4 ROE + \beta_5 ROA + \beta_6 LEV + \beta_7 WC + e_i$$

where S = Social Factor

GPM = Gross Profit Margin

NPM = Net Profit Margin

LEV = Leverage

WC = Working Capital

In the following picture, there are the results of the regression which are exported by E-Views:

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.012140	0.020184	-0.601487	0.5477
S	0.000327	0.001589	0.205492	0.8373
GROSS_PROFIT_MARGIN	0.077606	0.030406	2.552358	0.0109
NET_PROFIT_MARGIN	0.121615	0.049301	2.466802	0.0139
ROE	0.003577	0.002957	1.209810	0.2268
ROA	0.248574	0.111853	2.222336	0.0266
LEVERAGE	-0.000489	0.000481	-1.015572	0.3102
WORKING_CAPITAL	6.15E-10	5.02E-10	1.226714	0.2204
R-squared	0.084010	Mean dependent var		0.057093
Adjusted R-squared	0.074368	S.D. dependent var		0.155647
S.E. of regression	0.149748	Akaike info criterion		-0.947915
Sum squared resid	14.91219	Schwarz criterion		-0.894283
Log likelihood	326.9733	Hannan-Quinn criter.		-0.927146
F-statistic	8.712916	Durbin-Watson stat		1.746771
Prob(F-statistic)	0.000000			

Figure 5: Regression Results from the compounded dataset-Social Factor (Source: E-Views)

At significance level = 10%, if the Probability is lower than 0.10, the coefficient is statistically

significant and it can explain the dependent variable in a good way. As follows, if the Probability is higher than 0.10, the coefficient is not statistically significant and it does not actually exist or it is equal to 0. So, according to the above model, the Social factor is not statistically significant and the only variables that are statistically significant are the GROSS\_PROFIT\_MARGIN, the NET\_PROFIT\_MARGIN, and the ROA. This means that the regression equation can be rewritten as follows:

$$\text{YoY} = 0.0776 \text{ GPM} + 0.1216 \text{ NPM} + 0.2485 \text{ ROA} + e_i$$

It is clear that the Social factor does not affect at all the financial performance and the only variables that can affect the financial performance of a firm, which is measured by the Year over Year change in Revenues, are the gross profit margin, the net profit margin, and the ROA. According to the results of E-Views, the gross profit margin, the net profit margin, and the ROA affect the financial performance in a positive way. In particular, the model supports that if the gross profit margin, the net profit margin, and the ROA are increased by 1%, the YoY change is increased by 0.0776%, 0.1216%, and 0.2485% in the case of an increase of gross profit margin and net profit margin respectively.

The measure of goodness of fit of a model is the  $R^2$  and the Adjusted  $R^2$ , especially in cases where there is more than one coefficient. It seems how successful the independent variable is interpreting the dependent one and in general the closer the  $R^2$  to 1, the better the model. In this particular model, both  $R^2$  and Adjusted  $R^2$  are very low and close to 0 and this is an indication that the regression model is not a good one.

The Standard Error is the standard deviation of the error term and is the square root of the Mean Square Residual. It represents the average distance that the observed values fall from the regression line and it shows how wrong the regression model is on average using the units of the response variable. In general, smaller values are better because they indicate that the observations are closer to the fitted line. The Standard Error in this regression is 0.1497, which is quite small.

The F-Value is the Mean Square Regression divided by the Mean Square Residual, yielding  $F=8.7129$ . In general, the F statistic must be used in combination with the p-value. Here, the P-Value associated with F-Value (Significance F) is very small and in particular 0. Actually, we can use these values to answer the question "If the Social factor can really affect the YoY change in Revenues". Since this p-value is less than the significance level ( $\alpha=0,10$ ), we can conclude that the Social factor can really predict YoY. Standard Errors are associated with coefficients. They are used for testing whether the parameters are significantly different from

0 by dividing the parameter estimate by the standard errors to obtain the t-value. Also, standard errors can be used to form a confidence interval for the parameter

Another important feature that comes out from E-Views is the presence or not of autocorrelation, which is measured by the Durbin-Watson (DW). In general, if the DW is equal to 2, there is no autocorrelation, which is a good sign for the model, while it has negative autocorrelation if the DW is higher than 2 and positive autocorrelation if the DW is less than 2. In the particular model, the DW is equal to 1.7467, which means that the model has positive autocorrelation.

