Green Funds and Environmental Disclosure Quality

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Abstract

I study the association between the selection of a company by a green fund and its environmental disclosure quality. Based on fund holding and environmental disclosure data of companies in the EU between 2017 and 2021 I conduct a descriptive as well as an empirical analysis. I investigate whether the environmental disclosure quality is associated with the selection by a green fund. Literature examines green funds and environmental disclosure quality separately, but the theories discussed allow for the expectation that the green fund selection and the environmental disclosure quality of companies are positively associated. I find that (i) the environmental disclosure quality of green fund investees is higher than of companies which are not selected, and (ii) the environmental disclosure quality increases further after the selection by a green fund, (iii) but this increase does not seem to be due to the selection itself but a trend of increasing environmental disclosure quality. (iv) The results suggest that green funds which rely on environmental disclosures in their selection process tend to select companies with higher environmental disclosure quality than those selected by green funds which use additional data sources besides the disclosures in their selection processes.

Keywords: Environmental disclosures; Green funds; Disclosure quality; Sustainable finance; Fund selection processes.

1. Introduction

The financial sector plays a vital role in the economic transition towards sustainability and climate neutrality (Maltais & Nykvist, 2020, 3). The European Union (EU) set out a 2030 EU Climate Target Plan that encompasses the reduction of greenhouse gas emissions to limit the consequences of climate change. The long-term goal of the EU is to reach climate neutrality by 2050 whilst growing the economy (European Commission, 2020). To reach set goals it is essential that the EU directs investments towards sustainable projects and activities. Green funds, which are mutual funds that promote environmentally conscious policies and business practices, are one instrument to direct capital towards more environmentally conscious investments (European Parliament, 2020). As of December 2020, there were more than 400 green funds who manage about 177 billion USD worldwide. In that year the global assets in green funds almost tripled. Europe is the largest market for green funds and comprises more than three fourths of the global assets in green funds (Morningstar, 2022a). If this amount of capital is directed into investments which support the transition towards sustainability and climate neutrality, they can have an

immensely positive impact on reaching the EU climate targets. Especially private investors can provide large amounts of capital and can therefore support this development. That this has been recognized by the EU is mirrored in the recent implementation of mandatory education of private investors regarding sustainability in investing by investment advisors as part of the MiFID II as of 2nd of August 2022 (ESMA, 2022).

Green funds promote that they select their investments based on the environmental performance of the investment. Companies publish information on their environmental performance in corporate environmental or sustainability reports. The environmental disclosure quality is driven by the environmental performance of a company and green funds select their investment based on the environmental performance. Despite this relationship, green funds and environmental disclosure quality are usually investigated separately from each other (Lagasio & Cucari, 2019, 708). I reinforce the idea that environmental disclosures are an important instrument for fund providers to assess the business practices of companies with regard to environmental performance (Lagasio & Cucari, 2019, 701) as the environmental disclo-

sure quality is driven by the environmental performance of a company (Gangi, D'Angelo, et al., 2016). Based on this idea I investigate the following research question. I study whether environmental disclosure quality is associated with the selection by a green funds. I assess whether companies that are selected by a green fund have a higher environmental disclosure quality when compared to those companies which are not selected.

By analysing green funds and environmental disclosure quality in the same context I aim to provide new insights into how the two subjects are interlinked. I aim to improve the understanding of the selection processes of green funds and the role of environmental disclosures in these selection processes. Overall, I expect to find that the selection by a green fund is positively associated with the environmental disclosure quality of companies, and I expect the environmental disclosure quality to further increase after a company was selected by a green fund.

For my analysis, I focus on green funds and companies within the EU as this allows for the assumption of similar legal and regulatory frameworks. To answer the outlined research question, I initially discuss the relevant terminology and legal requirements for green funds and environmental disclosure quality. Subsequently, I give an overview of prior literature on green funds as well as environmental disclosure quality and illustrate, how my research can contribute to the literature. Based on the terminology and theory I then discuss the methodology of my analysis and how I aim to investigate the potential association between green funds and environmental disclosure quality. My analysis consists of a descriptive analysis of the selection processes of green funds and an empirical analysis of the association between green funds and environmental disclosure quality. With this I aim to understand how the fund selection process and the environmental disclosure quality of firms are interlinked. After this I present my analysis and discuss my results. Based on the results I conclude by answering my research question.

2. Institutional Background

In 2020 the EU implemented a sustainable finance strategy to support the financing of the transition to a sustainable economy. This is accompanied by the implementation of the EU taxonomy, a classification system which establishes definitions for environmentally sustainable activities to, amongst other things, create more transparency for investors regarding sustainability. The framework influences both, the understanding of green funds as well as environmental disclosures in the EU as it is accompanied by the implementation of two regulations. These are the Non-Financial Reporting Directive (NFRD) which requires large companies to disclose their environmental information, and the sustainable finance disclosure regulation (SFDR) which requires investment companies to disclose how their products comply with the goals of the EU taxonomy (European Parliament, 2020).

For my analysis of the association between the selection for a green fund and the environmental disclosure quality

of firms it is vital to understand how the terms green fund as well as environmental disclosure quality are defined and how they are legally regulated. In the following I therefore discuss the terminology and provide a definition for the terms which I use throughout my further analysis. Additionally, I provide insights into the current legal and regulatory requirements within the EU.

2.1. Green Funds

Green funds are mutual funds that select their investments based on environmentally conscious business practices. Green funds gained attention in the past years due to surging interests in climate change and other environmental issues (Ibikunle & Steffen, 2017, 338). There is an absence of common standards and metrics for measuring what 'green' in this context stands for and the processes based on which they select their investments differ. In general, green funds can be justified within different investment approaches (Kaufer & Steponaitis, 2021, 65). I discuss four common investment approaches for green funds in the following.

The first investment approach is SRI, which stands for socially responsible investing (Kaufer & Steponaitis, 2021, 65). The founding idea of SRI was a fight for human dignity and universal economic justice (Kaufer & Steponaitis, 2021, 78). Green funds can be defined within the SRI approach as, according to Ito, Managi, and Matsuda (2013), SRI encompasses investment vehicles which demonstrate awareness regarding social, environmental, and ethical issues. Green funds therefore focus on the environmental aspect of SRI. Alternatively green funds can be described as an investment vehicle following the ESG principles (Kaufer & Steponaitis, 2021, 78). ESG stands for environmental, social, and governance. The initial idea of ESG is attributed to the former United Nations (UN) Secretary General Kofi Annan. He urged businesses to commit to sustainable business practices (Foster, 2021, 3). Green funds can therefore also be described as mutual funds with a focus on the environmental aspect of the ESG principles. The third investment approach which justifies green funds is that of the triple bottom line. The approach comprises that business should commit to social and environmental performance in addition to their financial performance and not solely focus on profit. The concept can be broken down into three pillars, being people, planet, and profit (Elkington, 1998, 22).Within this concept green funds can be described as investment vehicles with a focus on the planet-pillar of the approach. Lastly, green funds can be seen as an investment vehicle following the impact investing approach (Kaufer & Steponaitis, 2021, 78). This strategy seeks financial returns whilst creating a positive environmental or social impact (Clarkin & L. Cangioni, 2016, 137-138). Within this, green funds can be described as mutual funds with a focus on a positive environmental impact.

The terms SRI, ESG, triple bottom line, and impact investing are often used interchangeably but they have different origins and practices (see Table 1). SRI involves the selection of investments based on sustainability criteria. ESG considers

the environmental, social, and governance aspects alongside traditional financial measures. The triple bottom line formulates the three pillars, people, planet, and profit as minimum requirements. Impact investing aims to help businesses to achieve a positive impact. A shortcoming of all approaches is the lack of consistent terminology as well as uniform measurement standards (Kaufer & Steponaitis, 2021, 77). Whilst green funds can be justified in all of these different investment approaches, I conclude that green funds can be defined as mutual funds that select their investments based on the environmental performance of a firm alongside traditional financial or performance indicators.

As illustrated above, green funds follow different investment approaches. Therefore, it is plausible that green funds are dissimilar in their characteristics. Inderst, Kaminker, and Stewart (2014) illustrate that the funds differ regarding their dimensions (number of stocks, average size, liquidity, or sector breakdowns) and their selection criteria. Green funds can have a sectoral or thematic focus (e.g., alternative energy, clean technology, or carbon emissions) or can also not focus on specific aspects of green investment. With this understanding of green funds in mind, I describe the legal requirements for green funds in the EU in the following.

2.1.1. Legal Requirements for Green Funds in the EU

The EU states that to reach the climate targets for 2030 and to direct investments towards sustainable projects and activities such as green funds, a clear definition of what can be called green or sustainable is needed. Therefore, the EU started to implement the EU taxonomy in 2020 (European Parliament, 2020). This taxonomy implements requirements for sustainable finance and therefore also green funds as well as further legal requirements which can be guidelines to understand what can be classified as 'green'. Therefore, I discuss the regulations which are part of the taxonomy and relevant for green funds in the following.

In 2019 the European Parliament passed the Sustainable Finance Disclosures Regulation (SFDR). Since March 2021 the providers of financial products have to comply with this regulation which comprises technical standards to be used by financial market participants when disclosing sustainability related information (European Parliament, 2019). Investment products according to the definition in Article 2 of the SFDR encompass investment funds. Therefore, the requirements apply to providers of investment funds and are relevant for green funds. Articles 6, 8 and 9 of the SFDR classify financial products into three different investment strategies (see Table 2). Article 6 of the SFDR covers products that do not integrate any sustainability criteria. They are allowed to be sold in the EU but are clearly labeled as non-sustainable. Green funds therefore do not fall under the regulations of that article. Articles 8 and 9 cover products which promote environmental or sustainable investments (European Parliament, 2019).

Article 8 of the SFDR comprises funds that promote environmental and social characteristics. Products that are labeled as compliant with Article 8 promote financial products which are selected based on environmental or social criteria, or a combination of both and additionally have to ensure that their investments follow good governance practices (European Parliament, 2019).

Article 9 comprises investment funds that include products that target specific sustainable investments and applies when a product has a sustainability target as its objective. Examples of such objectives are products that target green investments, the reduction of carbon emissions or the achievement of the climate goals of the Paris Agreement. Furthermore, Article 9-funds have to incorporate criteria of good governance in their investment strategy (European Parliament, 2019).

Products that want to comply with either Article 8 or 9 are also required to assess the fund portfolio against the principle of "do no significant harm" by considering the principal adverse sustainability impact indicators (PASIs). The fund providers have to ensure that the products, their fund invests in, do not cause negative impacts on for example the environment or human rights. How the PASIs are assessed, is up to the fund providers. The fund providers have to incorporate considerations regarding minimum social safeguards of their investments which are specified in the EU taxonomy (European Parliament, 2019, 2020).

If a fund is labeled as a product complying with Article 8 or 9, the fund providers have to disclose information regarding how the financial products included in the fund comply with the legal requirements. As of now there are no detailed specifications regarding the disclosure format. In general, the funds have to provide information on how they meet the characteristics required by the SFDR and additionally, if they measure their targets by comparison to an index, information on how that index is compliant with the characteristics. The SFDR does comprise reporting templates for the disclosures regarding compliance with Articles 8 and 9, the mandatory use of these templates however will start to apply on the 1st of January 2023 with disclosure regarding PASIs at entity level being further delayed until 30th of June 2023 (European Parliament, 2019). Based on the legal requirements I summarise that green funds in the EU are investment funds which comply with either Article 8 or 9 of the SFDR and moreover set their focus on environmental criteria in the selection of their investments.

Despite the SFDR together with the EU taxonomy providing some guidelines, the regulations do not yet provide a uniform definition on what is classed as an environmental or sustainable target. The regulations are leaving room for interpretation on which targets can be interpreted as green or sustainable and how these objectives need to be measured and benchmarked. Therefore, the asset allocation strategies and selection processes of these funds differ. In the following I illustrate the different investment approaches and selection processes of green funds.

2.1.2. Selection Approaches of Green Funds

In their selection processes funds use different metrics to assess environmental performance. Some providers select

Table 1: Investment Approaches for Green Funds

Source: Derived from Kaufer & Steponaitis, 2021, 65-78. Notes: This table provides an overview regarding the different investment concepts and approaches within which the concept of green funds can be justified.

Investment Concept	Key Ideas and Practices
SRI	Connect investments to socially responsible values and positive change of corporate practices.
ESG	Membership group with public commitment to sustainable business practices.
Triple Bottom Line	Reporting practices to create transparency for the social and environmental impact of companies.
Impact Investing	Align investment opportunities with impact objectives for a positive social change.

Table 2: Overview of SFDR Articles for Funds

Source: Derived from SFDR Articles 6, 8 and 9.
Notes: This table provides an overview regarding the level of integration of green objectives required by the SFDR for investment funds. The articles are sorted from lowest to highest level of green integration. Additionally, I show the names of the classes as which the fund are described according to the SFDR.

Article	Requirements	Class
6	None. Includes all managed funds.	None
8	Promotion of environmental or social characteristics.	Light Green
9	Sustainable investment objective.	Dark Green

investments based on qualitative metrics such as the operation in a green sector (e.g., sustainable energy), others use quantitative measures and invest in the firms with for example the largest contribution to reducing emissions within one industry. Consequently, it is not surprising, that the actual funds are very different in their characteristics (Inderst et al., 2014, 26-28). Whilst some funds implement an environmental research team tasked with the identification of firms that match the environmental criteria, others only focus on the exclusion of firms that fulfil negative criteria (Stuart & Bioy, 2021, 4). In general, firms that are selected for a green fund are required to fulfil both, financial and environmental criteria. This aligns with the ideas of the investment approaches which I present before in Table 1.

