Master's thesis

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Norwegian University of Science and Technology
Faculty of Economics and Management
Department of Economics

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Shareholder Reactions to The EU's New Classification System of Sustainable Economic Activities

A Study of the Credibility of the EU Taxonomy Regulation

Master's thesis in Economics
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Abstract

In 2019 the European Union (the EU) launched its new climate strategy, the European Green Deal. One of the goals of the new strategy was to make it easier for shareholders to invest in sustainable firms by developing a common classification system of sustainable economic activity. Therefore, the EU introduced the Taxonomy Regulation in 2020. Economic actors are required to disclose non-financial information on six main objectives of sustainability, which will make it easier for shareholders to verify which firms are sustainable by the Taxonomy's requirements. As a result, the Taxonomy will also be important for the EU's efforts to reduce greenwashing.

This thesis studies how shareholders have reacted to the Taxonomy Regulation by using event studies. The main results of is that shareholders expect lower future value of their investments, as the market value of firms is estimated to be reduced around important event dates for the regulation. I use credibility theory to discuss possible explanations for these results. The credibility of the regulation is important for the Taxonomy's ability to combat greenwashing. The empirical evidence from this thesis suggests that the Taxonomy is viewed as a credible regulation and therefore can be efficient in reducing greenwashing among European firms.

Sammendrag

Den Europeiske Unions (EU) nye klimastrategi ble presentert i 2019, kalt The European Green Deal. Et mål innenfor den nye strategien var å gjøre det enklere for investorer å identifisere miljøvennlige og bærekraftige bedrifter og portifolioer. For å nå dette målet innførte EU en Taksonomi for grønn finans, som legger grunnlaget for et felles klassifiseringssystem for bærekraftig økonomisk aktivitet. Finansielle aktører og bedrifter må i følge dette EU-direktivet (Taksonomien) øke rapporteringen av ikke-finansiell informasjon relatert til seks hovedkategorier, og bærekraftig aktivitet vil basere seg på bedriftenes prestasjon innenfor disse kategoriene. Det sistnevnte gjør at Taksonomien også er et viktig direktiv for å redusere forekomsten av grønnvasking.

I denne masteroppgaven undersøker jeg om Taksonomien har hatt en effekt på investorer ved å bruke event study-metode. Resultatene av de kvantitative analysene indikerer at investorer antar at investeringene deres vil ha redusert verdi som følge av Taksonomien, noe som indikeres av at markedsverdien til bedrifter falt rundt kunngjøringstidspunkter for Taksonomien. Jeg bruker teori om kredibilitet til politikk for å vurdere resultatene av de kvantitative analysene. Uten troverdighet kan effektiviteten til ny politikk være svakere. For at Taksonomien skal være et effektivt virkemiddel mot grønnvasking er det derfor viktig å analysere om investorer anser den som troverdig. Jeg argumenterer for for at de empiriske resultatene indikerer at investorer anser Taksonomien som troverdig, og at den kan være et effektivt virkemiddel mot grønnvasking.

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Contents

1 Introduction

From the most well-known definition, sustainability is described as the ability to meet current needs while not diminishing the ability to do so in the future. For many years there have been growing concerns about the unsustainable practices of humans, and the gravity of the environmental outcome if we do not change our practices has become even more prominent. As consumers and shareholders have become more aware and shifted their preferences towards sustainable products, the private sector has increasingly been held accountable for its impact on the environment. Furthermore, there is an increasing concern that the election of passive governments, either due to free-rider problems[1] or the lack of prioritising environmental actions weakens government initiatives and resources used on climate action. The politicisation of climate change, the increasing popularity of far-right movements, and the Covid-19 pandemic threaten to shift governments' focus and means away from climate action (Hess & Renner, 2019; Jylhä et al., 2020). The importance of private funding for sustainable solutions, as an alternative to government funding, has thus become prominent.

However, as firms adapt to the increased demand for sustainable products, the concept of "greenwashing"[2] has made it difficult for private investors to separate firms that contribute to reducing climate change from those who claim to be sustainable in order to maximise profits without changing practices. Greenwashing has caused a rise in demands for non-financial disclosure from firms. Non-financial disclosure includes reporting on issues not directly related to the costs and profits of firms, including reporting on Corporate Social Responsibility (CSR) issues. CSR covers labour rights, like fair wages and laws against child labour, and sustainability measures, like pollution and toxic waste. However, while increased information is generally assumed to be positive from an economic perspective, the empirical evidence on the relationship between non-financial disclosure and CSR performance is inconclusive.

[1] Free-rider problems in traditional economic theory is defined as actors withholding from contributing towards a common good, due to the belief that other actors will contribute regardless of their participation. Thus, their utility increases without contributing to the cost of a common good.

[2] Defined as firms claiming to be sustainable while causing harm to the environment or not having an actual positive effect on climate change. This concept is further explained in Chapter 2.

In an effort to ensure international action towards climate change, 196 parties [3] developed a legally binding framework on climate change at the 2015 United Nations Climate Change Conference, known as the Paris Agreements (or Paris Accords). The agreement aims to limit the global temperature rise to well below 2 degrees Celsius (UNFCCC, n.d.). The European Union has since 2016, when the Paris Accords came into force, worked on frameworks and action plans to reach the goals of the agreement. In 2019 the European Green Deal was launched, and as a part of this strategy the EU introduced Regulation 2020/852, the Taxonomy Regulation (TR), in 2020. The regulation aims to be a common and verifiable classification system of sustainable economic activities. The Taxonomy describes six environmental objectives, and economic activities are classified as sustainable according to their contribution to each of these objectives.

While both private actors and state actors have praised the EU for their initiative towards a common international screening criteria of sustainability, their decisions have not been free from criticism (Pacces, 2021). The Taxonomy Regulation from 2020 has previously been criticised for the limited scope of the regulation, for instance that it only covers companies with over 500 employees and that the regulation does not require firms to become more sustainable. However, the largest blow to the Taxonomy's credibility came at the end of 2021 when the EU decided that gas and nuclear power would be classified as sustainable in the "transfer" [4] toward a sustainable future. This decision caused great dissatisfaction amongst environmental activist and has led to internal conflicts among Member States.

For each of the six objectives in the Taxonomy Regulation, technical screening criteria will be included in delegated acts. The technical screening criteria is currently available for only two objectives, and the rest of the criteria is set to be done in 2022. This will be further explained in Chapter 2, but in essence, there is currently limited to no available data for the objectives set by the regulation. Analysing whether the Taxonomy will be an efficient tool for the specific environmental goals set by the European Union is therefore outside the scope of this paper. Instead, this thesis will focus on the expected effects of the EU Taxonomy on shareholders.

[3] 195 countries and the European Union.

[4] Transfer activities is a specific term of the TR relating to economic activities that is necessary for the transformation to a green economy, even though they are not necessarily sustainable in themselves.

Specifically, this thesis studies the following research question:

Does the EU Taxonomy Regulation have an effect on shareholders' behaviour, and if yes; does this effect have any indication on the credibility of the regulation and its efficiency to combat greenwashing?

The Taxonomy Regulation is expected to reduce greenwashing due to increased disclosure and it is expected to make it easier for shareholders to invest in sustainable firms and portfolios. However, if there is any uncertainty about the credibility of a policy, the policy's efficiency can be reduced. The criticism of the Taxonomy, especially from environmental activists, can affect the credibility of the regulation. Studying whether the public criticism of the Taxonomy is reflected in the behaviour of shareholders is therefore interesting when evaluating the regulation's ability to reduce greenwashing. The TR is the first transnational classification system of sustainable economic activity in the EU and is an important regulation in the EU's climate strategy (EU Technical Expert Group on Sustainable Finance, 2020). The effects of the Taxonomy on shareholders and the credibility of the regulation is therefore important not only for the efficiency of the policy itself, but for the credibility of the Union's whole climate strategy.

This thesis uses event study methodology to analyse whether the Taxonomy affected shareholders. The main result from the event studies is that the market value of firms are reduced compared to the expected market value without the Taxonomy. The reduced market value indicates that shareholders expect a reduction in the value of their shares due to the Taxonomy. As will be discussed in this thesis, the implications of these results on the credibility of the regulation depend on firm characteristics. The importance of credibility for the regulation's efficiency against greenwashing is also discussed. I conclude that the empirical evidence from my analysis suggests that shareholders have changed behaviour due to the regulation and that there is a weak indication of the Taxonomy being viewed as a credible regulation.

The paper proceeds with a presentation of the Taxonomy Regulation in section 2. Economic theory and previous literature follow in section 3. Data and methodology is presented in section 4, followed by results in section 5. Concluding remarks are found in section 6.

2 Institutional Background

2.1 The EU Taxonomy (Regulation 2020/852)

The EU Commission first presented the Taxonomy Regulation (TR) in 2018, and a Technical Expert Group (TEG) on sustainable finance was formed to develop the framework of a sustainable finance classification system. The TEG published their final report on the Taxonomy Regulation early in 2020, and in July 2020 the Taxonomy Regulation was adopted as the legal basis of what will become the full EU Taxonomy for sustainable activities. The regulation is the first official classification system for sustainable economic activity in the European Union, and is a part of the EU's efforts to meet the goals of the Paris Agreement and the European Green Deal (EU Technical Expert Group on Sustainable Finance, 2020).

In the Taxonomy Regulation, six objectives are presented as key indicators for sustainability. The six objectives are;

1. Climate change mitigation, covering the reduction of greenhouse gases in the atmosphere;
2. Climate change adaptation, covering risks of climate change on economic activity, nature, people, and assets;
3. The sustainable use and protection of water and marine resources;
4. The transition to a circular economy;
5. Pollution prevention and control;
6. The protection and restoration of biodiversity and ecosystems

Within these six objectives, technical screening criteria and threshold values will be specified in delegated acts[5] of the regulation. Currently, delegated acts for climate change mitigation

[5]Delegated acts are non-legislative acts adopted by the European Commission to amend or supplement elements of a regulation. Source: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM:delegated_acts.

and climate change adaption have been published. An economic activity can be defined as sustainable under the Taxonomy if it contributes substantially to one or more of these six objectives without causing significant harm to any of the other objectives. The latter point of not harming any other objective, is defined as ”The Do No Significant Harm (DNSH)” requirement. For example, if an economic activity meets emission thresholds for the objective climate change mitigation while simultaneously polluting water or marine resources, the firm will not be Taxonomy-aligned based on the DNSH criteria. Furthermore, the activity must follow minimum safeguards regarding human rights to be defined as sustainable (The European Union, 2020).

For each of the objectives, the technical screening criteria describes the main definitions of what is meant by ”substantially contribute” and the thresholds for Taxonomy-aligned activity. Economic activities can be categorised as Taxonomy-aligned by three definitions. The first one is the type of economic activity that is in itself sustainable and contributes to any of the six objectives directly. The second activity, called enabling activities, refers to economic activities that by extension contribute to the objectives by providing products or services so other activities can be sustainable. Furthermore, economic activities can be defined as ”transfer” activities. These are activities that are not sustainable or enabling, but are considered necessary in the transitioning to a more sustainable economy. An example of the latter is the production of gas, which is considered necessary to phase out the use of coal and oil as energy sources, even though gas is also a fossil fuel.

The Taxonomy Regulation currently covers three groups of actors: Financial market participants offering financial products in the EU, large companies (with more than 500 employees) already required to provide non-financial statements under the Non-Financial Reporting Directive (NFRD), and the EU and their Members States. Members States should use the Taxonomy when they develop environmental regulations or set public standards for green financial products (EU Technical Expert Group on Sustainable Finance, 2020). While the TR does not require financial market participants or firms to become sustainable, it presents new disclosure requirements. Firms and financial market participants must include the proportion of turnover aligned with the Taxonomy and the proportion of capital expenditures (CAPEX) and operating

expenses (OPEX) aligned with the Taxonomy in their non-financial statement.[6]

The original TR from 2020 did not include technical screening criteria for each objective. Thus, the disclosure is currently only required for the first two objectives climate change mitigation and adaption, as the screening criteria for these were presented in June 2021. By 2022 it is expected that the delegated acts with technical screening criteria for all environmental objectives of the Taxonomy will be adopted, and all disclosure obligations for the different actors must be followed by 2023 (The European Union, 2020).

The delegated acts of the Taxonomy Regulations are very technical and specific, meant to be used and understood by the three target groups currently covered by the regulation. This thesis does not aim to analyse or comment on the specifics of the regulation, as the regulation and its extensions targets fields other than economics. In addition, there is the issue of limited data, as firms, financial actors, and governments only have been required to disclose information on climate change adaptation and mitigation for less than a year. However, the TR can be analysed from a broader policy perspective, seeing as it is a new policy that will increase the non-financial disclosure of firms. This thesis proceeds to look at the implications of mandatory disclosure and new environmental policies on shareholders and firm value, rather than analysing the specific objectives or goals of the regulation.

2.2 Criticism of the Taxonomy Regulation

Several limitations to the Taxonomy Regulation has been noticed by environmental activists and economic actors. One limitation is that the regulation does not cover all sectors. Currently, the TR only covers seven main economic sectors; agriculture and forestry, manufacturing, energy, transport, buildings, water, waste and sewage remediation, and information and communication technologies. Taking climate change mitigation as an example, the technical screening criteria for the objective were developed by identifying economic activities in the sectors responsible for approximately 90% of greenhouse gas emissions in the EU, leaving som sectors out from

[6]EU firms are required to disclose non-financial and diversity information by Directive 2014/95/EU. The disclosure requirements of the TR will be included in the non-financial statement already to the EU.

the regulation. A second limitation is that companies with fewer than 500 employees are left out of the regulation. The sectors covered by the Taxonomy have a lower share of the total employment in the EU. The sectors responsible for $3/4$ of the total emissions in the EU are responsible for only 20% of the employment in the EU. The requirement that firms need 500 employees to be affected by the TR can, as a result, exclude firms with high levels of emissions (Schuetze & Stede, 2020).

The regulation has also been criticised for the evaluation process and development of the Taxonomy. Only around half of the stakeholders asked to comment on TEG's first report published in 2019 were private investors. The rest included public and private organisations and companies, whereas 70 per cent were industry associations or private companies. In comparison, only 12 per cent of the consulted actors were non-governmental organisations. This can be a result of actors self-selecting to participate in the consultation. Therefore the development of the regulation was not consulted by a random draw of institutions affected by the EU Taxonomy Regulation (Schuetze & Stede, 2020). The self-selection to participate may have led to the interest of some actors dominating the development of the Taxonomy.

Lastly, the Commission's decision to include gas and nuclear energy as transitioning activities has sparked a discussion on the credibility and future of the Taxonomy. While countries like France welcome the inclusion of nuclear energy, arguing that it is needed for decarbonising energy, other countries argue that the problems associated with toxic waste can be just as big of an environmental problem. Gas is still acknowledged as a fossil fuel, but is labelled as a transitioning activity needed to reach the goal of the Paris Agreement and reduce the use of coal to produce energy. Proponents argue that it should not have been included as a Taxonomy-aligned activity, even if gas is needed in the transitioning to a sustainable future (Pitchers, 2022).

The Taxonomy Regulation is the first classification system for sustainable economic activities and has the potential to increase private investment in sustainable products. The regulation can, furthermore, reduce greenwashing by increasing firm disclosure of non-financial information. However, the regulation has been met with criticism from both economic actors and environmental activists, which can affect its credibility as an environmental policy.

3 Theoretical Background

Environmental policy, green finance, and investment initiatives are widely studied concepts in economics and other social sciences. However, as the EU Taxonomy is a relatively new regulation, there is little literature on the topic. The literature that does exist is primarily theoretical or descriptive, as the short time since the Taxonomy was published limits the available data. However, concepts from theory on shareholder preferences and environmental policy are highly relevant to understanding how the Taxonomy can affect shareholders and firm behaviour. This section proceeds with an overview of relevant neo-classical economic theory for discussing the Taxonomy Regulation, followed by insights from existing articles about shareholder behaviour and the EU Taxonomy.

3.1 Negative Externalities and Government Failure

The effect of an economic activity that is damaging to the environment or contributes negatively to climate change is often defined as a market failure, more specifically, a type of negative externality. In Welfare Economics, market failures are described as market deviations from an efficient economic solution or allocation. In the case of a negative externality, the action of one agent is causing harm or damage to others' profits or welfare. The agent causing the damage is assumed to be unaware of or indifferent to the damage, and neither includes it in their decision making or costs nor compensates for the damage. One classic example of a negative externality is pollution. A polluting firm is assumed not to consider the pollution they cause surrounding areas when making decisions based on profit maximisation. The pollution affects the air quality and water quality of the population close to the firm. Thus, the firm will produce too much, considering the damage their production causes society (Perman et al., 2003).

