Mika Pelkonen

The impact of ESG rating on stock returns during the COVID-19 stock market crash

School of Accounting and Finance
Master's Thesis in Finance
Master's Degree Programme in Finance

Vaasa 2022

UNIVERSITY OF VAASA
School of Accounting and Finance

Author:	Mika Pelkonen		
Title of the Thesis:	The impact of ESG rating on stock returns during the COVID-19 stock market crash		
Degree:	Master of Science in Economics and Business Administration		
Programme:	Master's Degree Programme in Finance		
Supervisor:	Vanja Piljak		
Year:	2022	**Pages:**	66

ABSTRACT:

This paper studies whether a higher ESG rating leads to higher stock returns during the COVID-19 stock market crash. ESG rating is conjectured to affect stock returns as it works as a proxy for corporate social responsibility. Corporate social responsibility and socially responsible investment strategies have become popular topics in the financial research during the last decades, and their role during economically challenging times has been noted. Corporate social responsibility is said to have beneficial effects on corporate performance through various channels. In addition, it may provide safety, for example, during crises. Recently, many firms and investors have also started to pay attention to other information than financial data. Ethics and responsibility are now popular topics in the financial industry. Socially responsible investing strategies that consider not only financial performance are also said to perform better in worse conditions. The stock market crash induced by COVID-19 provides an opportunity to research whether the popularity of corporate social responsibility and socially responsible investing affects the stock returns of firms with high ESG ratings during uncertain times. Based on previous literature, a relationship between ESG rating and stock performance is expected.

This paper focuses on the publicly listed companies of Germany and France. The intention is to provide more information about the meaning of corporate social responsibility and ESG in the European financial markets, especially during a stock market crash. This paper covers the relevant theoretical framework related to corporate social responsibility, socially responsible investing, and ESG ratings and how they affect asset pricing. Existing studies related to the topic are also discussed in this paper to gain better understanding. To perform empirical tests, data about firms' pre-pandemic state is collected. The data contains financial metrics and ESG information. This data is used to analyze whether the pre-pandemic state affects the pandemic time performance. Comprehensive tests about the effects of ESG rating and its components on stock returns are carried out. This paper finds no statistically significant evidence that ESG rating would affect stock returns in the sample of German and French firms during the COVID-19 stock market crash. Similar results are found when assessing the effects of the components constituting the ESG ratings. No statistically significant relationship is found between any of the separate scores and stock returns. This paper also tests whether ESG rating affects stock returns during the post-crisis period when prices were recovering from the quick drop. However, no statistically significant evidence is found.

KEYWORDS: COVID-19, corporate social responsibility, societal responsibility, financial markets, ESG rating, financial crises

VAASAN YLIOPISTO
Laskentatoimen ja rahoituksen akateeminen yksikkö
Tekijä: Mika Pelkonen
Tutkielman nimi: The impact of ESG rating on stock returns during the COVID-19 stock market crash
Tutkinto: Kauppatieteiden maisteri
Oppiaine: Rahoituksen maisteriohjelma
Työn ohjaaja: Vanja Piljak
Valmistumisvuosi: 2022 **Sivumäärä:** 66

TIIVISTELMÄ:
Tässä tutkielmassa tutkitaan, johtaako korkeampi ESG-luokitus korkeampiin osaketuottoihin COVID-19-osakemarkkinaromahduksen aikana. ESG-luokituksen uskotaan vaikuttavan osaketuottoihin, sillä se edustaa yritysten yhteiskuntavastuullisuutta. Yhteiskuntavastuu ja vastuullinen sijoittaminen ovat nousseet suosituiksi aiheiksi rahoituksen tutkimuksissa viime vuosikymmenien aikana, ja niiden merkitys taloudellisesti haastavina aikoina on myös huomioitu. Yhteiskuntavastuulla sanotaan olevan myönteisiä vaikutuksia yritysten suorituskykyyn useiden eri kanavien kautta. Lisäksi se voi tarjota suojaa esimerkiksi kriisien aikana. Viime aikoina useat yritykset ja sijoittajat ovat myös alkaneet kiinnittämään huomiota muuhunkin kuin taloudelliseen tietoon. Eettisyys ja vastuullisuus ovat nyt suosittuja aiheita rahoitusalalla. Myös ei-taloudellisia tietoja huomioivien vastuullisen sijoittamisen strategioiden sanotaan menestyvän paremmin huonommissa olosuhteissa. COVID-19:n aiheuttama osakemarkkinaromahdus tarjoaa mahdollisuuden tutkia, vaikuttaako yhteiskuntavastuun ja vastuullisen sijoittamisen suosio epävarmoina aikoina sellaisten yritysten osaketuottoihin, joilla on korkea ESG-luokitus. Aiempien tutkimusten perusteella ESG-luokituksen ja osaketuottojen välillä voidaan olettaa olevan yhteys.

Tässä tutkielmassa painopisteenä on sekä Saksan että Ranskan julkisesti listatut yhtiöt. Tarkoituksena on tarjota lisätietoja yritysten yhteiskuntavastuullisuuden ja ESG:n merkityksestä eurooppalaisilla rahoitusmarkkinoilla erityisesti markkinaromahduksen aikana. Tutkielmassa käydään läpi yritysten yhteiskuntavastuullisuuden, vastuullisen sijoittamisen ja ESG-luokitusten teoriaa sekä vaikutuksia arvopapereiden hinnoitteluun. Tutkielmassa käydään läpi myös aiempien tutkimusten tuloksia syvällisemmän ymmärryksen kehittämiseksi. Empiiriseen osioon on kerätty dataa yritysten pandemiaa edeltävästä tilanteesta. Data sisältää taloudellisia lukuja sekä ESG-tietoja. Datan avulla pyritään analysoimaan, vaikuttaako pandemiaa edeltävä tilanne pandemia-ajan suorituskykyyn. Tutkielmassa tutkitaan kattavasti eri menetelmien avulla ESG-luokituksen vaikutuksia osaketuottoihin. Tilastollisesti merkittäviä todisteita siitä, että ESG-luokitus vaikuttaisi otoksessa olevien saksalaisten ja ranskalaisten yhtiöiden osaketuottoihin COVID-19-osakemarkkinaromahduksen aikana, ei löydetä. Samanlaisia tuloksia saadaan tutkiessa komponentteja, joista ESG-luokitukset koostuvat. Tilastollisesti merkittävää yhteyttä eri pisteytyksien ja osaketuottojen välillä ei voida vahvistaa. Lisäksi tutkielmassa tutkitaan, vaikuttaako ESG-luokitus osaketuottoihin markkinaromahduksen jälkeisenä aikana, jolloin osakekurssit toipuivat nopeasta pudotuksesta. Tilastollisesti merkittäviä todisteita tästä ei löydetä.

AVAINSANAT: COVID-19, corporate social responsibility, societal responsibility, financial markets, ESG rating, financial crises

Table of contents

Figures

Tables

Abbreviations

CSR = Corporate social responsibility
ESG = Environmental, social, and governance
SRI = Socially responsible investing

1 Introduction

In the beginning of 2020, a novel virus called COVID-19 caused a worldwide pandemic. This health-related crisis had significant effects on the global economy as various countries experienced nationwide lockdowns because of the easily spreading disease. As of 12th September 2021, there has been over 224 million cases and over 4,6 million deaths caused by the virus (World Health Organization, 2021). During the time of the pandemic, the stock market experienced its share of the crisis. The CBOE volatility index reached its highest value since the global financial crisis, indicating a turbulent time in the market. Various markets experienced extreme movements and the initial shock caused by the pandemic resulted in a plunge of approximately 30 % or more in many stock indices. According to Ding et. al. (2021), the reaction to the event is similar across many industries which could indicate that the reason for different companies surviving the crash better than some others can be found from firm-specific factors.

The purpose of this thesis is to research whether environmental, social, and governance factors (later addressed as ESG factors) affect stock performance during a financial crisis. In the recent years, the rising awareness of investors and stakeholders has shifted some of the focus in corporate world to performance measurements that are not only driven purely by profitability and financial success. Sustainability perspective, well-being of employees, adequate control systems, and such have become notable factors that may affect how companies are being viewed.

By investing into companies with high ESG ratings or funds that emphasize such companies, investors can promote their values (Broadstock et. al., 2021). According to Broadstock et. al. (2021), this is not the only reason why investors actively approach the trend; it is said to have a positive impact on portfolio performance by improving returns and decreasing risk. In 2019, over 30 trillion US dollars were invested in portfolios that consider ESG factors which shows the popularity of the phenomenon (Broadstock et. al., 2021).

Taken into consideration that ESG factors are largely related to corporate social responsibility, transparency, and trustworthiness, greater emphasis on these areas may act as a value preserving factor during times when the general trust in economy is otherwise low (Lins et. al., 2017). Even if the correlation between assets and different investments often increases during financial crises, this thesis tries to discover whether these certain firm characteristics increase the probability of surviving market downturns better.

1.1 Background and motivation

Corporate social responsibility and socially responsible investing have been popular topics among finance during the last decades, as investors and stakeholders have incorporated ethical principles and guidelines that affect decision making. The existing literature has researched how responsible investing strategies perform and how does CSR activities affect corporate financial performance.

As mentioned earlier, sustainable investments allow investors to promote their values and ethical views (Broadstock et. al., 2021). Investors may see this as a way to increase their overall utility even on the expense of financial performance (Renneboog et. al., 2008). This would mean that investors gain non-monetary value from personal objectives related to ethically right actions which outweighs the non-optimal performance (Renneboog et. al., 2008). It could be argued that in a such situation, investors are more resilient to market movements. When rational profit maximizing behaviour is not the only driving force in manging portfolios, it allows investors to hold on to investments even in situations where the rational decision would be something else.

Corporate social responsibility is also said to have a positive effect on the relationships with stakeholders (Ding et. al., 2021). According to Ding et. al. (2021) a strong network may result in a reciprocal returning of good actions and readiness to help through unfavourable conditions. During a financial crisis, this would certainly be beneficial but to measure such theory reliably and accurately is hard.

Corporate social responsibility has also been linked to the cost of financing. According to Attig et. al. (2013), credit rating agencies assess CSR related risks despite not using the exact word. For example, relationships with various stakeholders such as executives, personnel, unions, regulators, investors, and financiers are under evaluation (Attig et. al., 2013). Same goes for internal operations which can either generate or reduce risks (Attig et. al., 2013). By investing into CSR activities, companies can also decrease the probability of having to suffer from costs that are caused by negligent actions (Attig et. al., 2013).

For similar reasons as mentioned above, CSR has also been said to influence cost of equity. According to El Ghoul et. al. (2011), CSR activities decrease equity costs. This is in line with the consensus that CSR activities are associated with less risks and higher valuation (El Ghoul et. al., 2011).

Overall, the common belief suggests that corporate social responsibility is linked to a better corporate financial performance through various channels. This could also indicate that companies with higher ESG ratings may survive financial crises better.

1.2 Purpose of the study

The purpose of this thesis is to research whether ESG rating and corporate social responsibility have any implication on how stock returns behave during a financial crisis. ESG rating is a rating that evaluates different points from the environmental, social, and governance aspects. For example, Refinitiv evaluates sustainability, employee treatment, responsibility, and CSR strategy. (Refinitiv, 2021). If corporate social responsibility and socially responsible investing has previously mentioned positive effects on the corporate financial performance, it should be reflected to companies that have high standards in environmental, social, and governance areas.

The latest financial crisis related to COVID-19 also allows to research this phenomenon on a new data. One could argue that the demand for responsible investing and CSR has

increased since the global financial crisis. The common awareness related to social issues has increased, and topics related to sustainability have grown popularity. The results of this thesis help to assess whether the role of corporate social responsibility during financial crises has changed. By comparing the results of previous studies, conclusions about the increased importance or lack of it can be drawn.

This thesis focuses on the European markets and more specifically on the publicly listed companies of Germany and France. As the existing literature is often focused on the U.S. markets, this thesis attempts to find if the effects of corporate social responsibility and ESG rating that have been recorded in previous research are applicable to European markets. Germany and France are among the largest economies in Europe, and they also have sizeable financial markets. By studying these two countries, it is possible to draw conclusions whether European markets have adopted similar approaches to sustainability aspects as markets have in the United States.

