Financial Markets in the 21st Century –
Three Essays on How Sustainability Accounting Shapes Investors' Valuation Judgments

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List of Abbreviations

AB	Aktiebolag
ACR	Amazon Cloud Research
Adj.	Adjusted
AG	Aktiengesellschaft
ANCOVA	Analysis of Covariance
ANOVA	Analysis of Variance
ASA	Allmennaksjeselskap
AS	Aksjeselskap
AWS	Amazon Web Services
BBVA	Banco Bilbao Vizcaya Argentaria
CAR	Cumulative Market-Adjusted Return
CDP	Carbon Disclosure Project
Coef.	Coefficient
Coef. Dif.	Coefficient Difference
CO2	Carbon Dioxide
CPDR	Corporate Philanthropic Disaster Response
CSR	Corporate Social Responsibility
CSRD	Corporate Social Responsibility Directive
DoS	Degree of Sustainability
EAS	Environmental Attitudes Scale
EC	European Commission
E.g.	Exempli Gratia
ESG	Environmental, Social, and Governance
Et al.	Et Alii
EU	European Union
EU ETS	European Union Emissions Trading System
EU SFDR	European Union Sustainable Finance Disclosure Regulation
EUR	Euro
GBP	Great British Pound

GHG	Greenhouse Gas
GSIA	Global Sustainable Investment Alliance
Html	Hypertext Markup Language
Https	Hypertext Transfer Protocol Secure
I.e.	Id Est
ICAP	International Carbon Action Partnership
INC	Incorporated
ISO	International Organization for Standardization
K.K.	Kabushiki Kaisha
KIID	Key Investor Information Document
LLC	Limited Liability Company
M	Mean
Max.	Maximum
Min.	Minimum
MSCI	Morgan Stanley Capital International
N	Number of Observations
NV	Naamloze Vennootschap
OLS	Ordinary Least Squares
PBC	Public Benefit Corporation
P(-value)	Probability Value
PAS	Publicly Available Specification
PLC	Public Limited Company
SA	Société Anonyme
SBTi	Science Based Targets Initiative
SE	Societas Europaea
SEM	Structural Equation Modeling
Std. Dev.	Standard Deviation
Suest	Seemingly Unrelated Estimation
SRI	Socially Responsible Investing
T(-value)	Test Statistic Value
UK	United Kingdom

UK SDR	United Kingdom Sustainable Disclosure Regulation
UN	United Nations
US	United States
US SEC	United States Securities and Exchange Commission
Vs.	Versus
www.	World Wide Web

1 Introduction

The world is currently in the midst of a global climate crisis. Increasingly tangible effects of climate change, international climate protection agreements, and global social inequality have made sustainability the defining issue of recent times. Public and media attention about companies' social and environmental activities has been peaking (Haney, Pope, & Arden, 2020) and investor scrutiny has increased over recent years (Levit, 2019). Companies are not only increasingly urged by public pressure to become more sustainable, but also experience increased regulatory pressure. In the Paris Agreement, 193 countries committed themselves to climate neutrality and the Glasgow Climate Pact called on all countries to revisit and strengthen their 2030 targets (United Nations [UN], 2021). Regulators in major financial markets have enforced ESG disclosure regulations to increase market transparency (e.g., European Union (EU) Sustainability Finance Disclosure Regulations (EU SFDR), United Kingdom (UK) Sustainable Disclosure Regulation (UK SDR)). Accordingly, companies sense pressure to commit to ethical, socially oriented, sustainable business practices, transform their business models, and report about their progress (Çop, Olorunsola, & Alola, 2021), which increases the need for sustainability accounting. Sustainability accounting connects a companies' strategies from a sustainable framework by disclosing information on the activities that have a direct impact on its society, environment, and economic performance (Ameer, & Othman, 2012; Perrini, & Tencati 2006; Schaltegger, & Burritt 2010).

In view of this increasing importance in politics, business and society, sustainability aspects are also increasingly being taken into account in investment decisions. Indeed, recent research largely supports that prosocial preferences affect investment decisions (e.g., Andonov, Hochberg, & Rauh, 2018; Barber, Morse, & Yasuda, 2021; Bauer, Ruof, & Smeets, 2021; Dyck et al., 2019; Hartzmark, & Sussman, 2019; Riedl, & Smeets, 2017). Thus, investors balance prosocial preferences with liquidity, risks and returns of available investment alternatives to arrive at an optimal investment decision (Pedersen, Fitzgibbons, & Pomorski, 2021).[1] In this sense, sustainability accounting is becoming increasingly important for investor valuation judgment and results in sizable effects on financial markets (Hartzmark, & Sussman, 2019). Given this importance, this dissertation studies how sustainability accounting shapes investors' valuation judgments.

While recent research demonstrated that investors have prosocial preferences and show a willingness to pay for sustainability (Barber, Morse, & Yasuda, 2021; Hartzmark, & Sussman, 2019; Riedl, & Smeets, 2017), it is inconclusive whether investors are sensitive to an investment's degree of sustainability (DoS). An investment's DoS indicates its sustainability performance measured by analytical tools using environmental, social, and governance (ESG) criteria. Traditional decision theory, commonly applied in sustainable investing models, predicts that investors are consequentialists (Becker, 1974; Eckel, & Grossman, 1996), meaning that they derive utility proportional to an investment's DoS. In contrast, the theory of warm-glow giving assumes that investors derive utility from an emotional response to the act of behaving prosocial (Andreoni, 1990), meaning they are insensitive to an investment's DoS. To contribute to overcoming the global climate crisis, sustainable finance strategies aim to redirect capital flows to more socially responsible investments, relying on ESG disclosure regulations. ESG disclosure regulations only create an incentive to invest in more socially responsible investments, if investors are sensitive to an investment's DoS. This creates a need for research on the effectiveness of sustainability accounting. This dissertation addresses this research gap by analyzing whether an investment's DoS impacts investors' valuation judgments.

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[1] According to Markowitz (1952) portfolio theory expects investors to balance liquidity, risks and returns of available investment alternatives to arrive at an optimal investment decision.

A particularly critical observed component of sustainability accounting are corporate donations toward disaster relief efforts, often called corporate philanthropic disaster response (CPDR) (Berlemann, & Steinhardt, 2017; Van Aalst, 2006). As CPDR often is a highly visible part of philanthropy, it can positively affect a firm's reputation among consumers and investors (Martin, & Moser, 2016). But huge economic losses and strongly affected social and environmental structures (Deryugina, 2017; Martin, & Moser, 2016; Muller, & Kräussl, 2008) might be anticipated by investors as significant financial consequences to the company and may make philanthropic giving a controversial decision (Muller, & Kräussl, 2011). Previous research is inconclusive, as it finds that CPDR can result in both positive and negative capital market reactions (Chen, Patten, & Roberts, 2008; Muller, & Kräussl, 2011). Thus, there is an ongoing need for research on which particular mechanisms affect whether the capital market reacts positively or negatively toward CPDR. One potential reason why investors value firms differently could be based in their perception of how firms engage in CPDR. Thus, this dissertation also examines why private investors might consider CPDR as truly philanthropical or, on the contrary, assess CPDR skeptical and potentially egoistic-driven.

In recent years, the UN (2020) made carbon neutrality by 2050 the world’s most urgent mission. The vast majority of large global companies reports specific emissions reduction targets, and most of these even specific target years, when to achieve net zero emissions (Carbon Disclosure Project [CDP], 2017). Reporting a net zero emission record is the most salient achievement in sustainability accounting and likely attracts investor interest, as companies are responsible for the majority of global greenhouse gas (GHG) emissions, and public and media attention about companies’ environmental activities is peaking (Haney, Pope, & Arden, 2020). Previous research finds that investors consider GHG emissions data in their investment decision and there is a negative GHG effect on market capitalization (e.g., Bauer, Ruof, & Smeets, 2021; Chapple, Clarkson, & Gold, 2013; Clarkson et al., 2015; Griffin, Lont, & Sun, 2017; Matsumura, Prakash, & Vera-Muñoz, 2014). However, without a global pricing of GHG emissions that comprehensively reflects GHG's true externalities, companies have weak economic incentives to create the most efficient reduction strategies. From an investor perspective, a company's GHG emission reductions are inefficient if the investor could invest the returns lost on the emission reductions in a different project with higher emission reductions. Instead, reporting a net zero emission record is the most salient achievement. Simultaneously, retail investors tend to base investment decisions on salient information and may examine fewer other cues in the presence of salient information (e.g., Dierynck et al., 2024). Therefore, as carbon neutrality will continue to be the most relevant challenge in the near future and it is unclear whether companies committed to net zero emissions create the most GHG emission reductions per invested dollar, there is a great demand for research examining potentially negative side effects of sustainability accounting. This dissertation addresses this demand by examining whether investors invest more in funds disclosing net zero GHG emissions, even if such investment is less efficient in reducing carbon emissions.

These three challenges investors currently face, regarding the integration of sustainability accounting information in their valuation judgment, constitute the nucleus of this dissertation, which aims to address the abovementioned research gaps. Chapter two provides a comprehensive analysis of how investors integrate an investment's DoS into their valuation judgments. Thus, it adds to the literature on the influence of prosocial preferences in investment decisions (Barber, Morse, & Yasuda, 2021; Riedl, & Smeets, 2017; Hartzmark, & Sussman, 2019; Bauer, Ruof, & Smeets, 2021), by showing that investors perceiving an investment's DoS as high results in a higher valuation judgment. Moreover, I achieve first evidence that a higher DoS can compensate investors for lower returns, i.e. that investors would (partially) sacrifice an additional unit of return for an additional unit of sustainability. This study also provides practical implications, as I demonstrate that a high DoS creates an investment incentive for investors.

Chapter three adds insights about the effect of CPDR efforts on investors' valuation judgment, focusing on the mediating role of their attribution of motives to a firm's CPDR. It reveals that investors associate a higher magnitude of a firm's CPDR with values-driven corporate social behavior and reward it with a higher assessment of a firm's value, while a lower magnitude of a firm's CPDR can be perceived as an ingratiating attempt to win favor and affect investors' valuation judgment negatively. These findings explain why previous research finds that CPDR announcements can entail both positive and negative capital market reactions (Chen, Patten & Roberts, 2008; Muller, & Kräussl, 2011). Hence, this study extends the behavioral finance literature, examining the influence of Corporate Social Responsibility (CSR)-induced attributions on investors' valuation judgment (Ellen, Webb, & Mohr, 2006; Forehand, & Grier, 2003; Skarmeas, & Leonidou, 2013; Vlachos et al., 2009).

Chapter four analyzes if investors invest more in funds disclosing net zero GHG emissions, even if such investments are less efficient in reducing carbon emissions, compared to net positive GHG emission funds. It contributes to the large literature on investors' considerations of sustainability aspects in their valuation judgment (e.g., Bauer, Ruof, & Smeets, 2021; Biktimirov, & Afego, 2022; Hartzmark, & Sussman, 2019), suggesting that the salient and relevant setting of net zero emissions targets may lead to inefficient capital allocation as a result of narrow bracketing and examining fewer alternatives in the presence of net zero. This study especially expands the growing stream of literature on economic effects of GHG disclosure (e.g., Chithambo et al., 2022;

Tomar, 2023), because our experimental approach allows us to anticipate possible effects of firms achieving, or pretending to have achieved, net zero emissions and reporting about it.

In summary, this dissertation comprises three studies each of which has examined the relationship between sustainability accounting and investors' valuation judgment within a specific context. Each study makes an important contribution to the respective literature, as argued above. Short summaries of the studies presenting the contents of each chapter can be found below. After that, this dissertation proceeds as follows. Chapters 2, 3, and 4 each contain one of the studies summarized below. Lastly, chapter 5 concludes this dissertation.

Chapter 2 **"Does Degree of Sustainability Influence Private Investors' Valuation Judgments?"** experimentally examines private investors' sensitivity to an investment's DoS, considering the mediating role of socially responsible investing (SRI) skepticism. Major financial markets are establishing ESG disclosure regulations classifying socially responsible investment strategies. These are aiming to redirect capital flows toward investments with a higher DoS, to improve financing the transition to a sustainable economy. However, it is yet unclear how an investment's DoS affects investor valuation judgment. To address this, I conducted a 2x2x2 between-subjects online experiment with private investors recruited via Prolific, manipulating SRI strategy, SRI certification, and return differences compared to a non-sustainable investment. The results show that private investors have a higher willingness to invest in high DoS investments compared to low DoS investments. Additionally, I find that the DoS moderates the effect of return sacrifice and SRI certification on private investors' valuation judgments. I also examine the mediating role of SRI skepticism. My study mainly contributes to the literature examining the influence of reported sustainability attributes on investors' valuation judgments.

This chapter is single-authored and currently under review for publication at International Review of Financial Analysis.

Chapter 3 **“The Influence of Corporate Philanthropic Donations on Private Investors' Valuation Judgments: Experimental Evidence”** experimentally examines how the magnitude of corporate philanthropic donations toward disaster relief efforts affects private investors’ motive attribution and ultimately their assessment of a firm’s value. Corporate donations toward disaster relief efforts, often called CPDR, are commonplace practice and one critically observed subcategory of CSR, with high visibility in the global media. We investigate whether private investors value firms differently based on their perception of a firm’s engagement in CPDR. Therefore, we created an experimental investment scenario in which we manipulate the magnitude of a hypothetical Firm Y’s CPDR efforts to evaluate investment decisions of private investors recruited from Amazon’s Cloud Research platform. Our findings suggest that higher CPDR generally affects private investors’ assessment of a firm’s value positively. Using a structural equation model (SEM) and the CSR skepticism concept to examine private investors' motive attribution to firms’ CPDR, we find that private investors perceive a high CPDR as an indicator of honest and values-driven corporate social behavior and a low CPDR as an ingratiating attempt to win favor. Thus, we extend prior research by unveiling through which channels of impact CPDR potentially affects firm value and find an explanation of why CPDR can have adverse effects on firm value.

This chapter is joint work with Jochen C. Theis, associate professor at Southern Denmark University, and Marvin Nipper, assistant professor at Friedrich-Alexander-University of Erlangen-Nuremberg and is published in Corporate Social Responsibility and Environmental Management, 31(1), 540–554.

Chapter 4 **"Does Greenhouse Gas Disclosure Trigger a Net Zero Fallacy?"** empirically and experimentally examines how disclosing net zero GHG emissions influences retail investors' valuation judgments. GHG disclosures are the most developed ESG disclosures, and economies around the world target a net zero-emissions economy. Market mechanisms such as emissions trading systems encourage emission reductions where they are most cost-efficient, irrespective of remaining net emissions. As long as many high-emission projects exist, reducing low-emission projects to net zero emissions is unlikely the most cost-efficient. We leverage choice bracketing theory to predict that investors gravitate toward net zero as a psychological benchmark, causing them to invest in net zero projects even when more cost-efficient emission reductions are available. We test our prediction in three experiments with retail investors. Across two experiments, we find robust evidence that retail investors invest more in net zero (versus (vs.) net positive) emission projects when their emission reductions are cost-inefficient, thereby documenting a "net zero fallacy." In our first experiment, we additionally find some theory-consistent evidence that a broad bracketing investment advice intervention can reduce this net zero fallacy. Our second experiment suggests that the achievement of a net emission goal can replace the net zero psychological benchmark. In a third experiment, we explore boundary conditions of the net zero fallacy. Our study provides evidence on investors' considerations of non-financial information and the effects of ESG disclosure on these considerations.

This chapter is joint work with Christian Friedrich, post-doctoral researcher at the University of Mannheim, and Christian Peters, assistant professor at Nanyang Technological University Singapore, and currently under review for publication at The Accounting Review.

2 Does Degree of Sustainability Influence Private Investors' Valuation Judgments?

2.1 Introduction

Private market investments are widely considered to have the greatest potential to address the immense challenges necessary to mitigate the global climate crisis (Braak-Forstinger, & Selian, 2020). SRI[2] is seen as a mechanism for curbing negative ecological and social effects (Benabou, & Tirole, 2010; Pastor, Stambaugh, & Taylor, 2021), garnering increasing attention from academics and policymakers.[3] As a result, many major financial markets have established sustainable finance strategies, aiming for a redirection of capital flows toward more socially responsible investments, to finance the transition to a sustainable economy. These sustainable finance strategies often rely on ESG disclosure regulations, which classify SRI strategies[4] (e.g., European Commission [EC], 2021).

The idea that ESG disclosure leads to a redirection of capital flows toward more socially responsible investments relies on two assumptions. First, that investors possess prosocial preferences, and second, that investors derive utility proportional to an investment's DoS. Recent studies have indeed demonstrated that investors exhibit prosocial preferences and are willing to pay for SRI (Barber, Morse, & Yasuda, 2021; Hartzmark, & Sussman, 2019; Riedl, & Smeets,

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2 SRI is a long-term oriented investment approach, which integrates ESG factors in the research, analysis and selection process of securities within an investment portfolio (Cappucci, 2018; Eccles, & Viviers, 2011; Eurosif, 2021).

3 See for instance, Barber, Morse, and Yasuda, 2021, Brusuelas, Depew, and DeCandido, 2019, Gibson, and Krueger, 2017, Global Sustainable Investment Alliance (GSIA), 2020, Hartzmark, and Sussman, 2019, Krüger, 2015, Krüger, Sautner, and Starks, 2020, as well as Riedl, and Smeets, 2017.

4 Such as the EU SFDR, UK SDR, United States (US) Securities and Exchange Commission (US SEC), GSIA classification.

2017), leading to rapid growth in the SRI market[5] (GSIA, 2020). However, existing literature remains inconclusive as to whether investors are sensitive to variations in investments' DoS. Traditional decision theory, commonly applied in sustainable investing models, predicts that investors are consequentialists (Becker, 1974; Eckel, & Grossman, 1996), meaning that they derive utility proportional to an investment's DoS.[6] In contrast, warm-glow giving theory assumes that investors derive utility from an emotional response to the act of behaving prosocial (Andreoni, 1990), which implies that they may be insensitive to an investment's DoS. If this latter theory holds true, it would undermine the effectiveness of ESG disclosure regulations, as they may not create an incentive to invest more socially responsibly. Yet, understanding how an investment's DoS affects an investor's valuation judgment is crucial not only to academics but also to regulatory institutions.

My study addresses this research gap in a 2x2x2 experimental investment scenario to assess private investors' willingness to invest in an SRI fund (*Sustainability Fund*), by recruiting private investors from Prolific. Specifically, I manipulate three factors: (1) SRI strategy (low DoS fund, i.e., ESG aligned investment strategy vs. high DoS fund, i.e., impact related investment strategy), (2) SRI certification (absence vs. presence of certification), and (3) expected returns relative to a comparable non-sustainable investment (2% less vs. 5% less expected returns). In addition, participants' skepticism toward *Sustainability Fund*, SRI support, and willingness to sacrifice returns for *Sustainability Fund* are recorded.

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[5] The number of market participants interested in SRI has grown and the amount of assets increased by 55% from 2016 to 2020, amounting to approximately $35.3 trillion in the five major markets, Europe, US, Canada, Australasia, and Japan (GSIA, 2020).

[6] Evidence for investors having a consequentialist perspective can be seen in the findings of Bauer, Ruof, and Smeets (2021), and Gutsche, and Ziegler (2019), while Heeb et al.'s (2023) findings can be seen as evidence for investors showing warm-glow behavior.

In my baseline analysis, using an analysis of variance (ANOVA) model, I find results consistent with my hypotheses that (1) private investors' willingness to invest in sustainable investments is higher for high DoS investments than for low DoS investments, (2) private investors' willingness to invest decreases more sharply for low DoS investments when the return difference to a non-sustainable investment increases, and (3) private investors' willingness to invest increases more strongly for low DoS investments when SRI certification is present. Further contextualizing my findings by an SEM, I find that the effects of DoS and SRI strategy certification on private investors' valuation judgments are partially mediated by private investors' SRI skepticism and their willingness to sacrifice returns to invest sustainably. These findings corroborate my hypothesis.

My study offers several important contributions. First, it adds to the literature on the influence of prosocial preferences in investment decisions (Barber, Morse, & Yasuda, 2021; Riedl & Smeets, 2017; Hartzmark & Sussman, 2019; Bauer, Ruof, & Smeets, 2021), by confirming that investors are willing to pay for SRI. Moreover, I show that investors perceive the DoS of impact related investments as higher than that of ESG aligned investments, which results in a higher valuation judgment for impact related investments. This demonstrates that a higher DoS leads to a higher valuation judgment.

Second, my experimental design creates controlled conditions ensuring that the investments do not differ in liquidity and risks, isolating the effect of DoS and returns on investors' utility. This advances the literature by providing further evidence that private investors trade off financial performance and ethical concerns (Berry, & Yeung, 2013; Dorfleitner, & Utz, 2014; Gutsche, & Ziegler, 2019). Specifically, I achieve first evidence that a higher DoS can compensate investors for lower returns, i.e. that investors would sacrifice returns for additional sustainability. This supports that prosocial investors derive greater utility from investments with a higher DoS, which is a key assumption widely spread in traditional theoretical models of sustainable investing (Pastor, Stambaugh, & Taylor, 2021; Pedersen, Fitzgibbons, & Pomorski, 2021; Heinkel, Kraus, & Zechner, 2001).

Finally, I contribute to the large literature examining the effect of SRI certifications on investors' valuation judgments (Gutsche, & Ziegler, 2019; Gutsche, & Zwergel, 2020; Hartzmark, & Sussman, 2019; Klinger et al., 2022), by providing initial evidence that the impact of SRI certifications on investors' valuation judgments varies in magnitude depending on an investment's DoS.

In terms of practical implications, my findings suggest that sustainable finance strategies are effective in their current form, as I demonstrate that a higher DoS creates an incentive for private investors and even compensates them for lower returns. This is particularly important when achieving a higher DoS involves higher costs. Moreover, my study offers valuable implications for firms that reflect on issuing or distributing socially responsible investments, as I show that the impact of SRI certifications on investors' valuation judgments varies in magnitude depending on an investment's DoS. This finding implies that, according to an investment's SRI strategy, different approaches are needed to address investors' valuation judgments efficiently.

The following section provides a background on SRI classification systems, followed by a discussion on related research and the hypotheses development. Section 2.3 describes the methodology, while Section 2.4 discusses the results. Section 2.5 concludes the paper's findings.

2.2 Background and Hypotheses Development

2.2.1 Background

Major financial markets are establishing sustainable finance strategies, aiming for a redirection of capital flows to more socially responsible investments. Sustainable finance strategies often rely on ESG disclosure regulations and classifying SRI strategies. Classifying SRI strategies is intended to address investors' perceived DoS of an investment, and thereby affect their valuation judgments. For instance, the EU SFDR is part of the "EU sustainable finance framework" (EC, 2023), targeting investments toward more sustainable technologies and companies, to achieve the EU's climate and environmental goals (EC, 2021). According to the EU SFDR classification system, a sustainable investment will be classified as light green or dark green, indicating the investment's DoS.[7] To increase the generalizability of my study, I do not focus on a specific regulatory framework, but distinguish based on Busch et al. (2021) in ESG aligned, and impact related investment strategies. These fundamentally differing investment strategies cover the major international SRI strategy classification systems.

Busch et al. (2021) classify investment strategies based on their objective, materiality, approach, and documentation. An ESG aligned investment's objective can be characterized as reflection and mitigation of ESG-related risks, whereas an impact related investment is supposed to actively contribute to social and environmental goals. Impact related investments aim to generate impact, by providing additional capital toward sustainable transformation and therefore incorporate forward-looking targets, combining pre- and post-investment decision approaches[8].

[7] The EU SFDR classification system comprises Article 6 (funds without a sustainability scope), Article 8 (light green, i.e. funds that promote environmental or social characteristics), and Article 9 funds (dark green, i.e. funds that have sustainable investment as their objective).

[8] Exclusion criteria, norms-based screening, best-in-class, ESG integration, and thematic funds are considered as pre-investment decision approaches, while post-investment decision approaches include the use of voting rights according to the SRI strategy and investor engagement (Scheler, 2021).

Opposingly, ESG aligned investments have a retrospective approach and are not geared toward changing companies' ESG performance, and therefore focus on pre-investment decision approaches toward the consideration of E, S, or G factors. ESG aligned investments' materiality is not measured or documented in detail. Typically, only a brief description of aims is provided. In contrast, impact related investments provide proof of materiality through the assessment of output via benchmark analysis, or Sustainable Development Goal alignment and detailed documentation.

ESG aligned investments represent a low DoS (e.g., light green according to the EU SFDR classification system), while impact related investments represent a high DoS (e.g., dark green according to the EU SFDR classification system).

2.2.2 DoS as a Determinant of Investors' Valuation Judgments

Traditionally, portfolio theory expects investors to balance liquidity, risks, and returns of available investment alternatives to arrive at an optimal investment decision (Jang et al., 2007; Markowitz, 1952). Investors pursuing prosocial interests gain additional utility from an investment's sustainability attributes.[9] Recent research has demonstrated that prosocial preferences affect investment decisions (Bauer, Ruof, & Smeets, 2021; Riedl, & Smeets, 2017), resulting in sizable, market-wide capital flows toward sustainable investments (Hartzmark, & Sussman, 2019). An investment's sustainability attributes can accordingly be seen as incorporated in an investor's objective function, expanding modern portfolio theory to include an ESG dimension (Pedersen,

[9] Surveys show that a vast majority of North American and European private investors consider sustainability to be important (EC, 2009; Natixis Global Asset Management, 2019; Wins, & Zwergel, 2016). Studies find that non-financial factors are important to investors (e.g., Andreoni, 1990; Busch, Bauer, & Orlitzky, 2016) and that they gain additional utility from an investment's ESG attributes (e.g., Benson, & Humphrey, 2008; Bollen, 2007; Dorfleitner, & Nguyen, 2016; Statman, 2004).

