



SCHOOL OF  
ECONOMICS AND  
MANAGEMENT

Master's Programme in Innovation and Global Sustainable Development

# **ESG and Financial Performance, is there a correlation for the Italian listed organizations?**

A Quantitative Analysis of ESG risk score and ROE in Italy.

by

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Due to social and environmental crises, the concept of sustainability has grown in importance in our society over the past years. Things are changing, even in the financial industry. From the perspective of investors, the general public, and enterprises, Corporate Social Responsibility and the creation of sustainable value are becoming more and more significant. One of the most cutting-edge tools for actively promoting this paradigm change in investing and corporate strategies is the ESG (Environmental, Social, and Governance) criteria. A more resilient, long-lasting development system that puts humanity back at the centre can therefore be implemented with the help of the union of finance and sustainability through ESG standards. However, to bring this transformation, we must encourage and promote the transition, particularly in nations with a lower propensity towards sustainability, such as Italy.

A strategy to ultimately pragmatically incentivize markets toward a true adoption of sustainable themes would be to discover a systematic beneficial association between financial success and ESG standards. Therefore, this study intended to comprehend the nature of the relationship between ESG risk rating and FP by a quantitative analysis of the Italian market. Although the findings counter the general theory, they are consistent with other Italian studies and demonstrate that it is not possible to have empirical proof of a beneficial effect on the ESG-ROE relationship in Italy, probably due to the Italian ESG underdevelopment.

LUND UNIVERSITY

Lund University School of Economics and Management

Course Code EKHS34

Master's Thesis (15 credits ECTS)

June 2021

Supervisor: Sean Kenny

Examiner: Igor Martins

Word Count: 14 110







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# Abbreviations

<b>Abbreviation</b>	<b>Definition</b>
WFE	World Federation of Exchanges
ESG	Environmental, Social and corporate Governance
SRI	Social Responsible Investment
SR	Social return
CAPM	Capital Asset Pricing Model
SDGs	Sustainable Development Goals
CSR	Corporate Social Responsibility
UNEPFI	United Nations Environment Programme Financial Initiatives
ROE	Return on Equity
SFDR	Sustainable Finance Disclosure Regulation
RSFS	Renewed Sustainable Finance Strategy
EPS	Earnings per Share
VIF	variance inflation factor
MEIs	Material ESG Issues

***"Ethics is the new competitive environment."***  
- Peter Robinson, CEO, Mountain Equipment Co-op, 2016.



# 1 Introduction

Nowadays, investing has become a more common economic practice for households (Xiao & Tao, 2020; UNCTAD, 2021). The 5% increase in total financial assets of households across the EU in 2020 compared to the previous year reflects this trend (Eurostat, 2021). Analyzing the global financial system, it is possible to achieve a better understanding of the actual power of this sector. According to WFE, it is worth 89.47 trillion dollars in 2020. Many empirical studies (Rousseau and Wachtel, 2000; Beck, Levine, & Loayza, 2000) demonstrated the positive correlation between economic growth and financial development. Due to the urgency of climate change, other studies have examined the close connection between sustainability and economic growth (Malaska, Kaivo-oja, & Luukkanen, 1999). Following this logic, if deployed correctly, this sector could have the systematic potential impact to solve some of the biggest threats to the planet. However, thanks to the work of Galaz et al. (2018) it is possible to understand that until now the financial sector's influence on socio-environmental issues is overwhelmingly negative, causing huge pressure on the global tipping points. To reverse this trend, financial players and organizations must be more accountable for their actions and consumers need to support the more responsible companies to transit toward a more sustainable system, overcoming the paradoxical excuse of passive investor status (Appel Gormley & Keim, 2016).

It is precisely from the need to find a solution to these issues that the concept of sustainable finance was established. In response to the need for change, sustainability has been introduced in the financial markets, shifting the emphasis on weighted investment decisions from mere profit criteria under the investor's risk profile to the impact on the real economy, as well as on society and the environment, while observing a long-term horizon (OECD, 2021). Therefore, the consolidation of global financial markets far from the real economy dynamics highlighted the fragilities of profit-oriented market dynamics. Finding a systematic and empirical-based positive relationship between financial performance and sustainability criteria would be a strategy to finally influence global markets pragmatically toward a real implementation of sustainable arguments. The different stakeholders would be incentivized by common responsibility as well as an associated financial benefit. This thesis will follow this important achievement by studying a possible correlation between ESG criteria and FP.

ESG (Environmental, Social, and Governance) criteria are one of the most advanced tools of sustainable financing introduced in recent years. This tool actively encourages a paradigm shift in investment strategy (Friede, Busch, & Bassen, 2015; Van Duuren, Plantinga & Scholtens, 2016). By balancing environmental, social, and economic variables, it is feasible to prevent negative externalities in different industries and market segments that could present costs for businesses, investors, and other stakeholder groups. A development system that is more

resilient, long-lasting, and puts humanity back at the centre can therefore be implemented with the help of the union of finance and sustainability through ESG standards.

However, as they are still a relatively new idea and outside of the conventional financial dynamics, the current difficulty is the active application and promotion of these criteria. This paper's objective is to increase understanding of ESG by the quantitative examination of a potential relationship between ESG rating and financial performance, especially the Return on Equity (ROE), of Italian organizations. So, it will concentrate on companies listed on the Milan stock exchange, in contrast to most of the literature on similar analysis. The purpose is to enhance and disseminate information on ESG in a context, like Italy, which is a bit underdeveloped compared to its European peers in terms of sustainability (Europe Sustainable Development Report, 2021).

Thus, the thesis's overall goal is to advance knowledge of this industry and its sustainability implications for the Italian market. In doing so, the paper would like to highlight if Environmental, Social, and Governance criteria can be incorporated into organizations' strategies to promote long-term and economic growth. The value of this paper lies in the uniqueness of the settings of this research, and it could help managers, politicians, investors and even consumers in making deliberate and conscious choices concerning ESG.

## 1.1 Problem Statement and Research Purpose

As previously mentioned, the concept of sustainability has become more important in our society, especially given the post-Covid-19 pandemic recovery plan (Sarkis, 2020). Things are changing, even in the financial industry. Corporate social responsibility and the production of sustainable value are becoming more and more relevant in the eyes of investors, the general public, and businesses (Liang & Renneboog, 2020). Such a change cannot be motivated purely by altruism or philanthropy. Instead, since the associated low risk, it must be driven by a deliberate attempt to create long-term socio-environmental value as well as by a profit-driven logic (European Commission, 2021a).

Due to this, a multitude of studies examined the relationship between financial performance and ethical and sustainable business practices. Despite the most typical outcome being a positive correlation between the two variables, Syed (2017) asserts that managers do not prioritize using ESG factors when making decisions. In Italy, the situation is similar, and it may even be undeveloped in comparison to many markets (Europe Sustainable Development Report, 2021).

As a result, this thesis will examine whether there is a correlation between Italian-listed firms' financial success and favourable ESG ratings. The Return on Equity (ROE) will be studied as the primary metric to account for financial performance. The ESG risk rating and its components (exposure to and management of risk) will be used as the main sustainability ratings.

The decision to study the Italian market was influenced by the personal significance, being my country of origin, and the desire to support the growth of this sector in the Italian peninsula. Therefore, a quantitative investigation along these lines and the building of an ad hoc database for the analysis could advance discussion and knowledge on a subject crucial to the development of an ethical and sustainable Italy and Europe. Additionally, because there is a lack of thorough and ongoing study in this area regarding the Italian market, the thesis would aim to expand the research frontier by addressing the empirical gap.

To summarize, the purpose of this thesis is to examine, concerning Italy, the relationship between ESG ratings and ROE through a quantitative analysis of 58 organizations listed on the Italian stock market.

## 1.2 Research Questions

To provide the most holistic explanation possible, the thesis will try to answer four main research questions. All of them are developed around the theoretical framework of Section 2 and support the stakeholder approach (Friede, Busch & Bassen, 2015; Whelan et al., 2021). At the end of this section, figure 1 depicts the Research Model of the Hypotheses to support understanding.

To begin, I have chosen a first hypothesis that considers the relationship between the ESG risk score and the ROE for each company. The research question looks if there is an inverse correlation between the ESG risk and ROE among companies on the Italian stock market. As the literature will demonstrate, there is main empirical evidence that ESG risk has a significant impact on the ability to generate great ROE. Theoretically, lower ESG risk scores mean that companies are more sustainable in the long run and more attractive to customers and investors, allowing them to generate greater ROE than companies with higher ESG risk. As a result, the following hypotheses emerged:

***H1<sub>0</sub>**: There is no relationship between the ESG risk score and the ROE for the companies listed on the Italian stock market.*

***H1<sub>A</sub>**: The ESG risk score is negatively associated with the ROE for the companies listed on the Italian stock market.*

The second hypothesis takes into account ESG risk management and ROE for each company. The research question investigates if there is a positive correlation between ESG risk management and ROE among companies on the Italian stock market. There is a tendency to see good ESG risk management and great ROE as intricately intertwined, meaning that companies which are successfully skillful in the management of ESG risk are positively associated with

the ROE generated. The reason is that having an effective and stable strategy creates a suitable condition to achieve good financial and business performance. However, it could be that this relation is influenced by different levels of risk exposure. Meaning that a company with strong ESG risk management could face high ESG risk exposure, which could transform the relationship into a negative. Thus, to compensate for this aspect in addition to this hypothesis, it has been created an additional one (H4<sub>A</sub>) to account for the interaction effect. As a result, the following null and alternative hypotheses were formulated:

*H2<sub>0</sub>: There is no relationship between the ESG risk management and the ROE for the companies listed on the Italian stock market.*

*H2<sub>A</sub>: The ESG risk management is positively associated with the ROE for the companies listed on the Italian stock market.*

Regarding the third research question, it is intended to investigate the link between ESG risk exposure and ROE for each company. It tries to answer if there is an inverse correlation between the ESG risk exposure and ROE among companies on the Italian stock market. Being a company with high ESG risk exposure is associated with precarious business conditions that resulted in a lack of economic confidence due to the possible risk within the sector. Therefore, organizations can reduce exposure to ESG risks related to their operations. However, some challenges are embedded in specific sectors, becoming impossible to delete, such as oil companies and environmental damages. As a result, the relationship between ESG risk exposure and ROE should be negative. The following is how the two hypotheses are formulated:

*H3<sub>0</sub>: There is no relationship between the ESG risk exposure and the ROE for the companies listed on the Italian stock market.*

*H3<sub>A</sub>: The ESG risk exposure is negatively associated with the ROE for the companies listed on the Italian stock market.*

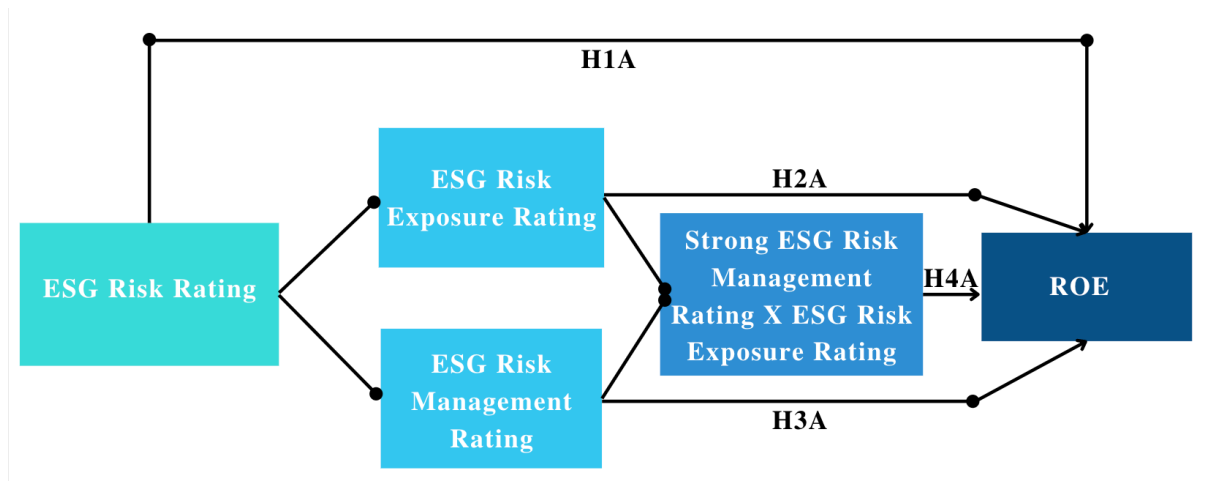
Furthermore, to understand the complexity of this topic it has been formulated one hypothesis concerning interaction to investigate whether the influence of one independent variable differs consistently from the value of another independent variable. It examines the association between the outcome (ROE) and the interaction effect of strong ESG risk management and ESG risk exposure. Here, the research question analyzes if companies with strong ESG risk management have a greater effect on ROE as ESG risk exposure increases. As a result of business dynamics, it is possible to expect that a company with strong ESG risk management would obtain a greater positive effect with the increase of ESG risk exposure on the ROE. So, the hypothesis is formulated in this way:

*H4<sub>0</sub>: There is no difference between the level of ESG risk management on the effect of ESG risk exposure on ROE.*



**H4A:** For the organizations listed on the Italian stock market having a Strong level of ESG risk management has a greater effect on ROE, as ESG risk exposure increases.

Figure 1: Research Model of the Hypotheses (created by the author for the purpose of the study).



### 1.3 Outline of the Thesis

After the presentation of Section 1 with the introduction, the research purpose and questions, the outline of the paper continues as follows: Section 2 discusses the theoretical framework, providing an overview of the main relevant literature and theory around the concepts of sustainable finance, ESG and their relationship with FP within the European and Italian context. Section 3 describes the data, explaining the collection process to develop the new database for the Italian organizations and analyzing the variable used in the study. Section 4 presents the methodology of this research, including the models' specification that ensures accuracy in the models. Section 5 introduces and discusses the empirical finding of the correlation matrix and the OLS regression. Section 6 concludes the analysis with a summary and recommendation for the future research

## 2 Theoretical Framework

Given the lack of a standard theoretical framework within the sustainable finance and ESG criteria, the present section will seek to review the most relevant sources to develop an appropriate literature review for this thesis. Even if the notion of sustainable finance is still relatively in its formative stages, there are already many research projects underway. Therefore, it is critical to establish a consistent theoretical framework from which to push the research frontier forward.

Historically, the concept first emerged in 1992 at the Rio de Janeiro Earth Summit, where a new framework for global environmental action was designed (Khor, 2012). From there, some initiatives started to take shape, with the most well-known being the United Nations Environment Programme Financial Initiatives (UNEP FI) (Dodds & Strauss, 2012). Consequently, both academics and practitioners have developed a wide range of additional interpretations and categorizations of sustainable finance (McGuire et al., 1988; Schoemaker & Schramade, 2018; Dimmelmeier, 2021). As a result, the theoretical framework will be structured around different pillars: the most relevant theories about sustainable finance, CSR and ESG criteria, the previous research about the relationship between FP and ESG rating, and the research on the Italian and European ESG implementation.

This Section is developed as follows: in section 2.1, the search strategy will be defined. Section 2.2 describe the primary theories around Sustainable finance and CSR. Section 2.3 introduces the ESG criteria and its components, while section 2.4 discusses the prior literature around the relationship between FP and ESG. In conclusion, section 2.5 explains the ESG implementation at the EU and Italian levels, putting the spot on specific research about ESG and FP for the Mediterranean Peninsula.

### 2.1 Search Strategy Research

Several sources, websites, search engines, and institutions were examined to carry on the investigation of the theoretical foundation for this topic. Google Scholar, Journal of Financial Economics and Journal of Economic Perspective were the primary search engines used. From them, various papers, academic journals, reports, and peer-reviewed works were chosen. The most common search keywords used to identify relevant sources for this work were Sustainable Finance, CSR, Environmental, Social, and Governance, ESG Rating, and Financial Performance. Due to the new and dynamic nature of sustainable finance, as an academic

research topic, the publication date and the number of citations were also important factors included in the search strategy. Thus, appropriate and relevant sources for this thesis were collected and examined.