In economic theory on market failures, the government is often assumed to be responsible for correcting these externalities. The use of taxes, i.e. Pigouvian taxes, or quotas to correct for over-production causing significant harm to the environment are the most commonly used examples of how the government can intervene to reduce negative externalities. However, the

theory of how governments can correct externalities does not come without criticism. The two most important critiques are information problems and government incentives. Calculating the exact impact of production on environmental objectives or the exact tax or quota to correct for a negative externality can be costly and perhaps even impossible. As a result, it is difficult to argue that governments will be able to find the optimal economic sanction to correct market failures. The lack of accurate and credible information can reduce the efficiency of government initiatives (Perman et al., 2003).

Another factor that affects the efficiency of correctional policies occurs if the government has incentive problems in their approach to market failures. Assuming that all political agents serve in self-interest, whether it be voters maximising their own wealth or governments maximising their probability of reelection, efficiency goals or environmental goals are not necessarily their main focus. Governments serving their self-interest can lead to either a lack of action to correct for negative externalities or that the action taken is not the most efficient one. Furthermore, pressure from influential interest groups or bureaucrats can steer politicians into making decisions to please these groups rather than representing the majority of voters (Perman et al., 2003).

An additional problem with relying on the government to correct market failures is that some policy solutions do not solve the source of the problem. Thus, inefficiencies occur as the correction happens too late. An example of the latter is investing in carbon capture and storage (CCS) rather than reduceing emissions. While both methods might be needed to reach this generation's climate goals, solely counting on CCS will not be sufficient to reduce emissions and may generate more hazards in terms of investment in abatement (Pacces, 2021). Lastly, problems of government actions occur due to national sovereignty limiting a government's possibility to control firms with production outside their border. In the absence of international regulations, the efforts of one government are less effective if they try to control the production in other countries (Bénabou & Tirole, 2010).

3.1.1 Shareholder Choices

Following the theory of government failure, some economists turn to firms and shareholders and how they can potentially correct market failures. Traditionally, firms and shareholders are assumed to be profit maximising, meaning that their main goal is to increase the monetary profit of the firm. For shareholders, increased profits for the firm leads to increased shareholder payouts or increased value of the stock they own. Therefore, some argue that private actors are not capable of or do not have incentives to correct negative externalities. However, calls for ”doing good” have been around for many centuries, and the pressure for firms to improve on human rights, employment rights, and sustainability is increasing both from shareholders, governments, and consumers. This suggests that shareholders can value other factors than profits in their decision making or that correcting negative externalities can be consistent with maximising profits.

Different motivational justifications can be used to explain why shareholders would encourage or demand socially responsible action from firms. One way to categorise shareholder motivation for CSR is presented in a paper by Bénabou and Tirole (2010). They introduce three motivational factors; ”Win-Win”, Delegated philanthropy, and Insider-initiated corporate philanthropy.

”Win-Win” motivation introduces a mutual benefit of firms investing in prosocial and sustainable initiatives from a long-term perspective. Financial theory has focused on the problem of short-term bias in firm behaviour and shareholder preferences, where actors prefer to increase short-term profits. Thus, initiatives that can lead to long-term benefits, like CSR initiatives, can be undervalued due to short horizons in profit maximising. Better worker rights, which can lead to more loyal and efficient workers in the long term, is an example of a CSR initiative that can increase short time costs and that are at risk of being undervalued by firms. However, the Win-Win motivation argues that shareholders expect a long-term benefit from CSR action, beneficial to both the firm, workers, and society. Therefore they encourage CSR initiatives from firms they have invested in. This motivation is also consistent with profit-maximising theory, as firms expect increased profits in the future from CSR actions.

In addition, shareholders and firms can engage in CSR initiatives to gain a competitive upper hand. If a firm is the first to act on a specific CSR issue, it can strategically choose an initiative that can be costly for other firms to implement. If one assumes that, given the same price, consumers will choose goods or services from the firm with the best CSR performance, firms with the best CSR score will have benefit in the market. Therefore there is an incentive for firms to act first in implementing CSR initiatives, and choose initiatives that can lead to increased costs for its competitors. This is a form of strategic CSR implementation that is a part of the ”Win-Win”-motivation (Bénabou & Tirole, 2010).

Delegated philanthropy and insider-initiated corporate philanthropy both stem from the idea of individual altruism. Delegated philanthropy is described as the use of firms to promote citizen values, arguing that shareholders have individual preferences that lead them to value the benefit of sustainability and ethics over the potential loss in profits from these potentially costly actions. CSR initiatives are, by this explanation, viewed as a result of firms adapting to citizen and investor demands, which can lead to increased future profits. Delegated philanthropy is therefore consistent with profit-maximising theory.

The last motivational explanation, insider-initiated corporate philanthropy, is not consistent with profit maximising behaviour. This motivation refers to firms engaging in CSR initiatives following the firm's management or board members' values or individual vision to do good. It is often assumed that these initiatives follow the personal preference of board members, without necessarily being the optimal initiative for the firm. An example is corporations donating money to charities where board members are active or have high positions. There is a risk that shareholders' goals are not consistent with managers' or board members' values, which makes this motivation not consistent with profit maximisation. If shareholders only wish to maximise profits or value other CSR issues than the managers, efforts to engage in CSR initiatives can displease current shareholders and lead to difficulties in acquiring funding as investors' goals are not fulfilled (Bénabou & Tirole, 2010).

The theories on shareholders' choices show that firms and shareholders' can be a good alternative to reduce negative externalities in the absence of efficient government action under the right conditions. It can be challenging to characterise the motivation behind shareholder pref-

erences and demands. Nevertheless, it is possible to argue that shareholders valuing ethical and sustainable action is feasible and can be consistent with traditional profit maximising theory.

3.1.2 Greenwashing

As sustainability has become an increased focus for both shareholders and consumers, claiming to be sustainable or highlighting only positive environmental information has become a marketing tool for firms, regardless of their actual level of sustainability. When firms mislead consumers or shareholders by claiming to be sustainable through marketing, they engage in greenwashing. The term is used loosely and can be defined in many ways. Some definitions focus on the intentional selective disclosure of positive information, while others describe the elements of greenwashing rather than forming a specific definition of the term. Greenwashing has also been described as symbolic corporate environmentalism, defining the concept of unconscious greenwashing (Lyon & Montgomery, 2015). The definition of greenwashing made by Delmas and Burbano (2011) is frequently used in the literature on greenwashing. They describe greenwashing as the intersection between a firm's positive communication about their environmental performance and their actual (poor) environmental performance. They further divide greenwashing into firm-level, which is when firms mislead consumers on the environmental performance of the company itself, or product-level, which is when other economic actors are misled on the environmental benefit of a product or service (Delmas & Burbano, 2011).

There is a extensive literature on firms deceiving consumers by greenwashing in marketing, but it is more relevant for this thesis to focus on greenwashing that can affect investors. The methods of greenwashing known to affect shareholders the most are selective disclosure, lack of proof or "best of the worst". Selective disclosure is when firms only disclose positive environmental information of their economic activities. Selective disclosure can lead to shareholders over evaluating the firm's environmental performance, as they are not informed about the its total environmental impact. Lack of proof occurs when firms claim to have a sustainable performance they cannot prove. Both types of greenwashing can lead to shareholders having an overly positive view of a firm's performance and are misleading in nature. Lastly, "best of the

worst" refers to businesses claiming to be the most sustainable in a sector that in itself is not sustainable, for example, oil and gas or fast fashion. "Best of the worst" can be perceived as greenwashing since firms will still have a poor environmental performance even though their performance is better than other firms in the same sector (Delmas & Burbano, 2011; Lyon & Montgomery, 2015).

While theory on greenwashing states that shareholders can be a victim of deceiving marketing, shareholders are also pointed out as a driver of greenwashing. Drivers of greenwashing can be divided into organisational, individual, and external psychological drivers. Organisational and individual drivers include factors that encourage greenwashing within the firms, firm characteristics, incentive structure, and preferences of leaders. While these characteristics are interesting when analysing firm action and their motivation for engaging in greenwashing, it is not relevant to the main focus of this thesis. Therefore, more attention is given to external drivers of greenwashing. External drivers are divided into non-market and market external drivers. Non-market external drivers are caused by the pressure or actions of non-financial actors, like regulators or NGOs. Pressure from financial actors, like shareholders and other firms, are market external drivers.

Uncertain or slack regulation are examples of non-market external drivers. The lack of appropriate regulatory practices to monitor and punish firms that engage in greenwashing can be a driver for greenwashing as firms see few (regulatory) costs and consequences of doing so. The absence of mandatory disclosure can be an additional driver, as consumers, investors, and other actors would not be able to cross-check firms' sustainability claims (Delmas & Burbano, 2011). Market external drivers include consumer demand, investor demand, and competitive pressure. Especially in the absence of legal or regulatory consequences, firms have incentives to appear to be environmentally friendly they, in reality, are brown firms.[7] They adapt to the demand of consumers and shareholders but do not put in the effort or costs to actually improve their environmental performance. Competition is another market factor that gives incentives to greenwashing, as fear of falling behind rivalling firms in sustainability practices causes them to communicate positive environmental information (Delmas & Burbano, 2011).

[7] A brown firm refers to a non-sustainable firm, and is the opposite of a green firm.

Greenwashing has been increasingly used as a strategy among firms and other economic actors. One reason for this is the lack of regulatory practices and monitoring of the sustainability claims of firms. Investors, governments, and consumers are at risk of being blindfolded in their decision-making when external pressure of sustainability is not followed by a legal framework of sustainability. The EU Taxonomy is an effort to reduce greenwashing, but as will be discussed in section 6, it is not certain whether it will be enough to counter greenwashing in the future.

3.2 Environmental Policy Instruments

An environmental policy often consists of the environmental goal of the policy and the instruments to achieve this goal (Stavins, 2003). Both the goals set and the instruments used are often heavily debated, as actors differ in how they value sustainability and how they are affected by the cost of becoming more sustainable. This section will focus on the different instruments that historically have been discussed and used in the field of sustainable policymaking.

3.2.1 Policy Designs

Of the existing policy designs, one can define three main categories: Command-and-control regulations, market-based instruments (MBIs), and voluntary programs.

Command-and-Control Regulations

The command-and-control approach previously dominated the environmental policy designs, especially in the US in the 1970s, but has since been criticised for its lack of flexibility (Prakash & Potoski, 2006b; Stavins, 2003). This policy design often consists of rules and regulations that firms need to follow rigidly, and often sets specific technology- and performance-based standards for firms to follow. One example of this type of regulation is the EU ban on Single-use plastic (SUPs). SUPs that can be easily replaced by sustainable alternatives at an affordable price cannot be placed on the market of EU member states. The use of SUPs that are harder

or more expensive to replace should be limited (The European Commission, n.d.). The policy directly affects businesses by monitoring the type of utensils the firm can use, and catering businesses and cafes are among the firms affected by this policy. It is often costly for governments and regulators to monitor and ensure that the command-and-control regulations are being followed, and the cost can vary substantially depending on the specific firm or sector (Stavins, 2003).

In addition, command-and-control approaches do not necessarily ensure the optimal environmental policy. The lack of flexibility might make them counterproductive if unexpected environmental problems occur or more efficient technology becomes available. Holling and Meffe (1996) argue that, when monitoring natural resources, the use of command-and-control policies can lead to unpredicted shocks in natural self-regulating ecological systems. Command-and-control policies pick and choose which part of natural resources to monitor while not having enough information about the ecological effect of these choices. This can cause large changes to the whole self-sustaining system of natural resources and is a risk regulators need to consider (Holling & Meffe, 1996). While the above criticism is relevant, other researchers argue that command-and-control regulations, while imperfect, reduced air pollution and waste. In addition, proponents of the command-and-control approach argue that it has had a positive environmental effect to a point where new environmental problems have come to light, following the need for new and complementary practises (Prakash & Potoski, 2006a).

Market-Based Instruments and Voluntary Programs

An alternative to the command-and-control approach is market-based instruments. Instead of explicit standards and regulations, MBIs encourage behavioural change through market signals (Stavins, 2003). Pigouvian taxes aim to indirectly reduce negative externalities of production by increasing the cost for the firm. Reversed Pigouvian taxes, like subsidies, are used to incentivise increased production where there are positive environmental externalities. Both types of Pigouvian taxes are common textbook examples of MBIs. Another important MBI is tradable quotas, where the government sets a limit for a sector or nation, and quotas within this limit are given to producers. An example is carbon quotas. These quotas can be traded and give an incentive to reduce the firms' pollution levels to gain income from selling the surplus of quotas.

Quotas reduce some of the information requirements compared to setting optimal taxes, which is an additional benefit of this MBI.

The MBI approach is consistent with the argument that environmental problems are market failures. Policies such as limiting or removing government subsidies, prioritisation of sustainable firms in public tenders, and deposit-refund systems can be included under the MBI-term (Pirard, 2012; Whitehead & Stavins, 1997). Unlike command-and-control regulations, proponents of market-based instruments argue that these policies are more flexible and cost-effective than the former. Furthermore, it can give stronger incentives to invest in new technology to reduce pollution and otherwise try to reduce the cost of being sustainable. However, this policy approach has been criticised for monetising something too important to be profit-based. The latter argument is part of a more complicated discussion of whether looking at drivers of climate change as externalities makes environmental policy too dependent on societal opinion and self-regulatory markets, causing society not to take the necessary action to reduce climate change (Gómez-Baggethun & Muradian, 2015).

Another criticism towards MBIs is that the term has been watered down and that some policies placed under the term do not have a strong connection to either markets or price effects. This has led to some policies being categorised differently depending on the researcher's definition of the term. Voluntary environmental programs are schemes that give businesses the possibility to take further environmental action than what is mandatory through rules and regulations (Prakash & Potoski, 2006b). An example of an action that can be both an MBI or a voluntary program is certification schemes/programs. Environmental certifications, like Forest Stewardship Council Labels (FSC), Fair Trade, and Dolphin Safe, can benefit the firm through better reputation or increased investments as shareholders focus on investing in firms holding a minimum ethical and environmental standards. Voluntary regulations vary in both form and effect. Some voluntary regulations expect a direct reduction of pollution or waste, while other encourage environmentally sound management strategies, like vegetarian options in the canteen or monitoring of paper use. Voluntary regulations can also require disclosure of relevant environmental performance or required that the firm provide access to non-financial information (Bui & Kapon, 2012).

Mandatory Disclosure

In recent years there has been an increase in the use of mandatory disclosure in environmental policies. Mandatory disclosure is neither an MBI nor a command-and-control policy, but can be an important addition to the development of both policy designs. Increased disclosure has been connected to efficiency gains in economic theory as it tackles problems of asymmetrical information. Furthermore, disclosing information on non-financial aspects can improve the reputation of firms performing well in CSR matters. On the other hand, especially for voluntary disclosure regimes, a lack of appropriate and universal definitions and monitoring of CSR matters can lead to firms only disclosing information that benefit their reputation. Mandatory disclosure regulations, if resulting in more credible and comparable information, can lead to fewer unintentional errors in reporting and can reduce intentional misreporting. Firms disclosing information under regulations benefit by being able to provide more credible information to shareholders and customers (Ioannou & Serafeim, 2017).

In addition, when information is more available for governments, they can develop more efficient environmental policies as there will be less information asymmetry in the market. However, as previously mentioned, disclosure in itself does not necessarily encourage better environmental performance. Firms can decide to disclose their information without trying to become more sustainable. There is a need for additional benefits of being sustainable or socially responsible in order for mandatory disclosure to be an efficient policy to increase CSR initiatives. However, assuming that shareholders, consumers, and even governments have shifting preferences towards sustainable businesses, being a brown firm under mandatory disclosure can reduce investments. Therefore, mandatory disclosure can lead to increased incentives to become more sustainable (Ioannou & Serafeim, 2017).

The EU Taxonomy falls under the category of mandatory disclosure, and has benefits and flaws like other policies. While it is outside the scope of this thesis to look at the EU's whole sustainability platform, it should be noticed that the EU has opted for a policy mix of all the above policy designs. The EU Taxonomy is thus part of a broader set of policies and is assumed to increase the transparency of firms' sustainable actions. The EU will also be able to refer to firms as sustainable or not, dependent on their level of Taxonomy alignment.

3.2.2 Credibility of Environmental Policy

A common trait of the policy approaches described above is that they are all being criticised for their efficiency, motivation, or their environmental effect. Generally, credibility is an important aspect of policy efficiency. An extensive literature exists on the topic of credibility in monetary policy, financial policy, and trade policy, and has been used as reference points for the development of credibility theory on environmental policy.

