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ESG DISCLOSURES AND MARKET REACTION

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Abstract

This thesis investigates the financial impact of Environmental, Social, and Governance (ESG) reporting on stock prices. While corporate sustainability has gained increasing importance in the modern business environment, empirical evidence regarding the market's immediate reaction to the precise publication date of these reports remains inconclusive. To address this research gap, the study employs an event study methodology on a proprietary, hand-collected dataset comprising 312 release dates of ESG disclosures from 67 top-tier firms, in the S&P 500 index, between 2021 and 2025. The analysis utilizes the Market Model to calculate abnormal returns, supplemented by the Fama-French Three Factor Model (FF3M) for robust statistical validation. Contrary to the common belief that sustainability performance yields positive financial outcomes, the empirical results reveal a statistically significant negative Average Abnormal Return (-0,27% based on Market Model or -0,22% according to FF3M) on the event day. Furthermore, the analysis reveals a strong asymmetric market reaction based on companies' pre-existing ESG ratings. Specifically, highly rated ESG firms experienced a statistically significant negative Cumulative Average Abnormal Return (CAAR), whereas firms with lower ESG scores exhibited a negligible impact. Finally, no clear temporal trend regarding the impact of these disclosures was observed over the examined five-year period. These findings suggest that investors may interpret the release of an ESG report, particularly by highly rated firms, as a signal of cost-intensive initiatives that constrain short-term profitability. The research highlights a potential implicit market reward for companies that prioritize profit maximization over costly sustainability activities.

Keywords: ESG Disclosures, Event Study, Abnormal Returns, Financial Performance, Sustainability Reporting, Corporate Social Responsibility, S&P 500.

Περίληψη

Η παρούσα διπλωματική εργασία διερευνά τον χρηματοοικονομικό αντίκτυπο της δημοσιοποίησης εκθέσεων Περιβαλλοντικής, Κοινωνικής και Εταιρικής Διακυβέρνησης (ESG) στις τιμές των μετοχών. Παρότι η εταιρική βιωσιμότητα έχει αποκτήσει ιδιαίτερη σημασία στο σύγχρονο επιχειρηματικό περιβάλλον, τα εμπειρικά στοιχεία σχετικά με την άμεση αντίδραση της αγοράς κατά την ακριβή ημερομηνία δημοσίευσης αυτών των εκθέσεων παραμένουν αβέβαια. Για την κάλυψη αυτού του ερευνητικού κενού, η μελέτη εφαρμόζει τη μεθοδολογία της μελέτης γεγονότος (event study) σε μια πρωτότυπη βάση δεδομένων, η οποία δημιουργήθηκε μέσω πρωτογενούς συλλογής 312 ακριβών ημερομηνιών δημοσίευσης εκθέσεων ESG, από 67 κορυφαίες εταιρείες του δείκτη S&P 500, για την περίοδο 2021-2025. Η ανάλυση χρησιμοποιεί το Υπόδειγμα Αγοράς (Market Model) για τον υπολογισμό των μη κανονικών αποδόσεων, ενώ υποστηρίζεται από το Υπόδειγμα Τριών Παραγόντων των Fama-French (FF3M), για την επιβεβαίωση της ανθεκτικότητας των αποτελεσμάτων (robustness checks). Σε αντίθεση με την ευρέως διαδεδομένη πεποίθηση ότι οι επιδόσεις βιωσιμότητας επιφέρουν θετικά χρηματοοικονομικά αποτελέσματα, τα ευρήματα υποδεικνύουν μια στατιστικά σημαντική αρνητική Μέση Μη Κανονική Απόδοση (AAR) της τάξης του -0,27% (ή -0,22% σύμφωνα με το FF3M) την ημέρα του γεγονότος. Επιπλέον, εντοπίστηκε μια ισχυρή ασύμμετρη αντίδραση της αγοράς βάσει της υφιστάμενης βαθμολογίας ESG των εταιρειών. Ειδικότερα, οι εταιρείες με υψηλή βαθμολογία ESG κατέγραψαν στατιστικά σημαντική αρνητική Σωρευτική Μέση Μη Κανονική Απόδοση (CAAR), ενώ οι εταιρείες με χαμηλότερη βαθμολογία παρουσίασαν αμελητέα επίδραση. Τέλος, δεν παρατηρήθηκε κάποια σαφής χρονική τάση (trend) ως προς την επίδραση των ανακοινώσεων κατά την εξεταζόμενη πενταετία. Τα ευρήματα αυτά υποδηλώνουν ότι οι επενδυτές ενδέχεται να ερμηνεύουν τη δημοσίευση μιας έκθεσης ESG, ειδικά από εταιρείες με υψηλή βαθμολόγηση, ως ένδειξη ανάληψης δαπανηρών πρωτοβουλιών που περιορίζουν τη βραχυπρόθεσμη κερδοφορία. Η έρευνα αναδεικνύει μια πιθανή σιωπηρή «επιβράβευση» της αγοράς προς τις εταιρείες που δίνουν προτεραιότητα στη μεγιστοποίηση του κέρδους έναντι της μακροπρόθεσμης βιωσιμότητας που απαιτεί επιπλέον κόστη.

Λέξεις-Κλειδιά: Δημοσιοποιήσεις ESG, Μελέτη Γεγονότος (event study), Μη Κανονικές Αποδόσεις, Χρηματοοικονομική Απόδοση, Εκθέσεις Βιωσιμότητας, Κοινωνική Εταιρική Υπευθυνότητα, S&P 500.

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1. Introduction

The evolving global financial landscape has placed a heightened emphasis on sustainability and corporate responsibility in recent years. The increasingly visible consequences of climate change represent a primary driver of this shift, while growing consumer awareness continues to exert pressure on corporate behavior. For this reason, businesses «switch the principles of corporations from maximizing shareholders' value to considering the benefits of all stakeholders» (Asimakopoulos P., Asimakopoulos S. & Li, 2023). A notable catalyst in this transition is the Principles for Responsible Investment (PRI), a United Nations initiative that has become a global leader in responsible investment. With over 5,000 signatories worldwide, representing $139,6 trillion in assets under management, PRI promotes the conviction that responsible investment generates superior outcomes for both investors and society (www.unpri.org).

Central to this concept is Stakeholder theory, as pioneered by Freeman (1984). This theory suggests that for a firm to remain successful and sustainable, it must create value for its entire environment, including customers, employees, suppliers, and the community, rather than focusing exclusively on shareholders. Within this theoretical framework, Environmental, Social, and Governance (ESG) criteria have emerged as a critical framework developed by financial institutions and the United Nations to evaluate corporate sustainability (United Nations, 2004).

In addition, as global awareness of ESG issues expands, a consensus has emerged among scholars and international organizations that traditional corporate reports are no longer sufficient for investors seeking to execute precise sustainable investment strategies. Consequently, an increasing number of firms have been motivated to adopt specialized disclosure frameworks to communicate their ESG performance more effectively to the global investment community (Nakajima & Inaba, 2022; Pandey et al, 2024).

However, corporate action is not solely voluntarily. Under these circumstances, governments and regulatory bodies worldwide have been prompted to implement measures aimed at enhancing transparency and accountability in corporate reporting, especially regarding climate-related disclosures. The European Union is a leader in this field, where Corporate Sustainability Reporting Directive (CSRD) is one of the most broad and strict frameworks globally (European Commission). In contrast, the US are against a unified and universal implementation of such regulations (SEC).

Given the fact that corporate sustainability and responsibility increase over years, a key question has arisen among economists: whether ESG performance affect financial performance and if so, in which direction. While a plethora of studies have examined this relationship, the results remain ambiguous and debated. On the one hand, several researchers concluded to a positive relationship (Alareeni & Hamdan, 2020; Chen, Song & Gao, 2023; Eng, Fikru & Vichitsarawong, 2022; Chen et al, 2024). On the other hand, some papers have calculated a negative impact of ESG to financial performance (Dziadkowiec & Daszynska-Zygadlo, 2021; Akyildirim et al, 2025). Other studies have reported neutral or non-existent effects (Waddock and Graves, 1997).

To examine this relationship between financial and non-financial aspects of companies, researchers have employed various variables and metrics. Regarding ESG,

the two most common measures probably are ESG news and ratings (Capelle-Blanchard & Petit, 2019; Zuraida, Houqe & Van Zijl, 2016). Moreover, other studies focus on sustainability disclosures or the implication of a new state regulation (Eng, Fikru & Vichitsarawong, 2022). On the financial side, the stock price is often selected as the primary measure of performance, though accounting metrics such as Return on Assets (ROA), Return on Equity (ROE), and general profitability are also common alternatives (Fatemi, Glaum & Kaiser, 2018).

However, a significant gap identified in existing literature is the lack of research focusing on the immediate market reaction to the precise release date of an ESG report. Sustainability disclosures represent an interesting field of study. From financial perspective, the effect of the announcement of financial statements is a key research field. Investors expecting these announcements to impact the market price of a firm rapidly. Thus, the response of investors to the publication of an ESG report is far from being determined. To the best of our knowledge, only two related studies have been conducted, by Du, Yu, Bhattacharya and Sen (2017) and Aureli, Gigli, Medei and Supino (2019).

Consequently, the contribution of this research to the literature is significant. First, it advances the existing literature by shifting the focus from general ESG sentiments and ratings to the precise, isolated event of an ESG report's publication. Second, it explicitly examines the financial importance of the reporting process itself. Despite the rapid increase in the number of sustainability reports, their actual effect on a company's value is still heavily debated. Third, due to the lack of databases offering the data of the reports' release dates, it was necessary to collect these data manually. Fourth, it evaluates a more contemporary time period (2021-2025) compared to the previous two similar studies.

The primary objective of this thesis is to empirically investigate the financial impact of ESG reporting on stock prices. Our sample included 67 firms from the top 150 of the S&P 500 index. Therefore, we have constructed a hand-collected dataset of 312 ESG disclosure release dates between 2021 and 2025. To guide the analysis, the research tests three key hypotheses. First, whether exists a relationship between ESG disclosures and a company's stock price. Second, if this relationship changes through time and third, if ESG Scores affect the above relationship.

To evaluate these hypotheses, this study employs the event study methodology, which measures the effect of a specific event on firm value by calculating abnormal returns. The Market Model is utilized as the primary tool to estimate expected returns, using the S&P 500 as the market index. Furthermore, to ensure the robustness of the findings, the study incorporates additional statistical techniques. For example, the Fama-French Three Factor Model as an alternative to Market model, multiple event windows and statistical tests.

The remainder of this research is organized as follows:

- Chapter 2 (Literature Review): Discusses the evolution of CSR and ESG, various reporting frameworks, and previous empirical research on financial performance.

- Chapter 3 (Data and Methodology): Details the event study process, the data collection of events, and the formulation of the research hypotheses.

- Chapter 4 (Empirical Results): Presents the findings for all three hypotheses and includes detailed robustness checks.

- Chapter 5 (Conclusions and Discussion): Summarizes the study's implications, acknowledges limitations, and suggests avenues for future research.

2. Literature review

2.1 Responsibility and Sustainability

Over the past few decades, since the mid-twentieth century, an increasing number of companies have become concerned about their impact on society. Despite the great progress in social welfare systems, the reduction of poverty, and the increase in overall social welfare, many severe problems continue to persist within our societies. Because governments and individuals alone cannot provide comprehensive solutions to these issues, the role of enterprises has become increasingly important.

Due to this fact and because there is a very broad field of possible implementations, no common terminology has been established until today. Numerous scholars have attempted to establish the fundamental on the field of the impact of companies in the society, giving their own terminologies. However, further development of the theoretical background is required. According to Votaw, the responsibilities of businesses are not always the same to everybody. «To some it conveys the idea of legal responsibility or liability; to others, it means socially responsible behavior in the ethical sense; to still others, the meaning transmitted is that of 'responsible for' in a causal mode; many simply equate it with a charitable contribution» (Votaw, 1972).

One of the most widely used terms is the Corporate Social Responsibility (CSR) (Garriga and Mele, 2004). Although some scholars had written about the social responsibility of businesses as early as the 1940s, Howard Bowen is widely considered the 'father' of CSR. In his landmark book «Social Responsibilities of the Businessman» in 1953 he set up the base of the topic (Carroll, 1999).

Bowen (1953) provided an initial definition of the social responsibilities of businessmen as «It refers to the obligations of businessmen to pursue those policies, to make those decisions, or to follow those lines of action which are desirable in terms of the objectives and values of our society». In his book he argued that despite of its importance in guiding a businessman's decisions, social responsibility is not a panacea for every problem (Carroll, 1999).

Since then, numerous other efforts have been made to establish a comprehensive and unified definition of CSR. Dahlsrud (2006) analysed 37 definitions from various organizations and scholars between 1980 and 2003. He created a coding scheme to group together the same dimensions that referred in these definitions. He ended up to five major dimensions of CSR: the stakeholders, the social, the economic, the voluntariness and the environmental. The last one was found to be the least frequently mentioned.

Some examples of these definitions are following (Dahlsrud, 2006). The first one is by the Commission of European Communities (2001)

> *A concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis.*

The next definition is by World Business Council for Sustainable Development (2000)

> *Corporate social responsibility is the continuing commitment by business to behave ethically and contribute to economic development*

> *while improving the quality of life of the workforce and their families as well as the local community and society at large.*

And the last one from Business for Social Responsibility (2000)

> *Operating a business in a manner that meets or exceeds the ethical, legal, commercial and public expectations that society has of business. Social responsibility is a guiding principle for every decision made and in every area of a business.*

Another classification of CSR theories identifies four main categories: instrumental, political, integrative and value theories (Garriga and Mele, 2004). Instrumental theories assume that companies have only one social responsibility, the wealth creation. Political theories focus on the relationship between businesses and society. Integrative theories emphasize that businesses must fulfil social demands and value theories examine CSR from an ethical perspective.

In addition to the idea of corporate responsibility, there is one more very commonly used term, about the impact of businesses on their environment. This is the concept of sustainability. Although scholars had been writing about sustainable growth and the use of natural resources for decades, it was not until the 1980s that the concept truly emerged in public sphere (Purvis et al, 2019).

According to Jackson, a sustainable economy is probably like (Bocken et al, 2014):

a) A system that encourages minimising of consumption, or imposes personal and institutional caps or quotas on energy, goods, water, etc.
b) A system designed to maximise societal and environmental benefit, rather than prioritising economic growth.
c) A closed-loop system where nothing is allowed to be wasted or discarded into the environment, which reuses, repairs, and remakes in preference to recycling.
d) A system built on collaboration and sharing, rather than aggressive competition.

In order to achieve sustainable development, companies should not only care for their economic growth, but also for the society and the environment. A new term was needed to encompass all three dimensions. John Elkington (1997) in his book «Cannibals With Forks: The Triple Bottom Line of 21st Century Business» coined the term ‘Triple Bottom Line’ (3BL). Elkington emphasizes the need for partnerships between, companies, organizations and societies. In other words, it proposes a balance between people, planet and profit (Purvis et al, 2019).