## 2.2 Sustainable Finance and CSR

Due to recent negative developments in environmental and social conditions, Corporate Social Responsibility (CSR) and subsequently Sustainable Finance has obtained a growing key role within the public debate, as demonstrated also by the action of different institutions, such as the European Commission (2021b).

The term CSR, according to Liang and Renneboog (2020), refers to the incorporation of environmental, social, and governance aspects into business management and portfolio decisions making a business accountable. This inclusion of corporate responsibility goes beyond legal compliance or market rationality, being a form of self-restraint for the greater good (Vogel, 2005).

As Schoenmaker and Schramade (2018) explain in their book “Principles of Sustainable Finance”, Sustainable Finance is defined as a tool that looks “at how finance (investing and lending) interacts with economic, social, and environmental issues.” (Schoenmaker & Schramade, 2018, p4). The two authors explain how the financial sector may be mobilized to overcome the widespread belief of a trade-off between economic and socio-environmental value using a combination of theory, empirical data, and policy. Their interpretation of sustainable finance is based on the idea that finance's purpose is to allocate resources to the most productive use possible. As directed by the Sustainable Development Agenda (UN, 2015), productive usage is no longer evaluated solely through economic logic. Thus, economic resources should foster long-term development by assisting the proper companies and projects. Different studies (Müller & Kreuer, 2016; Scholtens, 2017; Galaz et al., 2018) emphasized this significant relationship between finance and the environment, underlining the urgent and mutual need between them.

However, as demonstrated by its wide academic discussion, the role of Sustainable Finance and CSR and their value creation has different interpretations following two main approaches, the shareholder one and the stakeholder one (Ferrell, Liang & Renneboog, 2016).

On one hand, the shareholder approach considered the classical view of CSR, argues that the main responsibility and goal of a business is to act in the interests of its shareholders (Friedman, 1970). Thus, during the decision process, the manager needs to maximize the firm’s profit taking into account mainly the economic dimensions and not external considerations. Following this approach, CSR, which is viewed as a cost for the firm, is part of the management of the company only to the extent that it suits the owner (Garriga & Melé 2004). Following this approach an organization that does not consider factors other than economics is more

competitive and profitable since it has fewer management costs (Jensen, 2010). Consequently, the relationship between ESG and FP is seen as negative (Fatemi, Glaum, & Kaiser, 2018).

On the other hand, the stakeholder approach argues that the main responsibility of a business is to act in the interests of its stakeholders (Freeman, 2010). The term "stakeholder" is used to refer to all actors associated with a company's business, such as shareholders, employees, customers, business partners, government, and non-governmental organizations (Panwar et al., 2006). Companies must consider the environmental, social, and governance components when implementing solid CSR management to produce value for all stakeholders. In doing so, while the value for stakeholders is maximized, the risk of the traditional approach is reduced, developing a positive relationship with the FP (Ferrell et al., 2016). In essence, this alternative perspective considers the company as an active part of society that is responsible for its well-being (Marrewijk, 2003).

McGuire, Sundgren, and Schneeweis (1988) examined the roots of the interaction between finance and CSR, finding that investors were becoming more concerned about sustainability. Thus, in the eyes of stakeholders, a company that implements a robust and well-functioning sustainable finance and CSR strategy acquires a favourable competitive advantage. This advantage attracts long-term investments, highly qualified employees, and loyal customers (Porter & Kramer, 2011). Focusing on customers, which are often a firm's major source of profit, Forbes' research (Steele, 2021) found that 94% are more inclined to stay loyal to a company that uses sustainable and transparent practices in their services or products.

According to Eccles, Ioannou and Serafeim (2014), in addition to the different competitive advantages, the company may also be protected from environmental concerns by minimizing its impact. By reducing its environmental impact and consequently the risk related to it, it is also easier to comply with environmental regulations and reduce compensation costs. Different studies support this logic, explaining the concept of active ownership as a means of preventing negative repercussions of actors on socio-ecological systems (Dimson, Karakaş, & Li, 2015; Appel, Gormley, & Keim, 2016).

According to Barnett and Salomon (2012), adopting environmentally sustainable and socially responsible activities is one of the most effective ways for an organization to gain and maintain stakeholders' trust and confidence, and such behaviours can be lucrative. Based on their research, they concluded that companies with stronger CSR management perform better financially, not only because their consumers are more loyal, but also because their operational risks are lower, which has become increasingly costly for businesses in recent years.

To summarize, within CSR and Sustainable Finance there are two main approaches. On one hand, the stakeholder approach sees them as beneficial tools for the long-term development of all the stakeholders. On the other hand, the shareholder approach accounts for them as positive instruments only to the extent that benefits the owner and the single company.

### 2.3 ESG Criteria

A variety of instruments, including the most extensively used ESG measures, have emerged to meet the demand for new frameworks with socio-environmental sustainability characteristics (Friede, Busch, & Bassen, 2015; Van Duuren, Plantinga & Scholtens, 2016). ESG is related to Socially Responsible Investments (SRI), which is a tool that strives to provide overall positive value for society by avoiding unethical behaviours (Syed, 2017). It has been implemented to assess and quantify a company's non-economic success (European Commission, 2021b). In this way, it is possible to include environmental, social, and governance factors in corporate management and investment decisions. It is not designed to replace traditional rating systems, but rather to supplement them, with the purpose to expand the amount of information available and so improve evaluations and the decision-making processes.

ESG, as one might deduce from the name, is an acronym made up of three foundations: Environmental, Social, and Governance.

According to MSCI (2022a), one of the most important financial data provider companies in the last 50 years, the Environmental pillar focuses on climate change, natural resources, pollution and waste, and environmental opportunities. This criterion is used to evaluate the environmental risks and opportunities that an organization may experience during its operations, from both internal and external hazards. Due to the growing threat of climate change, it has been at the forefront of the ESG movement, attracting substantial media attention in recent years.

Instead, the Social pillar was initially left a bit behind because of the complexity of defining and standardizing it. However, after the pandemic, the vision has evolved, becoming an essential aspect. It primarily evaluates and takes into consideration the stakeholder ties of the organization. Human capital, product liability, stakeholder opposition, and social opportunities are its four categories (MSCI, 2022a).

Finally, the Governance pillar is developed around the company's internal operations management. It contains details about corporate governance and business behaviour. Contrary to environmental or social data, it has been compiled for a longer length of time. As a result, it has a more sophisticated and widespread classification (MSCI, 2022a).

Each of these criteria has its own set of sub-criteria, as shown in the table below:

*Table 1: ESG criteria classification (author's own construction as based MSCI, 2022a)*

<b>Environmental</b>	Climate Change	<ul style="list-style-type: none"> <li>• Carbon Emissions</li> <li>• Product Carbon Footprint</li> <li>• Financing Environmental Impact</li> <li>• Climate Change Vulnerability</li> </ul>
	Natural Resources	<ul style="list-style-type: none"> <li>• Water Stress</li> <li>• Biodiversity and Land Use</li> </ul>

		<ul style="list-style-type: none"> <li>• Raw Material Sourcing</li> </ul>
	Pollution and Waste	<ul style="list-style-type: none"> <li>• Toxic Emissions and Waste</li> <li>• Packaging Material and Waste</li> <li>• Electronic Waste</li> </ul>
	Environmental opportunities	<ul style="list-style-type: none"> <li>• Opportunities in Clean Tech</li> <li>• Opportunities in Green Building</li> <li>• Opportunities in Renewable Energy</li> </ul>
<b>Social</b>	Human Capital	<ul style="list-style-type: none"> <li>• Labor Management</li> <li>• Human Capital Development</li> <li>• Health and Safety</li> <li>• Supply Chain Labour Standards</li> </ul>
	Product Liability	<ul style="list-style-type: none"> <li>• Product Safety and Quality</li> <li>• Chemical Safety</li> <li>• Financial Product Safety</li> <li>• Privacy and Data Security</li> <li>• Responsible Investment</li> <li>• Health and Demographic Risk</li> </ul>
	Stakeholders Opposition	<ul style="list-style-type: none"> <li>• Controversial Sourcing</li> </ul>
	Social Opportunities	<ul style="list-style-type: none"> <li>• Access to Communications</li> <li>• Access to Finance</li> <li>• Access to Healthcare</li> <li>• Opportunities in Health and Nutrition</li> </ul>
<b>Governance</b>	Corporate Governance	<ul style="list-style-type: none"> <li>• Board Diversity</li> <li>• Executive Pay</li> <li>• Ownership and Control</li> <li>• Accounting</li> </ul>
	Corporate Behaviour	<ul style="list-style-type: none"> <li>• Business Ethics</li> <li>• Anti Competitive Practices</li> <li>• Tax Transparency</li> <li>• Corruption and Instability</li> <li>• Financial System Instability</li> </ul>

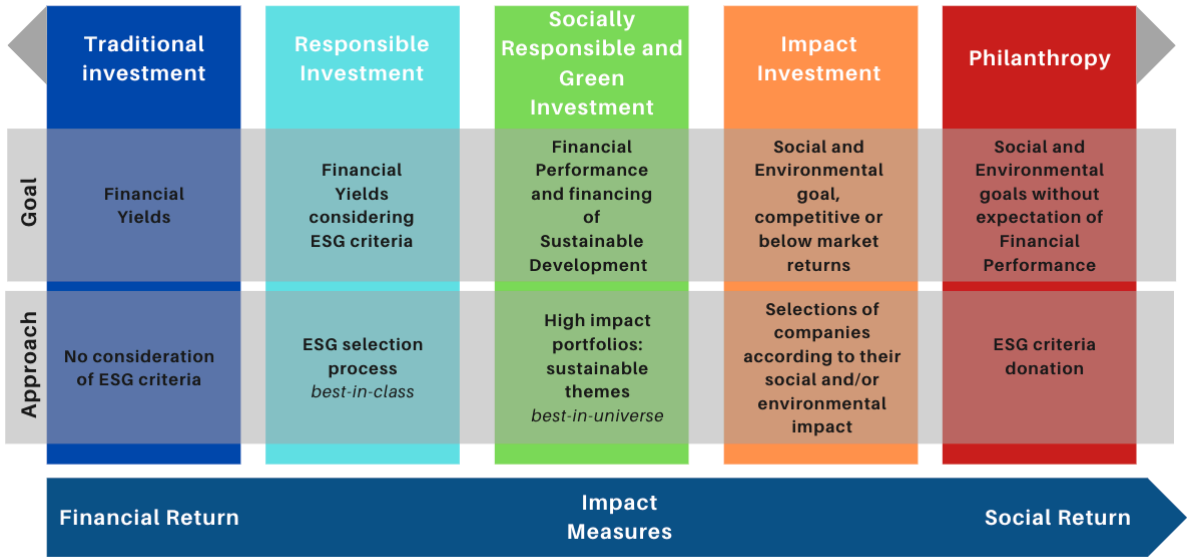
A company's good ESG performance indicates that it is not just adding value to society but also being in line with institutional guidance. The Environment component, for example, contributes to compliance with international agreements such as the 2015 Paris Agreement. However, as previously stated, the value of this instrument does not only rely just on ethical issues but also on positive investment decisions, as many academics believe (Friede, Busch & Bassen, 2015; Whelan et al., 2021; Koundouri, Pittis & Plataniotis, 2022). Incorporating ESG elements into the equation reduces long-term risks associated with an organization's operations. As a result

of this shift in the traditional paradigm, investors should expect safer investments and better financial results (Syed, 2017).

In summary, the ESG criteria are the foundation of sustainable finance, and consequently of sustainability compliant investing. When deciding how to construct a portfolio or a corporate strategy, the latter tool considers ESG performance as a key part, shifting the emphasis from solely on financial return to social return. Figure 2 depicts the spectrum of investments and light blue, and green columns represent strategies that include ESG criteria. The more conventional investing modes can be found in the columns to the left, while the more sustainable options are shown to the right.

Although this thesis largely focuses on ESG criteria from the point of view of the organizations, it could also be considered as a guide for private investors to understand if is financially correct to invest in ESG-based companies.

Figure 2: Spectrum of Investment (author’s own construction as based on Knowledge hub.Unido.Org, n.d.)



### 2.3.1 ESG Rating Agencies

With the rise of the sustainability sector and, consequently, of the ESG criterion, rating agencies play an essential role. These ESG rating agencies examine and evaluate a company's sustainability performance by assigning a score. They combine a variety of data related to the environmental, social and governance impact of organizations, so that institutional investors, asset managers, financial institutions, and other stakeholders can comprehend a company's sustainability. Hence, this score is valuable not just for companies and their stakeholders in determining how to enhance their ESG performance, but also for intra-industry competitor comparisons. However, there is currently a major lack of standardization in this sector

(Kotsantonis & Serafeim, 2019). Each rating agency uses its own technique for computing the ESG score. It is not uncommon to see different ESG scores for the same company due to different agencies' evaluations (Fiskerstrand et al., 2020). This condition, plus the presence of phenomena such as green-washing (de Freitas Netto et al., 2020) or the lack of institutional or technical support (Ahlström & Monciardini, 2021), undermine the potential of these instruments, hindering the sector's development.

Another downside of these organizations is the unavailability of the data they generate. Because this is a highly profitable industry with high demand, obtaining this information or services in most circumstances requires paying a premium fee. This hampers the growth of ESG ratings in the public eye and puts small businesses at a disadvantage because they cannot afford such expensive prices. As a result, typically some SMEs do not have ESG ratings even if they match the criteria (Dorfleitner, Kreuzer & Sparrer, 2020). This thesis has firsthand experienced the lack of availability of this data. To address it, a new database was created that drew information from a variety of sources. As will be further explained in the data section, the data will be made public subsequently to share accessible knowledge in this sector.

Furthermore, some of the companies that determine ESG scores are Morgan Stanley Capital International (MSCI), Bloomberg, Morningstar Sustainalytics, Viego-EIRIS, and Refinitiv (Escrig-Olmedo et al., 2019). Despite their limits, these agencies significantly contribute to the promotion of sustainable development by incorporating sustainability principles into their evaluation procedures (Escrig-Olmedo et al., 2019). They have also improved transparency and consistency in an industry that has been accused of greenwashing on several occasions.

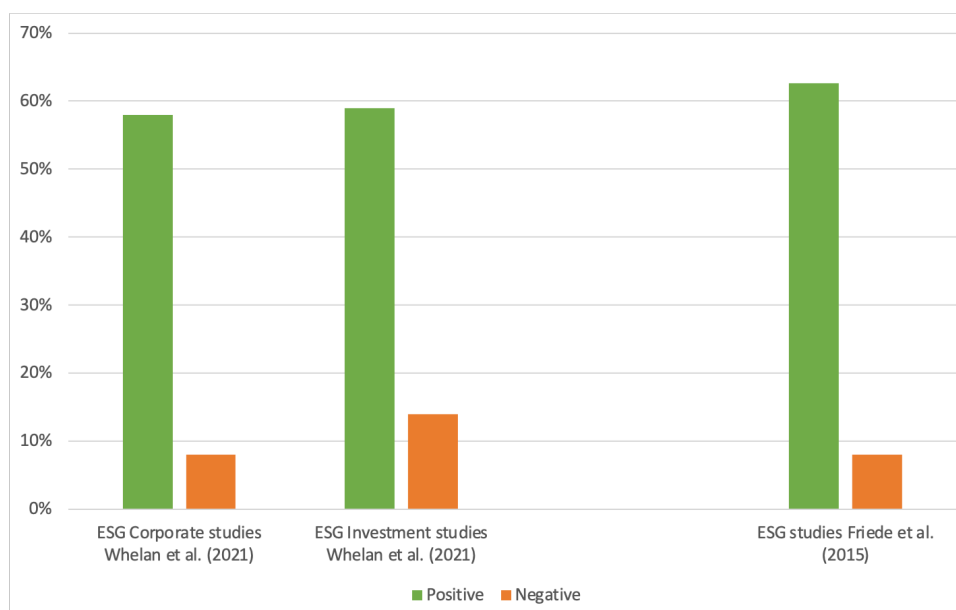
## 2.4 ESG and Financial Performance

Several studies have been conducted in recent years to study the relationship between financial performance and Environmental, Social, and Governance (ESG) factors. The overall goal was to determine the long-term effects of ESG behaviour and management on the company's and its stakeholders' financial success. Good ESG results, according to the shared academic perception, are associated with enhanced financial performance, including operational efficiencies, stock performance, and lower cost of capital.

