University of Zurich[UZH]

Department of Banking and Finance
Center of Competence for Sustainable Finance

# Sustainability and Crisis Resilience of European Stocks in Times of Covid-19

Master Thesis in Banking and Finance

Valentin Köferli

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Sustainability and Crisis Resilience of European Stocks in Times of Covid-19
Master Thesis in Banking and Finance

Valentin Köferli
Advisor: Dr. Annette Krauss
Professor: Professor Dr. Marc Chesney

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Zurich: University of Zurich, Department for Banking and Finance / Center of Competence for Sustainable Finance, Plattenstrasse 14, 8032 Zurich, Switzerland

# Abstract

Whether engaging in corporate social responsibility (CSR) is value-enhancing is subject to controversial debate in academia and praxis. The unexpected Covid-19 shock and an increased awareness to and demand for CSR during the Covid-19 pandemic give incentive to re-examine the relationship between CSR and financial performance. In a cross-sectional analysis of European firms, I find that CSR ratings are unrelated with stock performance during crisis and recovery periods around Covid-19. The findings are robust against using different variations of CSR scores. They also hold for industry- and country-specific analyses. Thus, CSR does not translate into increased crisis resilience for European stocks.

# Executive Summary

Whether engaging in environmental, social, and governance (ESG) activities is value-enhancing is the subject of a controversial debate in academia (Gillan, Koch, and Starks (2021)). The view that firms maximize shareholder value, not only stakeholder value, by enhancing corporate social responsibility (CSR) activities (McWilliams and Siegel (2001)) is contrasted with the agency theory-based view that managers conduct ESG activities for their own benefit at the expense of equity owners (Friedman (1970) and Masulis and Reza (2015)). So far, the literature examining the effect of CSR on firm value during the Covid-19 crisis does not provide a clear result in favor of the former or the latter view (e.g. Albuquerque et al. (2020) and Bae et al. (2021)). This ambiguity in findings motivates me to re-examine the relationship between a firm's sustainability level, measured as ESG scores, and corporate financial performance (CFP) from a European perspective. To my knowledge, this thesis is among the first empirical studies that concentrate on a European sample to analyze this relationship during Covid-19.

Prior crisis-related studies suggest that CSR protects shareholder wealth during economic downturns (e.g. Lins, Servaes, and Tamayo (2017)). Consistent with the stakeholder theory, ESG activities increase a firm's trustworthiness among stakeholders (Lins, Servaes, and Tamayo (2017)) making them more willing to support a firm's operations in times of crisis (Deng, Kang, and Low (2013)). Furthermore, the attention to and demand for CSR has increased among stakeholders, governments, and practitioners over recent years and during the Covid-19 pandemic (Bae et al. (2021)). Therefore, the overarching hypothesis in this thesis suggests that ESG is positively associated with stock market returns in crisis periods during the Covid-19 health disease.

The unexpected and exogenous nature of the Covid-19 shocks to the financial market allow me to circumvent possible reverse causality problems, a serious concern in the research on the CSR-CFP relationship (Deng, Kang, and Low (2013)). Firms were likely unable to respond promptly to the unfolding crisis, forcing investors to rely on pre-crisis firm characteristics (Albuquerque, Koskinen, and Zhang (2019)). Therefore, it enables me to identify the effect of pre-crisis ESG level on firm value.

I analyze the relationship between CSR and a firm's stock performance mainly in two crisis and two recovery periods caused by the Covid-19 pandemic, focusing on the phases of financial distress. I consider companies with better stock returns during periods of stock market turmoil to be more crisis-resilient than their counterparts. While

the stock market crash (fever period) and the subsequent recovery phase in the first half of 2020 are relatively well-researched, this thesis is, to my knowledge, the first empirical study to define and conduct research on the crisis and recovery period in the second half of 2020.

The study applies a cross-sectional OLS regression approach. The research design closely follows that of Lins, Servaes, and Tamayo (2017). In the baseline model raw and market model-adjusted returns over the different periods are a functional form of CSR, a firm's financial health, and other return-affecting firm characteristics. 2018 ESG ratings from Refinitiv are my primary measure of CSR. The sample comprises the STOXX Europe TMI listed firms with an ESG score available, excluding financial and micro-cap firms (market capitalization below EUR 250 million). This results in 909 distinct firms in the first half of 2020 and 906 distinct firms in the second half of 2020.

In a first step, I examine the association between ESG ratings and stock returns during all defined periods. I show that 2018 Refinitiv overall ESG scores do not affect either of the returns. This outcome is robust when replacing the CSR measure with 2019 Refinitiv ESG ratings and dummies for 2018 ESG ratings quintiles. Additionally, the results hold in robustness checks with ESG scores from Sustainalytics, except for first recovery returns. Firm performance in the first post-crisis phase is negatively associated with Sustainalytics ratings. However, the results generally suggest that rather than CSR, high return on assets (ROA) and low long-term leverage increase firm value during the fever period. During the second market crash, firms with low cash holdings, negative book-to-market ratios, and high momentum outperform.

Since scholars often view corporate governance not as part of CSR (Lins, Servaes, and Tamayo (2017)), the results for overall ESG scores may be influenced by a governance effect. Thus, I examine the relationship between crisis stock returns and each component of the ESG scores, namely the environmental (E), social (S), and governance (G) pillar scores. Even though social scores display a positive association with returns in both crisis periods, the coefficient estimates on all pillar scores and the average of the E and S scores remain statistically insignificant. This is consistent with previous outcomes and rejects a potential corporate governance effect modifying the previous results.

In a subsequent step, I rerun the regressions with overall ESG scores for country and industry subsamples. Prior country-level research suggests that the ESG-CFP

relationship is negatively affected by the level of a country's sustainability performance. I find that stock returns of Italian (French) firms are positively (negatively) associated with ESG during the second stock market decline. However, in all other county-level regressions, CSR has no impact on crisis returns. Moreover, I do not observe that a country's sustainability performance influences the association between ESG and firm value. However, it is worth pointing out that the variation in sustainability performance among the countries in the sample is low, as all countries have high sustainability standards. In industry-specific regressions, CSR is significantly positively associated with fever returns for firms in the Consumer Staples sector, supporting the overarching hypothesis. In all other industry-level regressions, ESG is not statistically significantly related to crisis stock performance.

Overall, the findings of this master thesis suggest that higher corporate sustainability activities have no influence on firm value around the Covid-19 induced stock market crises for Western European firms. This rejects my overarching hypothesis. It appears that the stakeholders' and investors' increased awareness and demand for CSR do not translate to more crisis-resilient stock performance for firms with high ESG levels. From an investors perspective, the present results do not give reason to view CSR as a protecting factor against downside risks. Regarding the debate on the ESG-CFP relationship, the findings are neither consistent with the value-enhancing theory nor the opposed value-destroying theory. Furthermore, the outcome is not in line with Albuquerque et al. (2020) and Ding et al. (2021), who find a positive association between CSR and stock returns during the fever period for a U.S. and a global sample, respectively. However, my results align with those of Bae et al. (2021). They report that ESG and firm value of U.S. companies are unrelated throughout the same period. Therefore, I do not assume the different regional focus to be the reason for the inconsistency between the results of the former papers and mine.

Lastly, one concern of this thesis is whether the outcome of the newly defined second crisis period can be extrapolated to other crises. The results of the control variables deviate considerably from those of earlier crises. Thus, further research on the impact of the Covid-19 pandemic on the stock market is needed. In addition, the country- and industry-specific findings offer interesting insights that can form the basis for future more extensive country- or industry-level research on the relationship between ESG and CFP in Europe.

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# List of Abbreviations

| | |
|---|---|
| BLUE | Best linear unbiased estimator |
| CARES | Coronavirus Aid, Relief, and Economic Security Act |
| CFP | Corporate financial performance |
| CLRM | Classical linear regression model |
| CPFF | Commercial Paper Funding Facility |
| CSP | Corporate social performance |
| CSR | Corporate social responsibility |
| ECB | European Central Bank |
| EPI | Environmental Performance Index |
| ESG | Environmental, Social, and Governance |
| Fed | Federal Reserve Board |
| GFC | Global financial crisis |
| GICS | Global Industry Classification Standard |
| HDI | Human Development Index |
| HML | High Minus Low |
| KLD | Kinder, Lydenberg, Domini |
| MOM | Momentum |
| OLS | Ordinary least squares |
| PEPP | Pandemic Emergency Purchase Programme |
| Q1 | First quarter |
| ROA | Return on assets |
| ROE | Return on equities |
| SMB | Small Minus Big |
| SRI | Socially responsible investments |
| TMI | Total market index |

# 1. Introduction

The attention to and demand for firms engaging in environmental, social, and governance (ESG) activities have increased over recent years and during the Covid-19 pandemic among stakeholders, governments, and investors (Bae et al. (2021)). This raises the question of whether engaging in ESG activities pays off for companies, especially during the Covid-19 induced stock market turmoil. The impact of ESG engagement on corporate financial performance (CFP) has been the subject of controversial debate in academia and praxis for over four decades. The view that enhancing corporate social responsibility (CSR) maximizes shareholder value, not only stakeholder welfare, (McWilliams and Siegel (2001)) is contrasted with the view that managers conduct ESG activities for their own benefit at the expense of equity owners (Friedman (1970) and Masulis and Reza (2015)). So far, academic studies analyzing the effect of CSR on firm value during the Covid-19 pandemic predominantly focus on U.S. samples and provide inconsistent results (e.g. Albuquerque et al. (2020) or Bae et al. (2021)). Thus, in this master thesis, I re-examine the relationship between a firm's ESG engagement and its resilience to plunging stock prices during the Covid-19 crisis from a European perspective.

Several academic and non-academic studies provide indications for the grown awareness and demand for sustainability-related considerations in recent times. The Global Sustainable Investment Review (2021) reports a constant increase in global responsible investments since 2016, achieving US$ 35 trillion sustainable investing assets worldwide in 2020. Pástor and Vorsatz (2020) demonstrate that investors' tastes start to shift towards green assets before the Covid-19 crisis and that the shift persists during the Covid-19-induced market shock. Additionally, they suggest that there is a similar movement in customers' preferences for green products, which is supported by a survey on consumer behavior in the EU (European Commission (2021a)). Furthermore, Shan and Tang (2020) point out that people's awareness of corporate culture (e.g. employee treatment) increases when they experience the impacts of difficult times[1] themselves, such as in the Covid-19 crisis. Similarly, governments and regulators indicate growing attention to corporate social responsibility (CSR). For instance, most firms in

[1] In this thesis, I use the terms economic downturn, tough time, or difficult time to refer to a time of crisis. I have observed all of these terms in the literature reviewed (e.g. Bae et al. (2021) and Ding et al. (2021))

the EU are required to report on environmental and social issues in their annual report 2019 (KPMG (2020)).

Generally, it is ambiguous whether the grown attention to CSR translates into a positive relationship between a firm's activities that enhance its sustainability and its financial performance. CSR theories, encompassing the stakeholder or institutional theory, suggest that engaging in ESG is value-enhancing when it aligns with stakeholder and environmental demands (Bae et al. (2021)). In contrast, based on the agency theory, researchers argue that executives invest in CSR to pursue social- and self-esteem and thus boost their own utility at the expense of shareholder value (Friedman (1970)). However, the prevailing view in academia and praxis is that ESG investments maximize shareholder value (Albuquerque et al. (2020)).

A major concern of empirical studies of the CSR-CFP relationship is that ESG investments might only be affordable for companies with superior financial performance, making it difficult to identify the direction of causality (Albuquerque et al. (2020)). The Covid-19 induced stock-market crash in the first quarter (Q1) of 2020 provides an unfortunate but valuable opportunity to circumvent this endogeneity concern. The unexpected and truly exogenous nature of the Covid-19 shock allows researchers to cleanly identify the effect of CSR on firm value during the crisis. (Ramelli and Wagner (2020))

Likewise, scholars take advantage of the setting of past crises. Lins, Servaes, and Tamayo (2017) document that stocks of socially responsible firms outperform those of less socially responsible firms in periods of economic downturns. Consistent with the stakeholder theory, they attribute their findings primarily to the rationale that CSR activities enable firms to increase the bond and trust with their stakeholder, who in return are more willing to support a firm's operations in crisis times (Deng, Kang, and Low (2013)). Similarly, Albuquerque et al. (2020) and Shan and Tang (2020) report a positive association between ESG activities and stock performance during the Covid-19 crisis. Their results suggest that socially responsible firms received increased loyalty and trust from customers, employees, and other stakeholders during the Covid-19 pandemic. In contrast, Demers et al. (2020) and Bae et al. (2021) find no significant relationship between CSR and crisis stock returns.

Since the Covid-19-related studies primarily examine the U.S. stock market, it is worth examining the effect of CSR on shareholder welfare for European firms. The CSR-CFP relationship is also generally considerably less researched for European samples than

for U.S. datasets, although Europe provides an interesting setting to analyze this relationship. For example, European investors have been among those with the highest fraction of sustainable assets in total assets under management since 2014 (GSIA (2021)). Dyck et al. (2019) report that European institutional investors are the only investors that push firms to achieve higher environmental and social performance. Also, they indicate that European countries tend to have strong environmental and social norms. In addition, the EU and the UK require listed firms with more than 500 employees to disclose environmental and social issues, while this is voluntary for U.S. companies (KPMG (2020)).

Thus, focusing on a Western European sample, this master thesis empirically analyzes in a cross-sectional ordinary least squares (OLS) regression approach the effect of CSR on CFP around the Covid-19 pandemic. As an umbrella term CSR "refers to the incorporation of Environmental, Social, and Governance (ESG) considerations into corporate management and investor's portfolio decisions" (Liang and Renneboog (2020), p.2). I use the terms ESG and CSR interchangeably[2] during this study. Furthermore, overall ESG scores represent the primary metric for CSR, while stock performance is my measure of crisis resilience. Usually, stock prices immediately incorporate all available public information (Brooks (2019)). Thus, I expect market participants to attribute a premium to more crisis-resilient stocks in response to declining equity prices. Stock performance is measured in two crisis periods and two subsequent recovery phases during the Covid-19 health disease. The focus of this thesis lies on the two crisis periods. Lastly, the sample comprises firms listed in the STOXX Europe Total Market Index (TMI) with ESG scores available. To my knowledge, this is the first European study to define and examine a Covid-19 related crisis and recovery in the second half of 2020.

In the remainder of the thesis, part 2 elaborates several theories explaining a possible link between CSR and CFP and presents non-crisis- and crisis-related research findings on this topic from the last four decades. Part 3 establishes the hypotheses and outlines the data and methodological design used to test these hypotheses. Part 4 presents and discusses the descriptive statistics and the regression results. In addition, it explains limitations of the present study and suggests future research opportunities. The final part draws the conclusions of this thesis.

[2] I rarely also use Corporate Social Performance (CSP) interchangeably with ESG and CSR even though its definition extends that of CSR with a focus on the social outcomes and impacts (Wood (1991)).

# 2. The effect of CSR on corporate financial performance in the literature

This thesis analyzes the influence of a firm's sustainability level on its crisis resilience during the Covid-19 pandemic. I measure corporate sustainability by firm-level ESG engagement. A firm's crisis stock performance proxies for its ability to withstand economically challenging times. Thus, this part provides insight into the extensive academic literature on the concept of CSR and its relationship to CFP. The first chapter discusses several theoretical rationales for this relationship, while the second chapter presents findings of empirical studies of the topic. Finally, the third chapter focuses on crisis-related research results on this subject.

## 2.1 Theoretical background for the relationship between ESG and CFP

Especially in recent years, the attention to CSR has grown (Bae et al. (2021)) and it has increasingly become mainstream to engage in ESG activities for firms (Liang and Renneboog (2020)). However, the concept of CSR starts to appear in the academic literature in the 1930s and 40s (Carroll (1999)). According to Carroll (1999), the landmark book "Social Responsibilities of the Businessman" in 1953 written by Howard R. Bowen is often characterized as the beginning of the modern era of CSR. The author is therefore also known as the "Father of Corporate Social Responsibilities" (Carroll (1999), p.270). In his book, Bowen (1953) argues that the actions and decisions of businessmen[3] affect their stakeholders, such as employees or customers, and thus, directly impact the lives of citizens. In his definition of social responsibility, business executives have an obligation to align their activities and decisions with the "objectives and values of our society" (Bowen (1953, p.6)). This subject receives increasing interest in the following decades, and various scholars try to further formalize CSR (Carroll (1999)). Growing awareness in society and social movements accompany and certainly influence the interest in CSR throughout this period (Agudelo, Jóhannsdóttir, and Davídsdóttir (2019)).

[3] These business executives possess businesses with power and a vital impact on society. Bowen (1953) talks about businessmen instead of corporations and does not mention businesswomen. Carroll (1999) assumes that corporations were not as dominant or prominent at the time and that businesswomen were not recognized, at least in formal writing. This may be the reason for the differing term "social responsibility" in the book's title from the commonly used CSR.

Roughly 20 years after the landmark book of Bowen (1953), Milton Moskowitz (1972) implies in an article of the first issue of the *Business and Society Review* that investing in socially responsible firms is profitable. He does not present any statistical evidence, nor does he give a sound theoretical rationale for his claim in his text. Furthermore, the article of Moskowitz (1972) initiates several follow-up studies of the relationship between CSR and firm profitability (Aupperle, Carroll, and Hatfield (1985)). Research on this subject has been exponentially growing since then (Friede, Busch, and Bassen (2015)). In contrast to the text of Moskowitz (1972), research nowadays provides various theories attempting to explain this relationship. According to Frynas and Yamahaki (2016), academics increasingly explore CSR from a theoretical perspective in recent years. Frameworks utilized to explain CSR are based on external drivers such as stakeholder theory or institutional theory and internal drivers including resource-based view or agency theory. In the literature on the relationship between ESG and CFP, the stakeholder theory becomes the predominant theoretical framework. (Frynas and Yamahaki (2016)) The stakeholder theory suggests that firms' decisions and actions are substantially influenced by their contractual (e.g. employees or suppliers) and public (e.g. governments) stakeholders (Freeman (1984)). Various studies support the idea that CSR helps firms to strengthen the relationship with their stakeholders, which in turn enhances their financial performance (e.g. Hillman and Keim (2001) and Ruf et al. (2001)). For example, Lee, Park, and Lee (2013) and Vlachos, Panagopoulos, and Rapp (2013) argue that engagement in CSR positively influences employee loyalty and satisfaction. Edmans (2011) provides evidence that a high level of employee satisfaction generates firm value. Furthermore, Albuquerque, Koskinen, and Zhang (2019) present a model where ESG investments increase customer loyalty and lower their price elasticity as part of a product differentiation strategy. Their model predicts higher profit margins that reduce systematic risk and lead to higher shareholder value. Consequently, researchers observing a positive relationship between CSR and shareholder value during the Covid-19 crisis link their findings to enhanced customer loyalty (Albuquerque et al. (2020)) or employee satisfaction (Shan and Tang (2020)).

Moreover, recent literature suggests that ESG engagement strengthens the relationship between a firm and its stakeholders by increasing trust, which in turn is beneficial during economically tough times (Lins, Servaes, and Tamayo (2017) and Flammer (2018)). Prominent firm theories view corporations as a nexus of contracts between shareholders and stakeholders (e.g. Coase (1937) or Jensen and Meckling (1976)). However,

according to Putnam, Leonardi, and Nanetti (1993) and Fukuyama (1995), formal contracts do usually not lead to (socially) efficient outcomes. Consequently, most interactions of firms with their stakeholders rely on implicit or incomplete contracts, making trust a crucial component (Lins, Servaes, and Tamayo (2017)). Putnam, Leonardi, and Nanetti (1993) claim that trust and cooperation are greater in firms with high social capital. Sacconi and Antoni (2010) report that CSR activities increase a firm's social capital and trustworthiness. Thus, engagement in ESG signals a firm's commitment to fulfilling such incomplete and implicit contracts (Lins, Servaes, and Tamayo (2017)). According to Deng, Kang, and Low (2013), this corporate commitment fosters stakeholders' willingness to support a firm's business, especially during times of crisis. As a result, CSR activities may protect firm value during economically difficult times (Lins, Servaes, and Tamayo (2017)).

The literature on socially responsible investments (SRI) offers another rationale for stronger performance resilience of firms with high ESG scores during tough times. Bollen (2007) and Renneboog, Ter Horst, and Zhang (2011) show that SRI funds are less sensitive to past negative fund returns and more sensitive to past positive returns compared to conventional mutual funds. Both papers consider this as an indication that ESG factors translate into higher shareholder utility. Therefore, they hypothesize that SRI investors not only value fund performance but also take ethical and social attributes into account (Bollen (2007) and Renneboog, Ter Horst, and Zhang (2011)). When investors with a preference for ESG are more resilient to negative returns, the stock prices of socially responsible firms should be less negatively affected by the crises caused by the COVID-19 pandemic.

In contrast to these views, which are often summarized as "doing well by doing good" (Albuquerque et al. (2020)), scholars argue that agency problems could cause a negative relationship between ESG activities and shareholder wealth. Friedman (1970) claims that corporate managers should not employ in philanthropy with others' money. In his view, ESG investments represent a self-serving behavior of managers to enhance their own utility at the expense of shareholder value. Such pursuit of social- and self-esteem generates lower profits and contradicts a manager's objective of maximizing shareholder value (Friedman (1970)). For example, later studies examining CSR-related agency problems find that corporate philanthropy and CEO ownership are negatively correlated (e.g. Atkinson and Galaskiewicz (1988) or Masulis and Reza (2015)). The higher the stakes owned by a CEO, the more important the firm's value

becomes, and thereby the less the firm engages in charity (Atkinson and Galaskiewicz (1988)).

Another interesting line of thought about the relationship between CSP and CFP arises also from the agency theory. Gillan, Koch, and Starks (2021) suggest that companies investing in ESG activities at the expense of firm value reflect a possibility that only managers of high-value or high-performance firms have. Hong, Kubik, and Scheinkman (2012) find that less financially constrained firms have higher ESG scores and conclude that "firms are more likely to do good when they do well" (p.4). On the one hand, this still implies a positive relationship between ESG and firm value. However, on the other hand, causality follows the opposite direction compared to the theories mentioned earlier in this chapter. Furthermore, it raises the question of whether prior studies suffer from endogeneity problems due to possible reverse causality. Indeed, many studies highlight that identifying causality is a critical issue to be addressed in research on the relationship between CSP and CFP (e.g. Deng, Kang, and Low (2013), Albuquerque et al. (2020), and Gillan, Koch, and Starks (2021)). In this context, the COVID-19 pandemic represents an unexpected shock to the economy that allows researchers to circumvent endogeneity issues. The exogeneity and speed of the shock suggest that companies have only limited ability to react to the crisis. This enables scholars to observe how investors respond to the shock, subject to a firm's preexisting ESG level, which remain fixed, at least in the short term. (Albuquerque et al. (2020) and Ramelli and Wagner (2020)).

## 2.2 Financial performance of socially responsible firms

In the past four decades, numerous studies have examined the impact of CSR on firm performance. In 1975, Vance is one of the first to react to the claims of Moskowitz (1972). In more detail, Moskowitz (1972) proposes a list of fourteen socially responsible firms that he believes would outperform their peers. Vance (1975) demonstrates that between 1972 and 1975, the stock price of all those firms decreases and perform far worse than popular US stock indices (e.g. Dow Jones or New York Stock Exchange Index). However, early studies of this subject often apply incomplete or simplistic methodological approaches and rely on subjective, value-laden, and therefore questionable CSR measures (Aupperle, Carroll, and Hatfield (1985)). Assessing a firm's social responsibility is ambiguous and relatively complex, stemming from the lack of a

concise and commonly recognized conceptualization of CSR (Aupperle, Carroll, and Hatfield (1985) and Wood (2010)).

Even though early studies give the impetus for CSR/CSP models and conceptualizations, the operationalization of CSR in the CSR-CFP literature still varies widely (see, e.g. Wood (2010)). While popular frameworks such as Carroll's (1979) pyramid or Wood's CSP model (1991)[4] provide a conceptual foundation, an appropriate and consistent CSR measurement that fits with these frameworks has yet to be found (Wood (2010)). Common ESG variables range from elaborate questionnaires incorporating theoretical frameworks to relatively simple methods like measuring corporate philanthropy. However, nowadays, ESG ratings of external rating agencies have become the predominant measure of CSR among researchers and practitioners (Liang and Renneboog (2020)), even though Wood (2010) argues that they cannot be assumed to capture all conceptual CSR factors accurately enough.

In contrast, measuring profitability is usually a straightforward process for which comprehensive data is available (Aupperle, Carroll, and Hatfield (1985)). The literature provides various measures of CFP. While academia finds evidence that CSR activities increase operating performance measured, for example, as return on assets (ROA) or sales growth (e.g. Liang and Renneboog (2017) or Lins, Servaes, and Tamayo (2017)), a lot of empirical studies focus on the effect of CSR on market-based performance. Market-based performance measures include short- or long-term stock returns, firm valuation, and cost of capital (Gillan, Koch, and Starks (2021)).

An academic study that analyzes the relationship between CSR and short-term returns is the paper of Deng, Kang, and Low (2013). Specifically, the authors analyze merger announcement returns. They assume merger announcements to be unexpected events, allowing them to circumvent the common reverse causality problem in the CSP-CFP research. They compare market performance between acquirers with high versus low

[4] One of the first conceptual models was Carroll's CSR Pyramid (1979). On top of the foundation of economic responsibility, it layers legal, ethical, and discretionary (later philanthropic) responsibility in decreasing order of suggested attention. This model has been reviewed and expanded numerous times in subsequent years (Wood (2010)). Furthermore, it serves as the basis for Wood's CSP model (1991), which is still widely accepted today. Wood (1991) extends Carroll's (1979) framework by incorporating the sociological complexity of managers' roles in society and the impact of their activities on others. In her CSP model the principles of social responsibility lead to the processes of social responsiveness and result in the outcomes and impacts on the society, environment, and the social systems. Figure 2 in the Appendix provides a graphical illustration of the two frameworks.

ESG scores. Their results demonstrate that ESG scores have a positive effect on stocks' announcement returns, long-term operating performance, and long-term equity returns after the merger (Deng, Kang, and Low (2013)). In their view, this reflects that CSR reputation is positively linked to a company's commitment to fulfilling its implicit contracts during the merger process. Further, the researchers argue that their findings are consistent with the stakeholder value maximation view and ultimately increase firm value.

Flammer (2015) applies a regression discontinuity design (RDD) on CSR shareholder proposals that pass or fail by a close call. In line with the results above, the passage of such proposals is associated with superior returns, an increased labor productivity, and sales growth. However, they point out that their outcome does not imply that CSR proposals are beneficial to firms in general. Adding to the literature on ESG-related events, Krüger (2015) demonstrates that negative CSR events induce a strong negative investor response, whereas positive events do not show significant market reactions.

Studies concentrating on stock performance in the long run or other proxies for firm value also present results supporting the view that ESG is value-enhancing. Dimson, Karakaş, and Li (2015) report that successful ESG engagements from active owners result in abnormal positive returns over an event window of 12-18 months. In line with the stakeholder theory, Edmans (2011) finds that firms with high employee satisfaction, one dimension of ESG policies, earn significantly higher long-term returns than their industry benchmarks. Furthermore, scholars provide evidence that CSR activities are positively influence Tobin's Q ratios[5], a common proxy for firm value in academic literature (Gao and Zhang (2015) and Ferrell, Liang, and Renneboog (2016)). However, Servaes and Tamayo (2013) claim that the positive relationship between CSR activities and firm value can only be found for firms with high advertising expenditures, which is an indicator for customer awareness.