Triple Bottom Line is based on an idea, which was previously well known among economists and accountants. The traditional Bottom Line in the a company's accounts represents the total profit or loss generated at the end of a particular period. Although the Triple Bottom Line concept spread quickly, «it is difficult to find anything that looks like a careful definition of the concept, let alone a methodology or formula for calculating one of the new bottom lines» (Norman & MacDonald, 2004).

Most advocates of 3BL speak generally and theoretically about the importance of the new bottom lines. They argue that social performance would help firms to improve their financial performance as well. Moreover, transparency and orientation toward a positive

social impact would improve firms' relationship with their stakeholders. However, even though there are many qualitative and quantitative measures of social and environmental performance, it is very difficult to combine all these data to make a single bottom line (Norman & MacDonald, 2004).

The 3BL, despite the difficulties in measuring, drives corporate progress in various ways. Markets become more competitive, corporate value change including social and environmental aspects, stakeholders requiring more transparency. As consumers alter their habits and desires, corporations should adapt to these new circumstances (Elkington, 2013).

Another theory concerning the interaction of a company with its environment is Stakeholder Theory. As outlined originally by R. Edward Freeman in 1984, stakeholder theory was concerned with the problems of value creation and trade, of ethics of capitalism and that of managerial mindset. In this way, the basic idea is to create value for stakeholders. «Business can be understood as a set of relationships among groups which have a stake in the activities that make up the business, such as customers, suppliers, employees, financiers» (Freeman et al, 2010).

The last theory we will mention, among a plethora of such in the field, is Creating Shared Value (CSV). This concept developed by Michael E. Porter and Mark R. Kramer (2011) and is often seen as an evolution of CSR. The core principle of CSV is that «companies can create economic value by creating societal value» (Porter and Kramer, 2011). It also moves beyond simply balancing profits and social good by pointing out three ways to create shared value: Reconceiving products and markets, redefining productivity in the value chain and building supportive industry clusters at the company's locations (Porter and Kramer, 2011).

2.2 About Environmental, Social, Governance (ESG)

In the previous chapter we analysed some of the most widespread concepts concerning the responsibilities of a company beyond the economic profit and the connection with the environment and the society. In our research we primarily use another term which is common between researchers nowadays. This concept is based on and have similarities with all the aforementioned theories. Although it is not a single, unified theory created by a single author, it represents a broad investment and management framework developed over time by financial institutions, researchers and mainly the United Nations.

The term Environmental, Social, Governance (ESG) was introduced in the landmark report 'Who Cares Wins', published by the United Nations Global Compact in 2004. The UN Global Compact is the world's largest corporate sustainability initiative with over 25.000 companies and organizations participating (unglobalcompact.org). Launched in July 2000 by then United Nations Secretary-General Kofi Annan, this international initiative brings companies together with UN agencies, labour unions and civil societies. The primary objective of Global Compact was to support UN goals and unite companies all over the world to advocate human rights, labour standards, environmental stewardship and anti-corruption (unglobalcompact.org). The first major achievement of Global Compact was the declaration of ten principles that every company should conform with

(Table 1). Principles for Responsible Investment (PRI), Women's Empowerment Principles and Guiding Principles on Business and Human Rights are other important frameworks within this context.

Table 1

The Ten Principles of the UN Global Compact
Human Rights
Principle 1: Businesses should support and respect the protection of internationally proclaimed human rights; and
Principle 2: make sure that they are not complicit in human rights abuses.
Labour
Principle 3: Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining;
Principle 4: the elimination of all forms of forced and compulsory labour;
Principle 5: the effective abolition of child labour; and
Principle 6: the elimination of discrimination in respect of employment and occupation.
Environment
Principle 7: Businesses should support a precautionary approach to environmental challenges;
Principle 8: undertake initiatives to promote greater environmental responsibility; and
Principle 9: encourage the development and diffusion of environmentally friendly technologies.
Anti-Corruption
Principle 10: Businesses should work against corruption in all its forms, including extortion and bribery.

Source: unglobalcompact.org

However, the fundamental contribution of Global Compact is the emergence of ESG terminology. In addition, it moved the discussion beyond the abstract concepts of Corporate Social Responsibility and Triple Bottom Line, presenting a pragmatic, actionable framework with measurable categories for investors. ESG issues have financial material for investors. This means that environmental or social policies are not just for ethical or charitable purposes, but they also serve as indicators of overall management quality (United Nations, 2004).

How, then, can ESG benefit a corporation? First, it facilitates better management of the potential risks a firm may face. The climate change, social movements and geopolitical events are some examples of factors that affect a company and increase risks. ESG metrics are measuring all these ongoing dangers. Second, good ESG performance contributes to a stronger brand and reputation. Consumers in the internet and social media era are more sensitive to ESG issues, so every business would like to take advantage of that. Finally, integrating an ESG philosophy within a company enhances its long-term resilience and value creation, as management focuses on establishing stable core values for the future rather than pursuing short-term profit maximization (Aziz and Alshdaifat, 2024).

To conclude, ESG approach yields two key outcomes. On the one hand, companies are encouraged to increase transparency and disclosure of ESG issues. On the other hand,

financial analysts and brokers should integrate environmental, social and governance factors into their investment research.

Some examples of ESG issues and activities in every pillar are the following (AuditBoard, 2024):

1) Environmental
   - Climate Change Adaptation
   - Biodiversity and Natural Resources
   - Resource Efficiency
   - Circular Economy
2) Social
   - Human Capital Management
   - Human Rights
   - Diversity, Equity and Inclusion
3) Governance
   - Board Structure
   - Shareholder Rights
   - Business Ethics

2.3 ESG Reports and Ratings

2.3.1 ESG Reports

The development of Environmental, Social and Governance, the Social Responsibility and other similar concepts has resulted in a significant rise in companies' awareness for sustainability, social and environmental issues. In recent years the majority of companies care about these issues and act in many ways. However, these activities must be documented and communicated. For this reason, there is a great increase in the number of businesses publishing an ESG report. According to recent research, globally more than 70% of companies publishing ESG, at least in some form, reports (McKinsey, 2022; PwC, 2022; KPMG, 2024).

There are many different formats for these reports, which makes them difficult to identify and analyse. Moreover, the reports have a wide variation in the content and the size. Some firms publish an independent report, while others issue an integrated report that combines financial performance with other activities. Furthermore, reports can be comprehensive or highly specific, focusing solely on environmental or social initiatives, for example. «Despite the common vision of these frameworks, sustainability reporting practices remain diverse» (Krasteva-Hristova et al, 2025). There are plenty of names too. A report might be titled among others as ESG, Corporate Social Responsibility, Sustainability or Impact Report. In this study, the term "ESG report" is used as an umbrella term encompassing all such reports.

The history of the ESG and sustainability reporting can be divided into three main periods (Fagbemi et al, 2025). Initially, reporting was a voluntary practice adopted by pioneering companies concerned with their social responsibility. Later, around the 2010s

the development of ESG create the first global reporting standards. And nowadays, these standards have matured sufficiently to promote convergence and integration of reports.

In modern literature there are plenty of frameworks that establish some key features and guidelines for structuring an ESG report and determining the essential data to include (Pande & Mishra 2025). We are going to focus on four of them: Global Reporting Initiative (GRI), Sustainability Accounting Standards Board (SASB), Task Force on Climate-related Financial Disclosures (TCFD) and Carbon Disclosure Project (CDP).

The Global Reporting Initiative was founded in the USA in 1997. The reason behind this initiative was the public outcry over the environmental damage caused by the Exxon Valdez oil spill, eight years ago. «The aim was to create the first accountability mechanism to ensure companies adhere to responsible environmental conduct principles, which was then broadened to include social, economic and governance issues» (www. globalreporting.org). The first version of GRI Guidelines (G1) was published in 2000 and served as the first global framework for sustainability reporting. In 2016, GRI transitioned from providing guidelines to setting the first global standards for sustainability reporting (www. globalreporting.org).

Similar to the International Accounting Standards (IASB) or Financial Accounting Standards (FASB), which set some norms to companies on how to measure and present their financial accounts, Sustainability Accounting Standards Board (SASB) helps companies disclose their sustainability relevant information. SASB was founded in 2011, as a nonprofit organisation, in order to help businesses and investors develop a common language about the financial impacts of sustainability (sasb.ifrs.org). In the following years, an increasing number of companies began using sustainability disclosures due to the growing prominence of these issues.

Recognizing the importance of not only financial aspects but also the necessity of sustainability reporting, the International Financial Reporting Standards (IFRS) Foundation created the International Sustainability Standards Board (ISSB) in 2021 (www.ifrs.org). The board operates alongside but independently from the IASB and develops Sustainability Disclosure Standards. There are already about to 40 jurisdictions adopted. These disclosures are «designed to deliver a truly global baseline of sustainability-related financial disclosures to inform capital markets» (www.ifrs.org). The IFRS Foundation consolidated SASB in August 2022 (sasb.ifrs.org).

Another initiative in environmental disclosures is Task Force on Climate-related Financial Disclosures (TCFD). The challenge it aimed to address was the financial markets need for accurate disclosure from companies. Climate change rise the climate related information and climate-based risks, which are necessary to be identified and measured. The Task Force was created at the request of G20 and the Financial Stability Board in 2015. After releasing many reports and recommendations, fulfilled its purpose. In 2023 the TCFD was also consolidated into the IFRS Foundation (www.fsb-tcfd.org).

The final environmental disclosure project we will mention is the Carbon Disclosure Project (CDP). The CDP is a global non-profit organisation founded in 2000. Its main purpose is to assist companies, capital markets, cities, states and regions to manage their environmental impacts. In this way, supports the environmental reporting, risk management and actions toward a more sustainable economy (www.cdp.net).

2.3.2 ESG Regulations

In the previous chapter, we focused on the ESG reporting and various initiatives that attempted to establish a framework of standards. As we could observed, the non-financial reports started voluntarily by some companies and organizations. Reasons such as the rapid transformation of the business environment, climate change, consumer demands and new corporate ethics could lead a company to formulate ESG reports.

However, in the previous years, many governments have begun establishing rules and regulations that mandate the disclosure of certain corporate aspects, particularly for large public-interest entities. These legislative measures take various forms and impose different reporting requirements on businesses. In this section, we will outline the legal frameworks in some of the world's largest economies.

The European Union has one of the most advanced, extensive and strict regulations about ESG reporting and Corporate Sustainability. The key objective is to redirect capital flows toward more sustainable investments and to align financial and non-financial reporting. The first mention of CSR in the EU occurred in the Lisbon Strategy in 2000, and the first comprehensive plan to achieve ESG goals was outlined in the Gothenburg Sustainability Strategy in 2001 (Camillieri, 2015). The main strategic goal was:

> *"to become the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion"* (EU, 2001)

A major step towards mandatory ESG reporting was Non-Financial Reporting Directive (NFRD) of the European Parliament and of the Council in 2014 (EU, 2014). The objective of the NFRD was to increase the transparency of the social and environmental information provided by companies and to improve the disclosure of non-financial information. Although it represented a significant leap toward mandatory reporting, the NFRD had a rudimentary format lacking strict regulations, and it only applied to a limited number of large companies.

Moreover, in 2019 EU launched the European Green Deal, an ambitious project to transform the EU into a modern, resource-efficient and competitive economy, by reducing significant the carbon emissions on the path to climate neutrality (EU, 2019). This project demand better reporting by companies, thus EU enacted the Corporate Sustainability Reporting Directive (CSRD) in 2023. The new framework is much broader than its predecessor. In addition, there are more specific and strict rules, and the reports should be audited by external auditors. CSRD is based on double materiality, meaning that businesses should report both how they affect their environment and on how external environmental conditions affect their financial performance.

The United Kingdom (UK) is one of the leading countries in ESG legislation, making mandatory reporting a prominent feature. In the UK, company law is mainly governed by the Companies Act 2006. The Act sets out requirements for the preparation of accounts and reports which include a range of ESG related information, for example employee welfare and environmental impact. Specifically, all large companies should disclose in their strategic report a "Section 172(1) statement". This section focuses on stakeholder

engagement, ensuring they are considered within relevant decision-making, and the impact of the business on the surrounding environment (UK, 2006).

The latest initiative is UK Sustainability Reporting Standards. Based on IFRS S1 and S2, these two standards are an adoption of international guidance to UK reality. Launched in 2025, these standards are currently for voluntary use (www.gov.uk). Finally, it worth to mention that in UK not only corporations should release sustainability reports but also all central government bodies. These reports are included in their annual reports in accordance with the Government Financial Reporting Manual (www.gov.uk).

In Asia, in general, environmental consciousness and regulatory frameworks are less strict. However, lately, in largest economies, there are some steps toward ESG reporting. China, for example, has been developing its ESG disclosure framework in recent years, moving from voluntary initiatives to a more structured regulatory system (www.china-briefing.com). In February 2024, based on China Securities Regulatory Commission (CSRC) instructions, China's three stock exchanges issued ESG reporting guidelines, mandating large companies to disclose their ESG data by 2026. CSRC also encourages other companies to publish ESG reports on a voluntary basis (www.unepfi.org). Moreover, in December 2024, the Ministry of Finance (MOF) finalized the Basic Guidelines for Corporate Sustainability Disclosure (Trial). These initiatives are important steps toward achieving the full implementation of a national disclosure system until 2030 (www.china-briefing.com).

Another major financial power in Asia is India. Although it is not considered among the most advanced economies, India was one of the first countries to introduce a mandatory Corporate Social Responsibility framework, according to Section 135 of the Companies Act, 2013 (Kharola, Goyal and Saxena, 2025). Regarding ESG reporting, the first voluntarily framework was set in 2011, by the Ministry of Corporate Affairs, which issued the "National Voluntary Guidelines on Social, Environmental and Economic Responsibilities of Business" (www.india-briefing.com). The current mandatory reporting framework was set by the Securities and Exchange Board of India in 2021, named as The Business Responsibility and Sustainability Report (Kharola, Goyal and Saxena, 2025).

The United States of America is the largest and one of the most advanced economies in the world. Some of the biggest corporations have also their base in USA. As mentioned before, ESG reporting has become a fundamental aspect of responsible business practices today. However, in the US, despite being the major financial market with trillions of dollars in capitalization, the legal framework about ESG reporting is fragmented and mostly voluntarily. Regulations are divided between the federal and state level (Tonello, 2025).

The first attempt at the national level was in 2010 by the Securities and Exchange Commission (SEC). In the «Commission Guidance Regarding Disclosure Related to Climate Change» the SEC intended to assist companies in satisfying their disclosure obligations under the federal securities laws and regulations (Cifrino, 2023).

Additionally, in 2022, the SEC introduced a proposed rule for enhanced disclosure of ESG metrics, aiming to standardize how companies report their impact. This included detailed information about their handling of climate related risks and opportunities, and

goals based on the TCFD framework (Cifrino, 2023). However, in 2025, following numerous protests and legal challenges, the SEC voted to end its defence of the rule. This decision ultimately led to the abandonment of the effort to adopt a nationwide ESG framework in the US (www.sec.gov).

