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## Firm ESG Commitment and the financial markets: market reactions to ESG related news

Igie Precious Omoregie

► **To cite this version:**

Igie Precious Omoregie. Firm ESG Commitment and the financial markets: market reactions to ESG related news. Business administration. 2021. dumas-03552097

**HAL Id: dumas-03552097**

**<https://dumas.ccsd.cnrs.fr/dumas-03552097v1>**

Submitted on 2 Feb 2022

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Mémoire de recherche

# **Firm ESG Commitment and the financial markets: Market reactions to ESG related news**

**Presented by: Igie Precious Omoregie**

**Supervisor: Prof. Isabelle Girerd-Potin**

**Master 2 R  
Advances in Finance and Accounting (AFA)  
2020 – 2021**

**Presented on the 15<sup>TH</sup> of June 2021**





#### Preface:

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# TABLE OF CONTENTS

<b>ABSTRACT .....</b>	<b>2</b>
<b>INTRODUCTION .....</b>	<b>3</b>
<b>PART 1: THEORETICAL BACKGROUND AND LITERATURE REVIEW .....</b>	<b>8</b>
CHAPTER 1.    ESG AND FIRM COMMITMENT .....	9
1.1    Changing capital market.....	9
1.2    Why firms commit to ESG.....	12
1.3    Measuring firms commitment .....	16
CHAPTER 2.    ESG AND STOCK MARKET REACTIONS .....	20
2.1    ESG commitment, firms value, and risk.....	20
2.2    Determinants of market reactions .....	21
2.3    Reactions to Environmental news .....	23
2.4    Market reactions to firm disclosures.....	25
<b>PART 2: RESEARCH PROBLEM AND METHODOLOGY .....</b>	<b>27</b>
CHAPTER 3.    RESEARCH QUESTION .....	28
CHAPTER 4.    METHODOLOGY AND DATA .....	32
4.1    Firms ESG Commitment .....	32
4.2    Event Study and the EMH .....	35
4.3    Data and events.....	39
<b>PART 3: STUDY AND CONCLUSION.....</b>	<b>45</b>
CHAPTER 5.    EMPIRICAL STUDY AND RESULTS.....	46
5.1    Event 1 (E1) .....	46
5.2    Event 2 (E2) .....	49
<b>CONCLUSION.....</b>	<b>52</b>
Contributions and limits of the study .....	53
Implication for future research .....	54
<b>BIBLIOGRAPHY.....</b>	<b>55</b>
<b>TABLES OF FIGURES.....</b>	<b>61</b>
<b>ACRONYMS AND ABBREVIATIONS.....</b>	<b>62</b>
<b>TABLES OF ANNEXES .....</b>	<b>- 0 -</b>
<b>ANNEX 1.    FIRMS ESG RATINGS AND COMMITMENT DATA TABLE .....</b>	<b>- 5 -</b>
<b>ANNEX 2.    R CODE .....</b>	<b>- 14 -</b>

## ABSTRACT

This master's thesis examined existing literature and use event studies to investigate the impact of negative and positive ESG related news on the market value of firms with different ESG commitments. The ESG ratings of 221 firms are collected from MSCI and Sustainalytics websites to classify the firms into three groups; high, moderate, and low ESG commitments firms. The market reactions to the groups of firms are studied around two general events, Event 1: The declaration of the victory of Joe Biden in the 2020 U.S. elections, Event 2: The declaration of COVID-19 illness as a pandemic.

The results of the event studies show a negative market reaction to Event 2 for all three groups of ESG commitments over the event window, with the group of firms with low ESG commitment, by far, the first to go down. For Event 2, market reaction was only significant for the group of firms with a low ESG commitment level.

I conclude that the market reacts more abruptly to firms with low ESG commitment. For positive ESG related news, the positive market reaction is more significant for firms with low ESG commitment. In case of a general market crash, the value of a low ESG committed firm might fall faster, but over time, the loss of value is around the same level for all three groups of firms.

Keywords: Environmental, social, and corporate governance (ESG), Corporate Social Responsibility, ESG Commitment, ESG News, Stock market reaction, ESG related events.

## INTRODUCTION

*According to the 2018 Global Sustainable Investment Review, sustainable investment is an investment approach that considers environmental, social and governance (ESG) factors in portfolio selection and management. (The Global Sustainable Investment Alliance & Alliance, 2018)*

The primary users of these criteria are investors and capital providers to screen companies that do not share the same ethical and moral values. The three pillars of ESG (Environmental, social, governance) focuses on the vital interactions of a company with the environment, the society as a whole, and the community where it operates. The environmental (E) criterion focuses on the impact of the company on the environment and how it manages these impacts<sup>1</sup>. The social pillar (S) focuses on how the firm relates with the employees, suppliers, customers, and the community where it operates<sup>2</sup>. The governance (G) criterion deals with the firm leadership and management style<sup>3</sup>. Being committed to ESG, for a firm, means being committed to responsible, sustainable, and ethical practices based on the general ESG principles.

While much of the push for ESG come from investors and capital providers, firm's commitment to ESG has come a long way. Ethical and religious beliefs shaped responsible and sustainable investments before the explosion of social and environmental issues in the 1960s. Sustainable and responsible investments became popular with the 1970s anti-war sentiments in the United States, the launch of the first sustainable mutual fund (PAXWX) in 1971, the construction of a list of socially responsible stocks by the activist journalist Milton Moskowitz to track performance against broad market indexes. The push continued with the pressure on international firms operating in South Africa on stands against the apartheid government during the late 1980s and early 1990s.

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<sup>1</sup> The company utilization of natural resources, its footprint, pollution and waste management, and use of green technologies and renewable energy: Company energy use, waste management, impact on pollution, emissions.

<sup>2</sup> Employee health, safety, human capital development, product and consumer safety, community relations.

<sup>3</sup> The corporate fairness and accountability, executive pay, transparency, conflicts of interest, audits, internal controls, and shareholder rights



Since the launch of the United Nations Principles for Responsible Investment in 2006, the practices and principles have become widely accepted by investors, capital providers, rating agencies, and firms as a guide to the integration of responsible, sustainable, and ethical practices into their activities. The global financial crisis that followed the 2008 market crash caused by excessive risk-taking of banks in the United States and the growing debate on the impact of human activities on climate change gave the needed awareness and drew more attention to ethical and sustainability issues. Several authors confirm that the attention for ESG related issues became immediately visible in the financial markets during and after the 2008 financial crisis and that ethical firms outperformed conventional firms after the financial crisis of 2008 (Risalvato et al. 2010). According to Lins et al. (2017), a strong CSR helps build trust between a company, its stakeholders, and the market. Firms with high social capital or CSR attention had excess returns up to 7% compared to firms with low social capital between 2008 and 2009. (Lins et al., 2017).

For investors, the classic integration involves the screening of companies whose activities and practices do not match their values from their portfolios, instead of basing their choices only on the financial performance of firms. As the number of capital providers that adopt the ESG framework increases, the impact on the extra cost of capital for firms that do not commit to ESG becomes more and more significant. Companies, on their part, try to adapt to the changing capital market by changing and improving in the three ESG pillars. The focal points of the studies on ESG criteria are mainly on how the introduction of ESG criteria into investment strategies affects investments performances and the impact on firm's stock market performance. These studies cover two periods, the pre-ESG period, which goes from the 1970s to early 2010s, and the period from the early 2010s onward (ESG era). The second period is characterized by studies that directly use ESG criteria to refer to firms ethical, responsible and sustainable behaviours.

Until the early 2010s, researchers studied the three pillars separately by referring directly to firm corporate social responsibility or CSR (McGuire (1988), Mackey et al. (2007), Oikonomou et al. (2012), Jo & Na (2012), Waddock & Graves (1997)), firms' environmental performance in relation with their financial performance (Al-Tuwaijri et al. (2004), Fisher-Vanden. k & Thorburn (2011), Konar & Cohen (2001)), and the impact of good or bad governance on firm value (Rob et al. (2004), Ammann et al. (2011), Jo &

Harjoto (2011)). The findings on the impacts of the three pillars on firm value and investments performance in both periods are inconclusive. Nevertheless, I would say that there is a consensus that the integration of ESG criteria into investing has positive impacts on investments risks and firms' value. In contrast to this consensus, a few authors argue for the so-called "sin stocks"<sup>4</sup>. These authors suggest that the screening of these stock from institutional portfolios<sup>5</sup> leads to opportunity costs for investors, and also argue that the sin stocks outperform the market due to the disregard of analysts. The most recent studies directly examine the three pillars of ESG together. Nevertheless, the conclusions on the impact on firm value and stock market performance have not changed.

From 2008 to today, ESG has become a central topic for both companies and capital providers. Using a large sample of borrowers, Amiram et al. (2021) found a significant increase in environmental protection provisions in the loan contract for borrowers that borrow from banks that adopt the ESG framework. The willingness of investors and capital providers to integrate ethical, sustainability, and responsibility evaluations keep pushing the markets to new norms, making firms commitment to ESG necessary for receiving ESG related finances.

In 2020 sustainable funds in the U.S. attracted a record \$51.1 billion in net flows, more than twice the previous record set in 2019<sup>6</sup>. Firms are committing to get their slice of this available capital. The number of public companies reporting ESG information grew from fewer than 20 in the early 1990s to 8,500 by 2014 (Sakis, Chris, & George, 2016). Sakis et al. (2016) suggest a positive relationship between ESG ratings and the cost of capital for firms. Devalle et al. (2017), covering all three pillars of ESG, examine the impact of ESG performance on credit ratings on a sample of 56 Italian and Spanish public firms in 2015 and conclude that ESG performance, social and governance metrics in particular, significantly affects credit ratings. A second study by Yasser et al. (2019) investigates whether lending institutions reward firms in 15 EU countries for their ESG performance and disclosure by lowering their cost of debt capital. They concluded that lending institutions integrate ESG information in their credit decisions and that firms with better ESG performance have a lower cost of capital.

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<sup>4</sup> Firms in the tobacco, weaponry, alcohol, pornography industries.

<sup>5</sup> Religious institutions, pension funds, universities, public entities.

<sup>6</sup> Global Sustainable Fund Flows Report 2020

The objective of my thesis is to investigate, from the literature and with the use of an empirical study, how the changing commitment of firms impact the way the market reacts to news on the firms.

Does the financial market react more significantly to negative news of firms with high ESG commitment compared to firms with low ESG commitment?

Is the reaction of the market significantly different to positive ESG news of firms with low ESG commitment compared to those with high ESG commitment?

In the case of news that affects the whole market, is the reaction the same for firms with different levels of ESG commitment?

From the literature, some relationships emerge between market reactions to ESG and firms ESG commitment, Endrikat (2016), Fisher & Thorburn (2011), Jacobs et al. (2010), Flammer (2013), Krüger (2015) all investigated how the financial market reacts to different ESG initiatives and found some contrasting results. It emerged that the market reacts more to bad news than good ones, with some variations. Other studies investigated the relationship between the market perception of firm risk and their ESG scores to find that firms with high ESG ratings considered less risky than firms with low ESG ratings. McGuire (1988), Jo et al. (2012), Oikonomou et al. (2012).

I deduct from the literature that the market reactions to ESG related news depends on different factors. Firm size, liquidity level, leadership, trust, and recent past related to ESG, are all factors that can impact market reactions to ESG related news. In the absence of controversies and agency issues, the market responds positively to positive ESG news and negatively to negative ESG news. For small firms and firms with low liquidity, this is not always true. Firms have interests to adapt to the changes in society, but they also need to know how the market reactions to these changes affect their market value. This investigation serves the purpose of providing insights to firms on how their ESG commitment level might impact how the market reacts to news regarding them.

Given the limited resources and time for this master's thesis, the empirical study is on two general events (Not ESG specific). The election of Joe Biden as the 47th U.S. president (E1) and the announcement of the COVID-19 disease becoming a pandemic (E2). The first event, E1, is considered a positive news event for ESG committed firms in the U.S. and E2 is considered a negative piece of ESG news for all firms globally.

I grouped 221 firms into firms with high ESG commitment (HC), moderate ESG commitment (MC), and low ESG commitment (LC) and analysed the impact of the two events on the stock market value of the three groups of firms.

For Event 2, with the market crash related to the COVID-19 health crisis, the value of low ESG committed firms fell faster. But in the complete event window of Event 2, all three groups of firms lost around the same market value. Event 1 was less significant economically for group HC and MC but had a significant positive impact on the group of firms with low ESG commitment.

I conclude that the market reacts more abruptly to firms with low ESG commitment in the case of events that impact all firms. For positive ESG related news, the positive market reaction is more significant for firms with low ESG commitment. Other than the general limits of the event study methodology, the numbers of firms in the study (221) and the use of two general events are the main limits of this work.

This master's thesis is organised into three parts. Part 1 explains and introduces the theoretical background of ESG criteria and firm ESG commitment, illustrates the empirical literature on the impact of a firm ESG commitment on firm value, stock market performance, and how the stock market reacts to ESG related news. In the second part, I formulate the research question based on the insights from the literature and explain the methodology and the data used for the empirical study. In the third part and last part, the results of empirical studies are reported and discussed. The conclusion section then follows.

**PART 1:**  
**THEORETICAL BACKGROUND AND LITERATURE**  
**REVIEW**

In this section, I put the dissertation into perspective by discussing the background and existing literature on firms ESG commitment, its impact on the firm value and market risk, and illustrating the relationship between a firm's ESG commitment and market reactions ESG related news..

## **Chapter 1. ESG AND FIRM COMMITMENT**

This chapter introduces the topic of ESG and firm commitment, why firms commit, and how to measure a firm's ESG commitment.

### **1.1 CHANGING CAPITAL MARKET**

As the capital market becomes more aware of issues related to ESG, firms are adapting their practices and business to compete for the best finances. Given that the economic argument for firms to adopt ESG criteria is still weak, it is the external pressure on firms to adopt new practices and behaviours to suit the changing capital market requirements that conditions the way firms behave. In this case, investors and capital providers have pressured firms over time to conform to certain norms, which is the introduction of ESG criteria into firms' decisions today.

As the American sociologists P.J. DiMaggio and W. Powell illustrated in their 1983 paper, *The iron cage revisited*, institutional isomorphism and collective rationality in organizational fields. Pressures from organizations and the expectations from society push firms to adapt to certain societal norms through coercive and normative isomorphism.

Ethical and religious beliefs shaped responsible and sustainable investments before the explosion of social and environmental issues in the 1960s. Sustainable and responsible investments became popular with the 1970s anti-war sentiments in the United States, the launch of the first sustainable mutual fund (PAXWX) in 1971, the construction of a list of socially responsible stocks by the activist journalist Milton Moskowitz to track performance against broad market indexes. The ideology continued with the pressure on firms operating in South Africa on stands against the apartheid government in place during the late 1980s and early 1990s. Since the launch of the United Nations' Principles for Responsible Investment in 2006, the practices and principles have become widely accepted by investors, capital providers, rating agencies, and firms as a guide to the integration of responsible, sustainable, and ethical practices into their activities.

The global financial crisis that followed the 2008 market crash caused by excessive risk-taking of banks in the United States and the growing debate on the impact of human activities on climate change gave the needed awareness and drew more attention to ethical and sustainability issues. The attention for ESG related issues during and after the 2008 financial crisis is visible in the financial markets. Ethical firms outperformed conventional firms after the financial crisis of 2008 (Risalvato et al. 2010). According to Lins et al. (2017), a strong CSR helps build trust between a company, its stakeholders, and the market. Firms with high social capital or CSR attention had excess returns up to 7% compared to firms with low social capital between 2008 and 2009. (Lins et al., 2017).

Today, the willingness of investors and capital providers to integrate ethical, sustainability, and responsibility evaluations keep pushing the markets to new norms, making firms commitment relevant and pushing them to participate. The number of public companies reporting ESG information grew from fewer than 20 in the early 1990s to 8,500 by 2014 (Sakis, Chris, & George, 2016). Sakis et al. (2016) suggest that there is a positive relationship between ESG ratings and the cost of capital for firms.

Another example of the impact of ESG on firms cost of capital is the one on environmental protection provisions. Using a large sample of borrowers, Amiram et al. (2021) found a significant increase in environmental protection provisions in the loan contract for borrowers that borrow from banks that adopt the framework. The results of their analysis are consistent with the idea that firms can reduce their cost of capital by opting to commit to environmental protection through loan contracts.

Two complete studies, in terms of covering all three pillars of ESG, the first one by ya examine the effect of ESG performance on credit ratings on a sample of 56 Italian and Spanish public firms with ESG performance in 2015, concludes that ESG performance, social and governance metrics in particular, significantly affects credit ratings, but not environmental scores. The second study by Yasser et al. (2019) investigates whether lending institutions reward firms in 15 EU countries for their ESG performance and disclosure by lowering their cost of debt capital. Yasser et al. (2019) distinguish between ESG performance used to indicate a commitment to ESG strategies and ESG disclosure that represents an effort to construct an image of commitment designed to positively influence stakeholder perception of firm commitment and find lending institutions to value both ESG performance and disclosure, affirming that both impacts firms costs of capital. They

concluded that lending institutions integrate ESG information in their credit decisions and that firms with better ESG performance have a lower cost of capital.

All of these studies confirm the hypothesis that a lower cost of capital is associated with high ESG commitment, and I did not find, in my search, any research sustaining that introducing ESG can increase the cost of capital. At the same time, ESG oriented capital keeps flowing into the capital market. In 2020, sustainable funds in the United States attracted a record USD 51.1 billion in net flows, more than twice the previous record set in 2019. Sustainable fund flows account for nearly one-fourth of overall flows into funds in the United States alone<sup>7</sup>. In 2018 sustainable investing assets in Europe, the US, Japan, Canada, and Australia and New Zealand were USD 30.7 trillion at the beginning of 2018, a 34 per cent increase since 2016<sup>8</sup>.

Among authors that discuss this changing capital market and how firms are adapting, Clementino et al. (2020) suggest that corporate responses depend on the managers' beliefs regarding the material benefits of adjusting to it, having a good ESG score or rating, and their alignment with corporate strategy. Although, their result is based only on interviews in one country, Italy, which makes it difficult to generalize their findings. Syed (2017), examining fund managers in the UK and France, show that the perception of ESG is different across countries and among managers. Syed (2017) find that even if they had common beliefs (Government demands environmental and social responsibility (ESR), that good ESR improves investment risks, and good corporate governance (CG) bolsters shareholder value), there were also differences. *UK managers believe that CG is the fiduciary obligation of the company while French managers believe that ESR is the fiduciary obligation of the company. UK managers believe that ESR is demanded by the shareholders while French managers have a belief that CG is demanded by the shareholders. French managers have a more favourable view towards ESR. On the other hand, UK managers have balanced beliefs toward CG and ESR.* (Syed, 2017).