Fitzgibbons, & Pomorski, 2021).[10] The following discussion will disregard liquidity and risks because I keep liquidity and risks constant in the experiment (see Section 3).

While the literature predominantly shows that investors derive utility from sustainability attributes, it remains inconclusive whether they are sensitive to the DoS of an investment. This also raises the question of whether sustainability plays a continuous or binary role in an investor's utility function. Decision theory, widely spread in traditional models of sustainable investing, predicts that investors are consequentialists (Becker, 1974; Eckel, & Grossman 1996), meaning that they derive utility proportional to an investment's DoS. In contrast, the theory of warm-glow giving assumes that investors derive utility from an emotional response to the act of behaving prosocial (Andreoni, 1990), meaning that investors are insensitive to an investment’s DoS. As addressing ESG issues is often perceived as a competitive advantage by private investors (Cordeiro, & Tewari, 2015; Flammer, 2018; Kunz, 2020), I follow the consequentialist perspective and argue that a rational investor derives utility proportional to an investment’s DoS. This argument aligns with models of altruistic behavior, which suggest that individuals derive utility from the well-being they enable in others, with greater societal contributions leading to increased personal utility (Becker, 1974; Andreoni, & Miller, 2002).

I expect private investors to perceive the DoS of impact related investments as higher than that of ESG aligned investments. Consequentialist investors would thus better assess the ESG dimension within their objective function, resulting in a higher valuation judgment for impact related investments. In contrast, a warm-glow investor’s willingness to invest would not differ between ESG aligned and impact related investments, because of its insensitivity to an

[10] Consistent evidence of investors balancing risk, return, and social preferences (e.g., Andonov, Hochberg, & Rauh 2018; Barber, Morse, & Yasuda, 2021; Dyck et al., 2019; Hartzmark, & Sussman, 2019), as well as claims for an extension of the traditional objective function of capital investment by the criterion “sustainability” can be found in many other studies (e.g., Ahmed, Gao, & Satchell, 2021; Cengiz, Braun, & von Nitzsch, 2010; Revelli, 2017).

investment's DoS. Following the consequentialist perspective, I formally state hypothesis 1 as follows:

H1: *Private investors' willingness to invest in sustainable investments is higher for impact related investments than for ESG aligned investments, ceteris paribus.*

2.2.3 DoS as a Moderator of Investors' Valuation Judgments

Recent evidence on investors' social preferences suggests that investors accept lower returns from funds that engage in companies that contribute to the UN Sustainable Development Goals (Bauer, Ruof, & Smeets, 2021). Some investors even show an explicit willingness to pay for investments with social impact (Barber, Morse, & Yasuda, 2021; Gutsche, & Ziegler, 2019). In contrast, Heeb et al. (2023) show that investors' willingness to pay additional fees, charged on a sustainable investment, is largely independent of the carbon emissions reductions of this investment. Previous literature therefore seems inconclusive, if a higher DoS can compensate investors for lower returns relative to a comparable non-sustainable investment (i.e. whether investors would (partially) sacrifice an additional unit of return for an additional unit of sustainability). This issue is crucial for the effectiveness of sustainable finance, to have an incentive for investments with substantial impact, because most theoretical models imply that investors need to accept lower returns ex-ante to have a higher DoS (Heinkel, Kraus, & Zechner, 2001; Pastor, Stambaugh, & Taylor, 2021).[11]

Decision theory predicts that investors are consequentialists, meaning that a rational investor derives utility proportional to an investment's return and DoS. The relationships between the components of an investor's objective function are traditionally characterized as conflicting objectives (Sharpe, 1964). In this perspective, the DoS is a conflicting objective to returns within the objective function. Investors may weigh these factors differently depending on their social

[11] This could be due to additional data and expertise requirements sustainable investments have (Heeb et al., 2023).

preferences, but utility derived increases when either factor improves. Since impact related investments have a higher DoS, I expect consequentialist investors' valuation judgments to be less affected by an increasing expected return sacrifice relative to a comparable non-sustainable investment. Specifically, the decline in their valuation judgment should be less sharp, as the higher DoS compensates for part of the expected return sacrifice. In contrast, a warm-glow investor's valuation judgment depends solely on the investment's returns, as long as the investment has a sustainability attribute, because of their insensitivity to investments DoS. Thus, a warm-glow investor's valuation judgment would be similarly affected, by an increasing expected return sacrifice relative to a comparable non-sustainable investment, for ESG aligned and impact related investments. Again, following the consequentialist perspective, I formally state hypothesis 2 as follows:

H2: *Private investors' willingness to invest decreases more sharply for ESG aligned investments than for impact related investments as the return difference to a non-sustainable investment increases, ceteris paribus.*

Recent research suggests a positive effect of certifications confirming the consideration of sustainability criteria, known as SRI certifications, on investors' valuation judgments (Gutsche, & Ziegler, 2019; Hartzmark, & Sussman, 2019). SRI certifications work as a 'seal of approval' for meeting a certain ESG standard (Klinger et al., 2022) and level out uncertainty about information that is not directly accessible (Gutsche, & Zwergel, 2020). This creates an abstract comparability regarding the DoS of an investment and equalizes investments on a fundamental level, even if there are persistent differences between them (Cason, & Gangadharan, 2002).

SRI certifications can therefore be expected to converge gaps between investments perceived DoS. For consequential investors, this convergence should improve their valuation judgments for

ESG aligned investments, where their perceived DoS is initially lower. Furthermore, SRI certifications help to overcome information asymmetries for investors, by providing new information and making information more salient, especially to private investors (Cason, & Gangadharan, 2002; Gutsche, & Zwergel, 2020). Finally, SRI certifications decrease information cost, which is particularly important for investors trying to evaluate an investment's DoS (i.e. investors deriving utility of an investment's DoS). Since impact related investments already provide measurable outputs and comprehensive documentation, private investors likely assess their indeed impact more easily, reducing the effect of certifications.

Again, following the consequentialist perspective, I expect that SRI certifications will improve investors' valuation judgments for either investment, but more strongly for ESG aligned investments and state hypothesis 3 as follows:

H3: *Private investors' willingness to invest in sustainable investments increases more strongly for ESG aligned investments than for impact related investments, when the SRI strategy is certified, ceteris paribus.*

2.3 Method

I conduct a 2x2x2 between-subjects online experiment, manipulating (1) the SRI strategy of an investment fund, (2) whether the SRI fund's strategy is certified, and (3) the return difference between the SRI fund and a comparable non-sustainable fund. This design allows for an examination of how DoS influences private investors' valuation judgments. Appendix 2A, Figure 2.2 contains a side-by-side comparison of my manipulations. In the following subsections, I describe the participant sampling, experimental procedure, treatments, as well as dependent and additional explanatory variables.

2.3.1 Participants

Participants are recruited from Prolific, a platform whose primary purpose is providing a participant pool for academic research.[12] Prior studies have shown that online participants are representative of the general population (Berinsky, Huber, & Lenz, 2012; Buhrmester, Kwang, & Gosling, 2011) and provide similar and consistent results to in-person studies (Casler, Bickel, & Hackett, 2013; Horton, Rand, & Zeckhauser, 2011). Research also demonstrates that intelligence (Buchheit et al., 2017), problem-solving, and learning task outcomes are similar between online and in-person participants (Crump, McDonnell, & Gureckis, 2013). Moreover, comparative studies show that the quality of data generated through Prolific participants is equal to or better than that from Amazon Web Services (AWS) Research Cloud, and other platforms and participant pools (Palan, & Schitter, 2018; Peer et al., 2017). As such, Prolific provides a resource-efficient way to quickly collect high-quality data and gain insights into private investors' behavior.

Eligibility criteria included residence in the UK, completion of at least 100 previous assignments with a minimum approval rate of 95%, and experience investing in the common stock market. A total of 850 participants entered the experiment, with 120 discontinuing or returning, and 29 screened out for failing attention checks[13], leaving a sample of 701 participants.[14] The sample consists of 49.4% males and 50.6% females, with an average age of 42.5 years and 10.4 years of investing experience. Participants had a relatively high willingness to invest in sustainable financial products[15] and an average monthly salary after taxes of approximately 2450€.

[12] See, https://www.prolific.com/academic-researchers.

[13] Removals are relatively equally distributed among conditions. Repeating my primary tests with all 730 participants demonstrates that my sampling choices do not affect the inferences from my primary tests.

[14] Participant characteristics did not differ between cells at a 5% significance level. However, age and investment experience differ between cells at a 10% significance level. When I include either of these demographic variables or both in an analysis of covariance (ANCOVA) model repeating my primary results, my inferences do not change.

[15] In the post experimental questions, I included the item "Please indicate your willingness to contribute to social and environmental causes by investing socially responsible.". On a 7-point Likert-scale, ranging from "No willingness (1)" to "Very high willingness (7)" participants on average gave 5.01.

Participants' reported comprehension of the case material was high.[16] The remuneration per participant was 2.20€. Participants who passed all manipulation checks were additionally entered into a drawing for a 100€ Amazon gift card. On average, participants took approximately 12 minutes to complete the experiment.

2.3.2 Experimental Procedure

Participants took the role of a private investor who had recently inherited 10.000€ and is now in search of investment opportunities, coming across *Sustainability Fund*, an SRI fund. They were instructed to approach the case seriously. To incentivize thoughtful participation, participants' chances of winning the gift card were increased tenfold if their investment decisions were deemed reasonable.[17]

Participants were randomly assigned to one of eight experimental cells. They were provided with information comparing *Sustainability Fund* to a non-sustainable fund, which had similar risk and liquidity but higher expected returns (return manipulation). Further information on the SRI strategy (SRI strategy manipulation) and SRI strategy certification (certification manipulation) were presented in the Key Investor Information Document (KIID) for *Sustainability Fund*. Participants then completed a set of questions assessing their willingness to invest, my dependent variable. On the next page, a debriefing questionnaire containing comprehension and manipulation checks, variables for additional analyses, and demographic questions followed. Participants could not change their responses after each step of the experimental procedure and were compensated after completing the experiment.

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[16] In the post experimental questions, I included the item "Please indicate how well understandable the case material was". On a 7-point Likert-scale, ranging from "Not understandable (1)" to "Very well understandable (7)" participants on average gave 5.45.

[17] Participants entered the drawing tenfold if their willingness to invest in Sustainability Fund suited their main reason stated for the investment decision.

2.3.3 Treatment Variables

The SRI strategy (IMPACT) was manipulated in the "Objectives and Investment Strategy" section of *Sustainability Fund's* KIID, which informed participants about its investment characteristics. Other characteristics are kept constant across all cells, including expected returns of 400€ per 10.000€ invested, a risk level of 3 out of 7, and global diversification of the portfolio's assets. I manipulate the SRI strategy as,

- "The fund invests in large and mid-capitalization companies in industrialized countries worldwide, to achieve total return through a combination of capital appreciation and income from the fund's assets. The currency of the fund is EUR. In addition to financial performance, environmental and social aspects, and the principles of good corporate governance (ESG aspects) are also taken into account to mitigate ESG-related risks and ethical considerations, when selecting investments. The selection of individual investments is at the discretion of the fund management. The fund management does not use a benchmark index." for the low DoS/ESG aligned condition (no IMPACT) and as,
- "The fund invests in large and mid-capitalization companies in industrialized countries worldwide, to achieve total return through a combination of capital appreciation and income from the fund's assets. The currency of the fund is EUR. In addition to financial performance, active contribution to social and environmental transformation is taken into account when selecting investments, to generate real impact by providing additional capital for sectors aligned with the UN Sustainable Development Goals. The fund management is therefore barring investments for the portfolio due to business activities that are deemed unethical, harmful to society, or in breach of laws or regulations (e.g. child labor, thermal coal, gambling, or alcohol) and instead invest in companies that

make the most effort to meet the environmental, social and governance (ESG) criteria that are relevant for their respective industries. After the investment decision, the fund uses its voting rights and engagement to increase the investments' ESG performance. Compared to an adequate benchmark index the funds' assets use 36% more green energy, produce 45% less greenhouse gas emissions, are free from unethical business activities, and have a 73% stronger corporate governance." for the high DoS/ESG impact related condition (IMPACT).

The return manipulation (SUBSTANTIAL) was embedded in the case description, which contained a comparison of *Sustainability Fund* to a non-sustainable fund. This comparison revealed that a non-sustainable fund with similar risks and liquidity would have either 200€ higher expected returns (not SUBSTANTIAL), or 500€ higher expected returns (SUBSTANTIAL). I chose these numbers to ensure participants perceive the return difference between *Sustainability Fund* and a non-sustainable fund as slightly or substantially.[18]

The SRI strategy certification manipulation (CERTIFIED) was either present or absent. In the not CERTIFIED condition, *Sustainability Fund's* KIID simply does not contain a certificate. In the CERTIFIED condition, participants were shown a label of an SRI certification in the

[18] In a preliminary study, I asked participants to indicate their level of agreement with either of two sets of statements: (1) "When I compare mutual funds, I experience a return difference of 0.5% [1.0%, 1.5%, 2.0%, 2.5%, 3.0%, 3.5%, 4.0%, 4.5%, 5.0%, 5.5%, 6.0%, 6.5%, 7.0%, 7.5%, 8.0%, 8.5%, 9.0%, 9.5%, 10%] as substantial," and (2) "When I compare mutual funds, I experience a return difference of 0.5% [1.0%, 1.5%, 2.0%, 2.5%, 3.0%, 3.5%, 4.0%, 4.5%, 5.0%, 5.5%, 6.0%, 6.5%, 7.0%, 7.5%, 8.0%, 8.5%, 9.0%, 9.5%, 10%] as slight," using a seven-point Likert scale from "strongly disagree (1)" to "strongly agree (7)." Participants' agreement with the "substantial" series of statements primarily guided the definition of my cutoffs. I chose 2% (200€ higher expected return) as the cutoff for the not SUBSTANTIAL condition because it was the highest return difference at which more than 50% of participants disagreed (indicated < 4). Similarly, I selected 5% (500€ higher expected return) as the cutoff for the SUBSTANTIAL condition, as it was the lowest return difference where more than 50% of participants agreed (indicated > 4). To further validate these cutoffs, I also analyzed participants' agreement with the "slight" series of statements. Here, 2% was the highest return difference where more than 50% of participants agreed (indicated > 4), and 4.5% was the lowest return difference where more than 50% disagreed (indicated < 4). This additional analysis supports the cutoffs used in my study.

"Objectives and Investment Strategy" section.[19] The label is similar to common established ratings from a reputable third party. Consistent with Elliott et al. (2014) and Johnson et al. (2020), I use a third-party report to avoid issues of disclosure credibility and to make the label fulfill all functions of SRI certification.

2.3.4 Dependent and Additional Variables

The main dependent variable is participants' willingness to invest in *Sustainability Fund* (*WTI_SF*). I measure this variable as the average of participants' answers to the following two items on a 101-point Likert-scale ranging from 0 (very unattractive; very unlikely) to 100 (very attractive; very likely):[20]

Attractiveness: "How attractive is an investment in Sustainability Fund as part of your diversified portfolio?"

Likeliness to buy: "How likely are you to invest in Sustainability Fund as part of your diversified portfolio?"

Both items are derived from Elliott, Grant, and Hodge (2018) and have been adapted in later studies (e.g., Friedrich, 2021). A Cronbach's alpha of 0.958 for willingness to invest in *Sustainability Fund* indicates very strong internal validity.

I include process measures to shed light on participants' skepticism toward *Sustainability Fund*, participants' willingness to sacrifice returns for *Sustainability Fund*, and participants' SRI support, as my three primary theoretical concepts.[21] I measure participants' skepticism toward *Sustainability Fund* (*SKEPT_SF*) as the average of participants' answers to an adapted three-item construct developed by Connors, Anderson-MacDonald, and Thomson (2017), based on

[19] Please see Appendix 2A, Figure 2.2 for the SRI certification label.

[20] My inferences remain unchanged if I use any single item instead of the corresponding scales in my analyses.

[21] The debriefing questionnaire contained some additional questions that do not directly link to my theory and results. For brevity, I do not discuss them in the paper.

Obermiller and Spangenberg (1998). Participants rated each item, consisting of a statement about *Sustainability Fund's* reliability in terms of social responsibility promises, on a 7-point Likert-scale, ranging from strongly disagree (1) to strongly agree (7).[22] A Cronbach's alpha of 0.882 indicates strong internal validity. Participants' willingness to sacrifice returns for *Sustainability Fund* (*WTS_SF*) serves as an additional dependent variable. To elicit this variable, I ask participants to indicate the maximum return they would sacrifice to invest in *Sustainability Fund* instead of a non-sustainable fund with similar risk and liquidity on a scale from 0,0% to 10,0%.[23] Participants' SRI support (*SUPPORT*) is measured following a five-item construct derived from prior work of Connors, Anderson-MacDonald, and Thomson (2017), based on Lichtenstein, Drumwright, and Braig (2004) and Sen and Bhattacharya (2001). I ask participants to indicate how funds should behave in terms of ESG on a 7-point Likert-scale, ranging from strongly disagree (1) to strongly agree (7).[24] A Cronbach's alpha of 0.965 indicates very strong internal validity.

2.4 Results

2.4.1 Manipulation Checks

To assess the effectiveness of the experimental manipulations, I employ three manipulation checks. I tested the success of the SRI strategy manipulation by asking participants to respond to the statement, "Investing in Sustainability Fund contributes to a sustainable economy (e.g. an

[22] The items are: (1) "I do not trust Sustainability Fund to deliver on its social responsibility promises.", (2) "Sustainability Fund is dishonest about its real involvement in social responsibility initiatives.", (3) "I am not convinced that Sustainability Fund will fulfill its social responsibility objectives.".

[23] The item is: "Please indicate the maximum return you would sacrifice to invest in Sustainability Fund instead of a non-sustainable fund with similar risk and liquidity.".

[24] The items are: (1) "I strongly believe that funds I invest in should support programs that benefit the environment and society.", (2) "I think a fund I invest in should have the responsibility to protect the planet.", (3) "Investing in funds that implement sustainability practices is important to me.", (4) "Funds I invest in should carry out programs focused on sustainability.", (5) "Funds I invest in should have an obligation to be socially responsible.".

economy that provides a good quality of life for people, stays within the limits of the planet, and helps keep global warming well below the 2°C threshold.).” on a 7-point Likert-scale, ranging “fully disagree (1)” to “fully agree (7)”. Participants in the *IMPACT* condition were significantly more likely to agree than participants in the no *IMPACT* condition (M = 5.35 vs. M = 4.48, T = 7.85), suggesting that my manipulation was successful. For the certification manipulation, participants were asked to indicate their agreement with the statement “Sustainability Fund is certified as a socially responsible investment by an independent organization” on a 7-point Likert-scale, ranging from “fully disagree (1)” to “fully agree (7)”. Participants in the *CERTIFIED* condition were significantly more likely to agree than participants in the not *CERTIFIED* condition (M = 5.17 vs. M = 4.12, T = 8.103), suggesting that my manipulation was successful. For the return manipulation, I asked participants to indicate how much additional returns the non-sustainable fund would earn them, when investing their 10.000€, on a scale, ranging from “0€” to “1.000€”.[25] Participants in the *SUBSTANTIAL* condition perceived the non-sustainable fund’s additional returns significantly higher than participants in the not *SUBSTANTIAL* condition (M = 489.25 vs. M = 314.28, T = 10.436), suggesting that my manipulation was successful.

2.4.2 Test of Hypotheses

Table 2.1 presents results from the primary analysis. Panel A shows the number of participants by experimental cell, along with means and standard deviations for willingness to invest in *Sustainability Fund*.[26] Participants’ willingness to invest in *Sustainability Fund* is highest for the (1) *IMPACT*, *CERTIFIED* and not *SUBSTANTIAL* condition, followed by (2) *IMPACT*,

[25] The item is: “Please indicate how much additional return would a non-sustainable fund with similar risk and liquidity earn you when investing your 10,000€.”.

[26] Participant numbers are slightly imbalanced because the random generator assigns new participants based on currently completed cases to achieve balance. However, rapid participation in Prolific lead to many parallel participations, disturbing the process. Hence, most participants came in when the random generator favored cells B, D, and H, making cell E, and G relatively small.

CERTIFIED and *SUBSTANTIAL*, (3) IMPACT, not CERTIFIED and not SUBSTANTIAL, (4) no *IMPACT*, *CERTIFIED* and not *SUBSTANTIAL* and (5) *IMPACT*, not *CERTIFIED* and *SUBSTANTIAL*. It is lowest in the (8) no *IMPACT*, not *CERTIFIED* and *SUBSTANTIAL* condition, followed by (7) no *IMPACT*, not *CERTIFIED* and not *SUBSTANTIAL* and (6) no *IMPACT*, *CERTIFIED* and *SUBSTANTIAL*.

Panel B presents the results of an ANOVA model with participants' willingness to invest in *Sustainability Fund* as dependent variable, and my treatments, as well as their interactions *IMPACT_SUBSTANTIAL* and *IMPACT_CERTIFIED* as factors.[27] I find significant main effects of *IMPACT* (p < 0.001, one-tailed), *SUBSTANTIAL* (p < 0.001, one-tailed), and *CERTIFIED* (p < 0.001, one-tailed), as well as their interactions *IMPACT_SUBSTANTIAL* (p = 0.023, one-tailed) and *IMPACT_CERTIFIED* (p = 0.003, one-tailed). The significant main effect of *IMPACT* is consistent with H1 predicting that investors' willingness to invest in sustainable investments is higher for impact related investments than for ESG aligned investments, demonstrating that a higher DoS leads to a higher valuation judgment.

[27] My modelling choices do not affect the inferences from my primary tests. Appendix 2B, Table 2.3 contains results from repeating my primary tests with all 730 participants in a full-factorial ANOVA with WTI_SF as the dependent variable, and the IMPACT, SUBSTANTIAL and CERTIFIED manipulations as treatment variables.

Table 2.1: Effects of IMPACT, SUBSTANTIAL and CERTIFIED on WTI_SF.

Panel A Descriptive Statistics – Mean (Standard Deviations) of WTI_SF

N = 701	Degree of sustainability				
	No Impact (ESG aligned)		Impact (Impact related)		
Return difference	Not Certified	Certified	Not Certified	Certified	Overall
Not Substantial	45.86 (2.57) N=85 [cell A]	57.26 (2.40) N=89 [cell C]	59.33 (2.47) N=80 [cell E]	63.10 (2.56) N=73 [cell G]	No Impact 51.70 (1.80) N=174 Impact 61.13 (1.78) N=153
Substantial	30.91 (2.38) N=98 [cell B]	51.44 (2.55) N=95 [cell D]	53.60 (2.40) N=87 [cell F]	62.37 (2.56) N=94 [cell H]	No Impact 41.01 (1.89) N=193 Impact 58.15 (1.78) N=181
Overall	37.86 (1.83) N=183	54.26 (1.76) N=184	56.34 (1.73) N=167	62.69 (1.82) N=167	

Panel B Two-way ANOVA Results

Adj. R^2 = 0.150 Source	Sum of Squares	Degrees of Freedom	F	p-value
Model	70334.57	5	25.75	<0.001***
IMPACT	11969.67	1	21.91	<0.001***
SUBSTANTIAL	9837.02	1	18.01	<0.001***
CERTIFIED	24072.69	1	44.07	<0.001***
IMPACT_ SUBSTANTIAL	2205.02	1	4.04	0.023**
IMPACT_ CERTIFIED	4121.01	1	7.54	0.003***
Error	379622.42	695		

Notes: Panel A presents the number of observations (N), the mean and standard deviation (in parentheses) of participants' willingness to invest in *Sustainability Fund* (*WTI_SF*) for each experimental cell. Columns denote the *IMPACT* manipulation divided by the *CRETIFIED* manipulation and rows denote the *SUBSTANTIAL* manipulation, which I present in detail in Appendix 2A. *WTI_SF* is measured as the average of a two-item construct (on a scale from 0 very unattractive; very unlikely to 100 very attractive; very likely): (1) “How attractive is an investment in Sustainability Fund as part of your diversified portfolio?”; (2) “How likely are you to invest in Sustainability Fund as part of your diversified portfolio?”. Panel B reports results of an ANOVA model with *WTI_SF* as dependent variable, and the *IMPACT*, *SUBSTANTIAL*, and *CERTIFIED* manipulations, as well as their interactions *IMPACT_SUBSTANTIAL* and *IMPACT_CERTIFIED* as factors. P-values reflect my hypothesis tests and are one-tailed equivalents. *, **, and *** denote significant at the 10-, 5-, and 1-percent levels, respectively.

The significant interaction effect of *IMPACT_SUBSTANTIAL* is consistent with H2, predicting that investors' willingness to invest decreases more sharply for ESG aligned investments than for impact related investments, as the return difference to a non-sustainable investment increases. The significant interaction effect of *IMPACT_CERTIFIED* is consistent with H3 stating that investors' willingness to invest in sustainable investments increases more strongly for ESG aligned investments than for impact related investments when the SRI strategy is certified. These findings indicate that DoS moderates the impact of return difference to a non-sustainable investment and SRI certifications on investors' valuation judgments. To further evaluate H2 and H3, I conduct a follow-up seemingly unrelated estimation (suest) test to analyze differences in the effects of the SUBSTANTIAL and CERTIFIED manipulations between ESG-aligned and impact-related investments.