On the other hand, several states have implemented their own legislation regarding ESG reporting. California is the most active advocate of these reports. Given the economic scale of the state, the regulation affects the majority of large companies who operates there. These legislative measures seek to improve transparency and accountability in corporate practices, while fostering sustainability and responsible investment (www.esgthereport.com). Other states with environmental responsibility regulations are for example New York and Minnesota.

In contrast, a growing number of states are implementing laws against ESG regulating. Florida and Texas lead the anti-ESG movement, adopting policies to restrict ESG considerations in state investments. These policies prohibit public pension funds, state and local government authorities to consider nonfinancial factors when making investment decisions (Tonello, 2025; esgthereport.com).

2.3.3 ESG Ratings

In the previous chapters, we analysed various ESG reporting frameworks and regulations across different countries. As we could see, there is no common protocol for firms to report their Environmental, Social and Governance results. In contrast, a main framework for financial statements is spread worldwide. Consequently, managers, investors, auditors and governments can easily understand the financial position of a company. However, at present, the lack of a common language in ESG reports has raised the necessity for alternative measurement tools.

As a result, ESG ratings getting growing attention. Most socially responsible investors (SRI) are not capable to evaluate sustainability of companies on their own. Therefore, they rely on the ESG scores provided by sustainability rating agencies, which have been established within the market as intermediaries (Drempetic, Klein & Zwergel, 2020). Given the complexity of measuring a firm's nonfinancial or ESG performance, the validity and convergence of these ratings have been a subject of critical debate in the scientific literature (Brandon, Krueger & Schmidt, 2021).

ESG Ratings emerged in the 1980s to assist investors seeking to allocate capital to sustainable corporations. The oldest ESG rating agency was Eiris, which was established in the United Kingdom in 1983. In USA the first agency, started in 1990, was Kinder, Lydenberg and Domini (KLD). While initially catering to a small group of highly specialized investors, ESG ratings spread fast in the next two decades. As a result, many early ESG rating providers were acquired by established financial data providers (Berg, Kölbel and Rigobon, 2022).

ESG rating agencies aim to evaluate companies, in a way similar to credit rating agencies. However, this attempt is challenging for at least for two reasons. First, while credit-worthiness is relatively clearly defined as the probability of default, the definition of ESG performance is far more ambiguous. Second, while financial reporting standards have matured and converged over the past century, ESG reporting is in its infancy (Berg, Kölbel and Rigobon, 2022). Another key difference between ESG and credit ratings is

that, in the case of ESG ratings, the rated company typically does not request or pay for the evaluation. This can lead to greater independence for the rating agency, as its true client is the investor rather than the rated firm (Drempetic, Klein & Zwergel, 2020).

The theoretical foundation for ESG rating agencies is provided by new institutional economics, which emphasizes the importance of institutions in reducing information asymmetries, by acting as intermediaries and reducing transaction costs (Oehler & Neuss, 2025). Compared to ESG disclosures, ESG ratings offer a more convenient, user-friendly, and time-saving alternative for investors. A high score can enhance a firm's reputation, provide access to capital at lower costs, and improve competitive advantages. For this reason, according to voluntary disclosure theory, companies with better performance in ESG criteria choose to release credible direct disclosures. Moreover, ESG ratings allow market participants to easily screen firms' ESG activities through an aggregated assessment (Oehler & Neuss, 2025).

Because ESG rating agencies' metrics are not very transparent, market participants have to trust and rely on the quality of these ratings, even if they do not fully understand the underlying factors (Oehler & Neuss, 2025). However, there is a major criticism to agencies, due to the frequent disagreement among their ratings. There is a plethora of researchers pointing out this problem (Berg, Kolbel and Rigobon, 2022; Avramov et al, 2022; Brandon, Krueger & Schmidt, 2021; Escrig-Olmedo et al, 2019; Vitto, Marazzina & Stocco, 2023).

One possible reason for the disagreement among the ESG rating agencies is the use of different methodologies to analyse and different variables to calculate the score of each company. To gather their data, agencies utilize various public and private sources. Companies' reports and websites probably is one of the most common sources. News on media or other organizations are also used often. Independent governmental or non-governmental reports could be a useful way to obtain additional information. Furthermore, some agencies contract to corporations with by conducting interviews or distributing questionnaires (Billio et al, 2020).

In addition, the number of estimation indicators varies among different raters. The weighting of Environmental, Social and Governance criteria can also fluctuate significantly. Some examples are following: For the environmental pillar, factors include greenhouse gas emissions, water and air pollution and land exploitation. For social reasons, criteria involve labor standards, workspace safety, human rights protection and gender equality. At last, governance pillar is mainly related to aspects such as the independence of the board members, respect to market competition and shareholders' rights (Billio et al, 2020).

There are numerous ESG ratings providers. Some of the most famous are Bloomberg, S&P Global, MSCI, FTSE Russell, LSEG (Refinitiv), Sustainalytics and ISS. Bloomberg is a global leader in business and financial information, delivering news and data about markets. Based in the USA, Bloomberg ESG Scores launched in 2008, focusing on how well a company manages its most significant sustainability risks (www.bloomberg.com). The London Stock Exchange Group is the owner of London Stock Exchange, one of the largest and oldest stock exchanges in the world. Additionally, it provides broader financial services through other acquired subsidiaries, such as FTSE Russell and Refinitiv. These two companies offer not only financial data, but also ESG scores (www.lseg.com). Sustainalytics is one of the oldest ESG data analysts, launched in the

Netherlands in 1992. Like most ESG ratings agencies, it was eventually acquired by a large financial institution, Morningstar (www.sustainalytics.com).

2.4 ESG and Financial Performance

Corporate Sustainability and Responsibility is drawing more attention over the past decades. According to traditional economic theories, a company's main concern is to maximize its economic profit. Managers are consistently faced with the major dilemma of how to allocate scarce corporate resources. Today, however, companies are under pressure because of the shift in customers preferences and demands, of new regulations by the governments and the climate change. Consequently, firms must enhance their ESG performance, prioritizing both their economic status and their societal impact (Waddock & Graves, 1997).

A fundamental question arising from this shift in corporate behavior is: «Does ESG performance affect financial performance and in which way, positive or negative? » Many researchers have studied the effect of ESG actions on financial outcome of company. The results remain inconclusive. Various studies have found positive, negative, and neutral links (Xie et al, 2019; Aouadi & Marsat, 2018; Fatemi, Glaum & Kaiser, 2018). Although the results of these studies are ambiguous, meta-analysis have a positive favour view. For example, Orlitzky, Schmidt & Rynes (2003) and Friede, Busch & Bassen (2015) after analysing a large amount of previous empirical studies, they found that the majority of them demonstrate a positive effect of ESG on financial performance of the firm.

One possible reason for this uncertainty surrounding the relationship between sustainability and financial performance is the measurement problem. According to Waddock and Graves (1997), corporate sustainability and responsibility is a «multidimensional construct». There is a variety of behaviors ranging from inputs (e.g. environmental strategies to reduce pollution), outputs (e.g. philanthropic activities) and internal processes (e.g. treatment of employers and customers). As a result, it is exceedingly difficult to capture every possible behavior in a single ESG measurement (Waddock & Graves, 1997).

Because of the difficulty mentioned above, most studies focus on a single dimension of ESG, for example, only environmental or social disclosures. Even in this case it is easier to find some parameters to carry out a study, it remains problematic. ESG dimensions are fundamentally interconnected. A limited number of studies focus on all dimensions of ESG and their collective impact on financial performance (Alareeni & Hamdan, 2020).

Several theories link ESG performance to financial performance. One of the most well-known is the Stakeholder theory by Edward Freeman. In his book «Strategic Management: A Stakeholder Approach» (1984), Freeman supports the idea that management should prioritize all stakeholders rather than focusing exclusively on shareholders. The term stakeholder includes all these individuals or groups who interact with the company, such as shareholders, financiers, employees and customers (Alsayegh, Rahman & Homayoun, 2020; Velte, 2017).

According to this theory, the satisfaction of various stakeholder groups is instrumental to organizational financial performance (Orlitzky, Schmidt & Rynes, 2003).

The long-term sustainability of a firm is connected to moral and ethical behavior. Good management practices improve relationships with key stakeholder groups, resulting in better overall performance (Waddock & Graves, 1997). In consequence, corporate responsibility has a positive relationship with financial performance.

Porter and Van der Linde (1995) offer an alternative perspective on the impact of government regulations regarding corporate social responsibility activities and the financial outcomes. They argue that CSR activities, especially environmental, could lead businesses to innovations that generate extra revenue, potentially offsetting all additional costs. In other words, environmental regulations can often give a long-run improvement in companies' revenues by encouraging them to concentration on reducing costs of production and increasing consumer satisfaction and sales (Alareeni & Hamdan, 2020).

Legitimacy is also vital for corporations to ensure their long-term prosperity. Suchman (1995) defines legitimacy as «a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions» (Aouadi & Marsat, 2018). The legitimacy theory provides an additional motivation for ESG disclosure. This stems from the idea that an organization requires social acceptance in order to exist and grow. Hence, legitimacy theory argues that companies must disclose certain information (e.g. community impact, human and natural resources, environmental strategy) to convince society that the organizational activities contribute to social value (Alsayegh, Rahman & Homayoun, 2020).

On the other hand, there are researchers argue that ESG performance has a negative effect to economic position of a business. Probably Milton Friedman is one the most outspoken economists holding this view. In his famous article in 1970 he claimed that the maximization of owners' profits is the firm's solely social responsibility. Moreover, he argued that the application of CSR imposes an unjustified and fundamentally undemocratic taxation on shareholders, that its implementation costs outweigh any potential tangible benefits and that due to this, it constitutes a misallocation and misappropriation of valuable company resources (Brooks & Oikonomou, 2018). Other academic studies have found that while ESG activities do indeed increase the short-term costs of a company, they improve its long-term performance (Chen, Song & Gao, 2023).

Finally, Slack Resource Theory offers a different perspective of the relationship between ESG and financial position of a firm. This term refers to the abundance of resources, for example human and natural capital, a firm could possess. If a company has excess resources available, then it is easier to invest a portion of this surplus in social responsibility activities. In this way, financial and ESG performance have a positive relationship, but the direction of causality is reversed: better financial performance acts as a predictor of better CSR, rather than the other way around (Waddock & Graves, 1997; Orlitzky, Schmidt & Rynes, 2003).

2.5 Related Empirical Research

As mentioned already, an increasing number of researchers have studied ESG due to the rise of corporate sustainability and responsibility in the last few years. The main subject is the relationship between Environmental, Social and Governance criteria and

economic performance. For this reason, many empirical studies seek to establish a link between the two in various ways.

Waddock and Graves (1997) used Kinder, Lyndenberg and Domini (KLD) data for social performance, alongside return on assets (ROA), return on equity (ROE) and return on sales (ROS), to measure economic performance. They conclude that one-year lagged CSR has significant explanatory power for ROA and limited power for ROS but none for ROE. On the other hand, they also found from separate regressions that lagged accounting variables all have significant explanatory power for next year's CSR figures. This evidence is potential sign of a virtuous circle.

Examining the connection between ESG and economic performance using an ESG score for the former and some accounting measures for the latter is very common approach. Chen, Song and Gao (2023) and Alareeni and Hamdan (2020) utilized similar methodologies. The first paper collected data from 3.332 listed companies worldwide, from 2018 to 2022. Thomson Reuters' ESG Scores and return on assets were the two variables. The second paper collected data of S&P 500 companies in the USA, during the period from 2009 to 2018. Bloomberg's ESG Index as well as ROE, ROA and Tobin's Q were chosen as variables. Both papers, after a regression analysis, concluded to a positive relationship, particularly for larger companies with a higher amount of assets.

Another concept under investigation is the link between corporate sustainability performance and financial risk. According to Godfrey, CSR can create a «moral capital», which is used as a reputational shield, if the firm finds itself under controversy. In this way, the company has a higher probability of retaining its trustworthiness and preserving its financial position (Brooks & Oikonomou, 2018). Godfrey, Merrill, and Hansen (2009) tested this theory running an event study surrounding a legal or regulatory actions against firms. The result indicated that CSR activities seem to yield an insurance-like protection.

Oikonomou, Brooks, and Pavelin (2012) examined the association between corporate social performance and financial risk, for an extensive panel data sample of S&P 500 companies, from 1992 to 2009. Their main findings were that Corporate Social Responsibility is negatively but weakly related to systematic firm risk and that Corporate Social Irresponsibility is positively and strongly related to financial risk.

In addition, to examining the overall relationship between ESG performance and financial performance, other researchers tried to figure out the link between an ESG event and the stock market. Two possible measures could be the ESG news and scores. As methodology also could be used the event study analysis, which we will explain in depth in the next chapter.

The relationship between ESG news and a company's stock price has been the point of interest for many scholars. Capelle-Blanchard and Petit (2019) analysed approximately 33.000 ESG news, positive or negative, for a hundred listed companies between 2002 and 2010. They conclude that a positive announcement had no effect on average on the market price, whereas after a negative event, there was an average 0,1% drop in price. Similar results had the study of Suryani et al (2025) in the Indonesian stock market, from 2021 to 2023. According to Serafeim and Yoon (2002) the market reacts particularly to financially material ESG news. Furthermore, the reaction is larger for positive news that receive more news coverage.

Other researchers have focused primarily on bad news. Dziadkowiec and Daszynska-Zygadlo (2021) ran an event study on 235 ESG misconducts related to companies in the

German stock market (DAX). The main findings were that between 2000 and 2009 the effect was insignificant but after 2009 until 2019, there was a negative effect, especially to governance related events. Akyildirim et al (2025) examined the impact of negative ESG events on European banks in period 2007 to 2023. They found evidence of significant negative abnormal stock returns and increased volatility. Contrary to the above findings, Aouadi and Marsat (2018) concluded, after a study of more than 4.000 firms across the globe between 2002 and 2011, that ESG controversies have a surprisingly significant and positive effect on firm's market value.

For some academics, an important Environmental, Social and Governance event could be a date that a regulation framework announced or came into force. There are many examples of such studies (Wang, Hu & Zhong, 2023; Kim, 2024; Grewal, Riedl & Serafeim, 2019; Hummel & Mosch, 2022; Pandey et al, 2024). The majority of these conclude that the introduction of a new set of rules that requires firms to act more responsible has a negative effect on stock prices.

Wang, Hu and Zhong (2023) examined stock market reaction to the enactment of the ESG Disclosure Simplification Act of 2021 by the United States House of Representatives on June 16, 2021. The result was a significant price drop of 1,1% across all firms. Grewal, Riedl and Serafeim (2019) investigated the equity market reaction to three crucial dates about regarding the European Union's legislation of mandatory non-financial disclosures. These days was April 16, 2013, when European Commission presented the proposal, February 26, 2014, when the European Council reached an agreement on that proposal and April 15, 2014, when the Commission adopted the proposal. They found an average negative market reaction of -0,79%, especially for firms having lower pre-directive nonfinancial disclosure levels.