Consistent with the view that CSR produces high firm value, some researchers propose that ESG does not (only) enhance shareholder wealth by increasing cash flows (e.g. through increased customer loyalty or employee productivity) but by lowering the cost of capital (Gillan, Koch, and Starks (2021)). Since socially responsible firms are

[5] Tobin's Q is the ratio between the market value of a company and the replacement cost of its assets. In practice, it is an estimate of whether a company is overvalued or undervalued. In academia, it is commonly used as a proxy for firm value, suggesting that a higher Tobin's Q indicates a higher firm value.

believed to be less risky, shareholders require a smaller premium. This implies that such firms have a lower cost of capital, resulting in a higher firm valuation (Gillan, Koch, and Starks (2021)). Oikonomou, Brooks, and Pavelin (2012) provide a variety of reasons why firms with high ESG scores should have lower firm risks. For example, they argue that socially responsible firms are better prepared against systematic adverse shocks or that their stocks attract institutional investors with a preference for long-term investments (e.g. pension funds). Adding to the latter hypothesis, El Ghoul et al. (2011) suggest that socially engaged firms face lower risks because they have a wider investor base than irresponsible firms. Due to the broader investor base, companies with high CSR levels are confronted with lower litigation risks, leading to a lower cost of capital (Hong and Kacperczyk (2009)). Under the common stand in finance, investors should be compensated for taking higher risks. Thus, scholars argue that low risks cause high firm value today and low returns in the future (Gillan, Koch, and Starks (2021)). Aligning with this view, Hong and Kacperczyk (2009) document that so-called sin stocks, stocks of firms producing alcohol, tobacco, and gaming, demonstrate higher expected returns than comparable stocks. They argue that this is an outcome of norm-constrained institutions having lower stakes of sin stocks in their portfolios, leading to greater litigation risk for such equities. Further, Amiraslani et al. (2017) report higher bond values and lower bond returns for socially responsible firms. Consequently, when firms with increased ESG activities have a broader investor base with a preference for long-term investments, these investors may hold on to their stocks in times of crisis, making stocks with high ESG ratings more resilient against downside risks.

Contrasting the common standpoint of the studies above that good firms do well, some researchers support the view that ESG investments are not profitable to firms. Di Giuli and Kostovetsky (2014) examine data from S&P 500 firms throughout 1991-2009. They find no significant relationship between lagged changes in KLD ratings and revenue growth. Their output even suggests a significant negative relation between lagged changes in KLD strength scores and future three-year changes in ROA. Furthermore, stock returns are negatively influenced by one-year lagged changes in KLD strengths. They conclude that better CSR leads to a decline in ROA in the long run and a delayed underperformance of stock returns since investors do not learn about CSR policy changes immediately. In line with the agency theory, they cautiously conclude that stakeholder benefits from CSR occur at the direct expense of shareholder wealth.

Corroborating this viewpoint, Masulis and Reza (2015) show that the rise in dividends following the US Tax Reform Act in 2003[6] is associated with a decline in charitable contributions. In addition, their results indicate that corporate giving is positively related to manager's charity preferences and that the announcement of corporate philanthropy produces negative market reactions. Yet, the authors do not rule out that charitable contributions can be beneficial to shareholders. In contrast, exploring a global sample, Liang and Renneboog (2017) illustrate that corporate donations positively affect financial performance and firm value. When market participants perceive high ESG investments as value-destroying, this could translate into poorer stock returns during economic downturns where firms face financial distress. Thus, the next chapter provides an overview of the findings of crisis-related studies on the CSR-CFP relationship.

## 2.3 CSR effect in crisis times

Various scholars use the unexpected and often exogenous nature of stock market shocks to examine the impact of CSR on a firm's financial performance. While an unexpected shock disrupts the equilibrium in the financial market, firm attributes such as the level of ESG remain unchanged in the short term (Albuquerque et al. (2020) and Lins, Servaes, and Tamayo (2017)). This allows scholars to sidestep typical endogeneity problems in the research on CSR. Specifically, it mitigates the issue of reverse causality, as the ability of firms to respond to the shock in a timely manner is often very limited. Consequently, it is unlikely that financial performance affects short-term CSR levels. Additionally, it enables academics to observe how investors react to a stock market crash when they are forced to build their decisions on preexisting firm characteristics (Albuquerque et al. (2020) and Lins, Servaes, and Tamayo (2017)).

A prominent crisis-related paper on the CSR-CFP relationship is that of Lins, Servaes, and Tamayo (2017). The authors examine a sample of 1'673 non-financial U.S. firms throughout the GFC. In addition to MSCI ESG scores, their regressions control for multiple other firm characteristics (e.g. cash holdings or leverage) that are known to influence crises-period stock returns. They document that firms entering this crisis with

[6] The US Tax Reform Act in 2003 reduced the personal dividend tax rate Masulis and Reza (2015). Furthermore, they consider it as an exogenous event.

high ESG scores earn significantly higher cumulative raw and abnormal returns[7]. Compared to firms with lower ESG levels, socially responsible firms also experience superior profitability, better gross margins, and higher sales growth during the crisis. Lins, Servaes, and Tamayo (2017) view the GFC primarily as an unexpected shock to financial market confidence. Thus, they conclude that investors reward firms with higher social capital with a premium for their increased trustworthiness during crises of trust. Moreover, in similar analyses, they report that stock returns around the Enron/Worldcom scandal are positively related to high CSR ratings. However, socially responsible firms do not show superior performance in growth and recovery periods before and after the GFC. In further studies of the GFC, superior social performance of non-financial U.S. firms appear to reduce stock return volatility (Bouslah, Kryzanowski, and M'Zali (2018)). In this case, the authors emphasize that the risk reduction is mainly due to the strengths component of CSR[8] and thus, acts as a risk-mitigating tool in economic downturns. Examining the ESG-CFP relationship of banks in the context of the GFC, Cornett, Erhemjamts, and Tehranian (2016) show that socially responsible banks achieve significantly higher returns on equities (ROE) before as well as after the shock and that the financial crisis amplifies banks' CSR activities.

Roughly a decade after the GFC, the ongoing Covid-19 pandemic has severely impacted the global economy causing turmoil in the stock markets. Again, researchers exploit the crisis to further investigate the effect of ESG investments on corporate performance. Similar to the approach of Lins, Servaes, and Tamayo (2017), Albuquerque et al. (2020) analyze the effect of ES policies on stock returns during the Covid-19 crisis. They omit the governance component of the ESG scores to avoid capturing a possible governance effect. Their outcome shows that CSR has a significant effect on abnormal returns in the cross-section. Furthermore, firms with high ES ratings are less volatile during Q1 2020 and realize higher profit margins in the same period. On the one hand, they observe that firms with high ES levels, having high advertising expenditures, earn significantly higher stock returns than companies with lower advertising expenditures. Advertising expenditures is used to capture a firm's ability to acquire customer loyalty. On the other hand, the researchers note that loyal investors, i.e., investors with

[7] They document that an increase of one standard deviation in CSR is associated with 2.25 percentage points higher raw returns and 4.15 percentage points higher abnormal returns.

[8] The applied CSR measure in their paper, namely the MSCI ESG Stats, subtracts ESG concerns from ESG strengths to arrive at the ESG score. The strengths component represents a firm's positive CSR.

preferences for ES, reduce stock return volatility during the crisis. Therefore, Albuquerque et al. (2020) attribute this crisis resilience to an increased customer and investor loyalty towards socially responsible firms.

Adding to the findings above, Ding et al. (2021) and Shan and Tang (2020) also find evidence for a positive relationship between CSR activities and stock performance during the Covid-19 pandemic. In a global sample of 61 economies, Ding et al. (2021) illustrate that stocks with Refinitiv ESG ratings in the top quartile experience a significantly smaller drop in returns than firms in the bottom quartile. Consistent with the stakeholder theory, Shan and Tang (2020) document that employee satisfaction in Chinese firms is positively associated with Covid-19 crisis returns. This confirms the findings of Edmans (2011) for a Chinese sample. Moreover, Pástor and Vorsatz (2020) observe that mutual funds with high Morningstar sustainability scores outperform conventional funds during the Covid-19 crisis. Morningstar itself reports that 70% of equity funds with an above-median sustainability rating in their Morningstar categories outperform their counterparts over the same period (Hale (2020)). This clear outcome is surprising since prior literature highlights that portfolio studies, including analyses of funds, tend to have mixed or neutral results (Friede, Busch, and Bassen (2015) and Revelli and Viviani (2015)).

While these studies suggest that CSR protects firm value against the adverse Covid-19 shock, other papers disagree with this outcome. Bae et al. (2021) and Demers et al. (2020) observe no impact of ESG scores on financial performance during the fever period and Q1 2020, respectively. Both studies use a comparable U.S. stock sample to that of Albuquerque et al. (2020). According to Bae et al. (2021), stock returns also remain largely unaffected by CSR when regressing single components of the ESG scores on stock returns or in industry-specific regressions. Bae et al. (2021) and Demers et al. (2020) use MSCI and Refinitiv ESG scores to capture CSR, whereas Albuquerque et al. (2020) only use Refinitiv ESG ratings. In contrast to Albuquerque et al. (2020), the other two papers include a governance component in their ESG measure but exclude financial and micro-cap firms from their sample. Demers et al. (2020) argue that the discrepant outcomes are a product of Albuquerque et al. (2020) omitting important market- and accounting-based control variables. However, Bae et al. (2021) report that the results of the latter study are sensitive to the exclusion of micro-cap firms and the use of the logarithm of market capitalization instead of sales as a proxy for firm size. In addition, Demers et al. (2020) claim that the findings of Ding et al. (2021) are driven by

non-U.S. firms since "ESG is known to have a more positive impact on returns in non-U.S. jurisdictions, … , such as in Europe" (p.8).

Nevertheless, all studies suggest a significant association between crisis stock returns and accounting-based firm characteristics such as firm size, cash holdings, or leverage. That these firm specifications have a substantial influence on a stock's crisis resilience is supported by a broad literature on the impact of the Covid-19 pandemic on stock performance (e.g. Acharya and Steffen (2020), Fahlenbrach, Rageth, and Stulz (2020), or Ramelli and Wagner (2020)).

In summary, so far, the Covid-19 related literature on the ESG-CFP relationship offers no clear answer to the debate of whether CSR is value-enhancing or value-destroying. In line with empirical studies of past crises, there is evidence that stronger bonds with stakeholders of firms engaging in ESG activities, such as higher customer loyalty or employee satisfaction, lead to superior performance of socially responsible firms during the Covid-19 crisis (Albuquerque et al. (2020) and Shan and Tang (2020)). Besides, the increased investor demand for sustainable financial products (e.g. mutual or equity funds) during the pandemic could translate into higher demand for stocks with better ESG ratings. However, this is contrasted by scholars finding no relationship between CSR and stock performance throughout the same period. Since this literature predominantly examines U.S. samples, analyzing the ESG impact on firm value during Covid-19 from a different geographic perspective might provide novel insights.

# 3. Research Design

The literature review provides an overview of the current state of research on the link between CSR and a company's financial performance by explaining various theoretical rationales for this relationship and discussing empirical findings on it. In a next step, this part outlines the hypotheses of this master thesis established based on the results in the literature. Further, it presents the data and methodology used to examine the hypotheses.

## 3.1 Hypotheses of this master thesis

The literature review introduces several empirical studies of past and the Covid-19 crises, providing various rationales and evidence that CSR protects firm value in economically tough times. In the context of this thesis, the paper of Ding et al. (2021) is particularly noteworthy. They show that ESG scores positively affect stock performance during the Covid-19 pandemic for a global sample, including European firms. Demers et al. (2020) consider European and other non-U.S. companies as the main driver for this outcome. Furthermore, non-crisis-related research suggests that socially engaged firms have a wider investor base than irresponsible firms and (El Ghoul et al. (2011)) tend to attract institutional investors with a preference for long-term investments (Oikonomou, Brooks, and Pavelin (2012)). I assume that the combination of these insights, namely a broader investor base with a preference for long-term investing, may help companies with high ESG ratings be more resilient to plunging stock prices.

Moreover, the introduction of this thesis outlines that the attention to and demand for CSR has increased among stakeholders and investors in recent years and during the Covid-19 health disease. Therefore, I expect investors to penalize firms with lower ESG engagement for failing to meet this increased sustainability awareness and demand.

This study analyzes two crisis periods and two recovery periods in 2020. While the crisis periods represent phases of plummeting stock prices, the recovery periods reflect the subsequent phases with rising stock prices. For the relationship between CSR and crisis stock returns during the Covid-19 pandemic I hypothesize the following, consistent with Albuquerque et al. (2020), Ding et al. (2021), and the reasoning above:

> Hypothesis 1a: *ESG scores are significantly positively associated with stock returns during crisis periods around the Covid-19 pandemic.*

Lins, Servaes, and Tamayo (2017) and Bae et al. (2021) show that post-crisis returns are unrelated to ESG. Therefore, I hypothesize the following for recovery stock returns:

> Hypothesis 1b: *ESG scores are unrelated to stock returns during recovery periods around the Covid-19 pandemic.*

In Hypothesis 1a and 1b CSR is measured as a firm's overall ESG rating. The overall ESG scores emerge from an environmental, social, and governance component[9]. Various researchers view corporate governance not as part of CSR (e.g. Lins, Servaes, and Tamayo (2017) or Albuquerque et al. (2020)). Thus, their positive findings draw on a CSR measure that only includes the environmental and social components.

Similarly, in general, public interest for sustainability issues seems to focus on the environmental and social sphere (e.g. Fridays For Future movement or different movements for gender or racial equality). Furthermore, the EU Non-Financial Reporting Directive (Directive 2014/95/EU), which concerned the annual report of listed EU companies with more than 500 employees for the first time in 2019, also concentrates on the disclosure of environmental and social issues (KPMG (2020)).

As a result, I expect that market participants pay more attention to corporate social and environmental activities. Thus, it is worth examining the effect of the pillar scores on Covid-19 crisis-related stock returns. As Ding et al. (2021) demonstrate that CFP is positively affected by E and S pillar scores during the Covid-19 pandemic, I state the following hypothesis:

> Hypothesis 2: *Social and environmental pillar scores, or a combination thereof, are significantly positively associated with risk-adjusted crisis stock returns during the Covid-19 pandemic.*

The examination of hypotheses 1 and 2 are conducted on a sample including multiple European countries. However, the Covid 19 pandemic struck countries to different degrees and at different moments. Additionally, government measures to combat the spread of the disease[10] and fiscal stimulus policies to counter the economic impact of the pandemic differed substantially across countries (Ding et al. (2021)). Ding et al.

[9] Throughout this thesis, I call the ratings of these three components pillar scores. The three Refinitiv pillar ratings again emerge from ten different category scores.

[10] For example, while Sweden refrained from a lockdown throughout 2020, Italy already declared a regional lockdown at the end of February and a country-wide shut down on March 10.

(2021) also report that a country's exposure to the health disease and the policies and stimulus packages to combat the pandemic significantly affect stock returns. Figure 3 in the Appendix illustrates the average country-level stock price movement for firms of six different countries in this sample. For instance, it shows that the average drop in stock prices is less severe for Swiss firms than for firms of other countries during the crisis period in Q1 2020.

While country-level infection rates and stimulus packages primarily influence stock prices, researchers note that other country-specific factors may impact the link between ESG and CFP. The study of Xiao et al. (2018) suggests that the degree of a country's sustainability performance reduces the impact of CSR on a firm's financial performance. They argue that stakeholders expect firms to adapt to the country-level environmental and social performance and thus become less sensitive to firm-level CSR improvements. As a result, it is more difficult to capitalize on CSR for firms in countries with higher levels of sustainability performance. In their paper, a country's social performance is measured by the Human Development Index (HDI). Environmental performance is evaluated according to the Environmental Performance Index (EPI)[11]. Miras-Rodríguez, Carrasco-Gallego, and Escobar-Pérez (2015) examine the influence of various cultural variables based on the GLOBE classification (House et al. (2004)) on the CSR-CFP relationship. They observe a positive relationship for countries with high future orientation, institutional collectivism, and humane orientation, whereas economies with a high assertiveness and gender egalitarianism[12] reveal a negative correlation. The latter results support the findings of Xiao et al. (2018). Moreover, another study illustrates that sustainability leadership is valued differently across Western European markets (Miralles-Quiros, Miralles-Quiros, and Arraiano (2017)). However, their results are mainly driven by German and Swedish firms. Further, they point out that the outcome is insignificant for firms in countries providing strong shareholder protection and requiring higher CSR transparency (e.g. the UK). Therefore, they conclude that the legal and governance system of a firm's country of domicile may

[11] The HDI is developed by the United Nations Development Program. It includes three essential aspects that reflect a country's social performance, namely the income per capita representing living quality, health achievement proxied by people's life expectancy, and education measured as years of schooling together with expected years of schooling (Neumayer (2001)). The EPI is developed by the Yale University and assesses a country's environmental performance in terms of environmental health (such as air and water quality) and the protection of the ecosystem (Xiao et al. (2018)).

[12] For a definition of these terms, see House et al. (2004)

influence the CSR-CFP relationship to some extent (Miralles-Quiros, Miralles-Quiros, and Arraiano (2017)).

Thus, it is worth examining the country-specific CSR-CFP relationship during the Covid-19 crisis. Consistent with Xiao et al. (2018), I expect differing country-specific outcomes for different degrees of country sustainability performance. This yields the following hypothesis:

> Hypothesis 3: *Higher country-level sustainability performance negatively moderates the positive association between CSR and risk-adjusted Covid-19 crisis returns. This means that the positive association between ESG and risk-adjusted crisis returns is higher in countries with poor sustainability performance than in countries with high levels of sustainability performance.*

The Covid-19 affected industries differentially[13]. Ramelli and Wagner (2020) note that these discrepancies are also reflected in the stock returns during the crisis. Figure 4 in the Appendix illustrates the average industry-level stock performance of the firms in this sample over the crisis period in Q1 2020. There are considerable among the individual industries. Moreover, according to van Beurden and Gössling (2008), Chand (2006) highlights that controlling for the industry is essential in studies of the ESG-CFP relationship. The way firms within an industry deal with their environmental, social, and financial environment makes ESG activities sensitive to a firm's industry membership. Furthermore, van Beurden and Gössling (2008) point out that Chand (2006) even suggests that studies of the link CSR and financial performance should concentrate their analysis on single industries.

Therefore, this thesis conducts additional studies of the impact of CSR on crisis stock returns on an industry level. Similarly, Bae et al. (2021) provide industry-level results. However, the literature reviewed and the outcome of Bae et al. (2021) do not provide clear evidence or a rationale that corporate performance is more or less sensitive to

[13] The operations of some industries, such as hotels, restaurants, leisure, or retailers of consumer durables (all are part of the Consumer Discretionary sector according to the Global Industry Classification Standard (GICS)), were severely struck by government restrictions during the first and second waves of the pandemic. In contrast, I expect demand in other industries, for instance telecommunications (Communication Services) or retailers of consumer non-durables (Consumer Staples), to remain unaffected or even increased.

ESG scores in specific industries. Consequently, I adopt a rather conservative formulation of my hypothesis:

> Hypothesis 4: *The association between ESG scores and risk-adjusted crisis returns during the Covid-19 pandemic is not driven by specific industries. This implies that the ESG coefficient estimates of industry-specific regressions are generally consistent with previous coefficient estimates in this thesis.*

Overall, I hypothesize that CSR is positively associated with returns during phases of economic downturn caused by the Covid-19 pandemic. This can be regarded as my overarching hypothesis for all analyses in this thesis. In the following chapter, I discuss the sources used to retrieve the data of this study.

## 3.2 Data sources

This study focuses on the impact of ESG on firm value during the Covid-19 crisis in Europe. To examine the European situation, the STOXX Europe TMI forms the foundation of my sample, mainly for three reasons. First, the STOXX Europe TMI covers nearly 95 percent of the free float stock market value of the Western Europe region (Qontigo (2021)). I deliberately omit the Eastern European region, as many Eastern European countries typically do not have the same level of development as countries in Western Europe[14]. Second, the STOXX Europe TMI comprises large, mid, and small market capitalization corporations, and in contrast to the more famous STOXX Europe 600 Index, it is not limited to the 600 largest companies. To my knowledge, the former is the most comprehensive traded index for the Western Europe region and contains more than twice as many stocks as the latter. Finally, ESG scores are available for roughly 85% of these stocks. Compared to a STOXX Europe 600 Index sample, it enables me to have substantially more observations. The sample consists of the year-end 2019 constituents of the STOXX Europe TMI, which included 1439 constituents as of December 31, 2019.

[14] Friede, Busch, and Bassen (2015) show that the share of studies finding a positive relation between CSR and CFP in emerging markets is substantially higher than in developed markets, including developed Europe. Therefore, I assume that the situation and functionality among Western European stock markets are comparable, while it is likely to be different between Western and Eastern European stock markets.

For the index and all constituents, I retrieve daily market data (including stock prices or the number of shares) between 31.12.2018 and 31.12.2020 and monthly market data during 31.12.2014 - 31.12.2020 from Thomson Reuters Datastream. Yearly accounting data, primarily as of 31.12.2019, is accessed from Thomson Reuters Worldscope. Information on each stock, including but not limited to ISIN number, name, or ISO-country code (representing the country of domicile), are also collected from Thomson Reuters. Due to the lack of availability on the Thomson Reuters terminal, I obtain the industry classification data according to the Global Industry Classification Standard (GICS) from Bloomberg. Further, factor return data and the risk-free rate used to construct the factor loadings Small Minus Big (SMB), High Minus Low (HML), and Momentum (MOM) according to the Carhart (1997) four-factor model, are from Kenneth French's website. The factor returns on their website are calculated based on a pan-European portfolio including stocks from most countries covered by the STOXX Europe TMI.

I obtain ESG data from Thomson Reuters Refinitv. According to Refinitiv (2021), their ESG scores cover over 70% of the global market capitalization and provide good coverage of listed European firms. The rating ranges from 0 to 100 and is usually published once a year, aligning with corporate reporting patterns. A firm's ESG performance is based on publicly available information. It results in a score that is evaluated relative to the performance and materiality of ESG factors within a firm's industry (for the environmental (E) and social (S) pillars) and country (for the governance (G) pillar). (Refinitiv (2021)) This implies that, for instance, an oil and gas company can have a very high environmental score, such as Royal Dutch Shell PLC with an E score of 91.9, even though it operates in a sector that I assume to be one of the least sustainable. The three pillars E, S, and G are divided into a total of ten categories. The evaluation of the E pillar emerges from the categories resource consumption, emissions, and (green) innovation. The S pillar arises from the workforce, human rights, community, and product responsibility categories. The components of the governance pillar are management, shareholders, and CSR strategy. Moreover, each category score covers some ESG themes[15]. (Refinitiv (2021)) I retrieve Refinitiv's 2018 and 2019 overall ESG scores as of 31.12.2018 and 31.12.2019, respectively. Besides total ESG scores, I retrieve 2018 ratings on each pillar and category. As ESG scores differ considerably across rating agencies

[15] The Refinitiv ESG scores brochure provides a list of definitions for each category and a list of themes covered by the respective category on p.22 and p.10, respectively (Refinitiv (2021)).

(Berg, Kölbel, and Rigobon (2020)), I obtain overall ESG scores from Sustainalytics as of 31.12.2019 from Bloomberg. I use Sustainalytics ESG scores for robustness tests.

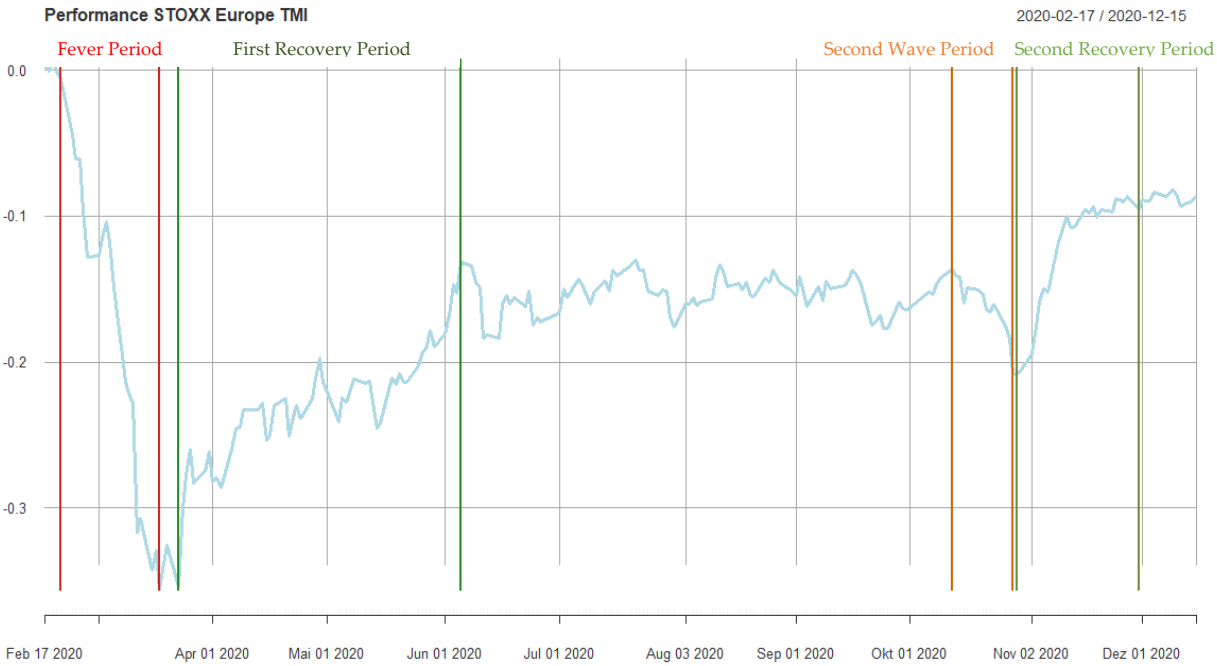
Finally, I use the statistical software R for the empirical analysis. The full R codes and corresponding raw data are available in separate files. In the next chapter, I discuss the different variables and the research design of this empirical study.

## 3.3 Derivation of the research design

### *3.3.1 The Covid-19 pandemic periods*

The Covid-19 health disease represents an exogenous and unexpected event that induced two notable shock and recovery periods to financial stock markets globally. As already discussed and consistent with the existing literature (e.g. Albuquerque et al. (2020) or Ramelli and Wagner (2020)), this allows me to observe the investor's response subject to preexisting ESG levels and, thus, to circumvent typical endogeneity problems in research on the CFP-ESG relation. However, the exact time horizon of the two shocks, especially of the significantly less severe shock in October 2020, is unclear.