1.3 Responsible finance in Germany and France

To better understand the phenomenon in questions, and how it potentially affects companies in the sample countries, it is favourable to look at existing research. According to Eurosif (2018), responsible finance in France has been led by investment professionals due to the pension system. Article 173 in France requires investment professionals to disclose how climate, environmental, social, and governance factors are considered in their methods. The article does not require to consider these aspects, but it needs to be reported (Eurosif, 2018). This has emphasized the role of asset owners in responsible finance in France. According to Eurosif (2018), the most popular approach to responsible finance in France is the best-in-class strategy which focuses on choosing firms with highest ESG ratings in a certain industry. Eurosif (2018) reports that other means of implementing responsibility have also grown popularity. These are, for example, sustainability themed funds, ESG incorporation, investments to create positive impacts on responsibility concerns, and the best-in-universe method (Eurosif, 2018). Eurosif (2018) also

mentions that in France, firms in the insurance industry have the biggest role as asset owners. In France, retail investors encounter responsible finance mostly in the form of corporate savings plans (Eurosif, 2018). Other financial institutions such as banks have also started to pay attention to socially responsible investment products (Eurosif, 2018). Overall, investors in France seem to value responsibility as 63 % of the public thinks that responsibility aspects should be considered in investment decisions (Eurosif, 2018).

Sustainable finance is also a current topic in the German financial markets as it has become mainstream (Green and Sustainable Finance Cluster Germany e.V., 2020). The climate aspect is especially popular as many institutions use key performance indicators related to climate (Green and Sustainable Finance Cluster Germany e.V., 2020). According to Green and Sustainable Finance Cluster Germany e.V. (2020), sustainability has unevenly distributed role in certain business areas in Germany. For example, it is seen more important in communications, strategy, and asset management (Green and Sustainable Finance Cluster Germany e.V., 2020). Many institutions also have separate business units for sustainability, but their resources are somewhat insufficient (Green and Sustainable Finance Cluster Germany e.V., 2020).

During the recent years in the German financial industry, larger amounts of instruments and products that focus on sustainability have been issued and they have been integrated in the standard product offerings (Green and Sustainable Finance Cluster Germany e.V., 2020). The risk assessment related to sustainability in the German financial industry relies heavily on screening practices and more specifically using screenings based on ESG (Green and Sustainable Finance Cluster Germany e.V., 2020). However, the study of Green and Sustainable Finance Cluster Germany e.V. (2020) states that there is room for improvement in awareness and knowledge related to sustainability among stakeholders as relatively small number of institutions consider their stakeholders to be highly or moderately aware of the topic.

1.4 Hypotheses

The hypotheses of this paper are based on the earlier mentioned beneficial effects of CSR. If ESG rating is adequate at displaying the level and standard of corporate social responsibility in companies, it can be argued that ESG rating could work as a factor in explaining returns. As the purpose of this thesis is to examine whether ESG rating and corporate social responsibility work as a value preserving factor during market downturns, the hypotheses are as follows:

$$H_0: ESG\ rating\ does\ not\ affect\ returns\ during\ the\ COVID-19\ market\ crash$$

$$H_1: ESG\ rating\ affects\ returns\ during\ the\ COVID-19\ market\ crash$$

In case the alternative hypothesis is accepted, the expectation is that companies with higher ESG ratings suffer smaller losses, or gain better returns, than companies with lower ratings. This assumption is based on the results of Lins et. al. (2017) who report that higher CSR engagement is associated with better performance during financial crisis.

1.5 Structure of the thesis

The structure of this thesis is as follows. The second chapter covers theoretical background related to corporate social responsibility, socially responsible investing, ESG factors, greenwashing, and asset pricing. The third chapter is a literature review, and it focuses on the previous research of the topic. Chapter four describes the data used in this thesis. Chapter five explains the methodology and chapter six discusses the results. Chapter seven is the conclusions.

2 Corporate social responsibility

Corporate social responsibility has been a popular topic among financial literature for the past decades. The term is often used vaguely and the interpretation or meaning of it can vary depending on the agendas of parties involved (Haynes et. al., 2012). Without exact definition, the term CSR is frequently redefined to suit the topic of discussion (Haynes et. al., 2012). Generally, corporate social responsibility can be considered as a phenomenon that has originated from the increasingly important role of corporations in modern day world (Dillard & Murray, 2012). With the power and the role that large multinational corporations have, the more pressure there is to avoid socially irresponsible actions and to comply with the societal norms (Dillard & Murray, 2012).

Corporate social responsibility does not only refer to complying with laws or contractual obligations, but it is also often associated with voluntaryism and doing more than is expected and required (Vogel, 2006). For example, it is understandable that companies should not violate human rights or exploit natural resources to perform their operations. Instead of only not using child labour or polluting, companies can proactively seek ways to generate improvements in their employment or sustainability areas. Vogel (2006) describes CSR as efforts that companies are willing to make to enhance the societies surrounding them. Kitzmueller & Shimshack (2012) say that CSR means exceeding the social or environmental obligations set by law or other authority in a related environment.

A fair portion of the discussion related to CSR is focused on the question whether it is necessary or whether companies should be held accountable for “CSR issues” if they already obey laws and regulations set in these areas. The traditional perspectives often emphasize the role of companies as profit maximisers (Wartick & Cochran, 1985). If companies sacrifice returns to perform socially responsible actions, they are inefficient and working against the market mechanism which would be harmful to shareholders who are only interested in financial returns (Wartick & Cochran, 1985).

Wartick and Cochran (1985) mention that according to economic responsibility, firms cannot have obligations tied to morality as they are not moral agents like individuals. This implicates that expenditure associated with CSR is harmful to stakeholders that benefit from profitability (Wartick & Cochran, 1985). The only justifiable reason for socially responsible actions would therefore be if it increases profits (Wartick & Cochran, 1985).

By taking part in socially responsible actions, companies include a political statement into their being (Wartick & Cochran, 1985). This diminishes the view of companies being purely economic entities that behave only according to economic goals (Wartick & Cochran, 1985). In a modern-day world, where large corporations are closely tied to the social development, for example, human rights and wellbeing of environment, it can be argued that social responsibility is in fact justifiable part of them (Wartick & Cochran, 1985).

According to Kitzmueller and Shimshack (2012), the earlier discussion about validity of CSR existence has shifted to a more acceptable perspective of it and figuring the reasons for such, and what kind of effects it has on economy. Kitzmueller and Shimshack (2012) state that CSR activities do not compete with the profit maximization point of view in all cases. If CSR activities are adopted in response to a majority demand, they might be in line with the interests of shareholders (Kitzmueller & Shimshack, 2012).

When discussing of CSR at microeconomic level, McWilliams and Siegel (2001) suggest that it can be considered as an investment. McWilliams and Siegel (2001) suggest that by allocating resources in CSR, companies can separate themselves from competitors, for example, by incorporating environmentally friendly production methods or offering products that have CSR elements. Based on this, the authors analyse the supply and demand of CSR. According to their framework, companies have a degree of CSR that's ideal for them and in this equilibrium profit maximization does not compete with stakeholder interests. To find the optimal level, an analysis should be carried out to determine at

which point the increased costs from CSR line up with the growth of revenue when the CSR demand is met (McWilliams & Siegel, 2001).

One of the main forms of CSR demand comes from consumers and it is related to supporting of responsibly produced goods (McWilliams & Siegel, 2001). Consumers can promote their ethical views by choosing products that correspond to their beliefs which will reward companies that choose to incorporate CSR into their processes (McWilliams & Siegel, 2001). McWilliams and Siegel (2001) also suggest that corporate social responsibility can affect the public view of a company or indicate about trustworthiness.

McWilliams and Siegel (2001) say that the other factors that affect demand are price, promoting, wealth level, preferences, demographics, and the cost of alternative products. According to the authors, promoting and advertising is essential to make consumers informed and to build a reputation. Level of wealth affects the willingness to buy CSR goods as wealthier consumers are less sensitive to changes in prices (McWilliams & Siegel, 2001). The other factors such as preferences, demographics, prices, and cost of alternative products also affect the demand as consumers have different values which can also influence the decision making when price and the cost of alternative products are considered (McWilliams & Siegel, 2001).

Other form of CSR demand comes from stakeholders such as employees and governments (McWilliams & Siegel, 2001). According to McWilliams and Siegel (2001), employees are drawn towards better working conditions and governments may have CSR standards with companies they operate with. The supply side of CSR comes from the inputs that companies need to incorporate into their methods. For example, investments into production methods, having a supply chain that is responsible, and employment practices all come with a price, but they are somewhat essential to create socially responsible outputs (McWilliams & Siegel, 2001).

In other words, corporate social responsibility can be seen as a strategic course of action to improve business. Kitzmueller and Shimshack (2012) on the other hand suggest a different approach which considers CSR in a broader way. Instead of considering CSR only as a strategy, the authors provide a categorization that examines why companies would willingly invest in CSR.

In a scenario where stakeholders' and shareholders' preferences vary in relation to social and monetary benefits, several outcomes are plausible (Kitzmueller & Shimshack, 2012). If both, stakeholders, and shareholders are more inclined to social preferences they might see CSR as an important factor and carry the expenses willingly (Kitzmueller & Shimshack, 2012). According to the authors, such situation would have undetermined effects on profits. On the other hand, if shareholders value social preferences and stakeholders are more inclined to monetary preferences, the profits are expected to decrease as stakeholders are not carrying the cost of CSR (Kitzmueller & Shimshack, 2012).

Kitzmueller and Shimshack (2012), similarly to McWilliams and Siegel (2001), agrees that CSR can be seen as a strategic play. If stakeholders value social preferences, shareholders that are driven by monetary preferences cannot leave such go by unnoticed as CSR behaviour is rewarded (Kitzmueller & Shimshack, 2012). On the other hand, if both stakeholders, and shareholders are driven only by monetary preferences there is no incentive to incorporate CSR into strategy (Kitzmueller & Shimshack, 2012).

2.1 Socially responsible investing

When discussing of corporate social responsibility, it is fruitful to discuss about the investment strategies that try to benefit from the phenomenon. Socially responsible investing, or SRI, is often referred to when discussing of some form of investments that incorporate ethical principles or other goals that exceed financial perspectives. SRI allows investors to voice their concerns regarding ethical issues by, for example, using their shareholder rights to promote responsible actions, investing into low-income

communities, and using screening to exclude investments that do not fit into the category of responsible companies (Bollen, 2007).

Screening is a method that SRI funds use to construct portfolios that consist of companies that perform well in the areas that are centres of concern (Bakshi, 2007). By screening, investors and funds can avoid choosing companies that have, for example, bad environmental records, operations in questionable areas, human rights violations, inappropriate marketing, needless animal testing, hazardous products, and links to intoxicants and otherwise addiction causing services and products (Bakshi, 2007).

SRI also focuses on communication between management and shareholders (Bakshi, 2007). Whether it is shareholder activism or discussing, it may help management to understand the concerns better and find solutions to incorporate responsible methods to areas where they have not been considered yet (Bakshi, 2007). A smaller portion of SRI also focuses on community investments (Bakshi, 2007). By investing into low-income communities, investors can enhance the development of those areas.

Whereas CSR has faced questions about the need of it, SRI has been questioned as well. There are numerous research comparing the performance of conventional investment strategies versus strategies that classify as SRI. For example, Derwall et. al. (2005) find that eco-efficient companies, that is companies that have better relative environmental performance, outperform others. Derwall et. al. (2005) define eco-efficiency as the value generated compared to the amount of waste that is required to produce the value. Hamilton et. al. (1993) on the other hand find no evidence that socially responsible funds would produce returns that differ from the returns of traditional funds. Hamilton et. al. (1993) research the performance of 32 different funds that have different requirements of inclusion and exclusion based on SRI attributes, yet results show no benefit in choosing responsible funds.

While some of the research focuses on the performance comparison, there are other aspects of research as well. Heinkel et. al. (2001) study whether firm behaviour is affected by green investments. The authors conjecture that if ethical investors avoid investing into firms that pollute, the risk levels of those firms increase. This will have negative effect on the stock price and cost of financing which leaves the choice for firms that pollute to adjust their behaviour (Heinkel et. al., 2001). If the improvement of environmental activities costs less than the increased cost of capital, ethical investing can promote social responsibility (Heinkel et. al., 2001).

So, in theory, socially responsible investing can affect firm behaviour. This is in line with the CSR theories that emphasize the demand aspect that is driven by consumers and investors. Higher demand for socially responsible firms could explain some of the positive effects of CSR.

The nature of socially responsible investors has also been studied. Bollen (2007) studies whether investors of socially responsible funds deposit and draw their money differently than investors of traditional funds. The author conjectures that socially responsible funds are used to gain utility and that investors appreciate the ethical characteristics. In a such situation the traditional portfolio optimization would not be able to explain the rebalancing (Bollen, 2007). Bollen (2007) reports that he finds a significant difference between the fund flow volatilities when comparing socially responsible funds and traditional funds. Socially responsible funds have lower fund flow volatility which could suggest that investors are loyal to their personal values (Bollen, 2007).

Bollen (2007) also uses the cash flows and fund performance to further investigate the effects of social responsibility. According to Bollen (2007), past positive performance attracts more money into funds classified as responsible. Bollen (2007) also states that past negative performance does not necessarily result into as big outflows as in traditional funds, although the result is not as strong as in the case of past positive

performance. Overall, Bollen (2007) says that these findings suggests that investors gain utility from investing ethically.