The first paragraphs of the literature review show that firms are committing and managers are adapting to the new norms in their society. Cai et al. (2012) even suggest that the top management of U.S. firms in controversial industries, in general, considers

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<sup>7</sup> Global Sustainable Fund Flows Report 2020 <https://www.morningstar.com/lp/global-esg-flows>.

<sup>8</sup> 2019 report of The Global Sustainable Investment Alliance (GSIA) on the 2018 Sustainable investment review



social responsibility important even though their products are harmful to people, society, or the environment. The next paragraphs explain more in-depth why firms are committing to ESG.

## **1.2 WHY FIRMS COMMIT TO ESG**

Logically, firms with poor or bad social and environmental practices have higher risks of exposure to lawsuits, activity suspensions, fines, and public scrutiny. Committing to ESG not only helps to mitigate some of these risks but also helps to improve the external perception of the firm risk. McGuire (1988) suggests that firms should not overlook the positive impact of socially responsible practices on risk. He argues that firms have an investment reputation, including their reputation for being socially responsible, which impacts the cost of capital. *An increase in perceived social responsibility may improve the image of the firm management and permit it to exchange costs, as it reduces more costly explicit claims for less costly implicit charges. In contrast, a decline in the level of stakeholder's view of a firm's social responsibility may reduce its reputation and increase costly explicit claims (McGuire, 1988).*

McGuire also finds an association between prior firm performance and corporate social responsibility (CSR). Finding prior financial performance to be a better predictor of CSR than subsequent performance, and arguing that the association between CSR and financial performance is probably an artefact of previous good financial performance. Which remains an important question in the literature, what is the causal relationship between CSR and firms' financial performance? Does good CSR practices lead to better financial performance or is it that firms with good financial performance have more resources to practice CSR.

McGuire (1988) suggests that the relationship between firms CSR practices and financial performance is partly explained by prior financial performance, as firms doing well financially are more likely to engage in CSR activities.

Waddock & Graves (1997), following up on the work of McGuire (1988) examined 469 firms, mainly among firms in the S&P 500 index. He confirms the association between social responsibility to past and future financial performance but still did not answer the question of what causes what, concluding that causation may run in both directions with the support of the theory that slack resources availability and CSR are positively related.

A more recent study by Mackey et al. (2007) instead suggests that the causation might be from CSR to firm's market performance. They state that the impact of CSR on market value depends on the supply and demand of CSR investment opportunities and the capacity of the firms to sell their CSR practices as a product to investors.

Other studies confirm positive relationships between corporate social responsibility and firms market value. Choi et al. (2010) also study the empirical relationship between corporate social responsibility (CSR) and corporate financial performance in Korea using a sample of 1222 firm-years between 2002 and 2008 and find a positive and significant relationship between corporate financial performance and corporate social responsibility. Cai et al. (2012) find corporate social responsibility engagements to enhance firms' value in some industries and by examining the empirical association between firm value and CSR engagement for firms in sin industries, such as tobacco, gambling, and alcohol, as well as other industries involved with emerging environmental, social, or ethical issues, i.e., Weapon, Oil, Cement, and Biotech, using a sample of U.S. firms from 1995 to 2009. They find that Corporate social responsibility engagement of firms in these controversial industries positively affects the firm value after controlling for various firm characteristics. Jiraporn et al. (2014), with similar conclusions, suggest that firm's corporate social responsibility policies are influenced by their surroundings and competition, affirming that socially responsible firms enjoy more favourable credit ratings with better access to capital markets and lower borrowing costs.

Looking at the relationship between CSR or ESG in general and firm market value across 12 industries, Ashwin et al. (2016) assessed 157 companies listed on the Dow Jones Sustainability Index and 809 not listed companies over two years and find that ESG factors affect each industry differently. Ashwin et al. (2016) findings suggest that investor expects firms with high ESG commitment to be less risky and are consequently willing to accept consequently lower returns for these firms, even if it is not necessarily true that lower risks will translate into lower returns. Using their quantitative model, they find that different ESG factors have different impacts across industries, and companies that are the most successful are the ones that have an ESG agenda.

What we can draw from this part of the literature is that the positive relationship between CSR practices and firm financial performance exists and it can vary across industries also. Friede et al. (2015) extract and examine the primary and secondary data

of around 2200 academic reviews from the 1970s to the late 2000s. In 90% of the studies, they find a non-negative relationship between ESG and corporate financial performance differentiating between regions, non-portfolio studies, and studies that include assets classes other than equity. While these studies are valuable and contain very large sample, the main limit to these studies is the difficulty to use them to generally admit that CSR practices improve firm value, the analyses are always based on one region (United State, One or Two European or Asiatic countries), and the periods of studies are not long enough. Studies with data that covers longer period would give more power to the hypothesis that CSR practices improves firm's performance.

Other studies find that the demand effect also plays a role in firms' decision to commit to ESG. The demand for ESG oriented firms is growing, as most reports show. Some papers even argue that the demand effect that affects stocks with high ESG scores may lead them to underperform compared to firms with low ESG scores that are less demanded (g; Hong and Kaperczyk, 2009). The demand effect that is increasingly becoming an issue for ESG oriented firms and investors is also visible in firms market reactions. Investors preference for ESG leads the market to overreact to ESG controversies (Cui & Docherty, 2020). While this is not a completed and published paper, it is the only paper I found stating the overreaction of the market to ESG related news.

Examining the performance of firms in industries that are often excluded for ethical reasons by norm-constrained institutions because of greater litigation risk heightened by the social norms, the famous "sin stocks" (pornography, gambling, tobacco, and weaponry), Hong and Kacperczyk (2009) argue that these neglected outperformed comparable firms that are not regarded as sinful stocks. Using the data of U.S. sin stocks from 1996 to 2006, they find a 3 to 4% excess return per year than comparable stocks. On one hand, they argue that these neglected firms pay more attention to their performances and have incentives to practice conservative accounting. While on the other hand, analysts dig less information on sin stocks, making the market less efficient in revealing the value of these stocks, creating opportunities for excess returns. They then suggest that institutions that exclude these stocks pay a hidden cost of abstaining from investing in them, even if they admit that the excess return is subject to higher risks. This argument revived one of the core debates in the field. Is the demand effect negative for ESG stock? Do sin stocks outperform other portfolios of stock (i.e., ESG oriented portfolios)?

Different critics have contradicted these studies that suggest that sin stocks outperform. Before diving into the arguments of some of the critics, it is useful to note that these studies used data of U.S. firms in periods between 1926 and 2007. This time frame incorporates the periods of global market expansion of U.S. firms and less public awareness of the social and environmental impact of many of these 'sin' products. While it might be possible that these firms outperformed the market in some periods between the late 1920s and early 2000s, there is no reason to believe that this has been the case in recent years. Another point to note is that even if these firms had excess market returns, they probably did not get efficient financing for the level of return they produced.

Trinks et al. (2017) use an international sample of more than 1,600 stocks for more than twenty years to investigate the impact of the screening of the sin stocks on financial performance, using a novel identification process by concentrating on individual firm conducts and by studying a wide range of issue<sup>9</sup>. They concluded that there is an opportunity cost to excluding these stocks from investments. Stating that; Investing in controversial stocks in many cases results in additional risk-adjusted returns, whereas their exclusion may reduce financial performance. (Trinks & Scholtens, 2017). Fabozzi et al. (2008) also examine the sin stocks at a global level (21 countries) using a one-factor model with each countries national index and find sin stocks to outperform the market. While this second group of studies are not limited geographically, like Berman (2002), Hong and Kacperczyk (2009), they still cover partially the same period (1970 to 2012) and includes a wider range of industries (i.e., Biotech) compared to the classic sin stocks.

The main critic of these works is the use of an equally weighted portfolio to compare a value-weighted benchmark. Critics argue that this outperformance, other than being explained by other market factors like capitalization or firm size, might be a result of errors made in the studies. In particular, the paper (Adamsson & Hoepner, 2015) found some inconsistencies in the analysis of Kacperczyk & Hong (2009), with which they discredit the findings. They argue that regressing an equal-weighted portfolio of sin stocks on a value-weighted market benchmark, as performed by Hong et al. (2009) is inconsistent. Adamsson & Hoepner (2015) re-examine whether the sin stocks premium recorded by Kacperczyk and Hong (2009) is possible for real-world investors or it was

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<sup>9</sup> Abortion, adult entertainment, alcohol, animal testing, contraceptives, controversial weapons, fur, gambling, genetic engineering, meat, nuclear power, pork, (embryonic) stem cells, and tobacco.

just a result of the inconsistent research design, using a value-weighted portfolio, they concluded that the stock premium found in the study of

(Kacperczyk & Hong, 2009) is inexistent in the real world. But the comparison of their work with that of Kacperczyk and Hong (2009) is also questionable, given that they used a much shorter period for their investigation (2002 – 2013) and a period of growing attention to social and environmental impacts of products of these industries. From these arguments, one can deduct that there is some weak evidence that sin stocks outperformed the market in some periods in the last decades, and the demand effect may play against ESG oriented firms. On the other hand, sin stocks are a different category of firms, unlike firms with low ESG commitment. Therefore, the ESG commitment of firms should be compared among firms of the same industry, and sin stocks are not a good proxy for low ESG committed firms. Increasing demand of ESG oriented firms might reduce the excess returns for investors, but it remains a reason for firms to commit.

The above literature suggests that firms commit to obtain better financing and the growing demand for ESG oriented firms. It is clear that firms, most probably, do not commit to ESG to improve their stock market performance. Several studies find no relationship between ESG related practices and stock market performance. La Torre et al. (2020), investigating if ESG components affect stock returns, use a two-step methodology to analyse the performance of companies included in the Eurostoxx50 index between 2010–2018 base on their ESG score. They combine several ESG indicators (quantitative ratings, scorings and qualitative opinions) collected monthly to classify companies in terms of ESG commitments and found no evidence that the financial performance of companies in the Eurostoxx50 is affected by their efforts in terms of ESG commitments. Other studies remain neutral and find no significant difference between the risk-adjusted returns of investments consisting of firms with high ESG commitment and firms that are not committed to ESG (Halbritter and Dorfleitner (2015), Auer and Schuhmacher (2016)).

### **1.3 MEASURING FIRMS COMMITMENT**

After getting an idea of why firms commit, the next question to understand from the literature is how to measure this firm commitment. Today, the most used measurement of firm's commitments is the ESG scores and ratings from specialised ESG rating agencies. ESG ratings are a good proxy for firms ESG Commitment given that committed firms will most likely have high ESG scores.

ESG ratings are the most used measure of a firm commitment by academics and field professionals, but not without downsides. In the literature, one of the few areas where both academics and field professional agrees is the need to improve ESG ratings among the different agencies and across different sectors, starting from the interpretation of the concept of sustainability (Liang & Renneboog, 2017). Other research work further documents the lack of consistency across rating agencies, with one study going to the extent to warn against the use of these ESG ratings and invite users of the ratings to be very cautious when using them because of their low consistency and validity. With the focus on social ratings, they suggest that users of social ratings should exercise caution in interpreting their connection to actual CSR, and those rating agencies should conduct regular evaluations of their ratings. (Aaron K., Rodolphe, David I., & Samuel, 2016)

Rating agencies serve valuable information to investors with which they re-evaluate the anticipated future cash flows of firms based on their ranking. The information therefore affects stock prices (Cordeiro & Tewari, 2015). Because ESG information of companies can be difficult and costly to collect and process, different stakeholders (researchers, investors, fund managers, institutions) usually rely on the third-party rating agencies to collect and process this information for them, making rating agencies the most convenient and accessible evaluation of firm commitment to ESG and are also the most used by academics, even if it is still far from being an accurate measurement of firm commitment. Berg et al. (2020) argue that the information decision-makers receive from ESG rating agencies is relatively noisy, posing a problem for both investments and empirical research. They made a clear illustration of the issue by analysing rating data from six important rating agencies globally<sup>10</sup> to investigate the divergence of ESG ratings. They group the divergences in ESG ratings by different rating agencies into three categories, scope divergence that arises from differences in the sets of rating attributes (carbon emissions, labour practices, and lobbying activities may, for instance, be included in the scope of a rating agency and another rating agency may include only lobbying activities, while another might not, causing the two ratings to diverge), measurement divergence that arises from using different indicators to measure the same attribute or using different data sources for the same indicators (for example, a firm's labour practices could be evaluated based on workforce turnover, or by the number of labour-related court

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<sup>10</sup> KLD (MSCI Stats), Sustainalytics, Vigeo Eiris (Moody's), RobecoSAM (S&P Global), As- set4 (Refinitiv), and MSCI)

cases taken against the firm), and weight's divergence that depends on the importance given to the different attributes by different rating agencies (for example, the labour practices indicator may enter the final rating with greater weight than the lobbying indicator for one rating agency and the other way around for another rating agency). From their investigation, Berg et al. (2020) find that measurement divergence is the number one driver of rating divergence, closely followed by scope divergence, while weights divergence plays a minor role and concluded that ESG rating disagreement related to the environmental pillar have a risk premium.

Other research works that used ESG scores and ratings to analysing firm performance find biases and divergences linked to companies' size and sectors. Dorfleitner et al. (2020), using the Fama-French five-factor model and a 10% cut-off positively screened portfolios based on controversy scores found no significant over or underperformance but noted that controversy scores benefit small companies that 'fly under the radar. They found that the worst-ranked firms outperformed the higher group of ranked portfolios and that investors can profit from the imprecision of ESG rating. Other than identifying different sources of divergences, they also find that firms that receive a high score in one ESG category are likely to receive high scores in all the other categories from that same rating agency, which lead them to argue that the overall view of the rating agency on a firm influences the assessments of the firm in specific categories, adding to the divergences across the different rating agencies.

According to the report of the OECD report of 2020 on "ESG Investing: Practices, Progress and Challenges", reasons for divergence between rating includes the difference in frameworks, measures, key indicators and metrics, data use, qualitative judgement, and weighting of subcategories. The observation of the 2020 OECD Report on ESG practices also confirms the suspect of bias of ESG ratings. The report finds evidence of an ESG ratings bias against SMEs for some providers, such that firms with much higher market capitalisation and revenues consistently receive higher ESG scores than those with very low market capitalisations. They link this partly to the ability of large-cap companies to dedicate more resources to reporting and not because the rating agency has a biased view of large-cap companies. Admitting that this inconsistency can lead to investors decision and research results being influenced by the rating agency's data used without finding a consistent reason of what impacts firm's financial performance. ESG reporting and ratings

approach currently do not sufficiently clarify either financial materiality or non-financial materiality (e.g., social impact), so investors are lacking a clear picture of the issues that are likely to directly impact the financial condition of a company.<sup>11</sup>

Another way to look measure a firm's commitment to ESG is to look into the firm's willingness to disclose needed information on ESG related issues. One study that gave some insight about this, Al-Tuwaijri et al. (2004), provides an integrated analysis of the interrelations among environmental disclosure, environmental performance, and economic performance. Based on the argument that management's unobservable overall strategy affects each of these corporate responsibilities and suggest that "good" environmental performance is significantly associated with "good" economic performance, and also with more extensive quantifiable environmental disclosures of specific pollution measures and occurrences.

This first chapter of literature has introduced the ideology behind ESG and how it has changed over time, why firms commit to ESG criteria, how we can measure firm's commitment to ESG. The next chapter of the literature looks into how the financial market is reacting to the behaviours of firms towards ESG.

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<sup>11</sup> (Boffo, R., 2020) (Boffo, R., and R. Patalano (2020), "ESG Investing: Practices, Progress and Challenges", OECD Paris, [www.oecd.org/finance/ESG-Investing-Practices-Progress-and-Challenges.pdf](http://www.oecd.org/finance/ESG-Investing-Practices-Progress-and-Challenges.pdf))



## **Chapter 2. ESG AND STOCK MARKET REACTIONS**

This chapter analyses the impact of a firm ESG commitment on the firm's market value, and how the markets react to different ESG related news.

### **2.1 ESG COMMITMENT, FIRMS VALUE, AND RISK**

In portfolio theory, the classic way to examine the performance of an asset is through the analysis of asset risk compared to its returns. The market reactions to firms are directly linked to these two parameters. While the market reaction to news regarding a firm affects the firm's market return, the perception of the firm's risk by investors affects the way they react to announcements and news regarding the firm. From the investor's perspective, the literature is still inconclusive about the impact of introducing ESG criteria into investment strategies. Using general literature on ESG and firm market performance, I take a firm's perspective with a focus on the impact of firm ESG commitment on the market perception of the firm risk and the market value.

Looking at the relationship between ESG and risk, (Oikonomou et al., 2012) find that social responsibility is positively and strongly related to systematic firm risk and inversely correlated to financial risk. They noted that in times of small or moderate level volatility, firms that engage in socially responsible behaviours are characterised by lower levels of market risk, while in times of high volatility instead, socially irresponsible firms are associated with higher levels of financial risks. The study (Jo & Na, 2012) boldly affirms that even controversial firms with products detrimental to society can engage in CSR activities and have positive feedback. They examine the relationship between CSR and firm risk in controversial industries like alcohol, tobacco, gambling using a sample of U.S. firms from 1991 to 2010. They find that CSR engagement inversely affects firms' risk after controlling for various firm characteristics. Acknowledging the risk of window dressing, they argue that CSR generally helps improve firm reputation and the effect of risk reduction through CSR engagement is more economically and statistically significant in controversial industry firms than in non-controversial industry firms. The study by McGuire (1988) also finds that CSR reduces firm risk. McGuire invites managers who are

interested in the financial impact of CSR to look through reduced risk rather than looking for increased profitability.

Comparing the environmental and financial performances of firms in the S&P 500 index, Konar & Cohen (2001) find that poor environmental performance has a significant negative effect on the intangible asset value of publicly traded companies that varies across industries. The discourse in the literature is clear that there is a positive relationship between ESG and firm market value. The main question is, what leads to what? For example, do firms that do well financially later spend more for ESG or firms that invest in ESG do well subsequently? Waddock et al. (1997) find corporate social performance (CSP) to be positively associated with prior financial performance (slack resource availability) and with future financial performance.

With a focus on the governance pillar, Gompers et al. (2003) and Cremers et al. (2005) both find relationships between corporate governance and firm market values. Gompers et al. (2003) created a governance index (G-Index) which is a summary measure of corporate governance based on 24 firm-specific provisions and showed that more democratic firms are more valuable firms, while the other study Cremers & Nair, 2005 find evidence that both internal and external governance is linked to firm value. Gompers et al. (2003) also find that returns are significantly more negative for firms with a poor corporate governance score and suggest that the existence of agency issues are a genuine concern for investors when reacting to firms ESG commitment. They also affirm that such concerns are mitigated by sound corporate governance.