Adapting to a new policy can be costly for firms, making consistency and stability of policies important. For example, introducing a carbon tax can lead to firms' investing in technology to reduce their carbon emissions. For firms to benefit from the new investment, the cost of investing in new technology must be lower than the cost of the carbon tax when using their old technology. If there is an expectation of the government removing or changing the policy after a couple of years, investment in new technology becomes relatively more costly (Brunner et al., 2012). On the other hand, environmental policy is dependent on flexibility as new information on climate change is developed. Thus, governments need to balance stability with flexibility when presenting new policies. A consequence of low credibility in a climate policy can be increased costs of climate change mitigation as a result of under-investment in research and development (R&D) (Bosetti & Victor, 2011; Faehn & Isaksen, 2016).

Nemet et al. (2017) introduced a set of policy design elements that can potentially increase policy credibility. A list of 13 elements is divided into four categories; 1) clearly defined flexibility in the design of the rules, 2) transparency and trust, 3) accounting for distributional effects, and 4) multiple policy instruments. Figure 1 shows the full list of elements that can enhance policy credibility.

	Policy Area				Example
1. Design of rules					
Rules on future targets	M	F			interest rate targets
Conditional rules	M	F	T		fiscal rules
Discretion within rules	M	F			safety valves
Periodic review of targets				O	5-year stocktake
Counter-cyclical mechanisms	M	F		O	target over bus. cycle
2. Transparency and trust					
Monitoring and verification	M	F			national accounts
Independent authority	M		T		WTO
Reputation and experience			T		tough on inflation
3. Political economy and distribution					
Compensate losers		F	T	O	grandfathering
Create new winners		F	T	O	exporters
Two-level game			T		trade liberalization
4. Robustness					
Multiple instruments		F		O	social insurance
Decentralized policy making			T	O	bilateral trade agreements

Figure 1: Credibility-inducing elements

Figure 1 shows a list over policy design elements used for credibility analysis by Nemet et al. (2017). The list include which policy type the element is extracted from; M - monetary policy, F - fiscal policy, T - trade policy, and O - other policy area.

Flexibility in design allows policy-makers to adapt the regulation to new information or unforeseen developments. However, flexibility must be defined in such a way that it does not undermine stability to the point where it reduces the credibility of the policy. Having periodic reviews of the targets when designing the regulation is an example of how flexibility and stability can be balanced. The review gives room for adapting the regulation following new information, but limits it to a specific timeline. Transparency is important so independent observers can assess whether announced policies have been implemented or targets have been reached. Furthermore, transparency can lead to countries reviewing each other's policies and identifying potential improvements in international policy agreements. Trust is also linked to transparency, as actors must be able to trust the information given as legitimate and correct, especially in the negotiation process of new or international policies. The third category takes on

the problem of policy implementation affecting economic actors and sectors differently. Ensuring that negatively affected actors feel compensated for their loss is important not only for the credibility of the policy but also for the policy-makers. Lastly, having a combination of policy instruments increases the robustness of the policy. If one of the instruments within the policy changes, having overlapping policies will reduce the possible negative effects of the change (Nemet et al., 2017).

3.3 Previous Literature

An important aspect of the EU Taxonomy is the increase of non-financial data firms need to report to the EU and its shareholders. Thus, studies on the effect of mandatory disclosure are relevant in assessing the effect of the regulation. In addition, looking at the introduction of environmental policies in general, not only limited to disclosure regulations, can give an indication on how the market will react to the TR. Furthermore, there are some papers written on the expected effects of the regulation. Relevant papers for this thesis will be presented in this section.

3.3.1 Mandatory Disclosure and Environmental Policy

Looking at market failures resulting from asymmetrical information, mandatory disclosure can encourage behavioural change in firms in two ways. The first one is that governments will have a better insight into the damages of production with mandatory disclosure and can thus develop regulations that more effectively correct for market failures. The second effect is that firms can no longer hide behind claims not supported by the actual data. The latter has also become important for shareholders that wish to invest in businesses with specific characteristics, like green bonds or firms that secure fair pay and other worker rights.

Disclosure Effects

Empirical evidence indicates that regulations on mandatory disclosure follow an already existing increase in demand for transparency. According to Michelon and Rodrigue (2015), requests from shareholders for firms to disclose information have increased since the beginning of the 21st century. However, the quality of self-reporting of non-financial information on both social and environmental factors has been, and still is, a concern. Analysing data on over 3000 shareholder proposals on CSR, Michelon and Rodrigue (2015) find that the majority of proposals from shareholders request additional reporting and increased transparency. Of these proposals, a majority request increased environmental reporting. However, as illustrated in Figure 2, the authors also find that all though demands for transparency have increased, the same trend is not found for demands for policy change or operational actions in the firm. They argue that these differences might be because disclosure demands are harder for the management of a firm to ignore. In contrast, requests that can directly affect the cost or performance of the firm are more likely to be opposed by both the management and other shareholders.

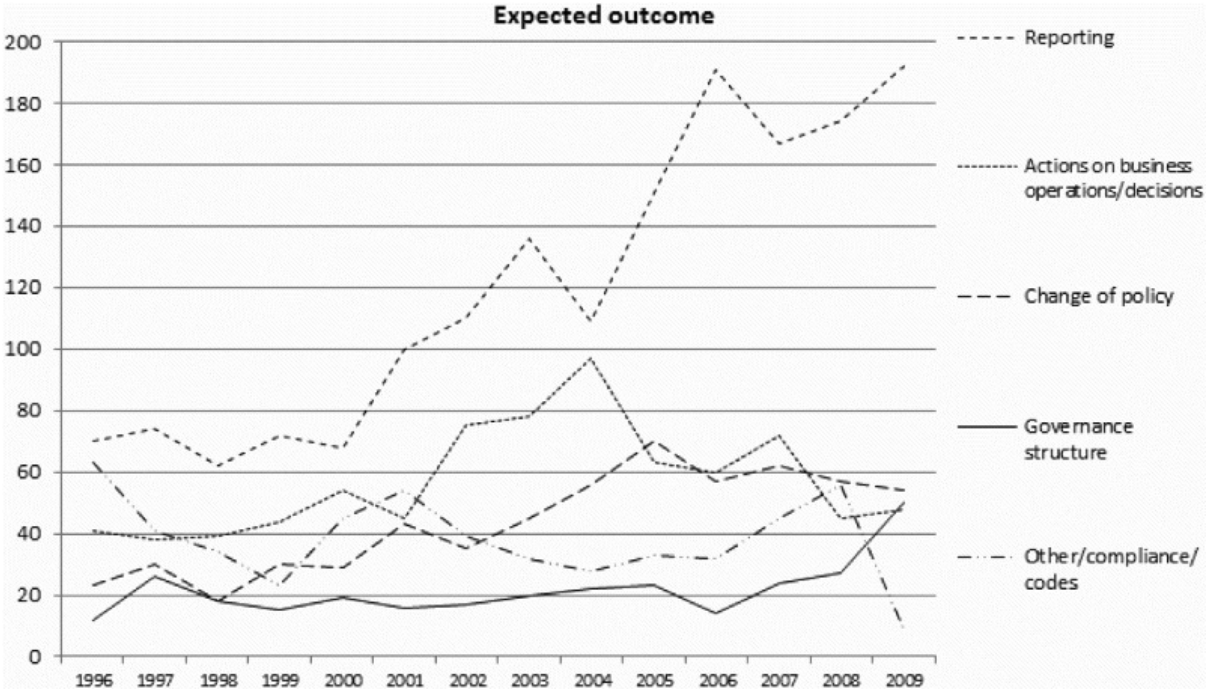


Figure 2: Time trends in expected outcome from 1996 to 2009.

The figure plots the number of proposals based on what the expected outcome of the proposal is. Source: (Michelon & Rodrigue, 2015)

The results from Michelon and Rodrigue (2015) indicate that increased demand for disclosure does not necessarily lead to behavioural change in firms. Therefore, it has been necessary to study whether increased disclosure, in reality, has any effect on environmental performance and financial outcomes. Several studies have been conducted on disclosure effects on both firms' financial performance, e.g. by looking at the cost of equity capital (COEC)[8] or profits, and environmental factors, such as pollution. In a study from 2011, Dhaliwal et al. analyse the effect of voluntary disclosure on CSR activities on the cost of equity capital. Their study tests whether firms with a high cost of equity capital in previous years get higher incentives to disclose CSR factors in the current year. Results show that firms initiating CSR disclosure have a significantly higher cost of equity capital before increased disclosure than non-initiating firms. They argue that this indicates an expectation of lower COEC following increased disclosure.

Their analysis also finds that firm size and the level of global operations increases the probability of publishing CSR reports. Furthermore, they analyse whether increased CSR disclosure can lead to a lower cost of equity capital. They do not find that CSR disclosure directly reduces future costs but find indications of a negative correlation between better CSR performance and the COEC. The evidence also suggests that voluntary CSR disclosure attracts institutional investors with long investment horizons and that this effect is stronger for firms with superior CSR performance (Dhaliwal et al., 2011). However, other studies, like Plumlee et al. (2015), do not find any statistically significant relationship between CSR and COEC. They differ from Dhaliwal et al. (2011) in their methodology and how they categorise CSR. While the latter uses stand-alone CSR reports published to analyse the relationship between disclosure and COEC, Plumlee et al. (2015) use differences within a firm's environmental disclosures to analyse the effects of disclosure on COEC and future cash flows. Their paper stands out from others by including both positive and negative factors to measure environmental performance.

Both above-mentioned studies are a part of a larger literature on COEC and CSR that provides inconsistent conclusions on voluntary CSR reporting and firms' financial performance. However, Chen et al. (2018) argues that results from voluntary disclosure regimes do not necessarily have the same effects as mandatory disclosure and therefore uses examples from China to analyse the effect of mandatory disclosure. They argue that mandatory disclosure comes with a

[8]The cost of equity is a compensation of risk paid by firms to shareholders. Higher risk indicates a higher cost of equity. Source: https://www.investopedia.com/terms/c/costofequity.asp

cost, but that it has a significant effect on CSR issues, like pollution. Using data from firms affected by mandatory disclosure regulations in China, the authors use the Difference in Difference methodology to draw conclusions on firm disclosure, financial performance and pollution. Using return on assets and return on equity to measure firm profitability, they find empirical evidence for an economically significant reduction in firm profitability in the treatment group. Furthermore, Chen et al. (2018) find that operating costs of treatment firms increase after the implementation of mandatory disclosure. In summary, the firm value and investments decrease with mandatory disclosure.

The authors also analyse how investors react to mandatory disclosure using an event study methodology. Their findings indicate that the market reacts negatively to news regarding mandatory disclosure regulations. Therefore, the overall expected reaction of investors to disclosure regulations is that future profits will be reduced due to the regulations, also for the untreated firms.

New Environmental Policy

While Chen et al. (2018) find negative abnormal returns relating to mandatory disclosure, studies on the effect of environmental policy on shareholders have other implications. Empirical evidence on environmental standards indicates that firms upholding higher environmental standards could experience a reduction in risks and that environmental regulation thus can boost market value and stock prices. On the other hand, if environmental regulations lead to old technologies being banned, firms can experience costs related to physical capital (Pham et al., 2020).

Both Ramiah et al. (2013) and Pham et al. (2020) study how the market reacts to environmental policy using event study methodology. Ramiah et al. (2013) looks at environmental policy in Australia and concludes that the biggest polluters are the least affected by environmental policy, arguing that these companies are capable of passing some of the cost to consumers. Shareholders of other industries experienced reduced value (negative abnormal returns[9]) as a result of the

[9]Abnormal returns are the difference between expected returns and actual returns, and is in event studies used to determine if announcements have had an effect on shareholders. Abnormal returns and event study methodology is explained in Chapter 4.

current environmental policy designs in Australia. While the stock market reacted both negatively and positively to environmental policy announcements, empirical evidence suggested that more sectors experienced negative effects. Ramiah et al. (2013) concludes that negative reactions from shareholders to new environmental policies could be an indication that the policy is not optimal. Pham et al. (2020) studies the effects of environmental regulation using French stocks and EU regulations. They find mixed effects of environmental policy, and highlight how different regulations affect the stock market asymmetrically. While water, soil, and air regulations generated negative abnormal returns, the EU-ETS regulation caused both positive and negative reactions. Furthermore, they find that the former type of regulations increase the risk for polluting firms and decrease the risk for more environmental friendly firms.

In summary, the effect of new environmental policy and mandatory disclosure is likely to vary depending on firm characteristics and across sectors. While an environmental policy can reduce risk, it can also lead to higher costs. Furthermore, negative reactions from market actors to a new policy can indicate that it has a sub-optimal policy design.

3.3.2 The Taxonomy Regulation

Pacces (2021) study the potential effect of the Taxonomy Regulation on sustainable corporate governance and argues that mandatory disclosure can align institutional investors' interests with firms eligible for their investment.

In the article, the author focuses on financial actors and products. He only includes mutual funds[10] when discussing and analysing the role of an institutional investor, which are companies or organisations that invest money on behalf of clients (also called beneficiaries). As it has become more typical for retail investors to hold shares through institutional investors rather than holding stock directly in firms, an agency cost problem occurs if an institutional investor fails to reflect the preferences of retail clients when investing on their behalf. Since the asset managers of funds prioritise to maximise profits, the cost occurs as their incentives to invest are

[10]Mutual funds are professionally managed funds made up by different securities like bonds, stocks, money market instruments, etc. Source: https://www.investor.gov/introduction-investing/investing-basics/investment-products/mutual-funds-and-exchange-traded-1

different to the interests of individual investors who value CSR initiatives. Pacces (2021) argues that greenwashing is part of this agency cost. Greenwashing portfolios may have a lower cost than actually increasing the number of sustainable firms in the portfolio and gives asset managers incentives to engage in greenwashing. Mutual funds can thus attract beneficiaries with sustainable preferences, but at a lower cost and without making the portfolio greener.

In the paper, it is argued that empirical evidence on environmental, social, and governance (ESG) mutual funds[11] indicate that ESG funds do not have a better CSR performance than other comparable, non-ESG funds. As there is no single ESG metric used by all, companies and investors have incentives to combine ratings from different ESG metrics to maximise their environmental score at the lowest cost. Furthermore, ESG ratings are a combination of the three factors and often include prosocial goals that are hard to measure. As a result, ESG ratings can be unreliable and easy to use to selectively disclose firm information.

Pacces (2021) analyses two possible effects of the Taxonomy based on previous literature. First, he analyses the above-mentioned agent problem. He describes different types of disclosure practices firms have to follow, amongst them disclosing the proportion of turnover and of their operating and capital expenditures (CAPEX) that are aligned with the new Taxonomy Regulation's sustainability measures. The turnover rate indicates how sustainable the company currently is, and the CAPEX indicates how sustainable the firm aims to be in the future. Since the Taxonomy is a classification system enforced by regulation, it can reduce greenwashing as EU businesses will be reporting based on the common framework accessible to all economic actors. Firms' level of Taxonomy-aligned activities will define their level of environmental performance.

Furthermore, it will be easier for beneficiaries to accurately deduct the level of sustainability in a portfolio, as it will be mandatory for financial institutions to disclose the proportion of sustainable investments. Better matching between beneficiaries and investors based on their preferences is an additional benefit of the Taxonomy. While Pacces concludes that the mandatory disclosure of the Taxonomy Regulation will reduce the agency cost of sustainable investment,

[11]ESG funds are funds where environmental, social, and governance factors are part of the investment decision of the portfolio. Source: https://www.investor.gov/introduction-investing/general-resources/news-alerts/alerts-bulletins/investor-bulletins-1

he illustrates some potential issues. Firstly, it is important to understand that environmental sustainability is difficult to measure, as it is often based on the current state of knowledge. Furthermore, the transition into sustainability and the acquiring of new knowledge is an uncertainty that affects the accuracy of environmental data. Lastly, the regulation is a result of political compromise and thus might not be the most optimal policy.

Pacces (2021) also analyses the potential effect of the Taxonomy on corporate governance. He looks at how institutional investors will act to pressure firms into becoming more sustainable, assuming that they can; 1) voice the preferences of their beneficiaries, 2) exiting, or threaten to exit, the company. Currently, it is more profitable for active funds to exit or avoid less environmentally sustainable companies when they make an investment decision based on the demand from beneficiaries. However, active funds exiting companies with lower environmental performance may underperform other funds on both return and risk. The latter is due to sustainable portfolios possibly missing out on risk diversification.[12] Furthermore, if excluded firms have higher risk-adjusted returns, conventional funds investing in these firms will outperform the green funds. Index funds, on the other hand, are more prone to using their voice as exiting generally is harder for these types of funds. Pacces argues that since index funds cannot exit companies that bring down the Taxonomy-alignment of their portfolio, they have to use their voice in order to make less sustainable firms take action to become more Taxonomy-aligned. Based on the economic and financial theory, the article concludes that both active and passive (index) funds will make asset managers push corporate managers to be more environmentally sustainable due to the TR.