Overall, five main categories of green fund strategies can be identified (see Table 3). These are low carbon, climate conscious, climate solutions, clean energy/tech, and green bond (Stuart & Bioy, 2021, 4). Low carbon funds invest in firms whose carbon intensity or carbon footprint is lower when compared to a benchmark index. Climate conscious funds select firms that consider the challenges of climate change in their business strategy and therefore, either align with a transition towards a low-carbon economy or provide carbon solutions. Climate solution funds focus on firms whose products provide solutions for the challenges of climate change. Clean energy/tech funds invest mostly in green energy solutions such as renewable energies or smart power management technologies (Stuart & Bioy, 2021, 4-5). Green bond funds invest in debt instruments with positive environmental and or climate benefits.

In difference to the other four fund categories outlined before, the International Capital Market Association (ICMA) provides detailed requirements for eligible projects for green

bonds which are called the green bond principles (GBP). Large fund providers are voluntarily members of this association and therefore required to apply the green bond principles (ICMA, 2021). The other green funds categories do not have voluntary or legal restrictions.

Despite the different fund categories in which green funds can roughly be classified, there are no uniform definitions of green funds. The main criteria for a green fund are that it selects investments that support the transition into sustainable and climate-neutral economy and support firms or projects with positive environmental or climate benefits.

2.2. Environmental Disclosures

The environmental performance of a company becomes more and more important for stakeholders and shareholders. In 2020 a 77 % majority of publicly listed companies in Europe has adopted sustainability reporting (KPMG, 2022, 10). Similar to the term green funds, the term environmental disclosures does not have a standard and uniform definition. Environmental disclosures can be explained as a sub-group of disclosures within different normative frameworks (Hahn & Kühnen, 2013, 7). On the one hand, environmental disclosures can be described as a part of sustainability disclosures. Sustainability disclosures contain three dimensions, economic, environmental, and social disclosures (Lozano & Huisingh, 2011, 103). On the other hand, environmental disclosures can be understood as a part of corporate social responsibility (CSR) reporting. CSR is defined as the responsibility of an organization for the impact of its decisions on society and the environment (European Commission, 2011).

Following these definitions, environmental disclosures should comprise information on the company's impact on the environment. This means that the environmental disclosures

Table 3: Categories of Green Funds

Source: Derived from Stuart & Bioy, 2021, 4-5 and ICMA, 2021.
Notes: This table provides an overview regarding the main categories of green funds.

Category	Investment Concept
Low Carbon	Firms with reduced carbon intensity/footprint relative to benchmark index.
Climate Conscious	Firms that consider climate change in their business concept or provide carbon solutions.
Climate Solutions	Firms that provide climate change solutions.
Clean Energy/Tech	Firms that contribute to the energy transition.
Green Bonds	Debt instruments that finance green projects.

can comprise information on for example carbon emissions, carbon footprint, waste production, or the energy and water consumption (Braam, de Weerd, Hauck, & Huijbregts, 2016, 724). The level and nature of the environmental information disclosed by the firms varies (Hahn & Kühnen, 2013, 6). To understand what environmental disclosures need to comprise and how environmental disclosures should be organized, I describe the legal requirements for environmental disclosures in the EU in the following section.

2.2.1. Legal Requirements for Environmental Disclosures in the EU

In the last years there was a steep increase in companies publishing environmental disclosures in the EU. The EU undertook several steps to standardize the requirements for sustainability reporting of which environmental disclosures are a part. In 2014 the EU published the Non-Financial Reporting Directive (NFRD) which, in short, requires all publicly listed companies and financial institutions with more than 500 employees to report non-financial information. The NFRD was implemented in national law by the EU member states between 2015 and 2018. The NFRD requires these companies to publish information on environmental and social matters as well as treatment of employees, respect for human rights, anti-corruption, bribery, and the diversity of company boards. Additionally, the companies are required to publish information on the due diligence processes within the corporation. With regards to environmental disclosures the NFRD requires information on the current and foreseeable impacts of the business on the environment, health and safety, the use of energy, greenhouse gas emissions, use of water and air pollution. This is only enforced so far, that statutory auditors are required to assure that the non-financial information has been provided. Member states are allowed to require an independent assurance of the information via their national law (European Parliament, 2014). In 2017 the European Commission published additional guidelines to support companies in the disclosure of environmental and social information, followed by a guideline regarding the reporting of climate-related information, but the application of these guidelines is not mandatory (European Commission, 2019). The NFRD itself does not provide a system of reporting standards and the implementation into national law by the EU member states varies (European Commission, 2017, 2019).

While the current legal requirements in the EU aim to increase the relevance, consistency and comparability of information disclosed and provide orientation, they do not yet provide a system of detailed standards for the disclosure of sustainability information, which would be an important step towards more comparability of sustainability disclosures in the EU (EFRAG, 2022). The EU realized the need for a further standardization of environmental and sustainability disclosures. Other regulatory initiatives are currently under development. One is for example the proposal for a Corporate Sustainability Reporting Directive (CSRD), which would amend existing reporting requirements of the NFRD and aims for an adoption of EU sustainability reporting standards which are already being developed by the European Financial Reporting Advisory Group (EFRAG) (European Parliament, 2021). Additionally, an EU-wide system for the classification of sustainable activities was published in 2020 as part of the EU taxonomy and is being implemented in several steps (European Parliament, 2020). Whilst these planned regulations are not yet implemented or only partly implemented, they already increased the momentum for sustainability-related reporting in the EU (KPMG, 2022, 12).

2.2.2. Requirements for Disclosure Quality

The current legal requirements do provide general statements regarding what environmental disclosures should contain but they do not provide information regarding the level of detail of disclsoures and which quality criteria the environmental disclosures need to fulfil. Besides the legal requirements which were outlined before, firms in the EU are allowed to adopt voluntary sustainability reporting standards as long as these standards also fulfil the legal requirements (European Parliament, 2014). Examples of voluntary standards with a widespread adoption in the EU are the reporting principles of the Global Reporting Initiative (GRI) and the recommendations of the Taskforce for Climate-Related Financial Disclosures (TCFD) (KPMG, 2022, 5-6).

The GRI develops voluntary standards for sustainability reporting which provide more detailed reporting standards than the current legal requirements in the EU. The GRI standards are the dominant voluntary reporting standards worldwide (KPMG, 2022, 25). The standards of the GRI also allow for an understanding of what quality of environmental disclosures can be defined as. The GRI defines accuracy, balance,

clarity, comparability, completeness, timeliness, and verifiability as principles for the quality of disclosures and provides detailed standards on how firms should disclose environmental information in order to meet the quality principles (GRI, 2022). The TCFD was launched by the Financial Stability Board and provides recommendations on how firms should disclose climate-related financial information in order to enable informed and efficient investment decisions. The TCFD recommendations are applied by more than one in five firms in Europe (KPMG, 2022, 39). Similar to the GRI guidelines the TCFD also encompasses principles for disclosure quality, being relevancy, completeness, clarity, consistency, comparability, reliability and timeliness (TCFD, 2017, 2018). Other voluntary standards for environmental disclosures such as those of the International Sustainability Standards Board (ISSB) or the Sustainability Accounting Standards Board (SASB) use similar terms as the GRI or TCFD when describing their principles for environmental disclosure quality (ISSB, 2022; SASB, 2020).

Voluntary environmental disclosure initiatives have a similar understanding on what criteria environmental disclosures need to fulfil to be of quality. In the EU there are no standards for environmental disclosures implemented yet, but the EFRAG published working papers for European Sustainability Reporting Standards (ESRS) in March 2022 which cover environmental disclosures. The working paper of the ESRS also covers characteristics of disclosure quality. These are defined as relevance, faithful representation, comparability, verifiability, and understandability (EFRAG, 2022). Despite the differences in terminology, the voluntary standards and the drafts for future EU legislation show a similar understanding of which characteristics environmental disclosures need to fulfil to be described as disclosures of quality, for an overview on the terminology used by the voluntary standards providers as well as the EFRAG see Appendix I. Overall, I summarise that characteristics for the quality of environmental disclosures are not only the extent of the disclosed information but also their credibility plays an important role.

3. Literature Review

To get an understanding of what prior literature discusses regarding green funds and environmental disclosure quality I in the following provide a literature review on these subjects. I aim to reveal trends, relations, and potential gaps in the literature and evaluate, how my research can contribute to literature. I start with a review of literature on green funds followed by a review of literature on environmental disclosure quality. As I outline before, both terms, green funds and environmental disclosure quality, do not have a uniform definition but a wide variety of descriptions and associated terms. Thus, I believe it is useful to initially review the literature regarding my research separately out of the perspective of green funds and out of the perspective of environmental disclosure quality before I outline the interlinkage

of the green funds and the environmental disclosure quality. Lastly, I discuss prior literature regarding a potential association between green funds and environmental disclosure quality. Based on my results in this review I formulate my expectations for the empirical analysis.

3.1. Green Funds

Prior literature indicates an increasing relevance of environmental and climate issues for capital markets. Prior research illustrates that institutional investors, such as fund providers, play a major role in encouraging a transformation into an environmentally friendly economy. Therefore, green funds are one tool to redirect investments into companies and projects which support a transition towards a more sustainable economy and to focus on sustainable long-term firm value rather than short-term profit maximization (Busch, Bauer, & Orlitzky, 2016, 310).

From a theoretical perspective, prior literature distinguishes an economic and an ecological perspective on green investments, which covers green funds (Busch et al., 2016, 308-309). From an economic perspective, profits need to be accumulated on the basis of long-term strategies and need to be responsibly related to the real term increase of economic value in order to be sustainable or green. Also, it requires that profits are not based on corruption and that elementary needs are not threatened. From an ecological perspective, the profit-making of green investments needs to be consistent with increasing resource productivity and usage of renewable resources, recycling and reuse of materials as well as the preservation of global and regional ecosystems. Therefore, proposed investments of green funds must fulfil both, financial and environmental criteria (e.g., Busch et al., 2016, Hoffmann, Scherhorn, & Busch, 2004, Ryall & Riley, 1996). This implies that a firm that is deemed as green would not be selected by a green fund if it does not fulfil the criteria of financial performance (Ryall & Riley, 1996, 234).

How green funds are supposed to define environmental criteria for the assessment of green behaviour and how to select their investments is, even though it is not discussed by many papers, controversially discussed in prior literature (Arribas, Espinós-Vañó, García García, & Oliver-Muncharaz, 2019, 1642). One of the main challenges when assessing whether a company is green and should be included in a green fund is a lack of consensus on the exact meaning of being 'green'. Also, this concept is often confused or mixed with other concepts in the universe of sustainable finance. And even if the same definition is applied, fund providers and other players such as rating agencies still apply different metrics for the measurement of the criteria (Capelle-Blancard & Monjon, 2012, 244).

In literature, two main approaches for the selection of green investments are discussed. These are negative and positive screening. Negative screening means that exclusion criteria are used to assess whether an investment is deemed as green (e.g., exclusion of coal or oil-based power generation). The environmental performance itself is not analysed, just the economic situation. Minimum standards are defined

and if the company does not comply with these it is excluded (Arribas, Espinós-Vañó, García García, & Oliver-Muncharaz, 2019, 1644). The negative screening approach is criticized in the literature as the exclusion criteria are not able to cover all non-green practices and activities which leads to companies, which clearly undertake non-green activities, being included in green funds whilst companies which actually are green are not selected if simple negative screening criteria are used (e.g., Arribas, Espinós-Vañó, García García, & Tamosiu-niene, 2019, Hellsten & Mallin, 2006). Positive screening is an approach where investment managers implement systematic environmental factors in their financial analysis and the investment selection process. They assess the environmental performance of the companies and usually form a score based on this. They select those firms with the highest score for their portfolio (Arribas, Espinós-Vañó, García García, & Oliver-Muncharaz, 2019, 1644). This approach is discussed in literature due to its complexity. Different variables must be assessed and measured before they can be weighted and combined into a score. This leads to points of criticism such as a lack of standardization and credibility of such scores and the input data as well as a lack of transparency and distortions due to a potential subjective bias of the score designers (Windolph, 2011, 42-49).

Overall, the literature on green funds is limited as most studies focus on various components of sustainable investments and blend different terms under the umbrella of sustainability (e.g., Ibikunle & Steffen, 2017, Ito et al., 2013). Few contributions cover intra-industry, intra-country or green versus conventional fund performance analyses (Lagasio & Cucari, 2019, 708). But the literature highlights the challenges regarding green funds, which are the lack of a uniform definition of what is green and the problems in the assessment of this for potential investments.

3.2. Environmental Disclosure Quality

The literature on environmental disclosures extensively discusses environmental disclosures and their quality in the context of various theories and setups. In the following I aim to provide an overview of the relevant literature and its implications for my analysis of the interlinkage between environmental disclosure quality and green funds.

In prior literature environmental performance is described as a driver for environmental disclosure quality. The companies disclose their environmental performance in order to fulfil stakeholder claims (Gangi et al., 2016, 1399). Prior literature on environmental performance and environmental disclosure quality identifies different incentives for companies to present environmental disclosures of quality. These incentives are based on forces relating to the legitimacy of the firm and institutional-oriented forces (Maltais & Nykvist, 2020, 6).

Frequently mentioned theories used to explain environmental disclosure quality are institutional theory, stakeholder theory, legitimacy theory and signaling theory (e.g., Maltais & Nykvist, 2020, Braam et al., 2016, Hahn & Kühnen, 2013). Following Fernando and Lawrence (2014) these theoretical

approaches can be described as a set of theories that predict similar or complementary incentives regarding the environmental disclosure quality of firms. Due to similar theoretical predictions, it is difficult to sharply differentiate between the different theories in the context of environmental disclosure quality (Maltais & Nykvist, 2020, 6-7). In short, the theories predictions promote the idea that firms are incentivised to comply with societal norms and values and use their environmental disclosures to comply with values and norms regarding their environmental performance (Campbell, Craven, & Shrives, 2003, 559).