**Figure 1 - STOXX Europe TMI performance**




This Figure illustrates the compounded returns of the STOXX Europe TMI from February 17, 2020, to December 15, 2020. It represents the movement of the market returns throughout this period. Dates are on the x-axis. The y-axis represents the percentage movement since the start date in decimal form. Furthermore, the in this study defined periods throughout the Covid-19 pandemic are highlighted.
Source: own research

Furthermore, the Covid 19 pandemic is now more than 18 months ongoing and far from under control. Thus, its overall impact on financial markets remains unclear at this point. Most European countries have already suffered three or more major waves of infection. However, Figure 1 indicates that the development of the international health crisis has significantly impacted the European stocks on only two occasions until the end of 2020, with a rapid recovery following in both cases. Hence, this master thesis analyzes the impact of CSR activities on stock performance over different time periods. On the one hand, I examine the two periods of plunging stock prices and their recovery periods, as highlighted in Figure 1. On the other hand, I cover the first and second quarters of 2020 in order to facilitate comparison of outcome with other studies (e.g. Demers et al. (2020)). This results in the following six phases:

- Fever period: 24 February 2020 – 18 March 2020
- First recovery period: 23 March 2020 – 5 June 2020
- Q1: 01 January 2020 – 31 March 2020
- Q2: 01 April 2020 – 30 June 2020
- Second crisis period: 12 October 2020 – 30 October 2020
- Second recovery period: 31 October 2020 – 30 November 2020

Since most Covid-19 and stock market-related studies focus on the first six months of 2020, the first shock and rebound period are adequately identified. Consistent with Ramelli and Wagner (2020), I define the start of the first, substantially more severe shock as February 24, 2020. March 18, 2020, displays the end date in accordance with Albuquerque et al. (2020). February 24, 2020, was the first trading day after Italy confirming the first Covid-19 cases in the western world on February 21, 2020, and putting several regions in the north of Italy under strict lockdown on February 23, 2020 (Parodi and Amante (2020)). This triggered a sharp decline in equity markets. On March 18, 2020, the European Central Bank (ECB) announced the Pandemic Emergency Purchase Programme (PEPP), a EUR 750 billion purchase program for bonds issued by public and private borrow to mitigate further market turmoil (ECB (2020)). On the same date, U.S. President Donald Trump signed a second coronavirus emergency aid package, the "Families First Coronavirus Response Act". Moreover, the Federal Reserve began its support of short-term credit flows for businesses and households under the Commercial Paper Funding Facility (CPFF) (Albuquerque et al. (2020)). Following Bae et al.

(2021), the recovery period after the first shock extends from March 23 to June 5, 2020. On March 23, 2020, the Federal Reserve Board (Fed) introduced two new initiatives to bolster credit to large companies, and on March 27, 2020, the third and largest U.S. economy stimulation package CARES (Coronavirus Aid, Relief, and Economic Security Act) was signed (Ramelli and Wagner (2020)). The STOXX Europe TMI regained around 64% of its loss from the shock period during the recovery phase. This implies that Q1 returns include the price development from the first shock and a minor portion of its rebound. Q2 returns are primarily dominated by the upward trend of the recovery phase.

For the second drop in stock markets, research is scarce. I do not find accurate time horizons for it in other studies. Therefore, I define the second crisis window from the peak on October 12[16] to the bottom on October 30, 2020, of the STOXX Europe TMI price. During this period, the index decreased by 8.5%, making it a much less severe decline than the first shock. Besides the steep rise in the number of infections worldwide, this phase appears to be negatively affected by the dwindling hopes of market participants for new fiscal stimuli ahead of the presidential election in the U.S. (The Economic Times (2020)). I often refer to this time interval as the second (infection) wave period in the following chapters. A turning point appears to be October 29 and October 30, 2020, respectively. On these dates, the U.S. and multiple European countries reported a GDP boom in the third quarter of 2020 that exceeded most experts' expectations (Amaro (2020) and Cox (2020)). Bolstered by steady fiscal support and encouraging news from the Covid-19 vaccine front, the stock market quickly recovered in November from the interim low at the end of October. The STOXX Europe 600 Index even had its best month in history. (Smith (2020)). Hence, I define the second recovery period as of October 31 – November 30, 2020.

### *3.3.2 Measuring corporate financial performance*

After defining the different phases of shock and recovery, I outline the choice of the dependent variable in this section. The objective of this thesis is to assess the relationship between CSR and CFP during the Covid-19 pandemic. Consistent with numerous studies, I measure financial performance using firms' stock returns. In contrast to other

[16] Please note that in the R code, I start calculating this period's returns with the daily returns beginning on October 13. This corresponds to the price change between October 12 and October 13, 2020. In contrast, I start calculating the returns for the fever period on February 24, 2020, as I consider the price change during that day to be part of the fever period.

common CFP measures such as ROA or Tobin's Q, which are based at least in part on accounting data, the efficient market hypothesis assumes that a firm's stock price immediately incorporates all publicly available information (Brooks (2019)). Furthermore, unlike accounting data, stock prices are continuously evaluated and are publicly available in real time. These features allow me to assess the influence of firm characteristics, including ESG engagement, on CFP during different time periods. In addition, in line with Albuquerque et al. (2020), I assume that better stock performance in times of crisis mirrors a firm's resilience against adverse shocks.

Following Lins, Servaes, and Tamayo (2017), I adopt raw and cumulative abnormal returns over the defined periods. Raw returns correspond to the relative price difference between the start and end dates of a defined time horizon. I compute abnormal returns using market model-adjusted daily returns. I estimate the market model parameters over 60 months between 2015 and 2019 with the STOXX Europe TMI returns as a proxy for the market returns[17]. Contrary to the CAPM, which is an equilibrium model, the market model is a purely statistical approach, using regression techniques to estimate stock returns. I apply the following formula to estimate the market model parameters, which is the most common approach in practice (Brooks (2019):

$$r_i = \alpha_i + \beta_i r_m + \epsilon_i$$

In this equation, the returns of a security ($r_i$) are represented by the linear relationship with the market returns ($\beta_i r_m$), stock-specific abnormal returns ($\alpha_i$) and an error term, which can be interpreted as idiosyncratic risk ($\epsilon_i$). The slope coefficient of this specification collapses to the CAPM beta when market returns are normally distributed (Stapleton and Subrahmanyam (1983)) and when the risk-free rate remains constant over the sample period. Since the Jarque Bera test suggests normally distributed market returns between 2015 and 2019, and the monthly risk-free rate is generally very stable, I assume the market model beta estimates to be very similar to those of a CAPM estimation. Therefore, I compute daily abnormal returns by subtracting the expected returns from the realized daily returns of a stock. Daily expected returns are calculated as the product of the beta estimate and the daily market return (Brooks (2019)). To arrive at the period's cumulative abnormal return, I sum over all daily abnormal

[17] For abnormal returns over periods in the second half of 2020, I estimate the market model parameters over a 60-month period between Q3 2015 and Q3 2020.

returns, as compounded abnormal returns may generate bias in the outcome (Brown and Warner (1985)). Thus, I end up with 12 dependent variables from six different periods.

### *3.3.3 Measuring sustainability performance*

My independent variable of interest is a firm's sustainability performance, which I measure using ESG scores. With this sustainability measure provided by external rating agencies, I join a large body of literature. Consistent with Albuquerque et al. (2020), I use 2018 ESG scores for my regressions to circumvent a possible look-ahead bias. Refinitiv usually publishes ESG ratings once a year, which align with corporate reporting patterns (Refinitiv (2021)). This implies, for example, that 2019 scores of firms with fiscal year-end on December 31, 2019, are likely to be published in the first half of 2020. However, I do not distinguish between different lots of fiscal year and use 2018 ESG scores for all firms in the sample. Moreover, ESG scores tend to be very sticky (Albuquerque et al. (2020)). For robustness checks, however, I redo some regressions using 2019 Refinitiv ESG scores. In further robustness tests, I replace 2018 ESG scores with quintiles of these ratings or ESG scores from Sustainalytics. In the latter case, scholars show that ESG scores differ considerably across rating agencies, mainly due to different practices in terms of scope, measurement, or weighting (Berg, Kölbel, and Rigobon (2020)). For example, Berg, Kölbel, and Rigobon (2020) report a correlation of 0.67 between standardized Refinitiv (formerly Asset4) and Sustainalytics ESG scores. Therefore, I test whether the results are robust against the choice of other rating agencies.

Unlike other studies of the ESG-CFP relationship that omit the corporate governance component (e.g. Albuquerque et al. (2020) and Lins, Servaes, and Tamayo (2017)), I employ overall ESG scores as my primary CSR measure in my regressions. I include the governance category for the following reasons: First, the definition of CSR in this thesis includes governance considerations. Second, I assume that the overall ESG score is commonly adopted by investors who take ESG considerations into account. Third, the overall ESG score of rating agencies is an industry-based weighted score that reflects the varying relevance of E, S, and G concerns across industries. Therefore, I expect that in the approach of Albuquerque et al. (2020) and Bae et al. (2021), who measure CSR by averaging the E and S scores, one of the two components to be overweighted. This is because I assume that the importance and manageability of environmental and social issues vary across industries. Furthermore, Albuquerque et al. (2020) and Bae et al. (2021) do not find a possible governance effect that would significantly

influence their results. However, in a second step, I examine the relation between firm value during the Covid-19 crisis and each pillar score and the average of E and S scores, respectively. This allows me to detect a possible governance effect in my results and better isolate the impact of the individual ESG components.

Furthermore, I delve deeper into the analysis of each E, S, and G component by reviewing the Refinitiv category scores that form the foundation of the pillar scores. In my own evaluation, I assess whether specific category scores include factors that could have mitigated corporate risks during the Covid-19 pandemic. This results in selecting the following category scores: Workforce, Product Responsibility, and (green) Innovation.

While Workforce and Product Responsibility are categories of the S pillar, Innovation is a category of the E pillar. Besides employee welfare, the workforce score assesses whether a healthy and safe workplace is provided (Refinitiv (2021)). In line with Shan and Tang (2020), who show that employee satisfaction is positively associated with corporate performance for Chinese firms, I assume job satisfaction but also health and safety at the workplace to be crucial during the Covid-19 health disease.

The Product Responsibility score measures a firm's ability and capacity to integrate a customer's health, safety, and data privacy in their services and products (Refinitiv (2021)). I believe that this category reflects relevant issues as health and data privacy have become increasingly important in recent years and have continued to gain importance during Covid-19 due to the health concerns induced by the pandemic and the increasing technological change.

The Innovation scores reflect a firm's capability to create new environmental technologies while reducing "the environmental costs and burdens for its customers" (Refinitiv (2021), p.22). In addition, it includes green innovation or research and development. Environmental awareness and the demand for environmentally friendly technologies and products have increased in European society in recent years. In particular, the European Parliament's commitment to climate neutrality by 2050 (European Commission (2021b)) probably enhances the need for green innovations. Although companies came under financial pressure during the Covid-19 crisis, I assume that green innovation mattered to some extent, especially for long-term investors who may have been willing to hold on to stocks with higher environmental innovation opportunities.

In regressions examining the effect of the three specific ESG aspects on crisis returns, I replace the 2018 overall ESG scores with these category scores and the average thereof, respectively. In all following regressions, namely in the industry- and country-specific regressions, overall ESG scores from Refinitiv are again the measure for CSR.

### *3.3.4 Derivation of other control variables*

Besides CSR, literature suggests several other variables that usually affect shareholder value during economic downturns. Various studies of the GFC illustrate that a firm's preexisting financial health, such as cash holdings, profitability, or leverage, are important drivers of firm value. Good financial health (e.g. higher cash holdings or lower leverage) allows maintaining investments, while companies in poor financial health are forced to reduce investments (Duchin, Ozbas, and Sensoy (2010) and Harford, Klasa, and Maxwell (2014)). Furthermore, more recent research shows that the same preexisting financial health determinants affect CFP during the major Covid-19 market shock (Acharya and Steffen (2020), Ding et al. (2021), and Ramelli and Wagner (2020)). Thus, consistent with Lins, Servaes, and Tamayo (2017), I control for *Cash Holdings*, *Short-Term Debt*, *Long-Term Debt* and *Profitability* in my baseline regression. I compute *Cash Holdings* by relating cash and short-term investments to total assets. For *Short-Term Debt*, short-term debt and the current portion of long-term debt is divided by total assets, whereas *Long-Term Debt* represents the relation between long-term debt and total assets. Finally, *Profitability* is represented by the ROA (operating income divided by assets).

Besides, in my baseline regression, I control for other return-affecting firm characteristics, namely *Size*, *Book-to-Market (BM)*, *Momentum* and *Idiosyncratic Risk*. Daniel and Titman (1997) argue that controlling for size, BM ratios, and past returns (momentum) is preferred to using factor loadings due to their high correlation with average stock returns in the cross-section. I measure *Size* as the logarithm of a firm's market capitalization. *BM* is the book value per share divided by the stock price per share. *Momentum* represents a stock's raw return over 2019. All other firm characteristics and financial health variables are as of December 31, 2019. In addition, I create a dummy variable for firms with negative BM values since their stock returns are expected to behave like those of distressed firms (Fama and French (1992)). Finally, there is evidence that stock returns are influenced by their volatility (Goyal and Santa-Clara (2003)). Hence, I control for idiosyncratic risk. I measure *Idiosyncratic Risk* by the volatility of the market model's residual ($\epsilon_i$), using monthly data over a five-year period until year-end 2019.

Moreover, in all regressions, I control for the factor loadings of the Carhart (1997) four-factor model since they explain a substantial fraction of the variation in expected returns in the cross-section (Carhart (1997)). Even though the set of explanatory variables comprises the firm characteristics *Size*, *Book-to-Market* or *Momentum*, I follow the approach of Lins, Servaes, and Tamayo (2017) and control for the factor loadings. I obtain factor loadings over a monthly five-year period from 2015 to 2019. Over this period, I regress excess stock returns on the STOXX Europe TMI excess returns and the SMB, HML, and MOM factor returns[18]. In calculations of excess returns, which is the difference between market or factor returns and the risk-free rate, I follow Fama and French (2012) and Fama and French (2017). They employ the risk-free rate of Kenneth French's website in their analysis of developed stock markets worldwide. This risk-free rate corresponds to the U.S. one month Treasury bill. Although the treasury bill is not of European origin, there are two main arguments that make me choose this risk-free rate. First, to my knowledge, no trivial, widely accepted risk-free rate exists for Western Europe. Second, the risk-free rate has a minimal impact on the factor loadings and is very close to 0 over the defined time horizon (the maximum monthly risk-free rate during 2015-2019 is 0.2%).

Ultimately, there have been considerable differences in how the Covid-19 health crisis has affected industries and countries. Therefore, I account for different industry and country traits by including industry and country dummies in all regressions. I employ the GICS industry classification throughout my thesis, mainly because of its narrow sector categorization and its popularity in praxis (Ramelli and Wagner (2020)).

### *3.3.5 Data adjustments*

This section explains the steps I take to arrive at my final cleaned sample. The foundation of the sample in this thesis builds the constituents of the STOXX Europe TMI. First, I remove firms that do not have 2018 Refinitiv ESG scores available, which reduces the number of firms from initially 1439 to 1214. In line with Lins, Servaes, and Tamayo (2017), I exclude micro-cap companies with a market capitalization below EUR 250 million at year-end 2019 from my sample. These "stocks tend to have low liquidity and

[18] In regressions with returns during the second half of 2020 as dependent variable, firm characteristics and factor loadings are calculated in the following way: *Size* and the market value of *BM* is as of 31.09.2020. *Momentum* is computed by the stock's raw return over Q3 2019 – Q3 2020. *Idiosyncratic Risk* is measured by the volatility of the market model's residual over a five-year period until Q3 2020. Finally, I obtain factor loadings from factor returns over a monthly five-year period from Q3 2015 to Q3 2020.

high bid-ask spreads, and are subject to more price pressure effects of trading, all of which would likely be more pronounced during the financial crisis" (Lins, Servaes, and Tamayo (2017), p.1793). In my regressions, I omit financial firms (with GICS sector code 40) since I am controlling for financial health variables, namely for *Short-Term Debt*, *Long-Term Debt*, and *Cash Holdings*. Such characteristics are difficult to compare between financial and non-financial firms (Fama and French (1992)). Furthermore, consistent with Lins, Servaes, and Tamayo (2017), I require a minimum of 12 months to estimate the factor loadings. Thus, I remove firms with less than 12 months of stock returns before January 2020. For regressions regarding returns in the second half of 2020, I omit firms with less than 12 months of stock returns before October 2020. I also exclude firms that were delisted from the exchange throughout the first half-year in 2020 for regressions within the first half of 2020. For regressions related to second crisis and recovery returns, I exclude firms delisted until the end of November 2020. Following Schmidt et al. (2019), I only include major listings and domestic stocks. This implies that I drop stocks with subordinate or no voting rights (e.g. preferred stocks) and those whose country of domicile does not coincide with the ISIN country. As a result, I obtain a sample of 909 observations for regressions regarding returns in the first half of 2020 and 906 for regressions on returns in the second half of 2020.

### *3.3.6 The OLS regression approach*

This section discusses econometrical aspects of the regression technique applied to test the hypotheses of this thesis. Most empirical studies use portfolio analyses, event studies, and panel or cross-sectional regressions to examine the CSR-CFP relationship. Although the Covid-19 pandemic ostensibly conveys the rationale for an event study (e.g. Albuquerque et al. (2020)), it is difficult to clearly define on which date the health crisis has impacted the financial market (Ramelli and Wagner (2020)). Around the onset of the first stock price decline, other events were influencing the stock market. For example, the price war on the oil market (March 7/8, 2020) or the presidential elections in the U.S. certainly played a role in the stock market's performance. Since the price movement during the health crisis followed a series of news, it is impossible to determine whether the price adjustment on a given day is due to new information or the continued (or reversed) adjustment from earlier days (Ramelli and Wagner (2020)). Furthermore, the data do not lend themselves to panel regression techniques because the focus is on short time periods. Moreover, many of my variables, including my main independent variable, show no variation during the defined time horizons. In

addition, the thesis aims to conduct an overall assessment of the impact of CSR on stock performance in different periods during the Covid 19 pandemic. Therefore, I address the research questions with a cross-sectional regression approach.

Cross-sectional regressions provide valuable insight into whether different characteristics significantly influence the dependent variable and to what magnitude (Brooks (2019)). Following several studies examining the impact of ESG or other firm characteristics on crisis stock returns (e.g. Lins, Servaes, and Tamayo (2017), Ramelli and Wagner (2020), or Bae et al. (2021)), I apply the ordinary least squares (OLS) regression technique. OLS is still the workhorse of econometric model estimation and produces the best possible outcome when the model satisfies the classical linear regression model (CLRM) assumptions (Brooks (2019)). Therefore, I briefly discuss the different assumptions and explain how I test their adherence.

In the subsequent overview of the CLRM assumptions, I follow the numeration of assumptions of Brooks (2019), which may deviate from the order of other textbooks. Furthermore, the following information is based on Brooks (2019) and my own knowledge.

Assumption 1 states that the errors should have zero mean. This is fulfilled when including an intercept in the model. Assumption 2 requires homoscedastic error terms, meaning that their variance is constant and finite. If heteroskedasticity is present, estimates are still unbiased and consistent, but the OLS standard errors could be wrong, and thus, inferences drawn from t-tests may be misleading. To detect heteroskedasticity, I plot the fitted values on the residuals and conduct the Breusch-Pagan test. Although some regressions display constant error variance, I use robust standard errors for all regressions. Robust standard errors account for heteroscedasticity and allow me to perform hypothesis testing in the usual but more conservative way. (Brooks (2019)) Assumption 3 requires the error terms to be uncorrelated with each other. This is usually more likely to occur in time-series data and would imply in the cross-section that residuals of (some) firms are related by a factor that the model does not capture. To test for the possibility of serial correlation, I apply the Durbin Watson test. (Brooks (2019))

Next, assumption 4 states that the error should be uncorrelated with its corresponding explanatory variable. While assumptions 2 and 3 are primarily needed to get efficient estimators, assumption 4 is crucial for unbiased and consistent estimators. An

independent variable violating this assumption is said to be endogenous. Endogeneity usually arises from omitted variables, reverse causality, or measurement error. Omitted variable bias occurs when relevant characteristics are unobserved or omitted from the model and correlated with dependent and independent variables. (Brooks (2019)) Section 3.3.4 describes a set of controls incorporated in the model to mitigate omitted variable bias. Reverse causality is generally a vital concern in OLS estimation as the regression outcome does not tell which way the causality runs. However, since I examine the stock market reaction on pre-crisis variables, I assume the possibility of reverse causality to be negligible. Further, I expect the prospect of measurement error not to be acute. Brooks (2019) notes that "in general the measurement error and revisions problems are far less serious in the financial context" (p.40).

Finally, assumption 5 specifies that the error term is normally distributed, which allows conducting hypothesis tests. To detect non-normality in the residuals, I apply the Jarque Bera test. Possible solutions to non-normality would be the use of robust standard errors or the removal of outlying residuals. However, according to the central limit theorem, the violation of assumption 5 is essentially inconsequential. (Brooks (2019)) The central limit theorem suggests that the sample mean of a sufficiently large sample converges to a normal distribution (Brooks (2019)). This implies that I can assume that the residuals are asymptotically normally distributed.

Moreover, according to Brooks (2019), an implicit assumption of the OLS approach is that independent variables are orthogonal to one another, which means that there is no multicollinearity and that the model is linear in the parameters. Multicollinearity between regressors, i.e., perfect or nearly perfect correlation between independent variables, can lead to poor accuracy in the estimated model. A high pairwise correlation between explanatory variables is a strong indication of multicollinearity. Additionally, extremely high standard errors and implausible magnitudes of coefficients may also signal multicollinearity. (Brooks (2019)) In my regressions, I do not observe any signs of multicollinearity.

The optimal outcome of the OLS regression technique is to arrive at consistent, unbiased, efficient estimators. When assumptions 1-4 hold, the OLS estimators have desirable properties, commonly known as BLUE (best linear unbiased estimators). BLUE means that the model is linear in its parameters, that it is unbiased, and that the beta estimators are efficient in the sense that they have the lowest variance among linear

unbiased estimators. (Brooks (2019)) Besides unbiasedness and efficiency, consistency is another desirable property. An estimator is considered consistent when the estimate converges to the true value as the sample size reaches infinity. This property is given with assumptions 1 and 4. (Brooks (2019)) In summary, when the CLRM assumptions are fulfilled, the model is linear in parameters, and no multicollinearity exists, the OLS approach gives the optimal result among linear regression techniques. Even when the homoskedasticity assumption is relaxed, it provides satisfactory results using robust standard errors. Furthermore, OLS regressions are popular for their simplicity in terms of implementation and interpretation.

However, there are some disadvantages and pitfalls to the OLS regression technique. First, the OLS regression line provides the average relationship between two or more variables. Since I am not explicitly interested in estimating the likelihood of extreme values, this presents no concern for the purpose of this thesis. Next, the performance of OLS is not only sensitive to multicollinearity but also to outliers. Outliers can have a disproportionate effect on coefficient estimates and thus may drastically reduce the performance of the econometric model. Furthermore, outliers often cause a rejection of assumption 5 in praxis as they have extreme residuals. (Brooks (2019)) One way to detect outliers is to plot the residuals against the fitted values. In case of outlier detection, a solution is to remove data points that do not fit with the rest of the data pattern. However, dropping observations is not reasonable as econometricians would argue that this may artificially improve the model's fit and that each observation represents useful information. (Brooks (2019)) Another solution is to winsorize the data, i.e., limiting extreme observations at a specified sample percentile. To address possible performance issues due to outliers, I follow Lins, Servaes, and Tamayo (2017) by winsorizing returns and control variables at the 1$^{st}$ and 99$^{th}$ percentiles[19].

In addition, OLS requires that the functional form is linear in parameters. The relationship between the dependent variable and the regressors is usually more complex than linear in the real world. This makes the OLS approach prone to underfitting, as it does not properly fit more sophisticated relationships. (Brooks (2019)) Since the model in this thesis closely follows that of Lins, Servaes, and Tamayo (2017), I do not assume that the model lacks severe misspecification. However, to detect a non-linear

[19] In unreported results, I run the regressions in section 4.2.1 with non-winsorized data. The outcome is very similar to the regression results of the winsorized sample.

relationship, I first perform a visual test by plotting the residuals of each regression against the fitted values and, in some cases, against the explanatory variables. Second, I formally test for model misspecification applying Ramsey's (1969) RESET test. Apart from one exception, discussed in more detail in section 4.2.2, the regressions do not show clear non-linear trends. Furthermore, in a model with numerous variables, it is often complicated to detect non-linear parameters. Moreover, the use of complex non-linear estimation techniques is only advisable when nonlinearities in parameters are known (Brooks (2019)).

A major drawback of OLS and a cross-sectional analysis, in general, is that it represents a snapshot at a specific point in time, making it difficult to draw conclusions for other periods. Therefore, the outcome of cross-sectional studies often provides correlations or associations rather than causal inferences. Since the Covid-19 health disease is unprecedented, it is difficult to extrapolate the results to phases when the financial market is not under pressure. However, the cross-sectional method provides valuable insight into how different factors affected firm value during the pandemic. Albuquerque et al. (2020) and Ramelli and Wagner (2020) even argue that the exogenous and unexpected nature and the speed of the first shock give reason to interpret their results as causal evidence. The fact that I analyze two different financial crisis periods and findings already exist on different shock periods allows me to make straightforward comparisons with results from other regions and other crisis periods.

In conclusion, I believe that a cross-sectional study can address my research hypotheses adequately and that OLS is the most appropriate technique to do so.

### *3.3.7 Definition of the regression models*

This section provides an overview of the different regression models used throughout the thesis and describes the varying specifications to test hypotheses 1-4. I begin testing hypotheses 1a and 1b by assessing how much variation in stock returns over the six defined time periods is attributable to CSR without controlling for firm characteristics and financial health. Therefore, I run the following OLS regression model:

$$R_i = \alpha_i + \beta_1\, ESG_i + \sum \beta_k\, Factor\ Loadings + \sum \beta_m\, Industy\ Dummies + \sum \beta_n\, Country\ Dummies + \epsilon_i \quad (1)$$

However, literature provides evidence that it is unreasonable to expect ESG policies to be the only factor that impacts stock returns in times of crisis besides the standard controls included in model (1). To better isolate the effect of CSR and to avoid omitted

variable bias, I control for other firm characteristics and a firm's financial health. Consequently, I define the following specification as my baseline model, closely following the specification of Lins, Servaes, and Tamayo (2017):

$$R_i = \alpha_i + \beta_1\, ESG_i + \sum \beta_j\, Control\ Variables + \sum \beta_k\, Factor\ Loadings + \sum \beta_m\, Industy\ Dummies + \sum \beta_n\, Country\ Dummies + \epsilon_i \quad (2)$$

In my regressions, $R_i$ is either raw returns or cumulative abnormal returns over a defined period. $ESG_i$ is the measure of CSR represented by different variations of ESG scores depending on the research question. $Control\ Variables$ encompass the multiple explanatory variables described in section 3.3.4. $Factor\ Loadings$ comprise the computed estimates on market returns and SML, HML, and MOM factor returns. Finally, $Industy\ Dummies$ and $Country\ Dummies$ are dummy variables for a company's industry membership according to the GICS industry classification and a firm's country of domicile, respectively.

Specification (2) is the baseline model to test all hypotheses in this master thesis. For hypotheses 1a and 1b, I regress the raw and abnormal returns on the CSR measure 2018 Refinitiv overall ESG scores (*Total ESG Score*) and the other control variables. In addition, *Total ESG Score* is replaced by quintiles of these scores, 2019 Refinitiv ESG scores, and Sustainalytics ESG scores for robustness checks of hypotheses 1a and 1b. While the two former robustness checks are done to test whether the regression results still hold when comparing the highest quintile scores with the lowest and for scores that represent a more recent level of CSR, respectively, the latter should provide evidence whether the results are sensitive to the chosen rating agency.

Since the foundational theory for this study mainly provides evidence and rationale on the positive impact of CSR on stock performance during crisis periods, I focus on risk-adjusted crisis returns in the subsequent examinations of hypotheses 2-4. In addition, further analyses of post-crisis returns is beyond the scope of this master's thesis.