## **2.2 DETERMINANTS OF MARKET REACTIONS**

A central question to this study is how the market reacts to firms ESG news based on the firm's level of ESG commitment. While issues of market reaction to ESG related news have been studied repeatedly since the pre-ESG era, I did not find any study of market reactions to ESG news based on the level of firms ESG commitment. The topic has become significantly relevant with the aggregation of the three ESG pillars. The news can be announcements of the company disclosures, scandals, initiatives, fines.

Krüger (2015) and Fisher-Vanden et al. (2011) went further on the agency concerns. Krüger finds a negative effect of liquidity and a positive effect of book leverage on returns around positive ESG events. Fisher-Vanden and Thorburn also suggest that managers

might seek to enhance their recognition via ESG initiatives to the detriment of shareholder value. The reaction to ESG related news depends on the legal and economic information contained in it. Important issues that are material financially generate more pronounced market reactions (Krüger, 2015).

Looking at how the markets react to ESG related news, Krüger (2015) study over two thousand events and find that investors value positive CSR news, especially for firms with a history of poor stakeholder relations. Krüger (2015) find that the market responds positively to positive ESG news if the firm in question had negative ESG news or controversies in its recent past, especially if the past news had to do with employee relations, environmental issues, and human rights issues. Differentiating between responses to bad and good ESG news, Krüger (2015) also affirms that the market may respond negatively to positive corporate social responsibility news, in contrast to expectation, if the firm leadership or governance have controversial issues.

Before looking into the literature, I also expected the market to respond positively to positive ESG related news or may not respond at all, and I did not expect that there are cases of negative reactions to positive news. The belief that CSR or some environmental sustainability initiatives can lead to lavish spending of managers motivated by personal benefits rather than the altruistic motive of non-financial utility can be linked to why the market might react negatively to positive ESG related news (Barnea and Rubin, 2010). This unexpected reaction occurs, especially when the announcements are of small companies or companies with low liquidity. (Aouadi and Marsat (2018))

On the other hand, when the company in question is large and already has high ESG commitment, the market response is usually limited. Probably because of the higher visibility of large companies, the higher number of analysts reporting on them, making most of the information regarding their ESG activities already present in the market. Examining stock market reactions, over a short and long period, to the announcements of ESG branded news of firms with high ESG-committed among those listed on the Tokyo Stock Exchange, Mitsuyama et al. (2015) find little evidence of a positive and significant stock price reaction to the ESG branded announcement.

Capelle-Blanchard and Capelle-Blanchard & Petit (2017) investigates the extent and the determinants of the stock market reactions following ordinary news related to environmental, social and governance issues. Investigates over thirty thousand (33,000)

positive and negative news of hundred listed companies over the period 2002–2010 and find that firms with negative news experience a drop in their market value of 0.1% on average while companies gain nothing on average from positive announcements or news. In their research, they also find the market to be responsive to the media, but not to press releases of firms or disclosures from NGOs.

Capelle-Blanchard and Petit (2017) firms the pattern found by the other researches that the market responds differently to different announcements and news. The response might depend on the nature of the news (positive or negative), the size of the firm involved, or the reputation of the firm involved (past issues, leadership). And probably also the level of commitment of the firms involved.

### **2.3 REACTIONS TO ENVIRONMENTAL NEWS**

Even if all three pillars have studies of the market reactions to news related to them, there is a vast concentration of these studies on the environmental pillar. It is probably the most important of the three pillars, and market reactions also appear to be different in this pillar. In some cases, the market also reacts negatively to news that is considered positive ESG news, even in situations of good corporate governance.

With a focus on the environmental aspects of ESG, Flammer (2013) examine shareholders sensitiveness to corporation's environmental footprint using event studies around the announcements of corporate news related to the environment for the U.S. publicly traded companies from 1980 to 2009. He finds a significant stock price increase for companies that behave responsibly toward the environment, whereas firms that behave irresponsibly suffered significant decreases in stock price. Flammer (2013) compare eco-harmful (environmental accidents like oil spills) and eco-friendly (i.e., recycling activities) events and argue that external pressure to behave responsibly towards the environment exacerbates the punishment for eco-harmful behaviour and reduces the reward for eco-friendly initiatives. Flammer (2013) finding is consistent with the other part of the literature on market reactions to ESG related issues. Also consistent with the increasing awareness on environmental issues, he finds an increase of negative stock market reaction to eco-harmful behaviours over time and a decrease in positive reactions to eco-friendly initiatives. The reduction of market reactions to positive initiatives indicates that as a company ESG commitment increases (decreases), the market reactions towards the company will probably decrease (increase).

Comparing the reactions of the market to different environmental initiatives, Fisher-Vanden & Thorburn (2011) examined 117 announcements of the membership of companies to a voluntary environmental program targeting the reductions of greenhouse gases (EPA climate leaders' program) and a more general environmental sustainability commitment program (Ceres), between 1993 and 2008. They find that the firms that announced their membership to the EPA program experienced significant negative abnormal returns of around 1% following the announcements and noted that the price decline is more important for firms with poor corporate governance and high growth stocks. While on the other hand, they find that the announcements of firms joining the Ceres program were not related to any significant abnormal return. This study is also in line with the others, corporate governance, liquidity, and resources matter when it comes to market reactions to ESG related news and announcements, so does the level of engagement.

Continuing on the environmental pillar, Jacobs et al. (2010) examine stock market reactions to two categories of announcements related to firm environmental performance.<sup>12</sup> 417 announcements of corporate environmental-related initiatives<sup>13</sup> and 363 announcements of environmental-related awards and certificates that provide information about the recognition granted by a third party for environmental practices of a firm. They find no significant relationship between the firm financial performance and these initiatives. Examining the sub-categories of the two initiatives instead lead to finding positive reactions to philanthropic environmental initiatives and that voluntary emissions reduction are associated with significant negative market reactions. In line with the view that market reactions depend on the level of engagement and impact on firm resources.

Endrikat (2016) synthesized previous empirical results regarding the stock market impact of positive and negative corporate environmental-related events using meta-analysis<sup>14</sup> and find a general indication of positive market reactions to positive events and

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<sup>12</sup> Environmental practices, strategies, environmental philanthropy, voluntary emissions reductions, eco-friendly products, recycling.

<sup>13</sup> Self-reported corporate efforts to avoid, mitigate, or offset the environmental impacts of its activities, products, and services.

<sup>14</sup> Examination of data from several independent studies of the same subject to determine overall trends.

negative reactions to negative events. He notes that market reactions are stronger for negative events compared to positive events across studies.

There is probably a positive causal effect of corporate environmental performance on corporate financial performance due to the alteration of the market's perception of firms net present value of their future profits and cash flows from good environmental practices or performance Endrikat (2016), that impacts market reactions.

From this part of the literature, I can say that there is a general acceptance that the market reacts to ESG related news and announcements, especially the ones related to the environment. The market reacts positively(negatively) to good(bad) ESG related news in general, with some exceptions for positive ESG news. For example, the market might respond negatively to an ESG news, considered positive, of voluntary reduction of greenhouse gases emissions because of the worries linked to the impact of the engagement on financial performances.

## **2.4 MARKET REACTIONS TO FIRM DISCLOSURES**

For voluntary disclosures by companies, the reactions are different compared to news and announcements. Investors, in general, appreciates the disclosure of the sustainability performance of firms, which alters their valuations of the firm (Du et al.,2017). It includes the willingness of the company to provide ESG related information to the public, and the market reacts positively to disclosure from both small and large firms. The reporting firm with superior sustainability performance enjoys higher positive abnormal returns. And the positive abnormal returns are more significant for smaller firms and firms with lower levels of institutional ownership. Investors, in general, appreciates the disclosure of the sustainability performance of firms, which alters their valuations of the firm. (Du et al.,2017)

Du et al. (2017) use event studies with the Fama-French three-factor model to investigate stock reactions to the release of the reports and find both significant cumulative absolute abnormal stock returns and cumulative abnormal trading volumes.

Cordeiro & Tewari (2015) also use an event study to examine investors reactions to the first Newsweek Green ranking in September 2019.<sup>15</sup>Drawing on the stakeholder's

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<sup>15</sup> A multi-dimensional rating of corporate environmental performance based on environmental impact scores (45%), green policy score (45%), and green reputation (10%). The project ranks the 500 largest

theory to develop their hypothesis, Cordeiro & Tewari (2015) examines whether a firm-level contextual variable, firm size, and market legitimacy significantly impacts the market reactions to the disclosure of new, relevant corporate environmental performance in both short and long terms. Like Du et al. (2017), they find that, for the sample of the largest 500 U.S. firms ranked by Newsweek, investors react positively to both general and within the industry ranking of green performance, up to 12 months.

Cordeiro & Tewari (2015) find investors reaction to be significantly influenced by the contextual variables, firm size, and market legitimacy and concluded that larger firms benefitted from the ranking publication. Being one of many authors finding a significant difference in market reactions to firms of different sizes.

Concluding from the literature on market reactions to ESG related news, I deduct that while the market reacts to ESG related news. The market responses are determined by firm size, corporate government, liquidity level of the firm, its resources, and the term of the engagement. The market response is more significant for small firms compared to larger ones. Probably because more information on the larger firms is already available in the market because more information about large firms is already available to the market. While the market reacts negatively to negative ESG related news and announcement, it might respond negatively also to positive ESG news, in cases where the firms involved are small, have limited liquidity, or if the announcement requires an important use of resources over a long period (i.e., Environmental sustainability programs). On the other hand, the market responds positively to ESG related disclosures, especially when the firm involved are small firms.

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publicly-traded companies in the United States (the U.S. 500) and the 500 largest publicly-traded companies globally (the Global 500) on overall environmental performance. The U.S. 500 consists of the 500 largest publicly traded companies headquartered in the U.S. by market capitalization as of 31 December 2013. The Global 500 consists of the 500 largest publicly-traded companies in the world by market capitalization as of 31 December 2013. Source: <https://www.newsweek.com/greenrankings>

**PART 2:**  
**RESEARCH PROBLEM AND METHODOLOGY**

In this section, I explain the research problem and how I intend to answer the related questions.



## Chapter 3. RESEARCH QUESTION

The general literature on the relationship between ESG practices and stock market value is still relatively in its early stages. Most of the studies on the topic focus on the investors perspective of integrating ESG criteria into investment strategies and the impact on portfolio performance. While this aspect of the literature is still inconclusive, there is not enough research from the firm's perspective of how the integration of ESG practices into their activities affects their market value.

With the current growing ESG trend and push for a more sustainable and responsible society globally, investors preference for ESG is evident from the market overreactions to ESG controversies (Cui & Docherty,2020). On the other hand, firms are committing to ESG practices, at a high rate to answer the growing demand for ESG investing<sup>16</sup> (Berman, 2002). This gap in the literature motivates me to provide insights on the market behaviour towards firms that are committing to ESG practices. It is useful for firms to have some information on the understanding of market behaviours towards ESG practices and their changing commitment level to guide the adaptation of their ESG strategy over time.

First of all, I examine the existing literature to get what they suggest regarding the impact of firms ESG commitment on firm market value and the market reactions to ESG related news, announcements, or events. The first point I note from the literature is that the financial markets are changing their requirements to firms that require capital from the market. A growing number of investors and capital providers integrate ESG criteria into their decision-making process, and firms have to adapt if they want to get the best possible financing.

According to several authors, finance is the main reason firms commit to ESG. Devalle et al. (2017), Yasser et al. (2019), Sakiset al. (2016) all agree on this point. Without a doubt, some firms commit to ESG because of the ethical and moral believes of the firm leadership. Looking at the impact of firms ESG commitment on their market value, some authors suggest that ESG related practices (CSR, environmental initiatives) impact firms market value positively through better financial performance (Mackey et al. (2007), Choi

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<sup>16</sup> Investing in responsible, sustainable, and ethical firms

et al. (2010), Jiraporn et al. (2014)). Older studies argue that the causal relationship between positive firm market performance and ESG related practices is unclear and probably flows in both directions (McGuire (1988), Waddock et al. (1997)). These authors also argue that CSR practices have a more significant relationship to prior financial performance than subsequent financial performance. This argument suggests that firms improve CSR practices when they have more resources.

On market reactions to ESG related news, from the existing literature, it turns out that the market reacts differently to good and bad ESG related news, with particular attention to the environmental pillar. I assume that this is due to the economic and reputational costs of settling issues related to the environment. There are several determinants of the nature of market reactions to ESG related news. Firm size, market legitimacy, level of available resources, liquidity level, firm's recent past, and leadership all impact the way the market reacts to ESG related news, announcement, or events. (Gompers et al. (2003), Cremers & Nair, (2005)), Capelle-Blancard & Petit (2017))

I deduct from the literature that, for large firms, the market reacts negatively to negative ESG related news and positively to positive ESG news, but less significant compared to bad news. For small firms or firms with limited resources or liquidity, the reactions are different. While the market reacts negatively to negative ESG related news, the market might respond negatively to positive ESG related news if it does not trust the firm leadership or have worries about other agency issues. The logic behind the unexpected reactions is the evaluation of the market of the impact of the event on the firm's future cash flows, and it appears to be more significant for small firms. This contrast reaction to small firms positive ESG related news does not apply to voluntary disclosures, which is always appreciated by the market, especially for small firms. (Du et al. (2017), Cordeiro & Tewari (2015))

Another particularity of market reactions to ESG related news is on the environmental pillar. Fisher-Vanden & Thorburn (2011) and Cordeiro & Tewari (2015) show that the market reacts positively to general initiatives that do not require important firm resources and engagement but respond negatively to long term environmental specific engagements.

For the role of firms ESG commitment level on the nature of market reactions to news about them, I found that positive ESG news positively impacts firm risk and risk perception by the market (Jo et al., 2012) and that firms ESG commitment can also help build trust between the firm, stakeholders and investors (Lins et al., 2017). From these last findings, I deduct that firms ESG commitment should positively impact the market perception of the firm's risks and the trust in the firm. Leading to my first assumption that firm's level of ESG commitment will positively impact the way the market reacts to news or events about them.

### **About firms with high ESG commitment**

Hypothesis 1 (H1) - The market reactions to ESG related news is less significant for firms with high ESG commitment for the three ESG pillars. This belief is because I assume that the market has better trust and knowledge of these firms, and therefore perceives them to be less risky.

Hypothesis 1a - In the case of positive ESG news, the market would react less to firms with high ESG commitment compared to firms with low ESG commitment. Because they already know and have confidence in the firms ESG practices.

Hypothesis 1b - In the case of negative ESG news, the market will react less significantly to firms with high ESG commitment because they trust these firms and might tend to be patient with them.

### **About firms with low ESG commitment**

A firm's recent past relationship with ESG issues is also an important determinant of market reactions to firms ESG related news. The market reacts positively to positive news for companies with poor CSR history (Krüger, 2015).

Hypothesis 2 (H1) - Market reactions to firms with low ESG commitment are more significant compared to other firms, both for negative and positive ESG news for the three ESG pillars.

Hypothesis 2a - In the case of positive ESG news, the market responds more significantly to firms with low ESG news. Because the market gets new information about the ESG practices of the firm and their perception of the firm value will probably change significantly.

Hypothesis 2a - In the case of negative ESG news, the market responds more abruptly to firms with low ESG news. Because they do not trust these firms and will not be patient with them, they will rush to remove them from their portfolios.

These hypotheses should be repeatedly tested before concluding on the relationship between ESG commitment and market reactions. But as already noted, some market participants are demonstrable less than rational (Malkiel, 2003), the market can act differently from expectations. This research aims to provide a first test of the above hypotheses. Given the limited time and resources for this master's thesis, I will use two general events to investigate how the market reacts to the same event for firms with different levels of ESG commitment.

Event 1 (E1), the election of Joe Biden in the 2020 presidential election of the United States positively impacts firms investing in ESG in the US. The politics of the previous administration rolled back regulations that aimed at integrating ESG criteria into firms' activities and investment strategies.

The date of study for Event 1 is 9/11/2020. The day majority of US news networks declare Joe Biden the winner of the 2020 US presidential election by the majority of US news networks was on Saturday 7//11/2020.

Event 2 (E2), the declaration by the WHO<sup>17</sup> on the 11th of March 2020 that the COVID-19 disease had evolved into a pandemic.

Question - The research question specific to these two events is if the market reactions to negative and non-negative events are less significant for firms with high ESG commitment compared to firms with low ESG commitment.

Investigating these events will partially test the above hypothesis since these are general events, but will provide insights into how a general shock impacts firms with high ESG commitment versus firms with low ESG commitment.

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<sup>17</sup> World Health Organization

## **Chapter 4. METHODOLOGY AND DATA**

This study is carried out using two main methods.

- The classification and grouping of firms based on their ESG commitment, using ESG scores and ratings.
- Event studies on the different groups of firms.

### **4.1 FIRMS ESG COMMITMENT**

Firms ESG commitment is measured using firms ESG ratings and scores. To improve the accuracy of commitment measurement and reduce the impact of biases from rating agencies, firms ESG ratings should be collected from several rating agencies. Firms with consistent good ESG scores can be labelled committed, and firms with consistent negative ratings are labelled firms with low commitment. For this study, I use ratings from 2 rating agencies. The ESG ratings of the same firm from the two rating agencies are compared, and firms with above-average ESG ratings from both agencies are labelled to be highly committed (high ESG commitment), given that, for firms to have above-average ratings from both agencies, the chance is high that the firm is actively managing its ESG risks and controversies. Firms with below-average ratings from both agencies are labelled firms with low ESG commitment. The other firms in between are considered to have a moderate ESG commitment.

There are three dimensions of firms practices and activities that determine the firm's commitment to ESG in general. The environmental dimension, which deals with the environmental impacts of the firm's activities and practices. The social dimension, the expectation that a business will contribute to society in return for legitimacy. The governance dimension is on how the company is managed, the company's strategy and leadership. The ratings of firms also exist at the individual pillar levels, environmental, social, and governance ratings. The grouping and classification of firm's commitment can be applied at the pillar level for a more in-depth study. The use of global ESG ratings gives the possibility to compare firms among different agencies but does not give enough information at the industry level. This is because the weight and importance of each pillar vary across industries and different rating agencies. For this study, only the ESG global

ratings are used. Nevertheless, the firms must be doing well on average in the three pillars to have a good ESG rating globally.

There are several providers of ESG ratings. They use different criteria and cover various topics and source information differently. See figure 1 below for an insight into the difference among the major providers. For this study, I use free of charge and accessible web tools from two comprehensive data providers<sup>18</sup>, Sustainalytics and MSCI. They cover all three ESG pillars and use a combination of publicly available data from media, non-governmental organizations and company reports, and household data.