Table 2.2 shows results from my suest test. I first regress willingness to invest in *Sustainability Fund* on my experimental treatment variables, as well as their interactions. Panel A presents the number of observations, and reports results of the following ordinary least squares (OLS) regression (1):

$$WTI\_SF_i = \alpha + \beta_1 IMPACT_i + \beta_2 SUBSTANTIAL_i + \beta_3 CERTIFIED_i + \beta_4 IMPACT_i \times SUBSTANTIAL_i + \beta_5 IMPACT_i \times CERTIFIED_i + \varepsilon_i \quad (1)$$

Results indicate that *IMPACT* (14.624, $p < 0.001$) and *CERTIFIED* (16.201, $p < 0.001$) significantly increase investors' willingness to invest in *Sustainability Fund*, while *SUBSTANTIAL* (-10.370, $p < 0.001$) significantly decreases investors' willingness to invest in *Sustainability Fund*. Additionally, investors' willingness to invest in *Sustainability Fund* is significantly positively affected by *IMPACT_SUBSTANTIAL* (7.166, $p = 0.041$) and significantly negatively affected by *IMPACT_CERTIFIED* (-9.830, $p = 0.005$). This means that *IMPACT* is moderating the negative effect of *SUBSTANTIAL* on private investors' willingness to invest in *Sustainability Fund*, which is consistent with H2. Consistent with H3, it means that *IMPACT* is attenuating the positive effect of *CERTIFIED* on private investors' willingness to invest in *Sustainability Fund*.

In order to explore whether the effects of *SUBSTANTIAL* and *CERTIFIED* on investors' willingness to invest in *Sustainability Fund* differ depending on an investment's DoS I conduct a sample split according to my *IMPACT* manipulation. Therefore, the interactions of my manipulations were excluded due to omitted variables bias. I regress investors' willingness to invest in *Sustainability Fund* on *SUBSTANTIAL* and *CERTIFIED*. Panel B presents the number of observations, and provides results for ESG aligned investments, while Panel C does the same for impact related investments, using the following OLS regression (2):

$$WTI\_SF_i = \alpha + \beta_1 SUBSTANTIAL_i + \beta_2 CERTIFIED_i + \varepsilon_i \tag{2}$$

Panel D presents the suest test results, comparing the effects of my *SUBSTANTIAL* and *CERTIFIED* manipulations on investors' willingness to invest in *Sustainability Fund* between ESG aligned and impact related investments. I find a significant effect difference for *SUBSTANTIAL* (-10.370 vs. -3.247, T = 4.12) and *CERTIFIED* (16.201 vs. 6.486, T = 7.64), providing strong support for H2 and H3. This demonstrates that a higher DoS can compensate investors for lower returns and that SRI certifications have a smaller impact magnitude on investors' valuation judgments for high DoS investments.

Table 2.2: Regression-model of influential factors on WTI_SF.

Panel A OLS regression-model for all participants				
N = 701, Adj. R^2 = 0.150 Variables	Coef.	Std. Dev.	T-value	p-value
IMPACT	14.624	3.066	4.77	<0.001***
SUBSTANTIAL	-10.370	2.475	-4.19	<0.001***
CERTIFIED	16.201	2.477	6.54	<0.001***
IMPACT_SUBSTANTIAL	7.124	3.509	2.03	0.041**
IMPACT_CERTIFIED	-9.715	3.515	-2.76	0.005***
Error	43.409	2.194		
Panel B OLS regression-model for participants in the no IMPACT condition				
N = 367, Adj. R^2 = 0.139 Variables	Coef.	Std. Dev.	T-value	p-value
SUBSTANTIAL	-10.370	2.475	-4.19	<0.001***
CERTIFIED	16.201	2.477	6.54	<0.001***
Error	43.409	2.194		
Panel C OLS regression-model for participants in the IMPACT condition				
N = 334, Adj. R^2 = 0.018 Variables	Coef.	Std. Dev.	T-value	p-value
SUBSTANTIAL	-3.247	2.488	-1.31	0.192
CERTIFIED	6.486	2.494	2.60	0.009***
Error	58.033	2.141		
Panel D Suest test between no IMPACT and IMPACT cells				
Variables	Coef. Dif.		chi^2	p-value
SUBSTANTIAL	-7.123		4.12	0.021**
CERTIFIED	9.715		7.64	0.003***

Notes: Panel A presents the number of observations (N), and reports results of an OLS regression-model, with participants willingness to invest in *Sustainability Fund* (*WTI_SF*) as dependent variable and my *IMPACT*, *SUBSTANTIAL* and *CERTIFIED* manipulations, as well as their interactions as independent variables. *WTI_SF* is measured as the average of a two-item construct (on a scale from 0 very unattractive; very unlikely to 100 very attractive; very likely): (1) "How attractive is an investment in Sustainability Fund as part of your diversified portfolio?"; (2) "How likely are you to invest in Sustainability Fund as part of your diversified portfolio?". Panel B and C present the number of observations (N), and report results of an OLS regression-model, with *WTI_SF* as dependent variable and my *SUBSTANTIAL* and *CERTIFIED* manipulations, as independent variables, with participants in the no *IMPACT* cells (Panel B), or *IMPACT* cells (Panel C). Panel D reports a suest test for my *SUBSTANTIAL* and *CERTIFIED* manipulations on *WTI_SF* between ESG aligned and impact related strategy conditions according to my SRI strategy manipulation (*IMPACT*). P-values of suest test reflect my hypothesis tests and are one-tailed equivalents. *, **, and *** denote significant at the 10-, 5-, and 1-percent levels, respectively.

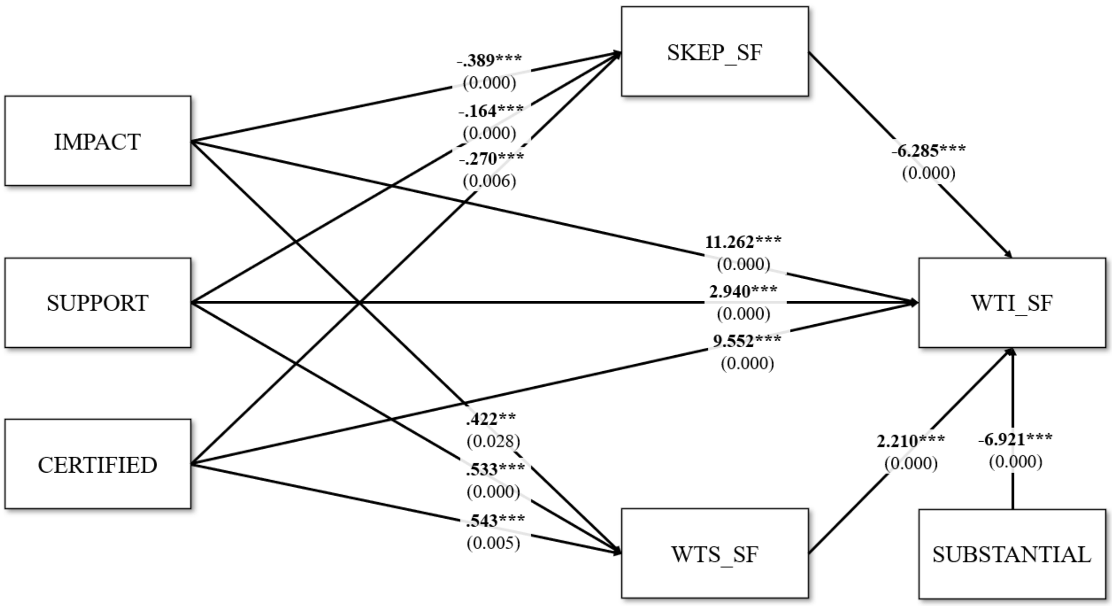
2.4.3 Additional Analysis

To provide further context, I conduct an SEM for a simple mediation analysis (Baron, & Kenny, 1986) to examine whether participants' willingness to sacrifice returns for *Sustainability Fund* (*WTS_SF*) and their skepticism[28] toward *Sustainability Fund* (*SKEPT_SF*) mediate my results. Figure 2.1 graphically illustrates the SEM and displays the results. Appendix 2B, Table 2.4 and Table 2.5 provide means and standard deviations of these variables for each experimental cell.

Skepticism regarding the indeed social responsibility of an investment, known as SRI skepticism, is relevant because private investors can't assess the indeed social responsibility of investments (Bonroy, & Constantatos, 2014; Entine, 2003; Heinemann et al., 2018). SRI skepticism is enhancing information costs, because investors spend more time searching for and compiling relevant information (Benson, & Humphrey, 2008). However, recent research suggests that SRI certifications increase private investors' willingness to pay and reduce investment barriers, i.e. SRI skepticism (Gutsche, & Zwergel, 2020). Impact related investments have more sophisticated documentation and an apparent causal effect on outcome, which can be measured and attributed to the investment. Thus, it can be argued that private investors are less skeptical toward high DoS investments and have a higher willingness to sacrifice returns for these investments. Reduced SRI skepticism and a higher willingness to sacrifice returns could in turn affect their willingness to invest positively.

[28] Skepticism describes a person's tendency to doubt, disbelieve, or question (Boush, Friestad, & Rose, 1994; Forehand, & Grier, 2003). Skepticism is considered as both, personality trait (Boush, Friestad, & Rose, 1994; Obermiller, & Spangenberg, 1998) and state that is elicited by context and situation, independently of personality traits (Forehand, & Grier, 2003; Mohr, Eroğlu, & Ellen, 1998; Vanhamme, & Grobben, 2009). Skeptical individual's elementary characteristic is that they may change their mind, when confronted with new information (Mohr, Eroğlu, & Ellen, 1998).

Figure 2.1: SEM exploring WTS_SF and SKEPT_SF as mediators



Notes: Figure 2.1 graphically illustrates my SEM (N = 608) and displays results for the mediating effects of participants' willingness to sacrifice returns for *Sustainability Fund* (*WTS_SF*) and skepticism toward *Sustainability Fund* (*SKEPT_SF*) on participants' willingness to invest in *Sustainability Fund* (*WTI_SF*). *WTS_SF* is measured as the item (on a scale from 0,0% to 10,0%): “Please indicate the maximum return you would sacrifice to invest in Sustainability Fund instead of a non-sustainable fund with similar risk and liquidity.”. *SKEPT_SF* is measured as the average of a three-item construct (on a scale from strongly disagree (1) to strongly agree (7)): (1) “I do not trust Sustainability Fund to deliver on its social responsibility promises.”, (2) “Sustainability Fund is dishonest about its real involvement in social responsibility initiatives.”, (3) “I am not convinced that Sustainability Fund will fulfill its social responsibility objectives.”. *WTI_SF* is measured as the average of a two-item construct (on a scale from 0 very unattractive; very unlikely to 100 very attractive; very likely): (1) “How attractive is an investment in Sustainability Fund as part of your diversified portfolio?”; (2) “How likely are you to invest in Sustainability Fund as part of your diversified portfolio?”. Participants’ support for socially responsible investments (SUPPORT) is measured as the average of a five-item construct (on a scale from strongly disagree (1) to strongly agree (7)): (1) “I strongly believe that funds I invest in should support programs that benefit the environment and society.”, (2) “I think a fund I invest in should have the responsibility to protect the planet.”, (3) “Investing in funds that implement sustainability practices is important to me.”, (4) “Funds I invest in should carry out programs focused on sustainability.”, (5) “Funds I invest in should have an obligation to be socially responsible.”. *IMPACT, SUBSTANTIAL,* and *CERTIFIED* refer to my manipulations, which I explain in detail in section 2.3.3 and display in Appendix 2A. Model fit statistics of $\chi2_{(608)} = 428.35$, $p < 0.001$, comparative fit index = 0.977, and root mean square error of approximation = 0.072 indicate a mediocre fit to the data. P-values (two-tailed) are displayed in parentheses. *, **, and *** denote significant at the 10-, 5-, and 1-percent levels, respectively.

To explore these assumptions, I first regress participants' willingness to sacrifice returns for *Sustainability Fund* and their skepticism toward *Sustainability Fund* on my *IMPACT* and *CERTIFIED* treatment variables and additionally, control for participants' support toward socially responsible investments (*SUPPORT*) in the following OLS regressions (3 - 4):

$$WTS\_SF_i = \alpha + \beta_1 IMPACT_i + \beta_2 CERTIFIED_i + \beta_3 SUPPORT_i + \varepsilon_i \tag{3}$$

$$SKEPT\_SF_i = \alpha + \beta_1 IMPACT_i + \beta_2 CERTIFIED_i + \beta_3 SUPPORT_i + \varepsilon_i \tag{4}$$

Second, I include participants' willingness to sacrifice returns for *Sustainability Fund*, their skepticism toward *Sustainability Fund*, and SRI support as control variables in an OLS regression of participants' willingness to invest in *Sustainability Fund* on my *IMPACT* and *CERTIFIED* treatment variables, to explore whether their effects mediate the overall effect of my *IMPACT* and *CERTIFIED* treatment variables (OLS regression 5):

$$\begin{aligned} WTI\_SF_i = {} & \alpha + \beta_1 IMPACT_i + \beta_2 CERTIFIED_i + \beta_3 SUBSTANTIAL_i + \beta_4 SUPPORT_i \\ & + \beta_5 WTS\_SF_i + \beta_6 SKEPT\_SF_i + \varepsilon_i \end{aligned} \tag{5}$$

The SEM shows that the direct effects of *IMPACT* (11.262, $p < 0.001$), *SUBSTANTIAL* (-6.921, $p < 0.001$), and *CERTIFIED* (9.552, $p < 0.001$) on investors' willingness to invest in *Sustainability Fund* are significant and of substantial effect size, supporting my primary analysis. Moreover, my *IMPACT* and *CERTIFIED* treatment significantly reduce investors' skepticism toward *Sustainability Fund* (-0.389, $p < 0.001$ and -0.270, $p = 0.006$), and parallel significantly increase their willingness to sacrifice returns for *Sustainability Fund* (0.422, $p = 0.028$ and 0.543, $p = 0.005$). This suggests that DoS alleviates investors' skepticism toward *Sustainability Fund* and enhances their willingness to sacrifice returns for *Sustainability Fund*. As predicted, investors' skepticism toward *Sustainability Fund* significantly reduces their willingness to invest in *Sustainability Fund* (-6.285, $p < 0.001$), while investors' willingness to sacrifice returns for

Sustainability Fund significantly increases their willingness to invest in *Sustainability Fund* (2.210, $p < 0.001$).

Conclusively, these results suggest that DoS's total effect on investors' willingness to invest in *Sustainability Fund* (14.636, $p < 0.001$) is a combination of a direct effect and an indirect effect mediated through investors' willingness to sacrifice returns for *Sustainability Fund* and investors' skepticism toward *Sustainability Fund* (3.375, $p < 0.001$). Figure 2.1 graphically illustrates the SEM and displays the results.

However, my results of the SEM only provide evidence for a mediocre fit to the data ($\chi^2_{(608)} = 428.35$, $p < 0.001$; comparative fit index = 0.977, the generally accepted minimum is 0.95 (Byrne, 2013); root mean square error of approximation = 0.072, generally accepted maximum is <0.05 (MacCallum et al., 1996).

2.5 Conclusion

SRI is increasingly viewed as a mechanism for curbing negative ecological and social effects (Benabou, & Tirole, 2010; Pastor, Stambaugh, & Taylor 2021). In response, major financial markets are establishing sustainable finance strategies, aiming for a redirection of capital flows toward more socially responsible investments, to finance the transition to a sustainable economy. These sustainable finance strategies often rely on ESG disclosure regulations, which classify SRI strategies. For ESG disclosures to effectively redirect capital toward more socially responsible investments, investors must derive utility proportional to an investment's DoS. However, previous literature is inconclusive regarding whether investors behave as consequentialists (Becker, 1974; Eckel, & Grossman 1996) and thus, sensitive to an investment's DoS, or warm-glow investors, who are indifferent to sustainability beyond a basic threshold (Andreoni, 1990). My study is aiming to shed light on this research gap.

By recruiting private investors through Prolific, I conduct a 2x2x2 between-subjects online experiment to examine the impact of an investment's DoS on private investors' valuation judgment. Given the differences in national regulations, I decided to distinguish between ESG aligned and impact related investments based on recent literature (Busch et al., 2021), covering major SRI strategy classification systems.

In line with expanded portfolio theory (Pedersen, Fitzgibbons, & Pomorski, 2021), drawing on consequentialist behavior, I predict that investors' valuation judgments is higher for high DoS than for low DoS investments. A full-factorial ANOVA model shows a significant effect of DoS on investors' valuation judgment, supporting hypothesis 1. I further hypothesize that investors' valuation judgments decrease more sharply for low DoS investments than for high DoS investments when the return difference to a non-sustainable investment increases. Again, using the ANOVA model revealed a significant interaction effect of DoS and return difference to a non-sustainable investment, supporting hypothesis 2. Finally, I find a significant interaction effect of DoS and SRI certification, providing support for my prediction that private investors' investors' valuation judgments increase more strongly for low DoS investments than for high DoS investments when the SRI strategy is certified.

To contextualize my findings, I conduct an SEM analysis, revealing that the effects of DoS and SRI certification on investors' valuation judgments are partially mediated by their skepticism toward sustainable investments and their willingness to sacrifice returns. This further corroborates the results of my primary analysis.

My study offers several important contributions. First, it adds to the literature on the influence of prosocial preferences in investment decisions (Barber, Morse, & Yasuda, 2021; Riedl, & Smeets, 2017; Hartzmark, & Sussman, 2019; Bauer, Ruof, & Smeets, 2021), by showing that investors perceive the DoS of impact related investments as higher than that of ESG aligned investments, which results in higher valuation judgments.

Second, it advances the literature by providing further evidence that private investors trade off financial performance and ethical concerns (Berry, & Yeung, 2013; Dorfleitner, & Utz, 2014; Gutsche, & Ziegler, 2019). Specifically, I achieve first evidence that a higher DoS can compensate investors for lower returns, i.e. that investors would sacrifice returns for additional sustainability. This supports that prosocial investors derive greater utility from investments with a higher DoS, which is a key assumption widely spread in traditional theoretical models of sustainable investing (Pastor, Stambaugh, & Taylor, 2021; Pedersen, Fitzgibbons, & Pomorski, 2021; Heinkel, Kraus, & Zechner, 2001).

Finally, I contribute to the large literature examining the effect of SRI certifications on investors' valuation judgments (Gutsche, & Ziegler, 2019; Gutsche, & Zwergel, 2020; Hartzmark, & Sussman, 2019; Klinger et al., 2022), by providing initial evidence that an investments' DoS moderates the impact of SRI certifications on investors' valuation judgments.

In terms of practical implications, my findings suggest that current sustainable finance strategies are effective, as I demonstrate that a higher DoS creates an investment incentive for private investors and even compensates them for lower returns. This is particularly important when achieving a higher DoS involves higher costs. Moreover, my study offers valuable implications for firms that reflect on issuing or distributing SRI funds, by showing that the impact of SRI certifications on investors' valuation judgments varies in magnitude depending on an investment's DoS.

While my study offers important contributions, it also has its limitations. First, I conducted the experiment with private investors, who have sufficient investing experience but are not professional investors. Prior research suggests that nonprofessional investors are more willing to invest in companies that align with their values and support socially responsible behavior (Cheah, & Phau, 2011; Cohen, & Simnett, 2015; McLachlan, & Gardner, 2004), whereas institutional investors may adopt a more traditional shareholder perspective (Eccles, Serafeim, & Krzus, 2011). Thus, future studies should explore whether institutional investors' valuation judgments are comparably affected by an investment's DoS. Second, as my study is designed as a stated choice experiment, I manipulate DoS and expected financial performance difference relative to a comparable non-sustainable investment at specific levels. More nuanced manipulations may provide meaningful insights. Future studies should investigate this possibility.

Appendix 2A

Figure 2.2: Comparison of experimental materials

Panel A Cell A&B no IMPACT and not CERTIFIED.

Key Investor Information Document

Sustainability Fund	
By Global Fund Management	ISIN: XX0158827195

Objectives and Investment Strategy

The fund invests in large and mid-capitalization companies in industrialized countries worldwide, to achieve total return through a combination of capital appreciation and income from the fund's assets. The currency of the fund is EUR.

In addition to financial performance, environmental and social aspects and the principles of good corporate governance (ESG aspects) are also taken into account, to mitigate ESG-related risks and ethical considerations, when selecting investments. The selection of individual investments is at the discretion of the fund management. The fund management does not use a benchmark index.

Risk Profile

← Typically lower risk				Typically higher risk →		
1	2	3	4	5	6	7

Performance

Expected financial performance of Global Sustainability Fund	
Expected performance	4.00% per year

Panel B Cell C&D no IMPACT and CERTIFIED.

Key Investor Information Document

Sustainability Fund	
By Global Fund Management	ISIN: XX0158827195

Objectives and Investment Strategy

The fund invests in large and mid-capitalization companies in industrialized countries worldwide, to achieve total return through a combination of capital appreciation and income from the fund's assets. The currency of the fund is EUR.

In addition to financial performance, environmental and social aspects, and the principles of good corporate governance (ESG aspects) are also taken into account, to mitigate ESG-related risks and ethical considerations, when selecting investments. The selection of individual investments is at the discretion of the fund management. The fund management does not use a benchmark index.

SRI STRATEGY CERTIFIED

Risk Profile

← Typically lower risk				Typically higher risk →		
1	2	3	4	5	6	7

Performance

Expected financial performance of Global Sustainability Fund	
Expected performance	4.00% per year

Panel C Cell E&F IMPACT and not CERTIFIED.

Key Investor Information Document

Impact Fund	
By Global Fund Management	ISIN: XX0158827195

Objectives and Investment Strategy

The fund invests in large and mid-capitalization companies in industrialized countries worldwide, to achieve total return through a combination of capital appreciation and income from the fund's assets. The currency of the fund is EUR.

In addition to financial performance, active contribution to social and environmental transformation is taken into account when selecting investments, to generate real impact by providing additional capital for sectors aligned with the UN Sustainable Development Goals. The fund management is therefore barring investments for the portfolio due to business activities that are deemed unethical, harmful to society, or in breach of laws or regulations (e.g. child labor, thermal coal, gambling, or alcohol) and instead invest in companies that make the most effort to meet the environmental, social and governance (ESG) criteria that are relevant for their respective industries. After the investment decision the fund uses its voting rights and engagement to increase the investments ESG performance.

Compared to an adequate benchmark index the funds' assets use 36% more green energy, produces 45% less greenhouse gas emissions, are free from unethical business activities and have a 73% stronger corporate governance.

Risk Profile

← Typically lower risk						Typically higher risk →
1	2	3	4	5	6	7

Performance

Expected financial performance of Global Sustainability Fund	
Expected performance	4.00% per year

Panel D Cell G&H IMPACT and CERTIFIED.

Key Investor Information Document

Impact Fund	
By Global Fund Management	ISIN: XX0158827195

Objectives and Investment Strategy

The fund invests in large and mid-capitalization companies in industrialized countries worldwide, to achieve total return through a combination of capital appreciation and income from the fund's assets. The currency of the fund is EUR.

In addition to financial performance, active contribution to social and environmental transformation is taken into account when selecting investments, to generate real impact by providing additional capital for sectors aligned with the UN Sustainable Development Goals. The fund management is therefore barring investments for the portfolio due to business activities that are deemed unethical, harmful to society, or in breach of laws or regulations (e.g. child labor, thermal coal, gambling, or alcohol) and instead invest in companies that make the most effort to meet the environmental, social and governance (ESG) criteria that are relevant for their respective industries. After the investment decision the fund uses its voting rights and engagement to increase the investments ESG performance.

Compared to an adequate benchmark index the funds' assets use 36% more green energy, produces 45% less greenhouse gas emissions, are free from unethical business activities and have a 73% stronger corporate governance.

Risk Profile

← Typically lower risk						Typically higher risk →
1	2	3	4	5	6	7

Performance

Expected financial performance of Global Sustainability Fund	
Expected performance	4.00% per year

Appendix 2B

Table 2.3: Original sample: Effects of IMPACT, SUBSTANTIAL, and CERTIFIED on WTI_SF

Panel A Descriptive Statistics – Mean (Standard Deviations) of WTI_SF

N = 730	Degree of sustainability				
	No Impact (ESG aligned)		Impact (Impact related)		
Return difference	Not Certified	Certified	Not Certified	Certified	Overall
Not Substantial	46.85 (2.50) N=89 [cell A]	57.43 (2.36) N=91 [cell C]	58.35 (2.47) N= 84 [cell E]	63.31 (2.43) N=77 [cell G]	No Impact 52.20 (1.76) N=180 Impact 60.72 (1.74) N=161
Substantial	32.63 (2.39) N= 104 [cell B]	51.69 (2.44) N=100 [cell D]	53.94 (2.33) N=90 [cell F]	62.20 (2.54) N=95 [cell H]	No Impact 41.98 (1.83) N=204 Impact 58.18 (1.75) N=185
Overall	39.19 (1.80) N= 193	54.42 (1.71) N=191	56.07 (1.70) N= 174	62.69 (1.77) N= 172	

Panel B Two-way full-factorial ANOVA Results

Adj. $R^2 = 0.138$ Source	Sum of Squares	Degrees of Freedom	F	p-value
Model	67111.63	7	17.62	<0.001***
IMPACT	27391.49	1	50.33	<0.001***
SUBSTANTIAL	7337.66	1	13.48	<0.001***
CERTIFIED	20773.12	1	38.17	<0.001***
IMPACT_SUBSTANTIAL	2359.67	1	4.34	0.019**
IMPACT_CERTIFIED	3053.27	1	5.61	0.009***
SUBSTANTIAL_CERTIFIED	1569.43	1	2.88	0.045**
IMPACT_SUBSTANTIAL_CERTIFIED	302.89	1	0.56	0.456
Error	392962.88	722		

Notes: Panel A presents the number of observations (N), the mean and standard deviation (in parentheses) of participants' willingness to invest in *Sustainability Fund* (*WTI_SF*) for each experimental cell. Columns denote the *IMPACT* manipulation divided by the *CRETIFIED* manipulation and rows denote the *SUBSTANTIAL* manipulation, presented in detail in Appendix 2A. *WTI_SF* is measured as the average of a two-item construct (on a scale from 0 very unattractive; very unlikely to 100 very attractive; very likely): (1) “How attractive is an investment in Sustainability Fund as part of your diversified portfolio?”; (2) “How likely are you to invest in Sustainability Fund as part of your diversified portfolio?”. Panel B reports results of a full-factorial ANOVA model with *WTI_SF* as dependent variable, and the *IMPACT*, *SUBSTANTIAL*, and *CERTIFIED* manipulations, as well as their interactions as factors. P-values reflect my hypothesis tests and are one-tailed equivalents. *, **, and *** denote significant at the 10-, 5-, and 1-percent levels, respectively.