Van Dooren and Galema (2018) have similar approach in their study of socially responsible investors. The authors research whether there is a difference between traditional investors and responsible investors in how they hold negative and positive positions. Van Dooren and Galema (2018) find that investors who mainly construct their portfolios around responsible investing maintain their negative positions longer than others and sell positive positions earlier than others.

The findings from Bollen (2007) and Van Dooren and Galema (2018) could indicate that responsible investors are more resilient to market movements. For example, in a financial crisis the utility derived from the responsibility aspect could act as buffer for not selling off stocks when the market otherwise experiences a decline. This could have a positive effect on the stock returns of firms that have some sort of indication that they are responsible, for example, a high ESG rating.

2.2 ESG components and their relation to risk and return

ESG ratings are a way to track firms' performance in environmental, social, and governance areas. It can be used as proxy for corporate social responsibility as CSR is often associated with the three aspects. ESG ratings are also a closely related to responsible investing as many funds and indices use them to screen companies. ESG data can be found from variety of sources, but many independent data providers have their own databases.

The effects of environmental, social, and governance factors on various corporate dimensions have been studied on their own but there is also a strain of literature that focuses on ESG ratings. Both are useful to draw conclusions about the factors and how they affect firms.

2.2.1 Environment component

The environmental aspect has gained a substantial amount of publicity during the last decades as news about climate change have reached the public eye. Companies are encouraged to consider their emissions and resource use to tackle the global concern. Feldman et. al. (1997) suggest in their paper that contradictory to the views that corporate spending to enhance environmental activities would only cause additional burden to profits, it can improve them in the form of prevented costs. Feldman et. al. (1997) find in their paper that enhancements in environmental practices are associated with lower risks and thus, it can lead to greater valuation.

It is indeed costly for companies to be associated with environmental catastrophes. Capelle-Blancard and Laguna (2010) report that in the petrochemical industry an accident that releases chemical toxins to environment can lead to a billion USD loss. Understandably this would not be the case in most different industries, but it is a good example of what environmental hazards can cause. Thus, a certain level of attention to environmental practices can mitigate risks.

El Ouadghiri et. al. (2021) study in their research how common awareness related to environmental issues affects returns. The authors research if extreme weather conditions and tragedies, publications about pollution and climate change, and internet searches for the topics affect sustainable and conventional indices differently (El Ouadghiri et. al., 2021). The authors conjecture that greater awareness of the public may lead to investors favouring environmentally friendly companies. The results of the study show that ESG indices have positive association and traditional indices have negative association to common awareness of environmental problems. Thus, it could be beneficial to companies to incorporate methods of sustainability.

2.2.2 Social component

The social aspect of corporations can be linked to various topics. For example, Turban and Greening (1997) suggest that it can affect the way that potential employees view companies and thus, help to recruit more adequate personnel. It can also provide insights about the values and work habits that companies have (Turban & Greening, 1997). The authors find evidence that corporate social performance is associated with better reputation and desirability in the eyes of employees. Thus, it can bring additional advantages in the form of skilled workers and management should consider incorporating social policies into corporate agendas (Turban & Greening, 1997).

Social responsibility has also been linked to other relationships as well. Han and Lee (2021) research whether CSR has any role in customer relationships in business-to-business market. The authors say that CSR has increased its importance in the supplier selection. Han and Lee (2021) conjecture that responsibility actions affect the level of riskiness that buyers view suppliers, connection felt by the parties involved by sharing similar values, reputation, and image. All of which are important aspects when building a network with business partners. The authors find evidence that strategic corporate social responsibility is positively associated with the previously mentioned. Han and Lee (2021) also find that CSR focused on non-business perspective has similar beneficial effects, but it does not lower the risk perceived by the buyers.

2.2.3 Governance component

Governance is also a topic often considered in ESG ratings. Various corporate governance related studies have linked governance with, for example, CEO compensation, firm performance, credit ratings, and equity prices (Core et. al., 1999; Ashbaugh-Skaife et. al., 2006; Gompers et. al., 2003). The main concern is often agency problems and costs associated with it. Core et. al. (1999) find in their research that agency problems are associated with the levels of governance. By researching corporate structures, the authors conclude that management gets better compensation when governance levels are low.

Similarly, the performance is weaker in firms that suffer from bigger agency problems (Core et. al., 1999).

Ashbaugh-Skaife et. al. (2006) research if governance has any effect on companies' credit ratings. The authors conjecture that better governance characteristics could mitigate costs related to agency problems and thus, affect credit ratings. Ashbaugh-Skaife et. al. (2006) find that the amount of large shareholders and the control of CEO has negative effect on credit ratings whereas lower stockholder control of takeover defences, clear and open reporting, independence of the board, board being owners in the company, and proficiency of the board have positive effect on the credit ratings. This result implies that companies can lower their cost of financing by improving governance (Ashbaugh-Skaife et. al., 2006).

Gompers et. al. (2003) research whether governance has impact on returns. The authors create an index to measure the distribution of control and power among executives and owners. Based on this index, Gompers et. al. (2003) measure the performance of a long-short strategy that goes long on companies that provide more rights to shareholders and short on the companies that provide less. Gompers et. al. (2003) find that such strategy resulted in 8,5 % abnormal returns per annum. The authors also report that companies in the former category had greater valuations, better profits, greater increase in sales, lower expenses, and they were associated with smaller number of acquisitions (Gompers et. al., 2003). However, the authors are cautious about drawing conclusions whether these results can be explained purely by governance.

Overall, there is evidence about the positive effects of the factors that construct ESG ratings. Though it must be noted that different research uses different data and different methodology, so results may not be applicable in every scenario.

2.3 Greenwashing

Greenwashing is a phenomenon that is closely related to corporate social responsibility and ESG factors. Greenwashing essentially means providing inaccurate ESG information (Yu et. al., 2020). This problem has occurred as firms have started to publish different reports related to their sustainability efforts but in many cases the data in them is not validated properly or it is not reported in comparable from (Yu et. al., 2020). Firms may have various reasons to portray themselves as more advanced in ESG areas than they are. For example, as mentioned above, greater emphasis on ESG might lead to lower risk and greater valuation (Feldman et. al., 1997). It might help in recruiting and building business relationships (Turban & Greening, 1997; Han & Lee, 2021). It can also reduce costs (Ashbaugh-Skaife et. al., 2006).

Greenwashing may have harmful effects on companies that take part in such actions, and it can also affect the credibility of CSR and ESG ratings. For example, Gatti et. al. (2021) state that investors see greenwashing as more negative action than other types of disobediences that are not related misinformation. Therefore, greenwashing can be damaging for reputation, and it may lead to potential investors avoiding greenwashing companies (Gatti et. al., 2021). Du (2015) shows that when companies are caught greenwashing, their market values suffer. Such a reaction is predictable as greenwashing is a form of deception and it contradicts the core ideas of CSR and ESG.

Yu et. al. (2020) report that greenwashing also causes harm to investors who are interested in incorporating ESG related data into their assessment. If firms publish reports about their sustainability and the information is not validated properly, it is harder to base decision making on this kind of information (Yu et. al., 2020). According to Yu et. al. (2020), firms can avoid greenwashing by, for example, emphasizing governance or paying attention to the ownership structures.

2.4 Responsible investing and asset pricing

In finance, research has focused on explaining stock returns since the early days. Fama and French are probably among the most well know researchers in finance that have contributed to the theory of asset pricing, and their research is still very popular. The theories of Fama and French (1993) are also utilized in this paper and therefore, it is useful to visit the asset pricing models introduced by the authors.

According to Fama and French (1993), stock returns can be explained by three factors. These are market factor, size factor, and value factor (Fama & French, 1993). Fama and French (1993) say that the latter two factors are linked to fundamentals and are therefore adequate at explaining returns. Market factor is the market return minus risk-free rate (Fama & French, 1993). Size factor, also known as SMB, is the returns of small stocks minus returns of big stocks (Fama & French, 1993). Value factor, also known as HML, is the returns of high book-to-market stocks minus returns of low book-to-market stocks (Fama & French, 1993). These factors construct the famous three-factor model that is widely known in finance.

The model has been developed further by introducing additional risk factors that explain returns better. Carhart (1997) expands the three-factor model presented by Fama and French (1993) by including a momentum factor. The momentum factor is the returns of well performing stocks minus returns of poorly performing stocks (Fama & French, 2012). Fama and French (2015) add factors that also take profitability and investments into account. The profitability factor is the returns of highly profitable stocks minus returns of stocks with low profitability (Fama & French, 2015). The investment factor is the returns of conservative firms minus returns of aggressive firms (Fama & French 2015).

Fama and French (2018) have expressed their concern regarding momentum factor. According to the authors it does not have sufficient theoretical background even though it works in empirical testing. Although new factors are being presented, the three factors that were introduced in the early stages have been largely adopted in asset pricing.

Even though Fama and French (2018) consider momentum with caution, other researchers have approached the topic. For example, Jegadeesh and Titman (1993) study how past stock market performance affects returns. According to the authors, a short-term strategy that focuses on buying stocks that perform well and selling stocks that perform poorly leads to better returns. So, in the short-term, the momentum effect seems to be present as winner stocks continue their rise and losing stocks continue performing poorly.

The existing literature has also focused on the implications that sustainable and responsible behaviour have on asset pricing. For example, Pástor et. al. (2021) introduce a model that studies how financial markets respond to the different demand levels of sustainable investing. In the model of Pástor et. al. (2021), the degree of sustainability varies between companies and investors and customers have different desires to promote sustainability. The authors also suggest that agents gain utility if they hold more sustainable companies, and the opposite effect takes place when they hold unsustainable companies (Pástor et. al., 2021). Agents in the model are also interested in companies' social impact (Pástor et. al., 2021). Pástor et. al. (2021) state that in the model agents pay higher prices if companies are more sustainable which in turn reduces the cost of capital of these companies.

Sustainable assets and non-sustainable assets also differ by nature in the model as the former group has negative alphas and the latter group has positive alphas (Pástor et. al., 2021). This also means that heavy emphasis on sustainable assets leads to lower expected returns (Pástor et. al., 2021). However, the utility from sustainability and the hedge from climate related risks compensates for the lower expected returns (Pástor et. al., 2021). Agents in the model construct their holdings based on the risk-free investment, the market, and the preferences to favour either sustainable or unsustainable assets (Pástor et. al., 2021). The last part is essential as without preferences investors would be satisfied with the market portfolio (Pástor et. al., 2021). Having equal preferences would also lead to this as markets would adapt (Pástor et. al., 2021).

The ESG factor introduced by Pástor et. al. (2021) portrays the shifts in agents' ESG preferences. If the demand of sustainable companies and their products increases, sustainable assets benefit and unsustainable assets are in disadvantage (Pástor et. al., 2021). Therefore, if such happens sustainable assets can outperform unsustainable assets. A situation like this could be, for example, a market crash if investors consider high ESG companies as more favourable investments. Pástor et. al. (2021) also state that sustainable investing causes beneficial effects as sustainable companies have greater valuations and this attracts companies to become more sustainable. The decrease in the cost of capital of sustainable companies also boost sustainable investments (Pástor et. al., 2021).

Pástor et. al. (2021) also expand their model and include a climate aspect to it. The addition affects the expected returns as unsustainable assets are riskier in this perspective and thus, it must be compensated by better expected returns (Pástor et. al., 2021). This also means that sustainable assets have lower expected returns because they hedge the risk (Pástor et. al., 2021).

Pedersen et. al. (2021) also research how responsible investing affects decision making in the financial markets. The authors introduce a theory where investors who have ESG preferences have different efficient frontier from investors who do not consider such information in their decision making. Pedersen at el. (2021) suggest that Sharpe ratio can be used to determine the optimal choices for investors who prefer to implement ESG ratings in investing decisions. Pedersen at al. (2021) introduce an ESG-efficient frontier. This frontier is constructed from the greatest achievable Sharpe ratios when takin into account different ESG levels.

Pedersen et. al. (2021) also show in their research that the capital asset pricing model can be adjusted to reflect ESG concerns. The authors suggest that when most investors are indifferent about ESG ratings and when better ESG rating is associated with more favourable future performance, stocks with better ESG ratings provide greater expected returns (Pedersen et. al., 2021). This is caused by the indifferent investors not driving up

the prices yet (Pedersen et. al., 2021). When the awareness related to ESG concerns increases, so does the prices and greater emphasis on ESG does no longer generate better expected returns (Pedersen et. al., 2021). If most investors are highly attracted to better ESG ratings, expected returns become lower (Pedersen et. al., 2021).

3 Previous research

This chapter focuses on the previous research on corporate social responsibility during unfavourable market conditions. The first subchapter covers studies related to the global financial crisis. The second subchapter focuses on the recent health related crisis that caused markets to crash. As the nature and root causes of the crises are very different, a look on both provides extensive information on the topic.