Following from this idea, companies' efforts to provide environmental disclosures of high quality can be explained by the company being incentivised to secure their legitimacy by operating within societal norms (Maltais & Nykvist, 2020, 7). A part of these norms and values is that companies are expected to operate on a high level of environmental performance. Additionally, the companies want to demonstrate accountability for their business practices by providing information within their environmental disclosures. Also, in a situation of asymmetric distribution of information, which is present in the relationship of a company with its stakeholders and shareholders, companies voluntarily disclose information to differentiate themselves from peers or competitors (Hahn & Kühnen, 2013, 14). To achieve this, they provide credible information which cannot be replicated by inferior environmental performers which leads to the expectation of literature that superior environmental performers also provide environmental disclosures of higher quality when compared to inferior environmental performers (Braam et al., 2016, 725). Therefore, based on these theories, environmental performance can be described as a driver of environmental disclosure quality (Gangi et al., 2016, 1399). This is mirrored in the phenomenon observed by literature that companies do not only disclose environmental information driven by regulatory demands but also provide voluntary environmental disclosures to convey their compliance with the societal norm of environmentally friendly business practices (Pérez-López, Moreno-Romero, & Barkemeyer, 2015, 722).

Whilst the theories discussed in prior literature offer arguments for why superior environmental performers provide environmental disclosures of higher quality when compared to inferior performers, prior literature does not neglect the problems coming with this argumentation. Within the set of theories companies with an inferior sustainable performance are expected to voluntarily disclose more environmental information to distract from their inferior performance (Braam et al., 2016, 726). Overall, results from prior literature imply that environmental disclosures are primarily used by firms to improve the environmental image and reputation of the firm as they found a positive impact of disclosing information regarding positive environmental performance internally as well as externally for the firms (e.g., Birkey, Michelon, Patten, & Sankara, 2016, Michelon, Pilonato, & Ricceri, 2015). But to gain this reputational benefit the environmental disclosures need to be credible, and the information provided needs to be matched by the actions of the firm. Therefore,

prior literature identifies credibility as the main reason for the positive reputational benefits of environmental disclosures by firms (Birkey et al., 2016, 144). Accordingly, prior literature claims that if a company acquires external assurance of the information presented in its environmental disclosures, this enhances the credibility of the disclosures and therefore allows for positive reputational benefits for the firm (e.g., Del Giudice & Rigamonti, 2020, Birkey et al., 2016, Chen, Srinidhi, Tsang, & Yu, 2016, Kolk & Perego, 2010). This implies that an increasing extent of disclosures does not necessarily enhance the environmental disclosure quality, but the credibility of the information does (Fernandez-Feijoo, Romero, & Ruiz, 2014, 54).

The importance of the credibility of the disclosed information on environmental performance by companies is mirrored in the approaches to measure environmental disclosure quality which are provided in prior literature. These framework approaches usually aim to measure environmental disclosure quality in a score and the disclosure items which are used in these frameworks can be assigned to two categories: hard disclosures (e.g., quantitative environmental performance indicators), and soft disclosures (e.g., vision and strategy claims). Hard disclosures are items that are verifiable and difficult to mimic whilst soft disclosures are of a general nature and difficult to verify (e.g., Michelon et al., 2015, Hahn & Kühnen, 2013, Clarkson, Overell, & Chapple, 2011). In general, the frameworks cover the adoption, extent, and the credibility of the environmental disclosures as central components for environmental disclosure quality.

Even though the frameworks to assess environmental disclosure quality which can be found in prior literature use similar disclosure items to assess disclosure quality, the usefulness of these frameworks itself is controversially discussed in prior literature. As regulations regarding environmental disclosures on an international level are still in their infancy, the environmental information disclosed by companies varies. This can impact the reliability of environmental disclosure scores as the frameworks, which assess the scores, have no uniform definition of environmental disclosure quality and which criteria need to be fulfilled within the score (Del Giudice & Rigamonti, 2020, 5672). Additional controversial issues are the complexity regarding the terminology and definition of what is green, the criteria of choice used in the frameworks, or the judgement of whether a criterion was met (e.g., Diez-Cañamero, Bishara, Otegi-Olaso, Minguez, & Fernández, 2020, Semenova & Hassel, 2015, Chatterji, Levine, & Toffel, 2009). Especially measurement divergence regarding disclosure items seems to account for a large part of discrepancies in environmental disclosure scores. Also, environmental disclosure scores might adopt different definitions of environmental performance and its determinants (Del Giudice & Rigamonti, 2020, 5673).

3.3. Literature Gap: Green Funds and Environmental Disclosure Quality

Prior literature for the most part does not focus on the environmental disclosure quality in the context of green funds but analyses both separately (Lagasio & Cucari, 2019, 708). But environmental disclosures are discussed as a key factor based on which the green funds select their investments. Despite environmental disclosures being mentioned as one problem in the assessment of a firm's environmental performance due to problems such as greenwashing, which is the practice of disclosing misleading information regarding the company's environmental commitment, environmental disclosures of a firm are described as the fundament on which the fund's examination of a company's environmental performance is based. Evidence in prior literature shows that despite the differences in the selection processes, green funds always initialize their selection process based on the environmental information disclosed by the firm itself (Ryall & Riley, 1996, 236-238).

Based on the theories which are discussed in prior literature it becomes visible that there is potential for an association between green funds and the environmental disclosure quality of companies. I argue, following the theories discussed in prior literature, that companies which are selected for a green fund have a higher environmental disclosure quality when compared to companies which are not selected. If they would not credibly signal a high level of environmental performance, this would undermine the legitimacy of their inclusion in a green fund and after their selection they need to continue to signal the legitimacy of their selection by a green fund to stay selected. Green funds select their investments based on the environmental performance of the companies, which is presented within the environmental disclosures. Therefore, the quality of the environmental information disclosed by the companies is relevant in their selection process. At the same time it is desirable for companies to be selected for a fund. If a company's stocks or bonds are selected for a fund this is a chance for the firm to gain reputational and financial benefits (Bancel & Mittoo, 2009, 846). Additionally, the selection by a green fund, is a chance to attract investors who want to benefit from both, the instant diversification in mutual funds and the chance to invest in sustainable companies or projects (Bassen, Gödker, Lüdeke-Freund, & Oll, 2019, 63).

Therefore, I expect to find an association between the selection for a green fund and a higher environmental disclosure quality of selected companies when compared to companies that were not selected. Furthermore, I expect the environmental disclosure quality of a company to increase after the selection by a green fund. To illustrate, how I approach my analysis of the association between green funds and environmental disclosure quality, I discuss my methodology in the following.

4. Methodology

In the following I describe how I address my research question. Prior to my analysis I gather data samples to construct a viable timeframe. I decide to conduct my analysis for the years of 2017 to 2021, therefore I cover two years before and after the implementation of the SFDR in the EU. Due to

the implementation of the SFDR regulation in the EU many funds were newly launched or restructured in order to comply with either Article 8 or 9 of the SFDR and to be classified as green. This allows me to identify companies which are initially selected for a green fund or deselected. Such observations help me to identify a potential association between the green fund selection and the environmental disclosure quality of firms. Based on this understanding I conduct my data collection which is the fundament for my analysis. I illustrate my data collection process as well as the steps of my analysis in the following.

4.1. Data Collection

To address my research question, I require data for the holdings of green funds as well as for the environmental disclosure quality of the companies which are investees of the green funds. Besides that, I have to decide on conditions based on which I construct my sample as well as which key assumptions I want to make. Therefore, I illustrate the data collection process for the green fund data as well as the environmental disclosure quality data in the following.

4.1.1. Green Fund Data

For my analysis of green funds and environmental disclosures in the EU I need to identify a sample of green funds and collect data on their holdings over the selected timeframe. I focus on funds which are classified according to Article 8 or 9 of the SFDR and have an additional focus on environmental or climate issues or at least do not explicitly exclude environmental or climate objectives in their asset allocation strategy. Additionally, I choose the green funds with the largest inflows in the fourth quarter of 2022 in the EU, effective date 31st of December 2021. These funds have net flows of more than 400 million EUR which is significantly higher than the inflows of other European green funds. High inflows highlight that investment activities took place in these green funds during this period which makes these funds useful examples when looking at the current state of selection processes of green funds. Besides these the funds have to fulfil the following criteria to be part of my analysis. I include open-ended mutual funds, primary funds and equity funds which are active and have their domicile in the EU. I do not include bonds which are issued for a specific project as they do not represent a company. I choose to focus on the EU as this allows for the assumption of a similar regulatory and legal framework. For an overview of the resulting funds see Table 4.

I choose to take the 31st of December 2021 as the effective date for the fund inflows, as the fund providers usually publish their annual fund reports with an effective date of 31st of December. Therefore, I have the same effective date for the fund inflow data, based on which I select my sample of green funds, as well as for the fund holding data. Additionally, this means that I use the most recent data for fund holdings which is currently publicly available. I manually collect the data of the funds' holdings out of their annual fund reports to ensure that my data set is as complete as possible and covers the funds I selected. These fund reports are provided yearly and show all holdings per fund as of the effective date. Moreover, this manual data collection allows for me to simultaneously collect further data points such as the funds' investment approaches and objectives and information on their selection processes.

To notice, the fund providers which hold the funds I selected as examples for my analysis are all under the top 20 of asset managers which provide Article 8 or 9 SFDR fund assets as of 31st of December 2021 (Morningstar, 2022b, 17). This allows for the assumption that the selection processes and asset allocation strategies of the selected funds are relevant examples for the selection processes of green funds in the EU and not specific to a minority of fund providers.

As a control group, I use a set of comparable firms which are not part of a green fund. I select the control group out of conventional mutual funds and again start my selection based on the top ten funds based on inflows as of the fourth quarter of 2021. Then I eliminate holdings which are selected for a green fund in my sample. Based on the resulting company universe I construct a sample control group of comparable size and fundamental financials when compared to my treatment group to prevent as best as possible that my empirical results are driven by other determinants than the selection for a green fund. This results in a balanced panel data sample.

4.1.2. Environmental Disclosure Quality Data

To approach the quality of the environmental disclosures I build on frameworks of environmental disclosure quality which can be found in prior literature (e.g., Braam et al., 2016, Michelon et al., 2015, Clarkson, Li, Richardson, & Vasvari, 2008). These framework cover indicators for the adoption, extent, and credibility of the environmental disclosures and combine them into one environmental disclosure score (EDS) which is in line with the requirements of disclosure quality as discussed in Chapter 2.1.2 and presented in prior literature as illustrated in Chapter 3.2. I use this score as a proxy for the environmental disclosure quality. The disclosure items which I assess using the framework cover hard and soft disclosures. Within the score, hard disclosure items are considered in an overweight position. The framework and the used indicators for my score are presented in Appendix II. I base my framework on the frameworks in prior literature. As the most recent framework is from 2016, I review and update the indicators based on the current requirements for environmental disclosures from voluntary disclosure standards and the standards drafts by the EFRAG for the EU regulations. The sources for this are indicated in Appendix II as well.

To determine the score, I use data from the Thomson Reuters EIKON ESG database. This database covers the indicators which are part of my framework for the environmental disclosure score. This data is the main source for the environmental disclosure score data to avoid a subjective bias. I only fill in missing data manually if necessary for the analysis. Based on this data I determine the environmental disclosure scores of the companies in my sample over the timeframe

Table 4: Selected Green Funds

Source: Derived from Morningstar, 2022a, 2022b, data as of 31st of December 2021.
Notes: This table reports the funds which I choose for my descriptive and empirical analysis based on the criteria outlined above as well as the respective fund providers. It additionally indicates whether the fund is classified as Article 8 or 9 of the SFDR.

	Fund Name	Fund Provider	SFDR Article
1	SRI Euro Quality	DNCA	8
2	ESG Multi-Asset Fund	BlackRock	8
3	Global Impact	UBS	8
4	Global SDG Engagement Equities	RobecoSAM	9
5	Sustainable Energy Fund	BlackRock	9
6	Sustainable Global Thematic Portfolio	AllianceBernstein	9
7	Global Climate and Environment Fund	Nordea	9
8	Worldwide Positive Change Fund	Baillie Gifford	9
9	Global Sustainable Equity Fund	Mirova	9

from 2017 to 2021 which together with the green fund data results in a balanced panel.

4.2. Data Analysis Process

I start my analysis with a descriptive analysis of the green fund selection processes. For this, I analyse the information of the fund providers and managers on the selection process as published for the selected green funds. All sources used for this descriptive analysis are presented under 'Additional Resources' which follows my reference list. I aim to provide insights into the selection processes and their differences as well as the interlinkage of this process with the environmental disclosure quality of the investees. Furthermore, I aim to create categories of green fund selection processes in order to categorize them based on the level of detail of their assessment of the environmental performance of the investees in the selection process. I expect such a categorization to be interesting to include in my empirical analysis. With the understanding of this process and its interlinkage to environmental disclosure quality, I then conduct an empirical analysis in order to answer my research question.