The 2021-study was conducted before sufficient data on the Taxonomy Regulation was available. However, the study provides a thorough prediction of possible Taxonomy effects. According to his predictions, one can assume that investors with environmental preferences will benefit from the regulation, that the TR can reduce the risk of greenwashing and that institutional investors will increasingly pressure firms to act more aligned with the Taxonomy.

[12]Risk diversification is the act of a portfolio investing across different sectors or categories, thus reducing the loss of assets of one specific sector or category performing poorly. Source: https://www.investor.gov/introduction-investing/general-resources/news-alerts/alerts-bulletins/investor-bulletins-35

3.4 Summary

This thesis's theoretical background aims at doing two thing: present why shareholders would value sustainability over profits and present a framework to discuss the credibility of the Taxonomy Regulation.

The Taxonomy Regulation is based on actors valuing sustainability when making economic decisions. Section 3.1.1. describes how shareholders can value sustainability and other CSR initiatives to three main motivational factors. Two of these factors, "Win-Win" and delegated philanthropy, are consistent with profit maximising behaviour. This is an important insight, as it does not make shareholders choose between profits and their values. This insight makes it more probable that shareholders, regardless of their level of altruism, can have a preference for investing in more sustainable firms and portfolios. In addition, the theory on shareholders that value sustainability shows how firms can be motivated to correct market failures. Governments are traditionally expected to correct market failures. However, the theory presented on shareholders' choice shows that private firms and actors can be motivated to correct negative externalities due to the demand of consumers and shareholders.

A second goal for the Taxonomy is to reduce greenwashing, and theory on both methods of and drivers for greenwashing has been presented. Together with the credibility theory in chapter 3.2.2. the greenwashing theory lays the framework of which the Taxonomy regulation will be discussed in this thesis. Credibility is important for the efficiency of a policy. If potential losers are not compensated for their loss, if the regulation is inflexible, or if it to loosely defined, actors affected by the policy might not act as expected by the policymakers. Taking into account the criticism of the TR from environmentalists and governments, the credibility of the regulation is essential for its ability to reduce greenwashing.

Lastly, empirical evidence from previous research is presented. Key takeaways from the literature on mandatory disclosure are that this type of policy approach can increase costs and reduce shareholder profits. Papers on environmental policy present that shareholders act differently depending on the policy designs and show how shareholder reactions can give an indication of

how optimal the environmental policy is. In addition, an extensive paper conducted on the Taxonomy is presented. The paper concludes that the TR can be expected to be positive for shareholders and that it will reduce greenwashing.

Theory on shareholder choices and market failures serves as a foundation for why a regulation as the Taxonomy is needed and why shareholders can benefit from investing in sustainable firms. The empirical evidence from previous papers gives inconclusive predictions of how the Taxonomy will affect shareholders. The paper from Pacces, greenwashing theory and credibility theory will be used to discuss the result of the event studies in this thesis.

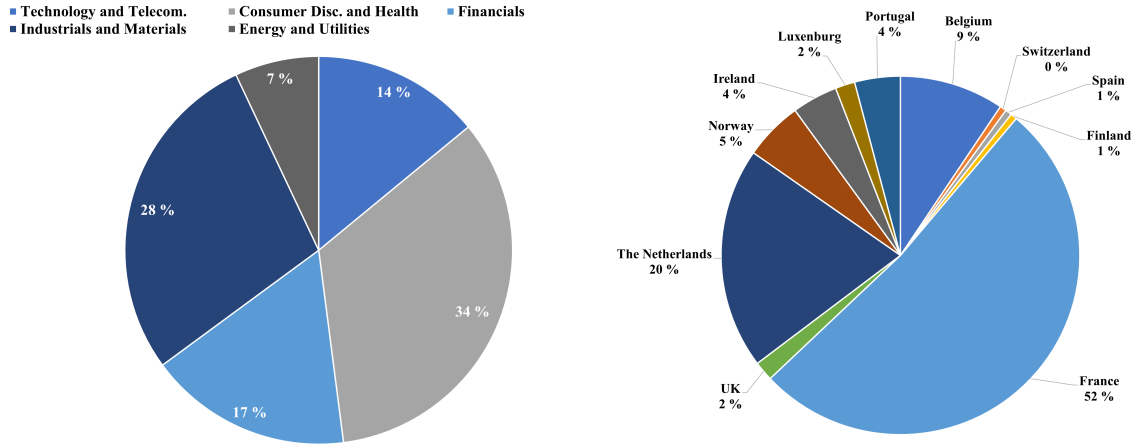
4 Methodology

4.1 Data

The firms affected by the EU Taxonomy are financial institutions and firms with over 500 employees, which are the same firms already covered by the EU's Non-Financial Reporting Directive (NFRD). The data sample used in this thesis initially includes data in business day cycles[13] for 2010 to 2021. However, data up to 2016 is removed due to the methodology chosen, which will be explained in the next section. This data consists of 204 firms, with information on net sales or revenues, earnings before interest and taxes, total debt, total assets, basic net income, and market value. Not all firms have reported data for the whole period, so the number of firms used in the analysis is reduced to 171.

The data is collected from the FTSE European 100 Index. The index measures the performance of the 100 largest capitalised European companies. The companies are ranked based on their full market value, and revision of the list happens annually in March. Companies falling below the 110^{th} position when eligible firms are ranked will be deleted (FTSE Russell, 2021). All the firms on the FTSE European 100 Index can be found on the European trading platform Euronext. A majority of the firms in the sample are either French or from The Netherlands.

[13] Business days excludes Saturdays, Sundays, and other public holidays.



(a) Percentage of firms per industry.

(b) Percentage of firms per country.

Figure 3: Descriptive figures of the data

All main industries based on the Russel group's Industry Classification Benchmark (ICB) are represented among the firms listed in the data. The 11 industries are Technology, Telecommunications, Health Care, Financials, Real Estate, Consumer Discretionary, Consumer Staples, Industrials, Basic Materials, Energy and Utilities. When analysed in this thesis, the industries have been further merged. The five merged industries and the percentage of the total per industry are shown in figure 3a. Consumer Discretionary, Consumer Staples and Health Care are merged into one category, and Financials is paired with Real Estate. Energy is combined with Utilities, Industrials with Basic Materials, and Technology with Telecommunications. All firms in the "Energy"-sector represented in this data sample are oil and gas companies. The sectors have been combined based on proximity and the expected effect of the Taxonomy Regulation. For example, it is expected that "Industrials and Basic Materials" and " Utilities and Energy" will be negatively affected by the TR.

In addition to the firm-specific data, data on spot rate yield curves for 3-month government bonds in the Euro area (2010-2021) has been collected from the European Central Bank's Statistical Warehouse[14]. Data for the historical daily spot rate of the Standard and Poor's 500 Index (S&P 500 SPX) have been collected through MarketWatch.com.[15] Both the spot rate yield curves and S&P 500 index are further explained in section 4.2.2.

[14]https://sdw.ecb.europa.eu/browse.do?node=9691126 (downloaded: 15th of April 2022)

[15]https://www.marketwatch.com/investing/index/spx/download-data?mod=mw_quote_tab (downloaded: 29th of April 2022)

4.2 Event Study

A principal motivation behind the EU Taxonomy is to make it easier for shareholders to verify the level of sustainability in a firm's economic activity. Thus, it is interesting to analyse whether the Taxonomy has affected shareholders by looking at firms' market value at announcement dates for the regulation.

An event study is an approach frequently used to analyse the effect of unexpected information on the stock market. In finance, the methodology is often used to analyse the reactions to financial announcements, while it in economics and law is used to analyse the effect of new regulations. Event studies are based on the efficient market hypothesis, which is the assumption that the market is rational and will react immediately to unexpected events. This methodology is therefore used to trace abnormality in the cross-sectional distribution of returns around or at a specific time (Khotari & Warner, 2006). The abnormal return is the difference between the expected normal returns and the actual return on the event date. In this thesis, data on the market value[16] of firms is used to analyse whether there is any abnormality in returns around important announcement dates regarding the Taxonomy Regulation. Abnormality indicates a reaction from shareholders, causing them to change behaviour. Positive abnormality indicates that the event is expected to positively affect the future value/profit of the firm, for example by reducing costs, getting a competitive advantage, or increase the demand for stocks from the firm. A negative abnormality, on the other hand, indicates that the announcement reduces the expected financial performance of the firm, and shareholders are willing to sell the stock at a hypothetical lower price. If there are no abnormal returns, it is an indication of the announcement not having any effect on the shareholders.

[16]The market value, also called market capitalisation, is defined as the current market price of a firm's share multiplied by the number of outstanding shares of the firm. The total stocks do not change over short periods. Source: https://www.nasdaq.com/glossary/m/market-value

The basic event study model takes the following form, assuming $t = 0$ is the time of the event:

$$mv_{it} = R_{it} + e_{it} \tag{1}$$

$$e_{it} = mv_{it} - R_{it} \tag{2}$$

The variable mv_{it} measures the daily change in the market value of firm i at time t, and R_{it} is the expected market value in the absence of abnormality. Since the number of stocks does not change in short periods of time, a change in market value is caused by a change in the current market price of a firm's shares. We are interested in the abnormal returns and rewrite equation (1) to find that e_{it} is a measure of the unexpected change in the firm's market value following an event compared to the expected change in daily market value in the absence of the event.

In order to conduct an event study, one needs to make two central decisions: the event window of the study and a model to measure expected normal returns, R_{it}. The event window is the period of the event that is expected to affect returns. For example, if a new regulation is introduced, the event window can be the hour of the announcement or the day of the announcement. If one wishes to study the effect of a structural change within a firm, the period might be longer, for example, from the day the change was announced to the day the structural change came into action (Campbell et al., 1997b; Khotari & Warner, 2006). The event window is essential for the validity of some of the model assumptions, which are further described in section 4.2.1. The choice of the expected normal returns-model is discussed in section 4.2.2.

4.2.1 Model Assumptions

The results of event studies are valid under three main assumptions: market efficiency, unanticipated events and no confounding effects. In an efficient market, all relevant information available to market actors should be incorporated into the stock price of securities. If this assumption holds, newly revealed information (an event) that is financially relevant will instan-

taneously be incorporated into the stock price. Therefore, all unanticipated shocks, events, or factors affecting the stock price should be incorporated into the price. A change in the market value of a firm following an event is, therefore, an indication of the firm causing a behavioural change in shareholders (Mcwilliams & Siegel, 1997). The efficiency assumption is important to consider when deciding on an event window for the study. Since there is an assumption that the market reacts immediately to relevant events, a shorter event window is often assumed to be more appropriate. This is because longer event windows indicate that researchers believe there could be a lagged reactions to the event. In other words, the effect is not ”immediate” in the abnormal returns as a result of the event.

The market efficiency assumption is often emphasised in event studies; however, the two other assumptions presented by Mcwilliams and Siegel (1997) are mentioned less frequently in event study literature. As previously stated, stock markets reacting quickly to new information is assumed to be the reason for abnormal returns. Thus, if there is any sort of information leakage, it is difficult to determine when investors are made aware of the new information and when the effect of this new information is incorporated into the stock price. Therefore, it is essential to reflect on whether the events analysed are unexpected or not. If information on the event has been incorporated into the stock price prior to the event date, the results of estimated abnormal returns will not be a correct representation of the event's effect on shareholders. The third assumption is that no confounding events should happen in the event window. In other words, there should not be other financially important announcements that can affect the stock price in the event window. If this assumption is violated, it is harder to isolate the effect of one event from the effect of other events. In the case of confounding events, the researcher cannot know what share of the abnormality in returns that stems from the event of interest and what effects come from other events (Mcwilliams & Siegel, 1997).

Longer event windows increase the risk of violating the three model assumptions. However, there are instances where it is appropriate to have longer event windows. Long-horizon event windows can be beneficial if researchers believe there is a risk of information on the announcement being leaked prior to the event date. In this case, the event's effect might already be incorporated in the stock price at the announcement date. Additionally, some information can be assumed to be revealed to shareholders over time. In both these cases, a longer event win-

dow is appropriate (Mcwilliams & Siegel, 1997). Several other issues can arise with longer event windows, but they will not be presented in-depth. Interested readers can consult Khotari and Warner (2006).

There are also some additional econometric issues associated with using daily data, which will be further discussed in section 5.1. However, a brief introduction is necessary before moving on to the research design. Empirical evidence suggests that the daily return (and daily excess return[17]) of individual stocks has a fat-tailed distribution rather than a normal distribution. Therefore, there is a possible violation of the Central Limit Theorem for small sample sizes. Additionally, there is an increased risk of cross-sectional dependence and serial dependence in the variance estimation of daily data.

A discussion on the model assumptions and potential econometric problems relating to this thesis's data and methodology is presented with the results of event study estimations in section 5.1.

4.2.2 Research Design

A Model of Expected Normal Returns

In order to carry out the event study, the expected normal returns, R_{it}, need to be calculated. One can use either statistical models (like the market model) or econometric models. One commonly used econometric model is the Capital Asset Pricing Model (CAPM), which is the equilibrium model chosen in this thesis. The CAPM is a simple economic model assuming that the expected return of asset i is a linear function of the market portfolio return and its covariance. The market portfolio return is defined as the return of a hypothetical portfolio of all individual securities. The model assumes risk-averse investors that maximise returns given the variance (level of risk), while consequently trying to minimise the variance of their investment (Verbeek, 2017). Furthermore, the model assumes homogeneous investors that only make their

[17]The daily excess return is the return of one investment subtracted from another investment return, often used to compare investment returns to the (expected) risk-free rate of returns or another benchmark value. Source: https://corporatefinanceinstitute.com/resources/knowledge/trading-investing/excess-returns/

investment decision based on the excess return of the market portfolio and that there is an absence of market frictions like transaction costs, taxes and trading restrictions (Campbell et al., 1997a; Fama & French, 2004). The last assumption is that the market portfolio is mean-variance efficient.

The baseline model is as follows:

$$E(R_i) = \beta_{im}(E(R_m) - R_f)) \tag{3}$$

Where

$E(R_i)$ - the expected return of asset i

$E(R_m)$ - the expected return on the market portfolio

R_f - the return on the risk free asset

While the CAPM model is preferable for event studies for its simplicity, both the risk-free asset and the market portfolio return are difficult to estimate. Thus, proxies for the two variables are used. In this thesis, the Yield curve spot rate for government bonds with a three months maturity and AAA-rating is used as a proxy for the risk-free rate. The yield curve is estimated by the European Central Bank (ECB) and is based on bonds issued by euro area governments. The AAA-rated yield curve is based on debt securities with the most favourable credit risk assessment (The European Central Bank, 2022). Government bond yield curves are commonly used as benchmarks for low risk-rates, as it is difficult to find examples of corporate securities having a lower risk than government bonds. In the rare case this happens, it is often due to poor quality of information (Brooks & Skinner, 2000). Since the AAA-rated yield curves are based on a mix of low-risk debt security from different euro area member states, it is an appropriate proxy for looking at the European Union.

The market portfolio return is defined as a hypothetical bundle of all types of assets available in the financial market. This variable has to be estimated, or a proxy needs to be used instead. S&P

500 SPX is often used as a proxy for the market portfolio (Campbell et al., 1997a). The S&P 500 SPX consists of 500 securities from American businesses from different sectors, chosen by a committee, and not only securities from the most profitable businesses.

Aggregation of Abnormal Returns

The standard model in equation (2) measures the abnormal return for each specific firm. However, to analyse the event's cross-sectional effect, one must calculate the aggregate abnormal return for all sectors. The standard method tests whether the mean abnormal return at time t is equal to zero. Given a sample of N securities, the mean abnormal return for a period t is:

$$AR_t = \frac{1}{N}\sum e_{it} \tag{4}$$

As previously noted, there are cases where it could be interesting to examine the abnormal returns for different periods around the event date. Either to test for market efficiency or because there is a possibility of information spillages before the event (Campbell et al., 1997b; Khotari & Warner, 2006). Since stock market data follows business days, there may be no available data for the specific event date and using aggregated return of days around the event date may be necessary. If analysing the abnormal returns around the event date is of interest, methods of aggregating the abnormal return over a period of time can be used. The cumulative average residual method (CAR), is frequently used for event studies and measures the aggregate return from time t_1 through time t_2:

$$CAR(t_1,t_2) = \sum_{t=t_1}^{t_2} AR_t \tag{5}$$

The choice of event dates and event window follows in the preceding section, and as will be shown, the appropriate equation for the event studies conducted in this thesis is equation (5).