To test hypothesis 2 and to detect a possible governance effect, I use different compositions of the pillar and category scores, discussed in section 3.3.3, to measure CSR. Besides a possible governance effect, this allows me to observe whether environmental or social issues are driving the relationship between overall ESG scores and firm value during the Covid-19 crisis.

Even though *Country Dummies* and *Industy Dummies* account for differing country traits and industry characteristics in the baseline model, the specification does not capture the possibly varying impact of CSR on firm value across countries and industries. To examine whether the correlation between CSR and stock crisis returns varies by country or industry, I create subsamples for each country and GICS sector, respectively. To test hypotheses 3 and 4, I again use the baseline model with overall ESG scores as my variable of interest. In country-specific regressions, *Country Dummies* are excluded, and industry-specific regressions exclude *Industry Dummies*. To comply with the central limit theorem, I only run country-specific regressions for country subsamples with at least 50 observations. For industry-specific regressions, I refrain from this measure because only two subsamples have slightly less than 50 observations.

After outlining the hypotheses as well as the data and methodology to test them, the next part presents and discusses the regression results. In addition, it highlights some limitations of this thesis and presents suggestions for future research.

# 4. The effect of CSR on European stock performance

Whether engaging in ESG activities protects firm value in times of crises is the primary research question of the present thesis. In this context, the overarching hypothesis suggests a positive association between CSR and stock returns during the Covid-19 crisis periods. In the remainder of this part, the descriptive statistics and the correlation matrix provide an overview of the sample in a first chapter. In subsequent chapters, this part presents and discusses the regression results of the relationship between overall ESG scores and CFP in different periods during the pandemic for a Western European sample. Different compositions of the ESG measure as well as country- and industry-specific results complement the previous regression outcome. Lastly, this part identifies some limitations of the study and offers suggestions for future research.

## 4.1 Descriptive statistics and correlation matrix

This section provides an overview of the dataset by displaying the summary statistics and the correlation between the different variables. Table 1 presents the sample's descriptive statistics that form the basis for the regressions in the following sections. The sample size corresponds to 909 observations for regressions regarding the first half of 2020 and 906 observations for the second half of 2020. Except for market capitalization and ESG scores, statistics for returns and control variables are based on winsorized data. Of the six periods yielding twelve different dependent variables, Table 1 includes eight return variables, covering both crisis and recovery periods. Raw fever returns range from -78% to 1.6%[20] and reflect the different magnitude that the Covid-19 pandemic has on CFP. Only about 1.3% (12 firms) experience positive returns during the fever period, with the majority operating in the Consumer Staples industry. The average return during the first crisis is -36.1%, which corresponds to an equal-weighted average. This is very close to the decline of the value-weighted STOXX Europe TMI of -35.2% and indicates that the performance of small firms does not considerably differ from big companies. Raw returns in the first recovery phase are positive and more volatile than the fever period, with a mean of 35%, a median of 31.4%, and a standard deviation of 23.6%. Thus, the average stock in the sample recovered around 62% of its pre-crisis value in reaction to the decline.

[20] The range of non-winsorized raw returns is -85% to 30%.

**Table 1 – Descriptive Statistics**

| | N | Mean | St. Dev. | Min | Median | Max |
|---|---|---|---|---|---|---|
| Raw Fever Returns | 909 | -0.361 | 0.154 | -0.780 | -0.362 | 0.016 |
| Raw Recovery 1 Returns | 909 | 0.350 | 0.236 | -0.051 | 0.314 | 1.157 |
| Raw 2nd Wave Returns | 906 | -0.084 | 0.064 | -0.258 | -0.084 | 0.082 |
| Raw Recovery 2 Returns | 906 | 0.174 | 0.163 | -0.090 | 0.143 | 0.705 |
| Abn. Fever Returns | 909 | -0.077 | 0.267 | -0.943 | -0.058 | 0.479 |
| Abn. Recovery 1 Returns | 909 | 0.090 | 0.197 | -0.385 | 0.076 | 0.761 |
| Abn. 2nd Wave Returns | 906 | 0.004 | 0.076 | -0.172 | -0.001 | 0.215 |
| Abn. Recovery 2 Returns | 906 | 0.021 | 0.119 | -0.244 | 0.010 | 0.403 |
| Total ESG Score | 909 | 57.34 | 19.02 | 1.40 | 58.69 | 94.29 |
| Environmental Score | 909 | 52.64 | 25.84 | 0.00 | 54.45 | 98.17 |
| Social Score | 909 | 62.22 | 21.37 | 1.57 | 65.28 | 97.09 |
| Governance Score | 909 | 54.36 | 21.65 | 2.12 | 55.00 | 96.93 |
| Sustainalytics Score | 458 | 71.03 | 25.05 | 0.00 | 77.88 | 100.00 |
| 2019 ESG Score | 935 | 59.35 | 17.98 | 6.31 | 60.50 | 93.58 |
| Market Capitalization | 909 | 10’256 | 22’523 | 255 | 3’305 | 286’861 |
| Cash Holdings | 909 | 0.111 | 0.104 | 0.003 | 0.085 | 0.609 |
| Long-Term Debt | 909 | 0.245 | 0.149 | 0.002 | 0.232 | 0.645 |
| Short-Term Debt | 909 | 0.055 | 0.052 | 0.000 | 0.044 | 0.275 |
| Profitability | 909 | 0.069 | 0.070 | -0.173 | 0.060 | 0.368 |
| Book-to-Market | 909 | 0.535 | 0.451 | -0.043 | 0.422 | 2.704 |
| Momentum | 909 | 0.256 | 0.317 | -0.430 | 0.243 | 1.394 |
| Idiosyncratic Risk | 909 | 0.006 | 0.005 | 0.001 | 0.004 | 0.032 |
| Beta | 909 | 0.890 | 0.455 | -0.578 | 0.854 | 2.788 |

This table displays the descriptive statistics for raw and market model-adjusted returns, ESG scores, financial health, and firm characteristics variables. All variables are defined in Appendix A. The sample comprises all firms from the STOXX Europe TMI with 2018 Refinitiv ESG data available. Market data is from Datastream, accounting information is from Worldscope, and Sustainalytics ESG ratings are accessed on Bloomberg. I exclude financial firms (GICS code 40) and firms with a market capitalization below EUR 250 million. This results in a sample of 909 firms for the periods in the first half of 2020 and 906 firms for the periods in the second half of 2020. Equity returns, financial, and accounting variables are winsorized at the 1% level.
Source: own research

Turning to the second crisis period returns, the standard deviation of 6.4%, as well as the mean and median of each -8.4%, indicate that this shock is considerably less severe. The mean of raw returns is 17.4% in the subsequent recovery period, indicating that the average stock recuperates more than its value before the decline.

In terms of abnormal returns, the realized returns lay below the expected returns during the first shock according to the mean and median of -7.7% and -5.8%, respectively. In comparison, expected returns in the second crisis match the realized returns closely

with an average (median) abnormal return of 0.4% (-0.1%). Abnormal returns show higher volatility than raw returns in both crisis periods.

Both recovery periods display positive abnormal returns with a mean (median) of 9% (7.6%) after the first shock and 2.1% (1%) after the second. Overall, the sample's raw fever returns summary statistics are similar to the crisis raw returns for U.S. equities, reported by Bae et al. (2021). However, it seems that U.S. companies recover faster in the post-crisis time horizon than Western European companies.

Next, 2018 overall ESG scores from Refinitiv lay between 1.4 and 94.3. The average (median) is 57.3 (58.7) and the standard deviation 19. While the environmental and governance pillar scores show lower means (52.6 and 54.4, respectively), the social score appears to be higher on average (62.2) than overall scores. Compared with 2018 ratings, the 2019 Refinitiv ESG scores increase slightly, with the mean score rising to 59.4 and the median to 60.5. The standard deviation decreases moderately from 19 to 18. Further, Sustainalytics scores range from 0 to 100 and appear to be clearly higher than Refinitiv scores, with a mean of 71 and a median of 77.9. In general, it is observable that Western European firms tend to have considerably higher sustainability ratings than U.S. firms. Albuquerque et al. (2020) and Bae et al. (2021) compute their CSR measure by taking the average of the Refinitiv E and S pillar score and report a mean of 28.9 for 2018 scores and 31 for 2019 scores, respectively.

Non-winsorized market capitalization ranges from EUR 255 million to EUR 287 billion, making the firm with the highest shareholder value more than a thousand times larger than the smallest. Cash availability (0.3%-60.9%) and leverage in terms of long-term debt (0.2%-64.5%) also show relatively significant differences among firms. Both can be critical to withstanding losses under challenging times. Overall, the average firm has a market capitalization of EUR 10.3 billion at year-end 2019, 11.1% cash holdings, a ROA of 6.9%, and 24.5% of its assets in long-term and 5.5% in short-term debt. Additionally, it has a BM ratio of 0.54, 0.6% idiosyncratic risk, and generated a raw return throughout 2019 of 25.6%. Market model beta estimations range from -0.58 to 2.79 at the end of 2019 and are 0.89 on average.

Table 7 in the Appendix details the summary statistics of the latter control variables and the market model beta calculated at the end of Q3 in 2020. These variables are used in regressions with returns related to the second infection wave. While the average BM

ratio and idiosyncratic risk are similar to the year-end 2019 values, the mean of Momentum has become negative (-2.8%), and the average Beta increased to 1.07.

Generally, there are no significant discrepancies between mean and median, suggesting that the data for most variables are only slightly skewed. A higher mean than the median implies positive skewness, i.e., the distribution's right tail is longer and fatter, and vice versa. It seems that ESG scores tend to be negatively skewed, while all other variables are rather positively skewed.

Table 2 illustrates the pairwise Pearson correlation matrix among the dependent variables, ESG scores, and control variables. The bivariate correlation between crisis returns and *Total ESG Score* is positive in the fever period (0.03 for raw returns and 0.11 for abnormal returns). In contrast, it is negative for raw (-0.12) and abnormal returns (-0.17) during the first recovery period. Unreported significance tests of the correlation coefficients show that the correlation between overall ESG scores and abnormal fever returns is significant. With respect to the first recovery phase, the correlation is significant for both types of returns. Interestingly, the correlation matrix reveals an inverse pattern for returns related to the second infection wave. While overall ESG scores are negatively but insignificantly correlated with crisis returns, their correlation is significantly positive with recovery returns. Focusing on specific pillar scores, E, S, and G scores generally display similar correlation schemes to *Total ESG Score* in terms of size and sign. Social ratings show the highest correlation with crisis returns, especially during the fever period. As ESG scores are relatively sticky, *2019 ESG Score* is highly correlated with 2018 ratings, and thus the correlation coefficients are almost identical. The correlation between Refinitiv and Sustainalytics scores is 0.65, which is fairly high between two distinct raters[21]. One noticeable difference is that Sustainalytics scores are positively correlated with returns during the second shock. Furthermore, ESG scores show a high correlation with firm size ranging from 0.54 for *Total ESG Score* to 0.34 for Sustainalytics ratings. This is not in an alerting area of about 0.8 or above that would indicate (near) multicollinearity issues (Brooks (2019)). However, it emphasizes the importance of including *Size* as a control variable to prevent a possible size effect through the CSR variable. Further, ESG scores tend to be positively correlated with leverage, BM ratio, and *Beta*, whereas their correlation is negative with *Cash Holdings*, *Momentum*, and *Idiosyncratic Risk*.

[21] For example, Bae et al. (2021) report a correlation between Refinitiv and MSCI ESG scores of 0.38.

**Table 2 – Correlation matrix**

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) | (18) | (19) | (20) | (21) | (22) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) Raw Fever Returns | 1 | | | | | | | | | | | | | | | | | | | | | |
| (2) Raw Recovery 1 Returns | -0.54 | 1 | | | | | | | | | | | | | | | | | | | | |
| (3) Raw 2nd Wave Returns | 0.15 | -0.06 | 1 | | | | | | | | | | | | | | | | | | | |
| (4) Raw Recovery 2 Returns | -0.53 | 0.15 | -0.30 | 1 | | | | | | | | | | | | | | | | | | |
| (5) Abn. Fever Returns | 0.71 | -0.35 | -0.00 | -0.29 | 1 | | | | | | | | | | | | | | | | | |
| (6) Abn. Recovery 1 Returns | -0.42 | 0.80 | 0.05 | 0.04 | -0.66 | 1 | | | | | | | | | | | | | | | | |
| (7) Abn. 2nd Wave Returns | -0.30 | 0.26 | 0.80 | 0.06 | -0.09 | 0.12 | 1 | | | | | | | | | | | | | | | |
| (8) Abn. Recovery 2 Returns | -0.24 | -0.13 | -0.26 | 0.87 | -0.27 | -0.02 | -0.19 | 1 | | | | | | | | | | | | | | |
| (9) Total ESG Score | 0.03 | -0.12 | -0.02 | 0.08 | 0.11 | -0.17 | -0.02 | 0.10 | 1 | | | | | | | | | | | | | |
| (10) Environmental Score | -0.01 | -0.11 | -0.03 | 0.11 | 0.07 | -0.16 | -0.01 | 0.12 | 0.86 | 1 | | | | | | | | | | | | |
| (11) Social Score | 0.06 | -0.13 | 0.01 | 0.07 | 0.15 | -0.19 | -0.00 | 0.09 | 0.89 | 0.72 | 1 | | | | | | | | | | | |
| (12) Governance Score | 0.00 | -0.05 | -0.05 | 0.04 | 0.03 | -0.07 | -0.04 | 0.05 | 0.70 | 0.39 | 0.43 | 1 | | | | | | | | | | |
| (13) Sustainalytics Score | 0.02 | -0.17 | 0.07 | 0.07 | 0.12 | -0.25 | 0.08 | 0.08 | 0.65 | 0.61 | 0.60 | 0.365 | 1 | | | | | | | | | |
| (14) 2019 ESG Score | 0.02 | -0.11 | -0.03 | 0.08 | 0.09 | -0.17 | -0.02 | 0.09 | 0.96 | 0.83 | 0.86 | 0.64 | 0.65 | 1 | | | | | | | | |
| (15) Size (log(Market Cap.)) | 0.16 | -0.14 | 0.10 | -0.31 | 0.10 | -0.10 | -0.12 | -0.17 | 0.54 | 0.48 | 0.48 | 0.36 | 0.33 | 0.53 | 1 | | | | | | | |
| (16) Cash Holdings | 0.01 | 0.11 | -0.09 | 0.06 | 0.13 | -0.01 | -0.03 | 0.03 | -0.10 | -0.15 | -0.07 | -0.03 | -0.17 | -0.11 | -0.04 | 1 | | | | | | |
| (17) Long-Term Debt | -0.18 | 0.01 | -0.02 | 0.13 | -0.23 | 0.09 | 0.04 | 0.11 | 0.07 | 0.06 | 0.04 | 0.09 | 0.08 | 0.08 | 0.02 | -0.29 | 1 | | | | | |
| (18) Short-Term Debt | -0.05 | -0.02 | -0.02 | 0.07 | -0.03 | -0.02 | 0.02 | 0.05 | 0.04 | 0.07 | 0.05 | -0.02 | 0.05 | 0.05 | -0.05 | -0.16 | 0.11 | 1 | | | | |
| (19) Profitability | 0.18 | 0.03 | 0.08 | -0.25 | 0.14 | 0.02 | 0.01 | -0.24 | 0.00 | -0.02 | 0.02 | -0.00 | -0.04 | 0.01 | 0.19 | 0.01 | -0.17 | -0.08 | 1 | | | |
| (20) Book-to-Market | -0.11 | -0.01 | -0.18 | 0.39 | -0.03 | -0.04 | -0.01 | 0.30 | 0.04 | 0.12 | 0.00 | -0.00 | 0.04 | 0.03 | -0.20 | -0.20 | -0.03 | 0.00 | -0.34 | 1 | | |
| (21) Momentum | -0.02 | 0.09 | 0.09 | -0.60 | 0.06 | -0.01 | -0.12 | -0.52 | -0.10 | -0.12 | -0.09 | -0.04 | -0.08 | -0.10 | 0.10 | 0.15 | -0.08 | -0.09 | 0.14 | -0.37 | 1 | |
| (22) Idiosyncratic Risk | -0.13 | 0.24 | -0.06 | 0.22 | 0.02 | 0.13 | 0.15 | 0.09 | -0.23 | -0.26 | -0.23 | -0.09 | -0.30 | -0.24 | -0.35 | 0.28 | -0.07 | -0.01 | -0.13 | 0.07 | 0.01 | 1 |
| (23) Beta | -0.27 | 0.22 | -0.18 | 0.53 | 0.46 | -0.38 | 0.44 | 0.05 | 0.12 | 0.11 | 0.13 | 0.04 | 0.14 | 0.12 | -0.07 | 0.17 | -0.09 | 0.04 | -0.04 | 0.08 | 0.14 | 0.20 |

This table displays the pairwise Pearson correlations among dependent, main independent, and control variables. All variables are defined in Appendix A.
Source: own research

Turning to returns, crisis returns, especially in the first shock, are strongly negatively correlated with subsequent recovery returns. This suggests that firms with a higher decline in value during the initial crisis generated higher returns in the following recovery phase. Further, fever raw returns and raw returns during the second crisis are positively and significantly correlated (0.15). However, the abnormal returns have a negative correlation coefficient (-0.09), leaving it unclear whether the same firm types outperform in the first and second shocks. Moreover, *Size*, *Cash Holdings*, *Long-term Debt*, and *Profitability* are significantly correlated with risk-adjusted fever returns, while *Size*, *Momentum*, and *Idiosyncratic Risk* are significantly correlated with abnormal second wave returns[22]. On top of that, the correlation coefficient of *Size* has the opposite sign between the two abnormal return variables. Similar discrepancies in correlation coefficient significance are observable between the abnormal returns in the first and second recovery phases. Lastly, the correlation coefficients do not exceed the alerting area for multicollinearity. Therefore, it seems that multicollinearity is not a concern of this sample.

## 4.2 Overall ESG scores and stock returns around the Covid-19 pandemic

In this chapter, I examine the cross-sectional effect of CSR on stock performance around the Covid-19 health disease. Thus, I regress crisis and recovery stock returns on pre-Covid-19 overall ESG ratings, representing the measure for CSR and additional control variables. All regressions include factor loadings of the Carhart four-factor model, as well as country and industry dummies. The following sections initially outline the regression results, then discuss the results, and lastly, robustness tests are conducted using other overall ESG ratings.

### *4.2.1 Regression results for overall ESG score regressions*

This section evaluates the impact of overall ESG ratings on raw and abnormal stock returns of six different periods during the Covid-19 health disease. Refinitiv 2018 overall ESG scores serve as a measure of CSR. Panel A of Table 3 tabulates the results of regressions regarding crisis returns. Robust standard errors are listed in parenthesis below the coefficient estimates. Columns (1)-(4) have returns over the fever period

[22] *Size*, *Cash Holdings*, and *Profitability* are positively correlated with abnormal fever returns, while *Long-term Debt* is negatively correlated. For abnormal returns during the second decline in stock prices, the correlation is negative with *Size* and *Momentum* and positive with *Idiosyncratic Risk*.

(February 24-March 18, 2020) as the dependent variable. In columns (5) and (6), the explained variable corresponds to returns realized during Q1 in 2020, while returns during the second shock period (October 12-30, 2020) represent the dependent variable in columns (7) and (8). Columns (1), (2), (5), and (7) refers to raw returns and columns (3), (4), (6), and (8) to abnormal returns.

To observe a general effect of ESG scores on returns during the first stock market crash, columns (1) and (3) demonstrate the regression results of the regression model (1). The coefficient estimates on CSR are negative for raw returns (-0.0001) but positive for abnormal returns (0.003) in the fever period. However, the magnitude of both coefficients is very small and statistically insignificant. According to the adjusted R-squared, the model fit is 27.9% for raw returns and 38.2% for abnormal returns.

In columns (2) and (4), I rerun the two regressions above, applying the basic regression model (2). The regressions in columns (5)-(8) are also based on the baseline model. CSR is negatively but insignificantly associated with raw and risk-adjusted stock performance in all crisis-related periods, namely the fever, Q1, and second wave periods. The ESG coefficient estimates are -0.006 (-0.002) for abnormal (raw) fever returns and -0.022 (-0.022) for second wave abnormal (raw) returns. The coefficient's magnitude is even bigger for Q1 returns. This suggests that, on average, one standard deviation increase in *Total ESG Score* is associated with -0.1 percentage points ($-0.006 * 19$) in abnormal returns during the first shock and -0.4 percentage points ($-0.022 * 19$) in abnormal returns during the second shock. Further, fever returns show a significant negative association with *Long-term Debt* and a significant positive association with ROA[23]. All other firm characteristics and financial health variables are insignificant in columns (2) and (4).

Columns (7) and (8) of Panel A of Table 3 display that second wave crisis returns are significantly positively associated with *negative BM* and *Momentum* and significantly negatively associated with *Cash Holdings*. In the same regressions, the coefficient estimates of *Long-term Debt* are negative but only marginally significant.

[23] In terms of abnormal fever returns, an increase of one standard deviation long-term debt is associated with a decline of 4.1 percentage points. An increase of one standard deviation Profitability is associated with 3 percentage points higher returns.

**Table 3 – Regression results for 2018 Refinitiv overall ESG scores**
**Panel A:** Crisis-related return regression results for overall ESG scores

| Dependent Variable: | Fever Raw | | Fever Abn. | | Q1 Raw | Q1 Abn. | 2nd Wave Raw | 2nd Wave Abn. |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Total ESG Score | -0.0001 | -0.002 | 0.003 | -0.006 | -0.031 | -0.067 | -0.022 | -0.022 |
| | (0.024) | (0.027) | (0.038) | (0.044) | (0.031) | (0.042) | (0.014) | (0.015) |
| Size | | 0.004 | | 0.009 | 0.020*** | 0.030*** | 0.0001 | 0.0001 |
| | | (0.005) | | (0.008) | (0.005) | (0.007) | (0.002) | (0.002) |
| Cash Holdings | | 0.052 | | 0.093 | 0.092* | 0.140** | -0.053** | -0.056** |
| | | (0.053) | | (0.087) | (0.055) | (0.071) | (0.024) | (0.026) |
| Long-Term Debt | | -0.184*** | | -0.278*** | -0.213*** | -0.259*** | -0.027* | -0.028* |
| | | (0.032) | | (0.053) | (0.036) | (0.049) | (0.015) | (0.016) |
| Short-Term Debt | | -0.021 | | -0.077 | -0.108 | -0.191 | 0.019 | 0.031 |
| | | (0.097) | | (0.165) | (0.103) | (0.146) | (0.042) | (0.046) |
| Profitability | | 0.226*** | | 0.425*** | 0.206** | 0.278** | 0.015 | 0.026 |
| | | (0.068) | | (0.118) | (0.084) | (0.116) | (0.036) | (0.038) |
| Book-to-Market | | 0.002 | | 0.010 | -0.030* | -0.045** | -0.007 | -0.006 |
| | | (0.013) | | (0.021) | (0.015) | (0.022) | (0.005) | (0.005) |
| Negative BM | | -0.025 | | -0.056 | -0.043 | -0.091 | 0.050** | 0.056** |
| | | (0.054) | | (0.086) | (0.066) | (0.098) | (0.021) | (0.024) |
| Momentum | | -0.006 | | -0.014 | 0.076*** | 0.107*** | 0.024*** | 0.021** |
| | | (0.019) | | (0.029) | (0.022) | (0.028) | (0.009) | (0.010) |
| Idiosyncratic Risk | | -0.501 | | -0.033 | 0.633 | 0.565 | 0.231 | 0.509 |
| | | (1.099) | | (1.778) | (1.406) | (1.858) | (0.639) | (0.624) |
| Factor loadings | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 909 | 909 | 909 | 909 | 909 | 909 | 906 | 906 |
| Adjusted $R^2$ | 0.28 | 0.32 | 0.38 | 0.42 | 0.41 | 0.36 | 0.14 | 0.28 |

Panel A of Table 3 displays the regression results for the association between 2018 overall ESG Scores from Refinitiv (*Total ESG Score*) and stock returns related to the crises around the Covid-19 pandemic. Columns (1)-(4) have returns over the fever period (February 24-March 18, 2020) as the dependent variable. The dependent variables in columns (5)-(6) are returns in Q1 in 2020 and returns during the second crisis period (October 12-30, 2020) in columns (7)-(8). Columns (1), (2), (5), and (7) refers to raw returns and columns (3), (4), (6), and (8) to market-model adjusted returns. Columns (1) and (3) correspond to the regression model (1). All other columns correspond to the baseline regression model (2) that includes variables on a firm's financial health and additional firm characteristics. All regressions include factor loadings of the Carhart four-factor model, industry fixed effects (GICS sector), and country fixed effects. All variables are defined in Appendix A. Robust standard errors are listed in parenthesis below the coefficient estimates. Statistical significance at the 1%, 5%, and 10% levels is displayed by ***, **, and *, respectively.
Source: own research

**Panel B:** Recovery-related return regression results for overall ESG scores

| Dependent Variable: | Recovery 1 Raw | Recovery 1 Abn. | Q2 Raw | Q2 Abn. | Recovery 2 Raw | Recovery 2 Abn. |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Total ESG Score | -0.053 | -0.040 | -0.048 | -0.027 | 0.037 | 0.036* |
| | (0.049) | (0.038) | (0.042) | (0.036) | (0.025) | (0.022) |
| Size | 0.001 | 0.002 | -0.003 | -0.004 | 0.0004 | 0.001 |
| | (0.008) | (0.006) | (0.007) | (0.006) | (0.004) | (0.004) |
| Cash Holdings | 0.041 | 0.019 | 0.045 | 0.012 | 0.119*** | 0.108*** |
| | (0.080) | (0.064) | (0.080) | (0.067) | (0.042) | (0.037) |
| Long-Term Debt | 0.209*** | 0.163*** | 0.086* | 0.098** | 0.044 | 0.035 |
| | (0.055) | (0.043) | (0.044) | (0.040) | (0.031) | (0.026) |
| Short-Term Debt | -0.133 | -0.075 | -0.023 | -0.022 | 0.004 | -0.002 |
| | (0.147) | (0.120) | (0.122) | (0.108) | (0.066) | (0.059) |
| Profitability | 0.202* | 0.070 | 0.395*** | 0.258*** | -0.159** | -0.160*** |
| | (0.104) | (0.080) | (0.104) | (0.086) | (0.063) | (0.055) |
| Book-to-Market | -0.007 | 0.001 | 0.030 | 0.029 | 0.012 | 0.005 |
| | (0.023) | (0.018) | (0.021) | (0.018) | (0.009) | (0.007) |
| Negative BM | -0.114*** | -0.037 | -0.131** | -0.076 | 0.050 | 0.040 |
| | (0.040) | (0.038) | (0.058) | (0.054) | (0.042) | (0.036) |
| Momentum | 0.033 | 0.009 | 0.046 | 0.020 | -0.150*** | -0.133*** |
| | (0.030) | (0.024) | (0.028) | (0.024) | (0.018) | (0.016) |
| Idiosyncratic Risk | 4.623** | 3.799** | 6.097*** | 5.177*** | 1.737 | 1.920* |
| | (1.908) | (1.605) | (2.059) | (1.636) | (1.295) | (1.112) |
| Factor loadings | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 909 | 909 | 909 | 909 | 906 | 906 |
| Adjusted $R^2$ | 0.29 | 0.35 | 0.24 | 0.24 | 0.55 | 0.38 |

Panel B of Table 3 displays the regression results for the association between 2018 overall ESG Scores from Refinitiv (*Total ESG Score*) and stock returns related to the recovery periods around the Covid-19 pandemic. The dependent variables in columns (1)-(2) represents returns over the first recovery period (March 23-June 5, 2020), returns throughout Q2 of 2020 in columns (3)-(4), and second recovery returns (October 31-November 30, 2020) in columns (5)-(6). Stock returns in odd-numbered columns are raw returns and market model-adjusted returns in even-numbered columns. All regressions correspond to the baseline regression model (2) that includes variables on a firm's financial health and additional firm characteristics. All regressions include factor loadings of the Carhart four-factor model, industry fixed effects (GICS sector), and country fixed effects. All variables are defined in Appendix A. Robust standard errors are listed in parenthesis below the coefficient estimates. Statistical significance at the 1%, 5%, and 10% levels is displayed by ***, **, and *, respectively.
Source: own research

In results concerning Q1 returns, *Idiosyncratic Risk* and *negative BM* are the only insignificant variables besides CSR. Q1 returns are a rather special case as they integrate pre-shock, first shock, and partly first recovery returns. The adjusted R-squared is 42.1% (32.1%) for analyses with abnormal (raw) fever returns and 27.7% (14.1%) for regressions with abnormal (raw) second wave crisis returns.