	Bloomberg	MCSI	S&P SAM (DJSI)	Sustainalytics	ISS ESG (formerly ISS-oekom)	RepRisk
<b>Cover</b>	over 11'500 companies	13'500 companies	over 7'500 companies (by invitation)	over 11'000 companies	over 5'000 companies	over 145'000 companies
<b>Sources</b>	<ul style="list-style-type: none"> <li>- Disclosure of the companies</li> <li>- Multiple ESG third party providers</li> </ul>	<ul style="list-style-type: none"> <li>- Disclosure of the companies</li> <li>- Databases (government, science, NGOs)</li> <li>- news and media</li> </ul>	<ul style="list-style-type: none"> <li>- Sector-specific questionnaire</li> </ul>	<ul style="list-style-type: none"> <li>- Disclosure of the companies</li> <li>- Media</li> <li>- NGOs</li> </ul>	<ul style="list-style-type: none"> <li>- Disclosure of the companies</li> <li>- Media</li> <li>- NGOs</li> <li>- Science</li> </ul>	<ul style="list-style-type: none"> <li>- Media</li> <li>- Other public information</li> <li>- Explicit exclusion from corporate reporting</li> </ul>
<b>Number of topics</b>	120	37	~ 20-30 (branch-specific)	~ 40 (industry specific)	Up to 100 (mainly industry-specific)	86
<b>Participation</b>	Companies can request updates at any time	Companies are invited to verify data	Companies fill out questionnaire	Companies are invited to provide feedback and additional data	Companies are invited to provide feedback and additional data	No interaction
<b>Scale</b>	Off 100	AAA-CCC	0 – 100	0 – 100 5 Risk level	A+ to D-	0 – 100 AAA to D
<b>Timing</b>	Daily updated	Ongoing monitoring, annual in-depth review	Yearly	Ongoing monitoring, annual in-depth review	Yearly	Daily updated

**Figure 1** - Differences among the major ratings.

The figure shows the differences among the major ratings. The number of companies they cover, their sources of information, the number of topics they address, how companies can participate, their rating scale and how often they update their ratings, from daily to yearly.

SOURCE: ESG Ratings and Rankings: why they matter and how to get started - December 7, 2020 (Huck-Wettstein, 2021)

Given that one of the ESG rating agencies provides number scores (Sustainalytics) and the other provides letter scores (MSCI), I have to bring the ratings to the same dimension. I choose to transform the ESG scores from Sustainalytics to letters scores using Table 1, obtained from the explanation of ESG scores from the website of Sustainalytics.

<sup>18</sup> In contrast to fundamental data providers like Bloomberg and Refinitive (formerly Thomson Reuters) that focuses on data from the company's reports and publicly available data or specialized data providers like TruCost covering one or two aspects of ESG (i.e., Environmental (Climate change).

**Table 1 – Letter grades equivalence of Sustainalytics ESG score**

<b>LETTER RATING</b>	<b>ESG SCORE</b>
<b>AAA</b>	0-10
<b>AA</b>	10-15
<b>A</b>	15-20
<b>BBB</b>	20-25
<b>BB</b>	25-30
<b>B</b>	30-40
<b>CCC</b>	40+

Once both Ratings are of the same dimension, they are jointly used to classify the individual firms ESG commitment. Firms with combinations of AAA, AA, and A ratings from both agencies classified as firms with high ESG commitment and firms with combinations of BB, B, and CCC ratings are labelled as firms with low ESG commitment. Every other combination of ratings is considered moderate.

- Highly ESG committed firm: Combinations of ratings between AAA and A from both agencies.
- Moderate ESG committed firm: Every other combination, not considered as firm with high commitment or as a firm with low commitment. Average rating from both agencies and/or high rating from one of the agencies and low rating from the other.
- Low ESG committed firm: Combinations of ratings between BB and CCC class rating from both agencies

See the complete list of the firms and their commitment level on Table 5 : Firm's data and ESG ratings from Sustainalytics and MSCI. In the appendix. After classifying all the firms based on the scores from both agencies into low ESG commitment, moderate ESG commitment, and high ESG commitment, I use the firm's tickers<sup>19</sup> to obtain their historical stock market prices around the event study.

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<sup>19</sup> A ticker symbol is an abbreviation used to uniquely identify publicly traded shares of a particular stock on a particular stock market. A stock symbol may consist of letters, numbers or a combination of both. (Wikipedia)

## 4.2 EVENT STUDY AND THE EMH

The other method used in this work is the event study. An event study is a popular methodology used in finance and economics to study the impact of news and announcements on the financial markets. (For both macroeconomic events like the central bank announcements of changes in interest rates, of inflation projections and economic growth projections, regulations, and firm-specific events like earnings announcements, mergers and acquisitions, divestitures, credit ratings, product launch.) Event studies rely on the semi-strong form of market efficiency of the efficient market hypothesis (EMH) <sup>20</sup>, formalised by Eugene Fama in 1965, which assumes that market prices fully reflect all publicly available information. This form of market efficiency implies that it is impossible to gain excess returns based on existing information, therefore, if the market is "semi-strong-form efficient", the effects of an event that contains new information will be reflected immediately in stock prices. (MacKinlay, 1997).

Event studies have evolved to become the most reliable tool for investigating the impacts of firms related news and announcement on a firm market value using firms stock market prices. From the first published event study on the effect of the stock split on market stock prices by James Dolley in 1933, event study methodology has improved over the years thanks to the contributions of Ray Ball and Philip Brown (1968), Eugene Fama et al. (1969), Stephen Brown (1980), and Jerold Warner (1985). (MacKinlay, 1997).

Markets can be efficient in this sense even if they sometimes make errors in valuation, as was certainly true during the 1999-early 2000 Internet "bubble." Undoubtedly, some market participants are demonstrable less than rational. As a result, pricing irregularities and even predictable pattern stock returns can appear over time and even persist for short periods. (Malkiel, 2003)

Famous critics of the EMH claim that the only way an informed trader could earn a return from information gathering is if they can use their information to take a better position in the market than uninformed traders. But, If the EMH claims that prices reflect all available information at any given times were true, informed traders will not be able

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<sup>20</sup> Financial markets are efficient if current asset prices fully reflect all currently available relevant information. The intuition underlying the EMH is the invisible hand of the marketplace. In a quest for profits, competition among speculators to buy undervalued assets or sell overvalued assets will quickly drive expected gains to trade to zero.



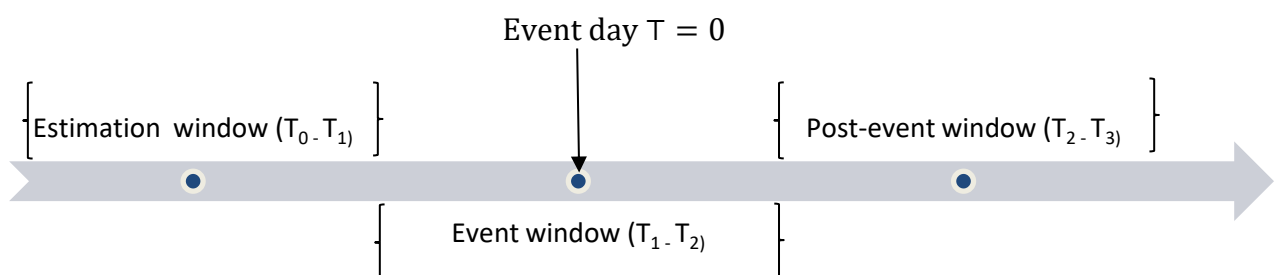
to gain any return from their work. Therefore, when the efficient market hypothesis is true and information is costly, competitive markets break down. (Grossman & Stiglitz, 1980). The arguments from Malkiel (2003) and Grossman & Stiglitz (1980) on EMH are useful to keep in mind the limitations of events studies linked to the assumptions of EMH.

This thesis uses a standard event study methodology using the stock market adjusted daily prices around the events to calculate the expected returns from the estimation window and the actual returns from the event window.

The first step to an event study is to decide on the event to study, the event day that best represents the event, the anticipation and adjustment periods around the event day, and the estimation window for the expected return. The second step is to collect the daily stock market prices to calculate the normal and abnormal returns. The last step is to test the significance of the abnormal and cumulative abnormal returns and represent them graphically to draw conclusions.

For this study, these steps are illustrated below.

- For E1, the announcement day is designated day zero. A 63 days event period, 42 days before the event, day 0 is the event, and 21 days after the event. The estimation window for the parameters is 252 days, and no post-event window in the study.
- For E2, the announcement day is designated day zero. A 63 days event like E1, 21 days before the event, 0 as the event, and 42 days after the event. The estimation window for the parameters is 252 days, and no post-event window like for E1.



**Figure 2 - Event study windows**

$T_0 - T_1$  is the estimation window that establishes the normal expected return.

$T_1 - T_2$  is the event window where the markets absorb the information.

$T_2 - T_3$  is the post-event window, used to examine the returns after the event period.

After the different windows have been stabilized, I calculate the abnormal returns for each group of firms in the event window.

The “abnormal” return for each of the days being studied for each firm in the sample is calculated as the actual return less the expected return. Different economic and statistical models<sup>21</sup> can be used to calculate firms expected return, depending on the availability of data and the circumstances, from the simplest mean return model to the multifactor Arbitrage Pricing Theory (APT) model.

Abnormal return ( $AR_{i\tau}$ ) = Actual realized return ( $R_{i\tau}$ ) – Expected (normal return) ( $E(R_{i\tau}|X_\tau)$ )

$$AR_{i\tau} = R_{i\tau} - E(R_{i\tau}|X_\tau) \quad (\text{Eq - 1})$$

For, every firm  $i$  studied for the event date  $\tau$ ,  $X_\tau$  is the condition information for the normal return model.

For this thesis, due to data availability and circumstances, I use CAPM model for Event 1 (E1) and the constant mean return model is used for Event 2 (E2).

The constant mean returns model (CMM), which defines the normal expected return as the simple mean of the return in the estimation window, assumes the mean return of a given security to be constant through time, therefore  $X_\tau$  in this model is constant.

$$AR_{i\tau} = R_{i\tau} - \bar{R}_i \quad (\text{Eq - 2})$$

Where,  $\bar{R}_i$  is the mean return for the estimation period,  $R_{i\tau}$  is the actual return.

On the other hand, the market model (MM) assumes that there is a stable linear relationship between the market return and the security return, and also assumes normality of assets return,  $X_\tau$  in this model is the market return.

$$AR_{i\tau} = R_{i\tau} - \hat{\alpha}_i - \hat{\beta}_i \cdot R_{m\tau} \quad (\text{Eq - 3})$$

Where,  $\hat{\alpha}_i$  &  $\hat{\beta}_i$  are the estimated alpha (the intercept of the linear relationship) and beta (the slope of the linear relationship) parameters of the assets in respect to the market,  $R_{m\tau}$  is the actual market return. In this study, I use the S&P500 index as the market

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<sup>21</sup> Economic models: Rely on assumptions on investors behaviours and are not based only on statistical assumptions. The capital asset pricing model (CAPM), the arbitrage pricing model (APT). Statistical models: Do not rely on any economic arguments and follow only from assumptions concerning the behaviour of asset returns. The market model (single index model), the return on a market index, the simple constant mean return model.

benchmark and the market model parameters are estimated using the ordinary least square (OLS).

I look at the average effect of the announcement rather than examining each firm separately. The single day's abnormal return for the event period is added up from the beginning of the event period to compute the cumulative abnormal return.

The last parts of event study are centred around plotting the graph of the abnormal returns around the event day and the cumulative abnormal returns, and the statistical test of the significance of the abnormal and the cumulative abnormal returns using T-statistics, evaluating whether the calculated abnormal returns are on average different from zero.

The null hypothesis ( $H_0$ ) for the T-test is that the event has no impact on the behaviour of the returns. *Under the null hypothesis, conditioned on the event window market returns, the abnormal returns will be jointly normally distributed with the zero conditional mean and conditional variance.* (MacKinlay, 1997)

Therefore,

$$AR_{iT} \sim N\left(0, \sigma^2(AR_{iT})\right)$$

The cumulative abnormal return is the sum of the abnormal returns in the event period,

$$CAR_{(T_1, T_2)} = \sum_{T=T_1}^{T_2} AR_{iT} \quad (\text{Eq - 4})$$

For the T-statistic, the z-score is calculated as,

$$Z_{value} = \frac{(CAR_{(T_1, T_2)} - \mu)}{\sigma(AR_{iT})} \quad (\text{Eq - 5})$$

A two-tail test is used for the analysis,

$H_0$ : The event has no impact on the stock returns ( $AR = 0$ )

$H_1$ : The event has an impact on the stock returns ( $AR \neq 0$ )

For both events, the null hypothesis  $H_0$  is rejected at significance level of 95% when z-value falls in the rejection region ( $\pm 1.96$ ) or with a p-value less than 5%.

The abnormal and cumulative abnormal returns, together with the relative t-tests are examined to draw conclusions on the events.

### 4.3 DATA AND EVENTS

The following paragraphs explain the three different datasets collected and how they have been processed for this study.

The initial objective of this thesis is to investigate the impact of good and bad ESG news related to the three ESG pillars would require an extensive collection of data related to both firm-specific and general<sup>22</sup> ESG news. The collected events data should be grouped into good ESG news for the environmental pillar, good ESG news for the social pillar, good news for the governance pillar, bad ESG news for the environmental, social, and governance pillars based on the impact of the news on the factors that contribute to ESG contributing events<sup>23</sup>. The ESG ratings of the individual firms at the moment the event occurred should be collected and integrated into the data, together with the stock market prices of the firms should be collected around the different events. For this study, the annual ESG rating of the firm is used, instead of the rating at the moment of the event, there should not be much different given that the ratings are updated periodically.

Good ESG news is announcements, events, or initiatives that improve firms' environmental, social, and governance practices, impacting positively the firms' ESG score or rating. Bad ESG news is announcements or events that limit or worsen firms' ESG practices and therefore may negatively impact firms' ESG score or rating. For this master's thesis, given the limited resources at hand, two general events are selected. One that I assume to be a positive event for firms committing to ESG (Event 1), and one that I assumed to be a negative news for all firms (Event).

The information of the dates of the announcements were collected from official web pages of the major U.S. news outlets for E1, 7<sup>th</sup> of November 2020<sup>24</sup>, and the website of the WHO for E2 date of event 2 is the 11<sup>th</sup> of March 2020<sup>25</sup>. For E1, the announcement

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<sup>22</sup> News that affects different firms across different industries.

<sup>23</sup> Example of contributing events is Business Ethics Incidents: Accounting and Taxation, Animal Welfare, Bribery and Corruption, Business Ethics, Intellectual Property. Customer Incidents: Anti-Competitive Practices, Data Privacy and Security, Quality and Safety. Employee Incidents: Labour Relations, Occupational Health and Safety. Operations Incidents: Emissions, Effluents and Waste, Energy Use and GHG Emissions, Land Use and Biodiversity, Community Relations, Sanctions, Social Impact of Products.

<sup>24</sup> Majority of the major US networks announced the victory of Joe Biden on the 7<sup>th</sup> of November. Both Joe Biden (the presidential candidate) and Kamala Harris (the vice-presidential candidate) also gave their victory speeches that same evening. Being it a Saturday, the next trading day is the 9<sup>th</sup> of November.

<sup>25</sup> The day the World Health Organization (WHO) declared that the COVID 19 is officially a pandemic.

date is a Saturday, therefore the next stock market date (9<sup>th</sup> of November) is used as the event day.

The ESG ratings and scores of the firms are collected from Sustainalytics and MSCI websites, and the stocks market prices of the firms are obtained from yahoo finance using the firm tickers, with the package Quantmod on R programming. The additional information on the selected firms were collected manually from the firm's website and yahoo finance webpage.

To avoid biases, I randomly selected 221 companies globally from 31 different countries<sup>26</sup>. The countries are grouped into 3 macro regions, EMEA (Europe, Middle East, and Africa), America (North and south America), and Asia (Including China, India, Russia, Japan, South Korea, and South east Asia region) and 10 industrial sectors, see Table 2 below.

**Table 2: Number of firms in the study by region and industry**

INDUSTRY	EMEA	AMERICA	ASIA	TOTAL
AUTOMOBILES	7	3	14	24
FOOD PRODUCTS	6	11	6	23
OIL & GAS PRODUCERS	10	7	8	25
PHARMACEUTICALS	10	13	10	33
RETAILING	4	10	8	22
SEMICONDUCTORS	2	8	3	13
SOFTWARE & SERVICES	4	14	4	22
TECHNOLOGY HARDWARE	3	8	20	31
TEXTILES AND APPAREL	10	12	6	28
<b>TOTAL</b>	<b>56</b>	<b>86</b>	<b>79</b>	<b>221</b>

#### .4.3.1 ESG ratings data

The ESG ratings are the most important data for this study as it permits the proper classification of the selected firms into their commitment groups (high ESG commitment, moderate EGS commitment, and low ESG commitment). Given the importance of ESG investing today, there are numerous providers of ESG ratings and scores and many studies view this proliferation of rating agencies and the divergences across the different ratings

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<sup>26</sup> Argentina, Austria, Brazil, Canada, China, Colombia, Denmark, Finland, France, Germany, India, Indonesia, Ireland, Italy, Japan, Luxembourg, Netherlands, Norway, Poland, Portugal, Russia, Saudi Arabia, South Africa, South, Korea, Spain, Sweden, Switzerland, Taiwan, Thailand, United Kingdom, United States.

as one of the major challenges in ESG investing moving forward. The choice to use two different ratings is to increase the power of the classification of the firms as committed and non-committed firms. As seen in the literature, using just one rating agency can lead to biases and ESG commitment level can be too dependent on the rating agency used.

ESG ratings are collected from Sustainalytics and MSCI web tools, both provide information on firms risks management and exposure, while only Sustainalytics provides information on the firm's controversy. Firms with good risk management, low-risk exposure and controversy have between average and high ESG scores. Firms with low commitment usually have high-risk exposure and controversy, with weak risk management.