Table 2.4: Effects of IMPACT, SUBSTANTIAL, and CERTIFIED on WTS_SF

Panel A Descriptive Statistics – Mean (Standard Deviations) of WTS_SF

N = 701	Degree of sustainability				
	No Impact (ESG aligned)		Impact Impact related		
Return difference	Not Certified	Certified	Not Certified	Certified	Overall
Not Substantial	2.748 (0.251) N=89 [cell A]	2.573 (0.270) N=91 [cell C]	2.754 (0.272) N= 84 [cell E]	3.173 (0.293) N=77 [cell G]	No Impact 2.659 (0.184) N=180 Impact 2.954 (0.199) N=161
Substantial	2.212 (0.224) N= 104 [cell B]	2.858 (0.250) N=100 [cell D]	2.484 (0.248) N=90 [cell F]	3.351 (0.308) N=95 [cell H]	No Impact 2.528 (0.169) N=204 Impact 2.929 (0.201) N=185
Overall	2.459 (0.168) N= 193	2.722 (0.184) N=191	2.614 (0.183) N= 174	3.271 (0.214) N= 172	

Panel B One-way ANOVA Results

Adj. R^2 = 0.012 Source	Sum of Squares	Degrees of Freedom	F	p-value
Model	87.12	5	2.76	0.009***
IMPACT	28.71	1	4.55	0.017**
SUBSTANTIAL	1.93	1	0.31	0.290
CERTIFIED	48.80	1	7.73	0.003***
IMPACT_SUBSTANTIAL	0.22	1	0.03	0.427
IMPACT_CERTIFIED	9.24	1	1.46	0.113
Error	4386.50	695		

Notes: Panel A presents the number of observations (N), the mean and standard deviation (in parentheses) of participants willingness to sacrifice returns for *Sustainability Fund* (*WTS_SF*) for each experimental cell. Columns denote the *IMPACT* manipulation divided by the *CRETIFIED* manipulation and rows denote the *SUBSTANTIAL* manipulation. *WTS_SF* is measured as the item (on a scale from 0,0% to 10,0%): "Please indicate the maximum return you would sacrifice to invest in Sustainability Fund instead of a non-sustainable fund with similar risk and liquidity.". Panel B reports results of an ANOVA with *WTS_SF* as the dependent variable, and my *IMPACT*, *SUBSTANTIAL* and *CERTIFIED* manipulations, as well as their interactions *IMPACT_SUBSTANTIAL* and *IMPACT_CERTIFIED* as factors. P-values are two-tailed. *, **, and *** denote significant at the 10-, 5-, and 1-percent levels, respectively.

Table 2.5: Effects of IMPACT, SUBSTANTIAL, and CERTIFIED on SKEPT_SF

Panel A Descriptive Statistics – Mean (Standard Deviations) of SKEPT_SF

N = 608	Degree of sustainability				
	No Impact (ESG aligned)		Impact (Impact related)		
Return difference	Not Certified	Certified	Not Certified	Certified	Overall
Not Substantial	4.614 (0.138) N=89 [cell A]	4.479 (0.142) N=80 [cell C]	4.294 (0.156) N=68 [cell E]	3.855 (0.129) N=62 [cell G]	No Impact 4.550 (0.099) N=169 Impact 4.085 (0.104) N=130
Substantial	4.567 (0.127) N= 94 [cell B]	4.215 (0.123) N=87 [cell D]	4.256 (0.170) N=77 [cell F]	3.983 (0.126) N=77 [cell H]	No Impact 4.398 (0.089) N=181 Impact 4.119 (0.106) N=154
Overall	4.590 (0.094) N= 183	4.341 (0.094) N=167	4.274 (0.116) N= 145	3.926 (0.090) N= 139	

Panel B One-way ANOVA Results

Adj. R^2 = 0.030 Source	Sum of Squares	Degrees of Freedom	F	p-value
Model	36.44	5	4.80	<0.001***
IMPACT	23.70	1	15.62	<0.001***
SUBSTANTIAL	0.61	1	0.40	0.263
CERTIFIED	10.41	1	6.86	0.005***
IMPACT_SUBSTANTIAL	1.54	1	1.01	0.157
IMPACT_CERTIFIED	0.33	1	0.22	0.320
Error	913.65	602		

Notes: Panel A presents the number of observations (N), the mean and standard deviation (in parentheses) of participants skepticism toward *Sustainability Fund* (*SKEPT_SF*) for each experimental cell. Columns denote the *IMPACT* manipulation divided by the *CRETIFIED* manipulation and rows denote the *SUBSTANTIAL* manipulation. *SKEPT_SF* is measured as the average of a three-item construct (on a scale from strongly disagree (1) to strongly agree (7)): (1) "I do not trust Sustainability Fund to deliver on its social responsibility promises.", (2) "Sustainability Fund is dishonest about its real involvement in social responsibility initiatives.", (3) "I am not convinced that Sustainability Fund will fulfill its social responsibility objectives.". Panel B reports results of an ANOVA with *SKEPT_SF* as the dependent variable, and my *IMPACT*, *SUBSTANTIAL,* and *CERTIFIED* manipulations, as well as their interactions *IMPACT_SUBSTANTIAL* and *IMPACT_CERTIFIED* as factors. P-values are two-tailed. *, **, and *** denote significant at the 10-, 5-, and 1-percent levels, respectively.

3 The Influence of Corporate Philanthropic Donations on Private Investors' Valuation Judgments: Experimental Evidence

3.1 Introduction

One subcategory of CSR that is critically observed by investors are corporate donations toward disaster relief efforts (Berlemann, & Steinhardt, 2017; Van Aalst, 2006). These donations, called CPDR, are a commonplace practice (Jin, & He, 2018) and often fill the headlines of global newspapers, as they play a deciding role in the success of the disaster response and mainly consist of cash donations as well as the provision of goods and services (Muller, & Whiteman, 2009).

Previous research finds that CPDR announcements can entail both positive and negative capital market reactions (Chen et al., 2008; Muller, & Kräussl, 2011a), and thus are not always beneficial for the donating companies, as the case of Amazon shows anecdotally. In 2020, in response to the Australian bushfires, Amazon announced that it will donate one million Australian dollars in assistance to wildlife recovery. This led to furor in major news outlets and on Twitter because the amount was perceived as too small and therefore symbolic, especially relative to the company's size (Business Insider, 2020). Additionally, the large GHG emissions of Amazon's core business, its corporate policies, and controversial partnerships with oil and gas companies were seen as contributions to the conditions that made the wildfires disastrous (Piper, 2020).

However, research has not unveiled yet which particular mechanisms affect whether the capital market reacts positively or negatively toward CPDR. As climate change fosters the frequency and severity of natural disasters (Berlemann, & Steinhardt, 2017; Van Aalst, 2006), this is an increasingly relevant issue. We contribute to this literature by examining how private investors perceive CPDR and what motives they attribute to firms that engage in CPDR.

Specifically, the empirical literature has not yet examined when and why private investors might consider CPDR as truly philanthropical or, on the contrary, assess CPDR skeptical and potentially egoistic-driven. Especially for private investors it is complicated to distinguish between philanthropically conscious donations and donations rooted in self-interest because private investors often rely on third-party information (Cohen et al., 2011; Parguel et al., 2011). Still, private investors tend to question why companies engage in CPDR and critically assess if philanthropic donations are connected to a true philanthropic motive or rather suggest greenwashing (Vanhamme, & Grobben, 2009).

To reach our research aim, we are creating an experimental investment scenario in which we evaluate the investment decisions of private investors in search of new investments. In our experiment, participants recruited from Amazon's Cloud Research platform learn about a hypothetical firm (Firm Y) and its CPDR efforts in response to a hurricane catastrophe. We manipulate the magnitude of Firm Y's CPDR efforts and vary its financial and sustainability performance in order to increase our experiment's generalizability. We ask participants to indicate how likely they are to invest in Firm Y. In addition, we record how participants perceive Firm Y's motivation for engaging in social and environmental activities using measures from the CSR skepticism concept to examine the motives private investors attribute to Firm Y's CPDR efforts (Skarmeas, & Leonidou, 2013).

In our baseline analysis, we find that private investors' perception of the magnitude of Firm Y's CPDR is positively associated with their valuation judgment. Our result is robust to the variation of Firm Y's financial and sustainability performance. Using a SEM and the CSR skepticism concept (Skarmeas, & Leonidou, 2013) to analyze what underlying motives private investors attribute to Firm Y's CPDR efforts, we find that for higher CPDR private investors attribute values-driven motives to Firm Y's CPDR efforts, which then reduces participants' CSR skepticism and increases their valuation judgment. Thus, we find that, if private investors perceive CPDR as high, they believe the donation's purpose is to contribute to society by mitigating the consequences of the natural disaster, thereby expressing moral, ethical, and social ideals. In line with Skarmeas and Leonidou (2013), we also consider an alternative SEM in which we examine whether the attributions of stakeholder-, strategic-, values-, and egoistic-driven motives directly affect investor valuation. Here, we find evidence that for low CPDRs, private investors perceive Firm Y's motives as egoistic, which reduces their valuation judgment. In both SEMs, we continue to also find a direct effect of CPDR magnitude on participants' valuation of Firm Y. Hence, we find evidence that both the motives private investors attribute to a firm's CPDR and the sole magnitude of the CPDR affect how private investors alter their valuation judgment when learning about the firm's CPDR efforts.

Our study extends the behavioral finance literature, especially prior research on CSR induced attributions (Ellen et al., 2006; Forehand, & Grier, 2003; Skarmeas, & Leonidou, 2013; Vlachos et al., 2009), by revealing that private investors perceive a firm's CPDR activities differently depending on the CPDR's magnitude. Our results furthermore contribute to the recent behavioral finance literature that examines the influence of CSR activities on investors' assessment of a firm's value by showing that the magnitude of CPDR affects investor valuation; both through motive attribution and a direct effect of the CPDR's magnitude. Collectively, our article is the first to provide explanation of why CPDR can result in both positive and negative capital market reactions. Therefore, our article offers relevant implications for firms that reflect on the impact of their CPDR efforts on the capital market and extends the understanding of how private investors perceive firms' CSR efforts.

We proceed as follows. In Section 3.2 we discuss related research and develop our hypotheses. Section 3.3 describes our methodology, while Section 3.4 discusses our results. Section 3.5 concludes our article.

3.2 Background and Hypotheses Development

3.2.1 Background

Climate change is believed to have an impact on the severity and frequency of natural disasters, such as cyclones/hurricanes and floods (Berlemann, & Steinhardt, 2017). While governments and non-governmental organizations generally lead the disaster relief efforts, companies also play a major role in the success of the disaster response, particularly through CPDR, which consists of cash donations and providing goods and services (Muller, & Whiteman, 2009). We deliberately chose CPDR, rather than corporate philanthropy (or CSR activities) in general as the object of study, because CPDR is an increasingly important element of corporate philanthropy (Muller, & Whiteman, 2009). In addition, philanthropy can be positively received by investors, according to prior research (Chen et al., 2008), but only if it is visible. When firms announce CPDR, intentionally or unintentionally it often fills the headlines of major global newspapers (Jin, & He, 2018). Thus, CPDR can positively affect a firm's reputation among consumers and investors (Martin, & Moser, 2016). To summarize, CPDR is a particularly visible part of philanthropy and is therefore important for our study.

Often, natural disasters cause not only huge economic losses, but also strongly affect social and environmental structures (Deryugina, 2017; Martin, & Moser, 2016; Muller, & Kräussl, 2008). For example, cyclones and hurricanes often cause substantial beach erosions, massive tree loss, and water contamination (Chapman et al., 2008; Tidwell, 2006). Above that, there are social damages, such as increased unemployment and medical expenses as well as a higher need for social support (Deryugina, 2017; Weems et al., 2007). Further, it is arguable that natural disasters bring uncertainty about economic impact. Disruption of supply chains, strain on employees, deterioration of employee performance, or diversion of attention (Godfrey et al., 2009; Kleindorfer, & Saad, 2005) might be anticipated by investors as financial impacts of the disaster of significant consequence to the company, and therefore philanthropic giving may be a controversial decision for investors at this time (Muller, & Kräussl, 2011a).

Literature suggests that firms engage in CPDR for business strategic reasons as a part of their corporate identity (Jin, & He, 2018). Hence, firms also might use these donations in the context of greenwashing, because of their high visibility. For example, Muller and Kräussl (2011b) show that firms with a reputation for social irresponsibility experienced the greatest drop in stock prices when Hurricane Katrina made landfall and also had the greatest likelihood of making a charitable donation. Therefore, it must be assumed that some firms also use CPDR to cover their neglect of CSR efforts. In this sense, research has not yet fully unveiled whether and under which circumstances investors perceive CPDR as truly philanthropic and what leads investors to doubt a firm's philanthropic intention behind CPDR activities. This is an important question considering the increasing interest of investors to invest in a more socially responsible way, even if this entails a loss of returns (Gutsche, & Ziegler, 2019).

3.2.2 Hypotheses Development

We investigate whether private investors value firms differently based on their perception of how firms engage in CPDR because it seems that there is a change in how corporate philanthropy[29] and

[29] According to the widely used concept of Carroll (1979, 1991), philanthropic responsibility, is a component of social responsibility, and belongs to the four categories of CSR that build on each other, along with economic responsibility, legal responsibility and ethical responsibility. Therefore, we consider CPDR as a part of corporate philanthropy, which in turn is a dimension of CSR (Godfrey, 2005; Wang et al., 2008).

especially CPDR is perceived. Over the past few years, critics of big philanthropy emerged saying that donations by the ultra-rich are part of a broken system where good public relations prevent policy changes (Piper, 2020). This is a point that is underscored by the example of public backlash toward Amazon's CPDR for assisting wildlife recovery in Australia, as Amazon is a big GHG emitter, defends controversial partnerships with oil and gas companies, and is taking advantage of various exemptions and loopholes in Australia's tax code. Thus, we expect that private investors critically observe if philanthropic donations are connected to a true philanthropic motive or rather suggest greenwashing.

Corporate philanthropy has theoretically been proposed to contribute to a firm's value via several channels of impact, for example by facilitating cooperation with different stakeholders (Godfrey, 2005; Sen et al., 2006; Wang et al., 2008), but empirical results are mixed (Chen et al., 2008; Orlitzky et al., 2003; Saiia et al., 2003; Seifert et al., 2004). While Bartkus et al. (2002) propose that charitable contributions have no clear relevance for firm value, Hess et al. (2002) as well as Porter and Kramer (2002) argue that CPDR can yield tangible benefits for the firm and therefore influences investors' assessment of its value. These tangible benefits, for instance, are positive reputation effects (Brammer, & Millington, 2005; Fombrun, & Shanley, 1990), "insurance" like policies against adverse effects of negative events (Godfrey et al., 2009; Peloza, 2006), enhanced trust among key stakeholders (Hillman, & Keim, 2001; Jones, 1995) and reduced transaction costs, risk mitigation, and improved access to vital resources (Arthur, 2003; Wang et al., 2008). Empirically, whether philanthropy actually contributes to firm value remains an open question (Orlitzky et al., 2003; Patten, 2008; Saiia et al., 2003; Seifert et al., 2004).

Recent research has uncovered several factors moderating the relationship between corporate philanthropy and an investors' assessment of a firm's value, for example, a firm's visibility and sensitivity to consumer perception (Lev et al., 2010) and, whether donations are considered as surprising (Brammer, & Millington, 2008) and the level of uncertainty and anxiety present in the market (Muller, & Kräussl, 2011a; Tilcsik, & Marquis, 2013). Godfrey (2005), Dean (2003) and McGuire et al. (2003) emphasize the perception of philanthropy as determining firm value effects. Previous research has also examined the role of the donation amount (CPDR magnitude). While Chen et al. (2008) find a positive association between the CPDR magnitude and the capital market's reaction, measured by cumulative abnormal returns. In the context of the 2004 tsunami, Muller and Kräussl (2011a) present a negative association between abnormal returns and CPDR magnitude. Therefore, we contribute to the empirical research on the effect of CPDR magnitude by experimentally examining private investors' reactions to CPDR announcements. As empirical evidence for the effect of the CPDR magnitude on firm value is inconclusive, we propose two competing baseline hypotheses for the direct effect of CPDR magnitude on private investors' valuation decisions.

H1a: *The magnitude of a firm's CPDR positively affects private investors' assessment of a firm's value.*

H1b: *The magnitude of a firm's CPDR negatively affects private investors' assessment of a firm's value.*

As of now, research has not yet examined through which channel CPDR can affect firm value and how the magnitude of CPDR is perceived by investors. We therefore investigate the underlying motives attributed to CPDR. As can be seen in Figure 3.1 further below, we will thereby hypothesize through a cascade of hypotheses that the impact of donation magnitude on investor valuation is (partly) mediated by investors' attribution of motives and associated CSR skepticism. While the back part of the cascade of hypotheses is not unique to this study and may seem intuitive as it refers to well-established directions of connections (e.g., between the different motives and CSR skepticism in H3a–d or between CSR skepticism and investor valuation in H4), the front part of the cascade, that is, H2a–d provides the tension: The question of interest in this study is how donation magnitude impacts the attribution of different motives (being an open question), which then induces CSR skepticism, which in turn drives investor valuation (both being well established by previous literature). The value of the following deliberations therefore lies in applying the implications of attribution theory to the specific context of this study and to argumentatively connect donation magnitude - via the different motives and CSR skepticism - to investor valuation.

As discussed above, private investors have a strong interest in understanding why companies adopt CSR practices (Gilbert, & Malone, 1995; Wang et al., 2015) and less confidence that these companies are just only "good corporate citizens" (Ellen et al., 2006). We make use of the attribution theory to analyze these backgrounds in more detail. Attribution theory belongs to the field of behavioral finance, which moves away from the classical assumption of people acting as the homo economicus, that is, a rational utility maximizer. Attribution theory provides an appropriate framework to explore CSR skepticism as it decodes the way private investors perceive corporate social commitment, attribute causes to it and how this cognitive perception influences their attitudes and behavior (Ellen et al., 2000; Kelley, & Michela, 1980; Vlachos et al., 2009). CSR activities are defined as a voluntary contribution by companies toward sustainable development that goes beyond the legal requirements (EC, 2011). Some firms may engage in CPDR to maintain a preexisting reputation for social and environmental responsibility and show their predictability and reliability in the CSR arena (Rindova, & Fombrun, 1999). CPDR activities can therefore be seen as part of a firm's CSR efforts (Muller, & Kräussl, 2011b). Theory states that causal analysis is inherent in people's need to understand events and that they attribute motives to the actions of organizations. These attributions influence their subsequent response to the organization (Boush et al., 1994; Campbell, & Kirmani, 2000; Schmitt, & Branscombe, 2002). Consequently, investors do not respond to the company's action itself but develop persuasion knowledge through attributional inferences (Kelley, & Michela, 1980; Lange, & Washburn, 2012). Persuasion knowledge helps private investors learn to interpret and evaluate the persuasion agents' goals and tactics and use this knowledge to cope with persuasion attempts (Friestad, & Wright, 1994).

In the context of CPDR, the event related to attribution theory is the donation of a company and the accompanied press release. The donating company represents the persuasion agent whose goal is to be credible. We assume that the magnitude of a firm's donation is used by private investors to build up persuasion knowledge. Thus, it influences the cognitive perception of private investors and the attribution of motives to CPDR activities of a company. The recent literature in the context of corporate social engagement is driven by (1) the framework of Du et al. (2007) distinguishing intrinsic and extrinsic attributions, as mutually exclusive and (2) the framework of Ellen et al. (2006) suggesting four different types of causal inferences (motives) that can be attributed to the actions of organizations. These are egoistic-, values-, strategic-, and stakeholder-driven motives (Vlachos et al., 2009). We think because of the complexity of human cognitive processes, a distinction between intrinsic and extrinsic attributions falls short and follow Ellen et al. (2006). According to their framework (intrinsic and extrinsic), motives can occur independently and thereby co-exist, or be a mixed form itself, for example, strategic-driven motives. While this literature suggests that the magnitude of a firm's CPDR is associated with the four above-mentioned motives, the specific direction of the effect remains an open empirical question. Thus, we formally state the following non-directional hypotheses:

H2a: *The magnitude of a firm's CPDR affects private investors' perception of stakeholder-driven motives.*

H2b: *The magnitude of a firm's CPDR affects private investors' perception of strategic-driven motives.*

H2c: *The magnitude of a firm's CPDR affects private investors' perception of values-driven motives.*

H2d: *The magnitude of a firm's CPDR affects private investors' perception of egoistic-driven motives.*

In line with Ellen et al. (2006) and Vlachos et al. (2009), we now connect these four motives to the construct of CSR skepticism. Skepticism describes a person's tendency to doubt, disbelieve, or question (Boush et al., 1994; Forehand, & Grier, 2003). In the corporate context, skepticism has been identified as a possible consumer/ investor response to advertising, promotion, and public relations (Boush et al., 1994; Obermiller et al., 2005). Corporate social marketing (Forehand, & Grier, 2003), environmental claims (Mohr et al., 1998), cause-related claims (Singh et al., 2009), CSR communication during crises (Vanhamme, & Grobben, 2009), and CSR programs (Pirsch et al., 2007) have been the subject of research. Skepticism is considered both as a personality trait (Boush et al., 1994; Obermiller, & Spangenberg, 1998) and as a state that is elicited independently of personality traits and varies according to context and situation (Forehand, & Grier, 2003; Mohr et al., 1998; Vanhamme, & Grobben, 2009). An elementary characteristic of skeptical individuals is that they may change their minds when presented with sufficient evidence (Mohr et al., 1998). Thus, skepticism is a cognitive reaction that can result from situational factors (Forehand, & Grier, 2003).

As described above CPDR activities are a complex event toward which private investors are likely to identify plausible causal inferences for corporate social engagement (Öberseder et al., 2011). Relevant to the impact on CSR skepticism is how private investors perceive the company's motives (Ellen et al., 2006; Vlachos et al., 2009). Two primary types of motives (causal inferences) are distinguished: company-related motives (stakeholder-, strategic- and egoistic-driven motives), which emphasize the potential benefits for the company itself, and publicity-related motives (values-driven motives), which focus on the potential benefits for people outside the company (Barone et al., 2000; Forehand, & Grier, 2003). Company-related motives are generally perceived negatively, as they signify an individualistic perspective, and public-related motives positively, as they show an increased social interest (Becker-Olsen et al., 2006).

Stakeholder-driven motives refer to the belief that the company engages in CSR activities to meet the expectations of various stakeholders (Vlachos et al., 2009). Following the theory, CSR activities are consequently seen by private investors as extrinsically motivated and serve to avoid punishment by stakeholders (Ellen et al., 2000; Vlachos et al., 2009). Applied to CPDR, this would mean, that CPDR seems not to be in line with the company's beliefs (Smith & Hunt, 1978), as it does not seem to be motivated by true altruistic motives but is rather caused by external pressure. Investors potentially assume that CPDR is a particular incentive, as these activities are often displayed in the media. In the case of less high-profile decisions, private investors could fear, that the company does not behave in a similarly ethical and moral manner (Franklin, 2008) and will not continue to honor promises, when nobody forces these actions (Bhattacharya et al., 1998).

To provide formal, theoretical support for these effects we make use of the correspondence theory (Jones, & Davis, 1965). Correspondence theory can be found in the behavioral finance literature which moves away from the assumption that people act as a homo economicus, that is, a rational utility maximizer. It attempts to posit a relationship between thoughts or statements on one hand, and things or facts on the other. It states the truth of a statement is determined by how it relates to and corresponds to the world (David, 2015). Stakeholder-driven motives are non-correspondent, representing a behavior in contrast with the firm's true beliefs, and thus are viewed negatively (Smith, & Hunt, 1978).