Hypothesis 1b states that CSR is unrelated to returns after the shock. To test this hypothesis, I run the baseline regression model (2) for firm performance in times of recovery. Panel B of Table 3 shows the regression outcomes with recovery-related returns as the dependent variable, corresponding to recovery returns after the fever period (March 23-June 5, 2020) in columns (1)-(2), returns throughout Q2 of 2020 in columns (3)-(4), and recovery returns after the second stock market decline (October 31-November 30, 2020) in columns (5)-(6). Stock returns in odd-numbered columns correspond to raw returns and abnormal returns in even-numbered columns.

The coefficient estimates on *Total ESG Score* are negative for first recovery and Q2 returns and statistically insignificant. They range from -0.053 for first recovery raw returns to -0.027 for Q2 abnormal returns. CSR is positively and in terms of risk-adjusted returns marginally statistically significantly associated with returns in the second recovery phase. A one standard deviation increase in ESG scores is associated with 0.7 percentage points ($0.036 * 19$) higher abnormal second recovery returns. Furthermore, the results suggest that in the first recovery period, *Long-term Debt* and *Idiosyncratic Risk* are positively associated with firm performance, while returns after the second shock are positively associated with *Cash Holdings* and negatively associated with *Profitability* and *Momentum*[24]. For Q2 returns, the coefficients estimates are positive and significant for *Long-term Debt*, *Profitability*, and *Idiosyncratic Risk*. The model fit is 34.9% for the first recovery and 38.2% for the second, according to the adjusted R-squared in regressions with abnormal returns.

### *4.2.2 No firm value protection through overall ESG scores*

The regressions in Table 3 examine whether crisis returns around the Covid-19 pandemic are positively affected by CSR (hypothesis 1a) and whether recovery returns are unrelated to ESG (hypothesis 1b). Overall, the regression results do not align with

[24] In terms of magnitude, *Momentum* has the most considerable influence on abnormal stock returns in the second recovery period: a one standard deviation increase in Momentum is associated with a 5 percentage point ($-0.133 * 0.375 * 100$) decrease in stock performance.

hypothesis 1a, but they support hypothesis 1b. Despite the variable *Total ESG Score* showing a positive and statistically significant correlation with abnormal fever returns in Table 2, the coefficient estimates in regressions with crisis returns are not significantly different from zero. In addition, ignoring statistical significance, the estimated ESG coefficients do not appear to be economically important. The results suggest that high ESG firms are not more resistant to adverse shocks to the financial market than firms with low ESG scores. It appears that the increased awareness and demand for CSR and the potentially wider investor base of investors with a long-term investment horizon do not protect European firms with high ESG engagement against downside risks during the Covid-19 pandemic.

The outcome is neither consistent with the view that good firms do well nor that ESG activities reduce the shareholder wealth. Furthermore, the regression results disagree with the findings of Lins, Servaes, and Tamayo (2017), Albuquerque et al. (2020), and Ding et al. (2021). This raises the question of whether the discrepancy in outcomes is caused by the regional difference of the examined firms. Yet, my results are consistent with those of Bae et al. (2021), who examine a U.S. sample. Thus, it does not seem that the impact of ESG on crisis stock performance is equally pronounced in European developed countries than in the U.S. Another reason for the inconsistency with the former results could stem from poorer performance of the European regression model. However, since the model fits are in a comparable range to those of Bae et al. (2021), the baseline model in this thesis does not suffers from poor specification.

Moreover, the regression results suggest that having low *Long-term Debt* and high *Profitability* is profitable for Western European firms during the fever period. In contrast to the findings of Bae et al. (2021), *Cash Holdings* and *Size* do not seem to play a significant role in the resilience against the decline in firm value in the first shock. Their coefficient estimates are significant in the regression with Q1 returns, though.

The analyses of returns during the second and less severe shock reveal a different picture. In this phase, firms with lower *Cash Holdings*, *negative BM* and greater *Momentum* outperform. Similar to the first shock, *Long-term Debt* is negatively associated with CFP but statistically and economically less relevant. Especially the negative influence of *Cash Holdings* on second shock returns contradicts the logic of prior studies proposing that cash-rich firms can maintain investments during financial distress. The inconsistency in regression results between the first and second crisis periods raises the

question of whether investors relied on different firm-related factors during the second crisis and, thus, whether the second crisis is comparable with earlier crises. Moreover, the lower explanatory power of second wave regressions corroborates the concern. Chapter 4.6 further discusses this matter.

The studies of Lins, Servaes, and Tamayo (2017) and Bae et al. (2021) suggest that CSR is unrelated to post-crisis performance. In this thesis, post-crisis returns are expressed as returns during recovery periods. The results in Panel B of Table 3 agree with hypothesis 1b as ESG scores are unrelated to all recovery-related regressions at the 5% significance level. Interestingly, the coefficient estimates' signs are negative in the first recovery period but positive and, in the case of abnormal returns, marginally statistically significant in the second recovery period. Nevertheless, higher ESG engagement does overall not translate into better stock performance in times of recuperation.

Again, the coefficient estimates on the control variables show some considerable disagreement between the two recovery periods. While companies with higher long-term leverage and higher *Idiosyncratic Risk* outperform in the first recovery phase, cash-rich firms with a lower ROA and lower *Momentum* generate superior stock returns after the second crisis. Lastly, *Profitability* and *Idiosyncratic Risk* become increasingly important for firm performance during Q2 2020.

The model fit of recovery return regressions is on a comparable level to crisis return regressions. However, the plot of fitted values against residuals and the RESET test show indications of non-linearity of the functional form for second recovery period regressions. To resolve these misspecification issues, I rerun the two regressions, including the polynomial of Cash Holding, Long-term Debt, and Momentum. Figure 5 and 6 in the Appendix provide a graphical comparison of the plots of fitted values against residuals between the baseline and the newly specified models for both types of second recovery returns. It clearly shows the improvement in the latter model. Table 8 in the Appendix displays the regression results when controlling for the polynomials. The coefficient estimates remain positive and even increase in significance[25], supporting the positive association between ESG and the second recovery period returns. Moreover, allowing for non-linearities in the model significantly improves the model

[25] The ESG coefficient estimates are positive and statistically significant at the 10% level for raw returns and statistically significant at the 5% level for abnormal returns.

fit[26].However, there are no theoretical rationale in the literature reviewed that would justify the inclusion of such polynomial terms. Therefore, the purpose of the new model is solely to observe whether the results from the baseline regressions hold.

### *4.2.3 Robustness tests with additional overall ESG measures*

In this section, I test whether the results in Panel A and B of Table 3 are robust to alternative versions of overall ESG scores. I repeat the regressions in Table 3 except for those involving Q1 and Q2 returns. In Panel A-C of Table 9 in the Appendix show the regression results of the robustness check. The dependent variables in columns (1)-(2) correspond to fever returns, in columns (3)-(4) to returns during the first recovery period, in columns (5)-(6) to second shock returns, and in columns (7)-(8) to returns during the second recovery period. The odd-numbered columns refer to raw returns, and the even-numbered columns refer to market model-adjusted returns.

First, I evaluate whether the results in Table 3 are sensitive to ESG scores from different rating agencies. In Panel A of Table 9 in the Appendix, I use overall Sustainalytics ESG scores to proxy for CSR. As already discussed, ESG scores can deviate considerably across sustainability raters. In addition, descriptive statistics show that Refinitv scores are available for roughly twice as many companies in the sample as Sustainalytics ratings. The regression results demonstrate that Sustainalytics scores are unrelated to crisis returns around the Covid-19 pandemic. Unlike the results in Panel A of Table 3, the CSR coefficient estimates are positive for all crisis return regressions. Moreover, Sustainalytics ESG scores are negatively associated with the first recovery period and statistically significant at the 5% significance level. This is not consistent with hypothesis 1b. It indicates that, on average, firms with low Sustainalytics ratings regain more of their value after the initial shock than high ESG firms, although they do not appear to suffer larger losses during the first crisis period. Since some coefficient estimates of the control variables differ in magnitude and significance to the regression results in Table 3, I rerun the regressions on firms of the Sustainalytics sample using Refintiv ESG scores in unreported results. The outcome of those regressions is in line with Panel A of Table 9 in the Appendix. However, Refinitiv ESG scores remain unrelated to first recovery returns, suggesting that the association in the first post-crisis phase is sensitive to the ESG rating agency.

[26] Misspecification is tested using the RESET test and improved model fit is tested using an analysis of variance (ANOVA) across the two models.

In a second step, I replace *Total ESG Score* with 2019 overall ESG ratings. The exact date when Refinitiv updates its ESG scores is unclear. Due to the reporting aligned publication, I assume that most 2019 ESG scores were published in the first half of 2020. Panel B of Table 9 in the Appendix presents the regression outcome with 2019 ESG ratings. Applying the same data cleaning steps, the regressions on the first shock include 935 observations and the regressions on the second wave include 940 data points. In general, the results are consistent with those in Table 3. This is likely due to the stickiness of the ESG scores and the high correlation between the 2018 and 2019 scores. Interestingly, the negative ESG coefficient estimate becomes statistically significant at the 10% significance level in the second crisis period, contradicting hypothesis 1a. With respect to second recovery abnormal returns, the marginal statistical significance disappears for 2019 ESG scores, supporting hypothesis 1b.

Third, I use quintile dummies as a CSR measure. This allows me to assess, first, whether the association between CFP and CSP is more pronounced at very high or very low ESG levels, and second, whether the results of the previous sections hold when I contrast the highest with the lowest ESG ratings. Thus, I divide 2018 Refinitiv overall ESG scores into quintiles and repeat the regressions in Table 3, replacing *Total ESG Score* with quintile dummies. Figure 7 and 8 in the Appendix illustrate the average stock returns for each quintile during the fever and the second wave periods, respectively. The stock performance does not differ considerably among quintiles. Panel C of Table 9 in the Appendix illustrates the regression outcomes and corroborates this impression. Quintile 5 represents the dummy variable for firms with the highest ESG scores. All quintile dummies are compared to the quintile with the least socially responsible firms in the sample. The results demonstrate that none of the quintiles statistically significantly out- or underperform the firms in the lowest quintile in any period. The coefficient estimates for firms in Quintile 5 are even negative for both crisis returns and only positive for second recovery returns. This is in line with Table 3 and suggests that the results hold.

Overall, the baseline regression results with *Total ESG Score* are robust against replacing the main independent variable with other versions of overall ESG scores. It appears that overall ESG scores do not affect crisis returns during the Covid-19 health disease, which rejects hypothesis 1a. Hypothesis 1b is supported chiefly as most overall ESG proxies are unrelated to recovery returns. The next chapter further assesses the

relationship between crisis CFP and CSR, analyzing the effect of specific components of the overall ESG scores.

## 4.3 The impact of environmental and social engagement during the crises

Overall ESG scores, the primary measure of CSR in this thesis, emerges from three pillar scores, namely E, S, and G scores. Other studies of the CFP-CSP relationship often focus their analysis on the E and S components because they do not view corporate governance as part of CSR. To accommodate this view, the chapter presents and discusses the regression results using pillar scores, category scores, or a combination thereof as the explanatory variable of interest. On the one hand, I examine whether the regression outcome deviates from that of the previous chapter. On the other hand, I test hypothesis 2, stating that E and S scores, or their combination, are positively associated with crisis returns.

### *4.3.1 Regression results for pillar and category scores*

Panel A of Table 4 tabulates the results of the baseline regressions using each pillar score and, following the approach of Albuquerque et al. (2020), the average between E and S (*ES Score*) as CSR measure. The analysis focuses on crisis-related returns. Thus, the dependent variable of columns (1)-(4) is abnormal fever returns and abnormal second wave returns in columns (5)-(8). During the fever period, *S Score* (0.053) and *ES Score* (0.004) demonstrate a positive association with abnormal returns. In contrast, *E Score* (-0.035) and *G Score* (-0.021) are negatively associated with risk-adjusted returns. All associations are statistically insignificant. The coefficient estimate on social ratings shows the highest value, whereby a one standard deviation increase in *S Score* is associated with a 1.1 percentage point ($0.053 * 21.4$) increase in abnormal fever returns. Further, all variations in ESG scores are negatively associated with abnormal returns during the second shock. While *S Score* and *ES Score* remain statistically insignificant, *E Score* and *G Score* are statistically significant at the 10% significance level. Concerning the additional control variables, the results are generally consistent among the regressions in Panel A of Table 4 and with those in Panel A of Table 3.

**Table 4 – Regression results for pillar and category scores**
**Panel A:** Crisis return regression results for ESG pillar scores

| Dependent Variable: | Abnormal Fever Returns | | | | Abnormal 2nd Wave Returns | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| E Score | -0.035 | | | | -0.017* | | | |
| | (0.034) | | | | (0.010) | | | |
| S Score | | 0.053 | | | | -0.006 | | |
| | | (0.038) | | | | (0.012) | | |
| ES Score | | | 0.004 | | | | -0.016 | |
| | | | (0.040) | | | | (0.012) | |
| G Score | | | | -0.021 | | | | -0.021* |
| | | | | (0.035) | | | | (0.011) |
| Size | 0.012 | 0.005 | 0.008 | 0.010 | 0.0001 | -0.001 | -0.0002 | -0.0002 |
| | (0.008) | (0.008) | (0.008) | (0.007) | (0.002) | (0.002) | (0.002) | (0.002) |
| Cash Holdings | 0.088 | 0.096 | 0.093 | 0.094 | -0.057** | -0.054** | -0.056** | -0.053** |
| | (0.086) | (0.087) | (0.087) | (0.087) | (0.026) | (0.026) | (0.026) | (0.026) |
| Long-Term Debt | -0.279*** | -0.279*** | -0.278*** | -0.276*** | -0.029* | -0.028* | -0.029* | -0.026 |
| | (0.053) | (0.053) | (0.053) | (0.053) | (0.016) | (0.016) | (0.016) | (0.016) |
| Short-Term Debt | -0.071 | -0.080 | -0.078 | -0.078 | 0.032 | 0.030 | 0.031 | 0.028 |
| | (0.164) | (0.165) | (0.164) | (0.165) | (0.046) | (0.046) | (0.046) | (0.045) |
| Profitability | 0.416*** | 0.438*** | 0.427*** | 0.421*** | 0.026 | 0.030 | 0.027 | 0.027 |
| | (0.118) | (0.116) | (0.118) | (0.117) | (0.038) | (0.038) | (0.038) | (0.038) |
| Book-to-Market | 0.012 | 0.009 | 0.009 | 0.010 | -0.006 | -0.006 | -0.006 | -0.006 |
| | (0.021) | (0.021) | (0.021) | (0.021) | (0.005) | (0.005) | (0.005) | (0.005) |
| Negative BM | -0.049 | -0.061 | -0.057 | -0.057 | 0.058** | 0.055** | 0.057** | 0.054** |
| | (0.086) | (0.086) | (0.086) | (0.086) | (0.024) | (0.024) | (0.024) | (0.024) |
| Momentum | -0.015 | -0.010 | -0.013 | -0.014 | 0.021** | 0.022** | 0.021** | 0.022** |
| | (0.029) | (0.029) | (0.029) | (0.029) | (0.010) | (0.010) | (0.010) | (0.010) |
| Idiosyncratic Risk | -0.153 | 0.187 | -0.002 | -0.028 | 0.496 | 0.528 | 0.503 | 0.557 |
| | (1.770) | (1.783) | (1.778) | (1.776) | (0.621) | (0.628) | (0.625) | (0.625) |
| Factor loadings | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 909 | 909 | 909 | 909 | 906 | 906 | 906 | 906 |
| Adjusted $R^2$ | 0.42 | 0.42 | 0.42 | 0.42 | 0.28 | 0.28 | 0.28 | 0.28 |

Panel A of Table 4 displays the regression results for the association between each pillar score *(E, S,* and *G Score*) as well as the average of the E and S pillar (*ES Score*) and Covid-19 crisis returns. The dependent variables refer to market model-adjusted fever returns (February 24-March 18, 2020) in columns (1)-(4) and market model-adjusted second crisis returns (October 12-30, 2020) in columns (5)-(8). All regressions correspond to the baseline regression model (2). All variables are defined in Appendix A. Robust standard errors are listed in parenthesis below the coefficient estimates. Statistical significance at the 1%, 5%, and 10% levels is displayed by ***, **, and *, respectively.
Source: own research

**Panel B:** Crisis return regression results for ESG category scores

| Dependent Variable: | Abnormal Fever Returns | | | | Abnormal 2nd Wave Returns | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Workforce | 0.031 | | | | 0.001 | | | |
| | (0.036) | | | | (0.011) | | | |
| Product Respons. | | 0.035 | | | | 0.001 | | |
| | | (0.024) | | | | (0.008) | | |
| Innovation | | | 0.018 | | | | 0.0005 | |
| | | | (0.023) | | | | (0.008) | |
| Category Avg. | | | | 0.057 | | | | 0.001 |
| | | | | (0.035) | | | | (0.012) |
| Size | 0.007 | 0.007 | 0.007 | 0.005 | -0.002 | -0.002 | -0.002 | -0.002 |
| | (0.007) | (0.007) | (0.007) | (0.007) | (0.002) | (0.002) | (0.002) | (0.002) |
| Cash Holdings | 0.091 | 0.095 | 0.093 | 0.094 | -0.054** | -0.054** | -0.054** | -0.054** |
| | (0.088) | (0.088) | (0.087) | (0.088) | (0.026) | (0.026) | (0.026) | (0.026) |
| Long-Term Debt | -0.278*** | -0.280*** | -0.275*** | -0.276*** | -0.028* | -0.028* | -0.028* | -0.028* |
| | (0.053) | (0.053) | (0.053) | (0.053) | (0.016) | (0.016) | (0.016) | (0.016) |
| Short-Term Debt | -0.077 | -0.080 | -0.083 | -0.085 | 0.030 | 0.029 | 0.029 | 0.029 |
| | (0.165) | (0.165) | (0.164) | (0.164) | (0.046) | (0.046) | (0.046) | (0.046) |
| Profitability | 0.433*** | 0.432*** | 0.433*** | 0.441*** | 0.032 | 0.031 | 0.032 | 0.032 |
| | (0.117) | (0.116) | (0.118) | (0.118) | (0.038) | (0.038) | (0.038) | (0.038) |
| Book-to-Market | 0.010 | 0.010 | 0.009 | 0.009 | -0.006 | -0.006 | -0.006 | -0.006 |
| | (0.021) | (0.021) | (0.021) | (0.021) | (0.005) | (0.005) | (0.005) | (0.005) |
| Negative BM | -0.055 | -0.060 | -0.058 | -0.059 | 0.054** | 0.054** | 0.054** | 0.054** |
| | (0.087) | (0.086) | (0.087) | (0.087) | (0.024) | (0.023) | (0.024) | (0.023) |
| Momentum | -0.012 | -0.010 | -0.012 | -0.009 | 0.022** | 0.022** | 0.022** | 0.022** |
| | (0.029) | (0.029) | (0.029) | (0.029) | (0.010) | (0.010) | (0.010) | (0.010) |
| Idiosyncratic Risk | 0.086 | 0.177 | 0.110 | 0.286 | 0.546 | 0.546 | 0.547 | 0.549 |
| | (1.783) | (1.764) | (1.790) | (1.781) | (0.628) | (0.625) | (0.629) | (0.628) |
| Factor loadings | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 909 | 909 | 909 | 909 | 906 | 906 | 906 | 906 |
| Adjusted $R^2$ | 0.42 | 0.40 | 0.39 | 0.39 | 0.28 | 0.27 | 0.25 | 0.26 |

Panel B of Table 4 displays the regression results for the association between three category scores (*Workforce*, *Product Responsibility*, *Innovation*) as well as the average of the three category scores (*Category Average*) and Covid-19 crisis returns. The dependent variables refer to market model-adjusted fever returns (February 24-March 18, 2020) in columns (1)-(4) and market model-adjusted second crisis returns (October 12-30, 2020) in columns (5)-(8). All regressions correspond to the baseline regression model (2). All variables are defined in Appendix A. Robust standard errors are listed in parenthesis below the coefficient estimates. Statistical significance at the 1%, 5%, and 10% levels is displayed by ***, **, and *, respectively.

Source: own research

Next, I delve deeper into the E and S component analysis using Refinitiv category scores that form the foundation of the pillar scores. Based on their integration of aspects that could mitigate corporate risks during the Covid-19 crises, I select three categories in Section 3.3.3 meriting further examination, namely the category scores Workforce, Product Responsibility, and (green) Innovation. Panel B of Table 4 demonstrates the baseline regression results with abnormal fever (columns (1)-(4)) and second shock returns (columns (5)-(8)) as the dependent variable. Each of the three category scores as well as the average thereof represent the main explanatory variable. For all four variations of CSR measure, the association is positive but insignificant with both abnormal crisis returns. The coefficient estimates range from 0.018 (*Innovation*) to 0.057 (*Category Avg.*) for fever period regressions. In regressions related to the second wave period, only *Innovation* (0.0005) does not have a coefficient estimate of 0.001.

Overall, the results in Panel A and B of Table 4 suggest that abnormal fever returns' association with *Long-term Debt* is negative and positive with *ROA*. Meanwhile, risk-adjusted second crisis returns are negatively associated with *Cash Holdings* and positively related to *negative BM* and *Momentum*.

### *4.3.2 No outperformance through environmental or social engagement*

The regression outcomes illustrate that all versions of ESG measures focusing on environmental or social aspects generally remain unrelated to risk-adjusted crisis returns. The results suggest that investing in socially or ecologically engaged firms is not beneficial for shareholders during the two Covid-19 induced stock market declines. This supports the findings in the previous chapter and rejects hypothesis 2. Without considering significance, the study of pillar scores reveals that social engagement tend to be more relevant for resilient fever stock returns than environmental and governance policies. The second crisis regressions display a similar pattern with *S Score* having the least negative coefficient estimate. Moreover, no significant governance effect that would change the crisis regression results is observable. In fact, governance seems to exhibit a similar pattern of association as environmental policy. Thus, using *ES Score* leads to the same conclusion as using *Total ESG Score*.

Turning to individual category scores, Panel B of Table 4 reveals that higher job well-being, product responsibility, green innovation, and the equal-weighted average thereof generate slightly better abnormal crisis returns, but on an insignificant level. Overall, these aspects do not enhance Covid-19 crisis resilience, consistent with the

results for the *E Score* and the *S Score*, as well as with the findings from the previous chapter. In contrast to Shan and Tang (2020), showing that job satisfaction is positively associated with stock performance during the first Covid-19 market shock, the *Workforce* category score is unrelated to both crisis returns of Western European firms. However, it is worth mentioning that Refinitiv *Workforce* is not a standard proxy for job satisfaction. Similarly, *Product Responsibility* or *Innovation* do not depict common measures for green products and data privacy or environmentally innovative firms, respectively. Also, multiple firms have a value of zero for category scores *Product Responsibility* and *Innovation*[27]. But since the calculation of individual pillar scores includes category values of zero, I refrain from removing such observations from the respective samples.

Similar to the consistent result for ESG, the coefficient estimates for the other control variables resemble those of previous regressions. To further analyze the impact of ESG on stock performance in Europe, I conduct country-level studies in the next chapter.

## 4.4 The influence of ESG engagement in different countries

While the former chapters analyze the effect of different variations of the ESG scores on stock returns of the whole sample, this chapter focuses on country-specific samples. Specifically, it examines whether the relationship between ESG and Covid-19 crisis returns differs across countries and whether this association is more positive in countries with poorer sustainability performance than in countries with better sustainability performance, as suggested by hypothesis 3. Therefore, I repeat the baseline regressions for individual country samples and with *Total ESG Score* as the CSR measure. I perform country-level regressions for economies with more than 50 observations, namely Germany, the UK, Italy, Sweden, Switzerland, and France. The six countries account for roughly 70% of the observations in the sample. In line with Xiao et al. (2018), I calculate the average of the HDI and EPI scales[28], to reflect a country's overall sustainability performance. The following two sections present the country-specific descriptive statistics, the regression results, and a discussion thereof.

[27] Possibly because they do not take any action on these subjects (which is undoubtedly also industry-dependent) or because there are no publications publicly available.

[28] The HDI scale ranges from 0 to 1, and the EPI scale ranges from 0 to 100. Therefore, I divide the EPI scale by 100 before taking the average of both indices. The final country scale is between 0 and 1.

### *4.4.1 Country-specific descriptive statistics and regression results*

Table 10 in the Appendix shows the country-level summary statistics for abnormal fever returns and abnormal second wave returns. The UK has the largest number of observations, with 199 data points corresponding to 21.9% of the sample. The following countries are Germany and Sweden, with 112 and 102 observations[29], respectively. Across all countries in the STOXX Europe TMI, mean (median) abnormal fever returns range from 7.4% (5.5%) to -23.1% (-28.9%) and mean (median) abnormal second crisis returns range from 8.9% (7.7%) to -5.7% (-9.6%), illustrating considerable differences in crisis returns across countries. Italy has the highest average risk-adjusted returns among the six analyzed countries during the first shock (4.8%)[30] and the UK during the second shock (0.8%). In contrast, British firms show the lowest average risk-adjusted stock performance in the fever period (-19.5%) and Swiss companies in the second crisis period (-1.8%). The standard deviation for the abnormal crisis in the first and second shock among the regressed countries range from 18.3% to 31.1% and from 5.7% to 8%, respectively, with the UK (Switzerland) demonstrating the highest (lowest) variance in both shocks.

**Table 5 – Overall ESG coefficient estimates of county-specific regressions**
**Panel A:** Country-specific fever return regression results for overall ESG scores

| Dependent Variable: | Abnormal Fever Returns | | | | | |
|---|---|---|---|---|---|---|
| | (1) DE | (2) UK | (3) IT | (4) SE | (5) CH | (6) FR |
| Total ESG Score | -0.091 | 0.029 | 0.027 | 0.051 | 0.170 | 0.031 |
| | (0.103) | (0.115) | (0.180) | (0.115) | (0.192) | (0.142) |
| Control Variables | Yes | Yes | Yes | Yes | Yes | Yes |
| Factor loadings | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | No | No | No | No | No | No |
| N | 112 | 199 | 54 | 102 | 63 | 97 |
| Adjusted $R^2$ | 0.37 | 0.24 | 0.36 | 0.39 | 0.30 | 0.45 |

For table description, see below Panel B of Table 5.