3.1 Global financial crisis

The global financial crisis is potentially among one of the worst situations that the global economy has experienced. Around 2007 to 2009 the banking sector and housing market induced a market crash because of extensive risk taking, speculation, irresponsible lending, and unsustainable desire for profitability (Cornett et. al., 2016). The actions that caused the global financial crisis can be linked to the lack of social responsibility as the potential catastrophic effects of them were not taken into large enough consideration (Cornett et. al., 2016). A strain of financial literature has focused to research if companies that engage in socially responsible actions survive market crashes better than companies that do not engage in such activities.

Lins et. al. (2017) research whether the social capital of firms affects financial performance during economic downturns. The authors use data based on the global financial crisis. Lins et. at. (2017) conjecture that when markets experience a shock that causes harm to the general trust in companies and markets, trustworthiness may increase its worth during those times. Lins et. al. (2017) base their link between trust and social capital to writings of Scrivens and Smith (2013). Due to the nature of social capital, it is hard to accurately measure (Lins et. al., 2017). Therefore, Lins et. al. (2017) use corporate social responsibility to depict it.

Lins et. al. (2017) explain that corporate social responsibility is closely associated with the elements of social capital. It comprises common values, and collaboration between the parties of interest and firms (Lins et. al., 2017). Such traits may translate into reliability and credibility when evaluating firms from the outside (Lins et. al., 2017).

Lins et. al. (2017) use MSCI ESG Stats Database to collect firm ratings. The authors leave some of the categories from ESG ratings out of their evaluation as they do not serve the purpose of measuring CSR. For example, Lins et. al. (2017) drop product and governance related measurements and they do not exclude any industries like some ESG ratings do. The authors construct indices that measure the firm level CSR to perform their main analysis. Lins et. al. (2017) also incorporate variables such as debt levels, cash on hand, and profitability, that are related to performance during economically stressing times.

Lins et. al. (2017) find that firms with better CSR scores outperform others. Their result is significant and has economic importance as the difference in returns varies from four to seven percentage points (Lins et. al., 2017). The authors suggest that better performance could be related to greater relative accounting profits, growth in sales, and workforce efficiency that occur among the firms with greater CSR characteristics. Lins et. al. (2017) conclude by saying that social capital works as a safety net during times of low trust in the markets.

Cornett et. al. (2016) study how banks are affected by CSR. More specifically, the authors research if banks consider CSR more important now than before, and what kind of actions bank are doing to raise the average level of responsibility. Cornett et. al. (2016) also study if higher CSR rating is associated with better performance. As the global financial crisis was heavily influenced by banks and their lack of responsibility, the topic is important for the whole financial system (Cornett et. al. 2016).

Cornett et. al. (2016) find a positive relationship between corporate social responsibility and bank performance. Banks with greater CSR characteristics tend to have higher return

on equity (Cornett et. al. 2016). Cornett et. al. (2016) also find that larger banks contribute to CSR by charging less and by providing additional services in areas where household income levels are low. Such actions are less common for smaller banks (Cornett et. al. 2016). The general level of CSR among banks has also increased (Cornett et. al. 2016). The authors suggest that the global financial crisis caused banks to reassess their need for responsibility.

Nofsinger and Varma (2014) research the performance of socially responsible funds. More specifically, the authors are interested in investigating whether market crises affect these funds the same way as traditional funds. In addition to the global financial crisis, Nofsinger and Varma (2014) research the market crash that took place during the change of the century. The authors consider funds socially responsible if they utilize some sort of screening technique, positive or negative, in the environmental, social, and governance areas as well as in the industry choice. Nofsinger and Varma (2014) use data of U.S. funds and their sample period is from 2000 to 2012. The authors report that during their sample period, the popularity of socially responsible investing grew substantially. The number of funds increased as well as the amount of money under their management.

Nofsinger and Varma (2014) find in their research that socially responsible funds survive better during economically challenging times. The authors also find that during other periods these funds underperform. Nofsinger and Varma (2014) conjecture that the ethical characteristics reduce downside risk which attracts investors to invest into responsible funds despite smaller returns outside market crises. The authors also mention that the better performance during crises in their sample is influenced by funds that emphasize ESG factors.

3.2 Financial crisis related to COVID-19

Despite the novelty of the COVID-19, many researchers have studied its effects on financial markets. By nature, the COVID-19 induced stock market crash and the global

financial crisis differ from one another. Whereas the latter one was highly affected by the housing market and banking sector, the former is a health crisis that has affected global economy through nationwide lockdowns. The COVID-19 related market crash is also unrelated to economic events as it is a result of disease outbreak (Albuquerque et. al., 2020). Regardless of their differences, both have offered an opportunity to research the effect of corporate social responsibility and ESG factor.

Bae et. al. (2021) study the effects of corporate social responsibility in the U.S. markets. As CSR and green finance have become more mainstream and more notable topics among decision makers, the authors test whether CSR has any effect on stock performance during the COVID-19 crisis (Bae et. al. 2021). Bae et. al. (2021) use similar methodology to Lins et. al. (2017). The authors use two different ESG databases to measure CSR, and they also use variables that are related to surviving market downturns.

Contradictory to Lins et. al. (2017), Bae et. al. (2021) demonstrate that during a market crash, CSR has no impact on stock performance. The authors find little to no evidence about CSR affecting returns. However, after examining the constituents of CSR ratings, Bae et. al. (2021) find that the environmental component is associated with returns in a positive and significant manner. Bae et. al. (2021) say that their research shows that CSR does not preserve value during crisis and that conclusions about the benefits of CSR in market shocks should be considered with caution.

Another research related ESG investing, and a crisis period is conducted by Broadstock et. al. (2021). The authors study how ESG ratings of firms listed in the Chinese stock market affect returns. As ESG investing is a new phenomenon in the Chinese stock market, Broadstock et. al. (2021) provide useful insights about how investors treat it in this setting. Broadstock et. al. (2021) find that companies with higher ESG ratings were traded less during the market crash. The authors suggest that this could be explained by ESG investors having better composure. This finding is in line with Bollen's finding (2007) who says that investors gain utility from responsibility factors and therefore are less sensitive

to market movements, and Van Dooren and Galema's (2018) who say that socially responsible investors may hold their losing positions longer.

Broadstock et. al. (2021) use event study methodology and variety of event windows to analyse returns around the COVID-19 induced market crash. The authors use this data in the regression model also. The authors control for size, book-to-market ratio, and leverage (Broadstock et. al. 2021). In the main test, Broadstock et. al. (2021) find that the coefficient for ESG score is statistically significant and positive. After measuring the components of ESG scores separately, the authors find that environmental and governance scores have positive effect on stock performance whereas the social score has negative effect. Broadstock et. al. (2021) conjecture that better environmental performance helps to manage risks associated with sustainability and that better organized governance is linked to robustness and thus, they could improve stock returns. The authors also suggest that high emphasis on social score could indicate about not cutting costs on the expense of stakeholders and thus, it leads to worse stock performance.

Ding et. al. (2021) find similar results to Broadstock et. al. (2021). Ding et. al (2021) research how different attributes affect stock performance during the COVID-19 period. More specifically, Ding et. al. (2021) focus on characteristics that firms had prior to the crisis. One of these characteristics is corporate social responsibility. The authors use global data of over 6 700 companies.

Ding et. al. (2021) report that CSR score, and all its components are associated with better stock performance. The authors suggest that the positive relation could be a sign of firms with higher CSR activities having better relationships with their stakeholders and thus, these firms cope better in difficult situations. Ding et. al. (2021) also say that the beneficial effects of CSR are more pronounced in cultures where societal norms are high or environmental aspirations and equality are considered as core values.

Garel and Petit-Romec (2021) research whether the surprise factor related to COVID-19 has caused markets to re-evaluate the significance of sustainability. The authors conjecture that the unexpected health crisis caused by the COVID-19 could affect investor behaviour in the way that investors evaluate the likelihood of future crises. If investors consider climate change and environmental problems more severe and probable after experiencing COVID-19, it may cause demand among companies with better environmental performance (Garel & Petit-Romec, 2021). Garel and Petit-Romec (2021) also say that the pandemic period has led decision makers to consider climate in the recovery strategies which could further increase the value of companies that are already environmentally responsible.

Garel and Petit-Romec (2021) find that more sustainable firms survived the COVID-19 induced market crash better. The authors report statistically, and economically significant results as increase in environmental rating can lead to a 1,4 percentage points greater returns (Garel & Petit-Romec, 2021). Garel and Petit-Romec (2021) also mention that the environmental score has nearly similar effect on returns as variables displaying financial health. The authors also test if firms with bad environmental records are being punished but the results suggest that this is not the case.

Garel and Petit-Romec (2021) also research whether social and governance scores have impact on returns. Following the arguments of Lins et. al. (2017), the authors test if the better stock performance is explained by better ESG ratings rather than just by one component of it. Garel and Petit-Romec (2021) find that both components have positive association with returns, but they lack statistical significance.

Díaz et. al. (2021) research whether a new ESG factor, similar to what has been created by Fama and French, could be used to explain returns. Díaz et. al. (2021) conjecture that the popularity of ESG investing has reached the point where it could be considered as a systematic factor. The authors state that the recent events related to the pandemic could further increase the importance of ESG factor as throughout past crises hidden problems

have occurred. According to Díaz et. al. (2021), compliance with high ESG standards could reduce the risks of future problems in these areas.

Díaz et. al. (2021) organize their sample by ESG ratings, and they use the difference that is obtained by subtracting the returns of low ESG companies from returns of high ESG companies as the new factor. Díaz et. al. (2021) also perform similar analysis on all the separate components constructing the ESG ratings. The authors focus on the U.S. market during the COVID-19 outbreak.

Díaz et. al. (2021) find that companies with higher ESG ratings suffered smaller losses than S&P 500 index in the market crash. Respectively, companies with lower ESG ratings suffered greater losses than S&P 500 index. When analysing the effect of the ESG factor, Díaz et. al. (2021) find that the effect varies across industries. For some industries, the effect is negative and for others the effect is positive, and in some industries no effect is found. Díaz et. al. (2021) also find that when incorporating the new factor, size factor of Fama and French loses significance. When comparing the effects of the components, Díaz et. al. (2021) find that the magnitude, significance, and sign vary. However, environmental, and social components seem to determine the effect of ESG rating in many cases (Díaz et. al., 2021).

Engelhardt et. al. (2021) also find supportive evidence of the beneficial impact of a higher ESG rating. The authors research the phenomenon in European markets and extend the approach introduced by Lins et. al. (2017) by also researching if a higher ESG rating is more important in countries where general trust in society is lower. Lins et. al. (2017) study only how different trusting areas in the U.S. respond to the effect of CSR. Engelhardt et. al. (2021) conjecture that corporate social responsibility and a higher ESG rating can reduce uncertainty in countries where companies are less regulated.

Engelhardt et. al. (2021) have data of companies listed in 16 countries across the Europe. The authors use ESG data from Refinitiv. In addition to ESG ratings, Engelhardt et. al.

(2021) use dummy variable to categorize companies. In case the rating lies above the country median, it is considered as high ESG, and the dummy variable gets a value of one. If the rating is below median, dummy variable is zero (Engelhardt et. al., 2021). Like Lins et. al. (2017) and Bae et. al. (2021), Engelhardt et. al. (2021) control for various firm characteristics that can affect the analysis. Surprisingly, Engelhardt et. al. (2021) report that raw returns are not affected by ESG ratings, but abnormal returns are. Increase in ESG rating can lead to over 2 % additional return. In the COVID-19 market crash, European companies with above average ESG ratings earned almost four percentage points better abnormal returns (Engelhardt et. al., 2021).

Engelhardt et. al. (2021) also find that main component determining the impact of ESG ratings is the social rating. Out of all the subcomponents, it is displaying greatest magnitude and significance (Engelhardt et. al., 2021). The authors also find evidence that the environmental component has an impact, but its magnitude and significance are smaller. These results are in line with Díaz et. al. (2021) and similar when compared with the results of Garel and Petit-Romec (2021).

Albuquerque et. al. (2020) find supportive evidence of environmental and social scores affecting returns during the COVID-19 pandemic. The authors suggest that firms with greater emphasis on these two factors are benefiting from more devoted customers which leads to better profit margins. Also, Albuquerque et. al. (2020) say that socially responsible investors are more resilient against market movements. Based on these arguments, the authors conjecture that ESG score should affect returns during the COVID-19 market crash.

Albuquerque et. al. (2020) find that environmental and social scores are associated with better performance in the beginning of the COVID-19 pandemic. The authors also report that the profitability of firms emphasizing environmental and social aspects increased even though their sales decreased. Albuquerque et. al. (2020) also record lower volatility

for these firms. Both results are in line with the predictions of environmental and social scores' beneficial effects (Albuquerque et. al., 2020).