The final case we will analyse is the relationship between Environmental, Social and Governance Scores and market value. As already mentioned, ESG Scores gain a rapidly growing attention from investors seeking to invest in sustainable corporations, due to their simplicity and ease of understanding. Zuraida, Houqe and Van Zijl (2016) undertook a study using a regression model of Bloomberg's ESG scores and various accounting measures and conclude that there is a positive relationship. Cordeiro and Tewari (2015) find a positive reaction of the largest 500 USA firms to the first Newsweek Green Rankings in September 2009.

Chen et al (2024) examined the effect of SynTao Green Finance's ESG ratings, which officially launched on the Bloomberg ESG on June 22, 2021, on the Chinese stock market. The results showed that the top 10% of ESG-ranked stocks reacted significantly positively to the onboarding event, whereas the bottom 10% of ESG-rated stocks experience significant and negative cumulative average abnormal returns. Moreover, this effect is asymmetric, in that the negative returns have a greater and more prominent magnitude than the positive returns.

Eng, Fikru and Vichitsarawong (2022) performed research on the impact of sustainability disclosures and ESG ratings on firm value. Their sample draw data from over 2.600 publicly listed USA companies for the period 2014-2018. The regression analysis indicated a positive connection between both ESG Score and sustainability report and market value.

As demonstrated above, corporate sustainability and responsibility relation to financial position of a firm has been examined in a plethora of different ways. However,

to the best of our knowledge, only two papers have conducted a study for the market reaction of stock prices to the announcement of an ESG report of a company. Aureli, Gigli, Medei and Supino (2019) aimed to answer the question, whether investors react to the publication of companies' sustainability reports. For this purpose, 170 report disclosures were considered from 55 companies from all over the world in the period from 2009 to 2016. The conclusion was that 70% of the companies exhibited no significant abnormal returns across all event windows.

Finally, Du, Yu, Bhattacharya and Sen (2017) examined 328 release dates of sustainability reports from 139 firms included in the Fortune 500, between 2005 and 2011. The study concluded that ESG reports indeed affect a firm's financial performance in both the short and long term. Specifically, in the short term, the authors documented positive cumulative absolute abnormal returns and positive cumulative abnormal trading volumes around the release of sustainability reports, suggesting that these reports contain new, value-relevant information.

3. Data and Methodology

3.1 Event Study

In order to conduct our empirical research, the event study methodology will serve as our main analytical tool. Event study analysis is a statistical technique that has significant applications in finance, accounting and many other fields, and has received growing attention over the last few decades (Aureli et al, 2019). The purpose of an event study is to measure the effect of a specific event on the value of a firm or a group of firms (MacKinlay, 1997).

The importance of event studies arises from the fact that the magnitude of abnormal performance at the time of an event provides a measure of the (unanticipated) impact of this type of event on the wealth of the firms' claimholders (Kothari & Warner, 2007). Furthermore, the usefulness of such studies stems from the assumption of market rationality, implying that the effects of an event will be reflected immediately in security prices (MacKinlay, 1997). Consequently, this methodology also serves capital market research by testing market efficiency.

Examples of corporate events include earnings announcements, mergers and acquisitions, and the issuance of new debt or equity. Other events may include governmental policies, such as new legislation, elections, or public finance reports, as well as environmental occurrences, such as natural disasters. This technique can also be applied to examine the effect of an event on other metrics, such as price volatility and trading volume.

According to Kothari and Warner (2007), 565 event study papers were published in just five major economic journals between 1974 and 2000. This is a very conservative figure, as it is impossible to know the exact number of studies released across all scientific journals; however, it indicates the vast scale of the field. Perhaps more important is the growth observed during this period, rising from 5 papers in 1974 to 37 papers in 2000.

Two landmark papers by Ball and Brown in 1968 and Fama, Fisher, Jensen and Roll in 1969 are widely regarded as marking the beginning of modern event study methodology (Corrado, 2011). However, according to MacKinlay (1997) the first published study was likely conducted in 1933 by James Dolley. In the decades leading up to the late 1960s and the publication of the two seminal papers, other scholars such as John Myers, Archie Bakay, Austin Barker and John Ashley had conducted similar analysis. Another noteworthy paper, that advanced this methodology was the work of Stephen Brown and Jerold Warner (1985).

The procedure of an event study begins with defining the events to be examined, as well as the securities affected by these events. After collecting data for the event dates and security prices, using various sources, like financial databases, corporate reports or public media, it is necessary to select the period over which the prices of the involved companies will be examined. This period is commonly referred to as the event window and is centered on day 0, which represents the day the event occurs. All days prior to this day are denoted with a minus (e.g. -5 is five days before) and all days following the event are marked with a plus symbol (e.g. +4 is four days after). Therefore, an event window of (−5, +5) implies that the impact of the event will be examined over an eleven-day period: the event day itself, five days prior, and five days after (MacKinlay, 1997).

With the intention of finding out if the event has an impact on the stock price, we compare the normal or expected return with the actual return. As normal or expected return we define the return we expect a company should have if the event does not happen. If actual return of firm i in time t is $R_{i,t}$ and expected return is $E(R_{i,t})$ then abnormal return ($AR_{i,t}$) is the difference between these two measures (Corrado, 2011).

$$AR_{i,t} = R_{i,t} - E(R_{i,t})$$

There is a variety of models available to calculate the expected return (Kothari & Warner, 2007). One of the most commonly used models is the constant mean return model. As its name implies, this model assumes that the mean return of a given security is constant over time. Thus, once the mean return is estimated, the expected return can be calculated accordingly (MacKinlay, 1997). Another, more sophisticated method, is the market model, which attempts to isolate and remove the influence of overall market movements on a security's return. If market return on day t is RM_t , $e_{i,t}$ represents a firm specific return and a, b are parameters that specify the linear structure of the model then:

$$R_{i,t} = a + bRM_t + e_{i,t}$$

By assumptions inherent in the structure of the market model, the firm-specific return $e_{i,t}$ is unrelated to the overall market and has an expected value of zero. Hence, the expected return for a specific date t^* conditional on this date market return is (Corrado, 2011):

$$E(R_{i,t^*}) = a + bRM_{t^*}$$

And this way we could calculate the abnormal return as:

$$AR_{i,t^*} = R_{i,t^*} - (\hat{a} + \hat{b}RM_{t^*})$$

Other common models are the Capital Asset Pricing Model (CAPM), the Market-Adjusted Return Model and Fama-French Model. In all these models, in order to calculate the expected return, we need to define a control period. The estimation window is a period, usual before the event and without containing the event window. Using real data from this period we could calculate the normal return, based on the model we have chosen (MacKinlay, 1997; Corrado, 2011).

In addition to calculating the AR, it is important to determine the variance of the residuals of the market model regression. There are various formulas incorporating different adjustments aimed at improving estimation accuracy. Under the null hypothesis, the abnormal returns are assumed to be normally distributed with a zero conditional mean and a conditional variance $\sigma^2(AR_{i,t})$ is (MacKinlay, 1997):

$$\sigma^2(AR_{i,t}) = \sigma_\varepsilon^2 + \frac{1}{L_1}[1 + \frac{(RM_t - \overline{RM})^2}{\sigma_{RM}^2}]$$

Many times, it is interesting to examine the effect of the event in a whole period of the event window. In this way it is possible to have a more complete view of the event's action. On the one hand, if the event is partially anticipated, some of the abnormal return behavior related to the event should show up in the pre-event period. On the other hand, the market efficiency is questionable in practice, meaning that the market is not react immediately. Thus, the post-event returns could provide information (Kothari & Warner, 2007).

So, another common measure after AR is the Cumulative Abnormal Return (CAR), which is the sum of the abnormal returns in a specific period. Starting at time t_1 through time t_2 CAR is defined as:

$$CAR(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_t$$

The variance of CAR could be calculated as:

$$\sigma^2(t_1, t_2) = (t_2 - t_1 + 1)\sigma_\varepsilon^2$$

However, the calculation of AR or CAR of a single firm may not allow a researcher to draw general conclusions. For this reason, observations from several firms should be aggregated. Cross sectional analysis attempts to figure out whether one or more events have an effect on the stock prices of a group of companies. It is not necessary to be the same event, nor occur on the same date for all companies. Typically, the analysis uses the Average Abnormal Return (AAR) as variable, and for an amount of events N it is calculated as follows (MacKinlay, 1997):

$$AAR_t = \frac{1}{N}\sum_{i=1}^{N} AR_{i,t}$$

The conditional variance of AAR is:

$$\sigma^2(AAR_t) = \frac{1}{N^2}\sum_{i=1}^{N} \sigma^2\left(AR_{i,t}\right)$$

In the same way as before, we could combine the two methodologies and calculate the CAR of the total number of firms. The new measure shows the general effect of a type of events in the stock market. This measure, which we are going to name as Cumulative Average Abnormal Return (CAAR), is estimated with this formula (Nakajima & Inaba, 2022):

$$CAAR(t_1, t_2) = \frac{1}{N}\sum_{i=1}^{N} CAR(t_1, t_2)$$

And the variance of CAAR is calculated similar to $\sigma^2(AAR_t)$:

$$\sigma^2\big(CAAR(t_1,t_2)\big) = \frac{1}{N^2}\sum_{i=1}^{N}\sigma^2\big(CAR(t_1,t_2)\big)$$

Having calculated the above measures, we are ready to conduct some statistical tests. The usual null hypothesis is that the abnormal return is zero. Assuming returns are normally distributed, we create a test statistic that asymptotically approaches the standard normal distribution by dividing the abnormal return with the estimated standard error (MacKinlay, 1997).

$$t_{stat} = \frac{\widehat{AR_{\iota,t}}}{\sigma\big(\widehat{AR_{\iota,t}}\big)}$$

This is the simplest test and can be applied to all the measures mentioned above, AR, CAR, AAR and CAAR. By selecting a significance level a (e.g. 0,01 or 0,05), the null hypothesis of no abnormal performance is rejected, with a confidence level of 1- a, if the test statistic is either greater than the upper critical value or lower than the lower critical value (two-tailed test). If test statistic is higher than the upper-tail critical value, there is evidence of positive impact of the event on the stock price. Conversely, if the test statistic is lower, the impact is negative (Corrado, 2011).

The ordinary t-test as a simple measure, may be biased in some cases. For this reason, many modifications to the basic model have been developed by various researchers. These new tests attempt to address different problems inherent in the data, such as volatility, a small number of observations, or long estimation periods (Nakajima & Inaba, 2022). Some examples are the Patell test by James Patell (1976), the BMP test by Boehmer, Musumeci and Poulsen (1991) and the Sign test by Arnold Cowan (1992).

3.2 Data Collection

To empirically investigate the impact of the publication of ESG reports on the stock price of a company, it is necessary to collect data about the release dates of these reports. Initially, we considered selecting companies from European Union, where ESG reports are mandatory. However, according to the latest framework of CSRD, the sustainability report is included in the annual integrated report. Because this integrated report also presents financial information, we would be unable to isolate the effect of the ESG part.

Consequently, we chose to analyse firms from the United States. There are several reasons for that choice. First, the USA stock market is the largest in the world. Moreover, the broad use of corporate webpages as well as the native English language made the research easier. Though, there is a disadvantage on this selection. There is no mandatory legislation about ESG reporting, so companies could not release such reports.

Fortunately, most companies voluntarily publish their ESG performance. According to literature, larger companies are more likely to release these reports (Ioannou &

Serafeim, 2012). Thus, to increase our possibilities to find firms that have released ESG report we selected the top 150 companies of S&P 500, based on their market capitalisation on October 07, 2025. Focusing on this upper segment of the index serves a dual purpose. First, it ensures a high availability and continuity of ESG disclosures over our 5-year period (2021–2025). Second, these large-cap firms face the most significant scrutiny and pressure from institutional investors and stakeholders, which generally translates into more standardized, comprehensive, and timely ESG reporting compared to smaller firms.

A key methodological contribution of this study lies in the data collection process itself. Due to the lack of public or commercial databases containing precise ESG report release dates, it was necessary to search for them individually. This meticulous manual collection of event dates overcomes a significant limitation in existing literature, where automated data extraction often fails to capture the exact publication date required for an accurate event study.

We utilized various online sources, such as corporate official websites, press releases, articles in media and ESG specified webpages. The name of this report could vary. Therefore, we included terms like ESG, Sustainability, Responsibility, Impact, Corporate Social Responsibility, Citizenship and Global report. Reports that contained other financial statements were excluded from our sample, to prevent confounding effects. Finally, we included only those reports for which we could verify the exact release date from trustworthy sources, thereby constructing a highly robust, proprietary dataset capable of precisely isolating the market reaction to the ESG disclosure.

Under these criteria, we managed to identify 434 release dates. We retained in our sample only these companies that we found four or five reports. Then, we ended up to 72 firms with 335 reports. For these remaining companies, we needed their stock price from 2020 onward. However, in 5 cases, there were missing data on stock prices, so we excluded them from our sample. To conclude, the final data include 67 firms with 312 release dates. The complete data for these companies are on Appendix A and the number of events per year are on Table 2.

Table 2

Number of Reports per Year

Year	**Number of reports**
2021	63
2022	63
2023	66
2024	64
2025	56
Total	312

Source: Author

3.3 Hypothesis Development

The existing literature has not reached a clear conclusion regarding the impact of ESG disclosure on the financial performance of a firm. Nevertheless, the majority of previous empirical studies have shown that there is a positive effect (Orlitzky, Schmidt & Rynes, 2003; Friede, Busch & Bassen, 2015). In this study, we aim to examine whether indeed exists a significant stock market reaction on the release of corporate responsibility reports. Consequently, our first hypothesis is formulated as follows:

> *H_1: There is a positive relationship between ESG disclosures and a company's stock price.*

A second issue under investigation concerns the role of time. There is an increasing awareness of people to Environmental, Social and Governance matters the past few decades. For this reason, we aim to investigate whether this heightened awareness has resulted in a greater market impact in more recent years (Capelle-Blanchard & Petit, 2019). As we have events from a five-year period, between 2021 and 2025, we divided our sample in five annual subgroups to test our second hypothesis:

> *H_2: The impact of ESG disclosures on a company's stock price increases over time.*

The final subject to be analysed in this study is the impact of the ESG Score. As already mentioned, ESG ratings are a key factor for investors who want to invest in sustainable corporations. Thus, it is reasonable to expect that a company with high ESG Score is more likely to experience a larger rise in its stock price following the release of an ESG report, compared to a company with lower ESG Score (Eng, Fikru & Vichitsarawong, 2022):

> *H_3: There is a positive relationship between a company's ESG score and the increase in its stock price following an ESG disclosure.*

To test the third hypothesis, we collected the data of the latest ESG Scores for the 67 companies in our sample from two sources, LSEG (Refinitiv) and S&P Global. Based on these scores, we constructed two separate rankings in descending order, starting with the firm that received the highest score. We then calculated the average rank across the two lists for each company in order to classify them into groups. The complete dataset is presented in Appendix B.