[29] Please note that I use the values for abnormal fever returns. For second wave returns the number of observations is 198 for the UK, 111 for Germany, and 102 for Sweden.
[30] Interestingly, Figure 3 in the Appendix, indicates that Swiss firms experience a less severe decline in raw stock performance than all other countries during the fever period.

**Panel B:** Country-specific second wave return regression results for overall ESG scores

| Dependent Variable: | Abnormal 2nd Wave Returns | | | | | |
|---|---|---|---|---|---|---|
| | (1) DE | (2) GB | (3) IT | (4) SE | (5) CH | (6) FR |
| Total ESG Score | -0.003 | -0.048 | 0.090** | -0.038 | -0.077 | -0.113** |
| | (0.032) | (0.029) | (0.042) | (0.042) | (0.047) | (0.054) |
| Control Variables | Yes | Yes | Yes | Yes | Yes | Yes |
| Factor loadings | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | No | No | No | No | No | No |
| N | 111 | 198 | 55 | 102 | 65 | 96 |
| Adjusted $R^2$ | 0.24 | 0.39 | 0.45 | 0.08 | 0.16 | 0.21 |

Panel A and Panel B of Table 5 display the coefficient estimates of 2018 overall ESG Scores from Refinitiv (*Total ESG Score*) for country-specific regression results on Covid-19 crisis returns. The regressions are run on countries with more than 50 observations, namely Germany, the UK, Italy, Sweden, Switzerland, and France. The dependent variable refers to market model-adjusted returns over the fever period (February 24-March 18, 2020) in Panel A and market model-adjusted returns over the second crisis period (October 12-30, 2020) in Panel B. All regressions correspond to the baseline regression model (2). All regressions include control variables on a firm's financial health and additional firm characteristics. Furthermore, they include factor loadings of the Carhart four-factor model and industry fixed effects (GICS sector). All variables are defined in Appendix A. Robust standard errors are listed in parenthesis below the coefficient estimates. Statistical significance at the 1%, 5%, and 10% levels is displayed by ***, **, and *, respectively.
Source: own research

In terms of sustainability performance, all countries in the sample are in the top quartile in both indices (HDI and EPI), with some of them also holding the top positions. The calculated country-specific sustainability performance scale indicates high sustainability standards across the six examined countries, ranging from 0.801 (Italy) to 0.885 (Switzerland). The statistics on country-specific ESG levels reveals that average ESG scores are not necessarily higher for firms domiciled in countries with higher sustainability performance. Among the regressed countries, Swiss firms have the lowest average ESG scores with 52.7, whereas French firms have the highest with 67.6.

Panel A and Panel B of Table 5 present the coefficient estimates on CSR from country-level baseline regressions. The dependent variables are abnormal fever returns for Panel A and second wave abnormal returns for Panel B. The ESG coefficient estimates during the first shock are positive, except for the subsample with German firms. They are all statistically insignificant and lay between -0.091 (Germany) and 0.17 (Switzerland). The estimated CSR coefficients regarding second crisis regressions range from -0.113 (France) to 0.09 (Italy). While the association between ESG and second crisis

abnormal returns is significant at the 5% significance level in the French and Italian sample, all other country-specific associations are not statistically significant and negative. The adjusted R-squared model fit is highest for France (62.5%) and lowest for Switzerland (11.8%) for fever period regressions. In second wave regressions, it spans from 7.9% (France) to 45.3% (Italy). Table 11 in the Appendix reports the full regression results of the country-specific regressions.

### *4.4.2 Resembling ESG effects on stock performance across countries*

Especially early in the pandemic, the Covid-19 health disease affected countries differently and governments adopted varying strategies to combat the unfolding crisis. Similarly, the descriptive statistics illustrate that the magnitude and variance of risk-adjusted crisis returns differ substantially across economies. Furthermore, prior studies suggest that the ability for companies to capitalize on CSR depends on the country's sustainability engagement, in which they are domiciled. Thus, I expect that the association between ESG and crisis returns varies across countries and that it is more positive for firms headquartered in economies with lower sustainability performance.

The sign and magnitude of the estimated coefficients on CSR differ across countries in both crises. For example, one standard deviation increase in ESG scores is associated with 3.7 ($0.17 * 21.6$) percentage points better abnormal fever returns in the Swiss subsample, while a standard deviation increase in ESG scores is associated with 2 ($-0.091 * 22.2$) percentage points lower abnormal fever returns in the German subsample. However, it appears that ESG is not a protecting firm characteristic against decreasing stock prices in the first Covid-19 stock market crash in any of the countries. None of the coefficient estimates are statistically different from zero. During the second shock, the regression results suggest that *Total ESG Score* is statistically significantly and positively associated with risk-adjusted returns for Italy. One standard deviation CSR improvement results in 1.5 ($0.09 * 16.9$) percentage points better financial performance for Italian firms. This is economically significant since the crisis period is relatively short. However, the Italian outcome seems to be an exception, as for all other countries, ESG is negatively associated with second crisis returns. For French companies the association is statistically significant. Overall, Panel A and B of Table 5 suggest that ESG engagement does not protect firm value in difficult times in most countries. Thus, country-level results are generally consistent with previous findings and indicate that the results in chapter 4.2 are unlikely to be affected by a particular country.

Turning to hypothesis 3, Italy denotes the worst country-level sustainability performance among the six regressed countries. Even though this economy reports the highest association between CSR and stock returns in the second crisis period, the outcome does not provide enough evidence to confirm hypothesis 3. Overall, there is no discernible pattern signaling that ESG performance is more positively associated with firm value in countries with lower sustainability during the Covid-19 crisis periods. However, I do not reject hypothesis 3 either, because all six economies exhibit high sustainability standards in an international comparison. Hence, they do not differ fundamentally from one another in this respect. Moreover, it is worth noting that ESG coefficient estimates between country-specific regressions are not straightforwardly comparable. They emerge from different subsamples, and their magnitude is likely to be influenced by the effects of the other explanatory variables on the dependent variable.

Merging country subsamples and rerunning the regression that includes an interaction term between the country dummy and the CSR measure is one way to test whether the ESG slope coefficients diverge significantly. In unreported results, I combine in a first step the two subsamples with the highest and lowest CSR coefficient estimates for each shock period. The interaction term is statistically insignificant in both crises, indicating that the highest and lowest ESG slope coefficients are not significantly different across countries. In a second step, I merge subsamples of the two countries with the highest (Switzerland and the UK) and lowest (Italy and France) sustainability performance scales. I do this, to examine whether ESG is more favorable for crisis CFP in countries with lower sustainability performance. In contrast to the fever period, such a pattern is observable in the shock period. The latter regression results suggests that Italy's ESG slope coefficient is significantly higher than the others. Additionally, the estimate of the CSR coefficient for France is marginally higher than that of Switzerland and the UK. This would support hypothesis 3.

Lastly, the varying model fit and the disagreement in the statistical significance of the control variables, displayed in Table 11 in the Appendix, indicate that the model does not perform equally well across countries. It appears that shareholder welfare is affected by different factors across countries. Analogous to the analysis in this chapter, the next chapter focuses on industries and discusses industry-specific results.

## 4.5 Industry-specific impacts of CSR on firm value

The Covid-19 crisis and fiscal measures to combat the unfolding pandemic affected firms' operations differently across industries. Besides, some researchers suggest that CSR-CFP studies should concentrate on single industries. Therefore, I analyze the effect of ESG on Covid-19 crisis returns on an industry level. Industry-specific regression results better reflect differences of the ESG-CFP relationship among industries than the industry dummies of previous regressions. Furthermore, they provide valuable insight into whether particular industries drive the overall results. The remainder of this chapter elaborates on the descriptive statistics and regression results and discusses them in more detail.

### *4.5.1 Industry-specific descriptive statistics and regression results*

For the industry-level regressions, I divide the sample into subsamples according to the eleven GICS sectors, excluding the financial sector. Table 12 in the Appendix provides the descriptive statistics of ESG scores and abnormal returns during both crises by industry. Regarding the number of observations, the industrial sector accounts for the largest share, with 232 companies making up 25.5% of the sample. Energy companies comprise the smallest fraction with 4.4% (40 observations). In the fever period, the Energy and Real Estate sectors experience the lowest average risk-adjusted returns with -24.2% and -23.2%, respectively, among the ten industries. The poor performance of the Energy industry is likely attributable to the oil price war between Russia and Saudi Arabia in March 2020[31] (Bae et al. (2021)). In contrast, Materials and Health Care are the only two industries with positive average abnormal fever returns with 6.2% and 4.6%. In terms of raw returns, Figure 4 in the Appendix illustrates that Energy firms are the hardest hit during the fever period, while Consumer Staples firms suffer the smallest decline in stock prices. Next, all industries record abnormal returns in the range of -4.3% (Consumer Staples) and 3.4% (Consumer Discretionary) throughout the second shock. The standard deviation ranges from 16.5% to 33.9% in the first crisis and from 4.7% to 10.2% in the second shock. Finally, companies in the Materials sector demonstrate the highest average CSR ratings (64.2), whereas Information Technology has the lowest (52.5). This is somewhat surprising since, in the U.S., tech firms tend to have high ESG scores.

[31] However, they experienced the second-highest abnormal returns during the post-crisis period (first recovery period) with 14.1%.

I run the baseline specification for all industries. Panel A of Table 6 shows the estimated ESG coefficients for each of the ten GICS sectors with the abnormal returns in the fever period as the explained variable. Among the coefficient estimates, four are negative, and six are positive ranging from -0.211 (Energy) to 0.548 (Consumer Staples). Moreover, ESG scores are positively and statistically significantly associated with risk-adjusted fever returns at the 1% significance level in the Consumer Staples industry. In contrast, all other coefficients are statistically insignificant. The model fit in terms of adjusted R-squared lies between 27.9% and 59.8%.

Panel B of Table 6 provides the industry-level coefficient estimates for ESG throughout the crisis caused by the second wave of the Covid-19 pandemic. None of the associations display statistical significance, and only three of them have a positive sign (Energy, Utilities, and Real Estate). The coefficient's magnitude varies between -0.068 (Health Care) and 0.079 (Utilities). The model's fit is negative[32] for the Communication and Utilities sectors and ranges to 63.5% for the Energy industry. Panel A and Panel B of Table 13 in the Appendix reveal the full regression results of the industry-specific regressions.

**Table 6 – Overall ESG coefficient estimates of industry-specific regressions**
**Panel A:** Industry-specific fever return regression results for overall ESG scores

| Dependent Variable: | Abnormal Fever Returns | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) G10 | (2) G15 | (3) G20 | (4) G25 | (5) G30 | (6) G35 | (7) G45 | (8) G50 | (9) G55 | (10) G60 |
| Total ESG Score | -0.211 | 0.003 | 0.029 | 0.044 | 0.548*** | -0.107 | -0.133 | -0.011 | 0.292 | 0.116 |
| | (0.287) | (0.153) | (0.086) | (0.148) | (0.162) | (0.155) | (0.104) | (0.124) | (0.214) | (0.099) |
| Control Variables | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Factor loadings | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry FE | No | No | No | No | No | No | No | No | No | No |
| Country FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 40 | 91 | 232 | 137 | 70 | 80 | 66 | 72 | 47 | 74 |
| Adjusted $R^2$ | 0.54 | 0.28 | 0.35 | 0.46 | 0.60 | 0.44 | 0.50 | 0.36 | 0.30 | 0.51 |

For table description, see below Panel B of Table 6.

[32] The adjusted R-squared penalizes the inclusion of irrelevant regressors when the regressor's absolute t-statistic value is below one. This may lead to a negative adjusted R-squared, which generally implies poor goodness of fit. (Brooks (2019))

**Panel B:** Industry-specific second wave return regression results for overall ESG scores

| Dependent Variable: | Abnormal 2nd Wave Returns | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) G10 | (2) G15 | (3) G20 | (4) G25 | (5) G30 | (6) G35 | (7) G45 | (8) G50 | (9) G55 | (10) G60 |
| Total ESG Score | 0.030 | -0.067 | -0.031 | -0.016 | -0.050 | -0.068 | -0.033 | -0.026 | 0.079 | 0.027 |
| | (0.048) | (0.065) | (0.026) | (0.039) | (0.059) | (0.045) | (0.062) | (0.063) | (0.085) | (0.030) |
| Control Variables | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Factor loadings | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry FE | No | No | No | No | No | No | No | No | No | No |
| Country FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 39 | 91 | 233 | 136 | 69 | 81 | 65 | 71 | 47 | 74 |
| Adjusted $R^2$ | 0.64 | 0.26 | 0.24 | 0.24 | 0.29 | 0.14 | 0.14 | -0.03 | -0.07 | 0.52 |

Panel A and Panel B of Table 6 display the coefficient estimates of 2018 overall ESG Scores from Refinitiv (*Total ESG Score*) for industry-specific regression results on Covid-19 crisis returns. Industries are categorized according to the sectors of the GICS industry classification, excluding the financial sector. This results in the following sectors: Energy (G10), Materials (G15), Industrials (G20), Consumer Discretionary (G25), Consumer Staples (G30), Health Care (G35), Information Technology (G45), Communication Services (G50), Utilities (G55), Real Estate (G60). The dependent variable refers to market model-adjusted returns over the fever period (February 24-March 18, 2020) in Panel A and market model-adjusted returns over the second crisis period (October 12-30, 2020) in Panel B. All regressions correspond to the baseline regression model (2). All regressions include control variables on a firm's financial health and additional firm characteristics. Furthermore, they include factor loadings of the Carhart four-factor model and country fixed effects. All variables are defined in Appendix A. Robust standard errors are listed in parenthesis below the coefficient estimates. Statistical significance at the 1%, 5%, and 10% levels is displayed by ***, **, and *, respectively.
Source: own research

### *4.5.2 Insignificant associations with one exception*

In this final regression analysis, I examine whether the association between CSR and crisis returns in some of the GICS industries is fundamentally different from regression results in the previous chapters. Indeed, the ESG slope coefficient of the Consumer Staples industry is the only positive and significant coefficient estimate of all regressions regarding abnormal fever returns throughout this thesis. A firm in this sector with one standard deviation better ESG scores experiences, on average, 9.7 ($0.548 * 18$) percentage points higher abnormal returns during the first shock. This is economically important. Thus, a high CSR level pays off for firms in the Consumer Staples industry during the fever period. However, the sector's ESG association is statistically insignificant and negative during the second crisis period to put this in perspective. Moreover, the ESG coefficient is statistically insignificant in the fever period for the

same industry in the U.S. (Bae et al. (2021)). Thus, before drawing a generalized conclusion for firms in the Consumer Staples industry, further research is needed.

In their study, Bae et al. (2021) do similar industry-level regressions for a U.S. sample in the fever period. They report a positive statistically significant coefficient estimate for the Health Care industry and a negative statistically significant coefficient estimate for Chemicals and Allied Products, which is part of the Materials sector according to the GICS industry classification. In contrast, the present study finds that Health Care firms are negatively and insignificantly associated and firms in the Materials industry are positively but insignificantly associated with abnormal fever returns. Therefore, the industry-specific relationships between CSR and stock returns of Western European firms may deviate from those of U.S. companies.

Overall, the results show substantial differences in the magnitude of the estimated CSR coefficients across industries. Yet, in nine of ten sectors, the coefficient is not significantly different from zero for both crises, consistent with the results from previous regressions. Consequently, there is no evidence that particular industries considerably modify the overall outcomes, supporting hypothesis 4.

The variation in the model fit and especially the negative adjusted R-squared for two industry-specific second shock regressions indicate that the model performance fundamentally differs across the sector subsamples. Furthermore, analogous to country-specific regression results, Table 13 in the Appendix reveals that explanatory variables having a significant effect on crisis returns vary by industry. The next chapter provides additional thoughts on the differing coefficient estimates by discussing the limitations of this thesis and proposing further research steps.

## 4.6 Limitations and suggestions for future research

The previous chapters examine the relationship between CSR and firm value primarily during the first major and second minor crises caused by the global Covid-19 health disease. Although my research design of this thesis closely follows that of Lins, Servaes, and Tamayo (2017), this study has some limitations that I discuss in this chapter. In addition, the remainder of this chapter elaborates on further research suggestions that arise based on my thesis.

Reviewing the price history of the STOXX Europe TMI between the outbreak of the Covid-19 pandemic at the end of 2019 and the beginning of 2021, two price collapses are discernible. The first stock market crash around February and March 2020, is relatively sizeable and has been the subject of multiple studies. In contrast, the second price drop is considerably less severe and largely unexplored. To my best knowledge, this thesis is the first study to define and analyze this second decline in stock markets. In most of the regressions on the two crisis periods, I find substantial discrepancies between the two economic downturns in terms of magnitude, sign, and significance of the regressors' coefficient estimates, as well as the model fit according to the adjusted R-squared. Even though the CSR slope coefficients do not significantly differ between the two shocks, the difference of the other variables raise questions about the comparability of the two crisis phases. Specifically, it is questionable whether the mechanism and factors driving crisis resilient stock performance are comparable between the two shocks and, more importantly, between the second shock and earlier crises. The factors that significantly affect stock returns during the fever period are comparable to those in studies of earlier stock market crashes. In contrast, *Cash Holdings* is significantly negatively associated with second wave returns, and *negative BM* is significantly positively associated. This is inconsistent with either the theoretical rationale or the results of previous studies of crisis-related returns. Consequently, it is dubious whether the outcome of the second crisis can be extrapolated to other (future) crisis periods. Furthermore, the pandemic and the economy were in a different stage at the onset of the second price drop. On the one hand, Europe already had the experience of the first infection wave. On the other hand, companies received financial support from the enormous fiscal stimulus packages.

In addition, the first crisis period represents an unexpected event where firms were likely incapable of responding to the shock promptly, forcing investors to rely on preexisting firm characteristics. In contrast, firms had enough time to adjust their business operations and possibly their CSR strategy to the Covid-19 health disease before the second stock market decline. As a result, firms were better prepared before the second shock, and investors were likely to have access to more recent information[33], for which I do not control in this thesis. Therefore, the second stock market drop requires further research. Analyses that incorporate more recent quarterly accounting

[33] For instance, investors were likely to have information on a firm's financial health from quarterly reports or on a firm's possible change in CSR orientation at that point in time.

data, rather than year-end 2019 data, could provide a better performing model and ultimately more reliable insights into what drives better CFP during the second crisis. However, the results around the second wave of this thesis provide a valuable impression of the aspects affecting shareholder wealth that future researchers can build upon. Furthermore, future research should generally analyze the impact of the Covid-19 pandemic on the stock prices after Q2 2020 more extensively.

Chapters 4.4 and 4.5 provide regression results on individual countries and industries. The analysis suggests that CSR of Italian firms is positively associated with abnormal returns in the second shock and that ESG is positively associated with abnormal fever returns for firms in the Consumer Staples industry. However, an extrapolation of these regression results should be done with caution. As the overall sample is limited to the firms included in the STOXX Europe TMI, the subsamples only comprise a minor part of the effective listed firms in a country or belonging to a specific sector. Future research that aims to achieve more reliable country- or industry-specific evidence should concentrate on a more comprehensive analysis of country- or industry-level data. Additionally, it should possibly use models tailored to a country or industry. Generally, such research is needed to gain an increased understanding of the CSR-CFP relationship in developed European markets.

Another concern arises from Refinitiv's adjustments in the scoring methodology in April 2020, leading to a rewriting of historical ESG scores (Berg, Fabisik, and Sautner (2020)). This implies that the initial 2018 Refinitiv ESG scores slightly deviate from the rewritten 2018 ratings. Thus, investors probably had somewhat different ESG data available on the onset of the fever period. Berg, Fabisik, and Sautner (2020) point out and analyze the change in Refinitiv's rating methodology. However, they only include 2011-2017 scores and do not report the discrepancies between European firms' initial and rewritten ESG ratings. Since I assume that firms with high (low) initial ESG ratings continued to have high (low) rewritten ESG ratings, I do not expect that the adjustments to the scoring methodology significantly affect my results. Furthermore, Demers et al. (2020) report comparable ESG coefficient estimates between regressions including the initial Refinitiv ratings and those using the rewritten scores. The fact that CSR remains unrelated to CFP in regressions regarding second crisis returns[34] as well

[34] At this point, ESG scores have already been updated with the new scoring methodology. Hence, it is likely that investors relied primarily on rewritten ESG data from Refinitiv.

as in regressions using Sustainalytics ratings or ESG quintiles lends additional validity to my findings. However, due to restricted access to the Refinitiv ESG scores computed under the initial methodology, it cannot be verified whether the initial scores would yield a different outcome.

As discussed in section 3.3.6, the OLS regressions outcomes rarely reflect causal relationships between the dependent and independent variables. Therefore, I view the results in this thesis as non-causal associations that are valid for the defined periods but may not hold for comparable periods. Biased estimators due to reversed causality and omitted variables is another limitation to the OLS regression technique. Reversed causality should not be a concern in this thesis. In contrast, the real world is often not fully captured by a theoretical model, implying that the model is likely to suffer from some omitted variable bias. For example, to better isolate the effect of ESG, Bae et al. (2021) include additional firm characteristics in an expanded model. These controls include CEO managerial ability score, a dummy for corporate culture, or a dummy for short- and long-term institutional ownership. Their results show that abnormal fever returns are not statistically significantly associated with the additional control variables apart from short-term institutional ownership. However, it might be insightful to include additional return-affecting variables in future European specifications.

The extensive literature on the relationship between CSR and CFP presents several alternative measures to the variables employed in this study. Therefore, scholars conducting further examination could focus on ROA, Tobin's Q, or other proxies for CFP. Furthermore, such studies could use alternative CSR measures (e.g. ESG ratings from other rating providers or corporate philanthropy).

Overall, the insights of this study give room for future research on various aspects of the ESG-CFP relationship. The next part briefly recapitulates these findings and draws the conclusion.

# 5. No crisis resilience through CSR

Whether engaging in ESG activities is value-enhancing is the subject of a controversial debate in academia. The attention to and demand for CSR has increased among stakeholders, governments, and investors during the Covid-19 pandemic. Combined with the exogenous and unexpected nature of the Covid-19 induced stock market crash, this has given new impulse to this debate. So far, studies analyzing the impact of ESG scores on stock returns during the pandemic provide inconsistent conclusions. Furthermore, results for European firms are scarce. Thus, this study examines the effect of corporate ESG engagement on firm value during the Covid-19 pandemic for a cross-sectional Western European dataset. In a research design that closely follows that of Lins, Servaes, and Tamayo (2017), this thesis shows that CSR is generally unrelated to the stock performance of firms listed in the STOXX Europe TMI. This rejects the study's overarching hypothesis, stating that ESG scores and crisis stock returns are positively associated.

Specifically, 2018 overall ESG scores are not statistically significantly associated with stock performance over two defined crisis and recovery periods during the Covid-19 health disease. This outcome is generally robust when using 2019 Refinitiv ESG ratings, dummies for 2018 ESG rating quintiles, and Sustainalytics ESG scores to capture CSR. In regressions where I examine the effect of E, S, and G pillar scores and Workforce, Product Responsibility, and Innovation category scores on returns in the crisis periods, the ESG coefficient estimates remain statistically insignificant.

I also assess the influence of ESG on crisis returns on a country and industry level. In country-specific analyses, I find that risk-adjusted stock returns of Italian (French) firms are positively (negatively) associated with overall ESG scores during the second stock market decline. However, CSR has no impact on crisis returns in all other country-level regressions. In addition, the literature suggests that the level of a country's sustainability performance negatively affects the link between ESG and CFP. I do not observe such a pattern in my results. On an industry level, ESG scores illustrate a positive association with firm value for companies within the Consumer Staples industry during the first Covid-19-related market crash. A firm with one standard deviation better ESG scores experiences, on average, 9.7 percentage points higher abnormal returns during the first crisis period in this sector. In all other industry-specific regressions, ESG is unrelated to CFP.

Overall, it appears that the increased awareness and demand for CSR does not translate into more crisis-resilient stock returns for European firms with high ESG levels. Moreover, it seems that the potentially wider investor base of investors with a long-term investment horizon of socially responsible firms do not protect against downside risks. Concerning the debate on the relationship between ESG activities and firm value, the findings are neither consistent with the value-enhancing theory nor the opposed value-destroying theory. Furthermore, the outcome is not in line with Albuquerque et al. (2020) and Ding et al. (2021), who find a positive association between CSR and returns during the stock market shock at the onset of the pandemic for a U.S. and a global sample, respectively. Regional differences between the examined firms provide one possible explanation for this inconsistency. However, I doubt that this is the primary reason since my results align with those of Bae et al. (2021). They report that ESG and firm value in the U.S. are unrelated throughout the same period. Therefore, this thesis supports the conclusion of Bae et al. (2021) that scholars and practitioners "need to be cautious about drawing unambiguous or unconditional inferences about the value of CSR during a crisis" (p.14).

Finally, my results are not dependent on particular countries or industries. Rather, the country- and industry-specific findings offer some interesting insights that may form the basis for future more extensive country- or industry-level studies of the relationship between ESG and CFP in Europe. Besides, the general impact of the Covid-19 pandemic on the stock market should be further explored, as the results of multiple explanatory variables for the second crisis period differ considerably from those of earlier crises.