My empirical analysis consists of several regression models. To initialize my analysis, I implement a regression model with the environmental disclosure score as the dependent and the selection for a green fund as the independent variable. I control for company and year fixed effects. In that setting, I analyse whether my expectation that the selection by a green fund is associated with environmental disclosure quality can overall be confirmed and whether the companies which are selected for a green fund have a higher environmental disclosure quality when compared to those companies which were not selected. Furthermore, I want to detect whether the environmental disclosure score increases after the selection by a green fund and is not just generally higher when compared to those firms which were not selected. Based on these two main regression models I additionally implement regression models in which I use the components of the environmental disclosure score (adoption, extent and credibility) as separate dependent variables as well

as models where I use the green fund types which I identify in my descriptive analysis as independent variables. Additionally, I use firm and year fixed effects as well as both together to control for unobservables. When I use both, the standard errors are clustered at firm level. In the models I also use determinants of environmental disclosure quality as control variables. Based on prior literature I use indicators for company size, profitability as well as leverage as their influence on the environmental disclosure quality is widely acknowledged in literature (e.g., Lagasio & Cucari, 2019; Braam et al., 2016; Hahn & Kühnen, 2013; Clarkson et al., 2011).

5. Analysis Results

In the following I present the results of my analysis. I start by illustrating my findings from the investigation of the green fund selection processes. After this I describe the results of my empirical analysis. This is followed by a depiction of the development of the relationship between green funds and environmental disclosures over time. Lastly, I provide a discussion of my results which covers the interpretation of my results and findings as well as potential limitations of my analysis.

5.1. Descriptive Analysis of Green Funds and Environmental Disclosure Quality

As described before, funds which are labeled as green in the EU fall under either Article 8 or 9 of the SFDR. In order to fulfil the requirements of the regulations, the funds have to screen and assess potential investments. To decide in which products they want to invest with their green funds, fund providers have to consider the environmental performance of the potential investments. There are no specific legal requirements regarding the process of how green funds have to select their investments. Therefore, the selection processes as well as asset allocation strategies of green funds differ. Whilst some funds implement an environmental research team tasked with the identification of companies which match their environmental criteria, others only focus

on the exclusion of firms that fulfil negative criteria (Stuart & Bioy, 2021, 4).

To illustrate how the selection processes of green funds differ and how this is interlinked with the environmental disclosure quality of companies in which green funds invest, I investigate the selection processes of the green funds in my sample as well as the results of these processes the following, for the selected green funds see Table 4.

5.1.1. Selection Processes of Green Funds

At first, I take a look at the investment approaches and fund categories which the selected green funds can be categorized into to look for potential patterns regarding the approaches and categories. For definitions of the investment approaches see Table 1 and for a description of the green fund categories see Table 3.

All of the considered funds follow specific investment approaches. In the asset allocation strategies and key investor information documents (KIID) I find SRI, ESG and impact investing as investment approaches which are applied by the funds. Most common is the SRI investment approach which is applied by four of the nine funds (see Table 5).

The green funds all can be assigned to a corresponding green fund category. The most common category, concerning six of the nine funds, is climate conscious, which can also be described as the most general category of green funds as it does not focus on for example a specific industry. The other categories are clean energy/tech and climate solutions. With regards to the green fund categories I notice that only funds which are classified according to Article 9 SFDR, which is also described as dark green (see Table 2.2), belong to a green fund category different than climate conscious. Therefore, in my sample, only Article 9 SFDR green funds have a more specific investment scope than just incorporating general environmental or climate criteria.

Based on these differences in investment approaches and fund categories I expect to find a pattern regarding how elaborate the selection processes of the corresponding funds are. Therefore, I take a closer look at the separate steps the funds conduct in their selection processes in the following, for an overview see Table 6.

All of the funds perform negative screening, usually as the first step in their selection process. As discussed in the literature review, negative screening describes a strategy by which securities are excluded as potential investments when they are not aligned with the values of the fund's strategy. The green funds usually exclude business such as coal mining, fossil-fired power generation, conventional oil and gas, production of oil sands, arctic drilling, or production of palm oil. The only exception here is the fund Sustainable Global Thematic Portfolio by Alliance Bernstein, which does conduct negative screening, but only for controversial weapons, and not for any climate or environmental criteria.

Interesting to notice here is also that several funds explicitly exclude companies that produce gas or nuclear power. In a recent decision from the 6th of July 2022 the European Parliament voted to classify gas and nuclear energy as green within the EU sustainability taxonomy after long and controversial debates. This could imply that retail investors either expected the European Parliament to take a different decision or they believe that gas and nuclear power should not be considered green.

The next step the majority of the funds in my sample (eight out of nine) perform, is positive screening. This means that the funds aim to identify investees which align with the values and objectives of the fund. One example for such a positive screening process is that the fund managers assess the positive impact or the exposure to environmental risks of a business on the transition to a sustainable economy based on sustainability indicators and combine them into a score (e.g., DNCA, 2022, Fund Dact Sheet, 2022; Nordea, 2022a). With these results the funds usually apply a best-in-universe approach and go forward with the investees which were not excluded in the negative screening and had the best score results in the positive screening. Theses scores are not necessarily calculated by the fund provider, but some fund managers also rely on external ratings for this step. Based on these insights I conclude that negative and positive screening are the standard steps which green funds conduct in their selection processes.

I observe more variety in the data collection and analysis processes of green funds within the selection process than for the screening steps. For five of the funds the investment managers are in direct contact with the investees and use this opportunity to gain further insights into the companies' environmental performance and seek confirmation of the performance and actions described in the environmental disclosures for the companies. The fund managers who are in active dialogue with the investees describe this as an integral part of the selection process as it allows them to gain insights into the companies' operational and business practices which go beyond what can be achieved based solely on publicly available data (e.g., Nordea, 2022b; Robeco, 2022c). Four of the fund selection processes are based on extensive in-house research based on which they set up own models and ratings for the selection (e.g., Baillie Gifford, 2022; Mirova, 2022b; Nordea, 2022b; Robeco, 2022b). An intersection of three of these funds is also in active dialogue with the companies and can therefore analyse the additional insights they gain from the contact with the investees and form models and ratings which target their investment objective.

Both, the active dialogue with the investees and the in-house research gives the fund managers the possibility to align their screening and selection better with their objective and value than a selection which is based on only publicly available data. Based on these results I try to provide a categorization of green funds according to their selection processes (see Table 7) as the classification according to SFDR, the investment approach, or the green fund category do not seem to have any patterns in relationship with the selection processes.

The conducting of negative and positive screening seems to be the minimum standard for green funds selection processes based on my results, therefore I class funds which con-

Table 5: Objectives and Investment Approaches of Green Funds

Source: Derived from various sources provided by the fund providers, see Appendix III.
Notes: This table provides an overview of the investment objective of the green funds, the investment approach they apply (see also Table 1), the fund category (see also Table 3) and whether they are an Article 8 or 9 SFDR fund (see also Tables 2 and 4).

		Investment Approach	Green Fund Category	SFDR Article
1	SRI Euro Quality	SRI	Climate Conscious	8
2	ESG Multi-Asset Fund	ESG	Climate Conscious	8
3	Global Impact	Impact Investing	Climate Conscious	8
4	Global SDG Engagement Equities	SRI	Climate Conscious	9
5	Sustainable Energy Fund	ESG	Clean Energy/Tech	9
6	Sustainable Global Thematic Portfolio	ESG	Climate Conscious	9
7	Global Climate and Environment Fund	SRI	Climate Solutions	9
8	Worldwide Positive Change Fund	Impact Investing	Climate Conscious	9
9	Global Sustainable Equity Fund	SRI	Climate Solutions	9

Table 6: Green Fund Selection Process Components

Source: Derived from various sources provided by the fund providers, see Appendix III.
Notes: This table provides an overview of the steps in the fund selection processes and which funds conduct which steps. For a definition of 'Negative Screening' and 'Positive Screening' see Chapter 3.1. 'Active Dialogue' means that the investment manager is in active dialogue with the managers of the investee to gain a better understanding of their business practices and environmental performance. 'In-House Research' describes that the fund providers have a research team dedicated to achieving insights into the environmental performance of the investees and they construct their own models and ratings. (Yes) means that the fund managers do conduct the step, but not with regards to environmental criteria.

		Negative Screening	Positive Screening	Active Dialogue	In-House Research
1	SRI Euro Quality	Yes	Yes	Yes	
2	ESG Multi-Asset Fund	Yes			
3	Global Impact	Yes	Yes	Yes	
4	Global SDG Engagement Equities	Yes	Yes	Yes	Yes
5	Sustainable Energy Fund	Yes	Yes		
6	Sustainable Global Thematic Portfolio	(Yes)	Yes		
7	Global Climate and Environment Fund	Yes	Yes	Yes	Yes
8	Worldwide Positive Change Fund	Yes	Yes	Yes	Yes
9	Global Sustainable Equity Fund	Yes	Yes		Yes

Table 7: A Categorization of Fund Selection Processes

Source: Based on results which are derived from various sources published by the fund providers, see Appendix III.
Notes: This table provides a categorization of the fund selection processes. For an overview of the different selection process components, I identify in my descriptive analysis, see Table 6. These are the basis for 'Requirements'. 'Fund in Category' indicates which funds are sorted into the respective category. For the fund number see Table 6.

Type	Requirements	Funds in Category
1 Basic	Performs one or two of the selection process components.	2, 5, 6
2 Medium	Performs three of the selection process components.	1, 3, 9
3 Advanced	Performs four of the selection process components.	4, 7, 8

duct these two steps as type 1 or 'basic'. Based on my observations the average fund selection process either is in direct dialogue with the investees or conducts in-house research in addition to the negative and positive screening. Thus, I class fund selection processes with three of the components as type 2 or 'medium', which therefore encompasses the average of my sample. Lastly, above average are fund selec-

tion processes which incorporate all four of the components. Therefore, I group these as type 3 or 'advanced'. With my sample this results in three green funds per type.

Based on the differences in the selection processes I expect that the holdings of the funds differ depending on the process components. It becomes apparent that some companies were selected by several green funds as illustrated in

Table 8. The table gives an overview of the top ten most selected companies by the green funds and how many times they are selected in the financial year 2021.

Now it would not be surprising that green funds with similar selection processes and similar investment approaches invest in the same companies. One example of the frequently selected companies is ASML Holding NV, a supplier in the semiconductor industry. Based on this example I analyse which funds selected ASML Holding NV as an investee and to which type of investment processes they belong and illustrate the results in Table 9.

This example illustrates that the same company, in this case ASML Holding NV, is selected by funds with different selection processes ranging from the lowest type of selection processes with the only fund of my sample, the ESG Multi-Asset Fund, that just conducts negative screening, to a fund with the most advanced and complex selection process being the Global Climate and Environment Fund. For the other companies in the top ten most selected companies by the green fund in my sample I find a similar picture, a full overview of the top ten companies and the green funds they are selected by see Appendix IV.

Therefore, the differences in the fund selection processes do not allow for conclusions about the selected companies. In my analysis I identify one pattern between the categorization of the selection processes and the result of the selection, which is that funds of the basic type of selection process on average have the most holdings and the funds of the advanced type of selection process have in average the lowest number of holdings in my samples as illustrated in Table 10.

Based on this descriptive analysis of the fund selection processes it becomes evident, that the processes differ from each other and cannot be summarised for green funds in general. Also, based on criteria such as the fund's investment approach, green fund category, or SFDR classification, I cannot make a generalized statement on what their selection process looks like. Therefore, I continue to use the green fund types I deduct based on my observations as presented in Table 7 in my empirical analysis to see whether the association between green funds and environmental disclosure quality, that I expect to find, differs depending on the design of the fund selection process. As some funds are for example in active dialogue with the investees and try to support improvements of environmental performance and disclosures, I expect that the environmental disclosure quality of the companies which are in fund with a more advanced selection process to be different from companies in green funds with more basic selection processes. To understand the relationship of green fund selection processes and environmental disclosure quality I describe the role of environmental disclosure quality in the selection processes of green funds in the next chapter.

5.1.2. Role of Environmental Disclosure Quality in the Selection Processes

Despite the differences in the selection processes of funds, especially regarding the level of detail with which the fund providers conduct their own research on the potential investee, all of the funds mention the disclosures of a company as a relevant source for their selection processes. For an overview on the usage of environmental disclosures of the funds in their selection processes see Table 11.

The documents on three of the funds describe that the environmental disclosures of the firm are the fundament for their assessment of the environmental performance of a company without mentioning further details regarding this process (BlackRock, 2022; Fund Dact Sheet, 2022). To note, two of these three funds are classified as selection process type 1, being the basic selection process type (see Table 7).

The documents provided by the fund managers and providers of six funds discuss more in depth how they use the environmental disclosures within their selection process for own models and ratings (see Table 11, column 'Extended'). Robeco (2022a) for example states for the Global SDG Engagement Equities fund that the information disclosed by a company are an integral part in their assessment of a company as they use them as one of the main data sources in their research center. This research center develops and applies a sustainability framework which defines a baseline which companies have to overcome in order to become part of RobecoSAM's investment universe. According to their framework, the company's disclosures play an integral role in the assessment on whether a firm reaches that baseline and additionally, whether the company should be included in one of their thematic funds. Mirova (2022a) describes that for the Global Sustainable Equity Fund they assess, amongst others, environmental criteria and form a score for the company which later is used to decide whether the fund invests in the company. They state that they gather the main information for the environmental score based on the environmental disclosures of the company. Another example is DNCA (2022). Regarding the SRI Euro Quality fund, they do not only mention environmental disclosures as a fundamental source for their financial and environmental analysis, but also discuss potential difficulties of using environmental disclosures. They state that environmental disclosures are a potentially difficult to use source due to a lack of uniform criteria, definitions, and standards for measurement. Furthermore, they point out that data access and reliability are potential hurdles when utilizing environmental disclosures. But despite these problems, DNCA still concludes that environmental disclosures play a key role in their analysis of companies as they are the only direct and publicly available source of environmental information on a company.