We, therefore, assume that such attribution of stakeholder-driven motives leads to higher skepticism toward the company's CSR activities because private investors see them as not corresponding with the company's true values and beliefs. In line with the relevant literature on CSR skepticism (Ellen et al., 2006; Vlachos et al., 2009) we formally state the following hypothesis:

H3a: *Stakeholder-driven motives relate positively to CSR skepticism.*

Strategic-driven motives represent the most common business case for CSR and yet are the most complex to understand. Private investors are thereby convinced that the company creates a win-win situation as it achieves its business objectives by undertaking and subsequently promoting social activities (Ellen et al., 2006; Vlachos et al., 2009). For private investors, this poses a complex valuation problem, as a company must be economically viable for such behavior to be perceived as legitimate (Ellen et al., 2006). Consumers may legitimize profit motivated CPDR since corporate survival requires retaining customers (Vlachos et al., 2009). Skarmeas and Leonidou (2013) find that strategic-driven attributions neither facilitate nor alleviate CSR skepticism, which is an indication that private investors are tolerant of strategic motives for corporate social engagement. (Skarmeas, & Leonidou, 2013). Formal theoretical support for this view can be found in the social exchange theory's principle of reciprocal reinforcement (Zafirovski, 2003), often used in the behavioral finance literature.

However, we anticipate that private investors are unwilling to accept for-profit behavior to be mixed with CSR activities (Barone et al., 2000; Hollender, 2004) and would perceive for-profit giving based on economic rather than moral considerations (Vlachos et al., 2009). Arguing with the correspondence theory it can be stated that strategic-driven motives are non-correspondent because there is a partial contrast between a firm's true convictions and its actions. Strategic-driven motives thus are viewed negatively (Smith, & Hunt, 1978). In addition, it can be argued that private investors could initially have doubts about a company's CSR activities if they attribute them to the for-profit motive, regardless of whether they ultimately consider these activities legitimate. Thus, we formally state the following hypothesis:

H3b: *Strategic-driven motives relate positively to CSR skepticism.*

Values-driven motives, in the context of CPDR, are understood by private investors to mean that a company donates solely to contribute to society by mitigating the consequences of the natural disaster, thereby expressing its moral, ethical, and social ideals (Becker-Olsen et al., 2006; Ellen et al., 2000). The theory states that CSR will be interpreted as an authentic interest in social problems by private investors in these cases because they consider the firm to be acting with sincere and benevolent intentions (Vlachos et al., 2009). Applying this to CPDR would mean that private investors uncritically accept donations, when attributing values-driven motives and observe the CSR activities of such a company less critically. In terms of the correspondence theory, values-driven motives are correspondent attributions, representing the true intention and dispositions of the firm, and are viewed positively (Smith, & Hunt, 1978). Thus, we formally state the following hypothesis:

H3c: *Values-driven motives relate negatively to CSR skepticism.*

In case of egoistic-driven motives private investors are convinced that the donor company exploits the natural disaster for good publicity and is not primarily interested in supporting the victims (Ellen et al., 2006; Vlachos et al., 2009). Following the theory, CPDR, as a part of a company's CSR activities, arising from egoistic-driven motives is seen by private investors as unethical and as a deliberate attempt to mislead them into wrong conclusions because the company is exclusively pursuing its own interests (Forehand, & Grier, 2003; Vlachos et al., 2009). We anticipate that private investors become more skeptical about a company's CSR activities when they attribute egoistic-driven motives. Correspondence theory provides support for these effects, because egoistic-driven motives are non-correspondent, representing a behavior in contrast with the firm's true beliefs (Smith, & Hunt, 1978). We therefore formally state the following hypothesis:

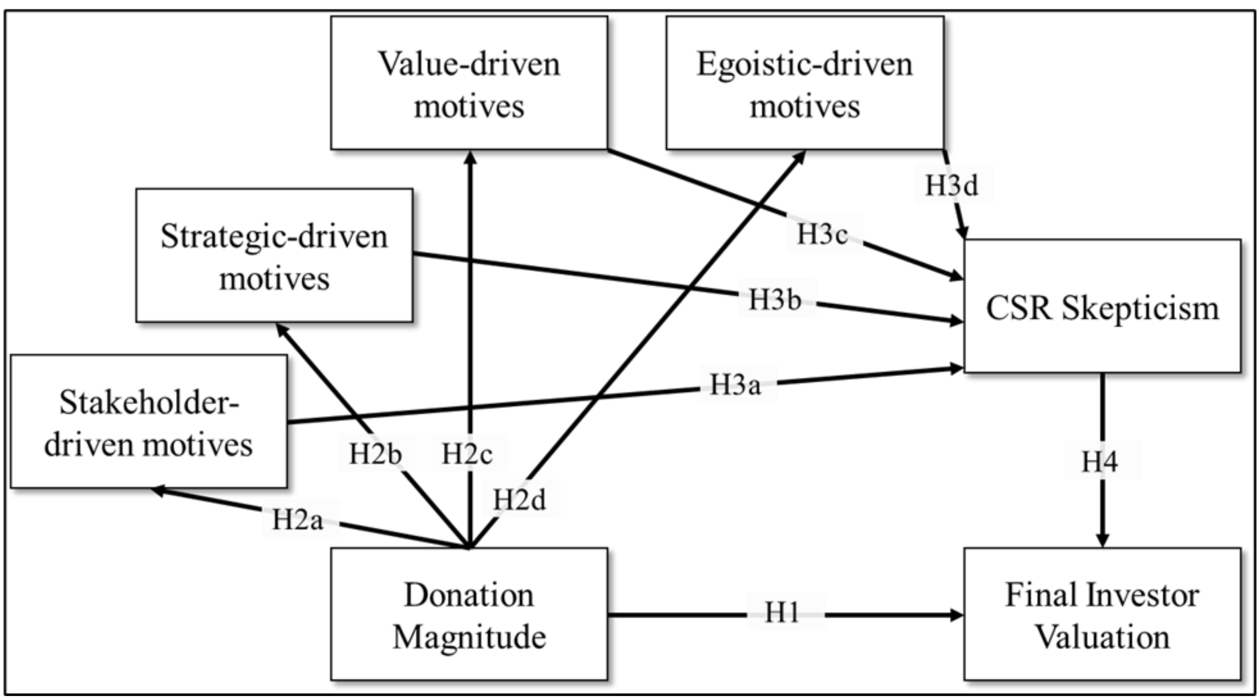
H3d: *Egoistic-driven motives relate positively to CSR skepticism.*

Prior literature has shown that CSR skepticism is an important driver of stakeholders' attitudes toward a company (Brown-Liburd, & Zamora, 2015; Godfrey, 2005; Klein, & Dawar, 2004; Luo, & Bhattacharya, 2006; Sen, & Bhattacharya, 2001). If stakeholders, for example, customers or investors, are not convinced about the genuine social consciousness of the company and express doubts about its ethical standards and social responsibility, their attitudes toward and perceptions of the company diminish (Brown-Liburd, & Zamora, 2015; Skarmeas, & Leonidou, 2013). Thus, negative CSR associations play an important role in private investors' assessment of a firm's value directly, but possibly also indirectly. Investors may additionally factor in that CSR skepticism negatively affects consumers' purchase decisions, and a reduction of (accumulated) purchasing decisions in turn may reduce a firm's future net inflows and ultimately its enterprise value (Damodaran, 2020). Additionally, prior literature reveals, that CPDR can be expected to generate "reputational capital" (Godfrey, 2005, p. 779), which is a part of the firm's value. This 'reputational capital' and thereby firm value can easily be lost in the presence of CSR skepticism.

Interestingly, in the context of Hurricane Katrina, Muller and Kräussl (2011a) find a negative and significant association of both a firm's CSR performance and donation magnitude with abnormal returns to donation announcements. In this sense, also Godfrey (2005) highlights that corporate philanthropy can negatively affect firm value when it is perceived as "an ingratiating attempt to win favor". We expect that, if private investors perceive that a firm is trying to take advantage of the situation by donating to disaster relief efforts and private investors are skeptical about the motives behind the donation, this skepticism will lead to a lower valuation. Thus, we formally state the following hypothesis:

H4: *CSR skepticism negatively affects private investors' assessment of a firm's value.*

Figure 3.1: Structure of hypotheses.



Notes: Figure 3.1 illustratively summarizes our hypotheses.

3.3 Method

3.3.1 Participants

We analyze the decision-making of private investors in a between-participants experimental setting recruiting participants from Amazon's Cloud Research (ACR) platform (formerly Mechanical Turk). Prior studies show that ACR participants are representative of the overall population (Berinsky et al., 2012; Buhrmester et al., 2011; Paolacci et al., 2010) and that they produce results similar to and consistent with in-person studies (Casler et al., 2013; Horton et al., 2011). Buchheit et al. (2017) find that measures of intelligence for ACR participants and traditional participants are similar, while Crump et al. (2013) prove the same for problem-solving and learning tasks. We require that participants reside in the US, have completed at least 100 other ACR assignments, and have at least a 95% approval rate from prior assignments. The minimum compensation per participant is $1.50. In total, we obtain 365 observations, and it took participants on average slightly more than 8 min to complete our survey. 55% of our participants are male, 44% are female and 1% identify themselves as “other”. On average, our participants are 41 years old. 64% of our sample report having at least a bachelor’s degree.

3.3.2 Design and Procedure

Participants assume the role of a private investor in search of new investments. We explain that, in the process of searching for new investments, they come across Firm Y. They learn that Firm Y is a mature, global manufacturer and distributor based in the US and view financial and sustainability information of Firm Y. The information has been adapted from real-world examples[30] and comprises the income statement for the year 2020 and a sustainability performance report. We vary Firm Y's relative financial performance to its peers (above industry average vs. below industry average) and Firm Y's relative sustainability performance (outperformer vs. underperformer) to increase the generalizability of our results. In the below industry average financial performance conditions, Firm Y's return on sales is 1.9% with a dividend per share of $0.31, which we indicate to participants to be “well below industry average” (cited from the experimental instrument). In the above industry average financial performance conditions, Firm Y's return on sales is 9.6% with a dividend per share of $0.98, which we indicate to participants to be “well above industry average” (cited from the experimental instrument). For our sustainability performance variation, we manipulate a label stating under- vs. outperformer. The label is similar to common established ratings from a reputable third party.[31] The participants see either a label indicating an outperformer sustainability performance report with an overall score of 80 or a label indicating an underperformer sustainability performance report with a score of 20 (scale ranges from 0 to 100). After participants view the information about Firm Y's financial and sustainability performance, they indicate how likely they are to invest in Firm Y on a 10-point Likert-scale (Initial valuation judgment).[32]

Next, participants learn that a hypothetical Hurricane A has moved across southeastern US with severe social, economic, and ecological disaster. In this context, we explain to participants

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[30] We examined the profit and loss statements of the largest 200 firms of the world (based on the Fortune Global 500) and used the averages to derive our financial information for Firm Y. However, for the variation of the financial performance, we altered the profitability in both the high and low financial performance condition.

[31] The labels were adapted from a report produced by Sustainalytics, a recognized global leader in research and ratings for corporate sustainability. Consistent with Elliott et al. (2014) and Johnson et al. (2020), we use a third-party report to avoid issues of disclosure credibility and signaling if Firm Y were to self-report its CSR performance. Furthermore, survey studies indicate that investors commonly use third-party CSR performance reports and believe that these reports provide important information (Cohen et al., 2011).

[32] Our valuation judgment scale is derived from Johnson et al. (2020) and captures participants' beliefs about the value of Firm Y's. It is similar to other scales used in prior research (see Bonner et al., 2014; Chen et al., 2016; Elliott et al., 2017).

that Firm Y donates $500,000[33] in our low donation condition ($5,000,000 in our high donation condition) as emergency aid to support the relief and recovery efforts and thus, also manipulate the magnitude of Firm Y's donation to the disaster relief efforts of Hurricane A. After that, we ask participants again to indicate how likely they are to invest in Firm Y on a 10-point Likert-scale (Final valuation judgment).[34] After that, participants answer post experimental questions.

3.3.3 Measures

Among these questions are items that measure how participants perceive Firm Y's motivation for engaging in social and environmental activities, such as the donation to the disaster relief efforts (Skarmeas, & Leonidou, 2013). Well-established measures were identified from existing research. The items measuring egoistic-, values-, strategic-, and stakeholder-driven motives are derived from prior work of Ellen et al. (2006) and Vlachos et al. (2009) and presented in Table 3.1.

[33] We examined the donation activity of the largest 200 corporations listed in the Fortune Global 500 for the following disasters: Australian Bushfires, Hurricanes Dorian, Florence, Michael, Harvey and Maria, Cyclone Idai, Amazonas Fires, Typhoon Hagibis, and California Camp Fire. The dollar amount of the donations was on average $772,500 and ranged from $50,000 to $10,000,000. Based on these donations, we concluded that it corresponds most closely to reality if we manipulate the donations of our hypothetical Firm Y to the levels of $500,000 in our low donation condition and $5,000,000 in our high donation condition.

[34] Our valuation judgment scale is designed to capture participants' beliefs about the value of Firm Y's common stock and is consistent with similar scales used in prior research (Asay et al., 2017; Bonner et al., 2014; Chen et al., 2016; Elliott et al., 2017; Johnson et al., 2020;). While using a general scale such as this may lead to different interpretations about what constitutes a low vs. high common stock valuation, random assignment of participants to conditions should negate any differences across conditions attributable to scale interpretation.

Table 3.1: Description of items used to capture attribution theory constructs

Item	Description (Please indicate your agreement with the following statements concerning Firm Y's motivation to donate to Hurricane A disaster relief: I believe that Firm Y…)
Attribution of stakeholder-driven motives	
STAKEHOLDER1	… feels its employees expect it.
STAKEHOLDER2	… feels its customers expect it.
STAKEHOLDER3	… feels its stockholders expect it.
STAKEHOLDER4	… feels society in general expect it.
Attribution of strategic-driven motives	
STRATEGIC1	… wants to keep its existing customers.
STRATEGIC2	… hopes to increase its profits.
STRATEGIC3	… wants to gain new customers.
STRATEGIC4	… hopes to increase its competitiveness.
Attribution of values-driven motives	
VALUE1	… has a long-term interest in society and the environment.
VALUE2	… is trying to give back something to society and environment.
VALUE3	… has an ethical responsibility to help society and the environment.
VALUE4	… feels morally obligated to help society and the environment.
Attribution of egoistic-driven motives	
EGOISTIC1	… is trying to capitalize on the growing social and ecological movement.
EGOISTIC2	… is taking advantage of the cause to help their own business.
EGOISTIC3	… is trying to benefit from the increased awareness of social and ecological problems.
CSR Skepticism	
SKEPTICISM1	… is a socially and environmentally responsible firm.
SKEPTICISM2	… is concerned about improving the well-being of society and the environment.
SKEPTICISM3	… follows high ethical standards.
SKEPTICISM4	… acts in a socially and environmentally responsible way.

Notes: Table 3.1 presents descriptions for each item used to capture participants' attributions related to our theory, i.e. stakeholder-driven, strategic-driven, values-driven, and egoistic-driven motives, as well as their CSR Skepticism.

Three items are grasping the construct of egoistic-driven motives and four items each measure the constructs of values-, strategic-, and stakeholder-driven motives, respectively. For each item, participants expressed their level of agreement or disagreement with possible explanations for the donation described in the experimental case on a 7-point Likert-scale, ranging from strongly disagree (1) to strongly agree (7). Our study also includes a measure for CSR skepticism following the paper of Skarmeas and Leonidou (2013). CSR skepticism was therefore assessed by a four-item construct. The participants expressed their level of agreement or disagreement with a statement given for each item on a 7-point Likert-scale, ranging from strongly disagree (1) to strongly agree (7).

The constructs for empathy and sustainability record how empathetic the respective respondent is, as well as his or her attitude toward sustainability. We use the 17-item Environmental Attitudes Scale (EAS) (Ebenbach et al., 1998; Kortenkamp, & Moore, 2001) to measure sustainability attitude. To measure participants' empathy, we use two 7-item empathy subscales developed by Davis (1980), the perspective-taking scale and the empathic-concern scale, which assess participants' ability to “adopt the perspective […] of other people” and the “ability to experience feelings of […] compassion and concern for others undergoing negative experiences” (Dietz, & Kleinlogel, 2014). For each item, participants expressed their level of agreement or disagreement with the statement given on a 7-point Likert-scale, ranging from strongly disagree (1) to strongly agree (7). Table 3.2 provides descriptive statistics for participants' answers to our investment likelihood questions and the motives and skepticism items, as well as participant demographics.

Table 3.2: Descriptive statistics for our sample of 365 participants

N = 365

Item	Mean	Std. Dev.	Min	Max
Initial Valuation	4.967	2.769	0	10
Final Valuation	5.567	2.734	0	10
Financial Performance	0.584	0.494	0	1
Sustainability Performance	0.499	0.501	0	1
Perceived Donation Magnitude	4.12	0.911	1	5
Stakeholder-driven motives	4.683	1.179	1	7
Strategic-driven motives	5.274	1.250	1	7
Values-driven motives	4.977	1.310	1	7
Egoistic-driven motives	4.512	1.441	1	7
CSR Skepticism	3.001	1.424	1	7
Age	41.071	11.555	18	77

Notes: Table 3.2 presents our number of observations (N) and describes the mean, standard deviation (Std. Dev.), minimum (Min) and maximum (Max) values of the corresponding items in each row. "Initial Valuation" is measured as participants' answer to the item (on a scale from 0 = very unlikely to 10 = very likely): "Please indicate how likely you are to invest in shares of Firm Y by using the slider below.". "Final Valuation" is measured as participants' answer to the item (on a scale from 0 = very unlikely to 10 = very likely): "Considering all information available to you, please indicate again how likely you are to invest in shares of Firm Y by using the slider below.". Financial performance and sustainability performance present our variations of Firm Y's financial and sustainability performance. "Perceived donation magnitude" captures participants' agreement with the following statement (on a scale from 1 = strongly disagree to 5 = strongly agree): "Firm Y's donation to Hurricane A disaster relief can be considered as high". Participants' attributions related to our theory, i.e. stakeholder-driven, strategic-driven, values-driven, and egoistic-driven motives, and CSR Skepticism are measured by the constructs presented in Table 3.1 on a scale from 1 (strongly disagree) to 7 (strongly agree). Age reflects participants' age in years.

3.3.4 Dependent and Explanatory Variables

We manipulate the magnitude of Firm Y's donation to the disaster relief efforts associated with Hurricane A's impact. Regarding this donation manipulation, for our participants, it might be unclear whether the donation amount ($500,000 or $5,000,000) is above or below the industry average. Furthermore, some participants might perceive $500,000 as a high donation, while others rate $5,000,000 as average, due to their specific income, financial situation, or experience with money in corporate environments. Therefore, to observe how Firm Y's donation affects participants' valuation judgment, it seems more reasonable to use how participants perceive Firm

Y's donation as explanatory variable instead of a dummy variable capturing our manipulation. We measure our participants' perception of our donation manipulation by capturing their agreement with the statement: “Firm Y's donation to Hurricane A disaster relief can be considered as high” on a five-point Likert-scale and find that our donation manipulation significantly affects participants' agreement with the statement (M = 4.387 vs. M = 3.875, $p < 0.001$). However, even for the condition in which Firm Y donates $500,000 (low donation condition) participants' agreement with the statement is on average 3.875, which is above the mean (3) of the scale (five-point Likert-scale ranging from 1 to 5). Therefore, this supports our above-mentioned considerations underlining that it is reasonable to use how participants perceived Firm Y's donation rather than the donation manipulation itself, as participants also considered our $500,000 donation condition as a relatively high donation.

For our dependent variable, we follow Johnson et al. (2020) and use participants' final valuation as dependent variable, while we use their initial valuation as explanatory variable. This approach captures both a participant's final valuation relative to other participants (between participant differences) and the difference between a participant's initial and final valuation (within participant differences). Thus, this approach is superior compared to using the difference between participants' valuation judgments, as this would only capture the magnitude of the difference between the two valuation judgments and not the relative magnitude of the final valuation judgment compared to other participants.

We also vary Firm Y's financial and sustainability performance to examine the robustness of the donation magnitude for different levels of financial- and sustainability performance and thus include dummy variables in our model. These variations are more straightforward than our manipulation of Firm Y's donation because in both cases it is clear if Firm Y performs better than the industry average or not. We include an attention check for both our variations to examine whether participants assessed the sustainability and financial performance in each condition differently. Therefore, we ask participants to agree (disagree) with the following statements: "Firm Y's sustainability performance was very good" and "Firm Y's financial performance was very good". Participants answer on a five-point Likert-scale ranging from 1 = "strongly disagree" to 5 = "strongly agree". We find a significant difference in participants' agreement with the statement that "Firm Y's sustainability performance was very good" between our two sustainability performance conditions ($M = 4.280$ vs. $M = 2.098$, $p < 0.001$). Also, our financial performance variation results in significant differences in participants' agreement with the statement that "Firm Y's financial performance was very good" between our two financial performance conditions ($M = 4.028$ vs. $M = 2.737$, $p < 0.001$).

3.4 Results

3.4.1 Analysis and Test of Hypotheses

In our baseline analysis, we use a regression model using the perceived donation magnitude as independent variable, while controlling for sustainability performance, financial performance, and participants' initial valuation. Participants' final valuation is our dependent variable. Table 3.3 shows the results of our regression model. We find that the perceived donation magnitude is positively and significantly associated with participants' final valuation judgment (0.354, $p < 0.001$). Therefore, our results suggest that a higher donation, as perceived by the private investors, increases their valuation of the firm. Consequently, we find support for H1a and not for H1b.[35]

[35] We addressed the effects of sampling on external validity by asking subjects "Have you invested in individual stocks in the past?". We thus ensure that the subjects are also real investors and do not reflect the general population. Our results hold even if we only include subjects who answered "Yes" to this question.

Table 3.3: Regression-Model of Participants Final Valuation

N = 365 Adj. R^2 = 0.734	Final Valuation	
Variables	Coef.	p-value
Constant	0.270	0.939
Financial Performance	0.086	0.603
Sustainability Performance	-0.187	0.275
Perceived Donation Magnitude	0.354	<0.001***
Initial Valuation	0.830	<0.001***

Notes: Table 3.3 presents our number of observations (N) and describes the effect of the corresponding variable in each row on participants' final valuation. "Final Valuation" is measured as participants' answer to the item (on a scale from 0 = very unlikely to 10 = very likely): "Considering all information available to you, please indicate again how likely you are to invest in shares of Firm Y by using the slider below.". Financial performance and sustainability performance present the variation of Firm Y's financial and sustainability performance. "Perceived donation magnitude" captures participants' agreement with the following statement (on a scale from 1 = strongly disagree to 5 = strongly agree): "Firm Y's donation to Hurricane A disaster relief can be considered as high". "Initial Valuation" is measured as participants' answer to the item (on a scale from 0 = very unlikely to 10 = very likely): "Please indicate how likely you are to invest in shares of Firm Y by using the slider below.". P-values are two-tailed. *, **, and *** denote significant at the 10-, 5-, and 1-percent levels, respectively.

Next, we examine if our result for the donation magnitude is affected by our sustainability or financial performance variation. We consider a sample split based on our variation of the sustainability- and financial performance. Table 3.4 presents the results for the sample split analysis. The effect of how participants perceived Firm Y's CPDR is less pronounced for the low financial performance case compared to the high financial performance case (0.415, $p < 0.001$ for the high financial performance; 0.278, $p = 0.073$ for the low financial performance). However, using a suest test, we do not find that the coefficients are statistically different ($p = 0.445$). Thus, our results for the effect of private investors' perceived donation magnitude are similar for high and low financial performance. Also, for both high and low sustainability performance, the perceived donation magnitude is positively and significantly associated with participants' valuation judgment ($M = 0.345$, $p = 0.003$ for the high sustainability performance; $M = 0.370$, $p = 0.002$ for the low sustainability performance). Again, using the suest test, we find that the coefficients for the perceived donation magnitude are not significantly different ($p = 0.878$). Thus, our results for the effect of private investors' perceived donation magnitude are also similar for high and low sustainability performance.