4.2.3 Event Dates and the Event Window

The Taxonomy Regulation was first mentioned as a regulation to be developed in 2018. As a result, several announcements regarding the regulation might indicate how shareholders have responded to the Taxonomy. In addition to the day the Taxonomy was officially adopted in the EU, the 18th of June 2020, six event days previous to the adoption and four post-adoption event days were initially chosen to be studied. However, one of the dates of interest is on a non-business day, and data is not available for the estimation of this specific date. Therefore, five pre-adoption dates will be studied instead of six. The events prior to the adoption date are chosen to recognise initial reactions to the (unfinished) regulation, e.g. the publication of the first report made by the TEG and when political agreement on the Taxonomy was made. The post-event dates include political agreement on the technical screening criteria for the two first Taxonomy objectives, publications of delegated acts as additions to the Taxonomy, and an announcement on the position of nuclear and gas in the Taxonomy. A full description of each event date can be found in the Appendix.

As previously discussed, the choice of the event window is important for an event study's implication. For the type of regulations and announcements studied in this thesis, one can argue that an event window of longer than one day might be appropriate. First of all, many of these announcements are made at a meeting in the EU. The dates of the meetings are often announced beforehand. There is a possibility that speculation on potential outcomes of planned meetings has affected the stock market before the announcement. At the same time, as regulations and reports published often have to be read through to cause a reaction, this can lead to a lagged market effect. However, longer event windows lead to a higher risk of other announcements affecting the market. Therefore, this study will have an event window of three days total, one before the event date and one after. Since an event window of three days is a limited approach, especially in the case of anticipated events or lagged market effects, extensions on the event dates will also be studied.

5 Empirical Results

5.1 Main Results

Table 1: Event study estimates of cumulative abnormal returns for the first 5 event days of interest. Prob-z corresponds to the test p-value of the Wilcoxon Sign Rank test.

	08/03-18	**07/12-18**	**18/06-19**	**18/12-19**	**09/03-20**
	(1)	(2)	(3)	(4)	(5)
cons	.320	-2.767***	.947***	-.577***	-8.932***
	(.201)	(.271)	(.187)	(.151)	(.464)
N	168	168	168	169	170
prob-z	0	0	0	0	0

Standard errors in parenthesis

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Estimates are for a 3-day event window, consisting of one day before the event, the announcement date, and the day after.

Date (1): the date the Taxonomy was first (briefly) mentioned as a part of the EU's new climate strategy. Date (2): market participants and governments were invited to give feedback on the first report on the TR. Date (3): is when the first official publication of TEG's report. Date (4): political agreement on the regulation was acquired. Date (5): the TEG's published its final report, including technical screening criteria for two objectives was published.

Table 2: Event study estimates of cumulative abnormal returns for the last 5 event days of interest. Prob-z corresponds to the test p-value of the Wilcoxon Sign Rank test.

	18/06-20	**21/04-21**	**09/12-21**	**10/12-21**	**31/12-21**
	(6)	(7)	(8)	(9)	(10)
cons	-1.397***	-.902**	-1.067***	-.904**	.385***
	(.317)	(.298)	(.260)	(.258)	(.092)
N	170	170	170	170	171
prob-z	0	0	0	0	0

Standard errors in paranthesis

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Estimates are for a 3-day event window, consisting of one day before the event, the announcement date, and the day after.

Date (6): the Taxonomy Regulation was officially adopted. Date (7): Political agreement on the first set of technical screening criteria was acquired. Date (8): A first delegated act on climate change adoption and mitigation was published in the Official Journal. Date (9): A supplementary delegated act with specifications on the information that must be disclosed was published in the Official Journal. Date (10): The development of a delegated act including gas and nuclear activities in the TR began.

Table 1 and Table 2 shows the result of the estimation of the total cumulative abnormal return across all firms, using Ordinary Least Square (OLS)-estimations on CAPM. The CAPM is estimated for each firm and used to estimate the expected normal returns without the event. The cumulative abnormal returns are estimated for an event window of three days Tests for heteroskedasticity were performed for the CAPM model. For event dates 3, 6, and 8, the homoskedasticity hypothesis was rejected, and robust standard errors have been applied. Robust standard errors have also been applied to the CAR regressions. Standard t-test for significance, the sign test and the Wilcoxon rank test are used to test the for significance of the event

dates. The two latter are non-parametric tests. The sign test checks the frequency of positive and negative abnormal returns, testing the sample's mean by using the number of observations with a positive sign and the number of observations with a negative sign. Parametric and non-parametric tests are often used together when conducting event studies to strengthen the results of tests on abnormal returns. For all event dates, the sign test rejects the null hypothesis, which indicates that there is evidence for abnormal returns on the event dates. The Wilcoxon rank sign test considers both the sign of the abnormal returns and the magnitude of abnormal returns. The Wilcoxon sign test fails to reject the hypothesis of no abnormal returns for all event dates. Therefore, both non-parametric tests indicate that there are abnormal returns for all event dates.

Using the regular t-test, the only date that fails to reject a null hypothesis of no abnormal returns, $H_0 : CAR = 0$, is the first event date. This was when the Taxonomy was first mentioned as part of the EU's action plan to reach the goals of the Paris Agreement. It is also plausible that the first event date of the study did not affect shareholders due to little information on the green deal and the Taxonomy. Specifically, no information was produced other than that a Green Deal, including the Taxonomy, would be a part of the EU's climate strategy.

Positive estimates for cumulative abnormal returns are obtained for three out of the ten event dates. A positive CAR indicates that the change in market value is greater than without the event. With positive CAR, shareholders are expected to sell their shares at a higher price than without the event. The positive estimates are obtained for the first event date, the third, which is the date of the first official report from TEG with recommendations for the TR, and the last date when the announcement on nuclear and gas was given. For the third day, the positive abnormal return can be an indication of initial positive reactions to the recommendations of the regulation. The publication came after a round of feedback from economic actors, and positive reactions from shareholders could be a result of market actors feeling that their feedback was taken into and that the effect of the regulation was expected to be less damaging to firms than previously assumed.

On the last announcement date, only information on the day prior to the announcement and event date is used in the estimation of CAR. This is due to the data sample lacking data for

the following business day. Therefore, the CAR may not capture the full reaction to the announcement. On the other hand, these news could be positive for the firms produce gas, as their production would be defined as necessary for future economic activity. Shareholders could have, as a result, expected the reduction in profits for brown firms to be smaller or that there would be no reduction at all. Also, firms with high energy consumption can react positively to this news. Many of the public (negative) reactions to the news on gas and nuclear power came some time after the initial announcements. These reactions came primarily from environmental activists or governments. It is possible that negative reactions to the announcement were not reflected in the market value of firms.

For the majority of the event dates, a negative abnormal return is estimated. One date is specifically noticeable. The 9th of March 2020 stands out due to the magnitude of the estimated CAR, which is estimated to be -8.932 percentage points. The value is also statistically significant at a 1% significance level using the standard t-test. On this date, the TEG published its final report, and it is not a date expected to have the largest effect on the stock market since it does not represent a final decision or agreement on the regulation. There may be confounding events in the event window for this specific date. The start of March 2020 was when the Covid-19 pandemic started to affect Europe on a larger scale. It is plausible that country-specific actions or situations due to the pandemic affected European stocks in this period. Furthermore, the general instability of the pandemic led to the stock market falling in this period. Therefore, it is likely that abnormal return estimated reflects market reactions to the Covid-19 pandemic rather than, or in addition to, reactions to the TEG report.

The second date before the official implementation of the Taxonomy where the abnormal returns are negative, is the day of political agreement on the regulation. The political agreement is a result of a compromise between EU Member States.Compromises often result in both winners and losers, and the negative abnormal return can be a result of Member States not seeing the compromise as optimal. The data used for this event study have a larger portion of firms from France (88) and the Netherlands (34). Therefore, if there are any country-specific factors that makes the result of the compromise negative for firms or shareholders, these can be overly represented in the result. One example could be that decision on nuclear power and gas was postponed, as France has been a proponent of the inclusion of nuclear power as a Taxonomy-

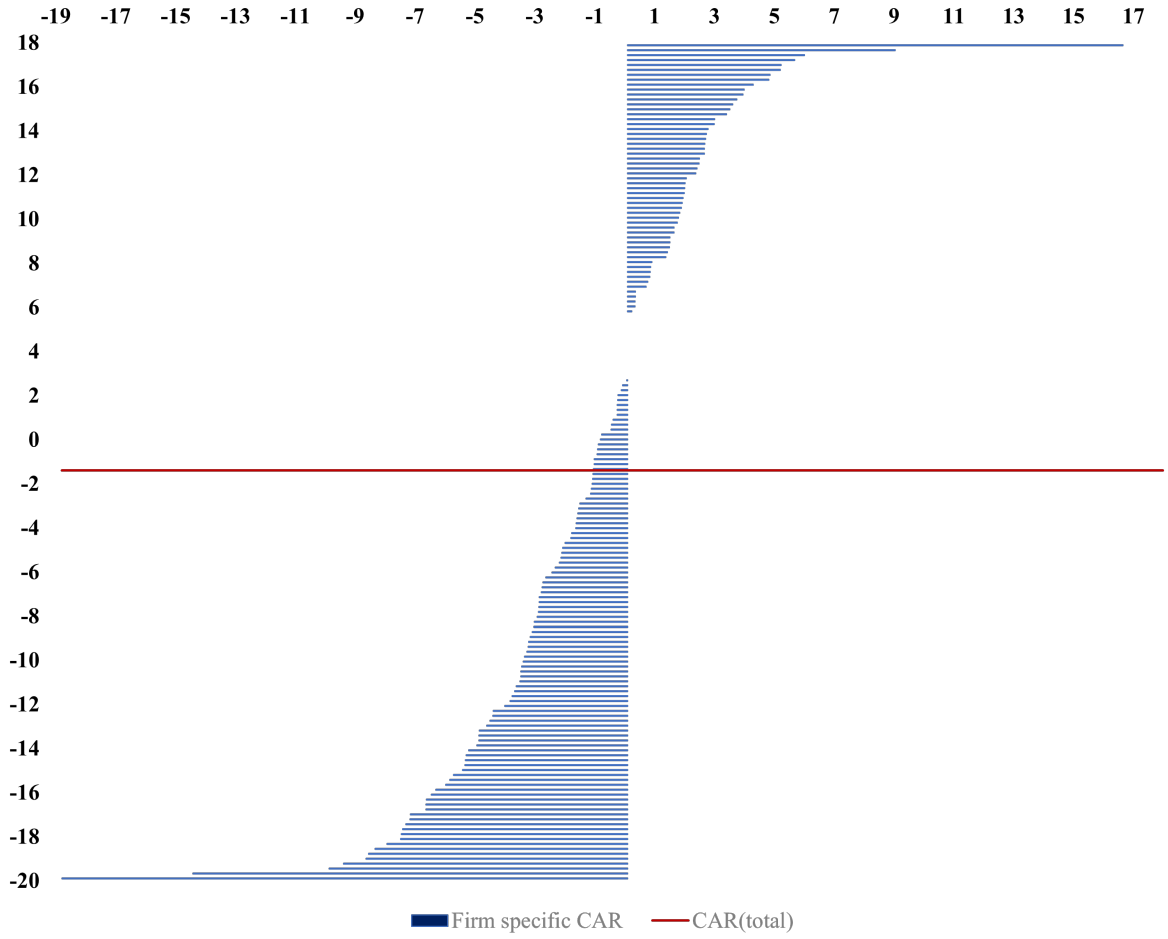
aligned activity. On the other hand, if shareholders expected that the TR would reduce the value of their investments, the event date for the political agreement can report negative abnormal returns as the agreement guarantees that the Taxonomy will be put into force.

The three post-implementation dates reporting negative abnormal returns are all related to the extensions or the specifications of the TR. On event date 7, a political agreement on the first set of technical criteria for climate change adaption and mitigation was given, and for event date 8, the first delegated act on the two objectives was published in the Official Journal.[18] However, the results for event date 8 and 9 are probably intertwined. Events 8 and 9 come right after each other, and for an event window of three days, the reaction from shareholders to one of the days will be part of the CAR-estimation of the other. If both event dates have estimated negative abnormal returns to the event, the CAR may be estimated to have a larger negative abnormal return, and if they have opposite signs of the abnormal return, the CAR may be estimated to be smaller than the reality. This will be further analysed in the next section, where CARs for different event windows are estimated, including an event window of one day.

Looking at the date of official implementation of the Taxonomy, the 18th of June 2018, a cumulative abnormal negative return of 1.345 percentage points is estimated. The result is statistically significant at a 0.1%significance level.

[18]The Official Journal is the official publication platform of EU legal acts. Source: https://eur-lex.europa.eu/content/help/oj/about-oj.html.

Figure 4: Firm specific cumulative returns including the total CAR for the 18th of June 2020.



The cumulative abnormal return for each firm on the adoption date, with the total CAR market return as the red horizontal line, is found in Figure 4. The two firms with the estimated negative return of the largest magnitude are a French insurance company (-18.89) and a French automobile company (-14.51). The insurance company had a ”board of directors” meeting on the 17th of June, and it is possible that the shareholders reacted to the decisions or themes discussed by the board. Therefore, the estimated effect for this firm can be affected by a confounding event.[19] The automobile company does not report any news on their website around the date of adoption. The outlier value on the positive abnormal return (16.55) is a dutch firm in industrial transportation. They did not have any specific events happening around the event date expected to have an effect on the company's stocks, as the only noticeable happening was

[19]Source:https://www.cnp.fr/en/the-cnp-assurances-group/newsroom/news/2020/covid-19-how-fondation-cnp-assurances-and-its-partners-have-adapted-their-activities

that they released new postal stamps on the 18th of June 2020. However, it is also plausible that the positive return results from the company being relatively sustainable or on a path to sustainability. Then shareholders might reacted positively to the new regulation as the TR is expected to affect sustainable firms positively. In 2022 the company was included in Euronext Amsterdam's most sustainable companies. [20] Removing the outlier values do not change the sign of the CAR, but reduces the estimated effect to -1.268 with a smaller standard error of 0.274. A larger per cent of the firms are estimated to have negative abnormal returns on the adoption day of the TR.

While the majority of the estimations for the different events resulted in negative abnormal return, some econometric issues affect the strength of the estimations. Since the event date is equal for all firms, there is clustering in the event study estimation. Clustering leads to increased variance of the abnormal returns and weakens the power of the test to detect abnormal performance (Peterson, 1989). Lower power of the tests can increase the probability of rejecting H_0 even if the alternative hypothesis is wrong. However, Brown and Warner (1980) found that methods adjusting for market movement, like the CAPM, are preferable when clustering increase in the variance of the event studies. Furthermore, clustering can lead to both serial correlation and cross-sectional dependence. Serial correlation is also a risk when securities are non-synchronously traded, and can lead to the estimates of the CAPM-model being biased and inconsistent. Both serial correlation and positive cross-sectional dependence can lead to too many rejections of the hypothesis of no abnormal returns when it is true (Brown & Warner, 1985). Therefore, the results of the significance tests cannot necessarily be taken literary. In addition, there is a risk of bias in the estimation of normal returns, which can affect the estimation of abnormal returns.

The result of the main model shows that across all dates, there is a sign that shareholders believe that their current investments will fall in value due to the Taxonomy Regulation. This is illustrated by the majority of the estimated cumulative abnormal have a negative sing. To further study different aspects of the reactions, the following sections provide additional analyses to gain further insights into the abnormal returns around the event dates.

[20] Source: https://www.postnl.nl/en/about-postnl/press-news/news/

5.2 Extensions

5.2.1 Extension 1: Different Event Windows

Table 3: Estimations of cumulative abnormal returns with different lengths of the event windows

	1	**3**	**5**	**7**	**9**	**15**	**31**
08/03-18	.615***	.320	1.070***	.592	-1.379***	-.862	.1863
(1)	(.134)	(.201)	(.280)	(.316)	(.393)	(.494)	(.782)
07/12-18	2.259***	-2.767***	-.278	2.033***	1.472**	1.592*	4.953***
(2)	(.143)	(.271)	(.432)	(.512)	(.551)	(.770)	(1.406)
18/06-19	1.210***	.947***	-.032	-.393	-1.184***	.665	-1.887***
(3)	(.105)	(.187)	(.258)	(.283)	(.313)	(.405)	(.558)
18/12-19	-.189*	-.577***	-.061	.483*	.059	.142	-.877
(4)	(.082)	(.151)	(.214)	(.235)	(.274)	(.361)	(.614)
09/03-20	-2.118***	-8.932***	-6.540***	-13.475***	-15.713***	-21.933***	-15.327***
(5)	(.309)	(.464)	(.547)	(.813)	(.898)	(1.653)	(1.387)
18/06-20	-.901***	-1.345***	-1.434***	-1.704***	-3.654***	-7.827***	-6.437***
(6)	(.114)	(.317)	(.341)	(.418)	(.479)	(.804)	(1.240)
21/04-21	-.398*	-.902**	-1.453***	-.555	-1.514*	-1.651	-1.303
(7)	(.154)	(.298)	(.604)	(.432)	(.585)	(.948)	(1.896)
09/12-21	.168	-1.067***	-.672	.334	-.552	1.849	.123
(8)	(.120)	(.260)	(.396)	(.478)	(.610)	(1.041)	(2.073)
10/12-21	-.706***	-.904**	-1.430***	-1.771***	.425	1.520	
(9)	(.098)	(.258)	(.384)	(.488)	(.610)	(1.051)	
31/12-21	.047	.385***					
(10)	(.068)	(.093)					

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The table presents the result of event date estimations for different event windows. All windows have an equal number of days before the event date and after the event date. For example column 31 include the event date, 15 days before and 15 days after in the estimation of cumulative abnormal returns. For event date (9) and (10) there is missing data for some event windows due to the data sample only consisting of data up until 31st of Dec 2021, and cumulative abnormal returns are not estimated if there is too much data missing.