Friede, Busch and Bassen (2015) and Whelan et al. (2021) are two studies in the field of sustainable finance and CSR that comprehensively and relevantly describe the association between ESG and Financial Performances, reviewing more than 3000 studies about the ESG-FP relationship. Figure 3 summarizes the findings of their research.



Figure 3: Summary of the results of more than 3000 studies about the relationship between ESG and FP (author's own construction as based on Friede, Busch & Bassen, 2015; Whelan et al., 2021).



Friede, Busch and Bassen (2015) released a study in the *Journal of Sustainable Finance & Investment* that examines 2200 single research on this subject from 1970 to 2015. The authors' purpose is to make broad statements about a topic that is both new and fragmented in research. They discovered that over 90% of research has a non-negative link after analyzing primary and secondary data from previous academic studies. Furthermore, 62.6% show a positive association with a central average correlation of roughly 0.15. As a result, they noticed how effective adoption of ESG criteria had a positive impact on a company's financial performance.

Analysing more than 1000 research studies from 2015-2020, the meta-studies by Whelan et al. (2021) confirm the findings of Friede, Busch and Bassen (2015). The authors, in partnership with NYU Stern Center for Sustainable Business and Rockefeller Asset Management, observed a 58% positive relationship for firm studies and a 59 % positive relationship for investment studies. They came to three major conclusions. First, the positive ESG-FP association improves over time. Hang, Geyer-Klingeberg and Rathgeber (2019) found no effect in the short term but a beneficial effect in the long run, which supports this conclusion. Second, ESG investments are less hazardous, particularly in times of global crises. Even after accounting for the COVID-19 crisis, 24 of the 26 ESG index funds outperformed their traditional equivalents in 2020. Third, without competent and effective management, ESG disclosure alone does not contribute to improved financial performance. As a result, only 26% of studies focused on disclosure identified a positive association within ESG-FP.

After reviewing the prior literature, another way to understand the relationship between ESG and FP is to compare the performance of traditional indices and ESG indices. Looking at the MSCI World Index to the MSCI World ESG Leaders Index, it is undeniable that there is evidence in favour of the researchers' general opinion of a positive association between ESG and FP (MSCI, 2022b). Considering the main financial performance of the indices, it is possible

to demonstrate that the sustainable investment option is now an economically successful choice, benefiting not just society and the planet, but also investors and businesses.

On the one hand, the MSCI World Index, which covers large and mid-cap equities from 23 Developed Markets, is one of the most widely followed stock indices in the world. The MSCI World ESG Leaders Index, on the other hand, is a capitalization-weighted index that through the best-in-class selection focuses on companies that have high environmental, social, and governance (ESG) performance. According to data from 2007 to 2022, the MSCI World ESG Leaders index equals or outperforms the MSCI World in terms of profitability. Furthermore, by comparing them to the index elements, it is also possible to see that the MSCI World ESG Leaders have stronger stock growth and lower stock risk. Despite this tendency does not provide clarity about the future since they are relatively new, by studying the past trajectory of the market it is feasible to identify probable margins of expansion.

Furthermore, the empirical data in table 2 confirms the financially competitive nature of ESG investments. Thus, it is reasonable to conclude that the MSCI ESG index is more convenient for investors, even if just by a few percentage points. If the trend continues in the same direction as it is currently, the difference will, nevertheless, become increasingly apparent in the future. This comparison of stock indices demonstrates that the conventional view of the trade-off between economic gain and sustainability is outdated. In recent years, thanks to the growth of the sustainable finance sector, it has been possible to invest in a medium-long term perspective, gaining both economic and socio-environmental value (Musto, 2022).

*Table 2: Index Performance - Gross Returns (%) (author’s own construction as based MSCI, 2022b)*

<b>Index Performance - Gross Returns (%)</b>	<b>1 Year</b>	<b>3 Year</b>	<b>5 Year</b>	<b>10 Year</b>
<b>MSCI World ESG Leaders Index</b>	11.29	16.13	7.15	11.58
<b>MSCI World Index</b>	10.60	15.55	13.01	11.49

## 2.5 ESG Implementation

Analyzing the ESG implementation to date, it is possible to observe that this approach has been growing. ESG criteria have been gradually incorporated into the strategies of an increasing number of organizations operating in the global economy, as well as an increasing number of institutions have adopted reporting standards that take ESG elements into account. The ESG+LAW Institute's 2021 report (2021) highlights how investor compliance with sustainable goals has gone from a fashionable idea to a practical plan. The environmental component of ESG has been the major emphasis in recent years due to the severity of the climate problem.

However, the attention on the social sphere has also grown due to the emergence of many social justice movements in the second half of the 2020s and shareholder activism.

To fully comprehend the magnitude of the ESG market, it may be beneficial to look at the data. In the third quarter of 2021 sustainable fund assets exceed US\$3.9 trillion (Murugaboopathy & Maan, 2021). After December 2021, 95% of S&P 500 corporations have provided substantial and detailed ESG disclosures. Furthermore, according to the Federated Hermes ESG Investing Survey (2021), over half of the investors believe that ESG practices have led to higher financial returns over time. Meanwhile, 81% of investors take ESG factors into account when building their portfolios.

The year 2021 was a remarkable year for ESG developments globally. In the following paragraphs, the European and Italian contexts will be examined in specific under the goal of this research.

### 2.5.1 ESG EU Panorama

The European Union stands out from other global players primarily for its commitment to and leadership in sustainable development. European institutions have mobilized to support the growth of sustainable finance by increasing market transparency and incorporating ESG principles into businesses and investment processes. This commitment is beyond the various achievements of individual countries in the Union and is demonstrated at the systematic level by regulations, such as the Renewed Sustainable Finance Strategy (RSFS) (European Parliament, 2021), the EU Green Deal (European Commission, 2019a), the Sustainable Finance Disclosure Regulation (SFDR) (European Commission, 2019b), Climate benchmarks (European Commission, 2019c), and EU taxonomy (European Commission, 2020). Thanks to the latter document, a classification scheme that defines what it means to be an environmentally friendly organization under EU jurisdiction has been developed. It might be critical to support the EU in promoting sustainable investment and implementing the European Green Deal. Therefore, a more precise definition of environmental sustainability for companies, investors, and institutions would also boost investor confidence, fight greenwashing, help companies become more environmentally friendly, diminishes market fragmentation, and help direct funds to areas that need it most. Such a tool will undoubtedly continue developing to become more user-friendly and socially engaged in the near future.

European institutions have stepped up their efforts to assist the expansion of sustainable finance by boosting market transparency and incorporating ESG principles into corporate operations and investment procedures. The work of Bruno and Lagosio (2021) shows how important it is to work at the European level to harmonize and level out various national laws. The two Italian researchers found that working at the European level is beneficial for each member, even though disclosure requirements at a national level are quite different, as understandable by their comparison of national European regulations for ESG. Table 3 attempts to establish a framework for comparison by classifying EU states into four groups. A fundamental premise

to fully understanding the following table is that this study focuses primarily on the banking industry.

Table 3: National European regulations on ESG factors (author’s own construction as based Bruno & Lagasio, 2021).

Countries	Disclosure Requirements	ESG Related Requirements	Prudential Requirement Related to ESG
Italy, France, Denmark	Banks, mutual funds, insurance providers, and asset managers are all types of institutional investors who are required to report their holdings.	No specific requirements	No specific requirements
Germany, Netherlands, Spain, UK	Just pension funds have to disclose their holdings.	No specific requirements	No specific requirements
Belgium	No specific requirements	Asset managers need to describe how ESG factors into their investing strategy.	No specific requirements
Austria, Luxembourg, Portugal, Sweden	No specific requirements	No specific requirements	No specific requirements

Italy, France, and Denmark are a few of the European nations providing higher legislation for ESG criteria in the financial sector. Even though the sector is growing, their efforts are still insufficient. ESG disclosure alone, as previously indicated, does not result in sustainable development or financial benefits (Whelan et al., 2021). Therefore, it will be essential to keep adhering to European directives and try to include ESG into financial and economic strategy in the next years.

Koundouri, Pittis and Plataniotis (2022) demonstrated through an analysis of enterprises across 17 European States that in the Eurozone, businesses with great ESG ratings typically had higher profitability than the rest. However, upon analyzing their data, they include companies from the STOXX Europe ESG Leaders 50 index, which contains best-in-class and big companies, leaders of their sectors and ESG. In other words, it is difficult to generalize these findings to a larger sample of companies, accounting also for SMEs. Furthermore, in the case of Italy, the

results are not too valid because just 3 Italian observations were included. While it is more accurate for France, Germany, Switzerland, and the UK.

## 2.5.2 ESG Italian Panorama

Despite the strong drive toward sustainability coming from the European institutions, as above-explained, ESG standards in Italy are still a subject not sufficiently developed, as shown by the limited number of available Italian studies related to this topic (Europe Sustainable Development Report, 2021). This Italian underdevelopment was mainly due to the lack of regulatory technical standards. However, thanks to the Italian Legislative Decree 254/2016 (Repubblica Italiana, 2016) and the EU regulation 2088/2019 (European Union, 2019c), 2021 marked a watershed moment for sustainability within corporate strategy, also in the Peninsula. Under this regulation, financial operators and companies are now obliged to provide detailed information to investors on how they manage ESG risk and business impact.

Recent developments also point towards a more sustainable sector for Italian institutional investors. The Forum for Sustainable Finance (2021) examined 115 pension funds and found that 80 had included sustainability risks in their risk management strategy. Furthermore, 52 pension funds report that they assess ESG risks concerning their activities and strategies. The sustainable investment market in Italy, as well as the rest of Europe, has been on a gradual and slow upward trajectory. According to the Forum for Sustainable Finance (2021), the challenges, that the central institutions will face, include completing the implementation of previously approved regulations, monitoring the effectiveness of the instruments implemented, gradually improving the quality of data available to investors, and introducing clearer quality standards and certification.

Regarding specific studies about Italian companies within the ESG field, according to the report published by CONSOB (Linciano & Ciavarella, 2019), in 2019, 151 of the 231 companies with ordinary shares listed on the Italian MTA released a non-financial statement, as figure 4 shows. Among the non-reporters, 72 companies were exempted from reporting due to factors such as size or a specific relationship with the parent company. Furthermore, figure 5 depicts that the majority of these 151 companies simply filed a non-financial statement rather than more comprehensive sustainability and ESG reports. According to a poll conducted by the authors, only 41% of board members of Italian companies feel that effective ESG integration has a favourable impact on financial performance.

Figure 4: Italian listed companies publishing non-financial information in 2019 (author's own construction as based on Linciano and Ciavarella, 2019).

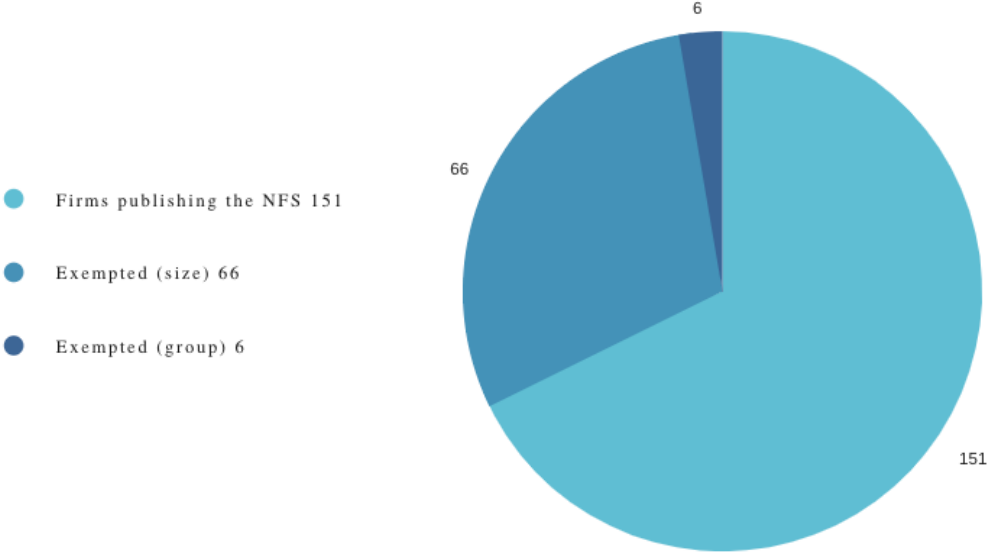
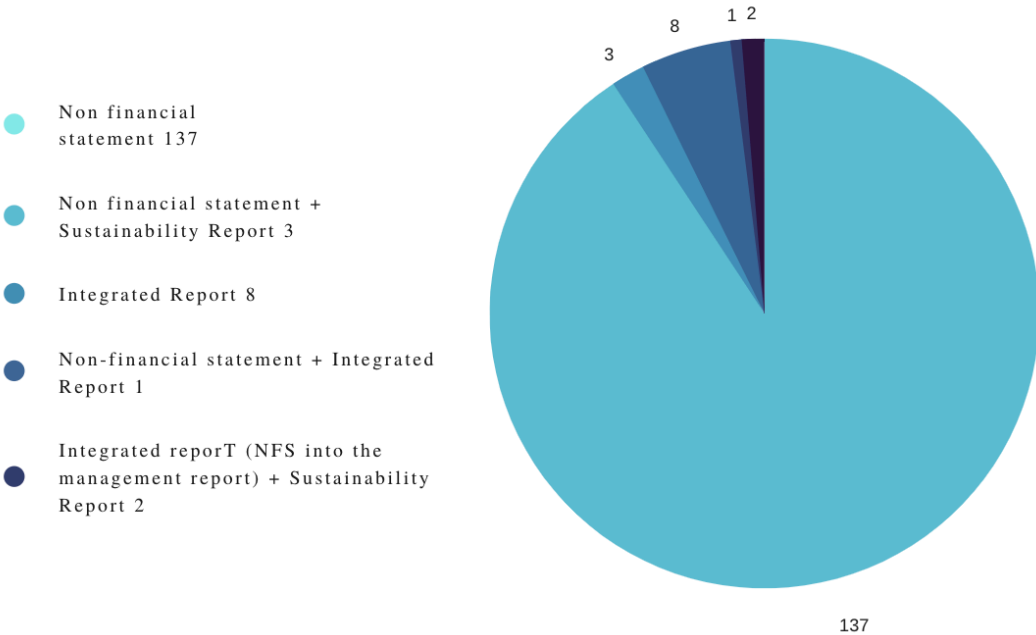


Figure 5: Non-financial information reports released by Italian listed firms in 2019 that are subject to the Decree (author's own construction as based on Linciano and Ciavarella, 2019)



Although a limited number of comprehensive quantitative research on the relationship between ESG ratings and FP in Italy, Landi and Sciarelli (2018) conducted an extensive study on the impact of Corporate Ethics Assessment on FP from 2007 to 2015. This research, which conducted a comparative analysis of the Italian landscape, served as the basis for this paper. They discovered a growing interest in CSR and sustainability, but a not positive and statistically significant impact on FP. This result could mean that, while sustainability and ethical criteria are becoming more popular, they are still not seen as a viable fundraising tool for Italian-listed

firms and investors. As a result of their work, they concluded that the Italian stock exchange market did not appear to reward ESG-responsible enterprises between 2007 and 2015.

When reviewing the literature concerning ESG, it is insightful to describe the unique work of Clementino and Perkins (2020). Unlike most of the presented studies, that look directly at the ESG ratings and their impact on FP, the two scholars have developed an interesting study on how companies in Italy relate to and react to ESG ratings. In other words, it is unique qualitative research about the companies' responses to this sustainability trend. Their findings reveal that there is no one-size-fits-all strategy for rating, but responses can be divided into four categories: passive conformity, active conformity, passive resistance, and active resistance. Because of the importance of reputation with old and new investors, active conformity is the proper response for most enterprises in their sample.