The existing literature provides mixed evidence of the effects of corporate social responsibility, ESG ratings, and the subcomponents of ESG ratings. The consensus seems to be that they are believed to be beneficial, but some research fails to capture this whereas others succeed. This is the case even with the COVID-19 related market crash. Some of the different results may be explained by different data and different methodologies but the lack of unambiguous evidence is detrimental to the credibility of the alleged beneficial effects.

The next chapter focuses on the data used in this thesis. It discusses in detail the choice of data and how the variables are formed to conduct the empirical testing.

4 Data

The data used in this thesis is collected from Thomson Reuters database. The initial plan was to focus on a single market located in Europe but as the ESG coverage remains somewhat limited, it is necessary to broaden the search to find a reasonable sized sample. As Germany and France represent the largest economies in Europe, data of the companies listed in these countries is used for the research. Also, the choice to use European data is partly driven by the fact that the existing literature tends to focus on the U.S. markets. In addition, Germany and France have western and developed markets so, the data is easily obtainable compared to several other markets.

The sample construction starts with finding companies that have the necessary data available. As the main variable of interest is the ESG rating, it is beneficial to research markets where companies generally have ESG ratings. Based on the data used, the ESG coverage in Germany and France has improved throughout the last five years. However, many companies still do not have an ESG rating which affects the sample construction. To ensure a large enough sample, no companies that have an ESG rating are excluded. Like Engelhardt et. al. (2021), raw ESG ratings are used for the main tests. The approach differs from Lins et. al. (2017) who consider only five subcategories of ESG ratings. The authors construct a measurement that considers the strengths and weaknesses of different ESG dimensions. Bae et. al. (2021) use the same approach as Lins et. al. (2017) but in addition, they also calculate a CSR variable that combines only the social and environmental ratings.

Following Engelhardt et. al. (2021) a dummy variable is used to further check the robustness of the results. If the ESG rating is above the sample median, it is classified as high ESG, and the dummy variable gets a value of one. If the value is below the sample median the dummy variable is set to zero.

In addition to ESG ratings, other variables are needed as well. Following Lins et. al. (2017), a set of variables displaying financial health are obtained. These are, for example, long-

term debt divided by total assets, short-term debt divided by total assets, cash and short-term investments divided by total assets, and operating income before depreciation and amortization divided by total assets. As market crashes may cause additional uncertainty related to financing, companies with greater degree of solvency may perform better as they are not dependent on external financing, and they might avoid unexpected financing costs such as increased interest payments. Profitability is also a factor that can help during economically stressing times, thus operating income before depreciation and amortization is included as a rough estimate of cash flows.

Other firm characteristics used by Lins et. al. (2017) and Bae et. al. (2021) are also considered. Market capitalization is used to measure size. The raw annual returns of 2019 are used to measure momentum, similarly to Bae et. al. (2021). Book-to-market ratio and dummy variable for negative book-to-market ratio are also used to measure the value effect. Also, to account for different effects that may occur among different industries, dummy variables based on industries are used. Idiosyncratic risk is calculated as the volatility of the market adjusted returns.

As for the returns, Bae et. al. (2021) define 18th of February to 20th of March 2020 as the market crash period. The authors also define 23rd of March to 5th of June 2020 as the recovery period. Similarly, in this paper, the returns are calculated for the same periods. The raw crisis return is the buy and hold return over the crash period which is -45,75 % on average in the sample. The raw post-crisis return is the buy and hold return over the recovery period which is 33,73 % on average in the sample. To calculate the abnormal returns, expected returns need to be estimated. This is done by first estimating the betas relative to the market returns. To estimate the betas, 60 months of returns prior to the crisis are used. CAPM is then used to calculate the expected returns for each firm. Abnormal returns are obtained by subtracting the expected returns from raw returns.

Following Lins et. al. (2017), the factor loadings for Fama and French three-factor model and momentum factor have been calculated for each firm. The factor loadings have been

calculated based on 60 months of returns prior to the crisis. The data for Fama and French factors has been retrieved from Kenneth R. French's data library. European data has been used for the calculations due to lack of country specific data.

As can be seen from the figure 1 below, the data availability affects the sample size. After collecting the necessary variables for the regressions, only 280 firms remain in the sample. Out of those 280 firms 136 are French and traded in the Euronext Paris exchange, and 144 are German and traded in the Xetra exchange. Even though Germany and France are developed markets with good accessibility to data, some variables are still missing from the database.

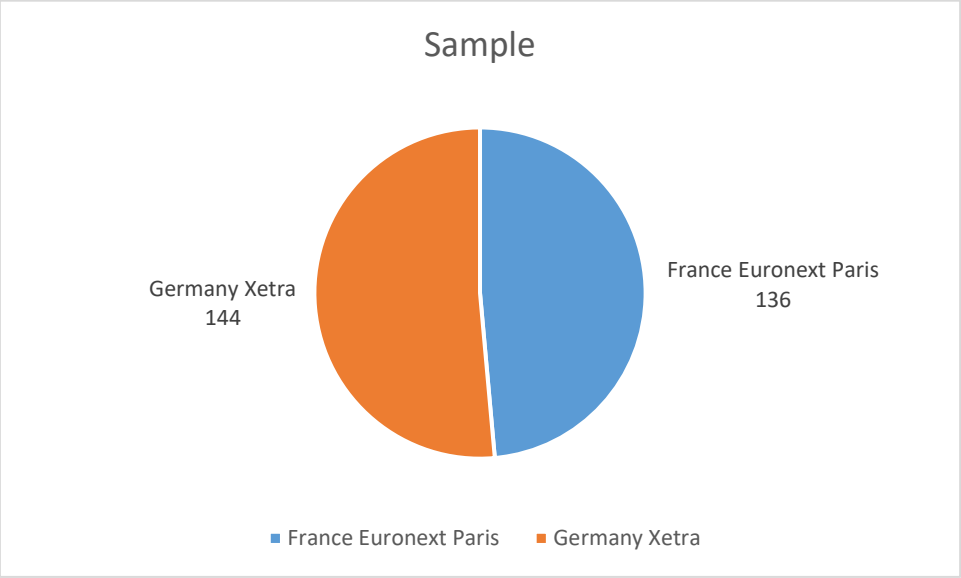

Figure 1. Distribution of sample.

Table 1 contains the descriptive statistics of the sample. The variables related to firm characteristics are from the year end 2019, as close as possible to the COVID-19 induced market crash. Albuquerque et. al. (2020) suggest that pre-pandemic state of firms determines the reaction to the market crash as it happened so fast that there was no time to prepare for it. The authors also emphasize the exogeneity of the crisis, meaning that it is unrelated to the economic conditions and therefore hard to predict.

As can be seen from the table 1, average firm has a market capitalization of 12,27 billion and an ESG rating of 57,80. The median value for ESG rating is 61,05 which indicates that firms in the sample have decent emphasis on societal aspects. When observing the components separately it can be seen that this holds true as the mean values for environmental, social, and governance scores are 56,67, 64,06, and 50,25. None of the components are displaying any extreme values that would indicate that some area is more emphasized than others. The median social score is higher than the median environmental or governance score but not very much. It can be only guessed whether the decent societal awareness is due to both countries in the sample being western and developed.

Table 1. Descriptive statistics.

	Obs.	Mean	Median	Maximum	Minimum	Std. Dev.
Crisis period raw returns	280	-0.46	-0.45	0.20	-1.21	0.21
Post-crisis period raw returns	280	0.34	0.34	0.82	-0.89	0.18
Crisis period abnormal returns	280	-0.13	-0.13	0.47	-0.75	0.21
Post-crisis period abnormal returns	280	0.06	0.07	0.55	-1.12	0.16
ESG rating	280	57.80	61.05	93.76	5.99	21.26
Environmental pillar score	280	56.67	60.62	98.35	0.00	25.55
Social pillar score	280	64.06	67.33	97.10	1.39	22.72
Governance pillar score	280	50.25	51.70	96.83	2.88	23.39
Market capitalization	280	12.27	2.85	208.61	0.05	25.50
Long-term debt	280	0.23	0.22	1.16	0.00	0.15
Short-term debt	280	0.06	0.05	0.68	0.00	0.07
Cash and short-term investments	280	0.14	0.10	0.92	0.00	0.13
Profitability	280	0.10	0.10	0.44	-0.92	0.10
Book-to-market	280	0.58	0.51	2.78	-1.96	0.48
Negative book-to-market	280	0.02	0.00	1.00	0.00	0.15
Momentum	280	0.17	0.18	1.13	-1.07	0.28
Idiosyncratic risk	280	0.02	0.02	0.05	0.01	0.01

The overall financial health of the companies in the sample is good as the percentage of cash and short-term investments out of total assets is 13,89 % on average while the percentages for long-term debt and short-term debt are 23,04 % and 6,38 % respectively. The level of operating income before depreciation and amortization is also decent with the mean being 9,60 % out of total assets. In terms of book-to-market ratio, the

companies in the sample are overvalued on average. An interesting observation that can be seen from the descriptive statistics is that the momentum variable, which is the raw returns of 2019, is very high. Companies in the sample had a return of 17,22 % on average prior to the pandemic. The returns for the crisis period as well as for the post-crisis period are both extreme. Even though the market experienced a very sharp decline during the beginning of 2020, the recovery has been remarkably strong. During the few months recovery period the average raw return in the sample is 33,73 %.

Before performing the main test, it is beneficial to look at the correlations between the main variables. Table 2 below describes the correlations.

Table 2. Correlation matrix.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Crisis period raw returns (1)	1.00																
Post-crisis period raw returns (2)	-0.48*	1.00															
Crisis period abnormal returns (3)	0.88*	-0.37*	1.00														
Post-crisis period abnormal returns (4)	-0.39*	0.83*	-0.48*	1.00													
ESG rating (5)	0.01	-0.02	0.18*	-0.16*	1.00												
Environmental pillar score (6)	0.04	-0.02	0.18*	-0.12*	0.85*	1.00											
Social pillar score (7)	0.05	-0.10	0.20*	-0.21*	0.91*	0.70*	1.00										
Governance pillar score (8)	-0.07	0.07	0.10	-0.10	0.79*	0.72*	0.58*	1.00									
(Log)Market capitalization (9)	0.16*	-0.01	0.30*	-0.18*	0.67*	0.59*	0.62*	0.51*	1.00								
Long-term debt (10)	-0.04	-0.19*	-0.05	-0.12*	0.10	0.10	0.08	0.12*	0.00	1.00							
Short-term debt (11)	-0.05	-0.01	-0.04	0.03	0.02	0.11	-0.02	0.04	-0.02	0.03	1.00						
Cash and short-term investments (12)	-0.03	-0.07	-0.01	-0.07	-0.26*	-0.26*	-0.22*	-0.16*	-0.17*	-0.24*	-0.12*	1.00					
Profitability (13)	0.00	0.06	-0.03	0.04	0.15*	0.15*	0.17*	0.04	0.14*	-0.16*	0.01	-0.22*	1.00				
Book-to-market (14)	-0.04	0.11	0.00	0.13*	0.03	0.02	0.00	-0.02	-0.10	-0.13*	0.13*	-0.24*	-0.18*	1.00			
Negative book-to-market (15)	-0.10	-0.14*	-0.07	-0.09	0.03	0.00	0.02	0.04	-0.11	0.30*	-0.01	0.05	-0.18*	-0.40*	1.00		
Momentum (16)	-0.10	0.16*	-0.12*	0.07	-0.03	-0.03	-0.03	-0.01	0.14*	-0.02	-0.04	0.12*	0.02	-0.39*	-0.04	1.00	
Idiosyncratic risk (17)	-0.26*	0.02	-0.15*	0.01	-0.35*	-0.36*	-0.30*	-0.26*	-0.60*	-0.01	-0.06	0.35*	-0.25*	-0.10	0.26*	0.04	1.00

* Denotes statistical significance at 5 % level.

As can be seen from the table, ESG rating shows little to no correlation between the standard measurements of returns. However, ESG rating has a small positive correlation at 1 % level with abnormal returns during the pandemic crash. The separate ESG components show similar results, and the correlations appears to be significant when returns are measured as abnormal returns. The logarithm of market capitalization is also positively correlated with ESG ratings, and the correlation appears to be high. It is also correlated with the subcomponents of ESG ratings which is unsurprising as larger companies tend to enhance their reputation by taking part in these aspects and they often are

presumed to have more resources to spend. Profitability is also positively correlated with ESG rating, although the correlation is minimal, yet statistically significant at 1 % level. This further supports the belief that having more resources allows firms to use more money on aspects that might not be considered as their core business.