Moreover, four funds explicitly describe that they use external ratings within their selection processes (see column 'Beyond' of Table 11). On the first glance this does not seem to imply a relationship between the selection processes of green funds and environmental disclosures, but the providers of external ratings also mention environmental disclosures as a main source of information in their assessment processes. One by the fund providers frequently mentioned example of such a rating is the MSCI ESG Rating. MSCI (2022) describes in their brochure on the ESG rating that company disclosure

Table 8: Top Ten Selected Companies by the Green Funds

Source: Derived from various sources provided by the fund providers, see Appendix III.
Notes: This table provides an overview of the companies which are the most frequently selected by the green funds in my sample. The funds are presented in Table 6.

Rank	Company	Number of Selections
1	ASML Holding NV	5
2	Orsted AS	4
3	Linde PLC	4
4	Christian Hansen Holding AS	4
5	Infineon AG	4
6	Allianz SE	3
7	Koninklijke DSM NV	3
8	Schneider Electric SE	3
9	Dassault Systems SE	3
10	L'Oreal SA	3

Table 9: Green Funds selecting ASML Holding NV

Source: Derived from various sources provided by the fund providers, see Appendix III.
Notes: This table illustrates which funds selected ASML Holding NV for their portfolio as well as their selection process types (for the types see Table 7). For a similar analysis for all the top ten holdings as presented in Table 8 see Appendix IV.

	Fund	Selection Process Type
1	SRI Euro Quality	2 Medium
2	ESG Multi-Asset Fund	1 Basic
7	Global Climate and Environment Fund	3 Advanced
8	Worldwide Positive Change Fund	3 Advanced
9	Global Sustainable Equity Fund	2 Medium

Table 10: Average Number of Holdings per Green Fund

Source: Derived from various sources provided by the fund providers, see Appendix III.
Notes: This table depicts the average number of holdings which are in my scope per green fund selection process type.

Total Average Number of Holdings: 22	
Type	Average Number of Holdings
1 Basic	36
2 Medium	22
3 Advanced	8

documents are one of their main sources of data for their evaluation of a company. This also encompasses environmental disclosures for the evaluation of the environmental performance of a company. A similar procedure is also described by S&P (2022) within their ESG score methodology, which is another example of a frequently used external source.

The fund providers describe not only the extent of the information presented as important but highlight the importance of their credibility. Therefore, they indirectly describe not only environmental disclosures but also environmental disclosure quality as relevant for their assessment of companies in their selection process, because the extent and credibility are, besides the adoption of environmental disclosures,

the components of environmental disclosure quality as discussed in Chapter 2.2.2 and as illustrated by the contributions in prior literature which are presented in Chapter 3.2.

Overall, these examples highlight that despite the differences in the level of detail in which the fund providers discuss their use of environmental disclosures, they all mention them as one of the key sources or even the key source in their environmental analysis of a firm and that the quality of the environmental disclosures is interlinked with their selection of a company. The use of additional external sources such as ratings does not contradict this interlinkage as these external ratings also use environmental disclosures as a main data source in their assessment of the environmental perfor-

Table 11: Environmental Disclosures in the Selection Processes

Source: Derived from various sources provided by the fund providers, see Appendix III.
Notes: This table provides an overview on how the different funds use environmental disclosures in their selection processes. 'Standard' means that the fund managers or providers mention the relevance of environmental disclosures for the selection process, 'Extended' means that they illustrate that they use data out of environmental disclosures in advanced research, ratings and models based on which they make their investment decisions. 'Beyond' means that the fund managers or providers state that they use external ratings within their selection process which again rely on environmental disclosures.

		Standard	Extended	Beyond
1	SRI Euro Quality	Yes	Yes	
2	ESG Multi-Asset Fund	Yes		Yes
3	Global Impact	Yes		
4	Global SDG Engagement Equities	Yes	Yes	Yes
5	Sustainable Energy Fund	Yes		
6	Sustainable Global Thematic Portfolio	Yes	Yes	
7	Global Climate and Environment Fund	Yes	Yes	
8	Worldwide Positive Change Fund	Yes	Yes	Yes
9	Global Sustainable Equity Fund	Yes	Yes	Yes

mance of a company.

5.2. Empirical Analysis of Green Funds and Environmental Disclosure Quality

My descriptive analysis of the fund selection processes reinforces my expectation that the selection by a green fund and the environmental disclosure quality are positively associated and that the environmental disclosure quality increases after the selection by a green fund. Additionally, based on the results from the descriptive analysis, I also expect that the association differs depending on the selection process of the fund. Based on these expectations I present the results of my empirical analysis in the following. The sample on which my analysis is based is illustrated in Table 12.

Based on the descriptive statistics it already becomes visible that companies which are selected for a green fund have an on average higher total environmental disclosure score. Especially the extent and credibility of environmental disclosures are on average higher when compared to the companies which are not selected by a green fund. As the adoption score consists of the general disclosure of environmental information and the adoption of voluntary disclosure standards (see Appendix II), the differences in the adoption score probably stem from differences in the adoption of voluntary disclosure standards, as the general adoption of environmental disclosures became mandatory for all publicly listed firms in the EU with the implementation of the NFRD which was transposed into national law between 2015 and 2018, as discussed in Chapter 2.2.

The correlations of the numeric variables which are presented in Table 13 exhibit increased correlations for the measures of environmental disclosure quality especially among the total environmental disclosure score and the extent as well as credibility of environmental disclosures score. This is reasonable as they are based on the same underlying framework. I investigate them separately as dependent variables in the following regression models.

Table 14 depicts the results of a regression analysis that examines the relationship between the total environmental disclosure score and the selection by a green fund.

The results illustrate that companies that are selected by a green fund have higher environmental disclosure scores than those who are not. The results also provide evidence that environmental disclosures scores of companies that are selected by green funds are higher after the selection. This is as the coefficients of the model including firm fixed effects that are only driven by companies which have variation in the variable green_fund are significantly positive. When controlling for year fixed effects, the results again indicate that the environmental disclosure scores of companies that are selected by green funds are higher than of those who are not. When using both, firm and year fixed effects however, the coefficient becomes negative and insignificant which suggests that the associations observed in the other models are driven by a general time trend and not by the selection by a green fund itself.

An additional investigation of how the association differs for the environmental disclosure quality components, being the adoption, extent, and credibility of the disclosures, does not provide comprehensive additional insights. My findings show a similar pattern when compared to the total environmental disclosure score. The coefficients are significant and positive for the three disclosure components besides when using firm and year fixed effects. The only exemption is the adoption of environmental disclosures of which the coefficient is also insignificant when using only firm fixed effects. This suggests that the adoption of disclosures is not different before and after the selection by a green fund. The implemented regression models that include the components as dependent variables and the selection by a green fund as independent variable are reported in Appendix V.

Moreover, I want to assess whether the association differs depending on the type of green fund by which the companies are selected. For this, I use the green fund types as indepen-

Table 12: Descriptive Statistics (Full Sample)

Source: The presented statistics are based on my sample data. The data is partly obtained from EIKON, partly manually collected. For a description of the data collection see Chapter 4.1.
Notes: This table reports descriptive statistics on the investigated balanced panel sample from 2017 to 2021. For each variable, the number of observations, the mean, the standard deviation, the minimum, the 25th, 50th and 75th percentile as well as the maximum are presented. The treatment group consists of companies which are selected by a green fund, the control group consists of companies which are never selected by a green fund during the sample period. The groups consist of 136 companies each. The variable eds represents the environmental disclosure score and eds_adoption, eds_extent and eds_credibility reflect the three components of the score, being the adoption, extent, and credibility of environmental disclosures (see Chapter 4.1.2 and Appendix II). SIZE, ROA, and LEV are numeric control variables. SIZE is the total assets of the company. ROA is the return on assets and LEV the leverage ratio of the company. SIZE is transformed with the natural logarithm and was originally recorded in thousand EUR. Significance tests show that the control group is significantly different from the treatment group for eds and the score components and not for the control variables SIZE, LEV and ROA. I implement four binary variables which are relevant for the treatment group. green_fund indicates if a company was selected by a green fund in the specific year. Within the treatment group, 97 of 136 companies have variation in the variable green_fund. green_fund type1, green_fund type2 and green_fund type3 indicate whether the company is selected by a green fund type with a selection process of category 1, 2 or 3 in the respective year. For the definition of the green fund selection process categories see Table 7. For the control group the four binary variables take 0 in all observations.

	Mean	S.D.	Min.	25 %	Median	75 %	Max.
Treatment Group n = 680							
eds	40.75	12.58	0.00	34.00	43.50	49.00	68.00
eds_adoption	1.75	0.50	0.00	2.00	2.00	2.00	2.00
eds_extent	27.85	8.82	0.00	23.00	30.00	34.00	47.00
eds_credibility	11.15	4.20	0.00	9.00	12.00	14.00	19.00
SIZE	9.88	1.96	0.00	8.93	9.82	10.99	14.27
ROA	0.06	0.10	-0.50	0.02	0.05	0.08	1.12
LEV	0.21	0.17	0.00	0.10	0.19	0.29	1.77
green_fund	0.63	0.48	0.00	0.00	1.00	1.00	1.00
green_fund type1	0.46	0.50	0.00	0.00	0.00	1.00	1.00
green_fund type2	0.23	0.42	0.00	0.00	0.00	0.00	1.00
green_fund type3	0.11	0.31	0.00	0.00	0.00	0.00	1.00
Control Group n = 680							
eds	31.88	16.98	0.00	22.00	36.00	45.00	64.00
eds_adoption	1.50	0.77	0.00	1.00	2.00	2.00	2.00
eds_extent	21.91	11.64	0.00	15.00	24.00	31.00	43.00
eds_credibility	8.48	5.22	0.00	4.00	9.00	12.00	19.00
SIZE	9.71	2.45	0.00	8.40	10.04	11.14	15.23
ROA	0.05	0.06	-0.23	0.01	0.04	0.08	0.33
LEV	0.21	0.16	0.00	0.08	0.18	0.31	1.00

Table 13: Correlations

Notes: This table reports Pearson correlations above and Spearman correlations below the diagonal for the numeric variables in my sample (n = 1360). For sample and variable definitions see Table 12. Asterisks indicate the significance as follows. * $p<0.05$/ ** $p<0.01$/ *** $p<0.001$

	A	B	C	D	E	F	G
A: eds		0.756***	0.984***	0.918***	0.463***	-0.098***	-0.046
B: adoption	0.599***		0.738***	0.651***	0.316***	-0.095***	-0.035
C: extent	0.971***	0.576***		0.834***	0.441***	-0.083**	-0.055*
D: credibility	0.900***	0.537***	0.779***		0.461***	-0.116***	-0.021
E: SIZE	0.459***	0.255***	0.420***	0.472***		-0.199***	-0.170***
F: ROA	-0.162***	-0.128***	-0.140***	-0.176***	-0.380***		-0.077**
G: LEV	0.006	0.011	-0.004	0.023	-0.095***	-0.070*	

dent variables and the environmental disclosure score and its components as dependent variables. Table 15 reports the results for the total environmental disclosure score.

The results exhibit that the environmental disclosure score has a significantly positive association with all three green fund types when not using fixed effects. The same is

Table 14: OLS Regressions (Total EDS)

Notes: This table reports the results of five OLS regressions with the environmental disclosure score as the dependent variable and the selection by a green fund as independent variable as well as additional control variables. The sample and all variables are defined in Table 12. Standard errors are presented in parentheses below the coefficients. The asterisks indicate the two-sided significance levels and should be interpreted as * $p<0.05$/ ** $p<0.01$/ *** $p<0.001$.

	Dependent Variable:				
	eds (1)	eds (2)	eds (3)	eds (4)	eds (5)
green_fund	9.482***	8.493***	3.565***	7.286***	-0.761
	(0.871)	(0.775)	(0.556)	(0.453)	(0.563)
SIZE		3.141***	3.043***	3.062***	1.224***
		(0.169)	(0.542)	(0.101)	(0.335)
ROA		-2.736	-5.667	-0.908	-0.171
		(4.412)	(5.190)	(0.832)	(4.437)
LEV		2.316	15.018**	1.051	2.108
		(2.241)	(4.883)	(2.195)	(3.184)
Constant	33.311***	2.532			
	(0.491)	(1.904)			
Estimator	ols	ols	ols	ols	ols
Observations	1360	1360	1360	1360	1360
R2	0.080	0.279	0.882	0.302	0.922
R2 Adjusted	0.080	0.277	0.849	0.297	0.900
Fixed Effects	None	None	Firm	Year	Firm, Year

the case when considering firm or year fixed effects. This again indicates that the companies selected by any green fund type have higher environmental disclosure scores than those who are not, and they increase after the selection by any of the three green fund types. The coefficients for green funds of type 1 are higher than of type 2 and 3, which suggests that the environmental disclosure quality of companies selected by green funds of type 1 is higher when compared to types 2 and 3. This could mean that the environmental information disclosed by the investees is less important for funds with more advanced selection processes that use for example active dialogue or in-house research as they do not solely rely on the publicly available information but use additional data sources.

Lastly, I investigate the differences in the associations between the green fund types and environmental disclosure score components. The results of the regression models implemented for this investigation are presented in Tables 16 to 18.

The reported regressions in Table 16 use the environmental disclosure adoption as the dependent variable.

The results in Table 16 indicate that companies selected by green funds of type 1 and 3 have higher adoption scores than those who are not. Companies which have variation in the green fund type variables do not have higher adoption scores before and after the selection by any fund types as the coefficients under consideration of firm fixed effects are insignificant. The differences in the adoption could stem from the adoption of voluntary disclosure standards as the gen-

eral adoption of environmental disclosures is mandatory for all companies in my sample since the implementation of the NFRD. Table 17 reports the results for regression models with the environmental disclosure extent as dependent variable.