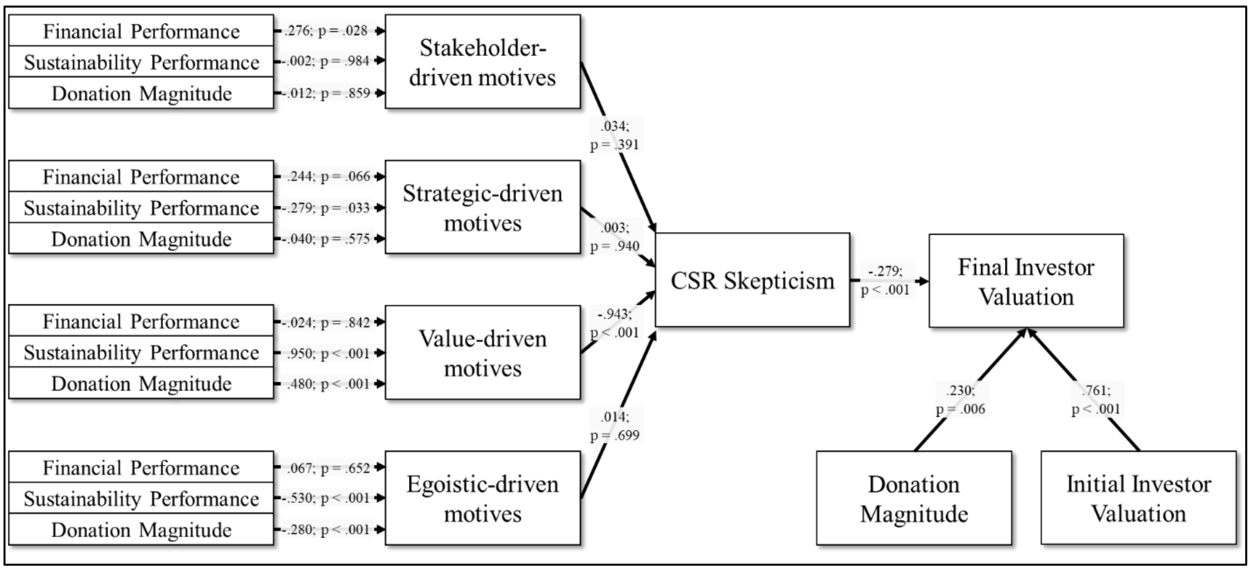
Table 3.4: Regression-Model of Participants Final Valuation for the financial and sustainability performance variants

Variables	Final Valuation: High financial performance	Low financial performance	High sustainability performance	Low sustainability performance
Constant	0.054	0.224	-0.172	-0.043
	(0.896)	(0.733)	(0.749)	(0.932)
Financial Performance			-0.026	0.187
			(0.910)	(0.435)
Sustainability Performance	-0.182	-0.186		
	(0.362)	(0.544)		
Perceived Donation Magnitude	0.415***	0.278*	0.345***	0.370***
	(<0.001)	(0.073)	(0.003)	(0.002)
Initial Valuation	0.797***	0.861***	0.850***	0.817***
	(<0.001)	(<0.001)	(<0.001)	(<0.001)
Suest Test	0.445		0.878	
N	213	152	182	183
Adj. R^2	0.713	0.669	0.644	0.710

Notes: Table 3.4 presents our number of observations (N) and describes the effect of the corresponding variable in each row on participants' final valuation, in our financial and sustainability performance variations. P-values are displayed in parentheses. "Final Valuation" is measured as participants' answer to the item (on a scale from 0 = very unlikely to 10 = very likely): "Considering all information available to you, please indicate again how likely you are to invest in shares of Firm Y by using the slider below.". of Firm Y's financial and sustainability performance. "Perceived donation magnitude" captures participants' agreement with the following statement (on a scale from 1 = strongly disagree to 5 = strongly agree): "Firm Y's donation to Hurricane A disaster relief can be considered as high". "Initial Valuation" is measured as participants' answer to the item (on a scale from 0 = very unlikely to 10 = very likely): "Please indicate how likely you are to invest in shares of Firm Y by using the slider below.". P-values are two-tailed. *, **, and *** denote significant at the 10-, 5-, and 1-percent levels, respectively.

To test our remaining Hypotheses H2a–H4, we employ an SEM. Figure 3.2 shows the design and corresponding results of our maximum likelihood SEM. We find that the perceived donation magnitude is significantly and positively associated with values-driven motives (0.480, $p < 0.001$) and negatively and significantly associated with egoistic-driven motives (-0.280, $p < 0.001$). The associations with both stakeholder-driven motives and strategic-driven motives are not statistically significant (-0.012, $p = 0.859$ for stakeholder-driven motives; -0.040, $p = 0.575$ for strategic-driven motives). Therefore, we find support for H2c and H2d but not for H2a and H2b. Our results suggest that a higher donation is associated with private investors perceiving the firm's social and ecological activities as values-driven and less egoistic. Vice versa, a smaller donation leads private investors to believe that the firm follows egoistic motives in pursuing social and ecological activities.

Figure 3.2: Results for the SEM



Notes: To improve the readability of Figure 3.2, we include financial performance, sustainability performance, and donation magnitude for each motive. However, of course, each variable is only included once in our model. P-values based on two-tailed tests.

Furthermore, Figure 3.2 also shows that only values-driven motives are significantly associated with CSR skepticism (-0.943, $p < 0.001$). Thus, we only find support for H3c but not for H3a, H3b, and H3d. Furthermore, we find a strong negative and significant association between CSR skepticism and participants' final valuation judgment (-0.279, $p < 0.001$), supporting our H4. Consequently, our SEM suggests that the perceived donation magnitude also affects private investors' valuation judgments via CSR skepticism and particularly values-driven motives. It seems that a higher donation leads private investors to believe that a firm's social and environmental activities are truly driven by moral, ethical, and social ideals of the firm, which ultimately leads to less skepticism about these activities and a higher valuation judgment of private investors. However, we simultaneously still find the direct association of the perceived donation magnitude on participants' final valuation judgment to be positive and significant (0.230, p = 0.006). Thus, the CSR skepticism construct only partially mediates the direct effect.

However, our results of the SEM only provide evidence for a mediocre fit to the data ($\chi^2_{(365)}$ = 112.29; $p < 0.001$; comparative fit index = 0.939 - the generally accepted minimum is 0.95, Byrne, 2013; root mean square error of approximation = 0.139, generally accepted maximum is <0.05, MacCallum et al., 1996).

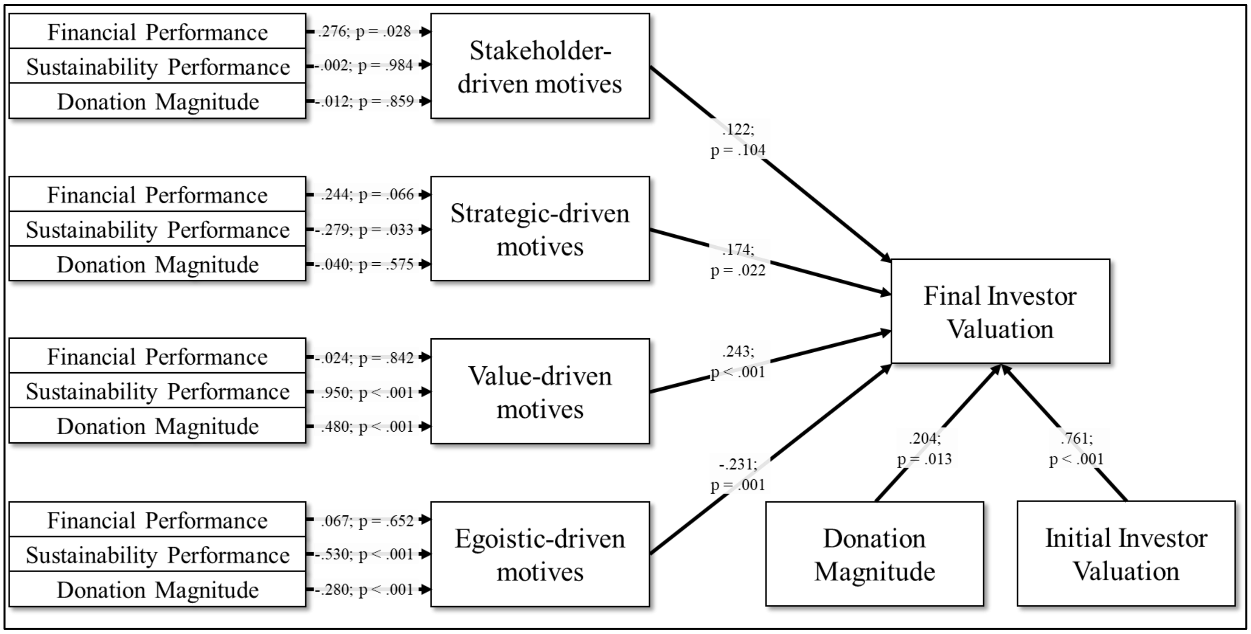
3.4.2 Rival Model

In line with Skarmeas and Leonidou (2013), we consider an alternative model in which we examine whether the attributions of stakeholder-, strategic-, values- and egoistic-driven motives directly affect investors' valuation judgments. Dropping the CSR skepticism construct significantly improves the fit of the model ($\chi^2_{(365)}$ = 26.631; $p < 0.001$; comparative fit index = 0.980; root mean square error of approximation = 0.097).[36] Thus, Figure 3.3 shows the results for this alternative model. We find significant effects for strategic-driven motives (0.174, p = 0.022), values-driven motives (0.243, $p < 0.001$), and egoistic-driven motives (-0.231, p = 0.001) on participants' final valuation. As the perceived donation magnitude is significantly associated with both values-driven motives and egoistic-driven motives, we find further evidence on how donations affect investor valuation judgment. First, the result for our original SEM continues to hold, as values-driven motives positively and significantly affect participants' final valuation judgment. Above that, we

[36] However, while dropping the CSR skepticism construct improves our SEM, our alternative model still does not reach some of the thresholds that are generally considered to indicate a good fit to the data.

also find that small donations lead to participants perceiving the social and ecological activities of a firm as egoistic, which negatively affects their valuation judgment. In summary, also considering the direct effect of the perceived donation magnitude, we find that higher donation positively affects private investor valuation judgment, as these donations are perceived as values-driven, while small donations generally foster private investors to perceive these activities as egoistic.

Figure 3.3: Results for the rival SEM



Notes: To improve the readability of Figure 3.3, we include financial performance, sustainability performance, and donation magnitude for each motive. However, of course, each variable is only included once in our model. P-values based on two-tailed tests.

3.5 Conclusion

The public demand for sustainable corporate behavior is omnipresent and firms intensively invest in CSR activities (Johnson et al., 2020; Moser, & Martin, 2012). As CSR investments have become mainstream (Hales et al., 2016; Moser, & Martin, 2012), the challenge for accounting scholars to engage in wider and deeper research related to CSR within the accounting space has grown (Hales et al., 2016). Therefore, we are creating an experimental investment scenario, recruiting participants from Amazon's Cloud Research platform, in which participants learn about a hypothetical firm (Firm Y) and its CPDR efforts in response to a hurricane catastrophe. We manipulate the magnitude of Firm Y's CPDR efforts to evaluate the investment decisions of private investors in search of new investments and vary its financial and sustainability performance to increase our experiment's generalizability. Thus, we explore the impact of the magnitude of a firm's CPDR (perceived as high or low) on private investors' assessment of a firm's value. Using a SEM and the CSR skepticism concept (Skarmeas, & Leonidou, 2013) to analyze what underlying motives private investors attribute to Firm Y's CPDR efforts, consistent with the theoretical foundation, our results indicate that a firm's engagement in CPDR affects private investors' assessment of a firm's value positively when the engagement is perceived as high. Furthermore, we show that the magnitude of a firm's CPDR affects private investors' perception of the firm's motives, which determines their CSR skepticism. In line with the existing literature, we can also demonstrate that CSR skepticism negatively affects private investors' assessment of a firm's value. Our results are robust to the variation of Firm Y's financial and sustainability performance.

Both our theory and experimental findings suggest that investors expect a higher magnitude of a firm's CPDR as an indicator of honest and values-driven corporate social behavior. Thus, private investors appreciate this form of authentic interest in social problems and reward it with a higher assessment of a firm's value, but if CPDR is perceived as an ingratiating attempt to win favor, corporate philanthropy can negatively affect firm value.

Hence, our study extends the behavioral finance literature, especially prior research on CSR-induced attributions (Ellen et al., 2006; Forehand, & Grier, 2003; Skarmeas, & Leonidou, 2013; Vlachos et al., 2009), by revealing that a higher donation magnitude is associated with private investors perceiving the firm's social and ecological activities as values-driven and less egoistically. In line with prior research, our results show that value-driven motives reduce CSR skepticism (Skarmeas, & Leonidou, 2013). Our results furthermore contribute to the recent behavioral finance literature that examines the influence of CSR activities on investors' assessment of a firm's value, by showing that CSR skepticism influences private investors' assessment of a firm's value negatively. Collectively, our research extends prior research by providing evidence on how the magnitude of a firm's CPDR affects private investors' assessment of a firm's value. Our findings demonstrate that corporate policymakers should be cognizant that engaging in CPDR programs can backfire unless they pay particular attention to investors' attributions for CSR engagement. Therefore, our study contributes to the literature on CPDR and CSR skepticism. Employing the CSR skepticism construct, our article is the first to provide explanation of why CPDR can both result in positive or negative reactions and shows that the donation magnitude affects which motives investors attribute to the CPDR efforts. Therefore, our article also has relevant implications for firms that reflect on the impact of their CPDR efforts on the capital market.

However, our article is of course not without limitations. First, we conduct our experiment with private investors who have mostly limited investing experience. Prior research suggests that nonprofessional investors accept a lower return on invest if the company engages in CSR activities that expresses their own values and moral views (Cheah, & Phau, 2011; Cohen, & Simnett, 2015) because they want to support socially responsible behavior of firms' (McLachlan, & Gardner, 2004). Professional and institutional investors behave more rationally in their investment decisions, as they often cannot decide independently, and their investment proposals go through several instances before decisions are made. Therefore, investment proposals must be defended on a formal approach (e.g., valuation schedules using key performance indicators). In addition, professional and institutional investors can be expected to adopt a more traditional shareholder perspective (Eccles et al., 2011), because they are in competition and must meet the yield requirements of their clients. Thus, it is possible that professional and institutional investors would not be comparably impacted by the sustainability performance and the magnitude of a firm's donation for CPDR. Future studies could explore whether professional investors have the same perception-based imputation toward a firm's CPDR activities.

A second limitation of our study is that we manipulate the amount of the donation for CPDR based on archival evidence at very specific levels. Therefore, it is possible that different levels of CPDR produce different results. In this regard, we find that some of our participants in the low donation condition perceive the donation as high and vice versa. Thus, it seems that specific participant characteristics might influence how participants perceive the donation magnitude, which could be a starting point for future research.

A third limitation is that we analyze the effects of CPDR on private investors' perceptions using a US regulatory and corporate context, which may limit the generalizability of our insights to other regulatory settings. An avenue for future research possibly emerging from this limitation is to conduct an experiment in another regulatory context, for example, that of the EU, and with a focus on the EU's recent sustainability initiatives.

As a final limitation, it could be argued that the results of our study are driven by the specific type of donations used in the experiment and therefore are not generalizable to other forms of donation. Another avenue of future research could therefore be to investigate a situation where donations are not made in response to times of crisis. The area of political donations may be promising in this regard (Liang, & Renneboog, 2017).

A final suggestion for future research emerges from the point, that the objective of our study is to measure the isolated effect of CPDR on investment decisions, but it is reasonably arguable, that private investors use their perception of a firm's decision around CPDR also to interpret the firm's underlying broader CSR performance. Future research could thus explore the extent to which a firm's decision around CPDR and investors' interpretation of it, helps to inform and interpret the firm's underlying broader CSR performance and possible spillover effects.

4 Does Greenhouse Gas Disclosure Trigger a Net Zero Fallacy?

We need to build a truly global coalition for carbon neutrality by 2050. […] We need to align global finance with the Paris Agreement.

– UN Secretary-General António Guterres (UN, 2020)

4.1 Introduction

In the Paris Agreement, 193 countries committed themselves to a global net zero GHG emissions strategy and the Glasgow Climate Pact called on all countries to revisit and strengthen the 2030 targets. As another example, President Xi Jinping of the People's Republic of China pledged that China would become carbon neutral by 2060 (Hook, 2020). Furthermore, the UN (2020) call carbon neutrality by 2050 the world's most urgent mission. Accordingly, companies sense pressure to reduce their emissions, contribute to a net zero economy, and report about it. The vast majority of large global companies reports specific emissions reduction targets, and most of these companies report the year in which they target to achieve net zero emissions (CDP, 2017).[37] However, without global pricing of GHG emissions that comprehensively reflects GHG's true externalities, corporations have weak economic incentives to create the most efficient reduction strategies. Instead, reporting a net zero emission record is the most salient achievement and likely attracts investor interest. From an investor perspective, a company's GHG emission reductions are inefficient if the investor could invest the returns lost on the emission reductions in a different

[37] For instance, Morgan Stanley Capital International (MSCI) reports that 34% of listed companies have such a target (as of 31 August 2023), compared to 23% two years earlier (MSCI Sustainability Institute, 2023). Regarding funds, the Net Zero Asset Managers initiative lists 315 signatories with USD 64 trillion in assets under management on its website (as of 30 September 2023) that are committed to achieving net zero emissions by 2050 or earlier (see https://www.netzeroassetmanagers.org/, last accessed April 18, 2024).

project with higher emission reductions. It is unclear whether companies committed to net zero emissions create the most GHG emission reductions per invested dollar.[38]

We address this conundrum from an investor perspective and ask the following research question: Do investors invest more in funds disclosing net zero GHG emissions, even if investments in more cost-efficient carbon emission reductions are available? Previous research finds that investors consider GHG emissions data in their investment decision, and there is a negative GHG effect on market capitalization (e.g., Bauer, Ruof, & Smeets, 2021; Chapple, Clarkson, & Gold, 2013; Clarkson et al., 2015; Griffin, Lont, & Sun, 2017; Matsumura, Prakash, & Vera-Muñoz, 2014). Retail investors have a higher willingness to invest in companies that strive to reduce GHG emissions and are willing to forego returns to reduce GHG emissions (Alessi, Ossola, & Panzica, 2021; Heeb et al., 2023; Johnson et al., 2020 Martin, & Moser, 2016). Specifically, retail investors react to salient emission-related events, such as abnormal temperature experiences, and keep the lowest share of emission-intensive investments among all investor groups (Benz et al., 2021; Choi, Gao, & Jiang, 2020; Liu et al., 2023). Simultaneously, retail investors tend to base investment decisions on salient information and may examine fewer other cues in the presence of salient information (e.g., Dierynck et al., 2024). Public announcements of net zero emission operations are salient events that lead to significantly positive stock market reactions (see event study reported in Appendix 4A), and investors may narrowly focus on such

[38] Conversely, emission reductions to achieve net zero emissions are particularly likely to be inefficient as long as there are many net positive emitters. The intuition behind this argument is that the emission reductions of heavy emitters are likely relatively easy to achieve and to have economies of scale. The more emissions already have been reduced, the harder (and more costly) it gets to reduce emissions even more due to the principle of diminishing returns. From the investing firm's point of view, it may still be a viable strategy to invest in emission reductions although other firms may have more efficient emission reduction projects precisely because of a possible net zero fallacy. If it exists, firms enjoy lower costs of capital for investments that lead to net zero emissions. Finally, note that although we expect that firms achieving net zero, on average, do not create the most efficient emission reductions, it is possible that some of the most efficient emission reduction projects lead to net zero or net negative emissions.

achievements as a sustainability indicator. We predict that a focus on net zero GHG emissions could lead to inefficient capital allocation among retail investors.

We rely on rational inattention when processing information (Blankespoor, deHaan, & Marinovic, 2020) and choice bracketing theory (e.g., Read et al., 1999) to predict inefficient investment in net zero emission projects. Retail investors are unlikely to be fully attentive to all available information when making their investment decisions. Hence, they may be unaware of investment possibilities with more efficient emission reductions. Specifically, theory on narrow bracketing (Read et al., 1999) suggests that investors judge the characteristics of investment possibilities in isolation instead of as a portfolio, which leads to suboptimal decisions when balancing different objectives, in our case, reducing emissions and optimizing returns. Moreover, if one of those isolated investment possibilities is a net zero emissions project, we predict that the salience of reporting net zero emissions further exacerbates narrow bracketing. As argued above, net zero emissions likely are a salient reference point and may cause retail investors to forego searching for additional information (e.g., Dierynck et al., 2024). Taken together, we hypothesize that retail investors presented with an inefficient emission reduction project invest more in this project if it has net zero (vs. net positive) total emissions. We test this hypothesis in a series of three experiments with retail investors from Prolific.

Our first experiment is an incentivized 2 × 2 between-subjects experiment. Participants take the role of an investor who decides on investing an inherited €10,000. Their goal is to balance emissions and returns, and we incentivize this balance through a gift card drawing. We introduce *Sustainability Fund*, which has lower emissions and returns than comparable funds, and ask participants about their willingness to invest in *Sustainability Fund*. To keep our setting clean and simple, we use emission allowances in a cap-and-trade system[39] as the alternative investment device to reduce emissions. In the experiment, emission reductions through buying and retiring emission allowances are cheaper than the same emission reduction by investing in *Sustainability Fund*. We manipulate the total emissions of *Sustainability Fund* as net zero or net positive (ten tons per €10,000 invested). Our second manipulation introduces a moderation-of-process design to test whether investment advice to use broad bracketing can mitigate the predicted net zero fallacy. Specifically, we design a theory-driven investment advice treatment that aims to reduce narrow bracketing and provides process evidence for our hypothesized mechanism (Asay et al., 2022). Results from our first experiment are consistent with our hypothesis that retail investors are more willing to invest in a project with inefficient emission reductions when it has net zero (vs. net positive) total emissions. We also find modest evidence that broad bracketing investment advice reduces the net zero fallacy. Additional analyses suggest that participants are generally more likely to invest in the fund with inefficient emission reductions than in emission allowances, but the investment advice reduces this tendency.

In a second 2 x 2 between-subjects experiment, we repeat our primary design (without investment advice) with four important changes. We no longer incentivize a balance between emissions and returns, we neutrally name the alternative funds *Fund A* and *Fund B*, we do not show the differences in emissions and returns between the funds but show the absolute expected emissions and returns side by side, and we employ different questions to elicit willingness to invest

[39] In simple terms, a cap-and-trade emission trading system sets the maximum emission units for all included entities and a given period and hands out as many allowances to the included entities (e.g., through auctions or for free). Every entity must cover each emission unit it produces with an allowance. Entities are free to trade allowances they do not need to cover their emissions or keep them to cover future emissions. This means that every emission allowance that is purchased but never used to cover emissions ("retired") will force emissions of all included entities to be one unit below the emissions limit a jurisdiction has set. For more information on, e.g., the EUs' and California's cap-and-trade systems, see California Air Resources Board (2024) and EC (2024). See International Carbon Action Partnership [ICAP] (2024) for an overview of worldwide cap-and-trade systems.

following Asay et al. (2023). We continue to find our primary results. Our second manipulation adds another moderation-of-process design, focusing on the second element of our theory, the salient reference point. Specifically, we inform participants in the net zero (net positive) condition that the fund previously announced zero (ten tons per 10,000 € invested) emissions as an emission goal and the goal has thus been achieved. Results suggest that this goal achievement can replace net zero as a reference point, further corroborating the theoretical mechanism we propose. In cross-sectional analyses, we find evidence that, for participants with a high willingness to invest sustainably, adding goal achievement not only removes the net zero fallacy but also further increases their willingness to invest beyond the level of just net zero funds. Conversely, participants with a low willingness to invest sustainably are neither sensitive to the net zero fallacy nor to goal achievement.

Finally, we explore the boundary conditions of the net zero fallacy in a third experiment. First, instead of using net zero emissions as a salient reference point, it is possible that participants use the net emissions of both funds as reference points and simply form a perception on whether the difference is large. A difference of three tons may seem larger with zero and three as reference points compared to ten and 13 as reference points. Secondly, we observe a relatively high willingness to buy emission allowances across cells in our first two experiments. Hence, participants seem to be willing to costly reduce emissions even when investing in the lower-emissions fund. If the emissions from a net positive lower-emissions fund are close enough to zero, participants could find themselves in a net zero condition as long as expected returns from the fund are enough to buy and retire emission allowances for the fund's emissions. To explore these two possible behaviors, we repeat our baseline net positive conditions with the lower-emissions fund's net emissions at one or four tons, respectively. If the net zero fallacy is not subject to either boundary condition, we would expect both additional conditions to behave like the original ten tons condition. If the first behavior holds, we would expect willingness to invest to decrease gradually from zero to one to four to ten tons of net emissions. If the second behavior holds, we would expect the one ton condition to behave like the net zero condition and the four ton condition to behave like the ten tons condition. Our results are consistent with the last expectation. Thus, we conclude that the net zero fallacy arises whenever a single investment or an investment combined with a simple compensation achieves net zero emissions.

We contribute to at least two strands of the literature. First, we contribute to the literature on GHG disclosures. There is plenty of evidence on the determinants and consequences of these disclosures and great research interest in their economic effects (e.g., Tomar, 2023; Chithambo et al., 2022). While emission reductions are a focal point of this literature, it does not yet explore effects of salient reference points. Net zero emissions are yet to be seen on a substantial scale. However, our experimental approach allows us to anticipate possible effects of firms achieving, or pretending to have achieved, net zero emissions and reporting about it. Our results are also of practical relevance given the widespread commitments of countries, firms, and funds to reach net zero emissions in the next decades.

Second, we contribute to the large literature on investors' considerations of sustainability aspects in their investment decisions. While there is robust evidence that investors take sustainability information into account in their investments (e.g., Bauer, Ruof, & Smeets, 2021; Biktimirov, & Afego, 2022; Hartzmark, & Sussman, 2019), we know little about the extent to which they are attentive to this information as it relates to their objective function (Blankespoor, deHaan, & Marinovic, 2020). Our evidence suggests that the salient and relevant setting of net zero emissions targets may lead to inefficient capital allocation as a result of narrow bracketing and examining fewer alternatives in the presence of net zero.

These insights can inform practitioners who aim to reduce carbon emissions and care about efficient investments to reduce carbon emissions. For instance, the California Air Resources Board operates a cap-and-trade emissions trading system with the explicit goal that "California cost-effectively meets its goals for GHG emissions reductions" (California Air Resources Board, 2024). Similarly, the EU explains its emissions trading system as follows: "Allowance price serves as an incentive for companies to reduce emissions how and where it costs least to do so" (EC, 2024).[40] While emissions trading systems are appealing because they introduce a market-based mechanism to allocate investments presumably efficiently, we show potential suboptimal outcomes in those systems due to investors' bounded rationality.