5 Methodology

The methodology of this paper follows Lins et. al. (2017) and Bae et. al. (2021). It was first introduced by Lins et. al. (2017) in a study researching the effects of social capital during financial crisis, but Bae et. al. (2021) have implemented the same method to research the effects of CSR during the COVID-19 stock market crash. The main test is as follows:

$$R_i = \alpha + \beta_1 ESG_i + \sum \beta_k Control\ variables + \sum \beta_m Factor\ loadings + \sum \beta_n Industry\ fixed\ effects + \varepsilon_i \quad (1)$$

The dependent variable R_i is either the raw buy and hold return from 18th of February 2020 to 20th of March 2020 for firm i, or the abnormal return from the same period for firm i. When further analysing the effect of ESG rating, the raw buy and hold return and the abnormal return from recovery period are also used as the dependent variable. The main independent variable of interest is the ESG_i which is the ESG rating of firm i. Following Lins et. al. (2017) and Bae et. al. (2021), the chosen control variables represent the financial health and overall state of firm i. The control variables are long-term debt divided by total assets, short-term debt divided by total assets, the logarithm of market capitalization, cash and short-term investments divided by total assets, operating income before depreciation and amortization divided by total assets, book-to-market ratio, a dummy variable set to one if book-to-market ratio is negative, momentum, and idiosyncratic risk.

Following Lins et. al. (2017), the factor loadings for Fama and French three-factor model and momentum factor have been calculated for each firm. Also, dummy variables representing different industries are used to account for the different effects that may occur in different industries during market crashes.

To further analyse the effect of ESG rating, a dummy variable is assigned to companies that have higher ESG rating than the sample median. The purpose is to find if firms

considered as ESG leaders have collectively better returns than firms that do not emphasize environmental, social, and governance aspects.

As the components of the ESG ratings are also available for the whole sample, it is possible to conduct a test to see whether environmental, social, or governance scores have any effect on returns on their own. The existing literature has provided some mixed evidence about the importance of separate scores, but the consensus seems to be that some play more important role than others. This is tested for the sample used in this thesis. The test is conducted by running the regression (1) with same specifications, but instead of using ESG ratings, the separate ratings for environmental, social, and governance are used.

6 Results

This chapter introduces and analyses the results of empirical testing. The empirical testing uses the data presented in chapter four and follows the methodology presented in chapter five. The effects of ESG rating and its components on stock returns during the COVID-19 stock market crash are presented first. The impacts of ESG rating on post-crisis returns are presented later in this chapter.

6.1 ESG rating and stock returns during the COVID-19 market crash

The main results can be seen in table 3. As can be seen from the results, ESG rating does not affect returns in the sample. The coefficient for ESG rating is very insignificant statistically and economically in all four regressions. Also, in all four regressions, the coefficient for ESG rating is negative. This implies that investors did not reward companies with higher ESG ratings in the beginning of the COVID-19 pandemic.

The result is in line with Bae et. al. (2021) who find no significant and consistent association between ESG ratings and returns during the COVID-19 market crash, but it contradicts many studies that find ESG beneficial in the times of crises. For example, Lins et. al. (2017) show that firms with higher CSR attributes survived the financial crisis better. Similarly, Nofsinger and Varma (2014) show that socially responsible funds survive better during economically challenging times. The different results obtained in this thesis might occur from the nature of the crisis, as COVID-19 struck the global economy differently compared to the financial crisis. It can be so that during times of great distrust for financial institutions investors reward companies that display greater ethical characteristics. However, the COVID-19 pandemic was not a result of irresponsible banking, so the same may not apply.

The result is still contradictory to what Broadstock et. al. (2021) find. According to the authors, Chinese firms with higher ESG ratings performed better during the COVID-19

crash. This contradiction could also be explained by the different nature of the samples. In emerging markets, like China, where the trust for authorities can be lower, better ESG rating could indicate about trustworthiness and therefore lead to better performance during times of uncertainty.

Table 3. ESG rating and returns.

Panel A	(1)	(2)	(3)	(4)
Dependent variable :	Raw Returns	Abnormal Returns	Raw Returns	Abnormal Returns
ESG rating	-0.0003	-0.0006	-0.0001	-0.0003
	(0.0007)	(0.0007)	(0.0008)	(0.0008)
(Log)Market capitalization			0.0047	0.0021
			(0.0157)	(0.0157)
Long-term debt			0.0356	0.0543
			(0.0880)	(0.0878)
Short-term debt			-0.0298	-0.0243
			(0.1588)	(0.1584)
Cash and short-term investments			0.0833	0.0869
			(0.1045)	(0.1043)
Profitability			-0.1770	-0.1949
			(0.1326)	(0.1323)
Book-to-market			0.0054	0.0125
			(0.0392)	(0.0391)
Negative book-to-market			-0.0287	-0.0345
			(0.1013)	(0.1011)
Momentum			-0.1445***	-0.1574***
			(0.0483)	(0.0482)
Idiosyncratic risk			-0.7884	0.4813
			(3.4999)	(3.4922)
Constant	-0.2511***	-0.2264***	-0.3099	-0.2765
	(0.0566)	(0.0569)	(0.2286)	(0.2281)
Observations	280	280	280	280
Four-factor loadings	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
R-squared	0.2688	0.2216	0.3080	0.2747
Adjusted R-squared	0.2331	0.1836	0.2488	0.2126

Results of OLS regressions. In columns (1) and (3) the dependent variable is the raw returns during the COVID-19 market crash, and in columns (2) and (4) the dependent variable is the abnormal returns during the COVID-19 market crash. ESG rating is the main independent variable of interest. In columns (1) and (2), the regressions do not contain control variables. All regressions contain industry dummies and factor loadings for market return minus risk-free return, HML, SMB, and momentum factors. ***, **, and * Denote statistical significance at 1 %, 5 %, and 10 % level. Standard errors are reported in parenthesis.

It is noteworthy that even after including control variables, the coefficients lack significance. This can either be a poor choice of variables and a small sample, or during the crisis period the whole market declined so drastically because of panic that fundamentals did not matter. Only momentum, which is the raw returns of year 2019, is statistically significant. This could be interpreted so that the strong performance during previous year of pandemic inflated stock prices to a point where highest gainers suffered the most.

Some of the industry dummies, which are not reported in the table for brevity, have large coefficients and small p-values. For example, the coefficient for construction industry in column (4) is -0,2087 and it is statistically significant at 1 % level. It could be that industry is a better indicator about the reaction to the COVID-19 market crash than firm level fundamental data, as the impact of COVID-19 was so large scale. The adjusted R-squared values are similar to other studies related to this topic.

To further investigate the effect of ESG rating, same test is carried out with a dummy variable that categorizes firms as either high ESG or low ESG. Firms with ESG rating above the sample median are high ESG firms. The results are reported in table 4. As can be seen, the results are similar to the first test. The magnitude of the high ESG coefficient is larger, yet it is still statistically and economically insignificant. This further supports the finding that ESG rating does not affect returns, at least during exogenous market crashes. As for the other coefficients, they are similar to the first test. The only statistically significant variable is again momentum. In column (4), where abnormal returns are dependent variable, one standard deviation increase in momentum (0,2756), which is the raw returns of 2019, leads to an additional loss of 4,32 %.

The coefficient for High ESG is also inconsistent. In column (3), the coefficient is positive, while in other regressions the coefficients are negative. This further shows that ESG rating does not have unambiguous effect on returns, at least in the sample used in this thesis.

Table 4. High ESG dummy and returns.

Panel B	(1)	(2)	(3)	(4)
Dependent variable :	Raw Returns	Abnormal Returns	Raw Returns	Abnormal Returns
High ESG	-0.0056	-0.0142	0.0019	-0.0046
	(0.0290)	(0.0292)	(0.0308)	(0.0307)
(Log)Market capitalization			0.0039	0.0008
			(0.0153)	(0.0153)
Long-term debt			0.0346	0.0521
			(0.0877)	(0.0875)
Short-term debt			-0.0295	-0.0249
			(0.1589)	(0.1586)
Cash and short-term investments			0.0852	0.0889
			(0.1049)	(0.1047)
Profitability			-0.1787	-0.2006
			(0.1314)	(0.1312)
Book-to-market			0.0053	0.0123
			(0.0392)	(0.0391)
Negative book-to-market			-0.0294	-0.0361
			(0.1012)	(0.1010)
Momentum			-0.1443***	-0.1566***
			(0.0482)	(0.0481)
Idiosyncratic risk			-0.8488	0.4310
			(3.5168)	(3.5097)
Constant	-0.2619***	-0.2480***	-0.3011	-0.2674
	(0.0492)	(0.0495)	(0.2320)	(0.2315)
Observations	280	280	280	280
Four-factor loadings	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
R-squared	0.2685	0.2204	0.3080	0.2744
Adjusted R-squared	0.2327	0.1823	0.2488	0.2123

Results of OLS regressions with high ESG dummy. High ESG dummy gets a value of one if the ESG rating is above the sample median. In columns (1) and (3) the dependent variable is the raw returns during the COVID-19 market crash, and in columns (2) and (4) the dependent variable is the abnormal returns during the COVID-19 market crash. High ESG dummy is the main independent variable of interest. In columns (1) and (2), the regressions do not contain control variables. All regressions contain industry dummies and factor loadings for market return minus risk-free return, HML, SMB, and momentum factors. ***, **, and * Denote statistical significance at 1 %, 5 %, and 10 % level. Standard errors are reported in parenthesis

6.2 ESG components and stock returns during the COVID-19 market crash

In the existing literature, the ESG components are also said to have different effects on returns (Díaz et. al., 2021; Engelhardt et. al., 2021; Garel & Petit-Romec, 2021). As the separate ratings for each of the component are available in the sample, similar tests are used to analyse whether they display any effect on returns. Table 5 presents the results for each of the component; environmental rating (panel C), social rating (panel D), and governance rating (panel E).

Table 5. ESG components and returns.

Panel C	(1)	(2)	(3)	(4)
Dependent variable :	Raw Returns	Abnormal Returns	Raw Returns	Abnormal Returns
Environmental score	0.0002	-0.0001	0.0003	0.0001
	(0.0006)	(0.0006)	(0.0006)	(0.0006)
Control variables	No	No	Yes	Yes
Observations	280	280	280	280
Four-factor loadings	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
R-squared	0.2686	0.2199	0.3089	0.2744
Adjusted R-squared	0.2328	0.1818	0.2497	0.2123
Panel D	(1)	(2)	(3)	(4)
Dependent variable :	Raw Returns	Abnormal Returns	Raw Returns	Abnormal Returns
Social score	0.0004	0.0001	0.0006	0.0005
	(0.0006)	(0.0006)	(0.0007)	(0.0007)
Control variables	No	No	Yes	Yes
Observations	280	280	280	280
Four-factor loadings	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
R-squared	0.2693	0.2199	0.3102	0.2757
Adjusted R-squared	0.2335	0.1818	0.2512	0.2137
Panel E	(1)	(2)	(3)	(4)
Dependent variable :	Raw Returns	Abnormal Returns	Raw Returns	Abnormal Returns
Governance score	-0.0009	-0.0010	-0.0008	-0.0009
	(0.0006)	(0.0006)	(0.0006)	(0.0006)
Control variables	No	No	Yes	Yes
Observations	280	280	280	280
Four-factor loadings	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
R-squared	0.2743	0.2273	0.3132	0.2804
Adjusted R-squared	0.2388	0.1895	0.2544	0.2188

Results of OLS regressions with separate ESG components. In columns (1) and (3) the dependent variable is the raw returns during the COVID-19 market crash, and in columns (2) and (4) the dependent variable is the abnormal returns during the COVID-19 market crash. Panel C contains

results for Environmental score. Panel D contains results for Social score. Panel E contains results for Governance score. Only main independent variables of interest are reported for brevity but in columns (3) and (4) the regressions contain control variables. All regressions contain industry dummies and factor loadings for market return minus risk-free return, HML, SMB, and momentum factors. ***, **, and * Denote statistical significance at 1 %, 5 %, and 10 % level. Standard errors are reported in parenthesis.

As the results show, none of the components display any statistical significance when it comes to affecting returns. The magnitude of each coefficient is also small, meaning that the separate components do not determine returns in the sample. However, the coefficients for social score are consistently positive, whereas the coefficients for governance score are consistently negative. Firms with high social score might have good relationships with stakeholders and it could be beneficial during world-wide pandemic. Firms with high governance score might be seen as undynamic and not as good in adapting to crises. It is yet hard to find support for these theories as the results are statistically insignificant.

As the previously presented evidence suggests, this thesis finds no association between ESG ratings and stock returns during the COVID-19 market crash. However, this does not mean that ESG ratings and corporate social responsibility are unbeneficial. They still might help to recruit more adequate personnel, lead to better relationships with stakeholders, mitigate risks, and enhance governance (Turban & Greening, 1997; Han & Lee, 2021; Feldman et. al., 1997; Ashbaugh-Skaife et. al., 2006).