The results in Table 17 indicate that companies which are selected by a green fund of type 1 have a higher extent score than those who are not, this also holds when considering firm or year fixed effects. Therefore, companies which are selected by a green fund of type 1 also have a higher extent after the selection. But again, it seems that this is driven by a general trend as the coefficient in the model with both, firm and year fixed effects, is insignificant. The extent of environmental disclosures of companies selected by a green fund of type 2 is not significantly different in any model. For companies that are selected by a green fund of type 3 the extent score is higher than for those who are not, but it is not higher after the selection than before as indicated by the insignificant coefficient in the model using firm fixed effects. The coefficient for green fund type 1 is higher than for green fund type 3, additional tests however suggest that this difference is not significant. Therefore, the results indicate that the extent of environmental disclosures of companies selected by green funds of type 1 and 3 is higher than for companies which are not selected by these fund types, but only the disclosure extent of companies selected by a type 1 fund increases after the selection.

Table 18 reports the results of regression models using the credibility score as the dependent variable. The results show that the credibility score has a significantly positive associa-

Table 15: OLS Regressions (Total EDS, Fund Types)

Notes: This table reports the results of five OLS regressions with the environmental disclosure score as the dependent variable and the green fund types as independent variables as well as additional control variables. The sample and all variables are defined in Table 12. The green fund types are defined in Table 7. Standard errors are presented in parentheses below the coefficients. The asterisks indicate the two-sided significance levels and should be interpreted as * p<0.05/ ** p<0.01/ *** p<0.001.

	Dependent Variable:				
	eds (1)	eds (2)	eds (3)	eds (4)	eds (5)
green_fund type1	9.424*** (0.980)	8.270*** (0.873)	3.221*** (0.614)	7.600*** (0.228)	-0.407 (0.564)
green_fund type2	3.158* (1.298)	2.456* (1.152)	2.687** (0.921)	1.097* (0.328)	-0.957 (0.930)
green_fund type3	7.165*** (1.799)	7.261*** (1.599)	2.232** (0.832)	6.575*** (0.613)	-1.570* (0.769)
SIZE		3.119*** (0.169)	3.036*** (0.545)	3.035*** (0.094)	1.239*** (0.339)
ROA		-3.644 (4.405)	-5.727 (5.286)	-1.710* (0.504)	-0.310 (4.469)
LEV		2.944 (2.240)	15.132** (5.112)	1.560 (2.025)	2.151 (3.175)
Constant	33.423*** (0.479)	2.802 (1.900)			
Estimator	ols	ols	ols	ols	ols
Observations	1360	1360	1360	1360	1360
R2	0.088	0.284	0.882	0.310	0.922
R2 Adjusted	0.086	0.281	0.849	0.304	0.900
Fixed Effects	None	None	Firm	Year	Firm, Year

tion with the selection by all three fund types with green fund type 1 having the highest coefficients, even when controlling for firm or year fixed effects. Also, the credibility increases after the selection by all fund types. However, when controlling for both, firm and year fixed effects, the coefficients become negative and insignificant which indicates that despite the credibility scores being higher for companies that are selected by any green fund type, this does not seem to be driven by the selection itself but by a general trend. Additional tests show that the difference in the coefficients is significant when comparing green funds of type 1 and 2 as well as 2 and 3 which suggests that the credibility of environmental disclosures is the highest for green funds of type 1 and the lowest for green funds of type 3. This could indicate that the credibility of disclosures is less relevant for green funds which use active dialogue and in-house research in their selection processes as they have additional sources which they can use to assess the credibility of the information provided by the companies and are therefore not as depending on indicators for credibility which are published by the companies themselves.

Overall, the results of the regression models confirm my expectations that the environmental disclosure quality for green fund holdings is higher. Also, the environmental disclo-

sure quality is increasing after the selection by a green fund. The credibility scores are significantly lower for companies which are selected by green funds with more advanced selection processes. However, the associations do not seem to be driven by the selection itself but by a general trend. With this result in mind, I investigate the development over time in the following.

5.3. Green Funds and Environmental Disclosures over Time

In the following I want to assess how the environmental disclosure scores change over time and whether I find a time trend which is indicated by the empirical results. For a full overview of the environmental disclosure scores and growth rates for the investigated fund types and score components over time see Appendix VI.

Figure 1 shows the development of the total environmental disclosure scores for green fund holdings and non-green fund holdings in comparison. This graph illustrates that the environmental disclosure scores of both groups increase over time but that those of the green fund holdings are always on a higher level over the sample period.

These results illustrate the regression results reported in Table 14 being that the environmental disclosure score is higher for green fund holdings and increasing, but this is

Table 16: OLS Regressions (EDS Adoption, Fund Types)

Notes: This table presents the results of four OLS regressions with the environmental disclosure component adoption as the dependent variable and the green fund types as independent variables as well as additional control variables. The sample and all variables are defined in Table 12. The green fund types are defined in Table 7. Standard errors are presented in parentheses below the coefficients. The asterisks indicate the two-sided significance levels and should be interpreted as * p<0.05/ ** p<0.01/ *** p<0.001.

	Dependent Variable:			
	eds_adoption (1)	eds_adoption (2)	eds_adoption (3)	eds_adoption (4)
green_fund type1	0.158***	0.016	0.145***	-0.063
	(0.041)	(0.031)	(0.014)	(0.035)
green_fund type2	0.085	0.012	0.057*	-0.066
	(0.054)	(0.071)	(0.015)	(0.074)
green_fund type3	0.270***	0.005	0.256**	-0.075*
	(0.075)	(0.031)	(0.050)	(0.038)
SIZE	0.090***	0.125***	0.088***	0.085**
	(0.008)	(0.028)	(0.007)	(0.029)
ROA	-0.324	-0.280	-0.279	-0.149
	(0.206)	(0.266)	(0.143)	(0.262)
LEV	0.067	0.400	0.035	0.103
	(0.105)	(0.210)	(0.070)	(0.179)
Constant	0.686***			
	(0.089)			
Estimator	ols	ols	ols	ols
Observations	1360	1360	1360	1360
R2	0.124	0.793	0.131	0.804
R2 Adjusted	0.120	0.736	0.124	0.749
Fixed Effects	None	Firm	Year	Firm, Year

due to a general trend of increasing environmental disclosure quality for all companies. The scores of the green fund holdings are just on a higher level. This trend is also illustrated by the average and annual compound EDS change of green fund and non-green fund holdings over time which are presented in Table 19. The total score as well as its components increase for both groups and the growth rates are higher for non-green fund holdings.

Figure 2 depicts the development of the total environmental disclosure score before and after the selection by a green fund.

Lastly, I want to investigate the difference in environmental disclosure quality depending on the type of green funds over time. Figure 3 illustrates that the total environmental disclosure scores are increasing for all three fund types over time with the score of holdings of type 1 green funds being the highest. But the scores of types 2 and 3 holdings are catching up over time.

The findings suggests that green funds of type 1 tend to select companies with higher environmental disclosure scores as they are reliant on the published information, but the scores of companies selected by green fund types 2 and 3 increase more over the observed time period. For the total environmental disclosure score, extent and credibility, the av-

erage as well as compound annual percentage change is the lowest for fund type 1 and the highest for type 3 as illustrated in Table 20.

Overall, the development of the environmental disclosure scores over time supports the findings that indeed the environmental disclosure quality is higher for companies which are selected by green funds and is increasing after the selection by a green fund. But this seems to be an overall trend of increasing environmental disclosure score as the results also show increasing scores for those companies which are never selected by a green fund. The environmental disclosure scores for companies in green funds are just overall higher. With regards to the differences in selection processes of green fund the results provide evidence that the more sophisticated the fund selection processes, the lower the environmental disclosure scores are in the beginning and the more the environmental disclosure scores of respective fund holdings increase over time.

5.4. Discussion

My findings consistently support my initial expectations that companies in green funds have a higher environmental disclosure quality than companies which are not selected by a green fund as well as that the environmental disclosure

Table 17: OLS Regressions (EDS Extent, Fund Types)

Notes: This table presents the results of four OLS regressions with the environmental disclosure component extent as the dependent variable and the green fund types as independent variables as well as additional control variables. The sample and all variables are defined in Table 12. The green fund types are defined in Table 7. Standard errors are presented in parentheses below the coefficients. The asterisks indicate the two-sided significance levels and should be interpreted as * $p<0.05$/ ** $p<0.01$/ *** $p<0.001$.

	Dependent Variable:			
	eds_extent (1)	eds_extent (2)	eds_extent (3)	eds_extent (4)
green_fund type1	5.578***	1.895***	5.233***	-0.168
	(0.612)	(0.439)	(0.309)	(0.433)
green_fund type2	0.920	0.963	0.245	-1.042
	(0.807)	(0.676)	(0.269)	(0.652)
green_fund type3	5.547***	0.948	5.204***	-1.183*
	(1.120)	(0.509)	(0.280)	(0.542)
SIZE	2.051***	1.870***	2.007***	0.883***
	(0.118)	(0.306)	(0.072)	(0.232)
ROA	-1.256	-3.200	-0.403	-0.637
	(3.086)	(3.800)	(0.404)	(3.405)
LEV	1.353	8.358**	0.677	1.378
	(1.569)	(3.107)	(1.489)	(2.215)
Constant	2.915*			
	(1.331)			
Estimator	ols	ols	ols	ols
Observations	1360	1360	1360	1360
R2	0.260	0.884	0.274	0.910
R2 Adjusted	0.257	0.853	0.268	0.885
Fixed Effects	None	Firm	Year	Firm, Year

quality of companies in green funds increases further after the selection by a green fund. At the same time this does not seem to be a hint for a potential causal influence of the selection by a green fund on the environmental disclosure quality of their investees as my results show a similar trend of an increasing environmental disclosure quality for companies which are not selected by green funds. The environmental disclosure quality though is on a higher level for companies selected by green funds. This could indicate that green funds tend to select companies with a higher environmental disclosure quality which would be in line with the findings in my descriptive analysis which clearly highlight the importance of the information presented in the environmental disclosures of a company for the selection processes of green funds.

For the components of environmental disclosure quality, I find a significant positive association of the selection by a green fund and the adoption, extent as well as the credibility of environmental disclosures. Also, besides for the adoption of environmental disclosures, the quality increases after the selection by a green fund.

When looking at the green fund types my findings show that the selection by a fund of all types is significantly associated with a higher environmental disclosure score. Regarding the credibility my findings illustrate that the scores are lower for funds with more advanced selection processes. This indicates that for funds with advanced selection processes that use active dialogue and in-house research, the credibility of the environmental disclosures is less important as they gain information from additional sources. These results could also indicate that they do not automatically tend to select companies with higher environmental disclosure quality and credibility as they are not reliant on the credibility indicators published by the companies.

With my findings I also want to contribute to the identification of a potential causal relationship between the green fund selection and the environmental disclosure quality of companies. Based on my results I conclude that I would not expect to find a causal influence of the selection by a green fund on the environmental disclosure quality in general. Rather, I assume that the observed increase in environmental disclosure scores is driven by a general trend of increasing environmental disclosure quality. Based on the results of my investigation I suppose the idea that not the selection by a green fund itself but the interaction between green fund managers and the investees, for example due to active dialogue as well as the usage of information gathered directly from the investee in in-house research could have a positive effect on the environmental disclosure quality. This

Table 18: OLS Regressions (EDS Credibility, Fund Types)

Notes: This table presents the results of four OLS regressions with the environmental disclosure component credibility as the dependent variable and the green fund types as independent variables as well as additional control variables. The sample and all variables are defined in Table 12. The green fund types are defined in Table 7. Standard errors are presented in parentheses below the coefficients. The asterisks indicate the two-sided significance levels and should be interpreted as * p<0.05/ ** p<0.01/ *** p<0.001.

	Dependent Variable:			
	eds_credbility (1)	eds_credbility (2)	eds_credbility (3)	eds_credbility (4)
green_fund type1	2.533***	1.310***	2.222***	-0.177
	(0.276)	(0.257)	(0.135)	(0.209)
green_fund type2	1.451***	1.712***	0.795*	0.151
	(0.364)	(0.356)	(0.225)	(0.419)
green_fund type3	1.445**	1.278**	1.115*	-0.312
	(0.505)	(0.465)	(0.296)	(0.364)
SIZE	0.979***	1.041***	0.940***	0.271
	(0.053)	(0.255)	(0.073)	(0.142)
ROA	-2.064	-2.247	-1.028	0.476
	(1.391)	(1.612)	(0.405)	(1.227)
LEV	1.524*	6.374**	0.848	0.669
	(0.707)	(1.979)	(0.546)	(1.030)
Constant	-0.800			
	(0.600)			
Estimator	ols	ols	ols	ols
Observations	1360	1360	1360	1360
R2	0.284	0.833	0.344	0.906
R2 Adjusted	0.281	0.787	0.338	0.880
Fixed Effects	None	Firm	Year	Firm, Year

Table 19: EDS Change - Green Fund vs. Non-Green Fund

Source: Based on my sample data. The sample and all variables are defined in Table 12.

Notes: This table presents the environmental disclosure scores percentage change for the treatment group and control group over time, on average and compound annual. For variable and sample definitions see Table 12. For a full overview of the environmental disclosure scores and growth rates for the investigated fund types and score components over time see Appendix VI.