In light of what has been analyzed, Italy can be considered a developed market in terms of non-financial information disclosure. However, Cordazzo, Bini and Marzo (2020) recently examined non-financial data before and after the implementation of required ESG disclosure. The study's findings show no consistent changes following the law's implementation because Italian-listed corporations only divulge the bare minimum in terms of such disclosure. When ESG principles are implemented incorrectly, one of the most frequent errors is the adoption of a compliance-oriented approach. A reactive kind that concentrates on managing ESG only to simply comply with legislation and regulations through the bare minimum. Consequently, this approach does not favour the development of the sector, supporting the finding of Whelan et al. (2021) that disclosure alone does not contribute to improved financial performance.

## 3 Data

Data is one of the major limits of this sector, as was already noted. Despite being present and extensive, they are mostly provided to financial industry insiders in the form of a pricey service. Due to the limited resources, conducting quantitative research in this sector as a student is challenging. Furthermore, these datasets are quite scarce in terms of Italian organizations due to the underdevelopment of sustainable finance. Thus, to address these problems, a new ad hoc database was created, and it will be made freely available to the public after the conclusion of this study to promote further discussion on the subject. This database contains 33 economic, financial and ESG variables for 61 Italian listed organizations, for a total of 2.013 observations. (See Appendix A to see all the variables)

The present Section 3 follows this division: in section 3.1, the data collection and sampling strategy will be explained step by step. Section 3.2 describe the nature of the data in general and in the specific case for each variable used in the final models.

### 3.1 Data Collection and Sampling

Data from various sources were selected to generate a new and ad hoc database for the research of the relationship between ESG and ROE in the Italian context. To improve the quality of the analysis, several control factors were also chosen and included in addition to the dependent variable and independent variables. The data includes up-to-date information as of December 31, 2021, for 61 businesses listed on the Italian stock exchange. The organizations were chosen using an exclusion method based on the availability of data. Beginning with an identification process of more than 300 firms with IPOs on the Italian stock exchange updated through 2021 (Borsa Italiana, 2021), a final total of 68 entities was reached, selecting all Italian listed actors with ESG risk ratings from Morningstar Sustainalytics (2021).

The ESG data originates from the Sustainalytics database, and it was chosen since is a pioneer in ESG research, ratings, and analytics, for the last 30 years. As a demonstration of their work's quality, they created data about businesses operating in more than 170 nations. Furthermore, the Sustainalytics database also includes different details on risk management and a company's exposure to ESG issues. Both components will be used in the analysis to broaden the understanding of the research.

To achieve the intended analysis, the database was supplemented with company-specific demographic and financial data from the Bureau van Dijk Orbis database (2021). This platform provides a thorough firm database with indicators for measuring financial and operational



strength. They are the ideal source for gathering information on organizations because they have data on more than 400 million players worldwide.

At this stage, the total number is reduced to 61 from 68 companies due to a lack of data on some of the relevant variables. Then, organizations considered outliers compared to others were excluded. Dropping observations with a net profit of more than 3 billion and with an ROE lower than -40% and higher than 60% (See Appendix B for the box plot graph about outliers).

Both sources were chosen due to the databases' accessibility and the institutions' relevance. As a result, a reliable, valid, and consistent dataset is produced with 58 companies and 33 variables, that make up the final sample, as figure 6 depicts. The database will be available for future research to students not only as a tool to enhance the knowledge sector but also to demonstrate the reliability of the data. Furthermore, each variable will be discussed in detail in the following section, and it is possible to find a company description table in Appendix C.

Figure 6: Data flow chart showing data cleaning for the final sample (created by author for the purpose of the study)



### 3.2 Data Analysis

Data about 58 organizations registered on the Italian stock exchange through 2021 can be found in the dataset. The company's description, type, industry, and the number of employees were provided in addition to data on ESG risk and recent financial performance. Specifically, some variables only take into account the most recent year available, meanwhile, for others, it is assessed as an average for a period of three years since the most recent year available. The different time intervals are meant to improve the analysis's quality. The time for each variable will be mentioned in the explanation of the variables used in this study.

The exposure to and management of ESG risks are both incorporated in the ESG risk rating. However, to provide a more comprehensive picture of the company's ESG standards, the latter two factors were incorporated as single variables. Regarding the FP, in addition to the conventional ROE, other metrics like net profit, EPS, market capitalization, and Beta coefficient were included (Bernard, 1999).

### 3.2.1 Variable Definition and Measurement

The variables that are part of the final models will be defined and examined in this next part.

*Dependent:*

- Average ROE (%) (*avg\_ROE\_last\_3y*):

The Return on Equity (ROE) rating is the dependent variable in the model used for this research. It is one of the most important metrics for assessing a company's financial performance. It is known as the return on net assets because it is computed by dividing net income by shareholder equity, which is obtained by deducting debt from a company's assets. An organization is thought to be more profitable when its ROE is higher. ROE has been chosen as an indication of the FP since it is thought of as a reflection of a company's profitability and effectiveness in generating profits. Of course, when comparing organizations, one must consider that each ROE differs based on the industry in which the company operates (De Wet & Du Toit, 2007).

With an average value of 15.86%, this measurement, which is expressed as a percentage, ranges from -10.06%, which is the least negative value, to 49.15%, which is the largest positive value. The ROE variable was created by the average of data about the latest three years that were accessible to provide a more complete picture of the company's status. The calculation formula is shown below:

$$ROE = (NetIncome/Equity) * 100$$

Eq.1

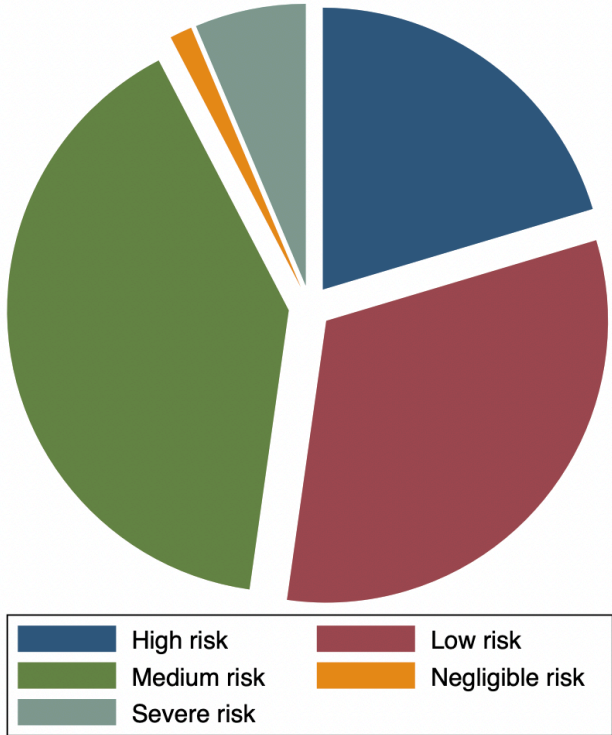
*Independent variables:*

- ESG risk (*ESG\_risk*):

In the model of this analysis, the ESG risk rating is one of the independent variables. Its usefulness lies in the fact that the rating can help companies and investors identify ESG issues and assess the extent to which such risks pose a financially significant risk. In other words, this variable measures the degree to which ESG issues jeopardize a company's value, also considering unmanaged risk. The higher the number, the higher the risk associated with the company's activities. To interpret better the level of risk, it is possible to classify it into five categories: negligible risk (0-10), low risk (10-20), medium risk (20-30), high risk (30-40) and severe risk (40+). To compute and evaluate the exact score, a total of 138 sub-sector classifications and an analysis of the potential effects of 20 "Material ESG Issues" (MEIs) for

each sub-sector are used. The following figure depicts a pie chart of the ESG risk rating distribution following the five risk categories.

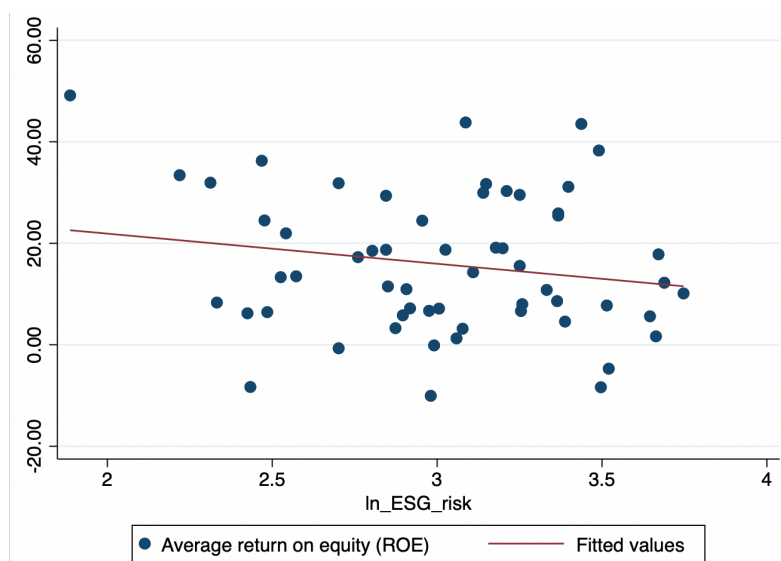
Figure 7: Pie chart of the ESG risk rating distribution following the five risk categories (created by author for the purpose of the study)



Despite this variable includes the exposure to and the management of ESG risk, the latter will be used as individual independent variables in this analysis.

As for the technical part of the variable, the sample has a positive skewness, with most of the values clustered around the left tail of the distribution. One option to solve the non-normality problem would be to use the natural log of the variable. Thus, following a theoretical approach to make the differences at the extremes less pronounced, it is transformed to its natural logarithmic form  $\ln\_ESG\_risks$ . In this way even though a perfect normal distribution was not obtained, the variable was improved, and a possible solution was generated to address the normality assumption of the residuals in the final model. Regarding its values, it has a minimum of 1.89 and a maximum of 3.75, with a mean of 3.01. Figure 8 shows a two-way chart between ROE and ESG risk in terms of data visualization, and it can be seen that ESG has a negative relationship with ROE, as expected.

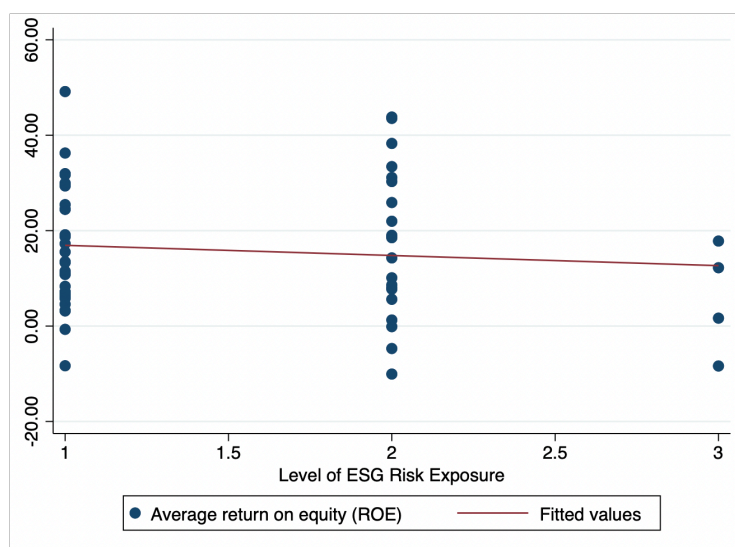
Figure 8: ROE and ESG risk (created by author for the purpose of the study).



- ESG Risk Exposure (*lvl\_expo*):

The variable ESG risk exposure describes how much an organization is exposed to different important ESG challenges. The Sustainalytics exposure score considers characteristics unique to the industry and the business model of the company. This variable's significance stems from the fact that it demonstrates a company's exposure to ESG risk. In other words, this is a measurement of potential losses in the future that might be caused by ESG issues that occurred within the sector in which they operate. Being a categorical variable, it has three levels: Low-Risk Exposure, Medium-Risk Exposure, and High-Risk Exposure. Likewise, for the relation between ESG Risk Exposure and ROE, there is a negative trend in the data, as figure 9 depicts.

Figure 9: ROE and ESG risk exposure (created by author for the purpose of the study).

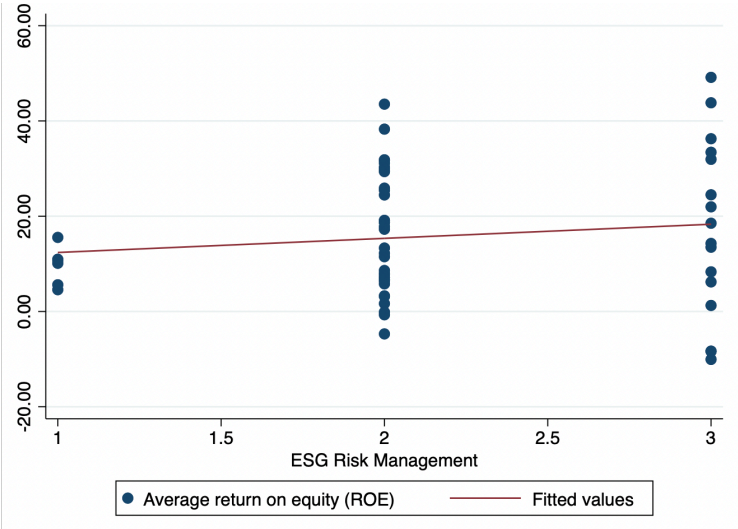


- ESG Risk Management (*lvl\_management*)

The ability of a corporation to manage pertinent ESG issues is referred to as ESG risk management. The strength of a company's ESG programs and policies are evaluated using the

Sustainalytics management score. It comprises the cultures, procedures, and organizational frameworks established to handle the possible drawbacks of ESG elements. Their objective is to decrease risks to an acceptable level considering that it is typically not feasible nor desirable to completely eradicate all ESG concerns. It is a categorical variable with three levels (Weak Risk Management, Medium Risk Management, and Strong Risk Management) that describe the range of corporate ESG management. As figure 10 delineate, there is a positive relationship between the dependent and independent variable.

Figure 10: ROE and ESG risk management (created by author for the purpose of the study).



- Strong ESG risk management x ESG risk exposure (*STRONG\_mana###vl\_expo*): This variable was developed to study the interaction effect between ESG risk exposure and ESG risk management. By doing this, it is examined to see if the impact of strong ESG risk management varies consistently with the dependent variable's changing ESG risk exposure value. Strong ESG risk management is a dummy that, for organizations that have it, has the value 1, whereas ESG risk exposure is a categorical one, as was aforementioned.

*Control variables:*

To complete the model, several control variables identified in previous literature were added as influences toward ROE, ESG risk, ESG risk exposure, and management. These variables are Earnings per Share (EPS), systematic risk (Beta), number of employees, net income, market capitalization, type of organization, and industry dummy.

- EPS (*ln\_EPS\_2*): According to Jewell and Mankin's (2016) study, earnings per share (EPS) is a crucial extra criterion to take into account when assessing a company's profitability. It is calculated by dividing a company's earnings by the quantity of outstanding common shares. The higher an organization's EPS, the more profitable it is considered to be. It was utilized in the logarithmic form to address the issue of this variable's non-normality. By adding the minimum to all observations, the problem of negative values that hindered the transformation was resolved. As

a result, the model is enhanced, and a nearly normal distribution is obtained. This variable's temporal frame is specific to the most recent year that was available.

- Systematic risk (*Beta\_1\_y*):

According to Surroca, Tribó, and Waddock (2010), the beta value represents a stock's systematic risk or volatility concerning the market, often the S&P 500. In other words, stocks having a beta value higher than 1.0 might be viewed as being more volatile and carrying a higher risk of financial loss than the S&P 500 index (Hong and Sarkar, 2007). Usually, the beta is used in the capital asset pricing model, which describes how systematic risk and expected return on assets are related. Using this variable as a control, the last available year of systematic risk of each stock was investigated and contrasted with ESG risk.

- Net profit (*ln\_avg\_net\_profit\_last\_3y164*):

Net income is the accounting period's profit for an organization. In other words, a company's net income includes all its costs and expenses, which are deducted from its revenues. Investors can assess a company's total profitability by looking at its net income or net profit, which reveals how well its management is performing. According to the literature, the variable is stated in the logarithmic form to account for the distinction between small and large enterprises (Harjoto & Laksmana, 2018; Dremptic, Klein & Zwergel, 2019). However, even in this case, the theory's suggested solution for the problem of negative values was to add the minimum to all observations. To enhance the study, this variable includes information on net income for the previous three years that was available.