These results rather suggest that investors and companies should be cautious when assessing the importance of ESG rating and corporate social responsibility. Based on the results of this thesis, investors should refrain from investing into high ESG companies during market crashes if they are interested in gaining better returns. Similarly, companies should consider if the purpose of participating into these activities is other than what they stand for, as the benefit derived from them might be less than expected. However, this brings the discussion to a point where the motives of investors and companies

must be evaluated as socially responsible investing and corporate social responsibility comprises the element of sacrificing returns in exchange for doing right and behaving ethically responsibly.

6.3 ESG rating and post-crisis stock returns

Even though the COVID-19 pandemic led to a very steep decline in stock returns, the recovery from it has been remarkably strong. As Garel and Petit-Romec (2021) suggest, investors might be in a situation where their risk evaluation and investment behaviour might change after facing such unexpected event. If the risks associated with environmental, social, and governance factors are believed to be more current, it might lead to a situation where the demand for firms that emphasize these areas increases. Therefore, it is also tested whether ESG ratings are associated with the returns that followed the COVID-19 market crash. The post-crisis returns are defined as raw returns and abnormal returns during the period of 23rd of March 2020 to 5th of June 2020, similarly to Bae et. al. (2021).

Table 6 presents the results for post-crisis returns. Again, the coefficient for ESG rating is marginal and statistically insignificant in all four regressions. When using post-crisis returns as dependent variable, ESG rating has consistently negative effect, although as mentioned, it is not statistically significant. Unsurprisingly, the coefficient for long-term debt is negative and statistically significant when using both raw returns and abnormal returns as dependent variable. Surprisingly, the coefficient for cash and short-term investments is negative and statistically significant in both regressions, and the magnitude is fairly large. One way to interpret this is that investors might consider large cash funds unnecessary after they see that the worst part of crisis has passed. Large cash funds could be used for other productive operations and holding large amounts of cash can be seen as a constraint. However, timing the market is hard, if not impossible. Therefore, it is somewhat surprising that cash and short-term investments have negative impact on

returns so shortly after the pandemic crash as investors should not know the exact end point of the market decline.

Table 6. ESG rating and post-crisis returns.

Panel F	(1)	(2)	(3)	(4)
Dependent variable :	Raw Returns	Abnormal Returns	Raw Returns	Abnormal Returns
ESG rating	-0.0008	-0.0004	-0.0007	-0.0005
	(0.0007)	(0.0006)	(0.0007)	(0.0007)
(Log)Market capitalization			-0.0100	0.0026
			(0.0135)	(0.0128)
Long-term debt			-0.2131***	-0.1515**
			(0.0755)	(0.0714)
Short-term debt			-0.1516	-0.0576
			(0.1363)	(0.1289)
Cash and short-term investments			-0.2335***	-0.1692**
			(0.0897)	(0.0849)
Profitability			0.0657	0.0779
			(0.1138)	(0.1077)
Book-to-market			0.0588*	0.0514
			(0.0337)	(0.0319)
Negative book-to-market			-0.0221	-0.0029
			(0.0869)	(0.0822)
Momentum			0.1367***	0.0951**
			(0.0414)	(0.0392)
Idiosyncratic risk			-5.9916**	-3.2261
			(3.0041)	(2.8416)
Constant	0.1607***	0.1486***	0.3722*	0.1507
	(0.0513)	(0.0469)	(0.1963)	(0.1856)
Observations	280	280	280	280
Four-factor loadings	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
R-squared	0.1217	0.1125	0.2549	0.1962
Adjusted R-squared	0.0787	0.0691	0.1912	0.1273

Results of OLS regressions when using post-crisis returns. In columns (1) and (3) the dependent variable is the raw returns. In columns (2) and (4) the dependent variable is the abnormal returns. ESG rating is the main independent variable of interest. In columns (1) and (2), the regressions do not contain control variables. All regressions contain industry dummies and factor loadings for market return minus risk-free return, HML, SMB, and momentum factors. ***, **, and * Denote statistical significance at 1 %, 5 %, and 10 % level. Standard errors are reported in parenthesis.

The momentum variable is also statistically significant and positive in both regressions. When raw returns are dependent variable, momentum is significant at 1 % level. When abnormal returns are dependent variable, it is significant at 5 % level. This could indicate

about market overreaction to the crisis. If during the crash period firms with strong 2019 stock performance experienced a steeper decline, they might have recovered from it quicker. It is noteworthy that compared to the crisis period regressions, the adjusted R-squared is lower in all the four regressions that use post-crisis returns as dependent variable. Only industry dummy in the regressions displaying statistical significance is retail trade. The coefficients for retail trade are positive and they are statistically significant on a 5 % level in column (2), 10 % level in column (3), and 1 % level in column (4).

7 Conclusions

The world-wide pandemic caused by the COVID-19 has had a significant impact on the financial markets. In the beginning of 2020, stock markets plummeted as the fear of the unknown disease shook economies and forced many companies to adapt to a new type of world. This thesis has focused on the crash period and questioned, whether the increased importance of non-financial measurements has any association with stock performance during that time. More specifically, the focus of interest is corporate social responsibility and metrics that are used to track this phenomenon.

Corporate social responsibility and its existence has been questioned, but it is argued that in a modern-day world where companies are much more influential, it is needed (Dillard & Murray, 2012). As the general development has headed towards a direction where the power of large companies has increased, one could assume that so has the need for corporate social responsibility. In addition to this, new perspectives have risen where corporate social responsibility can be seen as a strategic element and not competing with profit maximation (Kitzmueller & Shimshack, 2012; McWilliams & Siegel, 2001).

There is also a strain of literature that focuses on the subcomponents that constitute the ESG rating. The effects of environmental activities, social responsibility, and governance have been studied. The existing studies have found ties with all the above and better corporate performance. They might help with mitigating risks that could possibly occur if no attention was given to these aspects, recruiting more skilful employees, and cutting costs through enhanced governance (Turban & Greening, 1997; Han & Lee, 2021; Feldman et. al., 1997; Ashbaugh-Skaife et. al., 2006).

The aspect of socially responsible investing has also become widely known during the last decades. In this strategy, investors consider their ethical impact and non-financial goals when making investing decisions. Some researchers argue that it is possible to obtain better returns with socially responsible investing whereas others find no evidence

that such strategy would lead to better performance (Derwall et. al., 2005; Hamilton et. al., 1993).

Based on previous research, corporate social responsibility and ESG rating, which is often used as a proxy for it, should benefit companies during uncertain times. For example, Lins et. al. (2017) show that high CSR firms performed better in the financial crisis of 2008-2009. Nofsinger and Varma (2014) lend support to this finding by showing in their research that socially responsible funds survive economic downturns better.

Taken the previously mentioned into consideration, this thesis has researched whether the increased popularity of CSR and socially responsible investing affected stock performance during the COVID-19 market crash. This has been done by using the ESG rating as a proxy for corporate social responsibility. With a sample of German and French firms, the relationship between ESG ratings and stock returns has been analysed. Contradictory to many studies, this thesis finds no statistically significant evidence that ESG ratings would affect returns during market crash.

Even after categorizing companies as high ESG and low ESG by using a dummy variable, no statistically significant association between high ESG firms and returns are found. The coefficients gain magnitude, but they are inconsistent as in one of the four regressions the coefficient is positive and in others, they are negative. This further shows that ESG rating does not have unambiguous effect on returns.

The result is further strengthened by analysing the separate subcomponents of ESG ratings. This is done by individually testing whether environmental score, social score, and governance score affects returns during the COVID-19 market crash. No statistically significant evidence is found regarding any of the separate scores, which is somewhat unsurprising as the ESG rating itself shows no effect on returns in the tests. Social score on the other hand has consistently positive effect, but as mentioned, it is not statistically significant, and the magnitude is weak. Similar finding is done for the governance score.

It is consistently negative, but as mentioned it not statistically significant. Therefore, based on the results of this thesis, it is hard to assess whether any of the subcomponents have a more important role.

This thesis has also analysed the effect of ESG rating on the returns that followed the COVID-19 market crash. Despite the popularity of responsible behaviour that took place after the pandemic hit, no evidence is found to support the argument that higher ESG ratings would lead to better returns during the post-crisis period. A strong reversal in stock returns after the crash could also indicate that markets reacted more to uncertainty than firm fundamentals. Overall, it can be stated based on the sample and research conducted in this thesis, ESG rating shows no statistically significant effect on returns during the COVID-19 market crash and the period that followed shortly after.

The results obtained in this thesis add to the literature that finds no consistent evidence about the effect of CSR and higher ESG rating on returns in the times of crisis. The empirical evidence presented in this thesis implies that investors and companies should be cautious when assessing the importance of ESG ratings and CSR. If the purpose of investors is to look for safe havens during crises, they might be better off if they stay away from companies with high ESG ratings as there is no clear unanimous evidence that investing into these companies leads to better results. As for companies and their management, it is also advised to consider whether the purpose of participating into ESG activities is to obtain a safety net for economically challenging times as it might not turn out to be as simple as some claims suggest.

It is noteworthy that some of the previous research that suggests that there would be a relationship between CSR measurements and stock returns investigate different periods. As mentioned, Lins et. al. (2017) research the financial crisis that took place in 2008-2009. The mentioned crisis was induced by banking sector and housing markets, whereas the market downturn that was caused by the COVID-19 was exogenous. It is natural to question whether this fact affects the results, but at the same time it is a good

future research idea. To fully understand the possible benefits that CSR might bring, it is essential to understand in what kind of surroundings and situations they occur. To address this, more research needs to be done.

Another hypothetic scenario could be that due to the increased popularity of corporate social responsibility and socially responsible investing, their credibility might have suffered. If companies are only using responsibility activities as an excuse to improve their public image, instead of transparent actions, it is possible that this could lessen the value of CSR. Such behaviour is called greenwashing and Yu et. al. (2020) state that it complicates investors' abilities to implement responsibility related decisions. Having unreliable information of companies' actual actions may be troubling if they yet disclose their "efforts" towards responsibility (Yu et. al., 2020).

As for the COVID-19 crisis, other researchers have found similar results to what has been obtained in this thesis. Bae et. al. (2021) find no consistent evidence that CSR affects returns during the market crash. Engelhardt et. al. (2021) only find inconsistent evidence as raw returns in their research are not affected by ESG ratings, but abnormal returns are. Broadstock et. al. (2021) on the other hand find that Chinese stocks benefit from higher ESG ratings during the COVID-19 market crash. Similarly, Ding et. al. (2021) say that CSR and its subcomponents are associated with better stock market performance.

Engelhardt et. al. (2021) also point out in their research that according to their findings, ESG ratings seem to play a bigger role in countries where general levels of trust are low. This could partly explain why in China the role of ESG rating might be more important. Conversely, it could also partly explain why the results with data from two western and developed countries in this thesis are underwhelming. On the other hand, Lins et. al. (2017) state that in their research that is based on the U.S. that high regional trust enhances the effect of CSR whereas low regional trust diminishes it. Ding et. al (2021) also report similar results. According to the authors, in countries where societal norms are

high, and environmental aspirations and equality are highly valued, CSR's effects are more pronounced.

It must be also acknowledged that there are multiple limitations concerning this thesis. First, the sample used is small. To obtain more reliable results, it would be ideal to use a larger sample. On the other hand, data availability causes limitations, and it sets the framework in which empirical tests can be performed. Second, when researching a certain small period, in this case the COVID-19 market crash, it sets a limitation about the generality of results. As mentioned, other researchers have used different periods and different financial crises in their studies which affects the comparability of results. Previously it was suggested that future research could focus on studying whether the nature of the crisis affects the importance of ESG rating and CSR. Having more research with similar settings could help to determine whether the results obtained concerning COVID-19 market crash are applicable to a wider set of scenarios.

Having no significant results may also cause bias in interpretation of results as many of the assumptions made are based on other research that may have different methodologies, datasets, and approaches. Therefore, conclusions should be assessed with caution.

Overall, this thesis has covered the theoretical framework related to corporate social responsibility, socially responsible investing, and environmental, social, and governance factors. This framework combined with the previous research regarding the topics lay the foundation to the research question whether ESG rating affects returns during the COVID-19 crisis. Based on the data, methodology, and results presented in this paper, no statistically significant evidence of ESG ratings' effects on returns is found.