#### *.4.3.1.1 MSCI Ratings*

*MSCI ESG ratings are a comprehensive measure of a company's long-term commitment to socially responsible investments (SRI) and environmental, social and governance (ESG) investment standards. In particular, the MSCI ESG ratings focus on a company's exposure to financially relevant ESG risks.<sup>27</sup>*

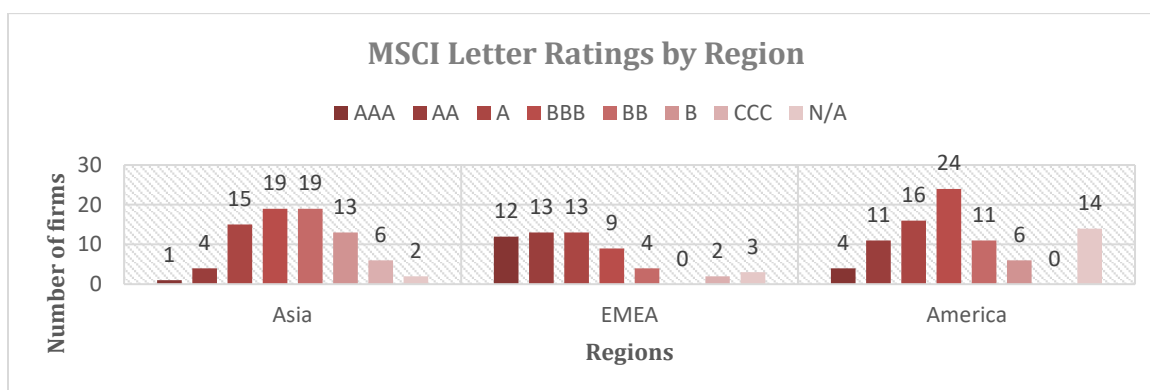
Firms ESG ratings are accessible through the corporate search tool from the MSCI<sup>28</sup>. The tool is free of charge and it permits the collection of information manually on firms historical ESG rating, up to 5 years. The ESG performance of each firm is also compared to industry peers. The MSCI rating provides a global ESG rating of the firm ESG performance, based on the firms ESG risks exposures and ESG risks management. The rating goes from AAA (best rating) to CCC (worst rating), see Annex 1 for the full classification.

At of the 221 firms selected, 19 are not rated by MSCI (see the N/As in the Table 5 : Firm's data and ESG ratings from Sustainalytics and MSCI.) I manually collected data on the historic ESG ratings (letter score) of the firms rated from 2016 to 2021 and their performance compared to their industry peers. From the data collected, majority of the European firms have higher ESG ratings compared to their American and Asiatic peers.

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<sup>27</sup> Investopedia, consulted on the 4TH of April 2020

<sup>28</sup> <https://www.msci.com/our-solutions/esg-investing/esg-ratings/esg-ratings-corporate-search-tool/issuer>



**Figure 3 - MSCI ESG ratings by regions, with numbers of firms**

The selected firms are well distributed across different industries. The majority of the firms have an average ESG rating (between A and B, independently from the region and industry). The worst industrial sector according to MSCI rating is automobiles, with no firm from this industry among the firms with the highest ratings, and 5 firms at off 24 in the industry have among the worst possible rating. On The other hand, textiles and apparel have the best average ESG rating, with 4 firms with AAA level rating, and no firms below BB level. This result is biased by the fact that 9 of the 19 firms without a rating from MSCI are from the textiles and apparel industry. See Annex 1 for more information on the different sectors of the firm.

Globally, of the 221 firms, 50 (23%) have above-average risk management according to the ratings from MSCI, 118 (53%) have average ESG risk management, and 34 (15%) have a below-average risk management rating. While 19 (9%) firms were not rated.

#### *.4.3.1.2 Sustainalytics ESG Scores*

Like for MSCI, the selected firms ESG ratings are collected manually from the Sustainalytics website<sup>29</sup> by using the tickers to search for the company's rating on the search tool provided on the webpage. In terms of the number of firms, Sustainalytics provided a more completed data, all the 221 firms are rated or at list got an ESG score. The ESG scores of Sustainalytics focuses more on the firm's exposure to industry-specific material ESG risks and how well the company is managing those risks. Other than the ESG scores, they provide additional information on firms' ESG risks exposures<sup>30</sup> and

<sup>29</sup> <https://www.sustainalytics.com/esg-ratings>

<sup>30</sup> Exposure refers to the extent to which a company is exposed to different material ESG issues, which takes into consideration subindustry and company-specific factors such as its business model.

controversies related to ESG<sup>31</sup>, together with a rating on the firms ESG risks management<sup>32</sup>.

The ESG scores for Sustainalytics are measured inversely, the lower the ESG score, the better the firms ESG performance. Of the 221 firms, the majority (117) are rated firms with average risk management, 84 are rated as firms with strong ESG management, while just 20 are labelled as firms with weak risk management practices (the majority of which are Asiatic firms), see Figures 5 and 6 below. The visible patterns in the MSCI ESG ratings that the majority of firms in the western hemisphere have better ESG rating on average compared to their peers in the eastern part of the world is confirmed in Sustainalytics data, Figure 6. The EMEA region appears to have better ESG ratings and risk management on average.

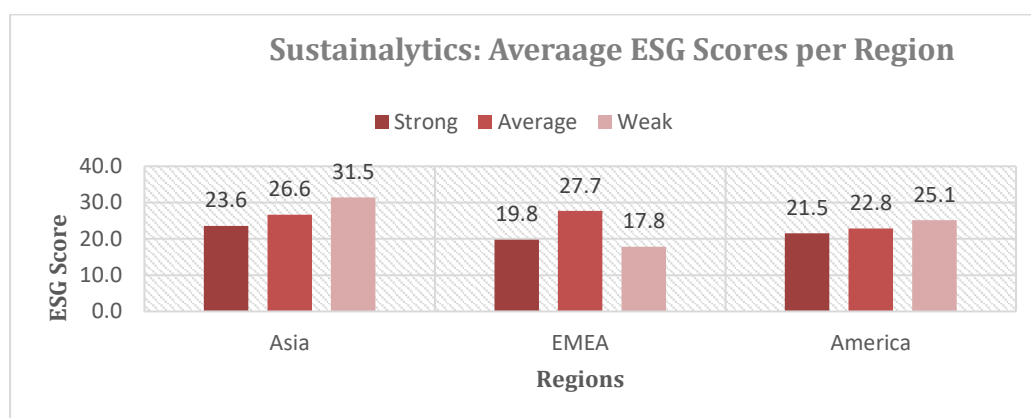


Figure 4 - Average ESG score by region and risk management level (colour).

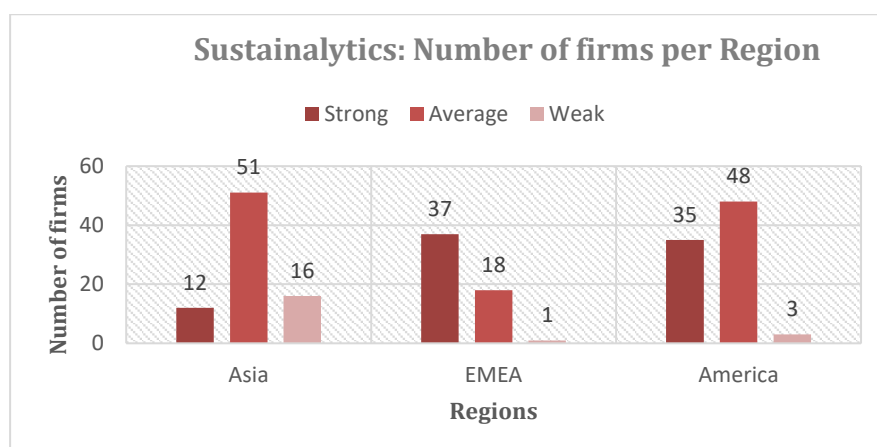


Figure 5 - Number of firms per risk management level (colour).

<sup>31</sup> Controversies can act as signals that management initiatives were insufficient or ineffective by identifying companies involved in incidents that may negatively impact stakeholders, the environment or the company's operations.

<sup>32</sup> Management refers to how well a company is managing its relevant ESG issues. The management score assesses the robustness of a company's ESG program, practices and policies.



American firms have the most controversies, where the data is available, but have good ESG risk management on average. Firms with lower scores have less controversies in general. See Annex 2 for more details. Looking into the firms' individual ratings, I found important divergence between the ratings of MSCI and Sustainalytics for about half of the firms. For example, the firm Equinor ASA had a very bad ESG score with Sustainalytics (32.1), but was rated a triple A (AAA) by MSCI, confirming the issues highlighted in the literature of divergence of the different ESG ratings from different rating agencies and for which I decided to use a joint ESG ratings from two different agencies.

From the Sustainalytics ESG scores, it is also evident that some industries have better scores than others. The textiles and apparel industrial sector confirm to be the industry with the best ESG score on average, while the oil and gas industry, together with the food products industries have the worst scores on average. The results of the average ESG ratings contradicts the rating of MSCI where the firms in the automobile industry had the worst scores.

After collecting and consolidating the ESG ratings from the two rating agencies, and grouping the firms based on their ESG commitment level. I move forward to collect the stock market prices for the related periods.

#### **.4.3.2 Stock market data**

The selected stocks historical prices are collected from yahoo finance from April 01 2018 to April 01 2021, to have enough data for the estimation window. Checking for inconsistency and missing data in the prices, I decided to exclude 7 firms out of the 221 firms, because of lack of data (Tiffany & Co. and Fiat Chrysler Automobiles N.V.) and not sufficient data for the period to be studied (JD.com, Inc., Alibaba Group Holding Ltd., Saudi Arabian Oil Co., Prosus NV, Infineon Technologies AG).

Given that the firms are traded in different stock markets, the holidays are sometimes different and therefore some trading days were missing in some firms. Holidays are removed from the data before the calculations are computed, which should not affect the returns computation, since log-returns are time additive and consistent compared to simple returns. The individual assets compounded logarithmic returns are calculated using the adjusted daily prices. After the division of the firms into highly ESG committed firms, moderate ESG committed, and low ESG, the event study is done using the calculated firm's returns to compute the average daily return per group.

## **PART 3:**

# **STUDY AND CONCLUSION**

This section presents the empirical study and the results.

## Chapter 5. EMPIRICAL STUDY AND RESULTS

After removing seven companies from the study due to insufficient data, I used the 84 U.S. firms for Event 1 and 214 global firms for Event 2. This chapter reports the results from the event studies and the respective statistical test. The results from the event studies are discussed in the concluding session.

### 5.1 EVENT 1 (E1)

Event 1 examines the impact of the election of Joe Biden as the 47<sup>th</sup> president of the United States of America (U.S.A.), which I consider good news for investors interested in ESG and for firms committing to ESG given the direction taken by the previous administration to limit the integration of ESG in investments strategies. For E1, the CAPM model is used to compute the expected returns of the firms, with the S&P 500 as the market benchmark. The event day considered is the 9<sup>th</sup> of November 2020, given that the day of announcement was a Saturday (7<sup>th</sup> November 2020)<sup>33</sup> and the stock market was closed. 252 days of estimation window is used to compute the expected return. 63 days for the event window, 21 days for the anticipation period, and 42 days for the adjustment period.

The abnormal and cumulative abnormal returns, Figure 11 and Figure 10 respectively, for the different groups of firms related to Event 1 shows no visible impact for firms that have high and moderate ESG commitments. While the group of high ESG committed firms, abnormal returns have a stable negative trend in the event window (CAR = -5.33%), the group of firms with low ESG commitment and the group of firms with moderate ESG commitment have positive abnormal returns in the event window (32.06% and 6.98%) respectively. Highly committed firms (HC) appear to be the least volatile with an annual standard deviation of 7.76%, compared to that of firms with moderate commitment (MC), 9.65%, and firms with low commitment (LC), 26.50%. On the event date, LC had a significant upward jump, signalling that there's a possibility new positive information was incorporated into the market price that day, regarding the group of low commitment. The HC group of firms instead had a moderate downward movement that is not significant (-

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<sup>33</sup> Declaration of victory – announcements made by major US networks and by the presidential campaign.

1.51% abnormal return on the event day). The results of Event 1 implies that the market responded differently to Event 1 for the three different groups with an important difference between the group of firms with low ESG commitment (6.67% abnormal return on the event day) and the other two groups.

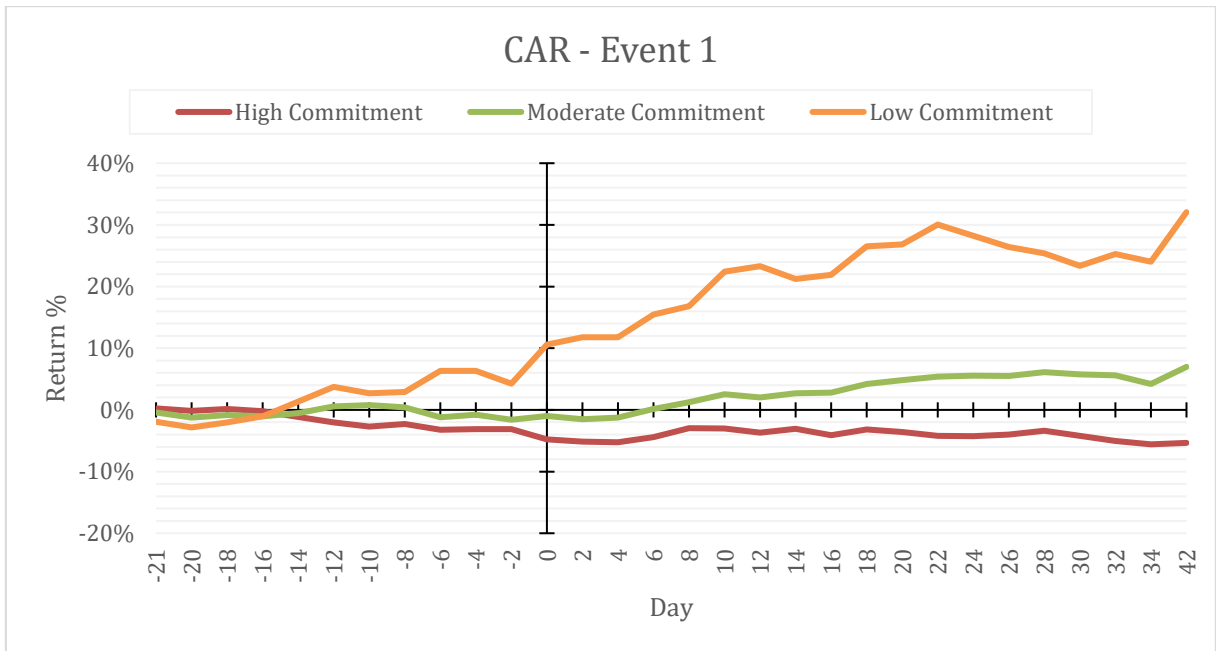


Figure 6 - Cumulative abnormal returns for Event 1 by firms ESG commitment groups

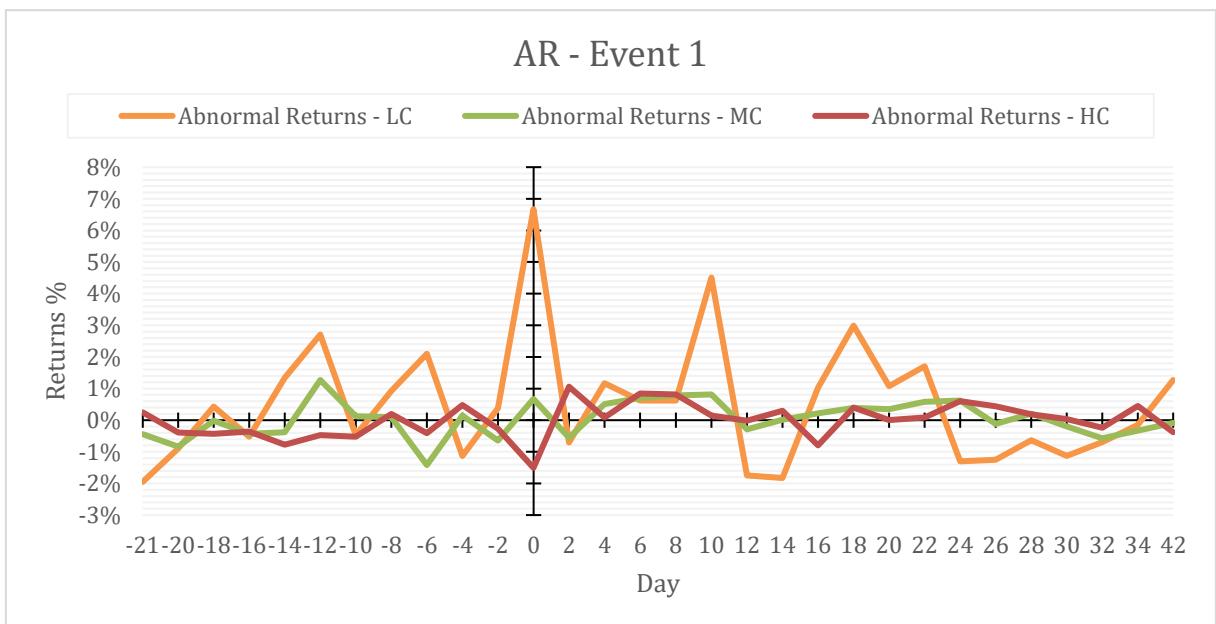


Figure 7 - Abnormal returns for Event 1 by firms ESG commitment groups

I used a 2-tail t-test to test how likely is it that the abnormal return occurred by chance.

With the null hypothesis:  $H_0$ : The event has no impact on the stock returns ( $AR = 0$ )

Table 4 provides the results of the statistical test for Event 1. Using a 95% significance level, the t stats fell in the rejection window twice, for the abnormal returns on the event day for the group of firms with high commitment (HC) and the group of firms with low commitment (LC). For every other case, the null hypothesis cannot be rejected. I therefore conclude that the event had a statistically significant impact on the LC and HC groups of firms only on the event day but there was no significant anticipation by the market and no significant adjustment after the event. There was no significant impact on firms with moderate ESG commitment before, during, and after the event. From the results, I can deduct that new information affecting firms with high and low ESG commitments have been incorporated into the market on the event day and that the announcement impacted the market value of the three groups of firms differently.

**Table 3 : Test of significance of Event 1 for the different groups of firms**

		HC	MC	LC
Standard Deviation		0.49%	0.61%	1.67%
Standard Deviation (21 days)		2.24%	2.79%	7.65%
Standard Deviation (42 days)		3.17%	3.94%	10.82%
Standard Deviation (252 days)		7.76%	9.65%	26.50%
Return (CAR)	Event	-1.51%	0.67%	6.67%
	Anticipation	-3.27%	-1.66%	3.93%
	Adjustment	-0.56%	7.97%	21.46%
	Total	-5.33%	6.98%	32.06%
T-stat (CAR)	Event	-3.08	1.10	4.00
	Anticipation	-1.46	-0.59	0.51
	Adjustment	-0.18	2.02	1.98
	Total	-0.69	0.72	1.21
P value (CAR)	Event	0.23%	27.08%	0.01%
	Anticipation	14.58%	55.27%	60.82%
	Adjustment	86.01%	4.42%	4.84%
	Total	49.27%	47.01%	22.75%

## 5.2 EVENT 2 (E2)

For event 2, the event day is the day the WHO declared that the COVID-19 disease turned into a global pandemic. The declaration was made by the WHO director-general Tedros Adhanom on the 11th of March 2020. On this day, the financial markets were opened, so the same day is used for the study.