Year	eds	eds_adoption	eds_extent	eds_credibility
Green Fund (in %)				
Average	6.48	1.92	5.29	10.47
Compound Annual	5.13	1.53	4.19	8.15
Non-Green Fund (in %)				
Average	9.46	6.51	8.16	13.65
Compound Annual	7.48	5.11	6.46	10.64

is supported by the environmental disclosure score growth rates which are considerably higher for green funds which conduct active dialogue, in-house research, or both, than for those who do not. Despite this, my results highlight the overall importance of environmental disclosures for the selection processes of green funds. Furthermore, when thinking about potential causal relationships, I believe that my results also provide insights which hint at a potential causal influence

of the environmental disclosure quality on the selection by a green fund, especially for funds of type 1 which do not rely on additional data sources in their selection processes. These trains of thought illustrate interesting questions for future research.

My study is not without uncertainty as there are several limitations to my findings. Firstly, my assessment of environmental disclosure quality is implemented in form of a score
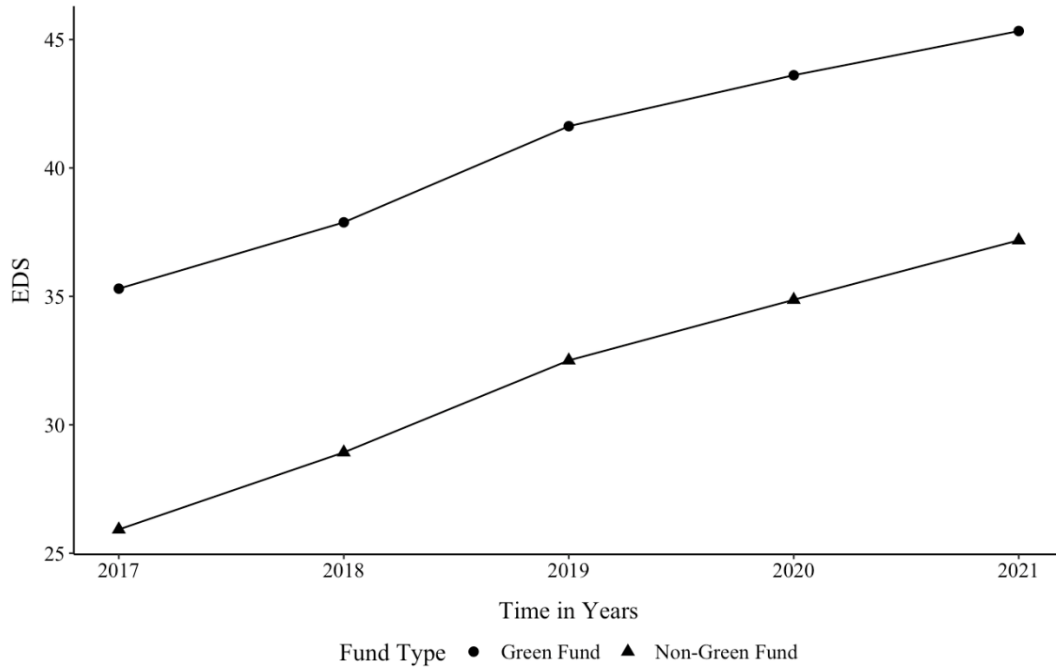
Figure 1: Total EDS over Time – Green vs. Non-Green Funds

Source: Based on the full sample data, the sample and all variables are defined in Table 12.
Notes: This graph depicts the total environmental disclosure score data and compares the scores of companies which are selected by a green fund to those that are not selected by a green fund during the sample period.
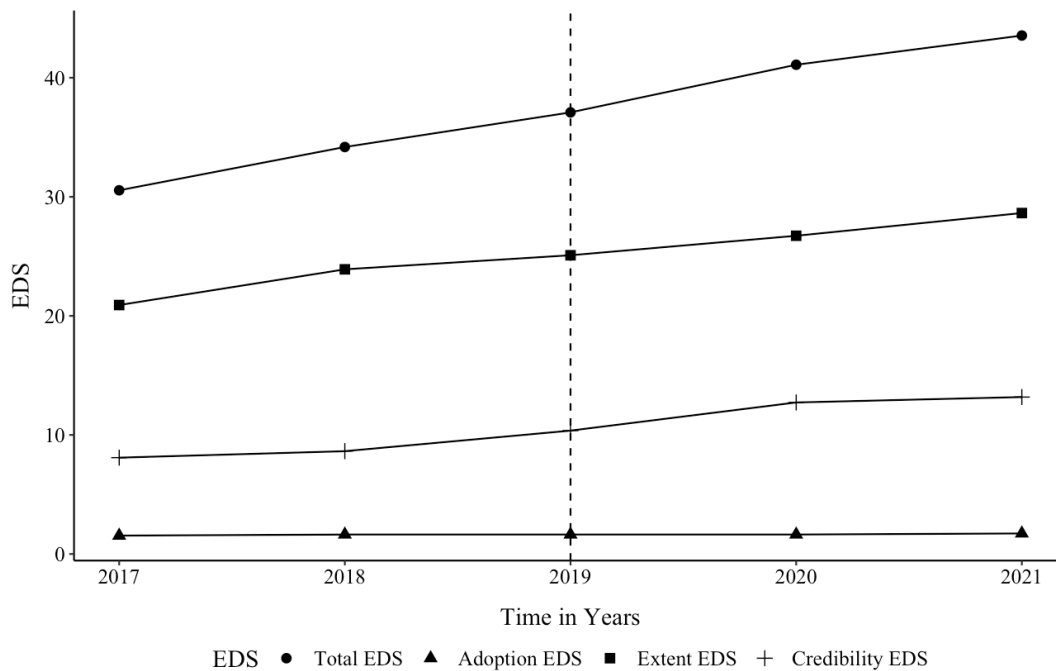

Figure 2: EDS – Before and After Green Fund Selection

Source: Based on treatment group data, the sample and all variables are defined in Table 12.
Notes: This graph depicts the environmental disclosure score data for companies which were initially selected by a green fund in 2019. This is illustrated by the dashed line. It shows that the scores do indeed increase further after the selection as also seen in the empirical results in Chapter 5.2, but I do not observe a change different from the growth before. This suggests that this further increase is not driven by the selection for a green fund itself but by the observed trend of increasing environmental disclosure quality.
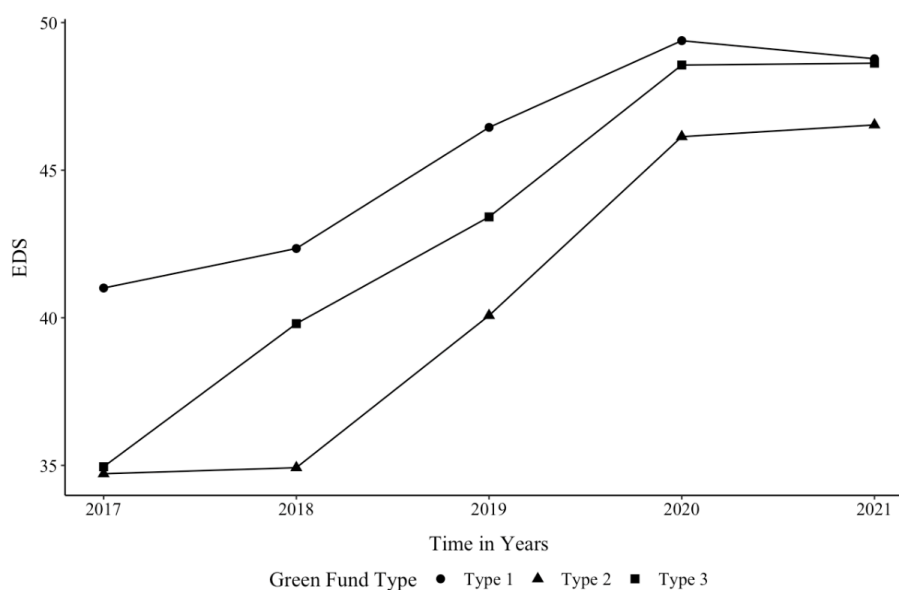
Figure 3: Total EDS over Time – Green Fund Types

Source: Based on treatment group data. The sample and all variables are defined in Table 12.
Notes: This graph depicts the total environmental disclosure score data and compares the scores of companies which are selected by the different types of green funds.

Table 20: EDS Change - Green Fund Types

Source: Based on treatment group data. The sample and all variables are defined in Table 12.
Notes: This table presents the environmental disclosure scores percentage change for the treatment group split up by fund type over time, on average and compound annual. For the fund type definitions see Table 7. For a full overview of the environmental disclosure scores and growth rates for the investigated fund types and score components over time see Appendix VI.

Year	eds	eds_adoption	eds_extent	eds_credibility
Type 1 (in %)				
Average	4.51	1.06	1.63	14.47
Compound Annual	3.53	0.84	1.29	10.70
Type 2 (in %)				
Average	7.83	0.13	5.18	17.98
Compound Annual	6.04	0.07	4.08	12.81
Type 3 (in %)				
Average	8.73	-0.18	6.41	19.56
Compound Annual	6.83	-0.15	4.96	14.31

which can never fully cover all aspects of environmental disclosure quality, as also outlined in the discussion on scores in prior literature illustrated in Chapter 3.2. Secondly, the outcome of the score is affected by the data quality in the database and despite the control of several samples I cannot ensure that the data is fully correct or unbiased. Moreover, I base my analysis on selected green funds and conventional funds of which I identify the holdings. Even though I cover different as well as large fund providers, this does not mean that my analysis covers the complete variety of fund selection processes. Lastly, my findings focus on the situation in

the EU. Therefore, the findings might not apply in other regions.

6. Conclusion

This analysis explores the relationship between the selection of companies by a green fund and their environmental disclosure quality. The findings show that the environmental disclosure quality of companies which are selected by green funds is higher than of those who are not selected. Additionally, I find that the environmental disclosure quality of

companies increases after they are selected by a green fund. But my further investigations of this development hint that this is not triggered by the selection itself, but the environmental disclosure quality just increases further. This further increase is not specific to the holdings of green funds but I observe a general trend of increasing environmental disclosure quality for all companies in my sample. Furthermore, I find that the relationship of green fund selection and environmental disclosure quality differs depending on the design of the selection processes of green funds. The environmental disclosure quality of holdings of green funds with basic selection processes is initially higher, but the environmental disclosure quality of holdings of funds with more advanced selection processes catches up quickly. Moreover, my findings suggest that funds with more advanced selection processes who use additional data sources within the selection processes seem to be less dependent on the environmental disclosures, especially regarding the credibility.

My results provide several queries which offer potential for interesting future research. As discussed, I find a general trend of increasing environmental disclosure quality over all companies. This could encourage an investigation of whether this trend is caused by for example the increasing regulatory pressure in the EU where mandatory environmental disclosures are already implemented and standards for the disclosures are planned to be implemented in the next years. Another potential explanation would be that I observe this increasing trend because all the companies in my sample are selected by an investment fund, green or conventional. The first idea could be tested based on my sample data with an inferential analysis of the changes in environmental disclose quality after the implementation of the environmental disclosure regulation in the EU whilst the other would require a larger sample which uses companies, which are not a holding of any fund as the control group. Furthermore, an investigating of a potential causal effect of the active dialogue or in-house research of green funds on the environmental disclosure scores can be conducted based on my sample under isolation of the funds which conduct these steps and could potentially explain the differences in the association between green funds and environmental disclosures depending on the green fund selection processes. Also, the data sample allows for an investigation of a potential causal influence of the environmental disclosure quality on the selection by a green fund and whether such a potential effect could be weaker or stronger depending on how much the specific fund relies on environmental disclosures as a data source in their selection process. Furthermore, literature and media currently discuss extensively whether green funds are actually green. My results indicate that green funds do invest in companies with a higher environmental disclosure quality which, if seen as an indicator for environmental performance as discussed in prior literature would mean that green funds do indeed invest in companies which are greener than the investees of conventional funds. Therefore, revisiting the relationship of environmental disclosures and environmental performance in this context could provide important insights for this discussion.

Overall, my analysis provides a detailed description of green fund selection processes and how these selection processes interact with the environmental disclosures of companies. The empirical results highlight the relationship between the selection by a green fund and the environmental disclosure quality of companies. By this I add to literature as I initially investigate this relationship not only theoretically but with a structured descriptive as well as empirical analysis. Moreover, I provide further insights into a topic which is currently of high timeliness but still lacks systematic investigations. Therefore, a structured investigation of green funds in the universe of sustainable finance contributes to the overall understanding of this vast field. Finally, the highlighted trend of an overall increasing environmental disclosure quality can be seen as a silver lining in the debate regarding whether environmental disclosures might just be a platform for greenwashing, especially due to the relevance of credibility of disclosures in the selection processes of green funds as well as the high increases of the credibility scores for both, holdings of green and non-green funds.

References

Arribas, I., Espinós-Vañó, M. D., García García, F., & Oliver-Muncharaz, J. (2019). Defining socially responsible companies according to retail investors' preferences. *Enterpreneurship and Sustainability Issues*, *7*(2), 1641–1653.

Arribas, I., Espinós-Vañó, M. D., García García, F., & Tamosiuniene, R. (2019). Negative screening and sustainable portfolio diversification. *Enterpreneurship and Sustainability Issues*, *6*(4), 1566–1586.

Baillie Gifford. (2022). *Baillie gifford worldwide funds prospectus 2022.* Retrieved from https://www.bailliegifford.com/en/germany/professional-investor/literature-library/funds/dublin-funds/fund-literature/baillie-gifford-worldwide-funds-prospectus/ (Last Access: July 8, 2022)

Bancel, F., & Mittoo, U. R. (2009). Why do european firms go public? *European financial management*, *15*(4), 844–884.

Bassen, A., Gödker, K., Lüdeke-Freund, F., & Oll, J. (2019). Climate information in retail investors' decision-making: Evidence from a choice experiment. *Organization & Environment*, *32*(1), 62–82.