- Market capitalization (*ln\_Market\_cap*):

The market capitalization, or market cap, of an organization is the total value of all its shares of stock (Wang et al., 2014). It is computed by dividing the stock's price by the total number of shares that are currently outstanding. It was used as a control variable because it may be used to understand a company's value by removing it from its context. The logarithmic form was also adopted for this variable, both for the theoretical reason of normality and for the logical purpose of reducing the distance between small and large organizations.

- Number of employees (*ln\_n\_employ*)

The number of employees is another sign of a company's size. Knowing the firm's staff numbers facilitates understanding internal management and, in turn, company governance. Additionally, it may be connected to the company's social influence. These factors led to the inclusion of the employee count as a control variable. The logarithmic form was used for the same reasons as for the other variables.

- Type of organization (*Lvl\_Typo\_organizationIfirm*):

A categorical variable was made for each type of actor to control the variations among the various actor typologies. As a result, it is coded with three variables for each type of organization: 1 for firms, 2 for banking institutions, and 3 for insurance companies. This

classification adheres to the standards set forth by the Bureau van Dijk Orbis database, the data source.

- Type of industry (*ind*):

This last control variable was added to account for the differences between industries. As was already mentioned, a company's ESG standards heavily depend on the industries in which it engages. Thus, it is essential to comprehend and consider the sector during the investigation. The variable was encoded as a dummy between the manufacturing (1) and services (0) industries since there were not enough observations in all seventeen industries that were collected during the database development. Then this control variable, which was created using the MSCI (2020) industry categorization, takes into consideration the various implications for the two macro-areas. Each industry grouping's specific industries are listed in Appendix D.

### 3.2.2 Descriptive Statistics

The next table includes a summary statistic that quantitatively characterizes the model's included variables and assists in understanding the data and analysis. It includes measures of central tendency and variability, such as mean and median values, standard deviation, skewness, kurtosis, and minimum and maximum values. The wide range of ROE shows that the sample organizations' performance varies, with a mean value of 15.9%. For the sample, the mean logarithmic ESG risk is 3.017, with a standard deviation of 0.42. When it comes to ESG components, the management pillar has the highest mean value on the second level, whereas the exposition pillar has the highest mean value on the first and second levels. These figures seem reasonable as they are in line with the figures provided in prior research on this subject.

Table 4: Descriptive Statistics (created by author for the purpose of the study).

Variable	Obs	Mean	Std. dev.	Skewness	Kurtosis	Min	Max
avg_ROE_last_3y	58	15.86489	13.77651	.3483421	2.511797	-10.06	49.15333
ln_ESG_risk	58	3.017665	.4198867	-.3761814	2.61379	1.88707	3.747148
<b>lvl_expo</b>							
1	58	.5689655	.4995461	-.2785242	1.077576	0	1
2	58	.362069	.4847961	.5739968	1.329472	0	1
3	58	.0689655	.2556086	3.402069	12.57407	0	1
<b>lvl_management</b>	58						
1	58	.1034483	.3072033	2.604237	7.782051	0	1
2	58	.6206897	.4894532	-.4974683	1.247475	0	1

<b>3</b>	58	.2758621	.4508512	1.002972	2.005952	0	1
<b>STRONG_mana</b>							
<b>0</b>	58	.7241379	.4508512	-1.002972	2.005952	0	1
<b>1</b>	58	.2758621	.4508512	1.002972	2.005952	0	1
<b>STRONG_mana##lvl_expo</b>							
<b>0 1</b>	58	.4310345	.4995461	.2785242	1.077576	0	1
<b>0 2</b>	58	.2413793	.4316571	1.208734	2.461039	0	1
<b>0 3</b>	58	.0517241	.2234038	4.048195	17.38788	0	1
<b>1 1</b>	58	.137931	.3478392	2.1	5.41	0	1
<b>1 2</b>	58	.1206897	.3286114	2.328727	6.422969	0	1
<b>1 3</b>	58	.0172414	.1313064	7.417381	56.01754	0	1
<b>ind</b>	58	.4482759	.5016609	.2080126	1.043269	0	1
<b>Beta_1_y</b>	58	.7151724	.3105696	-.0788616	2.253604	.07	1.45
<b>ln_n_employ</b>	58	7.062029	1.425702	-.0160199	2.967658	3.7612	10.32581
<b>ln_EPS_2</b>	58	.8937563	.4087841	-.4039368	7.689538	-.7985078	2.006871
<b>ln_avg_net_profit_last_3y164</b>	58	5.334717	.4437315	.3538385	6.792042	3.697178	6.777267
<b>Lvl_Typo_organization</b>							
<b>1</b>	58	.8448276	.3652312	-1.904762	4.628118	0	1
<b>2</b>	58	.137931	.3478392	2.1	5.41	0	1
<b>3</b>	58	.0172414	.1313064	7.417381	56.01754	0	1
<b>ln_Market_cap</b>	58	6.398896	1.498275	.5462035	2.420642	3.744314	9.673798



## 4 Methods

A quantitative approach will be used in the study to analyze the data and develop a more comprehensive description of the situation. Given the nature of the data set, it was considered the most suitable technique that should be used. Then, the methodology selected for this thesis is deductive, so the theory is established in advance and data are gathered based on it to find evidence supporting or refuting the existing hypothesis. So, this research seeks to explain whether there is a connection between ESG and ROE for Italian firms. An ordinary least squares (OLS) model is used to test the basic four hypotheses of this paper in order to estimate the coefficients of the linear regression equations, which describe the relationship between the dependent variable and the independent variables.

Thus, the present Section 4 explains the methodology chosen for this analysis. Section 4.1 presents the analytical framework through its specification and accuracy testing. The section concludes with a discussion of the limits of the present analysis.

### 4.1 Analytical Framework Specification and Testing

The models evaluate the previously provided hypotheses using the ordinary least squares (OLS) regression model, which is a form of linear least squares approach for assessing the unknown parameters in a linear regression model (Ohlson & Kim, 2014). Four models are developed with ROE (*avg\_ROE\_last\_3y*) as a dependent variable for the four hypotheses regarding 58 Italian organizations each. In other words, a similar model is being presented in four different ways, each of which looks at the relationships between the dependent variable and the ESG risk (*ln\_ESG\_risk*), level of ESG risk exposition (*i.lvl\_expo*), level of ESG risk management (*i.lvl\_management*), and strong ESG risk management x ESG risk exposure (*STRONG mana##lvl\_expo*) variables separately. Models 2, 3 and 4 are assessed to obtain detailed information that can be missed if examining just the general ESG scores (Wang & Sarkis, 2017; Fatemi et al., 2018).

Thus, the data analysis is performed to verify the degree of the impact of the independent variables on an organization's ROE through the following specified models:

*Model 1:*

$$\hat{Y}_{avg\_ROE\_last\_3y\ i} = \beta_1 + \beta_2 * ln\_ESG\_risk + \beta_3 * ind + \beta_4 * Beta\_1\_y + \beta_5 * ln\_n\_employ + \beta_6 * ln\_EPS\_2 + \beta_7 * ln\_avg\_net\_profit\_last\_3y + \beta_8 * Lvl\_Typo\_organization\ firm + \beta_9 * ln\_Market\_cap + \hat{u}$$

Eq.2

Model 2:

$$\hat{Y}_{avg\_ROE\_last\_3y\ i} = \beta_1 + \beta_2 * lvl\_management + \beta_3 * ind + \beta_4 * Beta\_1\_y + \beta_5 * ln\_n\_employ + \beta_6 * ln\_EPS\_2 + \beta_7 * ln\_avg\_net\_profit\_last\_3y164 + \beta_8 * Lvl\_Typo\_organization1firm + \beta_9 * ln\_Market\_cap + \hat{u} \quad Eq.4$$

Model 3:

$$\hat{Y}_{avg\_ROE\_last\_3y\ i} = \beta_1 + \beta_2 * lvl\_expo + \beta_3 * ind + \beta_4 * Beta\_1\_y + \beta_5 * ln\_n\_employ + \beta_6 * ln\_EPS\_2 + \beta_7 * ln\_avg\_net\_profit\_last\_3y164 + \beta_8 * Lvl\_Typo\_organization1firm + \beta_9 * ln\_Market\_cap + \hat{u} \quad Eq.3$$

Model 4:

$$\hat{Y}_{avg\_ROE\_last\_3y\ i} = \beta_1 + \beta_2 * i.STRONG\_mana###.lvl\_expo + \beta_3 * ind + \beta_4 * Beta\_1\_y + \beta_5 * ln\_n\_employ + \beta_6 * ln\_EPS\_2 + \beta_7 * ln\_avg\_net\_profit\_last\_3y164 + \beta_8 * Lvl\_Typo\_organization1firm + \beta_9 * ln\_Market\_cap + \hat{u} \quad Eq.5$$

A stepwise modelling approach was used to build each model, analyzing the statistical significance of each variable following a forward selection until an adequate and suitable model was obtained. Therefore, to control and enhance the model, additional variables logically related to the dependent variable are incorporated in addition to the main independent variables for the hypothesis, through a parsimonious methodology.

When using an OLS model, it is important to verify that it has been appropriately specified and that the OLS assumptions have been met. If these terms are fulfilled, the model will produce the specified "B.L.U.E." estimators (Best Linear Unbiased Estimate). Therefore, it is essential to evaluate the fit model's effectiveness using several formally tested criteria such as residual normality, multicollinearity, and heteroskedasticity (Osborne & Waters, 2002). The condition appears to be adequate and close to normal when viewing the residuals graphically using the histogram and q-norm. However, the null hypothesis on the normality of residuals is rejected in all four sets of models when a formal test is used to check for normality. (For the histograms, qnorm, skewness, and kurtosis tests for normality, consult Appendix E.) Despite this, testing is still going on because every feasible solution has been used.

Then, the variance inflation factor (VIF) was utilized to examine the multicollinearity and subsequently the correlations between the independent variables included in the final model. The test demonstrates that every variable used in each model has a VIF lower than 5, the threshold sets for this investigation (see Appendix F for the entire test). As a result, the models will interpret the coefficients more clearly as multicollinearity, which typically causes this issue, is not a concern.

To determine whether the OLS's assumption that the error term has a constant variance is valid, it is necessary to examine the heteroskedasticity. As a result, it was employed Breusch-Pagan and White's tests, neither of which rejected the null hypothesis that the error term has a constant variance across all models (see Appendix G for both complete tests).

In conclusion, it was determined that the model is adequate after analyzing and meeting almost completely the OLS assumptions.

The final models produced have an R-square higher than 0.40 (40%) explaining the fraction of the dependent variable's variation explained by the independent variables and are significant at the 1% level. Moreover, the adjusted R-squared is higher than 0.30 for the first three models and 0.27 for the fourth model.

#### 4.1.1 Limitations

For this analysis, it has been crucial to increase in a significant way its reliability and validity through transparency of data collection and analytical tests. However, some limitations must be taken into account concerning the analysis. They will be briefly discussed in the following section.

Since the quantitative nature of this analysis, the data, the sources, or the sample size may be a constraint. The data collected are limited to the availability of the sources. For instance, there is a potential issue with the data from Sustainalytics. This source has data freely accessible for just about the last year period. Thus, it will not be possible to make any significant judgments about the long-term effect. Furthermore, the size of the sample may also be affected by the data availability of Italian organizations. 58 organizations may not be sufficient to fully represent and capture the effect between ROE and ESG.

The OLS assumptions and multiple linear regression models could present other restrictions on the analysis. Since the ESG rating is thought to be a predictive measure, linearity may be an issue because it is difficult to identify the precise nature of the relationship. In other words, it is not feasible to rule out or confirm the issue of linearity with these testing. Then, through the multiple linear regression model, it is possible to consider only measurable data. As a result, data not falling within this category may be overlooked, such as each specific corporate culture, which has a potential impact on both ESG and FP success.

Furthermore, the ESG score itself has a limitation because there is no standard methodology to compute it and consequently a variety of techniques are used by various agencies (Fiskerstrand et al., 2020). As a result, different agencies may assign a different ESG score to the same organization. However, considering Morningstar Sustainalytics as a well-regarded rating organization and due to time and space constraints, the findings in this thesis will be founded on this data.

# 5 Emperical Analysis

STATA program was used to analyze the data through the developed model. The fact that it is specifically created for data manipulation, visualization, analytics, and automated report preparation led to its selection. Additionally, it is a statistical software in which I am knowledgeable and skilled, being the one used the most during the academic year.

Four regressions will be run in addition to the Person Correlation Matrix to investigate whether there is a relationship between ROE and ESG risk scores for Italian organizations. The regressions will use cross-sectional OLS models, and one of them will take interaction effects into account.

Section 5 is developed as follows: in section 5.1, the Correlation Matrix is shown and explained. Section 5.2 present the OLS regression for the four models. Section 5.3 discuss the findings of the research, delving into different technical and practical reasons.

## 5.1 Correlation Matrix Results

The Pearson's correlation matrix was used to summarize the dataset, identify trends, and display patterns for the dependent, independent, and control variables as part of the ongoing analysis of the cross-sectional data.

Table 5: Pearson Correlation Matrix (created by author for the purpose of the study).

	avg_ROE_last_3y	ln_ESG_risk	lvl_expo	lvl_management	STRONG_mana	ind	Beta_1_y	ln_net_employ	ln_EPS_2	ln_avg_net_profit_last_3y164	Lvl_Typo_organization1fir	ln_Market_cap
avg_ROE_last_3y	1.0000											
ln_ESG_risk	-0.1810	1.0000										
lvl_expo	-0.0973	0.5649*	1.0000									

<b>lvl_management</b>	0.1285	-	0.09	1.0000									
		0.5775*	36										
<b>STRONG_mana</b>	0.0639	-	0.06	0.8639*	1.0000								
		0.5634*	19										
<b>ind</b>	-0.1929	0.0788	0.11	0.0303	0.1418	1.00							
			13			00							
<b>Beta_1_y</b>	0.1132	-	-	0.3313*	0.3354*	-	1.000						
		0.4466*	0.25			0.05	0						
			00			46							
<b>ln_n_employ</b>	-0.0247	-	-	0.4776*	0.3140*	0.16	0.362	1.0000					
		0.3693*	0.11			89	7*						
			77										
<b>ln_EPS_2</b>	0.4961*	-0.1025	0.09	0.1129	0.0410	0.00	0.211	0.0524	1.0000				
			89			95	5						
<b>ln_avg_net_profit_last_3y164</b>	0.4868*	-	-	0.2925*	0.2839*	-	0.280	0.3399	1.0000				
		0.3596*	0.08			0.20	2*	0.1152	*				
			19			34							
<b>Lvl_Typo_organization</b>	0.0806	-0.1023	0.13	0.1577	0.1138	-	0.146	-0.0540	0.0988	0.2840*	1.0000		
			15			0.36	1						
						92*							
<b>ln_Market_cap</b>	0.3364*	-	-	0.5342*	0.5561*	0.01	0.376	0.4625*	0.2354	0.6502*	0.3119*	1.0000	
		0.4743*	0.07			13	4*						
			51										

Note: The correlations significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

An initial study of Table 5 reveals that many relationships are statistically insignificant, most likely because of the relatively small sample size. The discussion section will provide a more detailed analysis of this issue, which was already mentioned in the paper's limitations. Consequently, the analysis goes on. According to the Person correlation matrix for all the variables used in the models, the ROE is substantially positively and significantly associated with the other financial variables (Market cap, net profit, and EPS), suggesting alignment between the metrics. Additionally, it should be highlighted that organizations with better ROE typically have smaller employment and reduced systematic risk (beta).

When examining ESG measures, it is clear that ESG risk and exposure have a negative but not statistically significant association with ROE, meanwhile, among the ESG measurements, ESG risk score has a good and statistically significant relationship with exposure level and a negative

relationship with management level. The tendency for manufacturing companies to have lower ROE and more exposure to and management of ESG issues may be an insightful discovery.