Moreover, our results are relevant for regulators encouraging and disciplining GHG disclosure. Established standards, such as the GHG protocol, and mandatory disclosure under the EU Corporate Social Responsibility Directive (CSRD) and the European Sustainability Reporting Standards, already require the disclosure of gross emissions by different scopes (i.e., operational boundaries), along with reconciliations to net emissions and disclosing different measurement models of Scope 2 emissions (Momblanco, Aiuto, & Huckins, 2024).[41] While this transparency potentially reduces the focus on salient net zero emissions, voluntary disclosure of net zero emissions achievements is prevalent (see Appendix 4A), even if the gross emissions behind those

[40] In 2023, jurisdictions accounting for 58 percent of global gross domestic product ran 36 emissions trading systems, covering 18 percent of global GHG emissions and raising 74 billion US dollar. Another 14 emissions trading systems are under development, and 8 are under consideration (ICAP, 2024).

[41] Standards by the International Sustainability Standards Board, the US SEC, and the California Air Resources Board require at least some of these detailed disclosures (see Momblanco, Aiuto, & Huckins, 2024, for an overview).

disclosures may vary widely.[42] Such voluntary disclosure may catch investors' attention and undermine efforts of transparent mandatory disclosure, if available at all. Therefore, regulators and enforcement agencies should consider the effects of such certifications and accompanying voluntary disclosure, with and without contemporaneous GHG disclosure mandates.

4.2 Theory Predicting a Net Zero Fallacy

Traditionally, investors balance risks and returns of available investment alternatives to arrive at an optimal investment decision (Markowitz, 1952). However, recent evidence on investors' social preferences suggests that retail investors accept lower returns from funds that engage in companies that contribute to the UN Sustainable Development Goals (e.g., Bauer, Ruof, & Smeets, 2021). This evidence indicates that investors balance risk and returns with social preferences.[43] With respect to social preferences, we are specifically interested in investors' preferences for GHG emission reductions in a setting with a cap-and-trade emissions trading system. The advantage of this setting is that we can observe an upper bound for the marginal emission reduction utility of a rational investor in monetary units. Specifically, any investor can buy and remove a one-unit emission allowance from the cap-and-trade system at the current market price (EC, 2016). A rational investor uses this option if the price of the emission allowance is lower than the investors' utility from reducing emissions by one unit, and research has shown that investors are willing to make use of this option (e.g., Diederich, & Goeschl, 2014; Löschel, Sturm, & Uehleke, 2017).

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[42] For instance, the SBTi allows participants to label emission reductions as net-zero if they cover Scopes 1, 2, and 3, and if they reduce all material emissions by at least 90% and compensate for the residual emissions and non-material emissions (Science Based Targets initiative [SBTi], 2024). Conversely, International Organization for Standardization (ISO) 14068-1:2023 and its predecessor Publicly Available Specification (PAS) 2060 set no limits to the use of carbon offsets, when companies aim to report net zero emissions.

[43] Many other studies find consistent evidence of investors balancing risk, return, and social preferences (e.g., Andonov, Hochberg, & Rauh 2018; Barber, Morse, & Yasuda, 2021; Dyck et al., 2019; Hartzmark, & Sussman, 2019).

Another option for investors in a cap-and-trade system to optimize returns and emissions is allocating their invested capital between different investment projects. Specifically, investors can redirect investments from high-emission projects to low-emission projects to reduce the emissions of their portfolio. A rational investor reallocates funds if the resulting emission reductions are cheaper than buying emission allowances. Specifically, the return difference between a high-emission project and a low-emission project divided by the emission difference between the two projects must be lower than the current price for a one-unit emission allowance.

Investors face information processing costs when making an investment decision. These information processing costs determine which information they obtain (awareness and acquisition costs) and to which degree they interpret and integrate this information (integration costs; our focus) into their decision-making (Blankespoor, deHaan, & Marinovic, 2020). Information integration is subject to investors' cognitive limitations, such as limited working memory, limitations in readily accessible knowledge, and limited ability to carry out complex algorithms (e.g., Gabaix, 2019; Simon, 1955). If the cognitive costs to overcome those limitations exceed the expected benefits from integrating the information, investors become *rationally inattentive* to it (Blankespoor, deHaan, & Marinovic, 2020).[44] Additionally, if information is incomplete or overly complex, individuals tend to rely on simplifying heuristics or efficient rules of thumb (e.g., Kahneman, & Frederick, 2002; Shah, & Oppenheimer, 2008). In these cases, investors may become inattentive to some information cues, which may result in biased decision-making (e.g., Gilovich et al., 2002; Hurd, 2009; Tversky, & Kahneman, 1974).

[44] For our purpose, cognitive costs include the direct disutility individuals experience from using their cognitive resources and opportunity costs. The opportunity costs are forgone benefits from not processing other information because the cognitive resources are no longer available.

We rely on choice bracketing theory to build our predictions (Read et al., 1999). Choice bracketing theory posits that individuals make decisions by grouping choices into broad or narrow brackets, where broad bracketing considers a set of choices collectively and narrow bracketing evaluates each choice in isolation. In our setting, this means that investors separately optimize single assets (narrow choice bracketing) or consider interdependencies and the resulting net optimum (broad choice bracketing, e.g., Read et al., 1999; Thaler, 1999; Hirshleifer, 2015).

Cognitive limitations and investor inattention may hinder investors from fully performing all necessary calculations and comparisons to compare the per unit cost of emission reductions of investing in an emission-reducing investment alternative vs. buying emission allowances. Similarly, they may not be aware that such a comparison is mathematically possible and conceptually valid. That is, narrow choice bracketing may hinder investors from considering the interdependencies of financial performance and emissions of their investments and emission allowances. There is strong evidence that many individuals exhibit narrow bracketing, leading to suboptimal choices (Rabin, & Weizsäcker, 2009). Hence, investors in our setting may simply ignore the possibility of managing emissions and returns at a portfolio level. Instead, they may judge the emissions-return profile of each possible investment in isolation, possibly leading to suboptimal choices. Specifically, they may allocate funds to an emission-reduced project even if investing in the high-emission project yielded additional returns that could buy more emission reductions through emission allowances.

To illustrate this, consider a hypothetical case where an investor can invest in two firms, where one firm has higher expected returns and higher Carbon Dioxide (CO_2) emissions. Retail investors who incorporate social preferences with respect to CO_2 emissions in their investments would trade off the higher expected returns and emissions. The optimal investment for the investor then depends on the relative utility the investor attaches to expected returns vs. the disutility of the higher emissions. In an investment setting with a cap-and-trade system, retail investors can also invest in CO_2 allowances and retire them to avoid the emissions. In making this decision, retail investors could either bracket narrowly (i.e., regard the investment and buying and retiring CO_2 allowances as separate decisions) or bracket broadly (i.e., consider the investment and buying and retiring CO_2 allowances as a compound decision). When the price of a unit of CO_2 allowance in the cap-and-trade system is cheaper than the excess return per unit of CO_2 emissions, it is optimal for the retail investor to invest in the firm with the higher returns no matter the investor's preference for emission reductions.

For instance, consider a fund with €400 more returns and three additional tons of CO_2 emissions per €10,000 invested compared to another fund. An investor can use the cap-and-trade system to avoid the additional tons of CO_2. The investments are equivalent if the price for an allowance of a ton of CO_2 equals €$133\frac{1}{3}$. If the price for an allowance of a ton of CO_2 is below €$133\frac{1}{3}$, investors should always invest in the fund with higher returns and emissions. However, if investors bracket narrowly, they see both decisions as separate and their utility of returns and tons of CO_2 may be different in both decisions due to gain and loss framing (Tversky, & Kahneman, 1974; 1981; Read et al., 1999; Thaler, 1999). Hence, investors bracketing narrowly can make inefficient and suboptimal decisions when trading off returns with social preferences.

We argue that narrow bracketing may be especially pronounced when firms use salient numbers in their sustainability reporting. Net zero emissions represent a clear, attractive goal that resonates strongly with investors' desires to contribute to environmental sustainability.[45] For

[45] The large behavioral literature on round numbers and reference points discusses, e.g., discontinuities (e.g., Busse et al., 2013; Lacetera, Pope, & Sydnor, 2012), effects on investment performance (e.g., Kuo, Lin, & Zhao, 2015),

instance, policies such as the Paris Agreement have incited public excitement around net zero projects, possibly luring investors toward participating (e.g., Boettcher et al., 2021). This salience can make it more likely that investors bracket narrowly and, in the case of net zero, we predict that investors are therefore likely to disregard other information as they fixate on net zero as being the hallmark of sustainability. Based on the higher likelihood of narrow bracketing in the case of net zero, we predict that investors gravitate to net zero investments even if they are inefficient in reducing emissions. Taken together, we predict that investors are prone to choosing suboptimal investments when balancing emissions and returns and that they are most likely to do so for net zero projects with inefficient emission reductions. In a cap-and-trade system, an investment is inefficient if its per-unit costs (i.e., lower returns per avoided emission unit) are higher than the per-unit price of emission allowances. Thus, we hypothesize as follows:

H1: *Retail investors are more likely to invest in inefficient emission reductions when investing in net zero vs. net positive emission projects.*

In our first and second experiment, we employ two moderation-of-process interventions to further test the validity of our theory. Specifically, we design interventions aimed at treating the key features of our theoretical mechanism to obtain theory-consistent variation in our results. The first feature is narrow bracketing. We predict an intervention that can prompt investors to engage in broad bracketing to alleviate the net zero fallacy. Such an intervention could thus help investors to invest in more efficient emission reductions. We design our intervention as advice from a financial advisor to engage in broad bracketing. Financial advisors can substantially reduce the information processing costs or limitations of retail investors and essentially enhance retail

mergers and acquisitions (e.g., Hukkanen, & Keloharju, 2019), and signaling effects (e.g., Backus, Blake, & Tadelis, 2019). Collectively, findings in this literature strongly suggest that salient numbers (e.g., net zero) can have significant effects due to fixation.

investors' cognitive engagement (e.g., Gutsche, & Zwergel, 2020). In addition to increasing cognitive engagement, advisors typically act as experts educating non-expert investors (Davenport, & Ronanki, 2018). As such, they can credibly explain and reduce common sources of heuristic inattention (Jugnandan, & Willows, 2023). This argument leads us to our second hypothesis.

H2: *Broad bracketing advice attenuates retail investors' elevated investment in net zero vs. net positive projects with inefficient emission reductions.*

Panel A of Figure 4.1 illustratively summarizes our hypotheses H1 and H2, which we test in experiment 1.

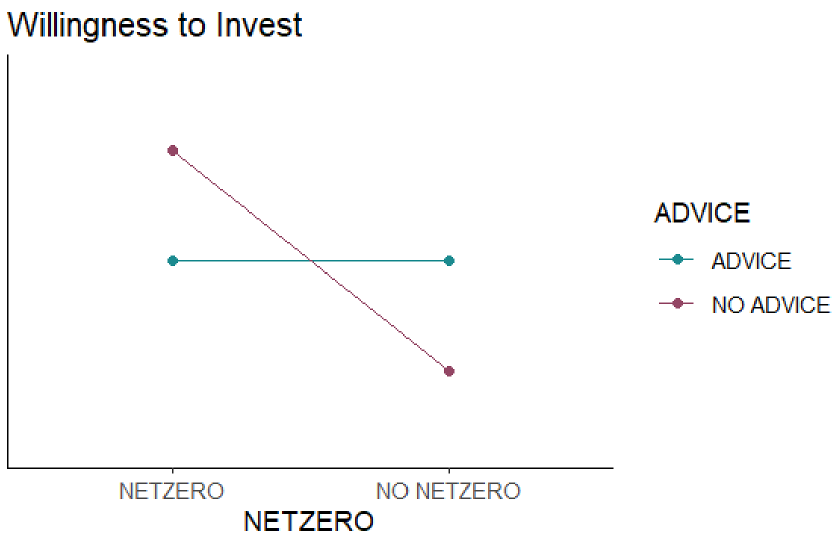
The second feature of our theory is the salient reference point. Our theory predicts that any reference point that is similarly salient as net zero emissions leads to similar investor behavior. Net zero emissions are the ultimate goal of initiatives such as the Paris Agreement. Therefore, we design our intervention as the fund having announced and achieved an emission goal that aligns with its currently reported emissions, and hypothesize as follows:

H3: *Emission goal achievements trigger retail investors' elevated investment similar to net zero vs. net positive projects with inefficient emission reductions.*

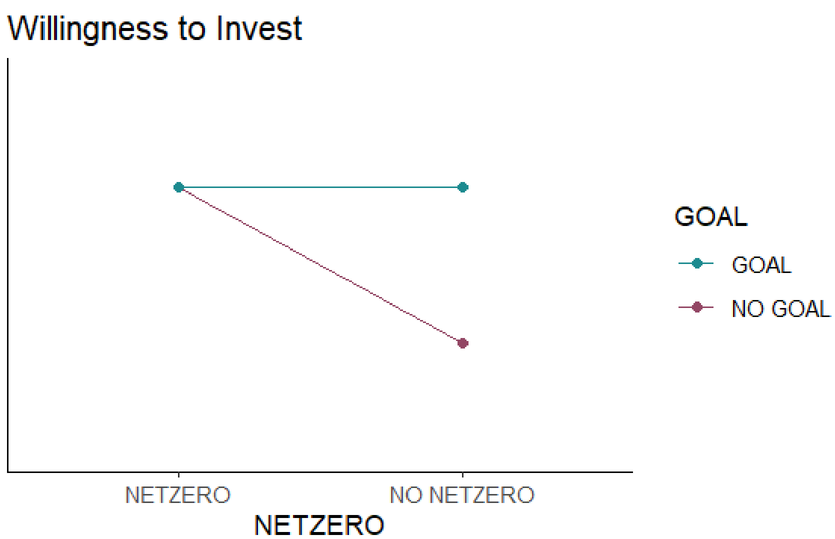
Panel B of Figure 4.1 illustratively summarizes our hypotheses H1 and H3, which we test in experiment 2.

Figure 4.1: Predictions

Panel A Graphical Illustration of H1 and H2 for Experiment 1



Panel B Graphical Illustration of H1 and H3 for Experiment 2



Notes: Panel A graphically illustrates our predictions from H1 and H2. *NETZERO* and *ADVICE* refer to our manipulations which we present in detail in Appendix 4B. Panel B graphically illustrates our predictions from H1 and H3. *NETZERO* and *GOAL* refer to our manipulations which we present in detail in Appendix 4C.

4.3 Experiment 1

We conducted an incentivized 2 × 2 between-subjects online experiment manipulating (i) the net emissions of an investment fund with inefficient emission reductions, and (ii) whether participants receive broad bracketing advice or not. Appendix 4B contains a side-by-side comparison of our manipulations. In the following subsections, we describe participants, the experimental procedure, our treatments, the dependent and additional variables, and results.

4.3.1 Participants

To analyze retail investor decision making in an experimental setting, we recruit participants from Prolific, a platform whose primary purpose is to provide a participant pool for academic research. Prior comparisons of participants from AWS Research Cloud, Prolific, and other platforms and participant pools have shown that the quality of data generated through Prolific participants is equal to or better than alternatives (Kay, 2024; Palan, & Schitter, 2018; Peer et al., 2017). Thus, using Prolific participants provides a resource-efficient way to collect high-quality data quickly and gain insights into the investment behavior of retail investors.

We require that participants reside in countries where the EU Emissions Trading System (EU ETS) is in force,[46] have completed at least 100 prior assignments, have at least a 95% approval rate on prior assignments, and investment experience in the common stock market for participating in the study. Our initial sample consists of 294 participants. Participants in our final sample (see section 4.3.5) are 50.43% male, 47,84% female, and 1.24% other. Participants have an average age of 32.5 years, took an average of 2 accounting and finance classes, and have 4.5 years of investing experience. They report a relatively high willingness to invest in sustainable financial

[46] Those are the member states of the EU, Iceland, Liechtenstein, and Norway.

products (4.9 on a scale from 1 to 7).[47] The remuneration per participant was 2.25 GBP. Moreover, if participants passed all manipulation checks, they automatically entered a drawing for a €100 Amazon gift card. On average, participants took approximately 13 minutes to complete the study.

4.3.2 Experimental Procedure

Participants took the role of a retail investor who recently inherited 10,000 and is now in search for investment opportunities, coming across *Sustainability Fund*. The experimental case explicitly asked participants to trade off financial returns and environmental sustainability. Moreover, there was a clear incentive for this trade off, as participants could increase their chances in the Amazon gift card drawing tenfold if their investment decision "finds a good balance between financial returns and environmental sustainability.".[48]

Before entering the study, participants viewed a brief explanation about the functioning of the EU ETS, which explicitly stated that "private investors can also buy emission rights and eliminate them to reduce the total amount of CO_2 emissions." We then randomly assigned participants to one of the four experimental cells. The case informed participants about their role, compared *Sustainability Fund* to a non-sustainable fund, and noted that one EU emission right (allowing the emission of one ton of CO_2) currently costs €100. The comparison of the funds revealed that a non-sustainable fund, per €10,000 investment, would have €400 higher expected returns and 3 additional tons of CO_2 emissions. We chose these numbers to ensure emission reductions of *Sustainability Fund* were inefficient because investors in such a setting could invest the entire €10,000 in a non-sustainable fund and use the €400 higher expected returns to buy four

[47] Participant characteristics did not differ between cells at a five-percent significance level. However, the willingness to invest in sustainable financial products differs between cells at a ten percent significance level. When we include this demographic variable in an ANCOVA repeating our primary results, our inferences do not change.

[48] Participants entered the drawing ten times if their willingness to invest in *Sustainability Fund* was below the sample median in their respective cell.

emission allowances, thus saving four tons of CO_2. (compared to only 3 tons when investing the €10,000 in *Sustainability Fund*). The case description concluded with a table containing further information about *Sustainability Fund*, including the net emissions manipulation, and the investment advice manipulation. The next page reminded participants of their role in the experiment and contained questions to construct our dependent variables. Thereafter, participants filled in a debriefing questionnaire containing comprehension and manipulation checks, variables for additional analyses, and demographic questions. Participants could not change their responses after each step of the experimental procedure they completed.

4.3.3 Treatment Variables

We manipulated the net CO_2 emissions (*NETZERO*) in the case description table. The table informs participants about *Sustainability Fund*'s characteristics for a €10,000 investment. We manipulate the net CO_2 emissions as ten tons for the net positive condition and zero tons for the net zero condition. Other characteristics are constant across cases and comprise expected returns of €300, a risk level of 4 out of 7, a liquidity level of 7 out of 7, and a global diversification of portfolio assets.

The broad bracketing investment advice (*ADVICE*) is manipulated as either present or absent. In the no investment advice condition, the case description simply ends after the table with *Sustainability Fund*'s characteristics. In the investment advice condition, participants receive the following advice from an "experienced investment advisor":

- "To achieve financial return and contribute to environmental sustainability, you need to balance risk, liquidity, return, and CO_2 emissions of your portfolio of investments (not just single positions).

- Considering the above-mentioned Funds and Certificates, the two most direct options to balance financial return and environmental sustainability are 1) invest in Sustainability Fund, or 2) invest in the alternative non-sustainable fund and compensate for CO_2 emissions by purchasing EU emission rights.
- Comparing Sustainability Fund with the alternative non-sustainable fund, risk and liquidity are the same, while returns fall by €133 for reducing 1 ton of CO_2 emissions."

The first bullet engages participants in thinking about balancing different characteristics of their investments and alerts participants that narrow bracketing is suboptimal. In the spirit of more concrete investment advice, the second bullet creates two scenarios to help participants make comparisons of bundles of investments. Thus, it should help participants concretely engage in broad bracketing. Finally, the last bullet processes some information for participants to reduce cognitive load and facilitate engagement in broad bracketing.

4.3.4 Dependent and Additional Variables

Our main dependent variable is participants' willingness to invest in *Sustainability Fund* (*WTI_SF*). As a complementary dependent variable, we elicit participants' willingness to invest in emission allowances (*WTI_ETS*). We measure both variables as the average of the answers to the following two items on a 101-point scale ranging from 0 (very unattractive; very unlikely) to 100 (very attractive; very likely):[49]

Attractiveness: "How attractive is an investment in Sustainability Fund as part of your diversified portfolio?"/"How attractive is a purchase of EU emission rights to compensate for emitted CO_2?"

[49] We adapt both items from Elliott, Grant, and Hodge (2018) and later studies, e.g., Friedrich (2021). Cronbach's alpha is 0.933 for *WTI_SF* and 0.900 for *WTI_ETS*. Our inferences remain unchanged if we use any single item instead of the corresponding scales in our analyses.

Likeliness to buy: "How likely are you to invest in Sustainability Fund as part of your diversified portfolio?"/"How likely are you to purchase EU emission rights to compensate for emitted CO_2?"

4.3.5 Comprehension and Manipulation Checks

To assess the effectiveness of the manipulations implemented in the experiment, we employ a comprehension check and two manipulation checks. As a comprehension check, we asked participants how many tons of CO_2 *Sustainability Fund* emitted. Participants used a slider to select between zero and ten tons. We excluded 50 participants (17.0 percent) from our sample who reported emissions far away from ten tons (*NO NETZERO* condition), or zero tons (*NETZERO* condition)[50] because we cannot know whether those participants made their investment decisions under the impression of *Sustainability Fund* having the intended emissions level or not. We additionally removed 6 participants because they gave low effort responses and 6 participants because they gave nonsensical verbal explanations for their investment decisions.[51] All following tests use the remaining sample of 232 participants.[52]

To test the success of our first manipulation, we asked participants whether "Investing in Sustainability Fund contributes to a net zero (CO_2 neutral) economy (i.e., an economy that does not emit any CO_2 or captures all emitted CO_2)" on a seven-point Likert-scale, ranging from "fully disagree (1)" to "fully agree (7)". Participants in the *NETZERO* condition were significantly more

[50] As a cutoff, we use zero tons in the *NETZERO* condition to make sure participants made their investment decisions under the impression of the fund having net zero emissions and six tons in the *NO NETZERO* condition. We choose this cutoff because we want to allow for some imprecision in recalling the information. These cutoffs are consistent with our theory. We later add a one ton and a four tons condition in experiment 3. With these cutoffs, we avoid overlap between the *NO NETZERO*, *NETZERO*, the one ton condition (which we label as correctly recalled with 1, or 2 tons), and the four tons condition (which we label as correctly recalled with 3, 4, or 5 tons).

[51] Specifically, they wrote "i am not familiar", "I Thing so", "- trend", "random", "Just it's the best", and "No reason", while all other participants referred to returns or emissions in some form.

[52] Removal likelihood does not significantly differ between conditions (F = 0.878, p = 0.453). Our sampling choices do not affect our inferences for H1, but we do no longer find that the broad bracketing prompt alleviates the net zero fallacy (H2). Appendix 4E contains results from repeating our primary tests with all 294 participants.

likely to agree than participants in the *NO NETZERO* condition (*M* = 5.88 vs. *M* = 3.94, *T* = 8.936), suggesting that our manipulation was successful. For our second manipulation, we asked participants to indicate their agreement with the statement “I received detailed advice on how to balance returns and CO_2 emissions” on a seven-point Likert-scale, ranging from “fully disagree (1)” to “fully agree (7)”. Participants in the *ADVICE* condition were significantly more likely to agree than participants in the *NO ADVICE* condition (*M* = 5.38 vs. *M* = 4.75, *T* = 3.172), indicating that our manipulation was successful.

4.3.6 Test of Hypotheses

Table 4.1 reports our primary analysis. Panel A shows the number of participants, means and standard deviations of WTI_SF by experimental cell. Participants’ willingness to invest in *Sustainability Fund* is highest for the NETZERO and NO ADVICE condition, followed by NETZERO with ADVICE, and NO NETZERO with ADVICE. It is lowest in the NO NETZERO and NO ADVICE condition. Figure 4.2 graphically depicts those results.