Birkey, R. N., Michelon, G., Patten, D. M., & Sankara, J. (2016). Does assurance on csr reporting enhance environmental reputation? an examination in the us context. In *Accounting forum* (Vol. 40, pp. 143–152).

BlackRock. (2022). *EU taxonomy implementation 2022.* Retrieved from https://www.blackrock.com/corporate/literature/prospectus/eu-taxonomy.pdf (Last Access: July 8, 2022)

Braam, G. J., de Weerd, L. U., Hauck, M., & Huijbregts, M. A. (2016). Determinants of corporate environmental reporting: The importance of environmental performance and assurance. *Journal of cleaner production*, *129*, 724–734.

Busch, T., Bauer, R., & Orlitzky, M. (2016). Sustainable development and financial markets: Old paths and new avenues. *Business & Society*, *55*(3), 303–329.

Campbell, D., Craven, B., & Shrives, P. (2003). Voluntary social reporting in three ftse sectors: a comment on perception and legitimacy. *Accounting, Auditing & Accountability Journal*.

Capelle-Blancard, G., & Monjon, S. (2012). Trends in the literature on socially responsible investment: Looking for the keys under the lamppost. *Business ethics: a European review*, *21*(3), 239–250.

Chatterji, A. K., Levine, D. I., & Toffel, M. W. (2009). How well do social ratings actually measure corporate social responsibility? *Journal of Economics & Management Strategy*, *18*(1), 125–169.

Chen, L., Srinidhi, B., Tsang, A., & Yu, W. (2016). Audited financial reporting and voluntary disclosure of corporate social responsibility (csr) reports. *Journal of Management Accounting Research*, *28*(2), 53–76.

Clarkin, J. E., & L. Cangioni, C. (2016). Impact investing: A primer and review of the literature. *Entrepreneurship Research Journal*, *6*(2), 135–173.

Clarkson, P. M., Li, Y., Richardson, G. D., & Vasvari, F. P. (2008). Revisiting the relation between environmental performance and environmental disclosure: An empirical analysis. *Accounting, organizations and society*, *33*(4-5), 303–327.

Clarkson, P. M., Overell, M. B., & Chapple, L. (2011). Environmental reporting and its relation to corporate environmental performance. *Abacus*, *47*(1), 27–60.

Del Giudice, A., & Rigamonti, S. (2020). Does audit improve the quality of esg scores? evidence from corporate misconduct. *Sustainability*, *12*(14), 5670.

Diez-Cañamero, B., Bishara, T., Otegi-Olaso, J. R., Minguez, R., & Fernández, J. M. (2020). Measurement of corporate social responsibility: A review of corporate sustainability indexes, rankings and ratings. *Sustainability*, *12*(5), 2153.

DNCA. (2022). *DNCA SRI euro quality monthly reporting as of may 2022.* Retrieved from https://www.dnca-investments.com/funds/dnca-sri-euro-quality/parts/nc-fr0013514882/MR-nc-fr0013514882/download_doc_share?locale=en&country_code=INT (Last Access: July 8, 2022)

EFRAG. (2022). *Draft european sustainability reporting standard 1 general provisions.* Retrieved from https://www.efrag.org/Assets/Download?assetUrl=%2fsites%2fwebpublishing%2fSiteAssets%2fWorking%2520Paper%2520ESRS%25201%2520General%2520Provisions.pdf (Last Access: July 1, 2022)

Elkington, J. (1998). Accounting for the triple bottom line. *Measuring business excellence*.

ESMA. (2022). *Mifid ii, policy activities.* Retrieved from https://www.esma.europa.eu/policy-rules/mifid-ii-and-mifir (Last Access: August 3, 2022)

European Commission. (2011). *Communication from the commission to the european parliament, the council, the european economic and social committee and the committee of the regions: A renewed eu strategy 2011-14 for corporate social responsibility.* Official Journal of the European Union, Brussels, Belgium.

European Commission. (2017). *Guidelines on non-financial reporting: methodology for reporting non-financial information.* Official Journal of the European Union, Brussels, Belgium.

European Commission. (2019). *Guidelines on non-financial reporting: Supplement on reporting climate-related information.* Official Journal of the European Union, Brussels, Belgium.

European Commission. (2020). *Communication from the commission to the european parliament, the council, the european economic and social committee and the committee of the regions: Stepping up europe's 2030 climate ambition - investing in a climate-neutral future for the benefit of our people.* Official Journal of the European Union, Brussels, Belgium.

European Parliament. (2014). *Directive 2014/95/eu of the european parliament and of the council of 22 october 2014 amending directive 2013/34/eu as regards disclosure of non-financial and diversity information by certain large undertakings and groups.* Official Journal of the European Union, Brussels, Belgium.

European Parliament. (2019). *Regulation (eu) 2019/2088 of the european parliament and of the council of 27 november 2019 on sustainability-related disclosures in the financial services sector.* Official Journal of the European Union, Brussels, Belgium.

European Parliament. (2020). *Regulation (eu) 2020/852 of the european parliament and of the council of 18 june 2020 on the establishment of a framework to facilitate sustainable investment, and amending regulation (eu) 2019/2088.* Official Journal of the European Union, Brussels, Belgium.

European Parliament. (2021). *Proposal for a directive of the european parliament and of the council amending directive 2013/34/eu, directive 2004/109/ec, directive 2006/43/ec and regulation (eu) no 537/2014, as regards corporate sustainability reporting.* Official Journal of the European Union, Brussels, Belgium.

Fernandez-Feijoo, B., Romero, S., & Ruiz, S. (2014). Effect of stakeholders' pressure on transparency of sustainability reports within the gri framework. *Journal of business ethics*, *122*, 53–63.

Fernando, S., & Lawrence, S. (2014). A theoretical framework for csr practices: Integrating legitimacy theory, stakeholder theory and institutional theory. *Journal of Theoretical Accounting Research*, *10*(1), 149–178.

Foster, N. J. (2021). Our commitment to ESG principles. *The Risk Management Association Journal*, *7*(103), 3.

Fund Dact Sheet. (2022). *Sustainability Policy 2022.* Retrieved from https://www.ubs.com/2/e/files/RET/FS_RET_LU1679116845_LI_EN.pdf (Last Access: July 8, 2022)

Gangi, F., D'Angelo, E., et al. (2016). The virtuous circle of corporate social performance and corporate social disclosure. *Modern Economy*, *7*(12), 1396.

GRI. (2022). *Sustainability reporting guidelines.* GRI Universal Standard, Amsterdam, The Netherlands.

Hahn, R., & Kühnen, M. (2013). Determinants of sustainability reporting: A review of results, trends, theory, and opportunities in an expanding field of research. *Journal of cleaner production*, *59*, 5–21.

Hellsten, S., & Mallin, C. (2006). Are 'ethical'or 'socially responsible'investments socially responsible? *Journal of Business Ethics*, *66*, 393–406.

Hoffmann, J., Scherhorn, G., & Busch, T. (2004). Darmstadt definition of sustainable investments. *Retrieved from Wuppertal: https://www.econs tor. eu/bitst ream/10419/59280/1/48495*, *7511*.

Ibikunle, G., & Steffen, T. (2017). European green mutual fund performance: A comparative analysis with their conventional and black peers. *Journal of Business Ethics*, *145*, 337–355.

ICMA. (2021). *Green bond principles - voluntary process guidelines for issuing*

green bonds. Retrieved from https://www.icmagroup.org/assets/documents/Sustainablefinance/2021-updates/Green-Bond-Principles-June-2021-140621.pdf (Last Access: June 17, 2022)

Inderst, G., Kaminker, C., & Stewart, F. (2014). *Defining and measuring green investments: Implications for institutional investors asset allocations* (Tech. Rep.). OECD Working Papers on Finance, Insurance and Private Pensions.

ISSB. (2022). *Draft ifrs s1 general requirements for disclosure of sustainability-related financial information.* Retrieved from https://www.ifrs.org/content/dam/ifrs/project/general-sustainability-related-disclosures/exposure-draft-ifrs-s1-general-requirements-for-disclosure-of-sustainability-related-financial-information.pdf (Last Access: July , 2022)

Ito, Y., Managi, S., & Matsuda, A. (2013). Performances of socially responsible investment and environmentally friendly funds. *Journal of the Operational Research Society*, *64*(11), 1583–1594.

Kaufer, K., & Steponaitis, L. (2021). *Just money: Mission-driven banks and the future of finance.* MIT Press.

Kolk, A., & Perego, P. (2010). Determinants of the adoption of sustainability assurance statements: An international investigation. *Business strategy and the environment*, *19*(3), 182–198.

KPMG. (2022). *The kpmg survey of sustainability reporting 2020, kpmg impact, 11th edition.* Retrieved from https://home.kpmg/xx/en/home/insights/2020/11/the-time-has-come-survey-of-sustainability-reporting.html (Last Access: July 02, 2022)

Lagasio, V., & Cucari, N. (2019). Corporate governance and environmental social governance disclosure: A meta-analytical review. *Corporate Social Responsibility and Environmental Management*, *26*(4), 701–711.

Lozano, R., & Huisingh, D. (2011). Inter-linking issues and dimensions in sustainability reporting. *Journal of cleaner production*, *19*(2-3), 99–107.

Maltais, A., & Nykvist, B. (2020). Understanding the role of green bonds in advancing sustainability. *Journal of sustainable finance & investment*, 1–20.

Michelon, G., Pilonato, S., & Ricceri, F. (2015). Csr reporting practices and the quality of disclosure: An empirical analysis. *Critical perspectives on accounting*, *33*, 59–78.

Mirova. (2022a). *Mirova minimum standards for controversial activities 2021.* Retrieved from https://www.mirova.com/sites/default/files/2021-01/Controversial-Activities-Jan-2021-EN.pdf (Last Access: July 8, 2022)

Mirova. (2022b). *Mirova our approach to esg assessment 2021.* Retrieved from https://www.mirova.com/sites/default/files/2021-03/our-approach-to-esg-assessment.pdf (Last Access: July 8, 2022)

Morningstar. (2022a). *Global sustainable fund flows: Q1 2022 in review, morningstar manager research.* Retrieved from https://www.morningstar.com/lp/global-esg-flows (Last Access: June 17, 2022)

Morningstar. (2022b). *SFDR article 8 and article 9 funds: 2021 in review, morningstar manager research.* Retrieved from https://www.morningstar.com/lp/sfdr-article8-article9 (Last Access: July 11, 2022)

MSCI. (2022). *MSCI ESG rating brochure, MSCI ESG research.* Retrieved from https://www.msci.com/documents/1296102/21901542/MSCI+ESG+Ratings+Brochure-cbr-en.pdf (Last Access: July 11, 2022)

Nordea. (2022a). *Fund fact sheet 2022.* Retrieved from https://www.nordea.de/de/professional/documents/monthly-report---fact-sheet/MR_N1_GCLIMEF_BP_EUR_ger_INT.pdf (Last Access: July 8, 2022)

Nordea. (2022b). *Nordeas commitment to the european sri transparency code 2022.* Retrieved from https://www.nordea.de/de/professional/documents/static-links/2022_Transparency-Code-40_ENG_Equity_NAM_ESG_STARS_and_ESG_Thematics.pdf (Last Access: July 8, 2022)

Pérez-López, D., Moreno-Romero, A., & Barkemeyer, R. (2015). Exploring the relationship between sustainability reporting and sustainabil-

ity management practices. *Business Strategy and the Environment*, *24*(8), 720–734.

Robeco. (2022a). *Fund factsheet 2022.* Retrieved from https://www.robeco.com/doca/CGF_SDGEE_DH-fact-202205-profdede.pdf (Last Access: July 8, 2022)

Robeco. (2022b). *Pre-contractual disclosure of a fund that has a sustainable investment objective 2022.* Retrieved from https://www.robeco.com/docm/sfdr-global-sdg-engagement-equities.pdf (Last Access: July 8, 2022)

Robeco. (2022c). *SDG framework 2022.* Retrieved from https://www.robeco.com/docm/docu-robeco-explanation-sdg-framework.pdf (Last Access: July 8, 2022)

Ryall, C., & Riley, S. (1996). Appraisal of the selection criteria used in green investment funds. *Business Strategy and the Environment*, *5*(4), 231–241.

SASB. (2020). *Conceptual framework exposure draft.* Retrieved from https://www.sasb.org/wp-content/uploads/2021/07/PCP-package_vF.pdf (Last Access: July 1, 2022)

Semenova, N., & Hassel, L. G. (2015). On the validity of environmental performance metrics. *Journal of business ethics*, *132*, 249–258.

S&P. (2022). *S&P global ESG scores methodology, S&P global.* Retrieved from https://www.spglobal.com/esg/documents/sp-global-esg-scores-methodology-2022.pdf (Last Access: July 11, 2022)

Stuart, E., & Bioy, H. (2021). *Investing in times of climate change, morningstar manager research.* Retrieved from https://www.morningstar.com/en-uk/lp/investing-in-timesofclimatechange?utm_medium=referral&utmcampaign=linkshare&utm_source=link (Last Access: June 17, 2022)

TCFD. (2017). *Final report - recommendations of the task force on climate-related financial disclosures.* Retrieved from https://assets.bbhub.io/company/sites/60/2021/10/FINAL-2017-TCFD-Report.pdf (Last Access: July 1, 2022)

TCFD. (2018). *Task force on climate-related financial disclosures: status report.* Retrieved from www.fsb-tcfd.org/wp-content/uploads/2018/08/FINAL-2018-TCFD-Status-Report-092518.pdf (Last Access: July 1, 2022)

Windolph, S. E. (2011). Assessing corporate sustainability through ratings: challenges and their causes. *Journal of Environmental sustainability*, *1*(1), 5.