Longer event windows have a higher risk of serial correlation in the estimation of the variance. However, Brown and Warner (1985) demonstrated that for models with longer event widows, corrections for autocorrelation played a minor role and that models not corrected for autocorrelation can still be well specified. Furthermore, because of the nature of the events, it is beneficial to analyse the abnormal returns over a longer event window. Due to only having available data until 31st of December 2021 the extension of event windows over 1 and 3 days will not be conducted for the last event of interest. Event date 9 has missing values for the 31-day window for the same reason.

One event date is specifically relevant to analyse with a longer event window. Event 2 was when the TEG started the consultant period of their first report. Actors interested in consulting the first draft of the Taxonomy were able to give feedback until January 2019. Therefore, even the longest event window of 31 days is appropriate. As seen in Table 3, the CAR-estimations are mostly positive for the different estimation windows for event 2. Therefore, it is possible that the ability to give feedback on the report made shareholders expect an increase in future profits or that shareholders expect a smaller reduction in future profits due to the Taxonomy. If this is true, it is possible that the estimation window of three days picks up a negative abnormal return from another confounding event. The estimated abnormal return with a1-day window the for the 7th of December 2018 is also positive.

Another noticeable change is between the two succeeding event dates. The 9th of December 2021 is only statistically significant in the 3-day event window, while the following date, event 9, reports significant results up to a 7-day event window. Furthermore, the abnormal return estimated for an event window of one day is positive for the 9th of December 2021, while the 10th of December reports a negative abnormal return. This might indicate that the negative abnormal return estimated for event 8 with a 3-day event window is biased due to event 9.

There are negative estimates for the abnormal returns of the implementation date, 18th of June 2020, across all event windows. However, the size of the CAR increases with the number of days. There are two conditions where longer event windows could be justified for the implementation day. The first is if there was information spillage prior to the date, e.g. if the market actors were notified that a statement on the regulation would be given on that specific date.

Then the effect of the TR on shareholders would already be implemented into the stock price at the time of event 6. The second justification is if reading through and adjusting the expected effect of the regulation on firms, their finances and production take more time than one day. Then the effect of the regulation could be implemented at a later date close to event 6. However, seeing that the magnitude of the abnormal returns increases substantially around 9 to 31 days, it is probable that there are confounding effects for the longer event windows. While some countries had stabilising Covid-19 cases around that time, other countries in Europe were still in the middle of a large health crisis. It is not unlikely that the negative abnormal return for longer event windows reflects announcements or developments in the pandemic during June 2020.

While giving some further insight into the reaction of shareholders for some of the event dates, the overall picture painted by extension 1 is consistent with the results from the main findings; that the majority of abnormal returns for announcement dates of the Taxonomy regulation are negative.

5.2.2 Extension 2: Accounting for Industry

Table 4: Event study estimations with portfolio aggregation and 3-day event window.

	Telecom. and Technology	Consumer Disc. and Health Care	Financials	Industrials and Basic Material	Utilities and Energy
08/03-18	.350	.275	-.189	.473	.950
(1)	(.350)	(.353)	(.350)	(.472)	(.648)
07/12-18	-2.828**	-2.605***	-2.377***	-3.378***	-1.902***
(2)	(.869)	(.453)	(.416)	(.615)	(.427)
18/06-19	.175	.852	1.078***	1.467***	.470
(3)	(.385)	(.449)	(.269)	(.258)	(.551)
18/12-19	-.198	-1.024***	-.270	-.841**	1.061*
(4)	(.510)	(.276)	(.251)	(.242)	(.465)
09/03-20	-7.397***	-7.079***	-11.302***	-8.449***	-17.008***
(5)	(.928)	(.582)	(.896)	(.933)	(2.469)
18/06-20	.086	-.697	-4.315***	-.893	-1.914**
(6)	(.613)	(.543)	(.848)	(.582)	(.603)
21/04-21	-.649	.005	-2.604***	-1.145*	-.634
(7)	(.515)	(.674)	(.604)	(.432)	(.829)
09/12-21	-1.549**	.642	-2.079***	-1.551*	-3.843**
(8)	(.498)	(.426)	(.408)	(.539)	(.990)
10/12-21	-1.410*	.604	-1.904***	-1.146*	-3.689**
(9)	(.581)	(.431)	(.407)	(.505)	(1.102)
31/12-21	.252	.420*	.521**	.463**	-.162
(10)	(.276)	(.189)	(.155)	(.157)	(.235)
N	24	58	29	48	12

Standard errors in parenthesis
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Estimation of cumulative abnormal returns accounting for industry differences. Industries are aggregated based on similarities and expected effect of the TR.

An alternative procedure to cross-sectional regressions that corrects for potential cross-sectional dependence is dividing the data into portfolios (Khotari & Warner, 2006). Furthermore, as the Taxonomy currently only covers some industries, it is interesting to conduct an analysis looking at different sector portfolios. Using an event window of three days and the five sectors described in section 4.1., the results indicate that sectors reacts differently to the regulation. The (merged) sectors used are ”Telecommunications and Technology”, ”Consumer Discretionary and Health Care”, ”Financials”, ”Industry and Basic Metal”, and ”Utilities and Energy”.

Figure 4 shows the results of the event study. Two dates report statistically significant CAR-estimations. While while taking into account the risk of over-rejection of the null hypothesis in this study, two explanations can be given for the results of the second date, the 7th of December 2018. On this day, market participants were invited to give feedback on the first report on the Taxonomy. All CAR-estimations have a negative sign, which might indicate that the market participants' first reaction to the outline of the Taxonomy was that it would reduce future market value. However, it is also possible that it is a result of confounding events, as both Yellow vest protests in France and a trade war between the US and China were ongoing around that time. Negative abnormal returns could therefore be a result of general instability and not specifically the TR. As previously stated, the large abnormal returns around the 20th of March 2020, the second day where all estimations are statistically significant estimations, are most likely due to the pandemic.

Another interesting result is that three sectors ”Financials”, ”Industrials and Basic Materials”, and ”Utilities and Energy” report the abnormal returns of the largest magnitude. These results are consistent with the sectors that are currently covered by the Taxonomy, even though one would expect larger abnormal returns from also from ”Telecommunications and Technology”. Sector-specific effects can also indicate that there is little expectation from other sectors to be included in the TR in the near future. On the other hand, some of the sectors have few data points and may not be accurate for the real sector effects. An example is the energy sector. Of the firms in this data sample, all energy firms are part of the oil and gas sector. However, one can expect renewable energy to be affected differently than the oil and gas firms.

The industry ”Financials” report overall negative abnormal returns, except for event 3 and event 10. On the official adoption date, a negative abnormal return of 4.315 percentage points is estimated. ”Utilities and Energy” is the only other sector to report a statistically significant result on the adoption date. ”Utilities and Energy” report more mixed abnormal returns than ”Financials”. For other industries, the estimation results are more mixed, both in terms of sign and significance.

The result of extensions 2 indicates that the Taxonomy is currently affecting sectors differently. Therefore, the total CAR estimated across industries might not be representative or accurate for shareholder reactions to the TR, as the estimation lack sector-specific factors.

6 Discussion

The theoretical background-section presented a number of explanations of how shareholders could react to new environmental policies. The theory on shareholder choices shows that positive reactions from shareholders to environmental action are consistent with profit maximisation. However, empirical evidence from studies on mandatory disclosure and environmental policy indicated that reactions could be negative depending on the policy design. Therefore, the expected reactions from shareholders to the Taxonomy Regulation were unclear. credibility theory was presented as a framework to analyse the efficiency of new policies. Since the Taxonomy has been both praised and criticised by economic actors and environmental activists, it is of interest to study whether shareholders view the regulation as credible, especially because the credibility can affect the regulation's efficiency. A discussion of the results of the event studies from a credibility perspective is given in this section.

6.1 Credibility of the Taxonomy Regulation

As stated in section 3, the credibility of a policy depends on its flexibility, transparency and trust, whether it accounts for distributional effects, and whether it includes multiple policy instruments. The majority of abnormal returns from the event studies were estimated to be negative and can be explained by credibility theory in one of two ways. Credibility is important for investors since it affects the risk of investment based on the commitment of legislators. Shareholders and firms may deem a policy less credible if it increases costs without appropriately compensating the firms. Furthermore, if a regulation is expected to be frequently changed or ignored by other economic actors, there is a risk of actors choosing not to follow the regulation. Therefore, as concluded by Ramiah et al. (2013) negative shareholder effects can be a result of sub-optimal policies. On the other hand, depending on the characteristics of shareholders' portfolios, negative reactions from shareholders can be a sign of the Taxonomy Regulation having credibility. Shareholders' reactions give an indication of the credibility of the regulation as the reactions reflect the expected future value of their investment. The two possible explanations for the negative abnormal return estimated are described in this section.

Before looking at the implications credibility theory give on the results of the event studies in this thesis, it is important to understand that different actors will vary in their criteria for a policy to be credible. For shareholders, firms, and governments alike, the balance between stability and flexibility of the regulation is important. The Taxonomy Regulation is an environmental regulation aimed at increasing information for financial actors. With increased information, shareholders can make more accurate decisions when investing their money in sustainable firms and portfolios. Therefore, two important factors for the credibility of the Taxonomy are that it will reduce information barriers and that its measures of sustainability are efficient and reliable. The same will be true for governments wishing to invest in or use environmental firms to minimise the environmental damage of public projects. Firms and businesses investing in making their production and products less damaging to the environment are also dependent on the TR recognising their efforts, and that other actors use the Taxonomy as a valid classification system. Therefore, the credibility of the regulation for actors valuing or investing in sustainable practices will be based on whether it will contribute positively towards a sustainable future and whether other economic actors also recognise it as an appropriate and credible regulation.

Firms that are in a position where they are not likely to be Taxonomy-aligned, like fossil fuel companies, can be assumed to base their credibility-evaluation of the policy on whether they are appropriately compensated for the potential loss of not being Taxonomy-aligned. This follows the argument of Nemet et al. (2017), that all policies with winners and losers should compensate the losers of the regulation in order to be credible. Thus, if firms react negatively to an environmental policy, it can be a sign that they do not trust the regulators to take their interests into account and therefore risking lower profits. On the other hand, if shareholders with investments in brown firms react negatively to the regulation can, it could be an indication of the TR being viewed as credible. If the TR works as it was made to, setting the expectation that green firms and green portfolios will be more profitable in the future, the securities of brown firms can be expected to have a lower future value, reflected in estimated negative abnormal returns.

Keeping this in mind, one can analyse the TR from the perspective of credibility theory. The Taxonomy regulation ticks several of the credibility-inducing concepts presented by Nemet et al. (2017). It includes a plan for revisions of the Taxonomy and its goals. An expert group that is tasked with advising the European Commission on how to improve and develop the

regulation has been permanently established. Furthermore, it is part of a larger climate strategy with multiple instruments and policy approaches. However, it can be argued that it is lacking in what Nemet et al. (2017) categorises as ”Transparency and Trust”, and ”Political Economy and Distribution”.

The TR in the event dates studied in this thesis does not require firms to verify the data disclosed. Therefore, while the regulation in principle should lead to better information between market actors, one cannot be sure if the information disclosed is truthful or accurate. Furthermore, questions regarding the influence of different market actors in the development phase of the regulation have been raised. If there is any uncertainty of who's interest was prioritised in the development of the regulation the credibility of the policy might be reduced. An example could be the interests of browns firm were prioritised over the interests of environmental NGOs, as a majority of the actors giving feedback on the first TEG report were private actors. Prioritising firm profits could reduce the credibility of the TR as an environmental policy. On the other hand, being able to provide feedback can strengthen the credibility from the perspective of firms, as they feel that their opinions were taken into account in the decision making of the policy.

The question is, then, which actor's credibility is most important for the efficiency of the policy. Given that the EU Taxonomy directly affects the cost of firms by demanding increased disclosure, it is important that firms see the value of adapting to the new set of regulations. However, the TR is a part of EU's Green Deal, and if it is believed that the interests of firms are prioritised over the interest of the sustainable future, it can affect the credibility of the EU's climate strategy. In addition, the TR is meant as a tool for shareholders wishing to invest in sustainable portfolios and firms, and if the regulation is not credible to them as an efficient tool for environmental classification, the intention of the regulation is not full-filled. Insecurity regarding who's interest was prioritised in the development of the TR can also be questioned as the policy is a result of political agreement. Even though the TEG that produced the recommendations for the regulation is independent and trustworthy, the regulation has been through a political compromise. Therefore, the optimal policy might have been set aside in order to gain a political agreement.

A second intention of the Taxonomy Regulation is that it should reduce greenwashing. The EU Commission, together with consumer authorities, examined 344 dubious claims of sustainability in more detail and found that in more than 50% of the cases, the trader did not provide easily accessible evidence to support their claim.[21] This suggest that greenwashing is present across European firms. As highlighted by Pacces (2021), the Taxonomy Regulation take on the problem of greenwashing by reducing information barriers. Firms have to increase their disclosure, and investors can with less difficulty check different firms' claims against a common classification system. Furthermore, it can be harder for firms to engage in selective disclosure or to claim a positive sustainable performance without proof. Institutional investors can actively use the Taxonomy as a measure of the sustainable performance of firms, and beneficiaries can get a better understanding of the actual "greenness" of portfolios when making investment decisions. By creating a common classification system, misinformation in the market due to mixed and sometimes unverifiable classification systems of sustainability can be reduced. Based on this, one could expect the TR to reduce greenwashing. Furthermore, if a majority of the firms in the study are brown firms, it is likely that some of them engage in greenwashing. Negative reactions from firms could then be a result of them knowing that a common classification system for green finance will make it harder for them to engage in greenwashing. Negative reactions from shareholders can then be a result of them shifting their investment from firms and portfolios they previously believed to be green but that they, due to the Taxonomy, recognised as less sustainable than claimed by firms.

However, for the TR to be effective against greenwashing, it is important that the regulation has credibility. If the Taxonomy Regulation is not perceived as trustworthy or appropriate, investors and firms can disregard it as a classification system. It will not matter if a firm is Taxonomy-aligned, if being Taxonomy-aligned is not recognised as being sustainable. From greenwashing theory, the importance of being able to monitor and punish firms engaging in greenwashing is important for the policy to be an efficient tool against greenwashing. The Taxonomy Regulation does not, per now, indicate any direct verification requirement of the disclosed information. [22] Neither does it state any specific punishment, as it is up to each Member State to enforce the regulation through their national courts.

[21] Source: https://ec.europa.eu/commission/presscorner/detail/en/ip_21_269

[22] A proposal for the Corporate Sustainability Reporting Directive (CSRD) on sustainability reporting was adopted by the EU Commission in 2021. This Directive requires the audit (assurance) of reported information, which possibly will affect the assurance practice and requirements for the TR.

Since the Taxonomy's goals, from a shareholder perspective, is to make it easier to invest in sustainable firms and portfolios and reduce greenwashing, credibility problems counteract the whole purpose of the regulation. However, credibility or lack there off is not the only possible explanation for the negative abnormal returns. As Bénabou and Tirole (2010) explained, CSR initiatives that lead to long-term benefits can be undervalued due to short-horizon profit maximising. Therefore, the negative reactions to the regulation may be due to an under-evaluation of the benefits of the regulation in the long term. Since the TR does not directly lead to any benefits to firms and shareholders that do not valye CSR over profits, the short term effect of reduced profits due to increased disclosure and correction of greenwashing may dominate the causes for behavioural changes in shareholders. However, when the policy has been around for a longer time, future studies could analyse whether there are any long term positive effects of the regulation for both brown and green firms. These positive effects include more investments, as there is a trend of increased importance of CSR in investment decisions of shareholders, and being eligible for specific government subsidies or being prioritised in government tenders.