Overall, it is clear from the correlation coefficients that collinearity between the variables when evaluating the research models is not plausible, which supports the findings of the VIF test.

## 5.2 Regression Analysis Results

The research questions were tested using an OLS regression after examining the descriptive statistics and the correlations matrix. Four OLS regressions were performed, with ROE functioning as the dependent variable and ESG risk measures as the independent variables. Since the OLS is a model type with constant coefficients, referring to both intercepts and slopes, it was determined to be a suitable method for this research.

First of all, a comprehensive analysis of the four models is required. All have an R-squared larger than 0.40 and a statistically significant p-value at the 1% level. Additionally, the adjusted R-squared is looked at to evaluate the goodness-of-fit metric. It accounts for the percentage of variance in a dependent variable explained by the independent variable and is adjusted for the number of cases and the number of variables (Park, 2011). The adjusted R-square estimates show that all models fit the data well.

The findings of the regression analysis between the dependent variable ROE and each of the independent variables, ESG risk score, ESG risk management, and ESG risk exposition, as well as the significant interaction effect between ESG risk management and ESG risk exposition, are presented in Table 6.

According to model 1's result, there is a negative but insignificant correlation between ROE and ESG risk score. As a result, the data does not support Hypothesis H1A, which states that for Italian organizations, there is a substantial negative link between ROE and ESG risk score. The second model looked into the relationship between ROE and ESG risk management. The results are positive but not statistically significant, rejecting Hypothesis H2A, and hence do not show that there is any proof of effect between the two variables.

Through the third model, this study takes into account the association between ESG risk exposure and ROE. Again, the statistical significance of the findings is discovered to be an issue. Therefore, although negative, the relationship is statistically insignificant. Therefore, the hypothesis H3A that exposure to ESG risk has a negative impact on ROE cannot be accepted. A solid ESG management system and ESG risk exposure are the two independent variables that are the subject of the interaction effect model. Although the results are negative, they are statistically insignificant, hence H4A must be disregarded.

Table 6: Results OLS regression (created by author for the purpose of the study).

	(1)	(2)	(3)	(4)
VARIABLES	Model 1	Model 2	Model 3	Model 4
ln_ESG_risk	-1.278 (4.466)			
Lvl_management 2=Average		5.395 (6.094)		
Lvl_management 3=Strong		3.019 (6.830)		
Lvl_exposition 2=Medium			-0,722 (3.509)	0,558 (4.255)
Lvl_exposition 3=High			-6.726 (6.404)	-3.845 (7.534)
Industries	-5.252 (3.476)	-4.456 (3.587)	-4.794 (3.514)	-4.814 (3.637)
Beta	-2.713 (6.070)	-1.020 (6.023)	-3.587 (6.071)	-3.208 (6.395)
ln_n_employee	-1.407 (1.401)	-2.070 (1.607)	-1.268 (1.389)	-1.308 (1.430)
ln_EPS_2	13.48*** (4.023)	12.54*** (4.119)	13.69*** (4.090)	13.13*** (4.270)
ln_avg_net_profit_last_3y164	7.728 (5.046)	7.439 (5.052)	7.546 (5.033)	6.790 (5.255)
Lvl_Typo_organization 1=firm	6.361 (5.587)	7.171 (5.667)	5.780 (5.784)	5.509 (5.994)
Lvl_Typo_organization 3= insurance company	-1.715 (13.02)	-1.574 (13.05)	-2.851 (13.05)	-4.073 (13.63)
ln_Market_cap	1.987 (1.720)	2.655 (1.867)	1.981 (1.693)	2.291 (1.905)
STRONG_management				0,994 (5.611)
0b.STRONG_mana#1b.lvl_expo Low				0 0
0b.STRONG_mana#2o.lvl_expo Medium				0 0
0b.STRONG_mana#3o.lvl_expo High				0 0
1o.STRONG_mana#1b.lvl_expo Low				0 0
1.STRONG_mana#2.lvl_expo Medium				-3.765 (7.473)
1.STRONG_mana#3.lvl_expo High				-10.94

				(14.85)
Constant	-37.39 (31.54)	-44.89* (24.22)	-39.74 (24.50)	-37.21 (25.71)
Observations	58	58	58	58
R-squared	414	425	427	436
adjusted R squared	304	302	305	269

Note: The correlations significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Overall, the variable directions are consistent with the main theories, but the statistical significance is not, which reduces the study's potential contribution. An identical issue exists with some control variables. Therefore, it is crucial to investigate the cause and, if at all feasible, find a solution, before discussing the results. OLS assumptions were verified again, but they do not reveal any massive abnormalities. As a result, a further attempt was made to construct a model using only the data related to the most recent year that was available rather than the variables that included the average of the previous three years (ROE and Net Profit). Thus, external influences on the model are minimized. Despite the models' situation getting better, producing more statistically significant variables, the study's main independent variables are still not significant. The second OLS regression results are presented in Appendix H. This OLS regression is also used as a sensitivity analysis and a robustness check for the analysis.

Another possible solution would be to utilize a Fixed Effect model, as was done in the analysis by Velte (2017) and Eccles et al. (2014), to eliminate the bias caused by omitted variables. However, research and theory suggest that this method is typically viable when panel data, not cross-sectional data, are present (Uchôa et al., 2014).

### 5.3 Discussion

In light of the findings, it is reasonable to conclude that the data gathered prevents us from drawing any generalizations about the correlation between Italy's ESG risk score and ROE. Although these results do not support the general opinion of the literature that sees a beneficial effect between ESG and FP (Friede, Busch & Bassen, 2015; Whelan et al., 2021), the findings of this study are consistent with those of Landi and Sciarelli (2018), which explicitly analyze the Italian setting.

As a result, it is insightful to try to comprehend this phenomenon's cause. Possible explanations could have both technical and practical implications.

Technically speaking, although there may be a relationship, the data and the model's statistical power are insufficient to demonstrate an effect. Factors, such as a limited sample size, a high level of random variation, or a correlation with other variables, may make the relationships of interest statistically insignificant. Looking at the analysis and the prior research, it is reasonable



to assume that the sample size is the primary cause of the statistically insignificant results. Therefore, other research on these topics examines a lot more data over a longer period, leading to a sufficiently large sample. The statistical power of the model is not strong enough to show a correlation between ESG score and ROE based on the analysis of only 58 firms. Moreover, most of the theory claims that the effect between the latter two variables is still quite small. The research of Hang, Geyer-Klingeborg and Rathgeber (2019), which demonstrates how the beneficial relationship between FP and ROE can only be observed over the long term and not in the short term, supports this notion. Thus, it would be necessary to have a model with even more statistical power than the one attainable with the data gathered.

In addition to technical ones, these are the practical reasons that could explain these findings. The Italian system is among the European countries with the most ESG-related legislation (Bruno & Lagasio, 2021). However, ESG disclosure alone with a compliance-oriented approach does not result in any beneficial achievement for the sector, as demonstrated by Cordazzo, Bini & Marzo (2020) and Whelan et al. (2021). Consequently, it may be that the Italian ESG industry's implementation is not yet sufficiently developed, which would explain why there is not any proof of an effect. Landi and Sciarelli (2018), one of the rare examples of research around the Italian correlation between ESG and FP, concluded their study with similar insignificant results. Thus, this paper could support their empirical results that although there is a growing interest in ESG in Italy, ESG investments are still not seen as a premium economic strategy both for organizations and investors. The Italian institutions will therefore have to overcome a variety of obstacles to turn the general appreciation toward ESG into a measurable effect, including finishing the implementation of previously approved regulations, monitoring the effectiveness of the implemented instruments, gradually raising the quality of data available, and introducing more definite quality standards and certification (Forum for Sustainable Finance, 2021).

Another practical issue could concern the time horizon. Therefore, the information gathered includes mainly data for 2020 and 2021, whereas the main ESG revolution in Italy took place at the end of 2021 (La Posta, 2022). By 2022, practically all significant Italian organizations had implemented sustainability initiatives intending to reach the SDGs and disclose ESG performance. This would imply that, before 2022, the relationship between ESG and ROE could be just present for a small subset of actors while failing to demonstrate a significant relationship for most organizations.

Additionally, the significant negative effects of the COVID-19-related health emergency may have influenced the outcomes. Recent Italian national statistical institute's estimates (ISTAT, 2021) show that at the end of 2020, more than two-thirds of Italian firms were experiencing revenue declines compared to 2019, and 62% anticipated that revenues would decline even in the first half of 2021. Continuing with the statistics of Italian companies, less than one in five reported being significantly spared by the crisis, and 32% of post-pandemic respondents believed their chances of survival were affected. Thus, the crisis has been very severe in Italy, endangering most of its companies. For this precise reason, it is possible that the study's

findings, which include information about the pandemic-affected years, have been impacted. Despite these terrible results, COVID-19 may also have favourable long-term consequences on ESG investment methods (Sarkis, 2020), that are not accounted for in this paper. Therefore, according to a recent Bloomberg analysis (2022), ESG assets reached US\$37.8 trillion at the end of 2021, accounting for one-third of all assets managed globally.

The theory's fragmentation could be another reason. Therefore, the literature is divided on what the actual relationship between ESG and FP is, as was examined in the theoretical review section. Even if most of the studies demonstrate a beneficial FP-ESG correlation, the results depend strongly on the settings of the study. Therefore, the lack of uniformity across the various agencies that generate ratings is one factor contributing to this divergence. According to Fiskerstrand et al. (2020), the choice of sustainability metric has a significant impact on the outcomes of the many studies on this subject. This might help to explain the findings of this investigation. Sustainalytics might not be adequate to show the ESG effect on ROE for market analysis in Italy.

As a result, the findings suggest that the cross-sectional data collected cannot demonstrate a correlation between the ESG risk score and ROE for the Italian organizations and additional research on this subject is necessary.

## 6 Conclusion

In order to determine whether improvements in CSR and sustainability governance performance result in better financial performance, this study attempted to comprehend the nature of the relationship between ESG risk rating, and its components, with the ROE performance measures for Italian organizations.

Previous studies that addressed these issues produced conflicting findings, with a majority advocating a positive association, others a negative one, and still others a neutral relationship (Friede, Busch & Bassen, 2015; Whelan et al., 2021; Koundouri, Pittis & Plataniotis, 2022). The inconsistent study findings reflect divergent viewpoints and an unstandardized approach to the ESG area. According to the few studies on the Italian setting, there is no proof of a beneficial correlation between FP and ESG ratings (Landi and Sciarelli, 2018). These distinct findings show that the sector has developed differently depending on the nation or industry of the organization.

This study discovered a negative but insignificant correlation between ROE and ESG risk. According to the negative correlation, for organizations in the dataset, a high level of ESG risk corresponds to lower ROE levels. Due to this sample's statistical insignificance, it is not possible to extrapolate the results to the full population. The size of the dataset, the actual condition of ESG growth in the Italian environment, and the lack of standardization between various ESG rating organizations may all be contributing factors to these outcomes. Thus, this paper, even if not following the general literature, is consistent with the prior theory about the Italian context (Landi and Sciarelli, 2018).

Through an updated database and a new comparison to previously conducted research, this thesis contributes to implications for principles like sustainable finance and ESG. Therefore, by offering a fresh ad hoc database of 61 organizations in the Italian environment, the study adds to the ongoing discussion on the economic effectiveness of ESG strategies. This is further underlined by adding the two ESG pillars (management and exposure) as well as several financial measures in the data collection. Moreover, by offering a thorough literature analysis of earlier studies, this work contributes to the improvement in understanding and standardization of ESG standards. Then, the last advantage results from the effort to explore the empirical gap in the Italian scenario by fostering a recent academic and scientific debate on the relationship between ESG and ROE.

## 6.1 Future Research

New research is necessary for this academic field to advance. Future studies may examine a wider range of organization sizes to determine whether the outcome differs for larger than small organizations in Italy. Larger organizations may have more difficult difficulties, such as those related to emissions, but they may also have more money to invest in R&D to discover novel sustainable solutions and adhere to ESG standards. Furthermore, to observe the evolution over time, it would be also interesting to conduct this analysis over a long past time frame. It would be noteworthy to observe how firms adapt to ESG rules, implement CSR policies, and how that impacts their financial performance.

Even conducting similar research again in the future, would be instructive. Therefore, the researcher would have greater access to information than the data gathered for this thesis as ESG criteria is a growing field and data availability is expanding year after year. Thus, it would be feasible to determine whether in Italy the rising trend toward sustainability has developed into a solid tool with a profitable outcome.

Furthermore, in the context of Italy, this work raises several additional three insightful and crucial research questions for ESG and FP.

Do we obtain divergent results using different ESG rankings offered by various rating sources, such as MSCI, Bloomberg, Refinitiv, or Thomson Reuters (Escrig-Olmedo et al., 2019)? Therefore, the index that was utilized to calculate our ESG sustainability risk score has a significant impact on the findings of this thesis (Fiskerstrand et al., 2020).

If there is a correlation between ESG and FP in Italy, do the various ESG pillars (Environmental, Social or Governance) have varying magnitude effects? If so, which one has the most impact?

Are the results of the ESG-FP correlation different for firms from distinct sectors and industries? If so, which industry has had the most development and which the least? Understanding the differences between the ESG components or industries could have important practical implications, helping managers and politicians.

This kind of questions demand greater attention from academics, politician, financial institutions, and society to address the threats associated with current environmental and societal crises through ESG criteria.

To sum up, this research area is essential for advising managers of firms and policymakers on the effectiveness of various CSR and ESG initiatives. The thesis' result suggests that additional studies are required to advance the research on ESG criteria, incorporating additional data and other variables. Being a topic that I feel is fundamental for the development of our society, I will try to enhance again the knowledge around it. Thus, in the future, I will gather additional information about the Italian scenario and perform a similar study using a panel data analysis to find out if there is a correlation between ESG and ROE for Italian organizations.

For anyone who would like to attempt running a similar analysis about the ESG-ROE relationship via this newly produced database, they can find my email at the beginning of this paper to request the excel sheet with all the observations and variables.