3.4 Research Design

After establishing our theoretical framework, we are ready to conduct the empirical analysis. As mentioned before, the main analytical tool is the event study, which relies on the abnormal return, the difference between the actual and expected return. To calculate this expected return, we utilize the market model expressed by the following equation:

$$R_{i,t} = a + bRM_t + e_{i,t}$$

Where $R_{i,t}$ is the return of firm i in year t and a, b parameters estimated by a regression analysis. As we have chosen stocks included in S&P 500 index, we could reasonably use this index as our market index. To compute daily returns of the stock prices and S&P500 index, we used the simple rate of return defined as the percentage change from the initial value to the final value, without dividends.

The estimation window, another crucial parameter to be set, is also used to determine the normal behavior of a stock's returns. For robust results, the estimation window needs to be of sufficient length. This period varies across studies but usually ranges from 80 to 200 days (Benninga, 2008). For example, Capelle-Blanchard and Petit (2019) used a 60-day window, Suryani et al (2025) and Hummel and Mösch (2022) employed a 100-day window, while Cordeiro and Tewari (2015), Nakajima and Inaba (2022) and Wang, Hu and Zhong (2023) preferred a long estimation period of 250 days.

In our study, we selected a 120-trading-day estimation window ending immediately before the event window. This choice was made for two reasons. First, a six-month period is sufficient to provide reliable statistical estimates of the model's parameters. Second, a longer period could be affected by other events or structural changes, potentially leading to biased parameter estimates.

Although there is no universal rule regarding the lengths of event windows, they are usually short. A common length starts one day before the event and finishes the day after (-1, +1). In general, a period of 21 days (-10, +10) is sufficient to include the full effect of the event on the stock price (Ding et al, 2018). In this research, we chose various event windows for a more robust analysis.

During the data collection process, we identified four ESG reports that released on non-trading days (e.g. on weekends). In these cases, the event date was defined as the first subsequent trading day, considering it the day the report's initial effect would be incorporated into the stock price.

To evaluate the statistical significance of our results, we used two different techniques. The null hypothesis always states that the value of the examined measure is zero. If this hypothesis is not rejected by the tests, it implies that the measure's true value is not significantly different from zero. Conversely, if the hypothesis is rejected, we have strong evidence that the calculated value differs from zero. Statistical significance is examined at the 10%, 5% and 1% levels.

The first test is the widely used t-statistic, which was discussed in the previous chapter. However, due to its simplicity, the effectiveness of this statistical technique is doubted sometimes. Therefore, we chose another one test, the Standardized Cross-Sectional or BMP Test (we use the second term from now on), which is briefly presented below.

The BMP Test, proposed by Boehmer, Musumeci, and Poulsen in 1991, is a robust, parametric statistical test, used in event studies to measure the significance of abnormal stock returns. This test's main concern is to account for the fact that stock price volatility often increases around the day of an event (Dutta, 2014). The phenomenon is known as event-induced variance. Traditional event-study tests (like the Patell Z-test) assume that

the variance of returns remains constant before and during the event window. However, major news (like a merger announcement) usually causes prices to swing wildly. If a test assumes low volatility (based on historical data) but the event itself causes high volatility, the test will underestimate the standard error (Marks & Musumeci, 2017).

To resolve this issue, BMP Test combine two approaches. On the one hand, it standardizes each stock's abnormal return by its own historical standard deviation, similar to the Patell Test. This ensures that high-volatility stocks don't dominate the average. On the other hand, instead of relying theoretically on historical variance for the final test statistic, it calculates the variance from the cross-section of event-day returns. By using the actual spread of returns on the event day to calculate the standard error, the BMP test adjusts for any volatility increase occurred on that specific day (Boehmer, Musumeci & Poulsen, 1991).

The formula of BMP test statistic is calculated in two steps. First, for every firm i, you calculate the Standardized Abnormal Return ($SAR_{i,t}$). This is the abnormal return divided by the standard deviation of the estimation window residuals:

$$SAR_{i,t} = \frac{AR_{i,t}}{\sigma_i}$$

The second step is the calculation of the test statistic. This measure is the average of the above standardized returns, divided by the cross-sectional standard deviation of those same standardized returns on the event day:

$$BMP\ test = \frac{\overline{SAR_t} * \sqrt{N}}{\sqrt{\frac{1}{N-1} * \sum_{i=1}^{N} \left(SAR_{i,t} - \overline{SAR_t}\right)^2}}$$

At this point we conclude with the analysis of the methodology, the data collection and the hypotheses setting up. In the next chapter we continue to the empirical implications of these factors.

4. Empirical Results

4.1 Main Results

In this chapter, we present the results of our empirical analysis. As we conducted several event studies with various event windows, we will analyse each of them separately, aiming to draw some general conclusions.

First, we examine our primary hypothesis: that there is a positive relationship between ESG disclosures and a company's stock price. To test this hypothesis, we conducted six event studies, using the following event windows:

(-1, +1), (-3, +3), (-5, +5), (-5,0), (0, +5), (-10, +10)

We begin the presentation with the event window ranging from one day before the event to one day after (-1, 1). This three-day window is particularly useful to researchers because it captures the immediate effect of the event on the stock price. It is frequently used, in contrast to a one-day event window consisting only of the event day, as the theory of efficiency in market is often not fully realized in practice. The results are presented in Table 3.

Table 3
Event Window (-1, 1)

AAR Results					
Day	**AAR**	**t test**	**p-value**	**BMP test**	**p-value**
-1	0,0001	0,1275	0,8986	0,3057	0,7600
0	-0,0027	-2,8511***	0,0046	-2,8514***	0,0046
1	0	0	1	-0,2747	0,7837
CAAR Results					
Period	**CAAR**	**t test**	**p-value**	**BMP test**	**p-value**
-1, +1	-0,0027	-1,8771*	0,0614	-1,7789*	0,0762

(The symbols *, ** and *** indicate statistical significance at the 0,10, 0,05 and 0,01 levels, respectively, using a two-sided test)

We observe that, at the 0,01 significance level, both the t-test and the BMP test reject the null hypothesis of no abnormal return. However, contrary to our initial expectation, there is a negative average abnormal return of -0,27% on the event day. Moreover, no abnormal returns are observed on the days before and after the event. Finally, the cumulative average abnormal return (CAAR) of -0,27% is statistically significant only at the 0,10 level.

The next event window ranges from three days before the event to three days after (-3, +3). This window provides a broader perspective on the event's impact on stock prices, although it is still narrower than the longer windows examined later in our analysis. The results are presented on Table 4.

Table 4
Event Window (-3, 3)

AAR Results					
Day	**AAR**	**t test**	**p-value**	**BMP test**	**p-value**
-3	-0,0005	-0,3599	0,7192	-0,0772	0,9386
-2	0,0012	1,1551	0,2489	1,1944	0,2332
-1	0,0001	0,1275	0,8987	0,2287	0,8192
0	-0,0027	-2,8486***	0,0047	-2,8627***	0,0045
1	-0,0001	-0,1169	0,9070	-0,2661	0,7904
2	-0,0009	-0,9617	0,3370	-0,6454	0,5192
3	-0,0015	-1,6127	0,1078	-1,4694	0,1427
CAAR Results					
Period	**CAAR**	**t test**	**p-value**	**BMP test**	**p-value**
-3, +3	-0,0044	-1,9119*	0,0568	-1,5306	0,1269

(The symbols *, ** and *** indicate statistical significance at the 0,10, 0,05 and 0,01 levels, respectively, using a two-sided test)

The results estimated using the second event window are similar to those of the previous one. Among the seven days examined, a statistically significant abnormal return (at the 0,01 level) is observed only on the event day. Additionally, the CAAR estimation of -0,44% is significant at the 0,10 level using the t-test, but under the assumptions of BMP test the null hypothesis is not rejected.

The third event window is slightly broader than the (-3, +3) window, covering eleven days in total (-5, +5). This specification is among the most commonly used in the literature, as it includes five days prior to the event and five days following it. In this way the researcher could have a better understanding of the event's effect in both directions. On the one hand, if the market has information about the upcoming release, it could discount the effect on the prior period. On the other hand, if the market is inefficient, the effect of the event may spread over several days following the event. The outcomes of this analysis are presented in Table 5.

Table 5
Event Window (-5, 5)

AAR Results					
Day	**AAR**	**t test**	**p-value**	**BMP test**	**p-value**
-5	-0,0012	-1,3188	0,1882	-0,6411	0,5219
-4	0	0	1	0,4405	0,6599
-3	-0,0006	-0,4314	0,6665	-0,1291	0,8973
-2	0,0013	1,2512	0,2118	1,2596	0,2088
-1	-0,0001	-0,1277	0,8985	-0,0318	0,9746
0	-0,0027	-2,8419***	0,0048	-2,7471***	0,0064
1	-0,0002	-0,2342	0,8150	-0,4290	0,6682

2	-0,0010	-1,0679	0,2864	-0,7286	0,4668
3	-0,0015	-1,6091	0,1086	-1,5199	0,1296
4	-0,0007	-0,8166	0,4148	-0,7383	0,4609
5	0	0,0089	0,9929	0,1207	0,9040
CAAR Results					
Period	**CAAR**	**t test**	**p-value**	**BMP test**	**p-value**
-5, +5	-0,0066	-2,1985**	0,0287	-1,5568	0,1205

(The symbols *, ** and *** indicate statistical significance at the 0,10, 0,05 and 0,01 levels, respectively, using a two-sided test)

As expected, the average abnormal return (AAR) on the event date is statistically significant at every level. Furthermore, no other day prior to or following the event exhibits a significant abnormal return. The CAAR for this period is also negative, at -0,66%. According to the t-test, it is significant at the 0,05 level; however, under the BMP test, the null hypothesis cannot be rejected. This discrepancy between the two test statistics may indicate increased volatility around the event date. Given that the BMP test is generally considered more robust in the presence of event-induced variance, we rely primarily on its outcome, suggesting that the CAAR is not statistically significant.

In the previous three event windows, we included days both before and after the event. Alternatively, we can isolate the effects by selecting days from only one sub-period. To achieve this, we conducted two additional event studies: the first utilizes an event window of (-5, 0) and the second a window of (0, 5). The CAAR results are included in the next two tables.

Table 6

Event Window (-5, 0)

CAAR Results					
Period	**CAAR**	**t test**	**p-value**	**BMP test**	**p-value**
-5, 0	-0,0033	-1,3856	0,1669	-0,6658	0,506

Table 7

Event Window (0, 5)

CAAR Results					
Period	**CAAR**	**t test**	**p-value**	**BMP test**	**p-value**
0, +5	-0,0058	-2,4053**	0,0167	-2,3987**	0,017

This additional analysis provides some interesting insights. For the period (-5, 0), the CAAR is -0,33%. Both t test and BMP test concluded that the abnormal return is not statistically significant. However, for the second period (0, +5), the CAAR is calculated at -0,58%. In this case, our tests, at the 0,05 significance level reject the null hypothesis of no abnormal return. Therefore, there is evidence that the negative post-event effect of the event is statistically significant.

The final event window under these conditions starts ten days before the event and finishes ten days after that (-10, 10). This much broader 21-day window allows us to examine abnormal returns further away from the event date. The absence of such abnormal returns would enhance the importance of the event itself. Otherwise, their presence might suggest that other factors are affecting the stock prices. Table 8 summarises the results.

Table 8

Event Window (-10, 10)

AAR Results					
Day	**AAR**	**t test**	**p-value**	**BMP test**	**p-value**
-10	0,0011	1,1914	0,2344	1,0557	0,2919
-9	-0,0011	-1,2698	0,2051	-1,5123	0,1315
-8	-0,0011	-1,3882	0,1661	-1,3864	0,1666
-7	-0,0008	-0,9291	0,3536	-0,9742	0,3307
-6	-0,0013	-1,5622	0,1193	-1,4913	0,1369
-5	-0,0010	-1,0848	0,2789	-0,4331	0,6652
-4	-0,0002	-0,2370	0,8128	0,2912	0,7711
-3	-0,0006	-0,4305	0,6671	-0,0908	0,9277
-2	0,0012	1,1505	0,2508	1,2263	0,2210
-1	0,0001	0,1266	0,8993	0,1893	0,8500
0	-0,0028	-2,9385***	0,0035	-2,8644***	0,0045
1	-0,0001	-0,1188	0,9055	-0,3124	0,7550
2	-0,0009	-0,9642	0,3357	-0,6543	0,5134
3	-0,0015	-1,6200	0,1062	-1,5062	0,1330
4	-0,0007	-0,8095	0,4189	-0,6880	0,4919
5	0,0001	0,1071	0,9148	0,2664	0,7901
6	0,0001	0,1453	0,8846	0,4773	0,6335
7	0,0008	0,9854	0,3252	1,1514	0,2504
8	0,0006	0,6741	0,5007	0,4660	0,6415
9	0,0003	0,4157	0,6779	0,2129	0,8315
10	-0,0014	-1,2724	0,2042	-1,2782	0,2021
CAAR Results					
Period	**CAAR**	**t test**	**p-value**	**BMP test**	**p-value**
-10, +10	-0,0093	-2,3115**	0,0215	-1,7778*	0,0764

(The symbols *, ** and *** indicate statistical significance at the 0,10, 0,05 and 0,01 levels, respectively, using a two-sided test)

The findings, as expected, are very similar with those of the previous event windows. Within this 21-days length window, the only statistically significant abnormal return is observed on the event date. This day the calculation of AAR is -0,28%. The two statistic tests confirm this result at a significant level of 0,01.

Regarding the cumulative abnormal average return, the estimation of our analysis is 0,93%. The first test, t test supports this evidence on a 0,05 significant level, while the BMP test is not so clear, but confirm the result on 0,10 significant level.

After completing the analysis of the first hypothesis, we proceed to examine the second hypothesis. For this part of the study, we divide our sample into five subsamples, one for each year from 2021 to 2025. As in the previous section, we conduct several event studies using alternative event windows. The estimation window remains the same as before, at 120 trading days.

Starting with the event window ranging from one day before to one day after (-1, 1), we aim to test the immediate effect of the ESG disclosure on the stock price. The results for all the subsamples are presented on table 9.

Table 9

Event Window (-1, 1) per year

CAAR Results					
Year	**CAAR**	**t test**	**p-value**	**BMP test**	**p-value**
2025	0,0009	0,2744	0,7848	0,6376	0,5264
2024	-0,0064	-1,5931	0,1161	-1,6118	0,1120
2023	-0,0029	-1,1317	0,2619	-0,8785	0,3829
2022	-0,0055	-1,5730	0,1208	-1,8372*	0,0710
2021	0,0008	0,3457	0,7307	0,3814	0,7042

The results do not indicate a clear trend across the years. In the first and last years, the CAAR is positive, while in the remaining years, it is negative. The statistical tests fail to reject the null hypothesis in almost every year, with the exception of one test in a single instance. We could conclude that there is no effect of the release of the ESG report for across any of the periods.