Given that the firms used for these studies are from different markets globally and there is no relevant benchmark that covers all financial markets, a constant return model is used for this event. As in E1, a 252 days estimation period is used to compute the expected return. In the 63 days of event window, 42 days for the anticipation period and 21 days for the adjustment period. I chose to inverse the anticipation and adjustment windows compared to Event 1 because I expect a more significant anticipation of this event, given that the health got gradually worse in the months before the declaration.

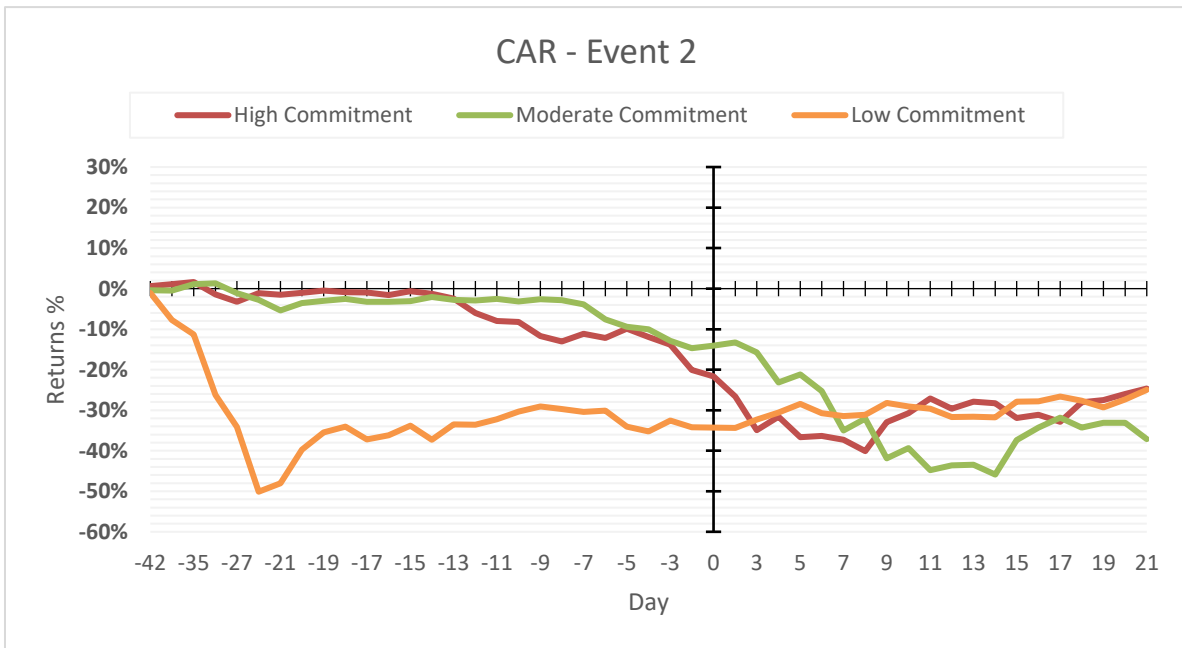
The abnormal and cumulative abnormal returns of Event 2 are represented in Figure 13 and Figure 12 respectively.

While the event was largely anticipated for group of firms that have low ESG commitment, important negative reaction (up to 50% drop) between day -42 and day -27, the value drop came much later for the other two groups of firms (between day -11 and day 9). While all three groups of firms resulted in losing around the same market value during the event window, the returns show that the group of firms with low ESG commitment resisted less to the crisis and their value fell much faster than the groups of firms with moderate and high ESG commitments.

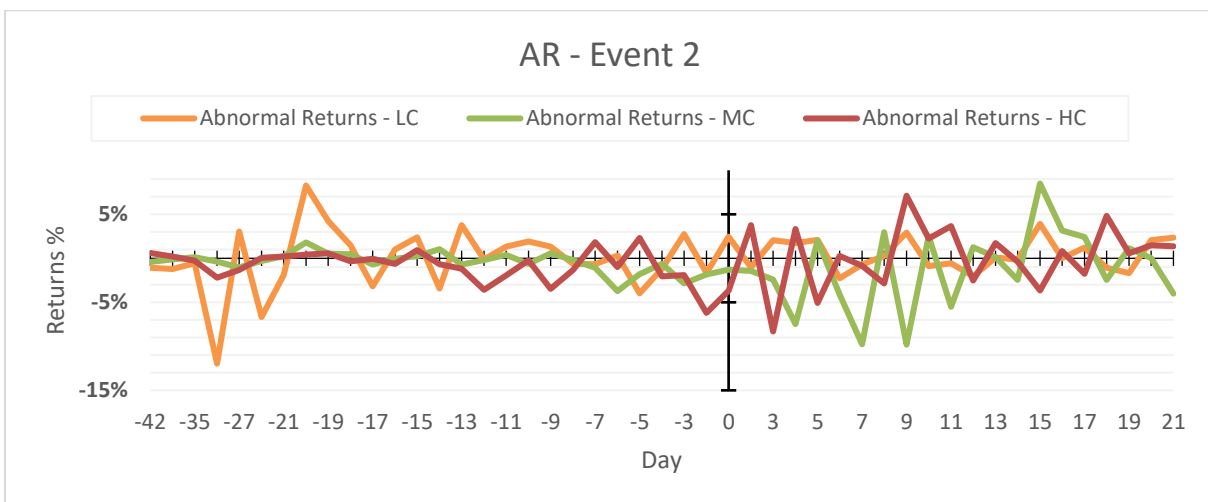
The HC group confirms to be less volatile, with a standard deviation of 21.43%, compared to 22.61% and 25.18% standard deviation for MC and LC respectively. All three groups of firms had negative trends in the event window, given that it is due to a global health crisis. With a CAR of -24.65% for HC, -37.09% for MC, and -24.96% for LC, in the period.

On the event day, highly committed firms (HC) appear to perform the worst among the different groups of firms with an AR of -3.68% compared to -1.31% and +2.46% for a moderate (MC) and low commitment firms. This important difference can be explained by the large anticipation of the market on the impact of the event on the LC group compared to the HC and MC groups, CAR in the anticipation period was -36.73% on the event day,

compared to -17.95% and -12.77% for HC and MC respectively. The adjustment period was also calm for the HC group without much movement of the market prices of the firms. From the results, it appears that the market anticipated the impact for the LC groups, waited longer to act on the HC group and the MC group after the event. After the announcement day, the market had a stronger negative reaction to the group of firms with moderate ESG commitment. Finally, all three groups of firms lost around 40% of their market value in the event window.



**Figure 8 - Cumulative abnormal returns for Event 2 by firms ESG commitment groups**



**Figure 9 - Abnormal returns for Event 1 by firms ESG commitment groups**

See Table 5 reports the statistical test of the abnormal and cumulative abnormal returns of Event 2 for the different groups of firms. I also used a 2-tail t-test to test how likely is it that the abnormal return occurred by chance in E2.

With the null hypothesis or no news expectation,  $H_0$ : The event has no impact on the stock returns ( $AR = 0$ )

As visible also in the graph, the announcement on the event day was significant for the HC group and not for MC and LC groups. But the MC and LC groups had a more significant market adjustment and anticipation periods. The total CAR fall in the acceptance zone for all three groups, so I cannot reject the null hypothesis that the impact of E2, globally, was insignificant for the three groups of firms. I can deduct on the other hand that, at a 95% significance level, the market reactions were different for the three groups of firms. The announcement on the event day was significant for the HC group, the adjustment period was significant only for the MC group, and the anticipation period was significant only for the LC group.

**Table 4 : Test of significance of Event 2 for the different groups of firms**

		HC	MC	LC
	Standard Deviation	1.35%	1.42%	1.59%
	Standard Deviation (42 days)	8.75%	9.23%	10.28%
	Standard Deviation (21 days)	6.19%	6.53%	7.27%
	Standard Deviation (225 days)	21.43%	22.61%	25.18%
Return (CAR)	Event	-3.68%	-1.31%	2.46%
	Anticipation	-17.95%	-12.77%	-36.73%
	Adjustment	-3.02%	-23.02%	9.31%
	Total	-24.65%	-37.09%	-24.96%
T-stat (CAR)	Event	-2.73	-0.92	1.55
	Anticipation	-2.05	-1.38	-3.57
	Adjustment	-0.49	-3.53	1.28
	Total	-1.15	-1.64	-0.99
P-value (CAR)	Event	0.68%	35.98%	12.16%
	Anticipation	4.13%	16.77%	0.04%
	Adjustment	62.63%	0.05%	20.14%
	Total	25.13%	10.21%	32.26%



## CONCLUSION

The objective of this study was to investigate whether firms ESG commitment levels impact the way the market reacts to firms ESG related news across the three ESG pillars. The aim was to find answers from the existing literature and also test hypothesis with an empirical study.

The literature on the topic is still in the early stages. Most of the findings suggest that the market reactions to ESG related news are influenced by several factors, the nature of the information received (good or bad), the size of the firm, the recent past of the firm with ESG-related issues, level of controversy, the firm's leadership, liquidity level. In particular, For the environmental pillar, the level of engagement and the required resources also resulted as determinants of market reactions. It emerged that the market reacts negatively to negative ESG related news and positively, but less significantly, to positive ESG related news. For small firms or firms with controversies, low liquidity, or agency issues, the reactions tend to contrast the expectation that the market will react positively to positive ESG news, apart from voluntary disclosures, where the market always appreciates. The literature illustrated several cases where the market could react negatively to positive ESG news.

I carried out an empirical study using event study methodology to investigate whether the market reactions to negative and positive events are less significant for firms with high ESG commitment. From my results, there is no clear answer to this question. My results suggest that, in the case of negative news (E2), the market reaction is more statistically significant for firms with high ESG commitment on the event day because the market anticipates the negative impact on firms with low ESG commitment. Economically, both groups of firms lost around the same level of market value in the event window, around negative 40% in the 63 days event window.

For positive news (E1), there was no significant anticipation of the event in both the groups of firms with low ESG commitment and the groups of firms with high ESG commitment. On the event day, the event was statistically significant for both groups of firms at a 95% confidence level. The economic impact was more significant for the group of firms with low ESG commitment on the event day, with a gain of around 6.5%, while

the group of firms with high ESG commitment lost circa 1.5%. In general, the E1 was not statistically significant for both groups of firms. Economically it was for the group of firms with low ESG commitment that gain around 30% CAR over the 63 days event window period.

With the study of these two general events, I cannot comment on the four hypotheses made from examining the literature, which is specific to ESG. Nevertheless, I suggest that, for events that are not ESG specific, the market's reaction to high ESG committed firms compared to low ESG committed firms is less significant for positive events and more significant for negative ones.

In general, from my results, I conclude that the market reacts more abruptly to firms with low ESG commitment. For positive ESG related news, the positive market reaction is more significant for firms with low ESG commitment. In case of a general market crash, the value of a low ESG committed firm might fall faster, but over time, the loss of value is around the same level for all three groups of firms.

The result of the study encourages firms with low ESG commitment to improving their ESG practices for better market trust and less abrupt market reactions.

## **CONTRIBUTIONS AND LIMITS OF THE STUDY**

This study adds insights to the existing empirical studies on the relationship between market reactions and ESG, in particular, how the market reaction to a piece of general news might differ for firms, based on their level of ESG commitment. This study can help managers adapt their ESG commitment strategy over time and act as a reference for academics in the field.

There are also some limitations the reader should pay attention to when using this thesis as an argument. Apart from the limitations of event studies and their reliance on EMH discussed in the methodology. To classify the firm's level of ESG commitment, I used annual ESG ratings, which somehow limits the results, as the ESG ratings of some of the firms might be different in the exact event period, given that the ratings are updated periodically.

Secondly, the limited numbers of firms in the study (221) and the use of two general events that surely contains other information that could explain the observations limit the possibility to generalize these results to ESG specific events and announcements.

## **IMPLICATION FOR FUTURE RESEARCH**

From the literature review, it appeared that firm size, level of leadership, recent past and liquidity levels firms play important roles in the reaction of the market to ESG related news. Further studies should investigate the roles of these different factors, to see how much of market reactions to ESG news they explain.

It will also be interesting to replicate the study for the individual pillars of ESG, using a dataset of ESG news that can be classified into good and bad environmental, social, and governance news. To see how market reactions vary across the three pillars, based on firms ESG commitment level.

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## Tables of figures

<b>FIGURE 1 - DIFFERENCES AMONG THE MAJOR RATINGS.....</b>	<b>33</b>
<b>FIGURE 2 - EVENT STUDY WINDOWS.....</b>	<b>36</b>
<b>FIGURE 3 - MSCI ESG RATINGS BY REGIONS, WITH NUMBERS OF FIRMS .....</b>	<b>42</b>
<b>FIGURE 5 - AVERAGE ESG SCORE BY REGION AND RISK MANAGEMENT LEVEL (COLOUR).....</b>	<b>43</b>
<b>FIGURE 6 - NUMBER OF FIRMS PER RISK MANAGEMENT LEVEL (COLOUR).....</b>	<b>43</b>
<b>FIGURE 9 - CUMULATIVE ABNORMAL RETURNS FOR EVENT 1 BY FIRMS ESG COMMITMENT GROUPS</b> <b>.....</b>	<b>47</b>
<b>FIGURE 10 - ABNORMAL RETURNS FOR EVENT 1 BY FIRMS ESG COMMITMENT GROUPS .....</b>	<b>47</b>
<b>FIGURE 11 - CUMULATIVE ABNORMAL RETURNS FOR EVENT 2 BY FIRMS ESG COMMITMENT GROUPS</b> <b>.....</b>	<b>50</b>
<b>FIGURE 12 - ABNORMAL RETURNS FOR EVENT 1 BY FIRMS ESG COMMITMENT GROUPS .....</b>	<b>50</b>

## **ACRONYMS AND ABBREVIATIONS**

AR – Abnormal Return

CAR – Cumulative Abnormal Returns

CG - corporate governance

CSP - Corporate Social Responsibility

ESG - Environmental Social, and Governance

ESR - Environmental Social Responsibility

EMH - Efficient Market Hypothesis

EU - European Union

OLS - Ordinary Least squares

SRE - Sustainability, Responsibility, and Ethics

United States – The United States of America

WHO - World Health Organization

# TABLES OF ANNEXES

**TABLES OF ANNEXES ..... - 0 -**  
**ANNEX 1. MSCI ESG RANKING TABLES ..... - 1 -**  
**ANNEX 2. SUSTAINALYTICS ESG SCORES AND CONTROVERSIES ..... - 3 -**  
**ANNEX 3. FIRMS ESG RATINGS AND COMMITMENT DATA TABLE ..... - 5 -**  
**ANNEX 4. R CODE ..... - 14 -**

# ANNEXES - FIGURES

**ANNEX 1. FIG. 1: MSCI ESG RATINGS BY INDUSTRY WITH NUMBERS OF FIRMS..... - 2 -**

**ANNEX 2 - FIG. 1: NUMBER OF FIRMS WITH DIFFERENT LEVELS OF ESG CONTROVERSIES BY REGION .... - 3 -**

**ANNEX 2 - FIG. 2 : AVERAGE ESG SCORES OF THE FIRMS BASED ON THEIR CONTROVERSY LEVEL AND  
REGION..... - 4 -**

## Annex 1. MSCI ESG RANKING TABLES

The table below indicates the equivalence of letter grades, numerical, and risk exposure from MSCI.

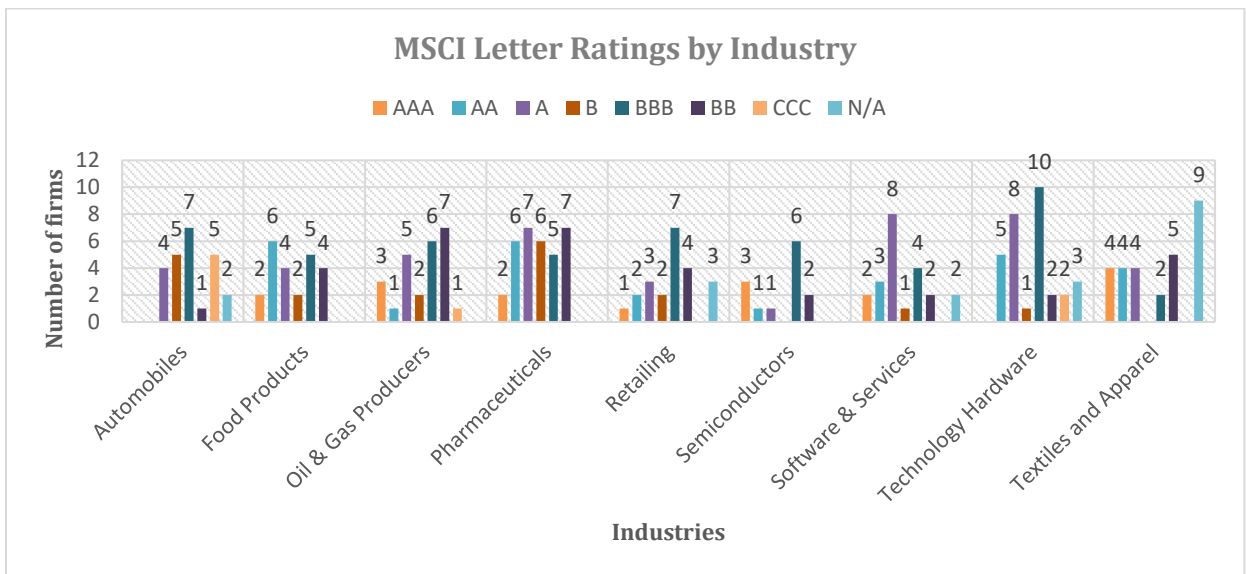
LEADER/LAGGARD	LETTER SCORE	NUMERICAL SCORE	RISK EXPOSURE
<b>LEADER</b>	AAA	8.571 - 10	0-10: Very Low
	AA	7.143 - 8.570	10-20: Low
	A	5.714 - 7.142	10-20: Low
<b>AVERAGE</b>	BBB	4.286 - 5.713	20-30: Average
	BB	2.857 - 4.285	20-30: Average
<b>LAGGARD</b>	B	1.429 - 2.856	30-40: High
	CCC	0 - 1.428	40+: Severe

**Annex 1. Table 1 : MSCI's ESG ratings score and ranking letter-scale from AAA (leaders) to CCC (laggards).**

*Source:* Data from MSCI.com

According to MSCI, a "leader" (rated AAA & AA) indicates a company leading its industry in managing the most significant ESG risks and opportunities. "Average" (rated A, BBB, or BB) companies are described by a mixed or unexceptional track record of managing ESG risks and exposures, relative to industry peers. While a "laggard" (rated B or CCC) trails its industry based on its high exposure and failure to manage significant ESG risks.