#### 4.3.4 The fourth regression model

Finally, the last regression model I used is based on the Governance Pillar of ESG:

(H<sub>4</sub>): Governance Pillar has a positive impact on Financial Performance

$$FP = \alpha + \beta_1 Governance + \beta_2 Control + e_i$$

According to the part 3.3, the above equation can be rewritten as follows:

$$YoY = \alpha + \beta_1 G + \beta_2 GPM + \beta_3 NPM + \beta_4 ROE + \beta_5 ROA + \beta_6 LEV + \beta_7 WC + e_i$$

where G = Governance Factor

GPM = Gross Profit Margin

NPM = Net Profit Margin

LEV = Leverage

WC = Working Capital

In the following picture, there are the results of the regression which are exported by E-Views:

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.045847	0.026044	-1.760390	0.0788
G	0.006018	0.003601	1.671084	0.0952
GROSS_PROFIT_MARGIN	0.072059	0.030474	2.364586	0.0183
NET_PROFIT_MARGIN	0.122753	0.048669	2.522173	0.0119
ROE	0.003372	0.002936	1.148391	0.2512
ROA	0.261713	0.111627	2.344529	0.0193
LEVERAGE	-0.000480	0.000479	-1.002130	0.3166
WORKING_CAPITAL	2.62E-10	5.43E-10	0.482659	0.6295
R-squared	0.087782	Mean dependent var		0.057093
Adjusted R-squared	0.078180	S.D. dependent var		0.155647
S.E. of regression	0.149439	Akaike info criterion		-0.952042
Sum squared resid	14.85078	Schwarz criterion		-0.898410
Log likelihood	328.3621	Hannan-Quinn criter.		-0.931273
F-statistic	9.141823	Durbin-Watson stat		1.765197
Prob(F-statistic)	0.000000			

Figure 6: Regression Results from the compounded dataset-Governance Factor (Source: E-Views)

At significance level = 10%, if the Probability is lower than 0.10, the coefficient is statistically significant and it can explain the dependent variable in a good way. As follows, if the Probability is higher than 0.10, the coefficient is not statistically significant and it does not actually exist or it is equal to 0. So, according to the above model, the variables that are statistically significant are the constant, the Governance Factor, the GROSS\_PROFIT\_MARGIN, the NET\_PROFIT\_MARGIN, and the ROA. This means that the regression equation can be rewritten as follows:

$$\text{YoY} = -0.0458 + 0.0060 G + 0.0720 \text{ GPM} + 0.1227 \text{ NPM} + 0.2617 \text{ ROA} + e_i$$

It is clear that apart from the Governance factor, the variables that can affect the financial performance of a firm, which is measured by the Year over Year change in Revenues, are the gross profit margin, the net profit margin, and the ROA. According to the results of E-Views, all variables affect the financial performance in a positive way. In particular, the model indicates that if the Governance factor, the gross profit margin, the net profit margin, and the ROA are increased by 1%, the YoY change will be increased by 0.0060%, 0.0720%, 0.1227%, and 0.2617% respectively.

The measure of goodness of fit of a model is the  $R^2$  and the Adjusted  $R^2$ , especially in cases where there is more than one coefficient. It seems how successful the independent variable is interpreting the dependent one and in general the closer the  $R^2$  to 1, the better the model. In this particular model, both  $R^2$  and Adjusted  $R^2$  are very low and close to 0 and this is an indication that the regression model is not a good one.

The Standard Error is the standard deviation of the error term and is the square root of the Mean Square Residual. It represents the average distance that the observed values fall from the regression line and it shows how wrong the regression model is on average using the units of the response variable. In general, smaller values are better because they indicate that the observations are closer to the fitted line. The Standard Error in this regression is 0.1494, which is quite small.

The F-Value is the Mean Square Regression divided by the Mean Square Residual, yielding  $F=9,1418$ . In general, the F statistic must be used in combination with the p-value. Here, the P-Value associated with F-Value (Significance F) is very small and in particular 0. Actually, we can use these values to answer the question "If the Governance factor can really affect the YoY change in Revenues". Since this p-value is less than the significance level ( $\alpha=0,10$ ), we can conclude that the Governance factor can really predict YoY. Standard Errors are associated with coefficients. They are used for testing whether the parameters are significantly

different from 0 by dividing the parameter estimate by the standard errors to obtain the t-value. Also, standard errors can be used to form a confidence interval for the parameter

Another important feature that comes out from E-Views is the presence or not of autocorrelation, which is measured by the Durbin-Watson (DW). In general, if the DW is equal to 2, there is no autocorrelation, which is a good sign for the model, while it has negative autocorrelation if the DW is higher than 2 and positive autocorrelation if the DW is less than 2. In the particular model, the DW is equal to 1.7651, which means that the model has positive autocorrelation, but the value of DW seems to approach 2, so it is a sign that the model is not that bad after all.

In total, the models used in this part of the analysis highlighted that both ESG criteria and the Environmental Factor itself affect the financial performance of the selected companies in a significant but negative way. According to the Social Factor, the analysis above proved that there is a positive relationship between this factor and the financial performance of the selected companies, but this result is not statistically significant and this is the reason why I cannot use it in order to have indicative results and conclusions. Finally, in the case of the Governance Factor, the results supported that there is a positive and statistically significant relationship between this factor and the financial performance of the selected firms.