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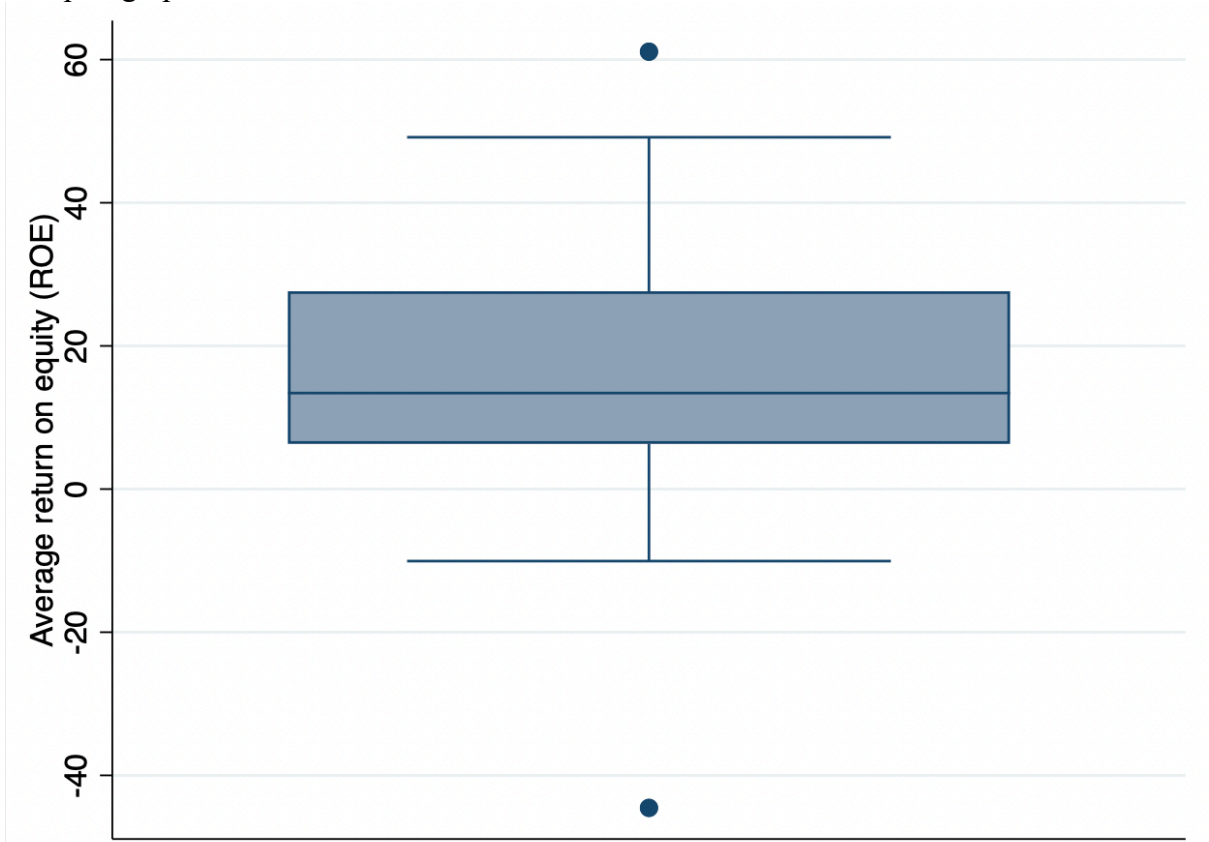
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# Appendix A

1. Company
2. Company description
3. Type of organization
4. Dummy for firms
5. Dummy Banks
6. Dummy for insurance companies
7. Sector
8. Dummy for manufacturing
9. Dummy for quoted
10. Country
11. Last available year
12. Number of employees last available year
13. ROE last available year
14. ROE year 2
15. ROE year 3
16. Average ROE last 3 years
17. Total Production last available year
18. Total Production year 2
19. Total Production year 3
20. Average Total Production last 3 years
21. Net profit last available year
22. Net profit year 2
23. Net profit year 3
24. Average Net profit last 3 years
25. EPS last available year
26. Market last available year
27. Beta last available year
28. ESG risk
29. Type of ESG risk
30. ESG risk Exposure
31. Type of ESG risk Exposure
32. ESG risk Management
33. Type of ESG risk Management

# Appendix B

Box plot graph for ROE outliers



Source: Created by author for the purpose of the study

# Appendix C

## Organization list

	<b>Company</b>	<b>Description</b>	<b>Sector</b>
<b>1</b>	<b>ENEL SPA</b>	The company's primary business is the provision of gas and electricity to end users.	Public utilities services
<b>2</b>	<b>PRYSMIAN S.P.A.</b>	Designing, developing, producing, supplying, and installing various cables for use in the global energy and telecommunications industries is the company's primary business.	Communications
<b>3</b>	<b>FINCANTIERI S.P.A</b>	The Company operates in the industry sector from its headquarters in Italy. It is involved in the construction of ships. Two business divisions make up the Company's activity, the Shipbuilding division and the Offshore division.	Production of transportation equipment
<b>4</b>	<b>SARAS S.P.A.</b>	The following are its main areas of operation: the refining of crude oil, the sale and distribution of a wide variety of oil products; the production and sale of electrical power through Sarlux and the joint venture Parchi Eolici Ulassai (PEU); industrial engineering and scientific research services; and information technology services.	Chemicals, pharmaceuticals, petroleum products, rubber and plastic items
<b>5</b>	<b>POSTE ITALIANE SPA</b>	It provides postal, banking, financial, and telecommunications services, as well as public telematics, collection and payment operations, and postal savings collection.	Banking, insurance and financial services
<b>6</b>	<b>PIRELLI &amp; C. SPA</b>	The company's primary business is the production and sale of high-value tires.	Chemicals, pharmaceuticals, petroleum products, rubber and plastic items
<b>7</b>	<b>UNIEURO S.P.A.</b>	The company's objectives are to engage in retail and wholesale business of consumer electronics products as well as general home appliance trade.	Wholesale trade
<b>8</b>	<b>MAIRE TECNIMONT SPA</b>	The Company's primary business is providing engineering services for the natural gas industry,	Business Services

9	<b>MONCLER S.P.A.</b>	Through the Moncler brand, the company develops, manufactures, and distributes clothes and accessories.	Textile and clothing industry
10	<b>PIAGGIO &amp; C. S.P.A</b>	The primary business of the company is the production of automobiles. The parent company of the Piaggio Group, Piaggio & C SpA, specializes in the manufacture of motorized two-wheelers.	Production of transportation equipment
11	<b>ANIMA HOLDING S.P.A.</b>	The company's primary activities are financial industry-related; it offers asset management services.	Banking, insurance and financial services
12	<b>SALVATORE FERRAGAMO SPA</b>	The Company's primary business activities are upon the design, production, and distribution of fragrances for men and women as well as other accessories.	Textile and clothing industry
13	<b>MARR SPA</b>	The Company's primary business is the marketing and distribution of fresh, dried, and frozen food goods.	Wholesale trade
14	<b>OVS S.P.A.</b>	The core business of the company is the design, development, and marketing of clothing under the OVS and uPIM brands.	Textile and clothing industry
15	<b>ORSERO S.P.A.</b>	The majority of the company's operations are dedicated to the import and distribution of fruits and vegetables.	Retail trade
16	<b>NEXI SPA</b>	Finance Company	Banking, insurance and financial services
17	<b>DIASORIN S.P.A.</b>	The company's primary business is the research, production, and marketing of diagnostic tests for hospital and private laboratories to use in a variety of clinical settings in the market for molecular and immunodiagnosics.	Chemicals, pharmaceuticals, petroleum products, rubber and plastic items
18	<b>MASSIMO ZANETTI BEVERAGE GROUP S.P.A.</b>	Mostly involved in investing money and other financial related operations  mostly involved in investing money and other related operations in Italy	Business Services
19	<b>SAFILO GROUP SPA</b>	The Company's primary business ventures include the design, manufacture, wholesale, and retail distribution of goods for the global eyewear industry.	Production of industrial, electrical and electronic machinery



20	<b>ENAV S.P.A.</b>	The Company's primary business is providing flying assistance for all types of traffic.	Transportation, customs services and storage
21	<b>BANCA GENERALI SPA</b>	Commercial Bank	Banking, insurance and financial services
22	<b>FABBRICA ITALIANA LAPIS ED AFFINI S.P.A. F.I.L.A.</b>	The Company's primary business is the production of items for coloring, drawing, molding, writing, and painting.	Chemicals, pharmaceuticals, petroleum products, rubber and plastic items
23	<b>GUALA CLOSURES S.P.A.</b>	Designing anti-adulteration closures (security), custom closures (luxury), aluminum wine closures (wine), standard closures (roll on), and other closures is the company's main line of business.	Chemicals, pharmaceuticals, petroleum products, rubber and plastic items
24	<b>BRUNELLO CUCINELLI S.P.A</b>	The company's primary business is in the fashion industry, which creates high-end goods.	Textile and clothing industry
25	<b>OPENJOBMETIS S.P.A.</b>	The Company's primary activities relate to administration or the professional supply of labor, whether on a fixed-term or ongoing basis.	Business Services
26	<b>TECHNOGYM S.P.A.</b>	The primary business of the company is the development and construction of technology for human health and exercise.	Travel, entertainment and hospitality
27	<b>NEWLAT FOOD S.P.A.</b>	The agri-food industry is the focus of the company's primary activities.	Food and tobacco industry
28	<b>DOVALUE S.P.A.</b>	Real Estate / Mortgage Bank	Banking, insurance and financial services
29	<b>DIGITAL VALUE S.P.A.</b>	The primary focus of the company's operations is on the management and resolution of complex IT issues for clients who are involved in key industries for the competitiveness of the national system and the Italian economy.	Banking, insurance and financial services
30	<b>GVS S.P.A.</b>	Manufacturers of injection-molded plastic filters for use in the industrial, medical, automotive and pharmaceutical fields.	Production of industrial, electrical and electronic machinery
31	<b>AVIO SPA</b>	The primary business of the company is to assist high-growth private Italian businesses that want to raise funds from institutional investors by listing their stock on a regulated exchange.	Production of transportation equipment

32	<b>BFF BANK SPA</b>	Finance Company	Banking, insurance and financial services
33	<b>CAREL INDUSTRIES S.P.A.</b>	The primary business of the company is the supply of heating, cooling, and air conditioning systems.	Production of industrial, electrical and electronic machinery
34	<b>IVS GROUP S.A</b>	The business is a prominent vending machine operator in Europe (a highly fragmented market).	Production of industrial, electrical and electronic machinery
35	<b>ZIGNAGO VETRO S.P.A.</b>	The Company's primary activities include the manufacturing and marketing of hollow glass containers for food and drink, cosmetics, perfumes, and specialty glasses.	Leather, stone, clay and glass products
36	<b>GRUPPO MUTUIONLINE S.P.A.</b>	Non-Bank Holding Company	Business Services
37	<b>AEFFE S.P.A.</b>	The company works in the luxury and fashion goods industry. The business is involved in the development, manufacture, and distribution of goods.	Textile and clothing industry
38	<b>TINEXTA S.P.A.</b>	The Company's primary market segments include services in business management solutions and digital	Business Services
39	<b>SERVIZI ITALIA SPA</b>	The business offers integrated services for the rental, cleaning, and sterilization of hospital-use fabrics and surgical instruments.	Business Services
40	<b>PIOVAN S.P.A.</b>	The Company's primary business activity revolves around automation systems for the handling, processing, and storage of plastic materials and food powders.	Production of industrial, electrical and electronic machinery
41	<b>RAI WAY SPA</b>	The Company's primary activities include the design, setup, construction, upkeep, implementation, development, and management of telecommunications and software networks, as well as the development, setup, and administration of a commercial network, distribution, and support, all for the purpose of providing energy transport.	Media and telecommunications
42	<b>SOMEK S.P.A.</b>	For cruises, special projects, and its primary activities, the company continues to produce and distribute Glazed Wraps.	Wholesale trade

43	<b>GAROFALO HEALTH CARE S.P.A.</b>	The company's primary business is operating a rehabilitation clinic including departments for nutritional rehabilitation, cardiac rehabilitation, and the first eating disorder treatment center in Europe	Banking, insurance and financial services
44	<b>TECHEDGE S.P.A.</b>	The company's primary activities revolve around assisting its clients in discovering and creating new disruptive processes based on digital environments, encouraging the development of new business models or the adaptation of existing ones to the new market conditions that new technologies facilitate.	Media and telecommunications
45	<b>D'AMICO INTERNATIONAL SHIPPING S.A.</b>	The company makes investments in businesses engaged in the shipping sector.	Transportation, customs services and storage
46	<b>FINE FOODS &amp; PHARMACEUTICALS N.T.M S.P.A</b>	The Company is the result of the merging of Fine Foods & Pharmaceuticals NTM SpA and Innova Italy 1 SPA, and its primary business is the development and production of solid oral dosage forms for the pharmaceutical industry on behalf of third parties. nutraceutical, too.	Chemicals, pharmaceuticals, petroleum products, rubber and plastic items
47	<b>ASCOPIAVE SPA</b>	The Company's primary business is in the natural gas distribution industry.	Public utilities services
48	<b>LANDI RENZO S.P.A.</b>	The Company's primary business activities include designing, manufacturing, installing, and selling parts for the automotive, industrial automation, and audio industries.	Retail trade
49	<b>IMMOBILIARE GRANDE DISTRIBUZIONE SOCIETA DI INVESTIMENTO IMMOBILIARE QUOTATA S.P.A.</b>	The Company focuses on the real estate industry. It primarily engages in the acquisition, development, management, and leasing of real estate.	Real estate services
50	<b>IERVOLINO &amp; LADY BACARDI ENTERTAINMENT S.P.A</b>	The primary endeavor of the company is the creation of motion picture and television programming.	Travel, entertainment and hospitality
51	<b>THE ITALIAN SEA GROUP S.P.A.</b>	Engaged in constructing, repairing, and modifying different types of vessels.	Production of transportation equipment

52	<b>VALSOIA SPA</b>	The company's primary activity is the development of functional soy-based foods.	Food and tobacco industry
53	<b>EUROTECH SPA</b>	The Eurotech group creates, develops, and sells ultra-compact and tiny computers.	Hardware for computer
54	<b>AEROPORTO GULIELMO MARCONI DI BOLOGNA S.P.A.</b>	The Company's primary activity is to administer Bologna Airport completely.	Transportation, customs services and storage
55	<b>FARMAE S.P.A</b>	The primary business of the company is to sell pharmaceutical products in the retail market.	Wholesale trade
56	<b>TOSCANA AEROPORTI S.P.A.</b>	The management of the Italian airport in Pisa is the primary business activity of the company. It also oversees the management of passenger services, infrastructure, and air traffic, as well as the budget and future plans for the airport.	Transportation, customs services and storage
57	<b>FRANCHI UMBERTO MARMI S.P.A.</b>	Operates as a special purpose acquisition company that offers management consulting and business support services.	Leather, stone, clay and glass products
58	<b>EDILIZIACROBATICA S.P.A.</b>	The Company is a leading company in the construction sector for rope work.	Business Services
59	<b>B&amp;C SPEAKERS S.P.A.</b>	The company's primary business is the production of audio equipment. Under the B&C brand, the company designs, manufactures, distributes, and markets professional loudspeakers.	Communications
60	<b>PITECO S.P.A.</b>	The company's main business is producing specialized software for the treasury and corporate finance sectors in the information technology industry.	Production of industrial, electrical and electronic machinery
61	<b>CY4GATE S.P.A.</b>	Consulting, planning, development, and production of hardware and software make up the majority of the company's activities.	Wholesale trade

Source: Bureau van Dijk Orbi (2021).

# Appendix D

## Industry's grouping

Services 0	Manufacturing 1
1=Public utilities	3= Manufacturing of transportation equipment
2=Communications,	4=Chemicals
5=Banking or insurance service,	8=Textile and apparel industry
7=Business services	10=Manufacturing of industrial machinery, electrical and electronic
6=Wholesale trade	13=Food and tobacco industry
9=Retail trade	14=Leather, stone, clay and glass products
11=Transportation, customs and warehousing services	17=Computer hardware
12=Travel, entertainment and hospitality	
15=Media and telecommunications	
16=Real estate services	

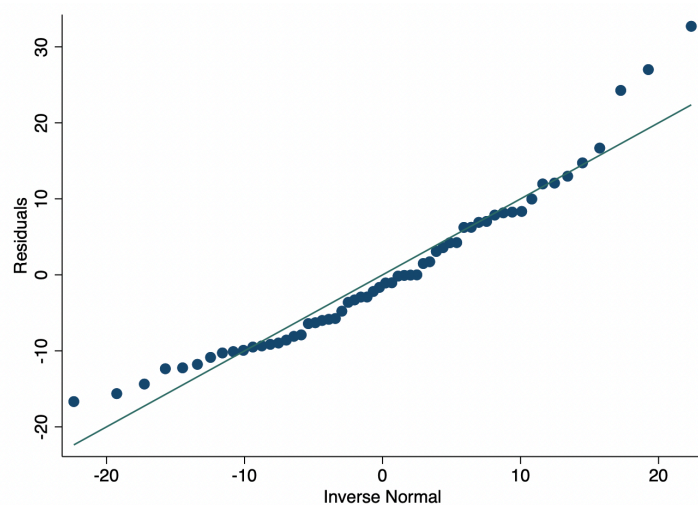
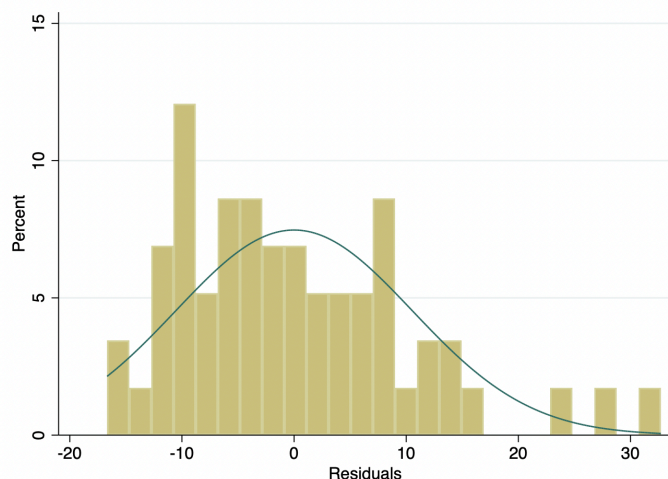
Source: MSCI (2020)