MSCI ESG ratings also provide additional information on firms ESG risk management that evidenced a better ESG risk management of European firms compared to the rest of the world (46% of firms in the EMEA region have above-average ESG risk management, compared to 20% of the American firms, 9% of Asian firms). On the other hand, Asian firms resulted with the worst risk management scores on average (33% of the Asian firms have below-average risk management scores, compared to 5% of European firms and 7% of American firms). These differences across regions are consistent with the findings of Hao & Reneboog (2017), that the legal origins of firms impact the CSR ratings. Firms from common law countries generally have lower rating than firms from civil law countries because they are less responsive to CSR issues.



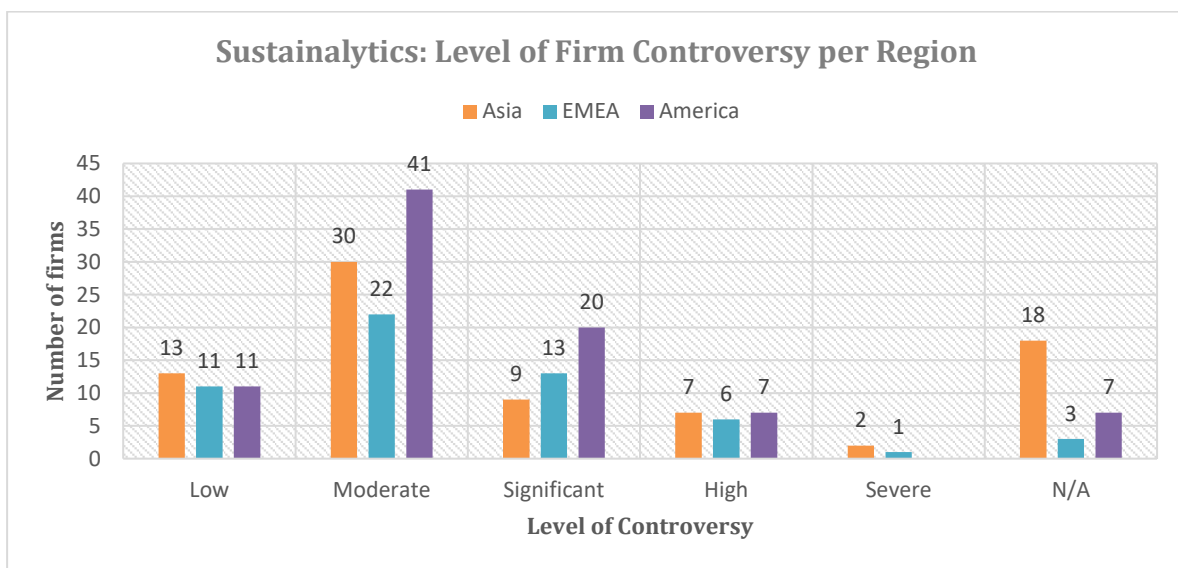
**Annex 1. Fig. 1: MSCI ESG ratings by industry with numbers of firms**

The above table shows the number of firms per industry with the different ESG letter scores. It tells you for example, how firms firms had AAA score in the Retailing industry and how many had BBB in the Textiles industry.

## Annex 2. SUSTAINALYTICS ESG SCORES AND CONTROVERSIES

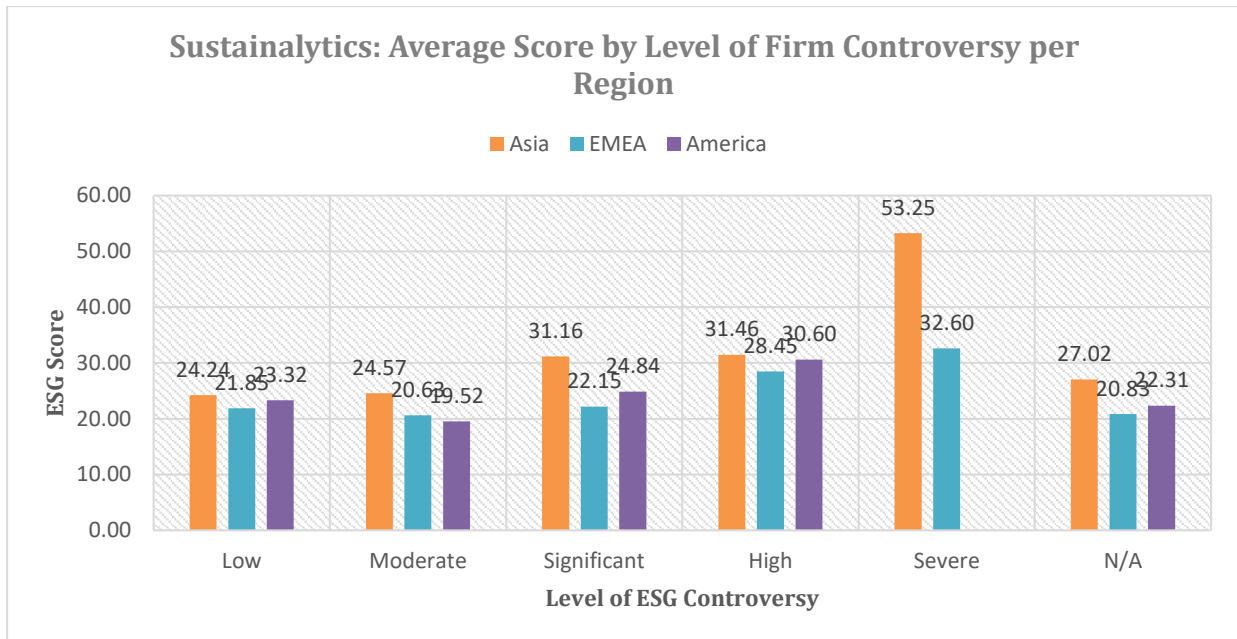
According to their explanations, risk management scores assess the robustness of a company's ESG related programs and practices. Considering ESG issues that are financially material to a given company in the relevant sub-industry.

An additional information from the Sustainalytics data is the information on firm's controversy issues, which is not obtainable from MSCI rating tool. The controversy gives more insight on the lower ESG ratings on average from Asiatic firms, they have high level of controversies and lower levels of risk management compared to the other regions.



Annex 2 - Fig. 1: Number of firms with different levels of ESG controversies by region

The above figure tells you for example how many firms had high controversy level in EMEA and how many in Asia.



**Annex 2 - Fig. 2 : Average ESG scores of the firms based on their controversy level and region**

The above figure tells you, for example, the average ESG scores of firms with high controversy level in Europe.



### Annex 3. FIRMS ESG RATINGS AND COMMITMENT DATA TABLE

This appendix contains the complete table of the 221 firms used for the studies, including the ESG scores from MSCI and Sustainalytics and the given ESG commitment level.

**Table 5 : Firm’s data and ESG ratings from Sustainalytics and MSCI.**

Company	Country	Industry	Sustainalytics			MSCI		
			ESG Score	Risk Management	Controversy level	ESG Rating	Risk Management	Firm Commitment
AbbVie Inc	United States	Pharmaceuticals	29.1	Average	Significant	A	AA	Moderate
ABC-Mart, Inc.	Japan	Retailing	18.8	Weak	N/A	B	BA	Moderate
Adidas AG	Germany	Textiles and Apparel	13.9	Strong	Significant	AAA	AA	Moderate
Adobe, Inc.	United States	Software & Services	10.9	Strong	Moderate	AA	AA	High
Advanced Micro Devices Inc	United States	Semiconductors	18.4	Strong	Moderate	BBB	A	Moderate
Advantech Co Ltd	Taiwan	Technology Hardware	20.6	Average	N/A	BBB	A	Moderate
Alexion Pharmaceuticals, Inc.	United States	Pharmaceuticals	18.9	Average	Moderate	BB	A	Moderate
Alibaba Group Holding Ltd.	China	Software & Services	28.2	Average	Moderate	BB	A	Moderate
Alliance Data Systems Corp	United States	Software & Services	17.6	Average	N/A	N/A	N/A	Moderate
Almarai Co. Ltd.	Saudi Arabia	Food Products	37.2	Average	Low	BBB	A	Low
Alnylam Pharmaceuticals Inc	United States	Pharmaceuticals	29.4	Average	Moderate	BB	A	Moderate
Alphabet Inc	United States	Software & Services	22.3	Average	High	BBB	A	Moderate
Amazon.com Inc	United States	Retailing	27.3	Average	Significant	BBB	A	Moderate
Analog Devices Inc	United States	Semiconductors	25.5	Strong	N/A	BBB	A	Moderate
ANTA Sports Products Ltd.	China	Textiles and Apparel	18	Average	Moderate	BB	BA	Moderate
Apple Inc	United States	Technology Hardware	16.9	Strong	Significant	BBB	A	Moderate
Associated British Foods PLC	United Kingdom	Food Products	30	Average	Moderate	AA	AA	Moderate
Astellas Pharma Inc.	Japan	Pharmaceuticals	20.4	Strong	Moderate	AA	AA	High

AstraZeneca PLC	United Kingdom	Pharmaceuticals	24.9	Strong	Significant	AA	AA	Moderate
Asustek Computer Inc	Taiwan	Technology Hardware	21	Average	Moderate	A	A	High
Baidu, Inc.	China	Software & Services	24.4	Average	Significant	BB	A	Moderate
Bayer AG	Germany	Pharmaceuticals	32.6	Strong	Severe	BB	A	Low
Bayerische Motoren Werke AK	Germany	Automobiles	27.1	Average	High	A	AA	Moderate
BeiGene Ltd	China	Pharmaceuticals	28.6	Average	Low	BB	A	Moderate
Biomarin Pharmaceutical Inc	United States	Pharmaceuticals	26.2	Average	Low	BBB	A	Moderate
Booking Holdings Inc	United States	Retailing	19.9	Average	Moderate	BBB	A	Moderate
BP p.l.c.	United Kingdom	Oil & Gas Producers	38.1	Strong	Moderate	BBB	A	Low
Bristol-Myers Squibb Co.	United States	Pharmaceuticals	22.8	Average	Moderate	A	A	High
Broadcom, Inc.	United States	Semiconductors	25.5	Average	Significant	BB	A	Moderate
Brother Industries, Ltd.	Japan	Technology Hardware	16.8	Average	Moderate	BBB	A	Moderate
Burberry Group PLC	United Kingdom	Textiles and Apparel	9.6	Strong	Moderate	AAA	AA	High
BYD Co., Ltd.	China	Automobiles	26	Average	Moderate	A	AA	Moderate
Campbell Soup Co	United States	Food Products	21.5	Strong	Moderate	AA	AA	High
Canon Inc	Japan	Technology Hardware	17.7	Strong	Moderate	BBB	A	Moderate
Carter's, Inc.	United States	Retailing	14.8	Average	Moderate	N/A	N/A	Moderate
Catcher Technology Co., Ltd.	Taiwan	Technology Hardware	17.5	Average	Moderate	BBB	A	Moderate
Celltrion Inc	South Korea	Pharmaceuticals	32.1	Weak	Low	B	BA	Low
Changchun High & New Technology	China	Pharmaceuticals	32.3	Weak	N/A	B	BA	Low
Chevron Corporation	United States	Oil & Gas Producers	40.5	Strong	Significant	BBB	A	Low
China Greatwall Technology	China	Technology Hardware	22.1	Weak	N/A	CCC	BA	Moderate
China Mengniu Dairy Co Ltd	China	Food Products	39.4	Average	Moderate	BB	A	Low
China Petroleum & Chemical Corp.	China	Oil & Gas Producers	52.1	Average	Severe	B	BA	Low
Chocoladefabriken Lindt & Sprüngli AG	Switzerland	Food Products	25.8	Average	Low	A	A	Moderate
Chongqing Zhifei Biological Products	China	Pharmaceuticals	31.9	Weak	N/A	B	BA	Low

Chugai Pharmaceutical Co., Ltd	Japan	Pharmaceuticals	31.1	Average	Low	AA	AA	Moderate
Columbia Sportswear Co.	United States	Textiles and Apparel	12.6	Strong	Moderate	N/A	N/A	Moderate
Compagnie Financière Richemont								
SA	Switzerland	Textiles and Apparel	11.3	Strong	Low	AA	AA	High
Conagra Brands Inc	United States	Food Products	32.8	Average	Significant	A	A	Moderate
Daiichi Sankyo Co Ltd	Japan	Pharmaceuticals	27	Average	Significant	A	A	Moderate
Daimler AG	Germany	Automobiles	25.8	Average	High	BBB	A	Moderate
Danone SA	France	Food Products	19.4	Strong	Moderate	AAA	AA	High
Dawning Information Industry Co.,								
Ltd.	China	Technology Hardware	25.6	Average	Low	N/A	N/A	Moderate
Dell Technologies, Inc.	United States	Technology Hardware	16.2	Strong	Moderate	BBB	A	Moderate
eBay Inc	United States	Software & Services	16.7	Strong	Moderate	A	A	High
Ecopetrol S.A.	Colombia	Oil & Gas Producers	36.6	Strong	Moderate	BB	A	Low
Eli Lilly & Co	United States	Pharmaceuticals	29.9	Average	Significant	A	A	Moderate
Eni SpA	Italy	Oil & Gas Producers	26.6	Strong	Significant	A	A	Moderate
Equinor ASA	Norway	Oil & Gas Producers	32.1	Strong	Moderate	AAA	AA	Moderate
Etsy Inc	United States	Retailing	20	Average	Low	BBB	A	Moderate
Expedia Group Inc	United States	Retailing	23.5	Weak	N/A	B	BA	Moderate
Exxon Mobil Corp.	United States	Oil & Gas Producers	34.9	Strong	Moderate	BBB	A	Low
Facebook Inc	United States	Software & Services	24.8	Average	High	B	BA	Moderate
Fast Retailing Co., Ltd.	Japan	Retailing	14.1	Average	Moderate	AA	AA	High
Feng Tay Enterprise Co., Ltd.	Taiwan	Textiles and Apparel	17.1	Average	N/A	BB	BA	Moderate
Ferrari NV	Italy	Automobiles	24.8	Average	Moderate	BBB	A	Moderate
Fiat Chrysler Automobiles N.V.	United Kingdom	Automobiles	27.3	Average	Significant	N/A	N/A	Moderate
Ford Motor Co	United States	Automobiles	31.2	Average	Significant	B	BA	Low
Foshan Haitian Flavouring & Food	China	Food Products	41.8	Weak	N/A	B	BA	Low
Galp Energia, SGPS, S.A.	Portugal	Oil & Gas Producers	27	Strong	Low	AAA	AA	Moderate
Gap Inc	United States	Retailing	13.4	Average	Significant	N/A	N/A	Moderate

Gazprom PAO	Russia	Oil & Gas Producers	37.5	Strong	High	BBB	A	Low
Geely Automobile Holdings Ltd.	China	Automobiles	25.4	Average	N/A	BBB	A	Moderate
General Mills Inc	United States	Food Products	21.3	Strong	Moderate	AA	AA	High
General Motors Company	United States	Automobiles	30.7	Average	High	B	BA	Low
Genmab A/S	Denmark	Pharmaceuticals	27.2	Average	N/A	AA	AA	Moderate
Gildan Activewear Inc.	Canada	Textiles and Apparel	10.5	Strong	Moderate	AA	AA	High
GlaxoSmithKline PLC	United Kingdom	Pharmaceuticals	21.6	Strong	Significant	AA	AA	Moderate
Goldwin Inc.	Japan	Textiles and Apparel	16.5	Average	N/A	N/A	N/A	Moderate
GRG Banking Equipment Co., Ltd.	China	Technology Hardware	29.1	Weak	N/A	CCC	BA	Moderate
Grifols, S.A.	Spain	Pharmaceuticals	22	Average	Low	BBB	A	Moderate
Guangzhou Automobile Group	China	Automobiles	29.8	Average	Moderate	BBB	A	Moderate
Hanesbrands Inc.	United States	Textiles and Apparel	14.5	Average	Moderate	N/A	N/A	Moderate
Henan Shuanghui Investment & Dev.	China	Food Products	42.1	Weak	N/A	B	BA	Low
Hennes & Mauritz AB	Sweden	Retailing	17.5	Average	Significant	AA	AA	Moderate
Hermès International SCA	France	Textiles and Apparel	11.3	Strong	Moderate	BBB	A	Moderate
Hewlett-Packard Enterprise Co.	United States	Technology Hardware	17.4	Strong	Moderate	AA	AA	High
Honda Motor Co Ltd	Japan	Automobiles	28.8	Average	High	BBB	A	Moderate
Hormel Foods Corp	United States	Food Products	26.4	Average	Significant	AA	AA	Moderate
HP Inc	United States	Technology Hardware	10.6	Strong	Moderate	AA	AA	High
Hyundai Motor Co., Ltd.	South Korea	Automobiles	36.2	Average	High	B	BA	Low
Imperial Oil Ltd	Canada	Oil & Gas Producers	33.8	Strong	Low	BBB	A	Low
Incyte Corp.	United States	Pharmaceuticals	26	Average	Low	BB	A	Moderate
Industria de Diseño Textil, S.A.	Spain	Retailing	9.9	Strong	Significant	AAA	AA	Moderate
Infineon Technologies AG	Germany	Semiconductors	17.5	Strong	Low	AA	AA	High
Inner Mongolia Yili Industrial Group	China	Food Products	39.3	Weak	Significant	BBB	A	Low
Intel Corp	United States	Semiconductors	16.9	Strong	Low	A	A	High