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# Appendix

## Appendix A: List of variables

| Variable | Definition |
|---|---|
| Raw fever returns | Raw returns over the fever period, calculated as the relative price difference between February 24 and March 18, 2020 |
| Abnormal fever returns | Abnormal returns over the fever period, calculated as the cumulative market model-adjusted daily returns over February 24-March 18, 2020. I estimate the market model using 60 months of returns over 2015-2019 and the STOXX Europe TMI as the market return. |
| Raw recovery 1 returns | Raw returns over the first recovery period, calculated as the relative price difference between March 23 and June 5, 2020 |
| Abnormal recovery 1 returns | Abnormal returns over the fever period, calculated as the cumulative market model-adjusted daily returns over March 23-June 5, 2020. I estimate the market model using 60 months of returns over 2015-2019 and the STOXX Europe TMI as the market return. |
| Raw 2nd wave returns | Raw returns over the second wave period calculated, as the relative price difference between October 12 and October 30, 2020 |
| Abnormal 2nd wave returns | Abnormal returns over the second wave period calculated as the cumulative market model-adjusted daily returns over October 12-30, 2020. I estimate the market model using 60 months of returns over Q3 2015- Q3 2020 and the STOXX Europe TMI as the market return. |
| Raw recovery 2 returns | Raw returns over the second recovery period calculated as the relative price difference between October 31 and November 30, 2020 |
| Abnormal recovery 2 returns | Abnormal returns over the second recovery period calculated as the cumulative market model-adjusted daily returns over October 31-November 30, 2020. I estimate the market model using 60 months of returns over Q3 2015- Q3 2020 and the STOXX Europe TMI as the market return. |
| Raw Q1 returns | Raw returns over the first quarter of 2020 calculated as the relative price difference between January 1 and March 31, 2020 |
| Abnormal Q1 returns | Abnormal returns over the fever period calculated as the cumulative market model-adjusted daily returns over January 1-March 31, 2020. I estimate the market model using 60 months of returns over 2015-2019 and the STOXX Europe TMI as the market return. |
| Raw Q2 returns | Raw returns over the second quarter of 2020 calculated as the relative price difference between April 1 and June 30, 2020 |
| Abnormal Q2 returns | Abnormal returns over the fever period calculated as the cumulative market model-adjusted daily returns over April 1-June 30, 2020. I estimate the market model using 60 months of returns over 2015-2019 and the STOXX Europe TMI as the market return. |
| Total ESG Score | A firm's 2018 overall ESG rating from Refinitv |
| 2019 ESG Score | A firm's 2019 overall ESG rating from Refinitv |
| Quintile 1-5 | Dummy variable for 2018 Refinitiv overall ESG scores that are divided into quintiles. Quintile 5 represents the dummy of firms with the highest ESG scores and Quintile 1 that of firms with the lowest ESG scores. |
| SA Score | A firm's overall ESG rating from Sustainalytics as of December 31,2019 |
| E Score | A firm's 2018 environmental rating from Refinitv |
| S Score | A firm's 2018 social rating from Refinitv |

| | |
|---|---|
| G Score | A firm's 2018 governance rating from Refinitv |
| ES Score | The equal-weighted average of a firm's 2018 E and S ratings from Refinitiv |
| Workforce | A firm's 2018 Workforce category rating from Refinitv |
| Product Responsibility | A firm's 2018 Product Responsibility category rating from Refinitv |
| Innovation | A firm's 2018 Innovation category rating from Refinitv |
| Category Average | The equal-weighted average of a firm's 2018 Workforce, Product Responsibility, and Innovation category ratings from Refinitiv |
| Size | The logarithm of a firm's market capitalization on December 31, 2020, for regressions related to returns in the first half of 2020 and on September 30, 2020, for regressions related to returns in the first half of 2020. The market capitalization is the number of shares multiplied by the stock price on those dates. |
| Cash Holdings | Cash and short-term investments divided by total assets as of December 31, 2019 |
| Long-term Debt | Long-term debt divided by total assets as of December 31, 2019 |
| Short-term Debt | Short-term debt and the current portion of long-term debt divided by total assets as of December 31, 2019 |
| Profitability | Return on assets, calculated as operating income divided by total assets as of December 31, 2019 |
| Book-to-Market | Book value per share divided by the stock price per share as of December 31, 2019. For regressions related to returns in the second half of 2020 the price per share is as of September 30, 2020. |
| Negative BM | A dummy variable for negative *Book-to-Market* values |
| Momentum | A stock's raw return over 2019. For regressions related to returns in the second half of 2020, it is a stock's raw return between October 1, 2019, and September 30, 2020. |
| Idiosyncratic Risk | The volatility of the market model's residual ($\epsilon_i$), using monthly data over a five-year period of 2015-2019. For regressions related to returns in the second half of 2020, the five-year period corresponds to Q3 2015-Q3 2020. |
| Factor loadings | Factor loadings of the Carhart four-factor model regressing monthly excess stock returns on the STOXX Europe TMI excess returns and the SMB, HML, and MOM factor returns over a five-year period of 2015-2019. For regressions related to returns in the second half of 2020, the five-year period corresponds to Q3 2015-Q3 2020. |
| Industry FE | Industry dummies according to the sectors of the GICS industry classification, excluding financial firms |
| Country FE | Country dummies for countries included in the STOXX Europe TMI |
| HDI | A country's social performance according to its scale in the Human Development Index (HDI) |
| EPI | A country's environmental performance according to its scale in the Environmental Perfor-mance Index (EPI) |
| Sust. Performance | A country's sustainability performance, calculated by the mean of the HDI and EPI scale (the EPI scale is first divided by 100) |
| Cash Holdings^2 | $(1 + Cash\ Holdings)^2 - 1$ |
| Long-term Debt^2 | $(1 + Long - term\ Debt)^2 - 1$ |
| Momentum^2 | $(1 + Momentum)^2 - 1$ |

## Appendix B: Additional Tables

**Table 7 – Descriptive Statistics of variables regarding second half 2020**

| | N | Mean | St. Dev. | Min | Median | Max |
|---|---|---|---|---|---|---|
| Book-to-Market | 906 | 0.573 | 0.763 | -0.001 | 0.345 | 4.191 |
| Momentum | 906 | -0.028 | 0.375 | -0.787 | -0.052 | 1.038 |
| Idiosyncratic Risk | 906 | 0.006 | 0.006 | 0.001 | 0.005 | 0.035 |
| Beta | 906 | 1.066 | 0.548 | -0.396 | 1.028 | 3.756 |

The table provides additional descriptive statistics on firm characteristics variables whose calculation derive (partly) from market data. For the periods in the second half of 2020, i.e., the second wave crisis and recovery period, the underlying market data are measured at the end of Q3 2020.
Source: own research

**Table 8 –Regression results corrected for misspecification**

| Dependent Variable: | Recovery 2 Raw | Recovery 2 Abn. |
|---|---|---|
| | (1) | (2) |
| Total ESG Score | 0.041* | 0.040** |
| | (0.024) | (0.020) |
| Size | 0.002 | 0.002 |
| | (0.004) | (0.003) |
| Cash Holdings | 1.525*** | 1.403*** |
| | (0.453) | (0.395) |
| Long-Term Debt | -0.751* | -0.736** |
| | (0.404) | (0.332) |
| Short-Term Debt | -0.010 | -0.013 |
| | (0.066) | (0.058) |
| Profitability | -0.155*** | -0.158*** |
| | (0.058) | (0.050) |
| Book-to-Market | 0.004 | -0.001 |
| | (0.008) | (0.007) |
| Negative BM | 0.002 | -0.004 |
| | (0.033) | (0.026) |
| Momentum | -0.632*** | -0.560*** |
| | (0.061) | (0.050) |
| Idiosyncratic Risk | -0.019 | 0.360 |
| | (1.263) | (1.066) |
| Cash Holdings^2 | -0.587*** | -0.540*** |
| | (0.183) | (0.160) |
| Long-Term Debt^2 | 0.305* | 0.296** |
| | (0.159) | (0.130) |
| Momentum^2 | 0.211*** | 0.187*** |
| | (0.024) | (0.020) |
| Factor loadings | Yes | Yes |
| Industry FE | Yes | Yes |
| Country FE | Yes | Yes |
| N | 906 | 906 |
| Adjusted $R^2$ | 0.61 | 0.46 |

This table displays the regression results, corrected for misspecification, for the association between 2018 overall ESG Scores from Refinitiv (*Total ESG Score*) and second recovery returns. The dependent variables for both regressions refer to second recovery returns (October 31-November 30, 2020). Stock returns in column (1) are raw returns and market model-adjusted returns in column (2). Besides the control variables included in the baseline regression model (2), the two specifications include the polynomial of *Cash Holdings*, *Long-term Debt*, and *Momentum*. All variables are defined in Appendix A. Robust standard errors are listed in parenthesis below the coefficient estimates. Statistical significance at the 1%, 5%, and 10% levels is displayed by ***, **, and *, respectively.
Source: own research

**Table 9 – Robustness test regressions with alternative overall ESG scores**
**Panel A:** Robustness regression results for overall Sustainalytics ESG scores

| Dependent Variable: | Fever Raw | Fever Abn. | Recovery 1 Raw | Recovery 1 Abn. | 2nd Wave Raw | 2nd Wave Abn. | Recovery 2 Raw | Recovery 2 Abn. |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| SA Score | 0.017 | 0.030 | -0.089** | -0.080** | 0.018 | 0.020 | 0.003 | 0.005 |
| | (0.027) | (0.041) | (0.043) | (0.035) | (0.013) | (0.014) | (0.021) | (0.017) |
| Size | 0.001 | 0.002 | 0.007 | 0.007 | -0.002 | -0.002 | 0.005 | 0.005 |
| | (0.006) | (0.009) | (0.009) | (0.007) | (0.003) | (0.003) | (0.005) | (0.004) |
| Cash Holdings | 0.128 | 0.204 | -0.076 | -0.080 | -0.031 | -0.022 | 0.131** | 0.119** |
| | (0.078) | (0.127) | (0.135) | (0.107) | (0.034) | (0.036) | (0.056) | (0.049) |
| Long-Term Debt | -0.164*** | -0.234*** | 0.111 | 0.076 | -0.009 | -0.009 | -0.025 | -0.035 |
| | (0.050) | (0.080) | (0.083) | (0.062) | (0.021) | (0.024) | (0.037) | (0.031) |
| Short-Term Debt | 0.294** | 0.415** | -0.312 | -0.252 | 0.030 | 0.046 | 0.090 | 0.036 |
| | (0.121) | (0.199) | (0.204) | (0.159) | (0.061) | (0.071) | (0.094) | (0.080) |
| Profitability | 0.183* | 0.319** | 0.194 | 0.075 | -0.026 | -0.012 | -0.022 | -0.053 |
| | (0.099) | (0.159) | (0.140) | (0.118) | (0.047) | (0.051) | (0.083) | (0.072) |
| Book-to-Market | 0.015 | 0.025 | -0.028 | -0.019 | -0.003 | 0.001 | 0.027*** | 0.016** |
| | (0.019) | (0.029) | (0.033) | (0.026) | (0.006) | (0.006) | (0.009) | (0.007) |
| Negative BM | -0.067* | -0.126* | -0.062 | 0.023 | 0.052** | 0.064*** | 0.045 | 0.041 |
| | (0.040) | (0.068) | (0.054) | (0.045) | (0.020) | (0.024) | (0.046) | (0.038) |
| Momentum | 0.031 | 0.051 | -0.006 | -0.031 | 0.029** | 0.026* | -0.175*** | -0.141*** |
| | (0.026) | (0.039) | (0.045) | (0.035) | (0.013) | (0.014) | (0.027) | (0.022) |
| Idiosyncratic Risk | -3.499** | -4.900** | 4.356 | 2.818 | -0.044 | -0.359 | 4.811*** | 4.214*** |
| | (1.550) | (2.468) | (3.241) | (2.403) | (0.875) | (1.004) | (1.693) | (1.327) |
| Factor loadings | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 458 | 458 | 458 | 458 | 456 | 456 | 456 | 456 |
| Adjusted $R^2$ | 0.40 | 0.42 | 0.33 | 0.37 | 0.08 | 0.25 | 0.64 | 0.45 |

For table description, see below Panel C of Table B.3.

**Panel B:** Robustness regression results for overall 2019 ESG scores

| Dependent Variable: | Fever Raw | Fever Abn. | Recovery 1 Raw | Recovery 1 Abn. | 2nd Wave Raw | 2nd Wave Abn. | Recovery 2 Raw | Recovery 2 Abn. |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| 2019 ESG Score | -0.017 | -0.037 | -0.068 | -0.042 | -0.025* | -0.026* | 0.017 | 0.019 |
| | (0.029) | (0.046) | (0.051) | (0.041) | (0.014) | (0.015) | (0.028) | (0.024) |
| Size | 0.005 | 0.012 | -0.001 | 0.001 | 0.001 | 0.001 | 0.0005 | 0.001 |
| | (0.005) | (0.008) | (0.007) | (0.006) | (0.002) | (0.002) | (0.004) | (0.004) |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Cash Holdings | 0.058 | 0.084 | 0.018 | -0.006 | -0.049** | -0.050** | 0.101** | 0.088** |
| | (0.049) | (0.080) | (0.074) | (0.060) | (0.023) | (0.026) | (0.041) | (0.036) |
| Long-Term Debt | -0.174*** | -0.263*** | 0.195*** | 0.157*** | -0.025* | -0.025 | 0.040 | 0.033 |
| | (0.032) | (0.053) | (0.054) | (0.043) | (0.014) | (0.016) | (0.030) | (0.026) |
| Short-Term Debt | -0.057 | -0.140 | -0.126 | -0.063 | 0.022 | 0.033 | 0.008 | 0.005 |
| | (0.093) | (0.158) | (0.144) | (0.117) | (0.042) | (0.045) | (0.069) | (0.061) |
| Profitability | 0.252*** | 0.457*** | 0.137 | 0.021 | 0.020 | 0.032 | -0.167*** | -0.164*** |
| | (0.067) | (0.116) | (0.103) | (0.080) | (0.035) | (0.038) | (0.063) | (0.055) |
| Book-to-Market | 0.007 | 0.017 | -0.016 | -0.005 | -0.005 | -0.003 | 0.014 | 0.007 |
| | (0.013) | (0.022) | (0.023) | (0.018) | (0.005) | (0.005) | (0.009) | (0.008) |
| Negative BM | -0.024 | -0.055 | -0.116*** | -0.038 | 0.050** | 0.056** | 0.051 | 0.038 |
| | (0.052) | (0.084) | (0.040) | (0.037) | (0.021) | (0.024) | (0.044) | (0.038) |
| Momentum | -0.005 | -0.006 | 0.042 | 0.016 | 0.025*** | 0.022** | -0.143*** | -0.126*** |
| | (0.018) | (0.028) | (0.029) | (0.023) | (0.009) | (0.010) | (0.018) | (0.016) |
| Idiosyncratic Risk | -0.663 | -0.257 | 4.627** | 3.510** | 0.236 | 0.415 | 1.774 | 2.186** |
| | (1.049) | (1.712) | (1.818) | (1.551) | (0.625) | (0.636) | (1.261) | (1.105) |
| Factor loadings | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 935 | 935 | 935 | 935 | 940 | 940 | 940 | 940 |
| Adjusted $R^2$ | 0.31 | 0.43 | 0.29 | 0.36 | 0.12 | 0.26 | 0.54 | 0.36 |

For table description, see below Panel C of Table B.3.

**Panel C**: Robustness regression results for ESG Quintiles

| Dependent Variable: | Fever Raw | Fever Abn. | Recovery 1 Raw | Recovery 1 Abn. | 2nd Wave Raw | 2nd Wave Abn. | Recovery 2 Raw | Recovery 2 Abn. |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Quintile 2 | 0.011 | 0.018 | -0.025 | -0.019 | -0.007 | -0.008 | 0.007 | 0.003 |
| | (0.014) | (0.022) | (0.023) | (0.018) | (0.007) | (0.007) | (0.013) | (0.011) |
| Quintile 3 | -0.013 | -0.028 | -0.020 | -0.013 | 0.001 | 0.001 | -0.002 | -0.004 |
| | (0.014) | (0.023) | (0.024) | (0.019) | (0.007) | (0.007) | (0.013) | (0.011) |
| Quintile 4 | 0.0004 | -0.003 | -0.026 | -0.019 | -0.009 | -0.008 | 0.012 | 0.011 |
| | (0.015) | (0.024) | (0.024) | (0.019) | (0.007) | (0.007) | (0.012) | (0.011) |
| Quintile 5 | -0.010 | -0.010 | -0.015 | -0.012 | -0.012 | -0.012 | 0.020 | 0.019 |
| | (0.016) | (0.025) | (0.026) | (0.020) | (0.007) | (0.008) | (0.014) | (0.012) |
| Size | 0.005 | 0.011 | -0.002 | 0.0001 | -0.0004 | -0.0002 | 0.001 | 0.001 |
| | (0.005) | (0.008) | (0.007) | (0.006) | (0.002) | (0.002) | (0.004) | (0.003) |
| Cash Holdings | 0.051 | 0.089 | 0.041 | 0.019 | -0.052** | -0.054** | 0.117*** | 0.106*** |
| | (0.053) | (0.087) | (0.080) | (0.064) | (0.024) | (0.026) | (0.042) | (0.037) |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Long-Term Debt | -0.185*** | -0.281*** | 0.208*** | 0.163*** | -0.026* | -0.027* | 0.044 | 0.035 |
| | (0.032) | (0.053) | (0.055) | (0.043) | (0.015) | (0.016) | (0.031) | (0.026) |
| Short-Term Debt | -0.016 | -0.072 | -0.140 | -0.080 | 0.019 | 0.031 | 0.004 | -0.002 |
| | (0.097) | (0.164) | (0.147) | (0.120) | (0.043) | (0.046) | (0.067) | (0.059) |
| Profitability | 0.231*** | 0.436*** | 0.198* | 0.067 | 0.011 | 0.021 | -0.154** | -0.156*** |
| | (0.069) | (0.120) | (0.105) | (0.081) | (0.036) | (0.038) | (0.063) | (0.055) |
| Book-to-Market | 0.003 | 0.010 | -0.009 | -0.001 | -0.007 | -0.006 | 0.011 | 0.005 |
| | (0.013) | (0.021) | (0.023) | (0.018) | (0.005) | (0.005) | (0.009) | (0.007) |
| Negative BM | -0.026 | -0.058 | -0.114*** | -0.036 | 0.052** | 0.058** | 0.047 | 0.037 |
| | (0.053) | (0.085) | (0.039) | (0.037) | (0.020) | (0.023) | (0.043) | (0.037) |
| Momentum | -0.007 | -0.014 | 0.034 | 0.010 | 0.024*** | 0.021** | -0.150*** | -0.133*** |
| | (0.018) | (0.029) | (0.030) | (0.024) | (0.009) | (0.010) | (0.018) | (0.016) |
| Idiosyncratic Risk | -0.509 | -0.012 | 4.667** | 3.826** | 0.191 | 0.470 | 1.799 | 1.983* |
| | (1.094) | (1.763) | (1.909) | (1.613) | (0.645) | (0.631) | (1.302) | (1.118) |
| Factor loadings | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 909 | 909 | 909 | 909 | 906 | 906 | 906 | 906 |
| Adjusted $R^2$ | 0.32 | 0.42 | 0.29 | 0.35 | 0.14 | 0.28 | 0.55 | 0.38 |

Panel A-C of Table B.3 displays regression results for robustness checks. The main independent variable is replaced with overall Sustainalytics ESG scores at 31.12.2019 in Panel A, with 2019 Refinitiv overall ESG scores in Panel B, and with 2018 Refinitiv overall ESG scores quintile dummies in Panel C. Quintile 5 represents the quintile with the highest ESG scores. All quintile dummies are referenced to Quintile 1. The dependent variables in columns (1)-(2) refers to returns over the fever period (February 24-March 18, 2020), returns over the first recovery period (March 23-June 5, 2020) in columns (3)-(4), returns during the second crisis period (October 12-30, 2020) in columns (5)-(6), and second recovery returns (October 31-November 30, 2020) in columns (7)-(8). Stock returns in odd-numbered columns are raw returns and market model-adjusted returns in even-numbered columns. All regressions correspond to the baseline regression model (2) that includes variables on a firm's financial health and additional firm characteristics. All regressions include factor loadings of the Carhart four-factor model, industry fixed effects (GICS sector), and country fixed effects. All variables are defined in Appendix B. Robust standard errors are listed in parenthesis below the coefficient estimates. Statistical significance at the 1%, 5%, and 10% levels is displayed by ***, **, and *, respectively.
Source: own research

**Table 10 – Country-specific descriptive statistics**

| | Abn. Fever Returns | | | | Abn. 2nd Wave Returns | | | | ESG Scores | | Sustainability Performance | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Country | N | Mean | Median | SD | N | Mean | Median | SD. | Mean | SD | HDI | EPI | Sust. |
| AT | 19 | -0.092 | -0.137 | 0.226 | 19 | -0.001 | -0.014 | 0.074 | 57.4 | 12.4 | 0.92 | 80 | 0.859 |
| BE | 34 | -0.063 | -0.110 | 0.249 | 34 | -0.045 | -0.038 | 0.072 | 54.0 | 17.7 | 0.93 | 73 | 0.832 |
| CH | 63 | -0.031 | -0.010 | 0.183 | 65 | -0.018 | -0.014 | 0.057 | 52.7 | 21.6 | 0.96 | 82 | 0.885 |
| DE | 112 | -0.026 | -0.004 | 0.227 | 111 | 0.002 | -0.005 | 0.063 | 55.7 | 22.2 | 0.95 | 77 | 0.860 |
| DK | 31 | -0.012 | -0.059 | 0.237 | 31 | -0.014 | -0.021 | 0.058 | 56.4 | 14.9 | 0.94 | 83 | 0.883 |
| ES | 45 | -0.050 | -0.085 | 0.240 | 44 | 0.006 | -0.011 | 0.075 | 63.7 | 19.8 | 0.90 | 74 | 0.824 |
| FI | 31 | 0.047 | 0.054 | 0.215 | 31 | 0.034 | 0.011 | 0.085 | 64.0 | 15.7 | 0.94 | 79 | 0.864 |
| FR | 97 | -0.051 | -0.039 | 0.255 | 96 | 0.008 | 0.002 | 0.068 | 67.6 | 16.3 | 0.90 | 80 | 0.851 |
| UK | 199 | -0.195 | -0.128 | 0.311 | 198 | 0.029 | 0.015 | 0.080 | 56.5 | 18.1 | 0.93 | 81 | 0.873 |
| IE | 13 | -0.211 | -0.242 | 0.220 | 13 | 0.022 | 0.005 | 0.062 | 53.2 | 21.1 | 0.96 | 73 | 0.842 |
| IT | 54 | 0.048 | 0.019 | 0.204 | 55 | -0.009 | -0.007 | 0.072 | 59.9 | 17.0 | 0.89 | 71 | 0.801 |
| LU | 3 | -0.203 | -0.176 | 0.227 | 3 | 0.089 | 0.077 | 0.065 | 52.0 | 11.0 | 0.92 | 82 | 0.870 |
| NL | 33 | 0.002 | 0.055 | 0.245 | 32 | 0.019 | 0.012 | 0.058 | 59.1 | 17.6 | 0.94 | 75 | 0.849 |
| NO | 38 | -0.231 | -0.289 | 0.263 | 37 | 0.020 | 0.006 | 0.100 | 50.0 | 20.0 | 0.96 | 78 | 0.867 |
| PL | 23 | -0.043 | -0.023 | 0.201 | 23 | -0.057 | -0.096 | 0.088 | 44.6 | 15.7 | 0.88 | 61 | 0.745 |
| PT | 12 | 0.074 | 0.046 | 0.191 | 12 | -0.004 | 0.008 | 0.062 | 61.3 | 16.5 | 0.86 | 67 | 0.767 |
| SE | 102 | -0.065 | -0.079 | 0.278 | 102 | -0.016 | -0.016 | 0.073 | 54.0 | 18.1 | 0.95 | 79 | 0.866 |

This table displays the country-specific number of observations, mean, median, and standard deviation for market model-adjusted returns during the fever period and the second crisis period. Furthermore, it shows the country-level mean and standard deviation for 2018 Refinitiv ESG scores. Lastly, it presents the country-specific social performance according to the Human Development Index (HDI), environmental performance according to the Environmental Performance Index (EPI) and the overall sustainability performance according to the average of the two former performance scales. All variables are defined in Appendix A.
Source: own research

**Table 11 – Country-specific regression results**

| Dependent Variable: | Abnormal Fever Returns | | | | | | Abnormal 2nd Wave Returns | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) DE | (2) UK | (3) IT | (4) SE | (5) CH | (6) FR | (7) DE | (8) GB | (9) IT | (10) SE | (11) CH | (12) FR |
| Total ESG Score | -0.091 | 0.029 | 0.027 | 0.051 | 0.170 | 0.031 | -0.003 | -0.048 | 0.090** | -0.038 | -0.077 | -0.113** |
| | (0.103) | (0.115) | (0.180) | (0.115) | (0.192) | (0.142) | (0.032) | (0.029) | (0.042) | (0.042) | (0.047) | (0.054) |
| Size | 0.037** | 0.018 | 0.025 | 0.015 | -0.007 | 0.029 | 0.002 | -0.008 | -0.009 | 0.003 | 0.017** | 0.020*** |
| | (0.019) | (0.019) | (0.028) | (0.016) | (0.026) | (0.023) | (0.006) | (0.005) | (0.011) | (0.008) | (0.007) | (0.006) |
| Cash Holdings | -0.247 | 0.287 | 0.723* | -0.219 | 0.314 | 0.534** | -0.048 | -0.061 | 0.010 | 0.019 | 0.138* | 0.076 |
| | (0.197) | (0.312) | (0.389) | (0.243) | (0.248) | (0.215) | (0.053) | (0.056) | (0.100) | (0.095) | (0.071) | (0.056) |
| Long-Term Debt | -0.367*** | -0.236** | -0.391* | -0.394** | -0.252 | 0.085 | -0.029 | 0.034 | -0.032 | -0.123** | 0.069 | 0.066 |
| | (0.134) | (0.120) | (0.204) | (0.184) | (0.240) | (0.161) | (0.042) | (0.030) | (0.067) | (0.053) | (0.070) | (0.050) |
| Short-Term Debt | 0.325 | -1.516*** | 0.415 | 0.151 | 1.162* | 0.517* | 0.050 | 0.095 | 0.199 | -0.020 | -0.047 | -0.247 |
| | (0.397) | (0.536) | (0.502) | (0.266) | (0.618) | (0.284) | (0.121) | (0.110) | (0.131) | (0.107) | (0.158) | (0.165) |
| Profitability | -0.499 | 1.022*** | -0.057 | 0.395* | 0.454 | 0.515 | 0.025 | 0.060 | -0.327** | -0.180 | -0.083 | 0.511*** |
| | (0.310) | (0.252) | (0.597) | (0.226) | (0.343) | (0.429) | (0.092) | (0.070) | (0.151) | (0.132) | (0.083) | (0.110) |
| Book-to-Market | -0.045 | 0.087* | -0.064 | -0.019 | 0.126 | -0.067 | -0.0002 | -0.033** | -0.063*** | 0.004 | 0.0002 | 0.039*** |
| | (0.057) | (0.049) | (0.048) | (0.100) | (0.090) | (0.067) | (0.011) | (0.016) | (0.008) | (0.032) | (0.013) | (0.011) |
| Negative BM | -0.776*** | -0.050 | | 0.076 | | 0.014 | 0.135*** | 0.025 | | 0.130** | | 0.053** |
| | (0.121) | (0.147) | | (0.129) | | (0.072) | (0.037) | (0.050) | | (0.055) | | (0.026) |
| Momentum | -0.088 | -0.057 | -0.051 | -0.033 | 0.033 | 0.068 | 0.010 | 0.051** | 0.034 | 0.037 | 0.089** | 0.024 |
| | (0.072) | (0.066) | (0.075) | (0.062) | (0.140) | (0.112) | (0.027) | (0.025) | (0.033) | (0.024) | (0.036) | (0.028) |
| Idiosyncratic Risk | 8.344 | -1.153 | -9.242 | 4.855 | -15.787 | 2.022 | 3.619** | 0.120 | -5.456** | -2.651* | -9.370* | 1.790 |
| | (5.742) | (4.974) | (9.487) | (4.075) | (14.275) | (4.910) | (1.731) | (1.383) | (2.321) | (1.528) | (4.920) | (1.409) |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Factor loadings | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | No | No | No | No | No | No | No | No | No | No | No | No |
| N | 112 | 199 | 54 | 102 | 63 | 97 | 111 | 198 | 55 | 102 | 65 | 96 |
| Adjusted $R^2$ | 0.37 | 0.24 | 0.36 | 0.39 | 0.30 | 0.45 | 0.24 | 0.39 | 0.45 | 0.08 | 0.16 | 0.21 |

This table displays the full country-specific regression results. *Total ESG Score* corresponds to 2018 overall ESG Scores from Refinitiv. The regressions are run on countries with more than 50 observations, namely Germany, the UK, Italy, Sweden, Switzerland, and France. The dependent variable refers to market model-adjusted returns over the fever period (February 24-March 18, 2020) in columns (1)-(6) and market model-adjusted returns over the second crisis period (October 12-30, 2020) in columns (7)-(12). All regressions correspond to the baseline regression model (2) that includes variables on a firm's financial health and additional firm characteristics. All regressions include factor loadings of the Carhart four-factor model and industry fixed effects (GICS sector). All variables are defined in Appendix A. Robust standard errors are listed in parenthesis below the coefficient estimates. Statistical significance at the 1%, 5%, and 10% levels is displayed by ***, **, and *, respectively.
Source: own research