## **5. Conclusion and future research**

### **5.1 Conclusion**

This study examined if there is a positive, negative, or no relationship between the financial performance of a firm and the ESG criteria both as total and as environmental, social, and governance factors separately. The sample used consists of 796 observations for the period from 2017 to 2020. The companies used in the sample are listed in the S&P500 stock exchange and all of them are large capitalization firms that reported ESG information for the period under investigation. All the relevant information was extracted from the database Yahoo Finance. For the completion of the regression models, several control variables were used, such as firms' gross profit margin, net profit margin, ROE, ROA, leverage, and working capital.

The main results of the study supported that both ESG criteria and the Environmental Factor itself affect the financial performance of the selected companies in a significant but negative way. According to the Social Factor, the analysis above proved that there is a positive relationship between this factor and the financial performance of the selected companies, but this result is not statistically significant, and this is the reason why I cannot use it in order to have indicative results and conclusions about the social factor. Finally, in the case of the Governance Factor, the results supported that there is a positive and statistically significant relationship between this factor and the financial performance of the selected firms.

This study has provided some similar results with the majority of the existing studies of this context, but some parts of the research do not agree with the literature. In particular, most of the existing studies support that there is a positive relationship between the ESG criteria and the financial performance of a firm. According to the results of the thesis, only the part of the governance pillar agrees totally with the existing literature. The environmental and the social pillar do not follow the results of the majority of existing studies, but still, there is a small number of researchers that have found similar results.

This study is relevant and very useful to the majority of shareholders. Both managers and shareholders of a company need to know about the influence that ESG criteria can have on their company, as it can affect in a significant way the behavior of shareholders. In addition, regulators would need this kind of information as well, as it is their responsibility to encourage or not the recording of this kind of information.



## 5.2 Contribution to the field of research

There are several studies that are trying to find a connection between the context of ESG and the financial performance of the companies. Over the years, the majority of the existing studies have shown that there is a positive relationship between the ESG information and the financial performance of a firm. Nevertheless, there are also several studies that support that there is a negative relationship between the ESG criteria and the financial performance and some others which support that those two factors, ESG, and financial performance, are not associated at all.

This particular study showed that the ESG criteria and the Environmental Factor itself are proved to have a significant and negative effect on the financial performance of the companies, while the Governance Factor seems to have a significant and positive effect on the financial performance. In the case of the Social Factor, the regression results are not statistically significant, and this is the reason why we do not have a clear view of the effect of the social factor on the financial performance.

This thesis contributes to the field of the existing research as it supports some of the existing results. Also, it provides further steps into a deeper exploration of the effects of ESG on the financial performance of the companies. There are regions, companies, and specific model factors that are not tested in this specific study and it would be a good idea for future researchers to examine them.

## 5.3 Limitations

Like most academic studies, this study has several limitations as well. First of all, this study uses a time span of only four years, between 2017-2020, and it only included companies that do not present missing values for any of the selected variables. This time span is thought to be a quite small one in order to get significant results in any research. Also, this study uses only large-capitalization companies which operate in the S&P500, without taking into consideration the particular sector of each company. Additionally, the ESG scores are extracted from Yahoo Finance, without being compared with respective scores from other databases. As each provider may use a different method in this field, this kind of comparison would be necessary in order to test their accuracy.

The ideal approach of the particular research would have been with the use of panel data, instead of pooled cross-sectional data. The panel data denote the dependent variable with two subscripts, which allows them to track the  $i_{th}$  of  $n$  companies in the  $t_{th}$  of  $T$  periods. In the

case of panel data, the dataset is either balanced or unbalanced, with the balanced dataset to contain information for all the companies for each time period and the unbalanced dataset to miss some observations for a single company for one time period or there are missing observations for any variable (Stock & Watson, 2012).

#### **5.4 Recommendations for future studies**

As it was mentioned before in the part 5.3, there are several limitations and parts of this thesis that could be analyzed thoroughly in future studies. First of all, a broader time span of observations could be used, such as five or ten years. Also, another similar study could examine the same question, by focusing on specific regions, such as Europe or the USA, including all kinds of companies according to their size. Another idea for a future researcher would be to create dummies for each sector of the selected companies, in order to present the relationship between financial performance and ESG scores in each specific sector, in order to track possible differences from sector to sector. Also, there are many different control variables that could be used in future studies that may present different results than the existing ones.

The effect of Covid-19 could be also included in a future study. The best approach would be to collect data at least for the years 2020, 2021, and 2022, in order to have a fulfilled idea about the effects of the pandemic. Finally, future studies could make use of ESG information exported by other sources, such as Bloomberg or Thomson's Reuters, in order to examine the reliability of those scores.

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#### *Other Resources*

<https://corporatefinanceinstitute.com/resources/knowledge/other/corporate-social-responsibility-csr/>

<https://www.bbva.com/en/sustainability/what-are-the-esg-environmental-social-and-governance-criteria-and-why-are-they-important-for-investors/>