The short-term bias can also be a result of a lack of appropriate compensation for brown firms, which is a credibility-inducing factor. However, rather than indicating that the TR is not a credible environmental policy, it could be explained as brown firms not believing that they will be compensated for not being sustainable. This can be a credibility problem for firms in sectors that cannot, by nature, be sustainable and may indicate a lack of appropriate evaluation of the future of non-sustainable economic activity, like oil and gas.

The analyses in this article do not include measures of environmental practices or emissions in order to conclude on which of the above reasonings are true for the Taxonomy. However, extension 2 can lead to some implications on whether it is more likely that the regulation is perceived as credible or not. The most polluting industries are energy, transportation, agriculture, fashion and food retail.[23] Clothing retailers and food retailers are included in the combined industry "Consumer Discretionary and Health-care", while industrial transportation and different materials are found in "Industrials and Basic Material". As previously mentioned, oil, gas and coal firms are included in "Utilities and Energy". Table 4 shows that the abnormal returns of the largest magnitude are found in "Financials" and "Utilities and Energy". The latter could be

[23]Source: https://ecojungle.net/post/the-most-polluting-industries-in-2021/

an indication of the TR being credible and that shareholders expect securities from brown firms to have reduced value following the regulation. Negative, relatively large abnormal returns can also be found for ”Industrials and Basic Material”. Since there is empirical evidence that ESG funds so not perform better than non-ESG funds in sustainability, as presented by Pacces (2021), the reaction estimated from the financial sector can be a sign that the TR is perceived as credible. If the TR leads to ESG/green funds being recognised as less sustainable than they claim, this can reduce the future value of the portfolio as shareholders shifts investments to Taxonomy-aligned portfolios.

Smaller abnormal returns are reported from ”Consumer Discretionary and Health Care”, and can be due to a number of reasons. The pollution connected to the fashion industry is often tied to the production of fabric and clothing in third-world countries. These effects are not necessarily included in European clothing shops' environmental measures, and the firms included in the sample of this thesis may not represent the negative environmental effect of the fashion industry accurately. Therefore, shareholders in this industry grouping may not react as they do to other brown firms, like oil, gas and coal firms. Even though the industry clusterings made in this thesis make the argument less precise, especially since there is no measure of environmental performance in the data sample and the sectors are divided into large industry clusters, the above-mentioned factors could be an indication of the Taxonomy being perceived as a credible classification system.

In summary, the negative reactions of shareholders to the Taxonomy Regulation can be explained through either credibility theory or short-term bias. However, it is not decisive evidence of whether the reaction is due to shareholders viewing the regulation as credible. To analyse whether the results are due to a short-time bias would be difficult to measure. The evidence from the event study conducted in this thesis gives a weak indication of the TR being perceived as credible. However, as explained in the next section, the data sample used in the event study lacks information to be able to conclude with certainty that the regulation is credible.

6.2 Limitations to the Model

While the insights from this study have given some interesting implications on the credibility of the EU Taxonomy, a couple of limitations are important to reflect upon. This serves as a suggestion to future studies on the topic as well.

First, the analysis does not consider the sustainable performance of the firms at the time of implementation. It is probable that some firms will benefit from the Taxonomy more than others. Firms with better environmental performance would react positively to the implementation of this regulation, while firms with a lower environmental performance are expected to get reduced future value compared to a situation without the TR. Therefore, if shareholders with investments in firms with good environmental performance reacted negatively to the Taxonomy, it would be a stronger implication of credibility problems than a negative reaction from shareholders with investments in firms with lower environmental performance. On the other hand, as previously highlighted, the current methodologies to estimate environmental performance differ across firms and sectors. Therefore, it can be harder to find an appropriate proxy to analyse the effect of environmental performance on the shareholder reactions to the TR. An alternative method could be to use sector-specific averages to determine if the level of sustainability affect how shareholders react to the Taxonomy.

As seen in extension 2, accounting for different sectors imply that some sectors react stronger than others to Taxonomy event dates. Therefore, an additional extension to the analysis should be to look at the effects of a more specific sector classification in addition to accounting for environmental performance. Alternative sector classifications are especially important for data samples where both renewable energy and oil-, gas- and coal firms are included, which is not the case in this thesis. This is because one would expect renewable firms to benefit from environmental policies. To use more specific sector classifications would make it clearer if the negative reaction from shareholders come from them deeming the TR a credible environmental policy, which would be the case if the studied sample has a majority of brown firms, or if it is a result of a credibility problem of the policy.

Second, including information on different types of shareholders for each firm or sector would be an interesting addition to the analysis. Firms with a majority of shares held by sustainable investment funds is expected to react differently than a firm with mostly profit maximising institutional investors or retail investors. In addition, including information the types of investors could build upon the study of Pacces (2021) on how institutional investors can affect firms. In the future, when more data is available, one could use the share of different categories of shareholders to analyse whether some shareholder profiles lead to a faster adaption to Taxonomy-alignment.

Furthermore, this thesis has only studied the implication of shareholder reactions on the credibility of the regulation up until the end of 2021. However, analysing the shareholder effects of further announcements on the decision of including nuclear enegy and gas would be interesting. As previously stated, much of the critique on the inclusion of gas and nuclear comes from governments and environmental activists. These are not necessarily the same actors sitting with large shares in companies affected by the TR. Therefore, it could be interesting to analyse if the market shares the dissatisfaction of activists. For example, some shareholders could react positively to the news on nuclear and gas because it would reduce the potential loss of having invested in brown firms.

7 Conclusion

This thesis aimed to analyse the effect of the EU's first classification system of sustainable economic activity on shareholder behaviour. The regulation is young, and therefore the available data is limited. However, enough data has been available to analyse the initial reactions to the TR. While the regulation is complex, and not something the general public fully understands, the regulation has been publicly criticised by governments and environmental activists.

My question was initially whether this criticism is reflected in shareholders' behaviour. Therefore, I wished to study shareholders' reactions to the Taxonomy and what implications their reactions would have on the Taxonomy's goals. By using event study methodology on a set of Taxonomy-related announcements, a majority of the estimation results indicate that shareholders expect the Taxonomy to reduce the future value of their investment compared to a situation without the TR. This result could be due to shareholders not evaluating the regulation as credible, for example that they expect that the TR will not be acknowledged as an appropriate sustainability measure, and, as a result, only increase costs due to disclosure demands, without giving the benefits of being recognised as a sustainable firm. However, negative abnormal returns can be also be an implication of shareholders viewing the Taxonomy as an efficient regulation, and therefore the market value of brown firms would fall as shareholders redistribute their investment towards Taxonomy-aligned firms. This latter effect would also be present if the TR exposed greenwashing firms, causing shareholders that value sustainability to reduce their investment in firms exposed for greenwashing. In both cases, investing in sustainable firms is expected to lead to higher profits for investors as a result of the Taxonomy.

I conclude that the empirical evidence from the event studies produces weak support for the TR being viewed as credible and that the Taxonomy can be an effective regulation to improve environmental information and combat greenwashing. However, further studies including the environmental performance of firms prior to the implementation of the Taxonomy are needed to gain better insight into the efficiency and credibility of the regulation.

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Appendix

A.1. Description of Event Dates

Number	Date	Description
1	8th of March 2018	First mention of a Taxonomy for green finance as a part of the EU's climate strategy
Dropped	24th of March 2018	The EU's action plans to meet the goal of the Paris agreement is introduced, including the TR.
2	7th of Dec 2018	Invitation for market participants and governments to give feedback to the first report published by the TEG on the Taxonomy
3	18th of June 2019	First publication from TEG on the Taxonomy, still awaiting agreement by co-legislators. Includes the preliminary recommendations the Taxonomy Regulation.
4	18th of Dec 2019	Political agreement between the European Parliament and the Council on the Taxonomy Regulation.
5	9th of March 2020	TEG published its final report, including technical screening criteria on the first two objectives.
6	18th of June 2020	The Taxonomy Regulation was officially adopted by the European Parliament
7	21st of April 2021	The College of Commissioners politically agreed on the first set of technical criteria to define which activities contribute substantially to climate change adaption and climate change mitigation.
8	09th of Dec 2021	A first delegated act on sustainable activities for climate change adaptation and mitigation objectives was published in the Official Journal.
9	10th of Dec 2021	A Delegated Act supplementing Article 8 of the Taxonomy Regulation was published in the Official Journal. It specifies the content, methodology and presentation of information to be disclosed by financial and non-financial undertakings concerning the proportion of environmentally sustainable economic activities.
10	31st of Dec 2021	Consultation on the development of a Taxonomy Complementary Delegated Act covering gas and nuclear activities began.

A.2. Figures of Cumulative Abnormal Returns

Below are figures for all event dates equal to the figure for event date 6 (Figure 4) presented in the chapter 5. The figures consist of the estimated cumulative abnormal return for an event window of three days for all individual firms. The total CAR estimated is represented by the red horizontal line.

Figure 5: Firm specific cumulative abnormal return including the total CAR for Event Date 1

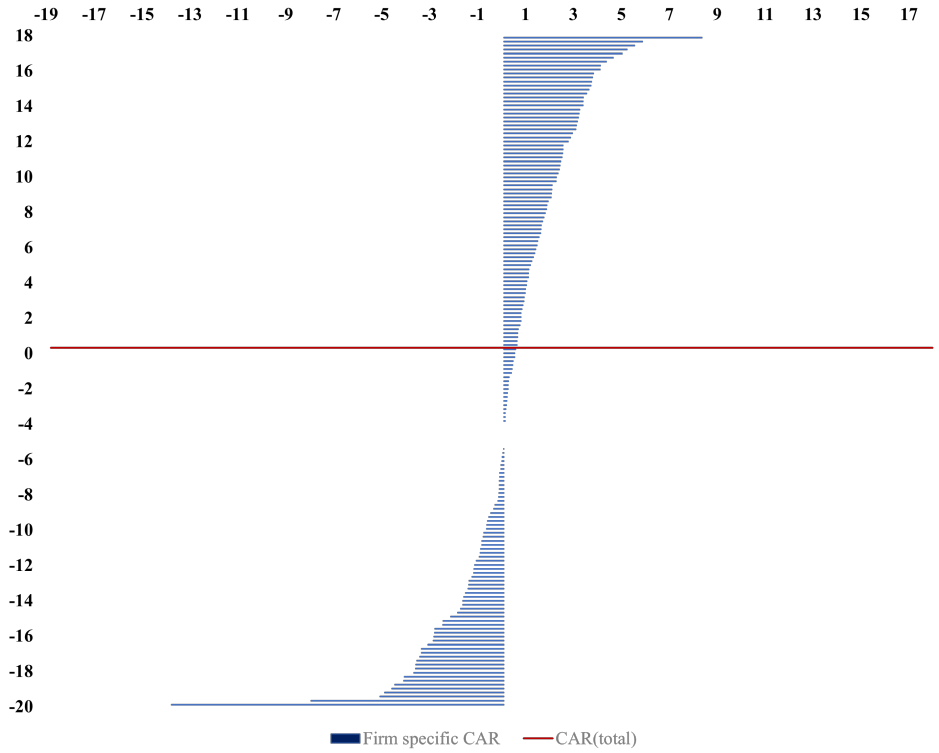


Figure 6: Firm specific cumulative abnormal return including the total CAR for Event Date 2

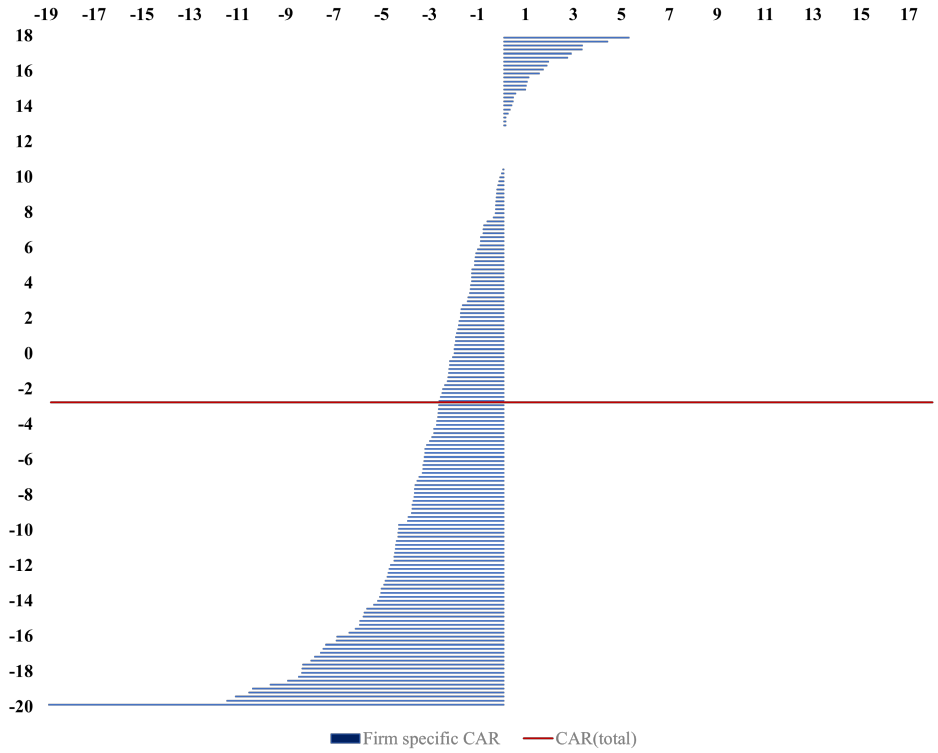


Figure 7: Firm specific cumulative abnormal return including the total CAR for Event Date 3

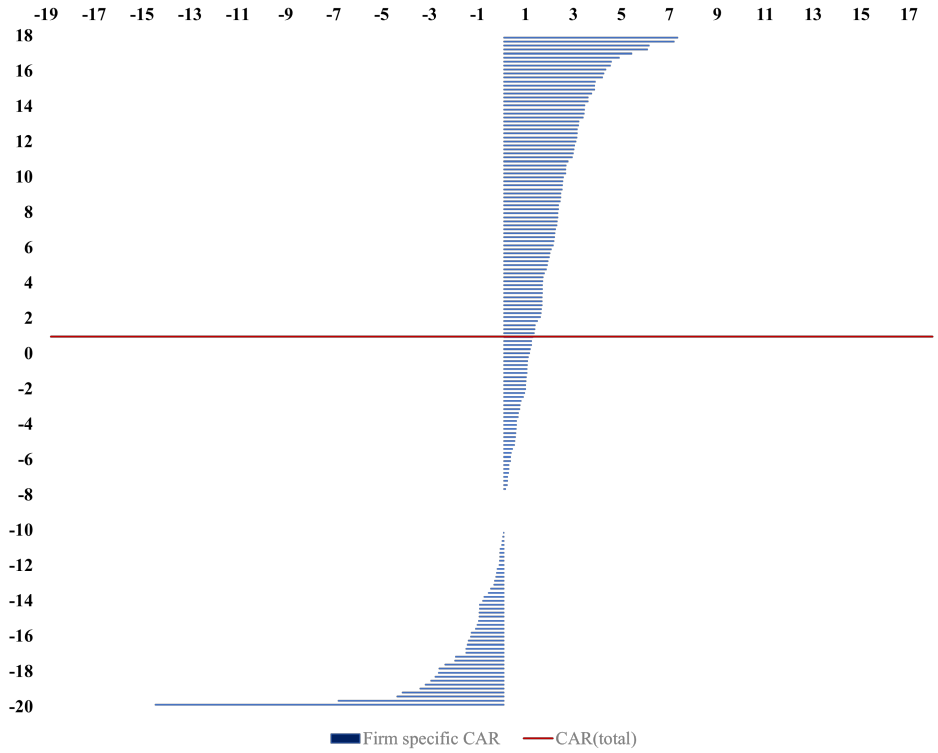


Figure 8: Firm specific cumulative abnormal return including the total CAR for Event Date 4