The next event window examined is (-3, 3). By extending the window, we are able to investigate whether the effect spreads over additional days slightly further from the event. The results are in the following table.

Table 10

Event Window (-3, 3) per year

CAAR Results					
Year	**CAAR**	**t test**	**p-value**	**BMP test**	**p-value**
2025	0,0023	0,3395	0,7355	0,6979	0,4882
2024	-0,0045	-0,8898	0,3770	-0,6715	0,5044
2023	-0,0087	-2,0304**	0,0464	-1,5556	0,1246
2022	-0,0089	-1,7267*	0,0892	-1,8198*	0,0736
2021	-0,0013	-0,2801	0,7803	-0,2332	0,8164

Once again, no clear trend emerges across the years. The only notable change is observed in 2021, where the CAAR shifts from positive to negative, while the results for the other years remain broadly consistent with the previous window. Moreover, only in 2022 and 2023 is there evidence that the abnormal return is statistically significant.

The final event window used to examine the second hypothesis is (-5, 5). We consider this window large enough to capture the full effect of the event on the market price. We present the AAR per day for each year and the CAAR in Table 11.

Table 11
Event Window (-5, 5) per year

AAR Results					
Day	**2025**	**2024**	**2023**	**2022**	**2021**
-5	-0,0038	-0,0004	0,0002	-0,002	0,0002
-4	0,0011	0,0006	-0,0003	-0,0032	0,0010
-3	-0,0034	0,0007	-0,0010	0,0015	-0,0009
-2	0,0063**	0,0031	-0,0032	-0,0004	0,0009
-1	-0,0008	-0,0014	0,0017	-0,0012	0,0020
0	-0,0007	-0,0070**	-0,0020	-0,0022	-0,0015
1	0,0024	0,0020	-0,0029*	-0,0019	0,0005
2	0,0021	-0,0014	-0,0001	-0,0025	-0,0025
3	-0,0042	-0,0006	-0,0013	-0,0023	0,0003
4	-0,0026	0,0028	-0,0002	-0,0013	-0,0024
5	-0,0031*	0,0016	-0,0002	0,0025	-0,0007
CAAR Results					
Year	**CAAR**	**t test**	**p-value**	**BMP test**	**p-value**
2025	-0,0066	-0,8051	0,4242	-0,4972	0,6210
2024	0,0001	0,0085	0,9933	0,2214	0,8255
2023	-0,0092	-1,7621*	0,0828	-1,0831	0,2828
2022	-0,0130	-1,8953*	0,0627	-1,5846	0,1181
2021	-0,0031	-0,5196	0,6052	-0,4459	0,6572

(The symbols *, ** and *** indicate statistical significance at the 0,10, 0,05 and 0,01 levels, respectively, using a two-sided test)

As we could easily observe, the AAR is not significant at any level, except for a few sporadic cases on different days over the last three years. Furthermore, the CAAR is negative in four of the years and in 2024 is almost zero. However, the results for only two years (2022 and 2023) appear to be statistically significant, and this is only under the t-test assumptions; the BMP test does not reject the null hypothesis of zero abnormal returns.

The last hypothesis mentioned in the previous chapter suggests that a company's ESG score is related to the market reaction to its sustainability disclosure. Specifically, firms with higher ESG scores are expected to experience a more favorable stock price reaction compared to firms with lower ESG scores.

To test this hypothesis, we conducted several event studies using various event windows, while keeping the rest of the parameters constant. We divided our sample into three groups. The first group contains the 22 companies with the highest ESG Scores (High), as measured earlier in Chapter 3.3. The second group includes 23 firms with

median scores (Med). The final group consists of the remaining 22 companies with the lowest ratings (Low). The number of events in each group is 102, 107, and 103, respectively.

Following a methodology similar to the examination of the previous two hypotheses, the first event window starts one day before the event and extends to one day after (-1, 1). The results regarding the immediate effect of the ESG disclosures' release on the stock price, categorized by group, are presented in the table below.

Table 12
Event Window (-1, 1) per ESG Score Rank

CAAR Results					
ESG Rank	**CAAR**	**t test**	**p-value**	**BMP test**	**p-value**
Low	-0,0015	-0,7442	0,4585	-0,7607	0,4486
Med	-0,0032	-1,0383	0,3015	-0,8273	0,4099
High	-0,0033	-1,5814	0,1169	-1,6318	0,1058

The findings of this analysis are not entirely clear. High rated companies exhibit a cumulative abnormal return of -0,33% on average. This indicates a bigger negative effect on ‘good’ ESG corporations than the two other subsamples. However, neither test do not reject the null hypothesis, meaning that we cannot insist that there is a return significantly different from zero.

The next event window examined is (-3, +3). As previously discussed, a longer window allows us to observe whether the effect spreads over additional days. Abnormal returns prior to the event may indicate that the market is expecting the release of the report and discounts the rise or fall of the price. On the other hand, the impact on days following the event could explained as a lack of efficiency on the market, leading to a later adjustment of the price. More details are in table 13.

Table 13
Event Window (-3, 3) per ESG Score Rank

CAAR Results					
ESG Rank	**CAAR**	**t test**	**p-value**	**BMP test**	**p-value**
Low	-0,0013	-0,3017	0,7635	-0,2121	0,8324
Med	-0,0065	-1,4971	0,1373	-1,2584	0,2110
High	-0,0054	-1,6802*	0,0960	-1,1923	0,2359

This time the CAAR values have changed. Despite being negative for every one of the three groups, nevertheless there is a variation in the magnitude of the effect. Contrary to our expectations, high rating firms have a CAAR of -0,54%, which represent a greater return drop comparing to low rating group (for median firms the average abnormal return is -0,65%). However, only the t-test for high ranked companies at 0,10 significance level indicates a statistical significance of the cumulative abnormal return.

Therefore, we expanded the event window once more, to (-5, 5). With this longer window, we can examine if the effect spreads over additional days further from the event. The results are shown in the following table.

Table 14
Event Window (-5, 5) ESG Score Rank

AAR Results			
Day	**Low**	**Med**	**High**
-5	0,0022 (*BMP)	-0,0021	-0,0033 (**Both)
-4	-0,0006	0,0011	-0,0010
-3	0,0005	-0,0027	0,0007
-2	-0,0013	0,0024	0,0024 (*t-test)
-1	-0,0002	0,0011	-0,0008
0	-0,0022 (*BMP)	-0,0046 (*Both)	-0,0014
1	0,0009	0,0002	-0,0013
2	0,0008	0,0004	-0,0041 (*Both)
3	0,0003	-0,0034 (*t-test)	-0,0015
4	-0,0019	0,0006	-0,0008
5	0,0004	-0,0010	0,0009

CAAR Results					
ESG Rank	**CAAR**	**t test**	**p-value**	**BMP test**	**p-value**
Low	-0,0010	-0,1842	0,8543	0,3413	0,7336
Med	-0,0079	-1,4928	0,1385	-1,0914	0,2776
High	-0,0102	-2,1493	0,0340**	-1,7367	0,0855*

(The symbols *, ** and *** indicate statistical significance at the 0,10, 0,05 and 0,01 levels, respectively, using a two-sided test)

This event study leads to more clear evidence. The CAAR for high ESG Score firms is -1,02%. In addition, the median ranked companies' CAAR is -0,79% and the lower ranked is -0,10%. Moreover, the negative average return of the high ranked group is significant using both tests, at significant level of 0,10.

To further investigate the third hypothesis, we conduct another two estimations. The two event windows are (-5, 0) and (0, 5). The first window tries to measure the abnormal return before the event, while the second one to measure the excess change of the stock price next to sustainability disclosure. The outcomes are presented on tables 15 and 16.

Table 15
Event Window (-5, 0) per ESG Score Rank

CAAR Results					
ESG Rank	**CAAR**	**t test**	**p-value**	**BMP test**	**p-value**
Low	-0,0015	-0,3612	0,7187	0,5395	0,5907
Med	-0,0048	-0,9726	0,3330	-0,6540	0,5145
High	-0,0034	-1,1742	0,2431	-1,1194	0,2656

Table 16

Event Window (0, 5) per ESG Score Rank

CAAR Results					
ESG Rank	**CAAR**	**t test**	**p-value**	**BMP test**	**p-value**
Low	-0,0018	-0,5679	0,5714	-0,8739	0,3842
Med	-0,0075	-1,5036	0,1357	-1,5668	0,1201
High	-0,0078	-1,8862	0,0621*	-1,4738	0,1436

In the first sub-period (-5, 0), we observe a negative value for the three groups, from -0,15% of low ratings companies to -0,48% of median ranked. However, these values remain very close to zero and are likely not statistically significant based on the t-test and BMP test. On the other hand, the event window (0, 5) results in CAARs that follow a scaling from high- to low-scoring firms, but this time the magnitudes are larger across all groups, specifically for higher score firms. Notably, the high ESG rank subsample, with a CAAR of -0,78%, is statistically significant according to t-test statistic. This supports the conclusion that while low ESG rating firms experience no significant abnormal returns upon the release of an ESG report, high-rating companies face an average negative effect of approximately -0,78%.

4.2 Robustness Check

The event study methodology is widely used in financial analysis. Its main function is to examine the effect of an event on the market price of a security. There is no single, simple formula for conducting such an analysis. On the contrary, there are numerous techniques to measure, for example, abnormal returns or to test their statistical significance. Moreover, the researcher must choose various parameters, such as the estimation window, the event window, and the sample. Finally, as an econometric or statistical methodology, an event study has certain assumptions to yield reliable outcomes, e.g. the normal distribution of firms' returns. Therefore, the validity of these assumptions is often an empirical question (Kothari & Warner, 2007).

For these reasons, when a researcher chooses to conduct an event study, they must carefully examine the credibility of their methodological choices, parameters, and assumptions. Robustness checks provide an effective way to do so. In an event study, robustness checks are essential to ensure that the findings (abnormal returns) are not driven by specific methodological choices, timing assumptions, outliers, or underlying data issues (Kramer, 2001; Sorokina, Booth & Thornton, 2013). There are numerous such tests that can be incorporated into an analysis. In this section, we present the steps we took to enhance the validity of our results.

The first way to crosscheck the reliability of our analysis was to repeat the event study multiple times using various event windows. To test the Hypothesis one, we conducted six analyses, for second Hypothesis three and for the third Hypothesis five additional attempts. The fact that the results remained consistent despite the varying event windows is a strong indicator of our study's robustness.

Another method to ensure robustness is the use of two different significance tests to ascertain the statistical significance of the calculated measures. On the one hand, we used the t-test, probably the basic test statistic in most econometric analysis. This test is easy to understand and implement but due to its simplicity, it also has certain limitations. Therefore, we included the BMP test as a secondary method, which is generally a more robust test than the standard t-test. Ultimately, these two methods yielded consistent results in the majority of cases.

A third way to increase the reliability of our study was the formulation and examination of three main hypotheses. Testing multiple hypotheses required additional parameters and data, thereby increasing the complexity of the research. Moreover, if the results of each hypothesis had led to contradictory conclusions, this would have indicated potential misspecifications or invalidity in the study design.

However, we do not rely solely on the aforementioned methods to check the robustness of our research. In addition, we carried out two alternative tests. As previously mentioned, we used the market model to calculate expected returns. Nevertheless, this model is not the only available specification in event study methodology. Utilizing a different model could lead to an entirely different outcome. Therefore, we applied the Fama-French Three Factor model to validate our results.

Introduced by Eugene Fama and Kenneth French (1992), the 3-factor model (FF3M) is an asset pricing model which is designed to describe stock returns. It was primarily developed to improve the Capital Asset Pricing Model (CAPM). While the latter relies on just one variable to explain returns (market risk), Fama and French argued in the early 1990s that CAPM was insufficient. They observed that two specific types of stocks consistently outperformed the market: small-cap stocks and high book-to-market (value) stocks (Fama & French 1992; 1993).

To account for this, they added two factors to the well-known CAPM equation. Thus, except from market factor, they used the size and the value factor. The former is measuring the effect of small size companies, and it is calculated as the difference of the returns between small cap and large cap. The latter accounts for the value premium, the tendency of value stocks to outperform growth stocks. To estimate it, we calculate the return of a portfolio of High book-to-market stocks minus the return of a portfolio of Low book-to-market stocks. The mathematical formula is (Fama & French 1992; 1993):

$$R_{i,t} - R_{f,t} = a_i + b_{i,1}\left(RM_t - R_{f,t}\right) + b_{i,2}(SMB_t) + b_{i,3}(HML_t) + e_{i,t}$$

Where $R_{i,t} - R_{f,t}$ the excess return of the stock, $RM_t - R_{f,t}$ the excess return of the market, SMB_t the size factor, HML_t the value factor and $b_{i,1}, b_{i,2}, b_{i,3}$ the coefficients.

After this brief introduction to the model, we are able to perform our analysis. Using the same sample and under the assumptions of our previous study, we repeat the event study to test the three hypotheses. For simplicity reasons, we applied this new technique to a selection of the event windows used previously.

For the first hypothesis, that there is a positive relationship between ESG disclosures and a company's stock price, we chose two event windows, (-1, 1) and (-5, 5). The results

are in tables 17 and 18. The data for the SMB and HML factors were retrieved from Kenneth French's online library (mba.tuck.dartmouth.edu).

Table 17
Fama-French 3-Factor Model, Event Window (-1, 1)

AAR Results					
Day	**AAR**	**t test**	**p-value**	**BMP test**	**p-value**
-1	0,0001	0,1323	0,8949	0,3960	0,6924
0	-0,0022	-2,3609**	0,0188	-2,3738**	0,0182
1	0	0	1	-0,1390	0,8895
CAAR Results					
Period	**CAAR**	**t test**	**p-value**	**BMP test**	**p-value**
-1, +1	-0,0021	-1,5142	0,1310	-1,3010	0,1942

Table 18
Fama-French 3-Factor Model, Event Window (-5, 5)

AAR Results					
Day	**AAR**	**t test**	**p-value**	**BMP test**	**p-value**
-5	-0,0015	-1,7847*	0,0753	-1,1349	0,2573
-4	0,0001	0,1226	0,9025	0,8179	0,4141
-3	-0,0007	-0,5190	0,6041	-0,2821	0,7781
-2	0,0015	1,4209	0,1563	1,4331	0,1528
-1	0,0001	0,1307	0,8961	0,3785	0,7053
0	-0,0022	-2,3513**	0,0193	-2,3583**	0,0190
1	0	0	1	-0,1107	0,9120
2	-0,0013	-1,4223	0,1559	-1,2327	0,2186
3	-0,0010	-1,1328	0,2582	-0,9024	0,3676
4	-0,0010	-1,2164	0,2248	-0,9536	0,3410
5	0,0002	0,2211	0,8251	0,6260	0,5318
CAAR Results					
Period	**CAAR**	**t test**	**p-value**	**BMP test**	**p-value**
-5, +5	-0,0059	-2,019**	0,0443	-1,1315	0,2587

(The symbols *, ** and *** indicate statistical significance at the 0,10, 0,05 and 0,01 levels, respectively, using a two-sided test)

The results appear to be very close to those obtained using the market model. On the event day, there is an average negative effect of -0,22%, comparing to the initial -0,27%. Both tests confirm the statistical significance of this value at the 0,05 level. The Cumulative Average Abnormal Return is calculated -0,21% for the event window (-1, 1) and -0,59% for the (-5, 5). Under the market model, the corresponding values were -0,27% and -0,66% respectively. However, the CAAR in the first window is not statistically significant at any conventional level according to either test, while in the second window, there is significance only under t test at the 0,05 level.