**Table 12 – Industry-specific descriptive statistics**

| | Abn. Fever Returns | | | | Abn. 2nd Wave Returns | | | | ESG Scores | |
|---|---|---|---|---|---|---|---|---|---|---|
| Industry | N | Mean | Median | SD | N | Mean | Median | SD. | Mean | SD |
| Communication Services | 72 | -0.068 | -0.055 | 0.214 | 71 | 0.009 | 0.004 | 0.075 | 53.5 | 20.0 |
| Consumer Discretionary | 137 | -0.177 | -0.165 | 0.339 | 136 | 0.034 | 0.028 | 0.081 | 56.8 | 18.7 |
| Consumer Staples | 70 | -0.003 | -0.022 | 0.205 | 69 | -0.043 | -0.041 | 0.057 | 59.8 | 18.0 |
| Energy | 40 | -0.242 | -0.248 | 0.303 | 39 | 0.021 | 0.008 | 0.102 | 63.4 | 18.2 |
| Health Care | 80 | 0.046 | 0.048 | 0.216 | 81 | -0.023 | -0.038 | 0.062 | 56.8 | 20.4 |
| Industrials | 232 | -0.075 | -0.055 | 0.265 | 233 | 0.014 | 0.009 | 0.074 | 56.0 | 18.3 |
| Information Technology | 66 | -0.014 | -0.012 | 0.225 | 65 | -0.026 | -0.022 | 0.076 | 52.5 | 18.7 |
| Materials | 91 | 0.062 | 0.078 | 0.222 | 91 | 0.025 | 0.011 | 0.072 | 64.2 | 16.6 |
| Real Estate | 74 | -0.232 | -0.258 | 0.184 | 74 | -0.015 | -0.027 | 0.060 | 53.7 | 20.7 |
| Utilities | 47 | -0.100 | -0.077 | 0.165 | 47 | -0.016 | -0.009 | 0.047 | 63.1 | 19.3 |

This table displays the industry-specific number of observations, mean, median, and standard deviation for market model-adjusted returns during the fever period and the second crisis period. Furthermore, it shows the industry-level mean and standard deviation for 2018 Refinitiv ESG scores. Industries are categorized according to the sectors of the GICS industry classification, excluding the financial sector. All variables are defined in Appendix A.
Source: own research

**Table 13 – Industry-specific regression results**

**Panel A:** Industry-specific regression results for abnormal fever returns

| Dependent Variable: | Abnormal Fever Returns | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) G10 | (2) G15 | (3) G20 | (4) G25 | (5) G30 | (6) G35 | (7) G45 | (8) G50 | (9) G55 | (10) G60 |
| Total ESG Score | -0.211 | 0.003 | 0.029 | 0.044 | 0.548*** | -0.107 | -0.133 | -0.011 | 0.292 | 0.116 |
| | (0.287) | (0.153) | (0.086) | (0.148) | (0.162) | (0.155) | (0.104) | (0.124) | (0.214) | (0.099) |
| Size | 0.044 | 0.012 | 0.003 | -0.018 | -0.013 | 0.011 | 0.021 | 0.027 | -0.052 | 0.019 |
| | (0.030) | (0.036) | (0.018) | (0.023) | (0.023) | (0.018) | (0.020) | (0.023) | (0.032) | (0.023) |
| Cash Holdings | 1.070** | -1.000*** | 0.054 | 0.321* | 0.125 | 0.020 | 0.285 | 0.064 | -0.528 | 0.141 |
| | (0.495) | (0.383) | (0.189) | (0.192) | (0.285) | (0.121) | (0.180) | (0.306) | (0.505) | (0.365) |
| Long-Term Debt | -0.560** | -0.423* | -0.390*** | -0.521*** | -0.668*** | 0.028 | -0.325** | -0.084 | 0.070 | 0.052 |
| | (0.275) | (0.221) | (0.105) | (0.150) | (0.176) | (0.118) | (0.146) | (0.125) | (0.193) | (0.159) |
| Short-Term Debt | -0.214 | -0.039 | -0.490 | -0.177 | -0.672* | 0.216 | -0.936* | 0.805 | 0.278 | 0.779*** |
| | (0.547) | (0.478) | (0.420) | (0.400) | (0.373) | (0.323) | (0.504) | (0.554) | (0.416) | (0.255) |
| Profitability | -1.585** | 0.760* | 0.791** | 0.556** | 0.404 | 0.096 | 0.033 | 0.633** | 0.409 | -1.640 |
| | (0.755) | (0.406) | (0.335) | (0.257) | (0.473) | (0.193) | (0.385) | (0.312) | (1.326) | (1.193) |
| Book-to-Market | 0.007 | 0.017 | -0.015 | 0.033 | 0.072 | -0.043 | -0.116 | 0.067 | 0.075 | -0.336*** |
| | (0.068) | (0.050) | (0.056) | (0.051) | (0.084) | (0.034) | (0.102) | (0.054) | (0.090) | (0.068) |
| Negative BM | 0.828*** | | -0.147 | 0.228 | 0.078 | | -0.138 | -0.004 | | |
| | (0.183) | | (0.090) | (0.213) | (0.182) | | (0.112) | (0.114) | | |
| Momentum | 0.053 | -0.111 | -0.048 | 0.084 | -0.046 | 0.019 | -0.104* | -0.124** | 0.234*** | -0.043 |
| | (0.112) | (0.100) | (0.055) | (0.061) | (0.082) | (0.057) | (0.060) | (0.062) | (0.086) | (0.082) |
| Idiosyncratic Risk | -1.301 | 1.426 | -0.939 | 15.195*** | -7.331 | 3.426 | -7.950** | -0.504 | -12.983* | 56.995*** |
| | (7.157) | (5.534) | (5.022) | (5.284) | (5.754) | (3.988) | (3.781) | (5.711) | (7.421) | (20.016) |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Factor loadings | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry FE | No | No | No | No | No | No | No | No | No | No |
| Country FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 40 | 91 | 232 | 137 | 70 | 80 | 66 | 72 | 47 | 74 |
| Adjusted $R^2$ | 0.54 | 0.28 | 0.35 | 0.46 | 0.60 | 0.44 | 0.50 | 0.36 | 0.30 | 0.51 |

For table description, see below Panel C of Table B.8.

**Panel B:** Industry-specific regression results for abnormal second wave returns

| Dependent Variable: | Abnormal Fever Returns | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) G10 | (2) G15 | (3) G20 | (4) G25 | (5) G30 | (6) G35 | (7) G45 | (8) G50 | (9) G55 | (10) G60 |
| Total ESG Score | 0.030 | -0.067 | -0.031 | -0.016 | -0.050 | -0.068 | -0.033 | -0.026 | 0.079 | 0.027 |
| | (0.048) | (0.065) | (0.026) | (0.039) | (0.059) | (0.045) | (0.062) | (0.063) | (0.085) | (0.030) |
| Size | -0.020 | 0.011 | 0.003 | 0.004 | 0.001 | 0.005 | -0.001 | 0.010 | -0.017 | -0.017** |
| | (0.013) | (0.011) | (0.005) | (0.006) | (0.009) | (0.007) | (0.009) | (0.009) | (0.013) | (0.007) |
| Cash Holdings | -0.499*** | 0.266* | -0.009 | -0.123 | -0.074 | -0.141*** | -0.009 | -0.043 | -0.277** | -0.378*** |
| | (0.132) | (0.137) | (0.055) | (0.084) | (0.090) | (0.044) | (0.083) | (0.073) | (0.140) | (0.100) |
| Long-Term Debt | -0.001 | 0.014 | -0.002 | -0.050 | -0.010 | -0.015 | -0.061 | -0.077 | -0.108** | -0.136*** |
| | (0.056) | (0.068) | (0.031) | (0.039) | (0.063) | (0.044) | (0.058) | (0.065) | (0.049) | (0.050) |
| Short-Term Debt | 0.234* | -0.147 | 0.123 | 0.125 | -0.330*** | 0.058 | -0.097 | 0.138 | -0.074 | -0.106 |
| | (0.120) | (0.148) | (0.109) | (0.105) | (0.112) | (0.141) | (0.179) | (0.353) | (0.179) | (0.116) |
| Profitability | 0.654*** | -0.059 | 0.130 | -0.042 | -0.045 | -0.135 | 0.282*** | 0.057 | 0.012 | 0.658** |
| | (0.171) | (0.173) | (0.090) | (0.073) | (0.240) | (0.091) | (0.100) | (0.110) | (0.390) | (0.283) |
| Book-to-Market | -0.001 | -0.018 | -0.004 | -0.006 | -0.020 | -0.103*** | 0.0002 | -0.029 | -0.019 | 0.012 |
| | (0.008) | (0.011) | (0.012) | (0.011) | (0.020) | (0.034) | (0.027) | (0.021) | (0.027) | (0.022) |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Negative BM | -0.132*** | | 0.155*** | 0.043 | 0.069 | | 0.024 | 0.036 | | |
| | (0.043) | | (0.041) | (0.035) | (0.086) | | (0.030) | (0.059) | | |
| Momentum | 0.049 | -0.026 | 0.022 | 0.025 | 0.063 | 0.012 | 0.084*** | 0.009 | 0.058 | 0.067 |
| | (0.066) | (0.040) | (0.020) | (0.026) | (0.045) | (0.018) | (0.028) | (0.028) | (0.061) | (0.042) |
| Idiosyncratic Risk | 0.737 | 0.768 | -1.372 | 2.507 | -7.484*** | 2.735* | 0.386 | 2.075 | -1.737 | -2.709 |
| | (1.652) | (2.126) | (1.105) | (1.590) | (2.069) | (1.634) | (1.597) | (2.123) | (2.633) | (2.767) |
| Factor loadings | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry FE | No | No | No | No | No | No | No | No | No | No |
| Country FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 39 | 91 | 233 | 136 | 69 | 81 | 65 | 71 | 47 | 74 |
| Adjusted $R^2$ | 0.64 | 0.26 | 0.24 | 0.24 | 0.29 | 0.14 | 0.14 | -0.03 | -0.07 | 0.52 |

Panel A and B of Table B.8 display the full industry-specific regression results. *Total ESG Score* corresponds to 2018 overall ESG Scores from Refinitiv. Industries are categorized according to the sectors of the GICS industry classification, excluding the financial sector. This results in the following sectors: Energy (G10), Materials (G15), Industrials (G20), Consumer Discretionary (G25), Consumer Staples (G30), Health Care (G35), Information Technology (G45), Communication Services (G50), Utilities (G55), Real Estate (G60). The dependent variable refers to market model-adjusted returns over the fever period (February 24-March 18, 2020) in Panel A and market model-adjusted returns over the second crisis period (October 12-30, 2020) in Panel B. All regressions correspond to the baseline regression model (2) that includes variables on a firm's financial health and additional firm characteristics. All regressions include factor loadings of the Carhart four-factor model and country fixed effects. All variables are defined in Appendix A. Robust standard errors are listed in parenthesis below the coefficient estimates. Statistical significance at the 1%, 5%, and 10% levels is displayed by ***, **, and *, respectively.
Source: own research

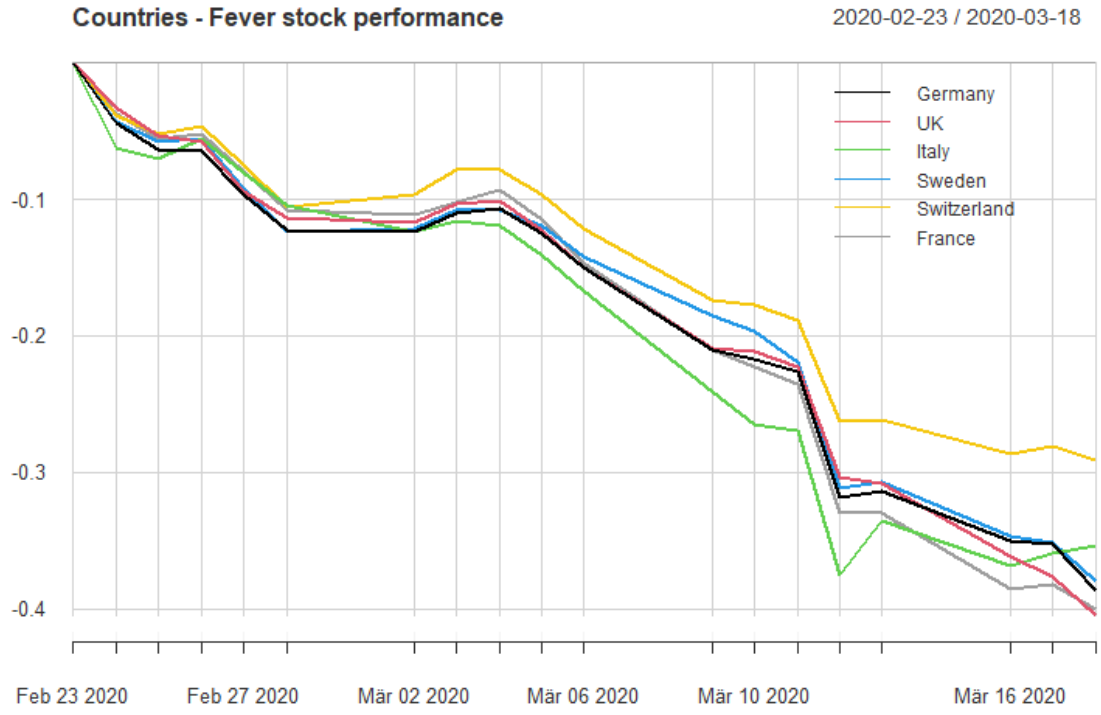
## Appendix C: Additional Figures

**Figure 2 - Carroll's CSR pyramid (1979) and Wood's CSP model (1991)**

| | | | | | |
|---|---|---|---|---|---|
| DISCRETIONARY RESPONSIBILITY | **PRINCIPLES OF SOCIAL RESPONSIBILITY** | --> | **PROCESSES OF SOCIAL RESPONSIVENESS** | --> | **OUTCOMES & IMPACTS OF PERFORMANCE** |
| ETHICAL RESPONSIBILITY: Companies should obey society's ethical guidelines. | **Legitimacy**: businesses that abuse the power society grants them will lose that power. | | **Environmental Scanning:** gather the information needed to understand and analyze the firm's social, political, legal, and ethical environments. | | **Effects on people and organizations**. |
| LEGAL RESPONSIBILITY: Companies should obey the law. | **Public Responsibility**: Businesses are responsible for outcomes related to their primary and secondary areas of involvement with society. | | **Stakeholder Management**: active and constructive engagement in relationships with stakeholders. | | **Effects on the natural and physical environments**. |
| ECONOMIC RESPONSIBILITY: Companies should fulfill the institutional role of resource conversion. | **Managerial Discretion**: Managers and other employees are moral actors and have a duty to exercise discretion toward socially responsible, ethical outcomes. | | **Issues/Public Affairs Management**: a set of processes that allow a company to identify, analyze, and act on the social or political issues that may affect it significantly. | | **Effects on social systems and institutions**. |

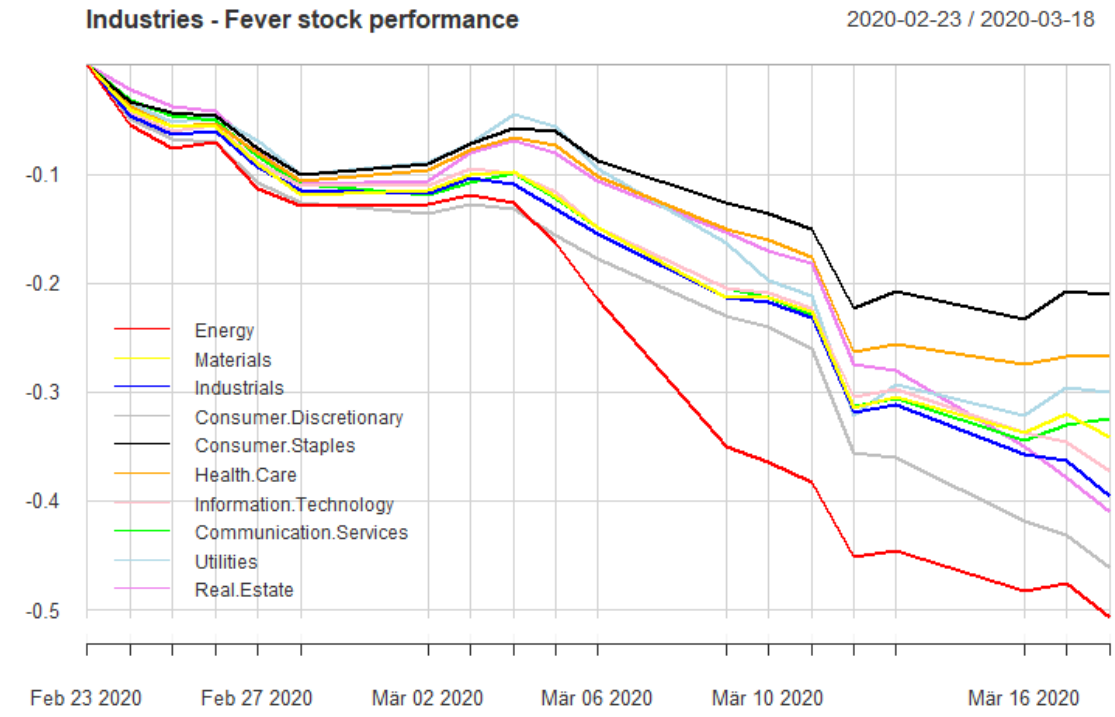
This figure displays on the left hand the hierarchy of CSR of Carroll (1979). On the right hand side, it presents Wood's CSP model (1991).
Source: Wood (2010)

**Figure 3 - Country-specific average fever stock performance**



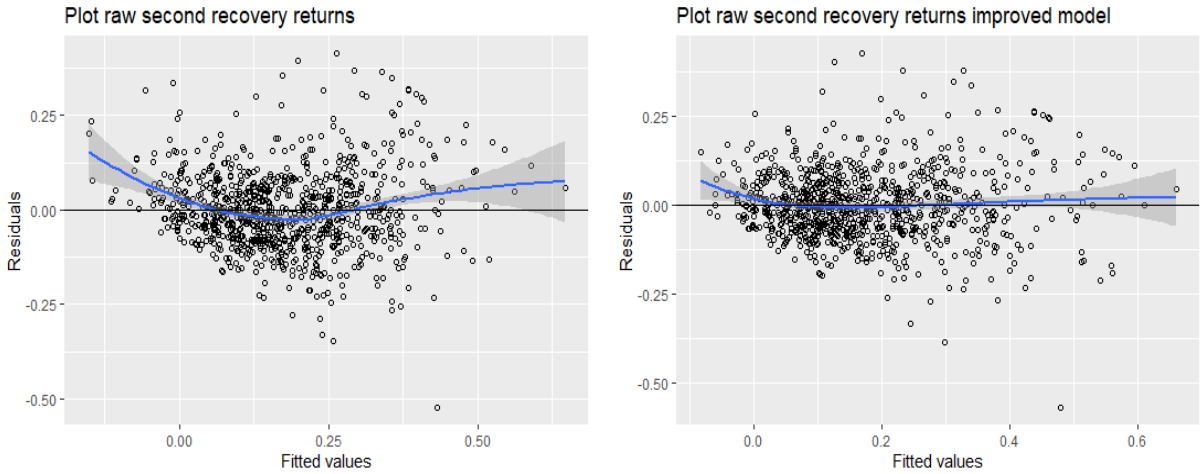

This Figure illustrates the mean compounded returns by country during the fever period. This is done for countries with more than 50 observations, namely Germany, the UK, Italy, Sweden, Switzerland, and France. Dates are on the x-axis. The y-axis represents the percentage movement since the start date in decimal form.
Source: own research

**Figure 4 - Industry-specific average fever stock performance**



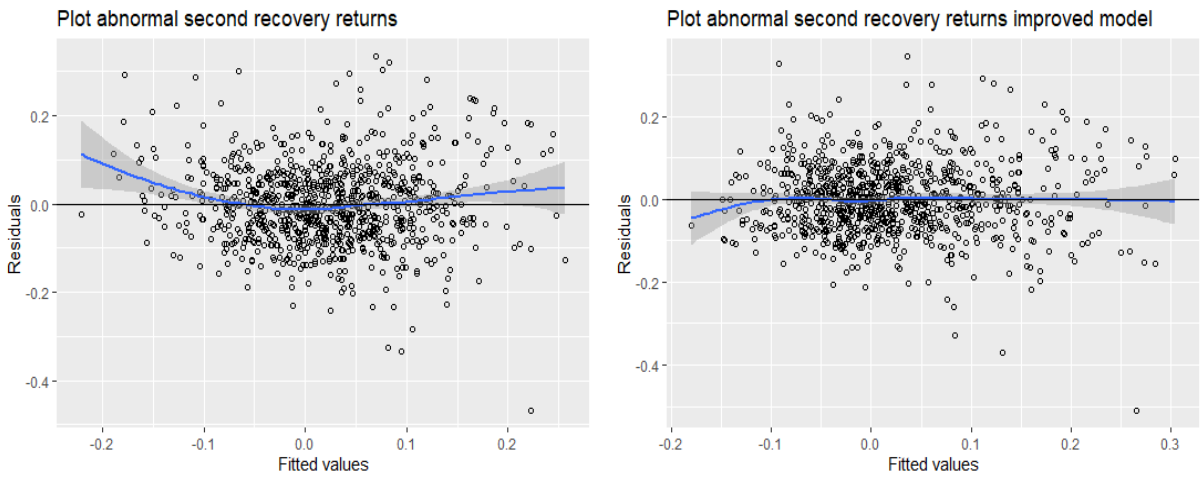

This Figure illustrates the mean compounded returns by industry during the fever period. This is done for all sectors according to the GICS industry classification, excluding the financial sector. Dates are on the x-axis. The y-axis represents the percentage movement since the start date in decimal form.
Source: own research

**Figure 5 – Model comparison for second recovery raw returns**



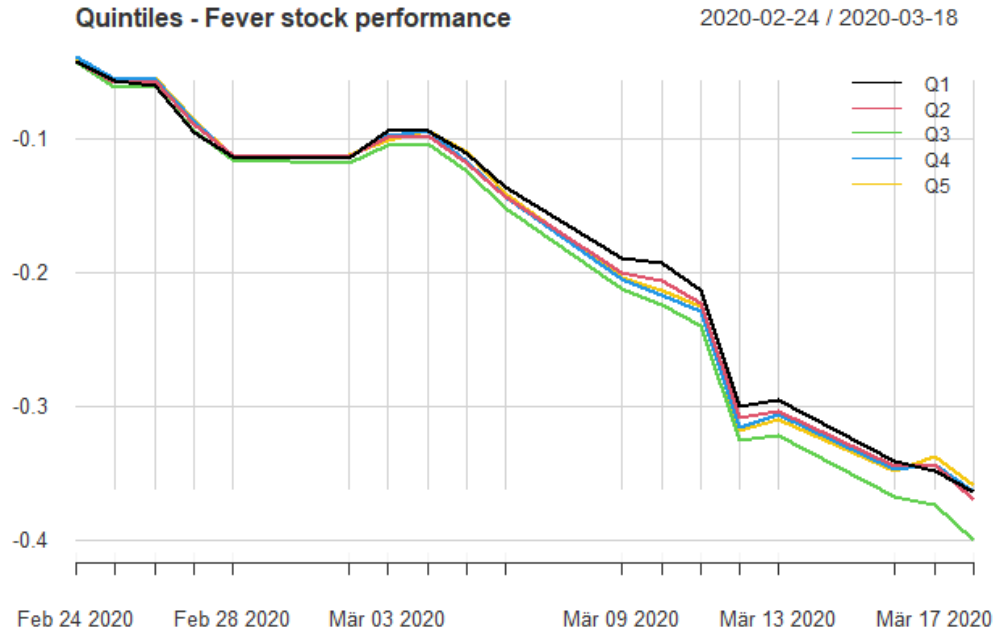

This figure illustrates the comparison between the baseline and the improved model for raw returns in the second recovery period as the dependent variable. On the left hand side, the fitted values are ploted on residuals from the baseline regression model, showing a non-linear trend. On the left hand side, the fitted values are ploted on residuals from the improved regression model.
Source: own research

**Figure 6 - Model comparison for second recovery abnormal returns**



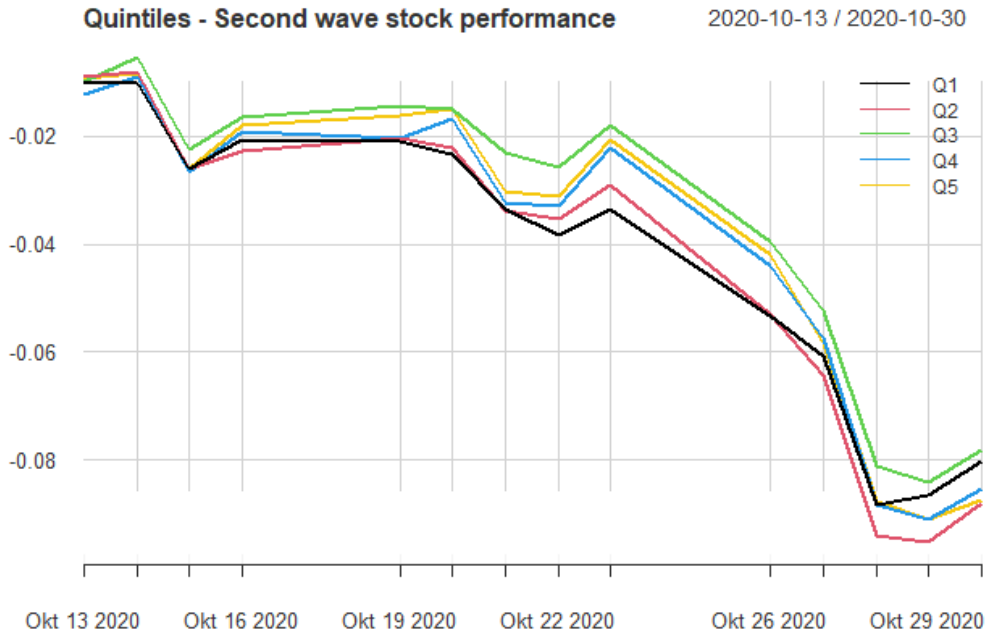

This figure illustrates the comparison between the baseline and the improved model for abnormal returns in the second recovery period as the dependent variable. On the left hand side, the fitted values are ploted on residuals from the baseline regression model, showing a non-linear trend. On the left hand side, the fitted values are ploted on residuals from the improved regression model.
Source: own research

**Figure 7 - Average fever stock performance by ESG Quintile**




This Figure illustrates the mean compounded returns by quintiles during the fever period. Q5 is the quintile with firms with the highest ESG scores, while Q1 is that with the lowest. Dates are on the x-axis. The y-axis represents the percentage movement since the start date in decimal form.
Source: own research

**Figure 8- Average second wave stock performance by ESG Quintile**




This Figure illustrates the mean compounded returns by quintiles during the second wave period. Q5 is the quintile with firms with the highest ESG scores, while Q1 is that with the lowest. Dates are on the x-axis. The y-axis represents the percentage movement since the start date in decimal form.
Source: own research