Intuit Inc	United States	Software & Services	16.6	Average	Low	AA	AA	High
Inventec Corp.	Taiwan	Technology Hardware	16.1	Average	Moderate	A	A	High
JD.com, Inc.	China	Retailing	25.5	Weak	Moderate	BB	A	Moderate
Jiangsu Hengrui Medicine Co., Ltd.	China	Pharmaceuticals	41	Weak	Low	B	BA	Low
Johnson & Johnson	United States	Pharmaceuticals	29.6	Average	High	BBB	A	Moderate
Kellogg Co	United States	Food Products	26.9	Strong	Moderate	AAA	AA	Moderate
Kering S.A.	France	Textiles and Apparel	11.5	Strong	Significant	AA	AA	Moderate
Kerry Group PLC	Ireland	Food Products	25.3	Strong	Moderate	AA	AA	Moderate
Kia Corp.	South Korea	Automobiles	34.9	Average	High	CCC	BA	Low
L Brands Inc	United States	Retailing	16.1	Average	Moderate	N/A	N/A	Moderate
Lenovo Group Ltd.	China	Technology Hardware	17.7	Strong	Moderate	AA	AA	High
Li Ning Co Ltd	China	Textiles and Apparel	16.7	Average	Moderate	BB	BA	Moderate
Lite-On Technology Corp.	Taiwan	Technology Hardware	19.9	Average	Low	A	A	High
Logitech International S.A.	Switzerland	Technology Hardware	13.4	Strong	Low	AA	AA	High
Lululemon Athletica Inc.	Canada	Textiles and Apparel	13.2	Average	Moderate	A	A	High
LVMH Moët Hennessy Louis								
Vuitton	France	Textiles and Apparel	10	Strong	Moderate	A	A	High
Maruti Suzuki India Ltd.	India	Automobiles	26.5	Average	High	BB	BA	Moderate
McCormick & Co Inc	United States	Food Products	28.4	Average	Moderate	A	A	Moderate
MediaTek Inc.	Taiwan	Semiconductors	24.6	Average	N/A	BBB	A	Moderate
Meituan	China	Software & Services	25.7	Average	Low	A	A	Moderate
Mercadolibre, Inc.	Argentina	Software & Services	24.3	Average	Low	A	A	High
Merck & Co Inc	United States	Pharmaceuticals	23	Strong	Significant	BBB	A	Moderate
Merck KGaA	Germany	Pharmaceuticals	19.6	Strong	Moderate	AAA	AA	High
Microchip Technology, Inc.	United States	Semiconductors	31.5	Average	Low	BB	A	Low
Micron Technology Inc	United States	Semiconductors	17.9	Strong	Moderate	BBB	A	Moderate
Microsoft Corp	United States	Software & Services	14.6	Strong	Significant	AAA	AA	Moderate
Micro-Star International Co., Ltd.	Taiwan	Technology Hardware	21.7	Average	Low	BBB	A	Moderate

Moderna, Inc.	United States	Pharmaceuticals	30	Weak	Low	B	BA	Moderate
Moncler SpA	Italy	Textiles and Apparel	10.4	Strong	Moderate	BBB	A	Moderate
Mondelez International, Inc.	United States	Food Products	23.4	Strong	Significant	BBB	A	Moderate
Naspers Ltd.	South Africa	Software & Services	18.5	Strong	Moderate	A	A	High
NEC Corp.	Japan	Technology Hardware	17.5	Strong	Moderate	A	A	High
Nestlé S.A.	Switzerland	Food Products	28.9	Strong	Significant	AA	AA	Moderate
NetApp, Inc.	United States	Technology Hardware	16.4	Strong	N/A	BBB	A	Moderate
Nike, Inc.	United States	Textiles and Apparel	15.3	Average	Significant	A	A	Moderate
Ninestar Corp.	China	Technology Hardware	30.2	Weak	N/A	B	BA	Low
NIO, Inc. (China)	China	Automobiles	24.9	Average	Moderate	BBB	A	Moderate
Nissan Motor Co Ltd	Japan	Automobiles	33.1	Average	High	CCC	BA	Low
NK LUKOIL PAO	Russia	Oil & Gas Producers	35.7	Strong	Significant	BBB	A	Low
NK ROSNEFT' PAO	Russia	Oil & Gas Producers	33.9	Strong	Significant	BB	A	Low
Nokia Oyj	Finland	Technology Hardware	13.4	Strong	Moderate	AA	AA	High
Novartis AG	Switzerland	Pharmaceuticals	16.9	Strong	Significant	A	A	Moderate
Novo Nordisk A/S	Denmark	Pharmaceuticals	22.4	Strong	Significant	AAA	AA	Moderate
NVIDIA Corp.	United States	Semiconductors	13.3	Strong	Moderate	AAA	AA	High
NXP Semiconductors NV	Netherlands	Semiconductors	19.9	Strong	Low	BBB	A	Moderate
Ocado Group PLC	United Kingdom	Retailing	20.6	Average	Moderate	A	A	High
Occidental Petroleum Corp	United States	Oil & Gas Producers	37.6	Strong	Moderate	BB	A	Low
OMV AG	Austria	Oil & Gas Producers	28.1	Strong	Moderate	AAA	AA	Moderate
Oracle Corp	United States	Software & Services	18.2	Average	Significant	BBB	A	Moderate
Pandora AS	Denmark	Textiles and Apparel	12.1	Strong	N/A	AAA	AA	High
Pegatron Corp.	Taiwan	Technology Hardware	21.8	Average	Low	BB	A	Moderate
PetroChina Co Ltd	China	Oil & Gas Producers	54.4	Average	Severe	CCC	BA	Low
Petróleo Brasileiro SA	Brazil	Oil & Gas Producers	41.5	Strong	High	BB	A	Low
Peugeot S.A.	France	Automobiles	18.4	Strong	Significant	N/A	N/A	Moderate
Pfizer Inc	United States	Pharmaceuticals	24.6	Strong	Significant	B	BA	Moderate

Pinduoduo, Inc.	China	Retailing	25.8	Weak	Moderate	BB	A	Moderate
Polskie Gornictwo Naftowe	Poland	Oil & Gas Producers	44.1	Average	Low	BB	A	Low
Porsche Automobil Holding SE	Germany	Automobiles	23.6	Average	High	CCC	BA	Moderate
Pou Chen Corp.	Taiwan	Textiles and Apparel	19.6	Average	Low	BB	BA	Moderate
Prosus NV	Netherlands	Software & Services	23.2	Average	N/A	A	A	High
PT Astra International Tbk	Indonesia	Automobiles	28.4	Average	Moderate	A	AA	Moderate
PTT Public Co., Ltd.	Thailand	Oil & Gas Producers	27.1	Strong	Significant	A	A	Moderate
Puma SE	Germany	Textiles and Apparel	16.4	Average	Moderate	AAA	AA	High
Pure Storage Inc	United States	Technology Hardware	27.2	Average	N/A	N/A	N/A	Moderate
PVH Corp.	United States	Textiles and Apparel	13.4	Average	Significant	N/A	N/A	Moderate
Quanta Computer Inc.	Taiwan	Technology Hardware	26.5	Average	Moderate	BBB	A	Moderate
Rakuten, Inc.	Japan	Retailing	19.9	Average	Moderate	BBB	A	Moderate
Ralph Lauren Corp.	United States	Textiles and Apparel	13.6	Average	Moderate	N/A	N/A	Moderate
Repsol, S.A.	Spain	Oil & Gas Producers	22.8	Strong	Moderate	AA	AA	High
Ricoh Co., Ltd.	Japan	Technology Hardware	19.8	Average	Low	BB	A	Moderate
Roche Holding AG	Switzerland	Pharmaceuticals	23.9	Strong	Moderate	A	A	High
Ross Stores, Inc.	United States	Retailing	15.3	Average	Moderate	BB	A	Moderate
Royal Dutch Shell PLC	Netherlands	Oil & Gas Producers	36	Strong	High	A	A	Moderate
SAIC Motor Corp. Ltd.	China	Automobiles	33.2	Average	Moderate	B	BA	Low
Salesforce.com Inc	United States	Software & Services	11.2	Strong	Moderate	AA	AA	High
Samsung Electronics Co., Ltd.	South Korea	Technology Hardware	23.2	Average	High	A	A	Moderate
Sanofi	France	Pharmaceuticals	24.6	Strong	High	BBB	A	Moderate
SAP SE	Germany	Software & Services	10.2	Strong	Moderate	AAA	AA	High
Saudi Arabian Oil Co.	Saudi Arabia	Oil & Gas Producers	48.1	Average	Significant	BB	A	Low
Seagate Technology PLC	Ireland	Technology Hardware	10.7	Strong	Low	A	A	High
Seagen Inc.	United States	Pharmaceuticals	28.9	Average	N/A	BB	A	Moderate
Seiko Epson Corp.	Japan	Technology Hardware	13.7	Strong	Low	A	A	High
ServiceNow Inc	United States	Software & Services	17.1	Average	N/A	A	A	High

Shopify Inc.	Canada	Software & Services	25	Average	Moderate	A	A	Moderate
Sino Biopharmaceutical Ltd.	China	Pharmaceuticals	39.8	Weak	N/A	BB	A	Low
SK Hynix Inc.	South Korea	Semiconductors	20.1	Strong	Moderate	BBB	A	Moderate
Skechers U.S.A., Inc.	United States	Textiles and Apparel	21.9	Weak	Moderate	N/A	N/A	Moderate
Snap Inc	United States	Software & Services	25.1	Average	Moderate	A	A	Moderate
Spotify Technology SA	Luxembourg	Software & Services	24	Average	Moderate	N/A	N/A	Moderate
Subaru Corp.	Japan	Automobiles	27.7	Average	Moderate	B	BA	Moderate
Suncor Energy Inc.	Canada	Oil & Gas Producers	30.6	Strong	Moderate	A	A	Moderate
SURGUTNEFTEGAZ PAO	Russia	Oil & Gas Producers	48.8	Average	Moderate	B	BA	Low
Suzuki Motor Corp.	Japan	Automobiles	26	Average	Significant	CCC	BA	Moderate
Taiwan Semiconductor Manufact.	Taiwan	Semiconductors	14.5	Strong	Low	AAA	AA	High
Takeda Pharmacaetical Co., Ltd.	Japan	Pharmaceuticals	28.3	Average	Moderate	A	A	Moderate
Tapestry, Inc.	United States	Textiles and Apparel	13.5	Average	Moderate	N/A	N/A	Moderate
TATNEFT' PAO	Russia	Oil & Gas Producers	44.3	Average	Moderate	BB	BA	Low
Tencent Holdings Ltd	China	Software & Services	21.9	Average	Moderate	BBB	A	Moderate
Tesla Inc	United States	Automobiles	31.3	Average	Significant	A	AA	Moderate
Texas Instruments Incorporated	United States	Semiconductors	17.6	Strong	Moderate	AAA	AA	High
The Hershey Co.	United States	Food Products	25.7	Strong	Significant	BBB	A	Moderate
The J. M. Smucker Co.	United States	Food Products	26.9	Strong	Moderate	A	A	Moderate
The Kraft Heinz Co	United States	Food Products	34.3	Average	Significant	BB	A	Low
The Swatch Group AG	Switzerland	Textiles and Apparel	17.8	Weak	Moderate	BB	BA	Moderate
The TJX Cos., Inc.	United States	Retailing	14.6	Average	Moderate	BBB	A	Moderate
Tiffany & Co.	United States	Textiles and Apparel	15.9	Average	Moderate	N/A	N/A	Moderate
Titan Co. Ltd.	India	Textiles and Apparel	15	Average	N/A	A	A	High
Total SE	France	Oil & Gas Producers	27.5	Strong	Moderate	A	A	Moderate
Toyota Motor Corp.	Japan	Automobiles	30.4	Average	Significant	BBB	A	Low
Trip.com Group Ltd.	China	Retailing	23.3	Average	Moderate	BB	A	Moderate
Tyson Foods Inc	United States	Food Products	36	Average	High	BBB	A	Low



Uber Technologies, Inc.	United States	Software & Services	29.3	Average	High	BBB	A	Moderate
Under Armour, Inc.	United States	Textiles and Apparel	15.8	Average	Moderate	N/A	N/A	Moderate
Uni-President Enterprises Corp.	Taiwan	Food Products	27.4	Strong	N/A	BB	A	Moderate
Unisplendour Co., Ltd.	China	Technology Hardware	28.3	Weak	N/A	A	A	Moderate
VF Corp	United States	Textiles and Apparel	11.4	Strong	Moderate	AA	AA	High
Vipshop Holdings Ltd	China	Retailing	21.7	Average	Moderate	BBB	A	Moderate
Volkswagen AG	Germany	Automobiles	33.6	Average	High	CCC	BA	Low
Wayfair Inc.	United States	Retailing	23.7	Average	Moderate	BBB	A	Moderate
Western Digital Corp.	United States	Technology Hardware	12.1	Strong	Low	BBB	A	Moderate
WH Group Ltd. (HK)	China	Food Products	36.6	Average	Significant	BB	A	Low
Xerox Holdings Corp.	United States	Technology Hardware	16.9	Strong	Moderate	N/A	N/A	Moderate
Zalando SE	Germany	Retailing	11.5	Strong	Low	A	A	High
Zoetis Inc	United States	Pharmaceuticals	19.1	Average	Low	AA	AA	High
ZOZO, Inc.	Japan	Retailing	23.3	Weak	N/A	A	A	Moderate

## Annex 4. R CODE

This appendix contains the R script used for collecting the data from yahoo finance and computing the daily returns from the daily adjusted prices. The Event study is done in MS excel.

```

library(xlsx)
library(quantmod)
library(tidyquant)
library(tidyverse)

# Period - Prices
Start_date = "2017-01-01"
Stop_date = "2021-04-01"

# Assets groups based on their ESG commitment level using the tickers

Highly committed firms
Highly_comm <- c("ALPMY", "BRBY.L", "CFR.SW", "BN.PA", "TITAN.BO", "ZAL.DE",
  "2301.TW", "2330.TW", "2356.TW", "2357.TW", "6701.T", "6724.T", "992.HK", "9983.T",
  "ADBE", "BMY", "CPB", "CRM", "EBAY", "TXN", "VFC", "ZTS", "GIL", "GIS", "HPE", "HPQ", "I
  NTC", "INTU", "LOGN", "LULU", "MC.PA", "MELI", "NOKIA", "NOW", "NPN", "NVDA", "OCD
  O.L", "PNDORA.CO", "PUM.DE", "REP.MC", "RHHBY", "SAP", "STX")

Firms with low level commitment
low_comm <- c("000661.SZ", "BAYN.DE", "068270.KS", "2319.HK", "300122.SZ",
  "EC", "603288.SS", "000895.SZ", "005380.KS", "600887.SS", "600276.SS", "600104.SS", "
  7203.T", "VOW.DE", "000270.KS", "002180.SS", "1177.HK", "2280.SR", "288.HK", "BP", "C
  VX", "F", "TSN", "XOM", "GM", "IMO", "KHC", "LUKOY", "MCHP", "NISA.F", "OGZPY", "OXY",
  "PBR", "PGN", "PTR", "ROSN.ME", "SNGS.ME", "SNP", "TATN.ME")

Firms with a moderate level of commitment
mod_comm <- c("ABF.L", "BMW.DE", "1211.HK", "CHGKY", "DSNKY", "DAL.DE", "ENI.MI", "
  0175.HK", "2238.HK", "7267.T", "3690.HK", "ASII.JK", "4755.T", "005930.KS", "7270.T", "
  7269.T", "UHR.SW", "TOT", "1216.TW", "000066.SS", "000660.KS", "000938.SS", "002152
  .SS", "0700.HK", "2020.HK", "2377.TW", "2382.TW", "2395.TW", "2454.TW", "2474.TW", "
  2670.T", "3092.T", "4938.TW", "603019.SS", "6160.HK", "6448.T", "7751.T", "7752.T", "8
  111.T", "9888.HK", "9904.TW", "9910.TW", "9988.HK", "AAPL", "ABBV", "ADDYY", "ADI",
  "ADS",
  "ALNY", "ALXN", "AMD", "AMZN", "AVGO", "AZN", "BKNG", "BMRN",
  "CAG", "COLM", "CRI", "DELL", "EQNR", "ETSY", "EXPE", "FB", "MRK",
  "TJX", "TPR", "TSLA", "UAA", "UBER", "VIPS", "W", "WDC",
  "XRX", "FFP.PA", "GALP", "GMAB.CO", "GOOGL", "GPS", "GRFS",
  "GSK", "HBI", "HM.B", "HRL", "HSY", "INCY", "ITX", "JNJ",
  "K", "KER.PA", "KRZ.IR", "LB", "LISN.SW", "LLY", "LNNGF",

```

```
"MARUTI.BO", "MDLZ", "MKC", "MONC.MI", "MRK", "MRNA", "MSFT",  
"MU", "NESN.SW", "NIO", "NKE", "NOVN.SW", "NOVO-B.CO", "NTAP",  
"NXPI", "OMV", "ORCL", "PAH3.DE", "PDD", "PFE", "PSTG", "PTT.BK",  
"PVH", "RACE", "RDSA.AS", "RL", "RMS.PA", "ROST", "SAN.PA", "SGEN",  
"SHOP", "SJM", "SKX", "SNAP", "SPOT", "SU", "TAK", "TCOM")
```

```
#Get the daily adjusted prices and calculate daily returns of the three groups of  
#firms
```

```
Returns_Highly_comm <- Highly_comm %>%  
  tq_get(get = "stock.prices",  
    from = Start_date,to = Stop_date) %>% group_by(symbol) %>%  
  tq_transmute(select = adjusted,  
    mutate_fun = periodReturn,  
    period = "daily",type = "log",col_rename = "Return")
```

```
Returns_Highly_comm <- Returns_Highly_comm %>% pivot_wider(names_from = sym  
bol,values_from = Return)
```

```
#low commitment firms
```

```
Returns_low_comm <- low_comm %>%  
  tq_get(get = "stock.prices",  
    from = Start_date,to = Stop_date) %>% group_by(symbol) %>%  
  tq_transmute(select = adjusted,  
    mutate_fun = periodReturn,  
    period = "daily",type = "log",col_rename = "Return")
```

```
Returns_low_comm <- Returns_low_comm %>% pivot_wider(names_from = symbol,valu  
es_from = Return)
```

```
#moderate commitment firms
```

```
Returns_mod_comm <- mod_comm %>%  
  tq_get(get = "stock.prices",  
    from = Start_date,to = Stop_date) %>% group_by(symbol) %>%  
  tq_transmute(select = adjusted,  
    mutate_fun = periodReturn,  
    period = "daily",type = "log",col_rename = "Return")
```

```
Returns_mod_comm <- Returns_mod_comm %>% pivot_wider(names_from = symbol,v  
alues_from = Return)
```

```
write.xlsx>Returns_Highly_comm, file = "FirmsforES.xlsx",  
sheetName = "ALL_HC", append = FALSE)
```

```
write.xlsx>Returns_low_comm, file = "FirmsforES.xlsx",  
sheetName = "ALL_LC", append = TRUE)
```

```
write.xlsx>Returns_mod_comm, file = "FirmsforES.xlsx",  
sheetName = "ALL_MC", append = TRUE)
```