The second hypothesis assumes that the impact of ESG disclosures on the stock price of a company increases over time. The results using the market model was not leading to that conclusion. To verify this, we repeated the event study for the (-5, 5) window, but this time we utilized the model Fama-French with 3 Factors. The results are included in the next table.

Table 19

Fama-French 3-Factor Model, Event Window (-5, 5) per year

AAR Results					
Day	**2025**	**2024**	**2023**	**2022**	**2021**
-5	-0,0046	-0,0002	-0,0004	-0,0027	-0,0002
-4	0,0009	0,0006	0,0004	-0,0030	0,0018
-3	-0,0037	0,0006	-0,0008	0,0020	-0,0019
-2	0,0060*	0,0038	-0,0039	0	0,0023
-1	-0,0006	-0,0015	0,0017	-0,0005	0,0013
0	0	-0,0069**	-0,0015	-0,0018	-0,0007
1	0,0023	0,0021	-0,0021	-0,0026	0,0007
2	0,0017	-0,0011	-0,0004	-0,0041	-0,0026
3	-0,0034	0	-0,0007	-0,0019	0,0003
4	-0,0026	0,0033	-0,0009	-0,0024	-0,0026
5	-0,0027	0,0015	0,0007	0,0023	-0,0010
CAAR Results					
Year	**CAAR**	**t test**	**p-value**	**BMP test**	**p-value**
2025	-0,0066	-0,8187	0,4165	-0,6234	0,5356
2024	0,0022	0,3248	0,7464	0,8224	0,4139
2023	-0,0079	-1,5589	0,1239	-0,9859	0,3278
2022	-0,0146	-2,0915**	0,0406	-1,6540	0,1032
2021	-0,0026	-0,4756	0,6360	-0,3802	0,7051

Comparing the CAAR per year, we could observe that the highest return occurs in 2024, followed by 2021. The two worst performing years are 2022 and 2023. Thus, there is no evidence of a upward trend starting from 2021 to 2025. Additionally, four out of five years have a negative impact. Regarding the statistical significance of these estimations, only the CAAR for 2022 is statistically significant, and only according to the t-test.

When comparing these findings with those obtained in the previous chapter using the market model, the similarity is evident. This consistency further supports the robustness of the results related to Hypothesis 2.

The final hypothesis examines the relationship between the ESG Scores and the market's reaction to sustainability disclosures. Similarly to the other two hypotheses, we conducted a new event study based on the FF3M. The chosen window is (-5, 5). Table 20 summarizes the results.

Table 20

Fama-French 3-Factor Model, Event Window (-5, 5) ESG Score Rank

AAR Results			
Day	**Low**	**Med**	**High**
-5	0,0008	-0,0020	-0,0034 (**Both)
-4	-0,0001	0,0018	-0,0014
-3	0,0004	-0,0021	-0,0003
-2	-0,0007	0,0028	0,0023 (*t-test)
-1	-0,0007	0,0017	-0,0008
0	-0,0017	-0,0039 (*t-test)	-0,0011
1	0,0016	-0,0001	-0,0014
2	0,0003	0,0003	-0,0046 (**Both)
3	0,0007	-0,0024	-0,0014
4	-0,0021 (*t-test)	0,0005	-0,0015
5	0,0002	-0,0009	0,0015

CAAR Results					
ESG Rank	**CAAR**	**t test**	**p-value**	**BMP test**	**p-value**
Low	-0,0013	-0,2486	0,8042	0,5544	0,5805
Med	-0,0044	-0,8203	0,4139	-0,4317	0,6669
High	-0,0121	-2,672***	0,0088	-2,0907**	0,0391

(The symbols *, ** and *** indicate statistical significance at the 0,10, 0,05 and 0,01 levels, respectively, using a two-sided test)

The calculation of the Cumulative Average Abnormal Return for the three subsamples categorized by the firms' ESG ratings, do not support the claim of our third hypothesis. High ESG ranked companies exhibit a -1,21% CAAR, while med and low rank experience a negative average return of -0,44% and -0,13% respectively. Despite the fact that the t-test and BMP test found no statistical significance for the CAAR value for low and med ranked firms, both tests conclude that the negative effect for high-ranked firms is statistically significant at the 0,05. Under these conditions, the empirical results are opposite to our hypothesis.

Comparing the results of FF3M and market model, we once again observe very close outcomes. We believe that this number of robustness checks is sufficient to demonstrate that the use of the market model was a credible and robust choice for our primary analysis.

5. Conclucions and Discussion

The implementation of corporate social responsibility policies by companies is a subject being discussed among almost every executive boards. Over the last few decades, stakeholders have pushed firms to take more sustainable initiatives. Meanwhile, many researchers have supported this idea with various arguments. For example, Stakeholder Theory (Freeman, 1984) suggests that a firm can create value by doing good for society. According to that theory, a firm, in order to be successful and sustainable, must also create value to its environment, such as customers, employees, suppliers and community (Tsang, Frost & Cao, 2023).

Moreover, a plethora of studies have attempted to examine the relationship between Environmental, Social and Governance and the financial performance of a corporation. Some possible advantages for a firm with strong ESG performance are better access to finance, lower cost of capital and higher market value. Nevertheless, despite the number of studies on this subject, the relationship between CSR and firm value is still debated (Tsang, Frost & Cao, 2023). However, the increase in demand for non-financial information has led companies to release various ESG disclosures.

Given this context, the aim of this study is to examine the financial impact of ESG reporting on stock markets. To achieve this objective, we gathered daily stock price data from USA-based companies included in the S&P 500 index. Then we observed 312 ESG disclosures release dates, between 2021 and 2025. To perform our analysis, we used the event study methodology. This econometric technique calculates the abnormal return of a firm, resulting from a specific event. To conduct our research, we set three key hypotheses to be examined, as follows:

- *H_1: There is a positive relationship between ESG disclosures and a company's stock price.*

- *H_2: The impact of ESG disclosures on a company's stock price increases over time.*

- *H_3: There is a positive relationship between a company's ESG score and the increase in its stock price following an ESG disclosure.*

The analytical results of the study have been presented in Chapter 4. From these, we can draw several interesting conclusions. Starting with the first hypothesis, the results did not support the assumption of a positive relationship. Instead, a statistically significant negative Average Abnormal Return was observed on the event day (Day 0), calculated at -0,27% using the Market Model and -0,22% using the Fama-French 3-Factor Model. Furthermore, the Cumulative Average Abnormal Return is negative across every event window for which we performed an estimation. A summary of these outcomes is presented in Table 21. Additionally, Figure 1 shows a graph of the event window (-10, 10), which is the longest and most representative period.

Table 21

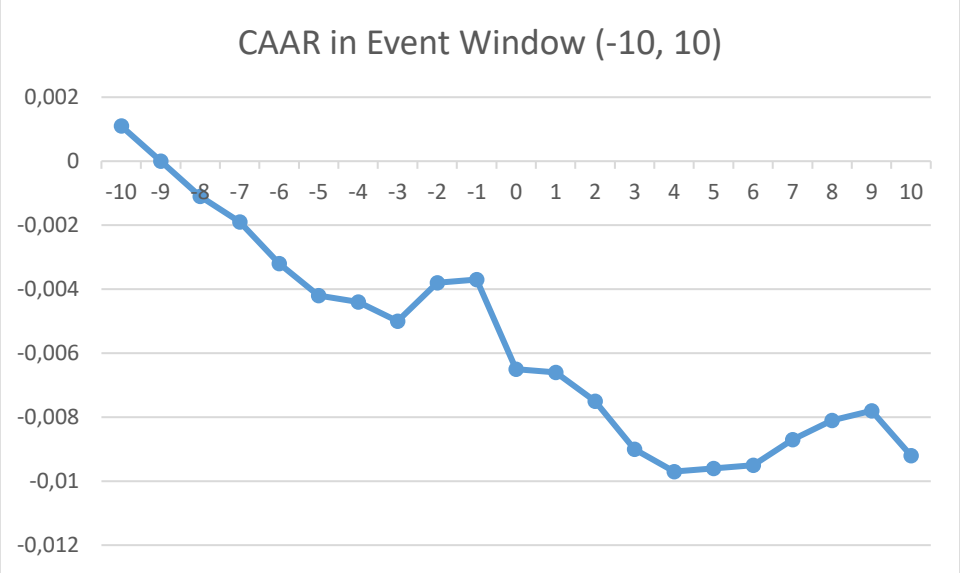
Hypothesis 1 - Results Summary

CAAR Results					
Window	**CAAR**	**t test**	**p-value**	**BMP test**	**p-value**
-1, +1	-0,0027	-1,8771*	0,0614	-1,7789*	0,0762
-3, +3	-0,0044	-1,9119*	0,0568	-1,5306	0,1269
-5, +5	-0,0066	-2,1985**	0,0287	-1,5568	0,1205
-5, 0	-0,0033	-1,3856	0,1669	-0,6658	0,5060
0, +5	-0,0058	-2,4053**	0,0167	-2,3987**	0,0170
-10, +10	-0,0093	-2,3115**	0,0215	-1,7778*	0,0764
-1, +1 (FF3M)	-0,0021	-1,5142	0,1310	-1,3010	0,1942
-5, +5 (FF3M)	-0,0059	-2,019**	0,0443	-1,1315	0,2587

The above outcome could support the argument that, in the short term, investors may perceive the release of an ESG report as a signal of increased compliance costs or resource diversion, rather than value creation (Waddock & Graves, 1997). Similar findings have been reported in the broader literature (Wang, Hu & Zhong, 2023; Grewal, Riedl & Serafeim, 2019)

Another finding is that as the length of the event window increases, the CAAR becomes progressively more negative. When we split the sample, before and after the event, using the windows (-5, 0) and (0, 5), the second case had more impact on the abnormal return than the first one. Thus, we could conclude that the negative effect starts on the event date and continues the following days, until Day 4, and then stabilizes.

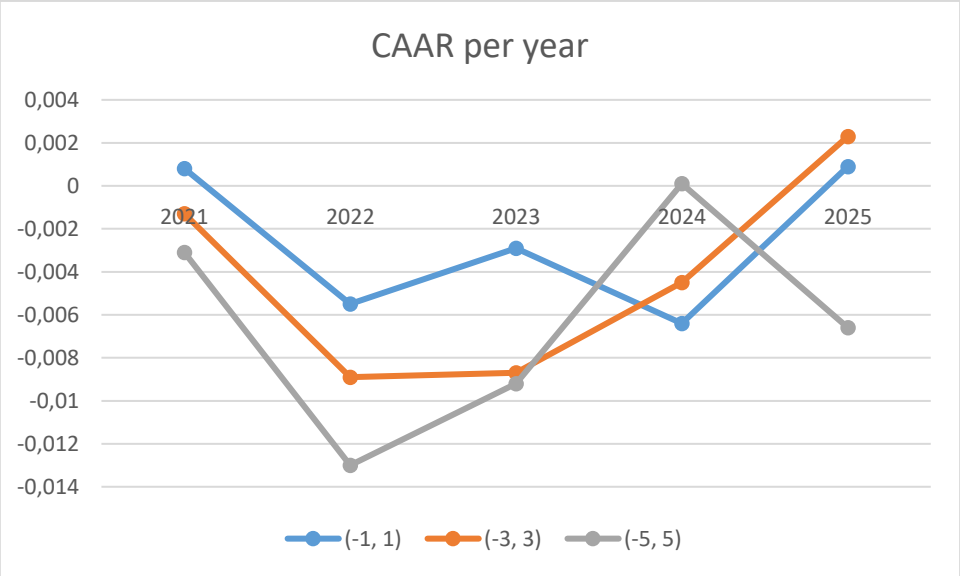
Figure 1



Regarding the second hypothesis (H_2), the analysis revealed no clear trend over time. The Cumulative Average Abnormal Returns varied across the years 2021-2025 without a consistent pattern, as we could observe in Figure 2. Moreover, the outcomes are not statistically significant for most years, with the exception of 2022 and 2023.

This indicates that the year of the report's release is not important during the period we examined. Perhaps the length of five years is not long enough to establish a trend, or the impact of ESG disclosures on stock prices simply did not experience a noteworthy shift during this period. The results of the study by Capelle-Blanchard and Petit (2019) are highly comparable to our conclusion. According to this study, the market's perception of ESG news did not significantly change between 2002 and 2010.

Figure 2



The most notable finding emerged from the third hypothesis (H_3). In that part of our research, we examined the impact of ESG reports on the stock prices across three subsamples, which categorized companies by their ESG Ranking. The results showed that on the event date, all three groups faced a negative impact. Particularly, for low ranked companies the average abnormal return estimation is -0,22% and for median ranked is -0,46%. These values are statistically significant, whereas for high ESG Score firms, we estimated a statistical insignificant negative return of -0,14%.

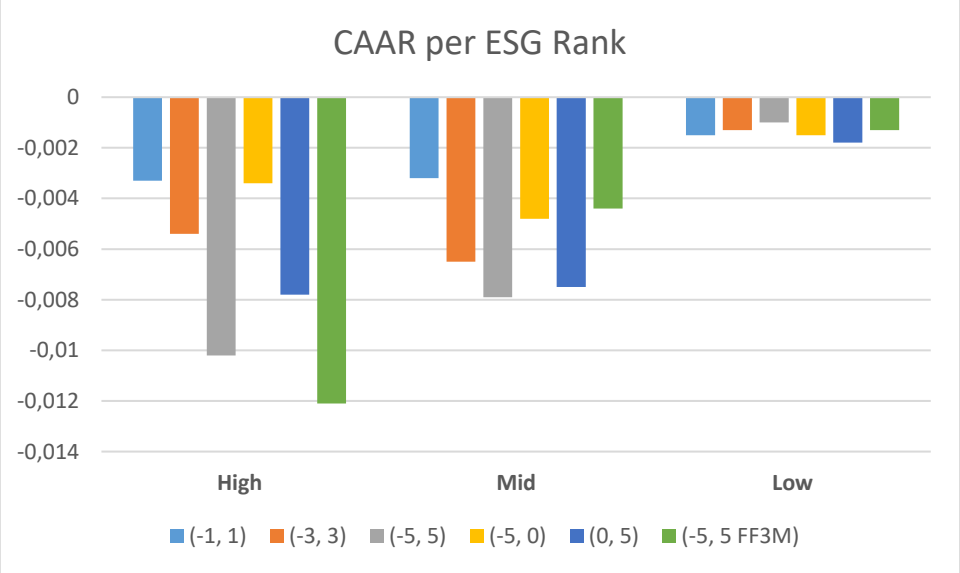
However, when we calculated the CAAR across different event windows, we observed that for low and median ranked companies, there was no statistically significant abnormal return. On the contrary, higher ranked companies exhibited a significant negative CAAR (e.g. -1,02% with market model and -1,21% with FF3M within the (-5, 5) event window). The complete outcomes are presented in Figure 3.