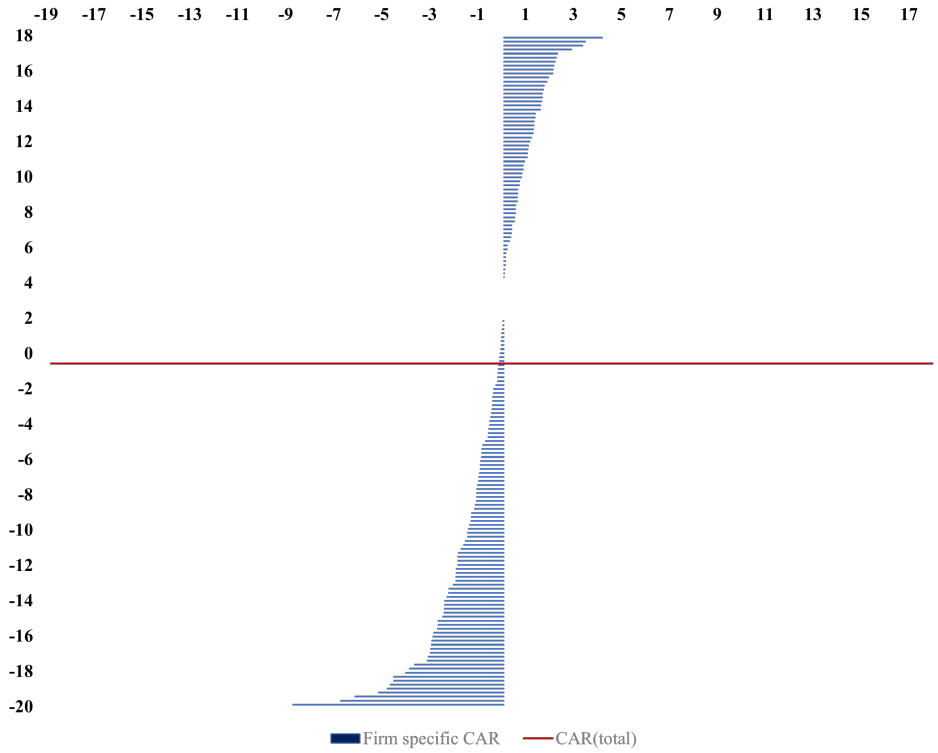


Figure 9: Firm specific cumulative abnormal return including the total CAR for Event Date 5

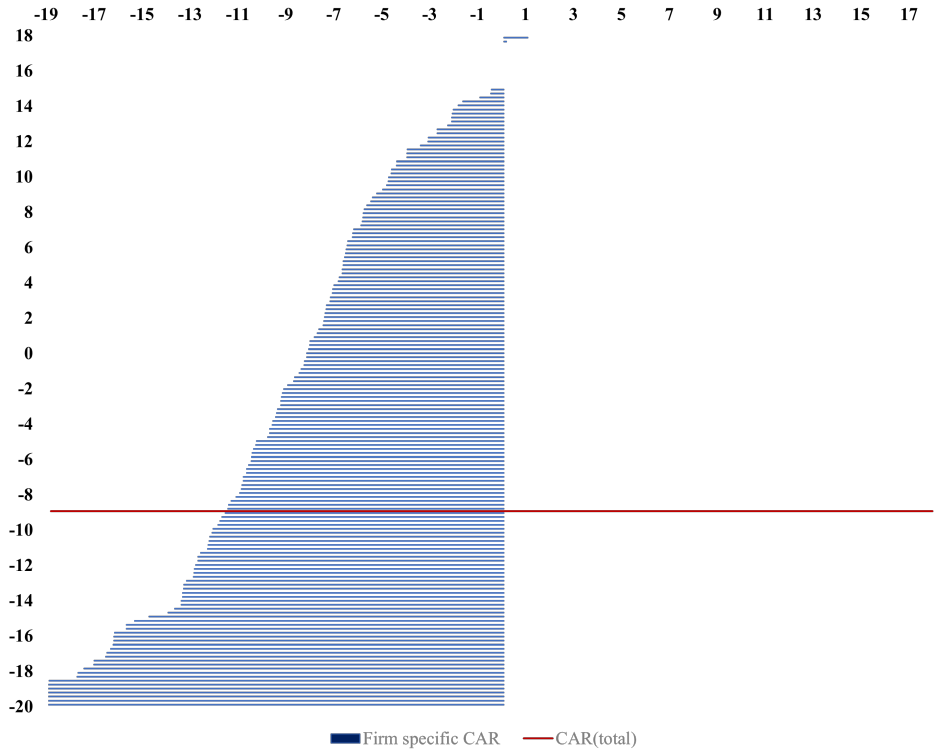


Figure 10: Firm specific cumulative abnormal return including the total CAR for Event Date 7

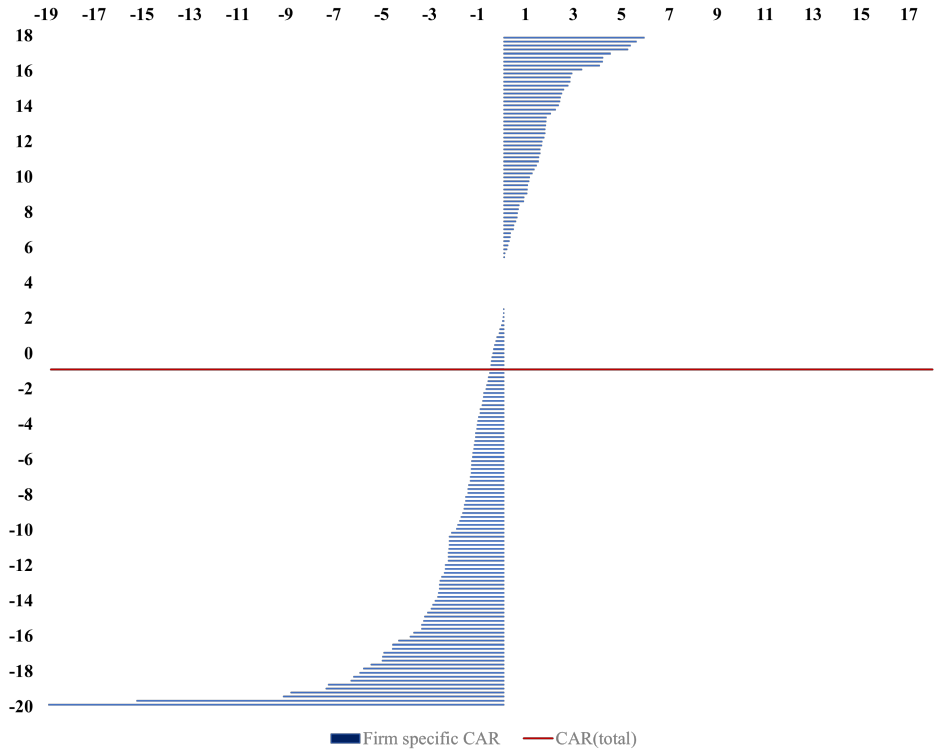


Figure 11: Firm specific cumulative abnormal return including the total CAR for Event Date 8

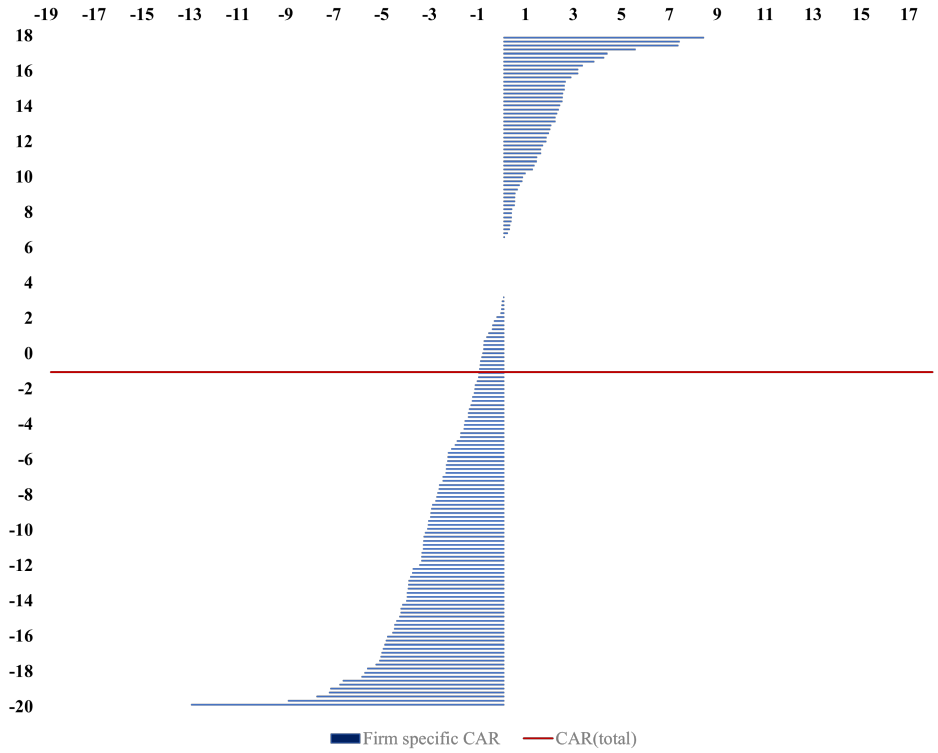


Figure 12: Firm specific cumulative abnormal return including the total CAR for Event Date 9

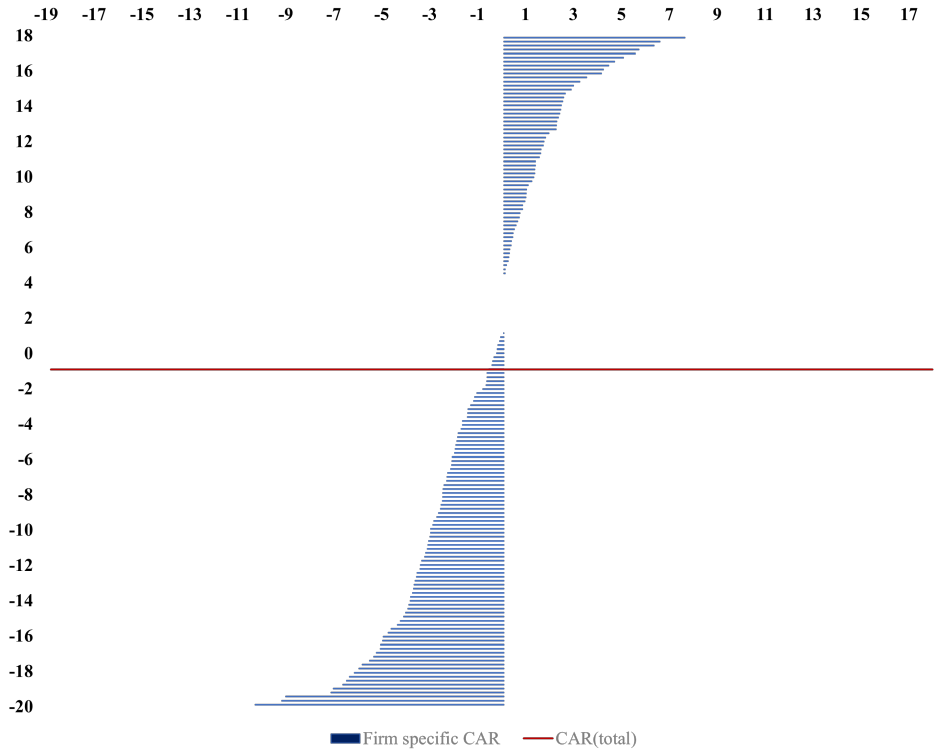
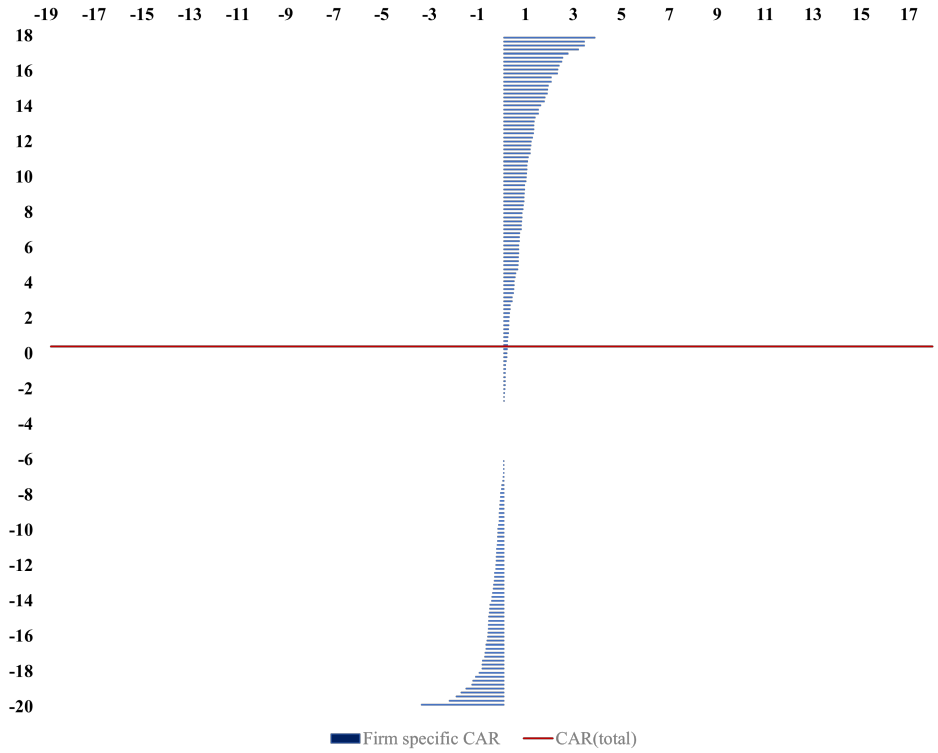
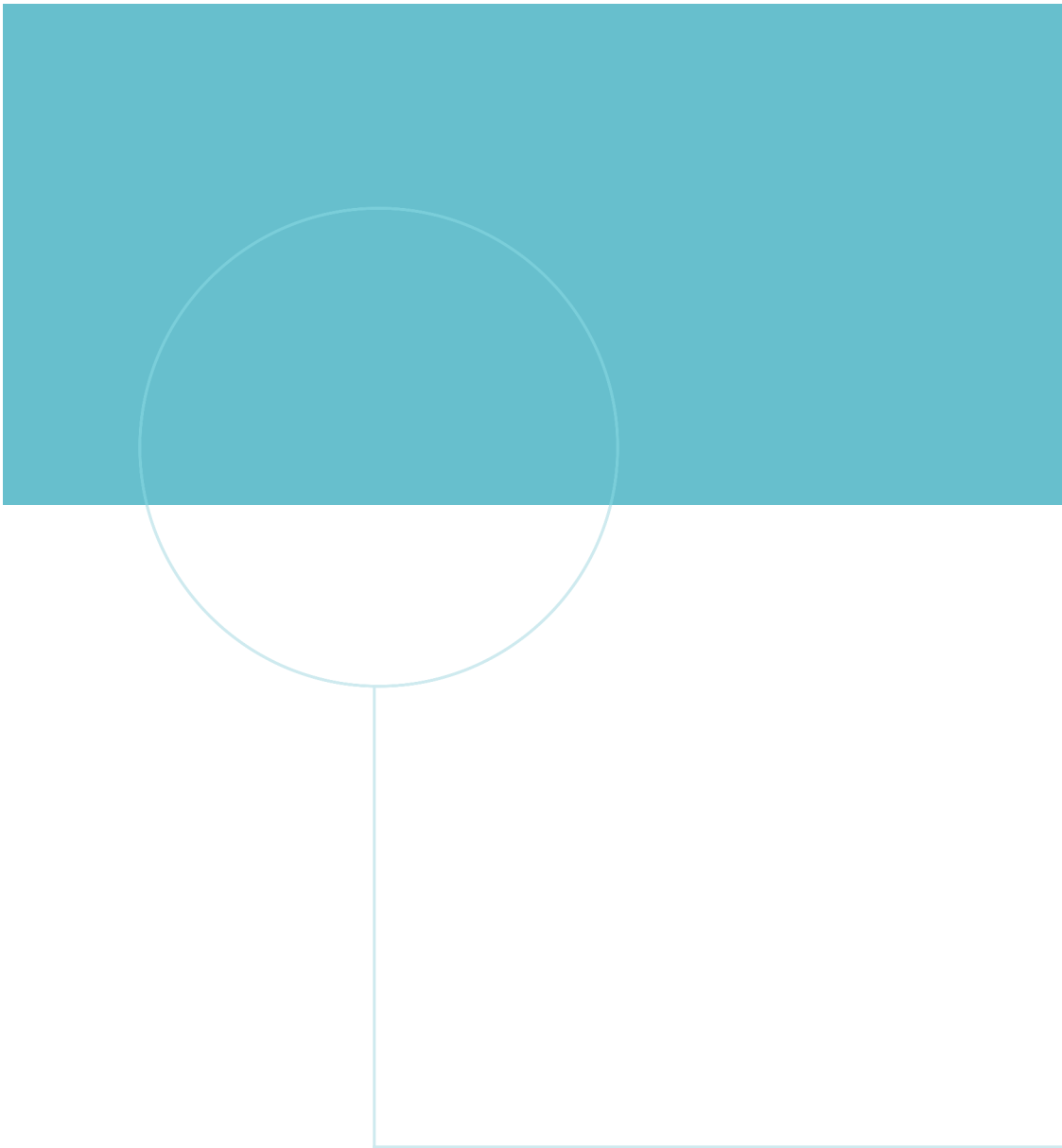


Figure 13: Firm specific cumulative abnormal return including the total CAR for Event Date 10





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