# Appendix E

## Model 1 Histogram, Qnorm, Skewness and kurtosis test for Normality of Residuals

Skewness and kurtosis tests for normality

Variable	Obs	Pr(skewness)	Pr(kurtosis)	— Joint test —	
				chi2(2)	Prob>chi2
e	58	0.0058	0.1538	9.65	0.0080

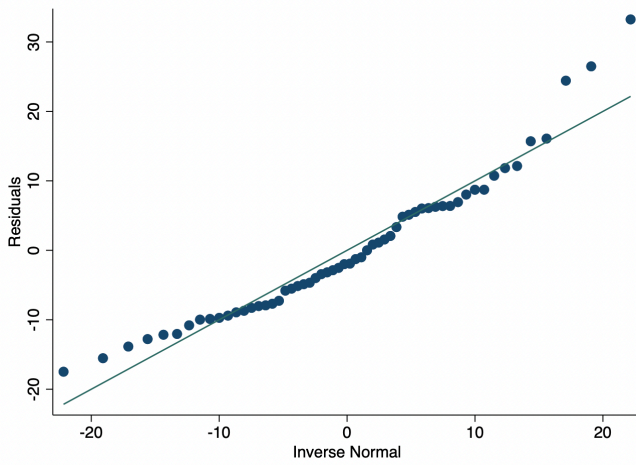
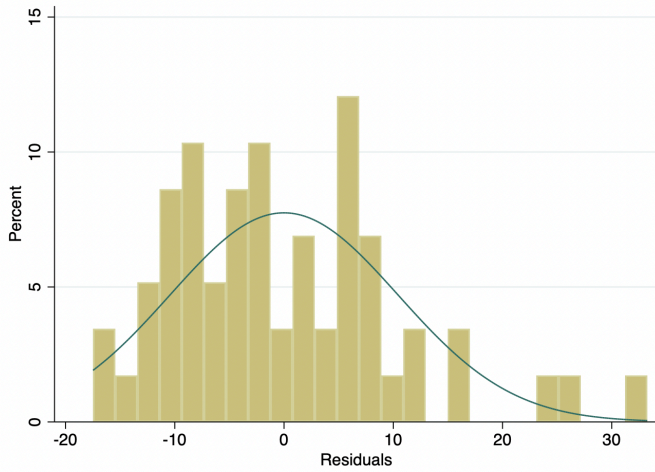


Source: Created by author for the purpose of the study

## Model 2 Histogram, Qnorm, Skewness and kurtosis test for Normality of Residuals

Skewness and kurtosis tests for normality

Variable	Obs	Pr(skewness)	Pr(kurtosis)	— Joint test —	
				chi2(2)	Prob>chi2
e	58	0.0049	0.1054	10.53	0.0052

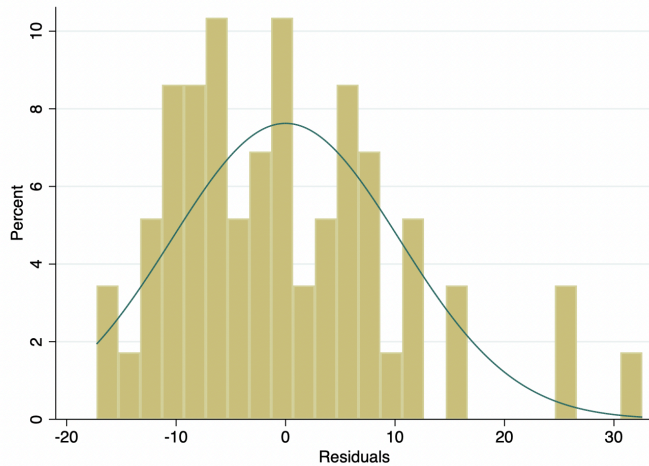


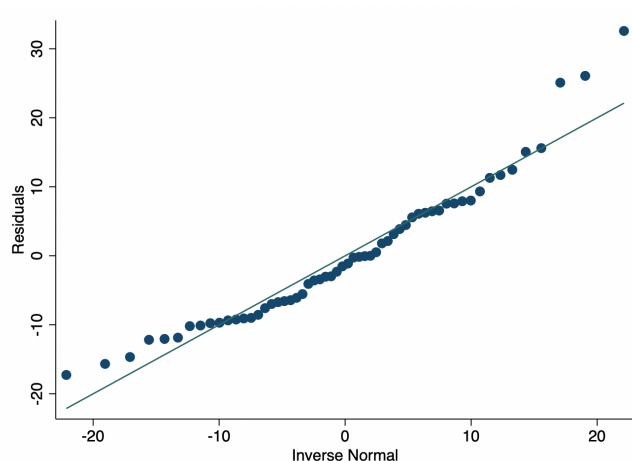
Source: Created by author for the purpose of the study

### Model 3 Histogram, Qnorm, Skewness and kurtosis test for Normality of Residuals

Skewness and kurtosis tests for normality

Variable	Obs	Pr(skewness)	Pr(kurtosis)	Joint test chi2(2)	Prob>chi2
e	58	0.0063	0.1328	9.73	0.0077

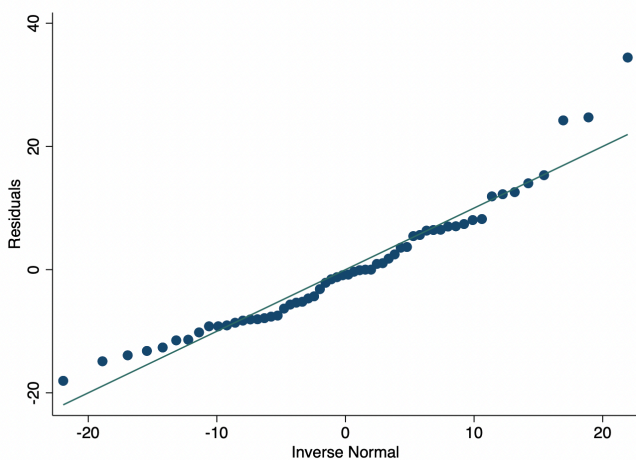
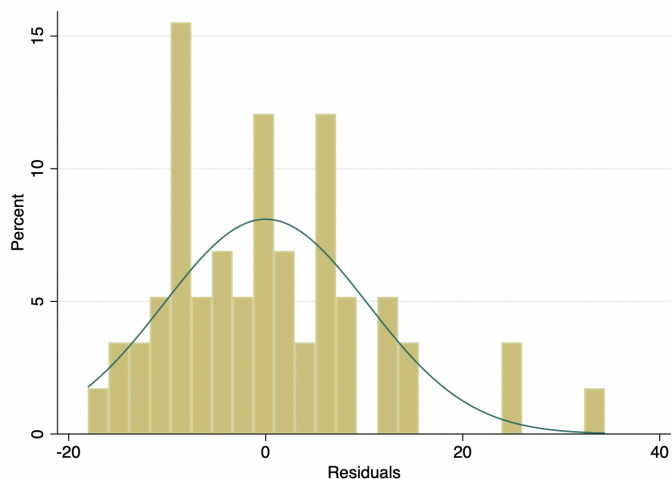




Source: Created by author for the purpose of the study

Model 4 Histogram, Qnorm, Skewness and kurtosis test for Normality of Residuals  
 Skewness and kurtosis tests for normality

Variable	Obs	Pr(skewness)	Pr(kurtosis)	— Joint test —	
				chi2(2)	Prob>chi2
e	58	0.0045	0.0670	11.41	0.0033



Source: Created by author for the purpose of the study



# Appendix F

Model 1 VIF

Variable	VIF	1/VIF
ln_ESG_risk	1.52	0.658899
ind	1.31	0.762042
Beta_1_y	1.53	0.651852
ln_n_employ	1.72	0.580413
ln_EPS_2	1.17	0.856831
ln_avg_n~164	2.16	0.462060
Lvl_Typo_o~m		
1	1.80	0.556473
3	1.26	0.792145
ln_Market_~p	2.87	0.348681
Mean VIF	1.71	

Source: Created by author for the purpose of the study

Model 2 VIF

Variable	VIF	1/VIF
lvl_manage~t		
2	3.83	0.261138
3	4.08	0.245017
ind	1.39	0.717670
Beta_1_y	1.51	0.663921
ln_n_employ	2.26	0.442845
ln_EPS_2	1.22	0.819455
ln_avg_n~164	2.16	0.462281
Lvl_Typo_o~m		
1	1.84	0.542298
3	1.26	0.791401
ln_Market_~p	3.37	0.296848
Mean VIF	2.29	

Source: Created by author for the purpose of the study

Model 3 VIF

Variable	VIF	1/VIF
lvl_expo		
2	1.25	0.800185
3	1.16	0.864250
ind	1.34	0.745250
Beta_1_y	1.54	0.651340
ln_n_employ	1.69	0.590333
ln_EPS_2	1.21	0.828613
ln_avg_n~164	2.15	0.464345
Lvl_Typo_o~m		
1	1.93	0.518910
3	1.27	0.789198
ln_Market~p	2.78	0.359891
Mean VIF	1.63	

Source: Created by author for the purpose of the study

Model 4 VIF

Variable	VIF	1/VIF
ind	1.37	0.730792
Beta_1_y	1.62	0.616716
ln_n_employ	1.71	0.585075
ln_EPS_2	1.25	0.798469
ln_avg_n~164	2.24	0.447312
Lvl_Typo_o~m		
1	1.97	0.507556
3	1.32	0.759786
ln_Market~p	3.35	0.298640
1.STRONG_m~a	2.63	0.380141
lvl_expo		
2	1.75	0.571492
3	1.52	0.655925
STRONG_mana#		
lvl_expo		
1 2	2.48	0.403379
1 3	1.56	0.639845
Mean VIF	1.91	

Source: Created by author for the purpose of the study

# Appendix G

Model 1 Breusch–Pagan and White's test for heteroskedasticity

Breusch–Pagan/Cook–Weisberg test for heteroskedasticity

Assumption: Normal error terms

Variable: Fitted values of **avg\_ROE\_last\_3y**

H0: Constant variance

chi2(1) = **0.02**  
Prob > chi2 = **0.8781**

White's test

H0: Homoskedasticity

Ha: Unrestricted heteroskedasticity

chi2(42) = **28.58**  
Prob > chi2 = **0.9432**

Cameron & Trivedi's decomposition of IM-test

Source	chi2	df	p
Heteroskedasticity	<b>28.58</b>	<b>42</b>	<b>0.9432</b>
Skewness	<b>7.10</b>	<b>9</b>	<b>0.6263</b>
Kurtosis	<b>0.92</b>	<b>1</b>	<b>0.3387</b>
Total	<b>36.60</b>	<b>52</b>	<b>0.9478</b>

Source: Created by author for the purpose of the study

Model 2 Breusch–Pagan and White's test for heteroskedasticity

Breusch–Pagan/Cook–Weisberg test for heteroskedasticity

Assumption: Normal error terms

Variable: Fitted values of **avg\_ROE\_last\_3y**

H0: Constant variance

chi2(1) = **0.06**  
Prob > chi2 = **0.8133**

White's test  
H0: Homoskedasticity  
Ha: Unrestricted heteroskedasticity

chi2(47) = **54.42**  
Prob > chi2 = **0.2130**

Cameron & Trivedi's decomposition of IM-test

Source	chi2	df	p
Heteroskedasticity	<b>54.42</b>	<b>47</b>	<b>0.2130</b>
Skewness	<b>13.37</b>	<b>10</b>	<b>0.2035</b>
Kurtosis	<b>1.10</b>	<b>1</b>	<b>0.2950</b>
Total	<b>68.89</b>	<b>58</b>	<b>0.1551</b>

Source: Created by author for the purpose of the study

Model 3 Breusch–Pagan and White's test for heteroskedasticity  
Breusch–Pagan/Cook–Weisberg test for heteroskedasticity  
Assumption: Normal error terms  
Variable: Fitted values of **avg\_ROE\_last\_3y**

H0: Constant variance

chi2(1) = **0.21**  
Prob > chi2 = **0.6472**

White's test  
H0: Homoskedasticity  
Ha: Unrestricted heteroskedasticity

chi2(45) = **46.50**  
Prob > chi2 = **0.4104**

Cameron & Trivedi's decomposition of IM-test

Source	chi2	df	p
Heteroskedasticity	<b>46.50</b>	<b>45</b>	<b>0.4104</b>
Skewness	<b>9.86</b>	<b>10</b>	<b>0.4525</b>
Kurtosis	<b>1.04</b>	<b>1</b>	<b>0.3089</b>
Total	<b>57.40</b>	<b>56</b>	<b>0.4231</b>

Source: Created by author for the purpose of the study

Model 4 Breusch–Pagan and White's test for heteroskedasticity  
 Breusch–Pagan/Cook–Weisberg test for heteroskedasticity  
 Assumption: Normal error terms  
 Variable: Fitted values of **avg\_ROE\_last\_3y**

H0: Constant variance

chi2(1) = **0.06**  
 Prob > chi2 = **0.8133**

White's test

H0: Homoskedasticity  
 Ha: Unrestricted heteroskedasticity

chi2(57) = **58.00**  
 Prob > chi2 = **0.4382**

Cameron & Trivedi's decomposition of IM-test

Source	chi2	df	p
Heteroskedasticity	<b>58.00</b>	<b>57</b>	<b>0.4382</b>
Skewness	<b>15.40</b>	<b>14</b>	<b>0.3511</b>
Kurtosis	<b>1.10</b>	<b>1</b>	<b>0.2937</b>
Total	<b>74.51</b>	<b>72</b>	<b>0.3967</b>

Source: Created by author for the purpose of the study

# Appendix H

## Second OLS regression

	(1)	(2)	(3)	(4)
VARIABLES	Model 1	Model 2	Model 3	Model 4
ln_ESG_risk	922 (5.035)			
Level ESG risk management 2=Average		-3.173 (6.795)		
Level ESG risk management 3=Strong		-2.297 (7.731)		
STRONG_mana = 1				3.607 (6.222)
Level ESG risk exposure 2=Medium			-1.810 (3.941)	385 (4.723)
Level ESG risk exposure 3=High			-1.423 (7.993)	-2.442 (8.347)
0b.STRONG_mana#1b.lvl_expo				0 0
0b.STRONG_mana#2o.lvl_expo				0 0
0b.STRONG_mana#3o.lvl_expo				0 0
1o.STRONG_mana#1b.lvl_expo				0 0
1.STRONG_mana#2.lvl_expo				-6.712 (8.325)
1.STRONG_mana#3.lvl_expo				30.36 (37.98)
Industry	-379 (3.802)	-804 (3.962)	-0.0895 (3.858)	-0.0443 (3.976)
Beta	-7.276 (6.734)	-8.195 (6.736)	-8.323 (6.803)	-9.388 (7.089)
ln_n_employ	-1.291 (1.528)	-921 (1.757)	-1.365 (1.525)	-877 (1.618)
ln_EPS_2	23.14*** (4.462)	23.69*** (4.591)	23.69*** (4.620)	22.63*** (4.845)
ln_Net_profit_lay	8.861*** (2.163)	8.817*** (2.198)	8.622*** (2.389)	13.36** (5.895)
Lvl_Typo_organization 1=firm	-2.873 (6.200)	-3.370 (6.333)	-3.718 (6.490)	-4.052 (6.688)
Lvl_Typo_organization 3= insurance company	-7.510 (14.44)	-7.653 (14.56)	-7.061 (14.59)	-9.029 (15.10)
ln_Market_cap	1.890 (1.563)	1.601 (1.735)	1.792 (1.519)	993 (1.866)
Constant	-59.43** (28.37)	-53.76*** (16.93)	-52.51*** (18.89)	-77.93** (35.94)
Observations	58	58	58	58
R-squared	609	611	610	624
adjusted R squared	536	528	528	513

Source: Created by author for the purpose of the study