Consequently, based on the above results, we could conclude that ESG disclosures did not influence firms with weak ESG Scores. In contrast, the release of a sustainability report led to a significant decline in the stock price for companies with high ESG Scores. Investors seem to react negatively to companies with good performance on ESG factors, while remaining relatively indifferent to less responsible firms. It is highly probable that investors interpret an ESG report as signaling the implementation of new, cost-intensive environmental or social initiatives that could constrain profit margins. For this reason, financial markets may react negatively, adjusting the valuation of a company with a high ESG rating downward following the publication of the report.

Regarding the existing literature, the majority of similar studies have concluded that the impact of sustainability performance on financial performance is positive. This consensus is further strengthened by the outcomes of meta-analyses (Orlitzky, Schmidt & Rynes, 2003; Friede, Busch & Bassen, 2015). Concerning ESG Scores and market prices, several papers have found a positive relationship between these two metrics (Zuraida, Houqe & Van Zijl, 2016; Cordeiro & Tewari, 2015).

However, other studies in the literature corroborate our findings. Brammer, Brooks and Pavelin (2006) investigated the relation between corporate social performance and financial performance, measured using stock returns, for a sample of UK companies. Their main finding was that firms with higher social performance scores tend to achieve lower returns. Similarly, Marsat and Williams (2013) conducted a study using the MSCI ESG Ratings and nearly 9.000 worldwide observations from 2005 to 2009. They concluded that stronger CSR behavior has a negative impact on firm value.

Figure 3



This study contributes to the literature on value relevance of ESG disclosures and provides practical implications for both management and investors. Contrary to the common belief, that sustainability performance has a positive impact on the financial position of a company, our findings indicate the exact opposite. Consequently, despite the increasing trend of corporate ESG disclosures, companies should anticipate a negative effect on their market value following the release of such reports.

Specifically, highly rated companies are penalized by the market, experiencing a more severe decline in returns. In other words, investors perceive that achieving and maintaining strong ESG performance requires substantial resource allocation, which may constrain short-term profitability. On the other hand, companies with lower ESG scores tend to experience an almost negligible negative impact on their market value. This phenomenon may be interpreted as an implicit market reward for their prioritization of profit maximization.

In addition, our analysis aims to open a new avenue of research, due to the absence of similar studies. Despite the increasing interest in the relationship between ESG and

financial performance, most papers examine other factors, such as ESG news, ESG ratings and state regulations.

However, there are certain limitations to this study. First, the difficulty in finding the exact release date of sustainability reports constrained the sample size. Second, we restricted the data collection to large cap USA firms and voluntary disclosures, which limits the generalizability of our findings to other markets or smaller corporations. Third, by relying on an event study methodology with a single variable, without the inclusion of control variables or alternative regression analyses, there is a possibility of omitted variable bias.

Finally, future research could expand the sample, both in USA and in other countries, allowing for a cross-regional comparison of investor reactions. Data retrieved over a longer time frame may change our conclusion regarding the impact of release year. Furthermore, employing Natural Language Processing techniques to analyse the sentiment and tone of the reports could provide deeper insights into whether the quality and content of the disclosure, rather than just its release, drive market reactions.

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Appendix A

ESG Disclosures Release Dates

No	Company	Symbol	2025	2024	2023	2022	2021
1	3M Company	MMM	-	15/04/24	14/04/23	26/05/22	11/05/21
2	Advanced Micro Devices	AMD	13/08/25	21/08/24	24/08/23	22/08/22	29/09/21
3	Alphabet	GOOG	27/06/25	01/07/24	24/07/23	-	19/12/21
4	Amazon	AMZN	16/07/25	10/07/24	25/07/23	02/08/22	30/06/21
5	American Express	AXP	-	21/10/24	04/08/23	04/08/22	28/09/21
6	Amgen	AMGN	14/05/25	17/05/24	08/05/23	02/05/22	18/05/21
7	Amphenol	APH	22/04/25	22/04/24	18/04/23	18/04/22	14/06/21
8	Aon	AON	31/03/25	25/03/24	27/03/23	06/06/22	24/03/21
9	Apple	AAPL	16/04/25	18/04/24	19/04/23	19/04/22	16/04/21
10	Applied Materials	AMAT	03/07/25	20/06/24	20/06/23	30/06/22	30/06/21
11	Boeing	BA	28/08/25	25/06/24	14/06/23	29/06/23	26/07/21
12	Boston Scientific	BSX	26/06/25	26/04/24	26/04/23	10/05/22	14/04/21
13	Caterpillar	CAT	13/05/25	07/05/24	01/05/23	11/05/22	11/05/21
14	Chevron	CVX	30/04/25	23/05/24	04/05/23	24/05/22	22/06/21
15	Cintas	CTAS	21/01/25	13/11/24	26/07/23	16/01/23	15/11/21
16	Cisco Systems	CSCO	22/07/25	18/12/24	06/12/23	08/12/22	14/12/21
17	Citigroup	C	16/07/25	29/04/24	24/04/23	25/04/22	26/04/21
18	Comcast	CMCSA	15/09/25	27/06/24	16/06/23	13/06/22	08/06/21
19	CVS Health	CVS	04/04/25	01/05/24	10/04/23	01/04/22	31/03/21
20	Danaher	DHR	10/06/25	16/07/24	16/08/23	05/10/22	12/10/21
21	Deere & Company	DE	16/01/25	23/01/24	01/02/23	18/02/22	01/02/21
22	Duke Energy	DUK	-	24/04/24	26/04/23	26/04/22	28/04/21
23	Eaton	ETN	10/07/25	10/07/24	13/07/23	30/06/22	30/06/21
24	Eli Lilly	LLY	11/07/25	01/11/24	22/05/23	-	04/05/21
25	Emerson Electric	EMR	01/07/25	12/06/24	13/06/23	14/06/22	15/06/21
26	Goldman Sachs	GS	-	29/04/24	24/04/23	22/04/22	20/04/21
27	HCA Healthcare	HCA	25/04/25	28/03/24	23/03/23	07/04/22	07/04/21
28	Home Depot	HD	22/08/25	16/08/24	27/07/23	28/07/22	27/07/21
29	Howmet Aerospace	HWM	16/04/25	-	28/03/23	08/04/22	19/05/21
30	IBM	IBM	-	11/04/24	11/04/23	12/04/22	30/06/21
31	Intel	INTC	10/07/25	07/05/24	11/05/23	12/05/22	13/05/21
32	Johnson & Johnson	JNJ	11/06/25	05/06/24	07/06/23	08/06/22	09/06/21
33	KLA	KLAC	12/08/25	02/08/24	10/08/23	25/08/22	05/08/21
34	Lam Research	LRCX	17/07/25	27/06/24	18/07/23	29/06/22	29/06/21
35	Linde	LIN	20/06/25	29/07/24	28/07/23	27/07/22	27/08/21
36	Lockheed Martin	LMT	12/05/25	08/05/24	27/04/23	21/04/22	-
37	Lowe's Companies	LOW	30/06/25	30/09/24	11/07/23	24/06/22	30/06/21
38	Marsh&McLennan	MMC	31/03/25	01/04/24	31/03/23	31/03/22	31/03/21
39	Medtronic	MDT	08/10/25	20/11/24	10/10/23	11/10/22	12/10/21

No	Company	Symbol	2025	2024	2023	2022	2021
40	Merck & Company	MRK	18/08/25	19/08/24	10/08/23	30/08/22	21/09/21
41	Meta Platforms	META	12/09/25	28/08/24	25/07/23	29/06/22	21/06/21
42	Micron Technology	MU	25/06/25	27/06/24	27/06/23	06/07/22	22/04/21
43	Microsoft	MSFT	29/05/25	15/05/24	10/05/23	21/04/22	-
44	Mondelez International	MDLZ	15/04/25	15/04/24	16/05/23	12/05/22	13/05/21
45	Motorola Solutions	MSI	-	01/07/24	29/06/23	15/06/22	12/07/21
46	Newmont	NEM	18/05/25	18/04/24	20/04/23	14/04/22	03/06/21
47	Nike	NKE	-	12/03/24	29/03/23	14/03/22	16/03/21
48	Parker Hannifin	PH	25/02/25	-	07/11/23	20/09/22	27/07/21
49	PepsiCo	PEP	28/08/25	20/06/24	29/06/23	07/07/22	29/06/21
50	Pfizer	PFE	13/06/25	14/03/24	16/03/23	-	10/04/21
51	Philip Morris	PM	03/04/25	28/03/24	05/04/23	17/05/22	18/05/21
52	PNC Financial Services	PNC	09/07/25	28/06/24	14/08/23	16/08/22	26/08/21
53	QUALCOMM	QCOM	01/08/25	21/02/24	09/03/23	22/07/22	02/02/21
54	Royal Caribbean Cruises	RCL	-	22/04/24	20/04/23	13/05/22	22/09/21
55	Salesforce	CRM	30/04/25	29/04/24	19/04/23	21/04/22	-
56	Sherwin-Williams	SHW	22/05/25	20/05/24	-	14/06/22	09/06/21
57	Southern Company	SO	-	10/09/24	28/04/23	07/11/22	27/09/21
58	Stryker	SYK	01/04/25	01/04/24	31/03/23	01/04/22	-
59	Synopsys	SNPS	15/09/25	26/08/24	30/05/23	09/03/22	14/04/21
60	Tesla	TSLA	01/07/25	23/05/24	24/04/23	06/05/22	09/08/21
61	Thermo Fisher Scientific	TMO	-	28/05/24	17/05/23	02/06/22	26/10/21
62	T-Mobile	TMUS	26/09/25	06/06/24	12/06/23	22/08/22	01/09/21
63	Trane Technologies	TT	29/05/25	-	23/05/23	22/04/22	30/04/21
64	Union Pacific	UNP	-	29/04/24	11/05/23	13/04/22	03/05/21
65	Waste Management	WM	14/07/25	15/08/24	05/09/23	-	13/10/21
66	Welltower	WELL	25/06/25	26/06/24	20/07/23	01/07/22	07/07/21
67	Williams Companies	WMB	31/07/25	31/07/24	27/07/23	28/07/22	28/07/21

Appendix B

Classification of Companies by ESG Score

No	Company	Symbol	LSEG Score	S&P Score	LSEG Rank	S&P Rank	Average Rank
	HIGH						
1	Philip Morris	PM	86	78	3	2	2,5
2	Newmont	NEM	86	75	3	3	3
3	Linde	LIN	82	79	9	1	5
4	Intel	INTC	89	53	1	19	10
5	Mondelez International	MDLZ	80	61	14	7	10,5
6	Waste Management	WM	80	61	14	7	10,5
7	Microsoft	MSFT	87	51	2	23	12,5
8	QUALCOMM	QCOM	80	57	14	12	13
9	Trane Technologies	TT	76	74	28	4	16
10	Danaher	DHR	81	51	10	23	16,5
11	Merck & Company	MRK	80	52	14	21	17,5
12	Williams Companies	WMB	75	68	31	5	18
13	Cisco Systems	CSCO	75	66	31	6	18,5
14	Lockheed Martin	LMT	78	54	22	16	19
15	PepsiCo	PEP	81	45	10	29	19,5
16	Goldman Sachs	GS	84	44	7	34	20,5
17	IBM	IBM	72	60	36	9	22,5
18	Union Pacific	UNP	72	60	36	9	22,5
19	Welltower	WELL	77	52	24	21	22,5
20	Medtronic	MDT	72	58	36	11	23,5
21	Lam Research	LRCX	73	56	34	14	24
22	Thermo Fisher Scientific	TMO	79	45	19	29	24
	MED						
23	Boston Scientific	BSX	77	50	24	25	24,5
24	Lowe's Companies	LOW	81	43	10	39	24,5
25	Applied Materials	AMAT	80	43	14	39	26,5
26	Emerson Electric	EMR	79	44	19	34	26,5
27	Motorola Solutions	MSI	77	45	24	29	26,5
28	Micron Technology	MU	72	53	36	19	27,5
29	Salesforce	CRM	70	57	44	12	28
30	Alphabet	GOOG	81	39	10	48	29
31	Citigroup	C	85	37	5	54	29,5
32	KLA	KLAC	69	54	46	16	31
33	Amphenol	APH	78	41	22	42	32
34	Boeing	BA	79	40	19	45	32
35	CVS Health	CVS	74	44	33	34	33,5
36	Deere & Company	DE	73	44	34	34	34

No	Company	Symbol	LSEG Score	S&P Score	LSEG Rank	S&P Rank	Average Rank
37	3M Company	MMM	83	31	8	61	34,5
38	Advanced Micro Devices	AMD	71	48	42	28	35
39	Amgen	AMGN	76	41	28	42	35
40	Howmet Aerospace	HWM	66	54	54	16	35
41	Johnson & Johnson	JNJ	85	27	5	65	35
42	Pfizer	PFE	77	39	24	48	36
43	Duke Energy	DUK	64	56	59	14	36,5
44	Nike	NKE	70	45	44	29	36,5
45	Synopsys	SNPS	69	45	46	29	37,5
	LOW						
46	Stryker	SYK	76	39	28	48	38
47	T-Mobile	TMUS	66	49	54	27	40,5
48	Eaton	ETN	65	50	58	25	41,5
49	Royal Caribbean Cruises	RCL	69	42	46	41	43,5
50	American Express	AXP	66	44	54	34	44
51	Home Depot	HD	69	39	46	48	47
52	PNC Financial Services	PNC	72	35	36	58	47
53	Eli Lilly	LLY	67	40	51	45	48
54	Sherwin-Williams	SHW	67	40	51	45	48
55	Apple	AAPL	71	34	42	59	50,5
56	Cintas	CTAS	64	41	59	42	50,5
57	Amazon	AMZN	72	26	36	66	51
58	Caterpillar	CAT	67	37	51	54	52,5
59	Southern Company	SO	60	39	64	48	56
60	Tesla	TSLA	68	28	50	63	56,5
61	Marsh&McLennan	MMC	54	39	66	48	57
62	Parker Hannifin	PH	61	37	62	54	58
63	Comcast	CMCSA	64	34	59	59	59
64	Aon	AON	54	37	66	54	60
65	HCA Healthcare	HCA	66	23	54	67	60,5
66	Chevron	CVX	61	30	62	62	62
67	Meta Platforms	META	56	28	65	63	64