References

Albuquerque, R., Koskinen, Y., Yang, S. & Zhang, C. (2020). Resiliency of Environmental and Social Stocks: An Analysis of the Exogenous COVID-19 Market Crash. *The Review of Corporate Finance Studies, 9*(3), 593-621. https://doi.org/10.1093/rcfs/cfaa011

Ashbaugh-Skaife, H., Collins, D. W. & LaFond, R. (2006). The effects of corporate governance on firms' credit ratings. *Journal of accounting & economics, 42*(1), 203-243. https://doi.org/10.1016/j.jacceco.2006.02.003

Attig, N., El Ghoul, S., Guedhami, O. & Suh, J. (2013). Corporate Social Responsibility and Credit Ratings. *Journal of business ethics, 117*(4), 679-694. https://doi.org/10.1007/s10551-013-1714-2

Bae, K., El Ghoul, S., Gong, Z. & Guedhami, O. (2021). Does CSR matter in times of crisis? Evidence from the COVID-19 pandemic. *Journal of corporate finance, 67*, 101876. https://doi.org/10.1016/j.jcorpfin.2020.101876

Bakshi, R. (2007). Transforming markets in the 21st century: Socially responsible investing as a tool. *Futures : the journal of policy, planning and futures studies, 39*(5), 523-533. https://doi.org/10.1016/j.futures.2006.10.002

Bollen, N. P. B. (2007). Mutual Fund Attributes and Investor Behavior. *Journal of financial and quantitative analysis, 42*(3), 683-708. https://doi.org/10.1017/S0022109000004142

Broadstock, D. C., Chan, K., Cheng, L. T.W. & Wang, X. (2021). The role of ESG performance during times of financial crisis: Evidence from COVID-19 in China. *Finance Research Letters 38.* https://doi.org/10.1016/j.frl.2020.101716

Capelle-Blancard, G., & Laguna, M. (2010). How Does the Stock Market Respond to Chemical Disasters? *Journal of Environmental Economics and Management, 59*(2), 192-205. https://doi.org/10.1016/j.jeem.2009.11.002

Carhart, M. M. (1997). On Persistence in Mutual Fund Performance. *The Journal of finance, 52*(1), 57-82. https://doi.org/10.1111/j.1540-6261.1997.tb03808.x

Core, J. E., Holthausen, R. W. & Larcker, D. F. (1999). Corporate governance, chief executive officer compensation, and firm performance. *Journal of financial economics, 51*(3), 371-406. https://doi.org/10.1016/S0304-405X(98)00058-0

Cornett, M. M., Erhemjamts, O. & Tehranian, H. (2016). Greed or good deeds: An examination of the relation between corporate social responsibility and the financial performance of U.S. commercial banks around the financial crisis. *Journal of Banking & Finance, 70*, 137-159. https://doi.org/10.1016/j.jbankfin.2016.04.024

Derwall, J., Guenster, N., Bauer, R. & Koedijk, K. (2005). The Eco-Efficiency Premium Puzzle. *Financial analysts journal, 61*(2), 51-63. https://doi.org/10.2469/faj.v61.n2.2716

Díaz, V., Ibrushi, D. & Zhao, J. (2021). Reconsidering systematic factors during the Covid-19 pandemic – The rising importance of ESG. *Finance Research Letters 38.* https://doi.org/10.1016/j.frl.2020.101870

Dillard, J., & Murray, A. (2012). Deciphering the domain of corporate social responsibility. In K. Haynes, A. Murray, & J. Dillard (Eds.), Corporate social responsibility: a research handbook (pp. 10–27). Routledge. ISBN 9781136256493

Ding, W., Levine, R., Lin, C. & Xie, W. (2021). Corporate immunity to the COVID-19 pandemic. *Journal of Financial Economics, 141*(2)*,* 802-830. https://doi.org/10.1016/j.jfineco.2021.03.005

Du, X. (2015). How the Market Values Greenwashing? Evidence from China. *Journal of business ethics, 128*(3), 547-574. https://doi.org/10.1007/s10551-014-2122-y

El Ghoul, S., Guedhami, O., Kwok, C. C. & Mishra, D. R. (2011). Does corporate social responsibility affect the cost of capital? *Journal of banking & finance, 35*(9), 2388-2406. https://doi.org/10.1016/j.jbankfin.2011.02.007

El Ouadghiri, I., Guesmi, K., Peillex, J. & Ziegler, A. (2021). Public Attention to Environmental Issues and Stock Market Returns. *Ecological economics, 180*. https://doi.org/10.1016/j.ecolecon.2020.106836

Engelhardt, N., Ekkenga, J. & Posch, P. (2021). Esg ratings and stock performance during the covid-19 crisis. *Sustainability, 13*(13), 7133. https://doi.org/10.3390/su13137133

Eurosif. (2018). *European SRI study 2018.* Retrieved 2022-04-25. https://www.eurosif.org/wp-content/uploads/2021/10/European-SRI-2018-Study.pdf

Fama, E. F. & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of financial economics, 33*(1), 3-56. https://doi.org/10.1016/0304-405X(93)90023-5

Fama, E. F. & French, K. R. (2012). Size, value, and momentum in international stock returns. *Journal of financial economics, 105*(3), 457-472. https://doi.org/10.1016/j.jfineco.2012.05.011

Fama, E. F. & French, K. R. (2015). A five-factor asset pricing model. *Journal of financial economics, 116*(1), 1-22. https://doi.org/10.1016/j.jfineco.2014.10.010

Fama, E. F. & French, K. R. (2018). Choosing factors. *Journal of financial economics, 128*(2), 234-252. https://doi.org/10.1016/j.jfineco.2018.02.012

Feldman, S. J., Soyka, P. A. & Ameer, P. G. (1997). Does Improving a Firm's Environmental Management System and Environmental Performance Result in a Higher Stock Price? *The Journal of investing, 6*(4), 87-97. https://doi.org/10.3905/joi.1997.87

Garel, A. & Petit-Romec, A. (2021). Investor rewards to environmental responsibility: Evidence from the COVID-19 crisis. *Journal of corporate finance, 68*, 101948. https://doi.org/10.1016/j.jcorpfin.2021.101948

Gatti, L., Pizzetti, M. & Seele, P. (2021). Green lies and their effect on intention to invest. *Journal of business research, 127*, 228-240. https://doi.org/10.1016/j.jbusres.2021.01.028

Gompers, P., Ishii, J., & Metrick, A. (2003). Corporate Governance and Equity Prices. *The Quarterly Journal of Economics*, *118*(1), 107–155. http://www.jstor.org/stable/25053900

Green and Sustainable Finance Cluster Germany e.V. (2020). *Shaping the Future – Green and Sustainable Finance in Germany 2.020*. Retrieved 2022-04-25. https://gsfc-germany.com/wp-content/uploads/2020/11/201124_GSFCG_Shaping-the-Future_EN.pdf

Hamilton, S., Jo, H. & Statman, M. (1993). Doing Well While Doing Good? The Investment Performance of Socially Responsible Mutual Funds. *Financial analysts journal, 49*(6), 62-66. https://doi.org/10.2469/faj.v49.n6.62

Han, S. & Lee, J. W. (2021). Does corporate social responsibility matter even in the B2B market?: Effect of B2B CSR on customer trust. *Industrial marketing management, 93*, 115-123. https://doi.org/10.1016/j.indmarman.2020.12.008

Haynes, K. M., Dillard, J. F. & Murray, A. (2012). *Corporate Social Responsibility: A Research Handbook*. Routledge.

Heinkel, R., Kraus, A. & Zechner, J. (2001). The Effect of Green Investment on Corporate Behavior. *Journal of financial and quantitative analysis, 36*(4), 431-449. https://doi.org/10.2307/2676219

Jegadeesh, N. & Titman, S. (1993). Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency. *The Journal of finance, 48*(1), 65-91. https://doi.org/10.1111/j.1540-6261.1993.tb04702.x

Kitzmueller, M. & Shimshack, J. (2012). Economic Perspectives on Corporate Social Responsibility. *Journal of economic literature, 50*(1), 51-84. https://doi.org/10.1257/jel.50.1.51

Lins, K. V., Servaes, H. & Tamayo, A. (2017). Social Capital, Trust, and Firm Performance: The Value of Corporate Social Responsibility during the Financial Crisis. *The Journal of Finance, 72*(4), 1785-1824. https://doi.org/10.1111/jofi.12505

McWilliams, A. & Siegel, D. (2001). Corporate social responsibility: A theory of the firm perspective. *The Academy of Management review, 26*(1), 117-127. https://doi.org/10.5465/AMR.2001.4011987

Nofsinger, J. & Varma, A. (2014). Socially responsible funds and market crises. *Journal of Banking and Finance 48,* 180-193. https://doi.org/10.1016/j.jbankfin.2013.12.016

Pástor, Ľ., Stambaugh, R. F. & Taylor, L. A. (2021). Sustainable investing in equilibrium. *Journal of financial economics, 142*(2), 550-571. https://doi.org/10.1016/j.jfineco.2020.12.011

Pedersen, L. H., Fitzgibbons, S. & Pomorski, L. (2021). Responsible investing: The ESG-efficient frontier. *Journal of financial economics, 142*(2), 572-597. https://doi.org/10.1016/j.jfineco.2020.11.001

Refinitiv. (2021). *Environmental, Social, and Governance scores from Refinitiv*. Retrieved 2022-04-25. https://www.refinitiv.com/content/dam/marketing/en_us/documents/methodology/refinitiv-esg-scores-methodology.pdf

Renneboog, L., Ter Horst, J. & Zhang, C. (2008). Socially responsible investments: Institutional aspects, performance, and investor behavior. *Journal of Banking and Finance, 32*(9), 1723-1742. https://doi.org/10.1016/j.jbankfin.2007.12.039

Scrivens, K. & Smith, C. (2013). Four Interpretations of Social Capital. *OECD statistics working papers, 2013*(6), 0_1.

Turban, D. & Greening, D. (1997). Corporate Social Performance and Organizational Attractiveness to Prospective Employees. *Academy of Management journal, 40*(3), 658-672. DOI 10.2307/257057

van Dooren, B. & Galema, R. (2018). Socially responsible investors and the disposition effect. *Journal of behavioral and experimental finance, 17*, 42-52. https://doi.org/10.1016/j.jbef.2017.12.006

Vogel, D. (2006). The Market for Virtue: The Potential and Limits of Corporate Social Responsibility. Brookings Institution Press.

Wartick, S. L. & Cochran, P. L. (1985). The Evolution of the Corporate Social Performance Model. *The Academy of Management review, 10*(4), 758-769. https://doi.org/10.5465/AMR.1985.4279099

World Health Organization. (2021). *COVID-19 Weekly Epidemiologic Update* (Edition 57, published 14 September 2021). World Health Organization. https://www.who.int/publications/m/item/weekly-epidemiological-update-on-covid-19---14-september-2021

Yu, E. P., Luu, B. V. & Chen, C. H. (2020). Greenwashing in environmental, social and governance disclosures. *Research in international business and finance, 52*, 101192. https://doi.org/10.1016/j.ribaf.2020.101192

Appendix

Appendix 1. Variable definitions

Variable	Definition
Crisis period raw returns	Raw stock returns from 02/18/2020 to 03/20/2020 (Bae et. al., 2021)
Post-crisis period raw returns	Raw stock returns from 03/23/2020 to 06/05/2020 (Bae et. al., 2021).
Crisis period abnormal returns	Abnormal returns from 02/18/2020 to 03/20/2020 using market model and daily returns. Daily returns over the period of 2015 to 2019 have been used to estimate the market model (Bae et. al., 2021).
Post-crisis period abnormal returns	Abnormal returns from 03/23/2020 to 06/05/2020 using market model and daily returns. Daily returns over the period of 2015 to 2019 have been used to estimate the market model (Bae et. al., 2021).
ESG rating	Raw ESG rating at the end of 2019 from Thomson Reuters database.
High ESG	Dummy variable set to one if ESG rating is above sample median, zero otherwise (Engelhardt et. al., 2021).
Environmental pillar score	Raw Environmental pillar score at the end of 2019 from Thomson Reuters database.
Social pillar score	Raw Social pillar score at the end of 2019 from Thomson Reuters database.
Governance pillar score	Raw Governance pillar score at the end of 2019 from Thomson Reuters database.
(Log)Market capitalization	The logarithm of market capitalization.
Long-term debt	Long-term debt divided by total assets.
Short-term debt	Short-term debt divided by total assets.
Cash and short-term investments	Cash and short-term investments divided by total assets.
Profitability	Operating income before depreciation and amortization divided by total assets.
Book-to-market	Book-to-market ratio.
Negative book-to-market	Dummy variable set to one if book-to-market ratio is negative, zero otherwise (Bae et. al., 2021).
Momentum	Raw annual stock returns of 2019 (Bae et. al., 2021).
Idiosyncratic risk	Volatility of the market model-adjusted returns over the period 2015-2019.
Beta_Market	Factor loading for market factor. Estimated over the period of 2015 to 2019.

Beta_SMB	Factor loading for size factor. Estimated over the period of 2015 to 2019.
Beta_HML	Factor loading for value factor. Estimated over the period of 2015 to 2019.
Beta_Momentum	Factor loading for momentum factor. Estimated over the period of 2015 to 2019.