Table 4.1: Effects of net zero strategy and investment advice on investors' willingness to investment

Panel A Descriptive Statistics – Mean (Standard Deviations)			
N = 232	Net zero strategy		
Investment advice	*NO NETZERO*	*NETZERO*	Overall
NO ADVICE	51.01 (28.50) N=56 [cell A]	65.96 (24.06) N=64 [cell B]	58.98 (27.17) N=120
ADVICE	57.25 (24.19) N=47 [cell C]	61.84 (22.05) N=65 [cell D]	59.91 (22.98) N=112
Overall	53.85 (26.68) N=103	63.88 (23.07) N=129	

Panel B Two-way ANOVA Results

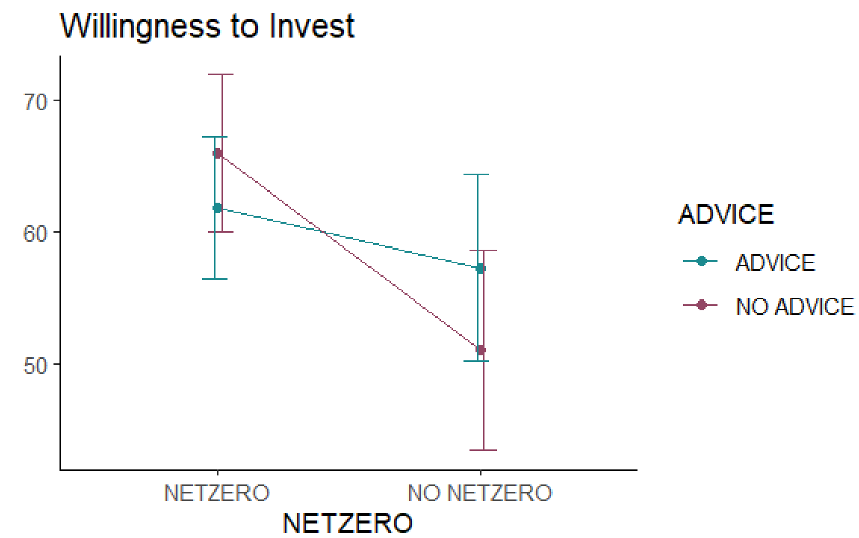
Source	Sum of Squares	Degrees of Freedom	*F*	*p*-value
Intercept	794,388	1	1301.44	<0.001***
NETZERO	5,447	1	8.92	**0.002*** **
ADVICE	64	1	0.10	0.650
INTERACTION	1,530	1	2.51	**0.057***
Error	139,170	228		

Panel C Planned comparison with simple effects tests

Source	Degrees of Freedom	Diff.	*t*-stat	*p*-value
Cell A vs. cell B	1	-14.95	-3.08	0.003***
Cell A vs. cell C	1	-6.24	-1.20	0.233
Cell B vs. cell D	1	4.12	1.01	0.312
Cell C vs. cell D	1	-4.59	-1.03	0.306

Notes: Panel A presents the mean, standard deviation (in parentheses), and number of observations (N) of participants' willingness to invest in Sustainability Fund (*WTI_SF*) for each experimental cell. Columns denote the *NETZERO* manipulation and rows denote the *ADVICE* manipulation which we present in detail in Appendix 4B. *WTI_SF* is measured as the average of a two-item construct (on a scale from 0 very unattractive; very unlikely to 100 very attractive; very likely): (i) "How attractive is an investment in Sustainability Fund as part of your diversified portfolio?"; (ii) "How attractive is a purchase of EU emission rights to compensate for emitted CO2?". Panel B reports results of a full-factorial ANOVA with *WTI_SF* as the dependent variable, and the *NETZERO* and *ADVICE* manipulation as treatment variables. P-values reflect our hypothesis tests and are one-tailed equivalents. Panel C presents T-tests (two-tailed) of the mean of *WTI_SF* between two experimental cells in each line. *, **, and *** denote significant at the 10-, 5-, and 1-percent levels, respectively.

Figure 4.2: Primary Results of Experiment 1



Notes: The figure plots the means and 95% confidence intervals by experimental cell from our primary results that we present in more detail in Table 4.1. *NETZERO* and *ADVICE* refer to our manipulations which we present in detail in Appendix 4B.

Panel B of Table 4.1 presents the results from a full-factorial ANOVA with WTI_SF as the dependent variable. We find a significant main effect of NETZERO (p = 0.002, one-tailed consistent with our hypothesis) and a marginally significant interaction effect of ADVICE and NETZERO on willingness to invest (p = 0.057, one-tailed consistent with our hypothesis). These results are consistent with H1 that investors tend to invest more in a project with inefficient emission reductions when it has net zero vs. net positive total emissions. H2 predicts that this effect attenuates when investors receive a broad bracketing investment advice. To further evaluate H2, we report results from follow-up simple effects tests in Panel C of Table 4.1. Without investment advice, the difference of WTI_SF between the net positive and the net zero version of *Sustainability Fund* (Cell A vs. Cell B) is significant (p = 0.003, two-tailed) and has a substantial effect size. The difference is 14.95 percentage points, or 0.52 standard deviations of the average willingness to invest in the NO ADVICE and NO NETZERO condition. Conversely, with investment advice, the difference reduces to about one-third (4.59 percentage points) and is no longer significant (p = 0.306, two-tailed). These more nuanced results provide some further support for H2. The visual comparison of our predictions in Panel A of Figure 4.1 and results in Figure 4.2 corroborates this interpretation. The NO ADVICE condition meets our predictions, while the ADVICE condition has an attenuated slope, but is not entirely flat, as theoretically predicted.

4.3.7 Additional Analysis

We use our measurement of the willingness to invest in emission allowances (*WTI_ETS*) in an additional analysis to contextualize our findings. While we primarily introduced emission allowances in the experiment to make sure that investing in *Sustainability Fund* is an inefficient emission reduction strategy, measuring participants' willingness to invest in emission allowances can contextualize our hypotheses as follows. We expect a fully rational investor to invest no money in the project with inefficient emission reductions (i.e., *Sustainability Fund*) and to invest some money in emission allowances only if the investor is willing to give up some returns for emission reductions. The reason for this investment strategy is that each Euro invested in emission reductions will reduce more CO_2 if invested in an emission allowance than if invested in the *Sustainability Fund*. However, boundedly rational investors willing to give up some returns for emission reductions would invest some money in *Sustainability Fund and* some money in emission allowances due to narrow bracketing. As their investment decisions under narrow bracketing are independent to each other and they have some willingness to trade off returns and emissions, we expect them to make a similar tradeoff for both decisions to invest in *Sustainability Fund* and to buy emission allowances. Thus, we expect a positive correlation between both decisions. As our broad bracketing prompt should reduce narrow bracketing, we expect this correlation to be weaker in the *ADVICE* conditions.

As expected, we find that the correlation between *WTI_SF* and *WTI_ETS* is significantly positive in the *NO ADVICE* conditions (*coef.* = 0.42, $p < 0.001$, two-tailed) and significantly lower in the *ADVICE* conditions (*coef.* = -0.03, $p = 0.726$, two-tailed; difference: $p < 0.001$, two-tailed). To add context to this result, an untabulated full-factorial ANOVA with *WTI_ETS* as the dependent variable suggests a significant main effect of *ADVICE* ($p = 0.048$, two-tailed; other $p > 0.242$, two-tailed). These results provide additional evidence of narrow bracketing behind our primary results and *ADVICE* reducing narrow bracketing.

4.4 Experiment 2

We conducted a 2 × 2 between-subjects online experiment manipulating (i) the net emissions of an investment fund with inefficient emission reductions, as in experiment 1, and (ii) whether the fund reports and achieves an emissions goal. Appendix 4C contains a side-by-side comparison of our manipulations. The design follows experiment 1 with some changes to alleviate concerns that details in the experimental design confound our results. In the following subsections, we describe participants, the experimental procedure, our treatments, the dependent and additional variables, and results.

4.4.1 Participants

The participant requirements were the same as in experiment 1.[53] Our initial sample consists of 324 participants. Participants in our final sample (see section 4.4.5) are 51.48% male, 47.87% female, and 0.66% other, have an average age of 34.6 years, took an average of 2.8 accounting and finance classes, and the median participant reports trading shares at least once a month. They report

53 Specifically, we require that participants reside in countries where the EU ETS is in force, have completed at least 100 prior assignments, have at least a 95% approval rate on prior assignments, and investment experience in the common stock market for participating in the study.

a relatively high willingness to invest in sustainable financial products (5.2 on a scale from 1 to 7).[54] The remuneration per participant was 2.25 GBP. On average, participants took approximately 14 minutes to complete the study.

4.4.2 Experimental Procedure

The procedure was as in experiment 1, with the following differences. Funds were called *Fund A* (lower emissions) and *Fund B* (higher emissions). We did *not* ask participants to trade off financial returns and environmental sustainability. The case did not mention the differences between returns and emissions of the funds in the case description but included the absolute returns and emissions of both funds in a tabular side-by-side comparison, replacing the tabular information from experiment 1. The goal manipulation replaced the investment advice manipulation.

4.4.3 Treatment Variables

We manipulated the net CO_2 emissions (*NETZERO*) in the tabular side-by-side comparison. The table informs participants about *Fund A*'s and *Fund B*'s characteristics for a €10,000 investment. We manipulate *Fund A*'s (*B*'s) net CO_2 emissions as ten (13) tons for the net positive condition and zero (three) tons for the net zero condition. Moreover, we label the emissions as expected, which we did not do in experiment 1. Other characteristics are constant across cases and comprise Fund *A*'s (*B*'s) expected returns of €300 (€700), and both Funds' risk level of 4 out of 7, liquidity level of 7 out of 7, and global diversification of portfolio assets.

In conditions with the goal manipulation (*GOAL*) participants in the *NO NETZERO* (*NETZERO*) condition additionally receive the following text. "Fund A joined the climate goals of

54 Participant characteristics did not differ between cells at a ten-percent significance level.

the Paris Climate Agreement. Its goal was to achieve 10 (0) tons of CO_2 emissions per 10,000€. Fund A has now achieved this goal well in time."

4.4.4 Dependent and Additional Variables

Our main dependent variable is participants' willingness to invest in *Fund A* (*WTI_SF*). As a complementary dependent variable, we elicit participants' willingness to invest in emission allowances (*WTI_ETS*). Unlike experiment 1, we measure both variables as the average of the answers to the following three items on a 101-point scale:[55, 56]

"How willing are you to invest in Fund A?"/"How willing are you to purchase EU emission rights to compensate for emitted CO_2?"

"Do you view Fund A as more favorable or less favorable in general?"/"Do you view purchasing EU emission rights to compensate for emitted CO_2 as more favorable or less favorable in general?"

"Are your feelings towards Fund A as a potential investment generally more positive or more negative?"/"Are your feelings towards purchasing EU emission rights to compensate for emitted CO2 generally more positive or more negative?"

4.4.5 Comprehension and Manipulation Checks

To assess the effectiveness of the manipulations implemented in the experiment, we employ a comprehension check and three manipulation checks. As a comprehension check, we asked participants how many tons of CO_2 *Fund A* emitted. Participants used a slider to select between 0 and 10 tons. We excluded 19 participants (5.9 percent) from our sample who reported emissions

[55] Our inferences remain unchanged if we use any single item instead of the corresponding scales in our analyses.
[56] Since our experiment was conducted with UK participants, the experimental materials were designed using UK English spelling, even though this thesis generally follows US English spelling.

far away from ten tons (*NO NETZERO* condition), or zero tons (*NETZERO* condition)[57] because we cannot know whether those participants made their investment decisions under the impression of *Fund A* having the intended emissions level or not. All following tests use the remaining sample of 305 participants.[58]

To test the success of our first manipulation, we used the same item as in experiment 1.[59] Participants in the *NETZERO* condition were significantly more likely to agree than participants in the *NO NETZERO* condition (M = 5.95 vs. M = 3.56, T = 13.064), suggesting that our manipulation was successful. For our second manipulation, we asked participants to indicate their agreement with the statements "Sustainability Fund has issued a CO2 emissions reduction goal" and "Sustainability Fund has achieved its CO2 emissions reduction goal well in time" on a seven-point Likert-scale, ranging from "fully disagree (1)" to "fully agree (7)". Participants in the *GOAL* condition were significantly more likely to agree than participants in the *NO GOAL* condition (M = 5.37 vs. M = 4.25, T = 6.208; and M = 5.86 vs. M = 4.34, T = 9.883), indicating that our manipulation was successful.

4.4.6 Test of Hypotheses

Table 4.2 reports our primary analysis. Panel A shows the number of participants, means and standard deviations of *WTI_SF* by experimental cell. Participants' willingness to invest in *Fund A* is highest for the *NETZERO* and *GOAL* condition, followed by *NETZERO* with *NO GOAL*, and *NO NETZERO* with *GOAL*. It is lowest in the *NO NETZERO* and *NO GOAL* condition. Figure 4.3 graphically depicts those results.

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[57] The cutoffs used were identical to those in experiment 1.

[58] Removal likelihood does not significantly differ between conditions (F = 0.032, p = 0.993). Our sampling choices do not affect our inferences.

[59] Specifically, we asked participants whether "Investing in Sustainability Fund contributes to a net zero (CO_2 neutral) economy (i.e., an economy that does not emit any CO_2 or captures all emitted CO_2)" on a seven-point Likert-scale, ranging from "fully disagree (1)" to "fully agree (7)".

Table 4.2: Effects of net zero strategy and goal achievement on investors' investment willingness

Panel A Descriptive Statistics – Mean (Standard Deviations)

N = 305	Net zero strategy		
Goal achievement	*NO NETZERO*	*NETZERO*	Overall
NO GOAL	37.41 (19.97) N=71 [cell A]	48.10 (25.49) N=82 [cell B]	43.14 (23.64) N=153
GOAL	45.89 (25.30) N=72 [cell C]	51.82 (24.91) N=80 [cell D]	49.01 (25.19) N=152
Overall	41.68 (23.13) N=143	49.94 (25.20) N=162	

Panel B Planned Contrast (-3, 1, 1, 1) Results

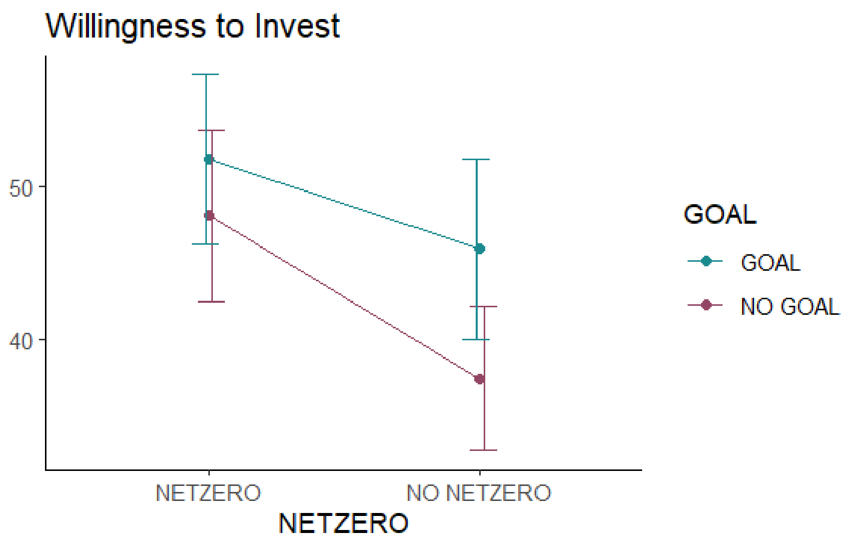
Source	Sum of Squares	Degrees of Freedom	*F*	*p*-value
Intercept	640,712	1	1100.53	<0.001***
CONTRAST	6,936	1	11.91	**0.001*** **
Error	176,403	303		

Panel C Planned comparison with simple effects tests

Source	Degrees of Freedom	Diff.	*t*-stat	*p*-value
Cell A vs. cell B	1	-10.69	-2.91	0.002***
Cell A vs. cell C	1	-8.48	-2.23	0.014**
Cell A vs. cell D	1	-14.41	-3.94	<0.001***
Cell B vs. cell C	1	2.21	0.54	0.590
Cell B vs. cell D	1	-3.27	-0.94	0.349
Cell C vs. cell D	1	-8.26	-1.45	0.148

Notes: Panel A presents the mean, standard deviation (in parentheses), and number of observations (N) of participants' willingness to invest in Sustainability Fund (*WTI_SF*) for each experimental cell. Columns denote the *NETZERO* manipulation and rows denote the *GOAL* manipulation which we present in detail in Appendix 4C. *WTI_SF* is measured as the average of a three-item construct (on a scale from 0 to 100): (i) "How willing are you to invest in Fund A?"; (ii) "Do you view Fund A as more favorable or less favorable in general?", (iii) "Are your feelings toward Fund A as a potential investment generally more positive or more negative?". Panel B reports results of a planned contrast with *WTI_SF* as the dependent variable, Cell A with a contrast weight of -3, and all other cells with a contrast weight of +1. P-value reflects our hypothesis test and is a one-tailed equivalent. Panel C presents T-tests of the mean of *WTI_SF* between two experimental cells in each line. P-values regarding planned comparison of Cell A reflect our hypothesis tests and are one-tailed equivalents, other p-values are two-tailed. *, **, and *** denote significant at the 10-, 5-, and 1-percent levels, respectively.

Figure 4.3: Primary Results of Experiment 2



Notes: The figure plots the means and 95% confidence intervals by experimental cell from our primary results that we present in more detail in Table 4.2. *NETZERO* and *GOAL* refer to our manipulations which we present in detail in Appendix 4C.

Hypothesis 3 predicts that goal setting and achievement replaces the salient signal of net zero emissions. Hence, we expect *WTI_SF* in both cells of the *GOAL* condition to be similar to *WTI_SF* in the *NETZERO* and *NO GOAL* condition. Combined with H1, which predicts a significant difference between *NETZERO* and *NO NETZERO* in the *NO GOAL* conditions, the correct analysis for the predicted pattern is a planned contrast with a -3 weighting for the *NO NETZERO* and *NO GOAL* cell and a +1 weighting for all other cells. Visual inspection of the pattern in Figure 4.3 is consistent with this prediction. Therefore, we run this planned contrast in Panel B of Table 4.2 and find a significant contrast (p = 0.001, one-tailed). Follow-up simple effects tests in Panel C of Table 4.1 confirm this pattern. The difference of *WTI_SF* between the *NO NETZERO* and *NO GOAL* cell and every other cell is significant ($p \leq 0.014$, one-tailed), whereas differences between any combination of the other cells are always insignificant ($p \geq 0.148$, two-tailed). Collectively, these results again support H1, thus triangulating our results with a different experimental design, and also support H3, adding important process evidence to our theoretical predictions.

4.4.7 Cross-Sectional Analysis

As we did not incentivize participants to invest sustainably, participants likely differ in their general willingness to give up returns for more sustainable investments. To check whether this disposition to invest sustainably interacts with our results, we asked participants for their agreement with the following five statements on a seven-point Likert-scale, ranging from "fully disagree (1)" to "fully agree (7)" in our post-experimental questionnaire:

"I strongly believe companies should support programs that benefit the environment."

"I think a company has the responsibility to protect the planet."

"Supporting companies that implement sustainability practices is important to me."

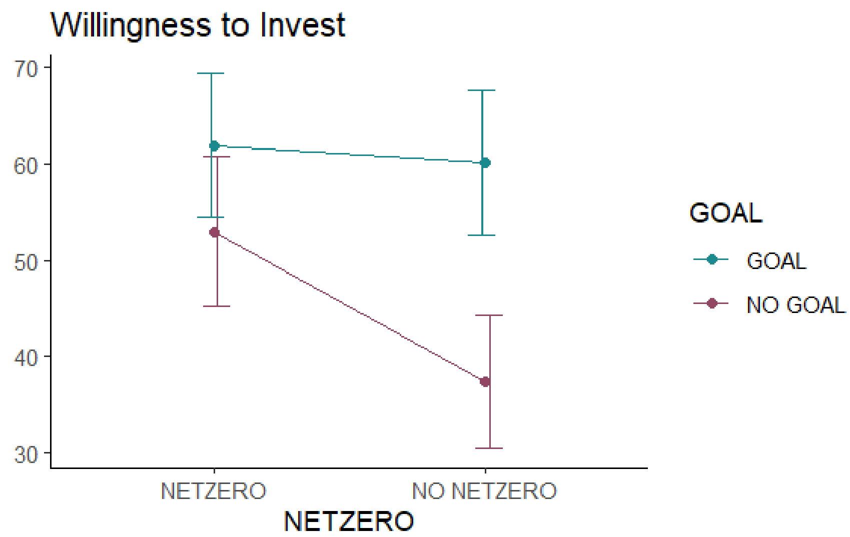
"Companies should carry out programs focused on sustainability."

"Companies have an obligation to be socially responsible."

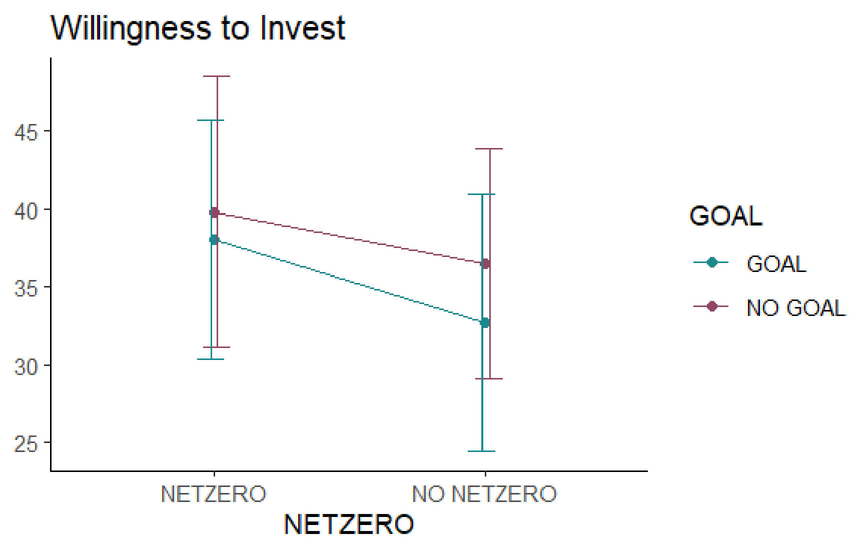
We take the average answer to these five questions as a proxy for their disposition to invest sustainably. We then analyze participants' *WTI_SF* by experimental cell for the two subsamples of participants with above-median (N = 146) and below-median (N = 130) disposition to invest sustainably. Figure 4.4 graphically depicts the results. Panel A shows that, for more sustainable investors, adding achieved goals does not only remove the net zero fallacy but also induces an additional positive main effect on investors' willingness to invest in Fund A. Conversely, Panel B shows that investors with a low disposition to invest sustainably neither show a net zero fallacy nor react to goal achievements.

Figure 4.4: Cross-Sectional Results of Experiment 2

Panel A Subsample of Participants with Above-Median Disposition to Invest Sustainably



Panel B Subsample of Participants with Below-Median Disposition to Invest Sustainably



Notes: We measure participants' disposition to invest sustainably by their average agreement with the following five statements on a seven-point Likert-scale, ranging from "fully disagree (1)" to "fully agree (7)" in our post-experimental questionnaire: (i) "I strongly believe companies should support programs that benefit the environment.", (ii) "I think a company has the responsibility to protect the planet.", (iii) "Supporting companies that implement sustainability practices is important to me.", (iv) "Companies should carry out programs focused on sustainability.", (v) "Companies have an obligation to be socially responsible." The median disposition to invest sustainably is 5.80. Panel A plots the means and 95% confidence intervals by experimental cell from our primary results based on only the subsample of participants with above-median disposition to invest sustainably (N = 146). Panel B plots the means and 95% confidence intervals by experimental cell from our primary results based on only the subsample of participants with below-median disposition to invest sustainably (N = 130). Median participants are not included in either subsample. *NETZERO* and *GOAL* refer to our manipulations which we present in detail in Appendix 4C.

4.5 Experiment 3

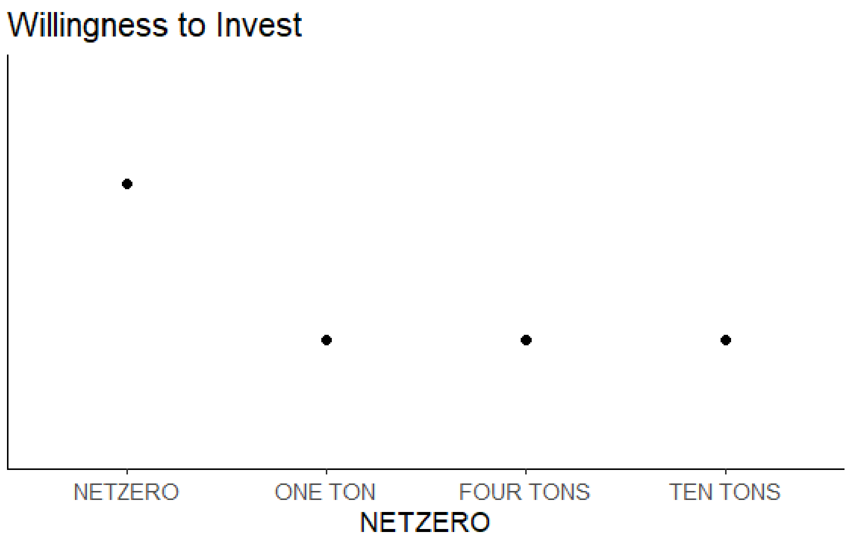
We conducted a 2×1 between-subjects online experiment manipulating only the net emissions of an investment fund with inefficient emission reductions. Appendix 4D contains a side-by-side comparison of our manipulations. The design follows experiment 2 with the only change being the net emissions of *Fund A* because we want to explore the boundary conditions of the net zero fallacy. Specifically, participants may use the net emissions of both funds (and not only *Fund A*) as reference points and focus on the difference. Instead of the net emission achievement, with net zero as a salience reference point, they may calculate the percentage difference in emissions between the two funds and use it as a salience reference point (*emission reduction explanation*). Moreover, participants in experiments 1 and 2 were generally willing to buy some emission allowances, suggesting a willingness to costly reduce emissions even when choosing the low-emission fund. If the emissions from a net positive-emissions fund are close enough to zero, participants face a net zero condition if expected returns from the fund are enough to buy and retire emission allowances for the fund's emissions (*net zero bundle explanation*), which is consistent with our theory. We address these explanations by manipulating *Fund A*'s emissions as one or four tons, respectively. If the net zero fallacy is not subject to either boundary condition, we would expect one and four tons to behave like the original ten tons condition (previously labeled *NO NETZERO*, now labeled *TEN TONS*). Under the emission reduction explanation, willingness to invest would decrease gradually from zero to one to four to ten tons of net emissions based on the size of the emission difference.[60] Under the net zero bundle explanation,

[60] Specifically, emission differences moving from *Fund B* to *Fund A* are 100% in the *NETZERO* condition (from 3 to 0), 75% in the *ONE TON* condition (from 4 to 1), 43% in the *FOUR TONS* condition (from 7 to 4), and 23% in the *TEN TONS* condition (from 13 to 10). Panel B of Figure 4.5 graphically depicts this pattern.

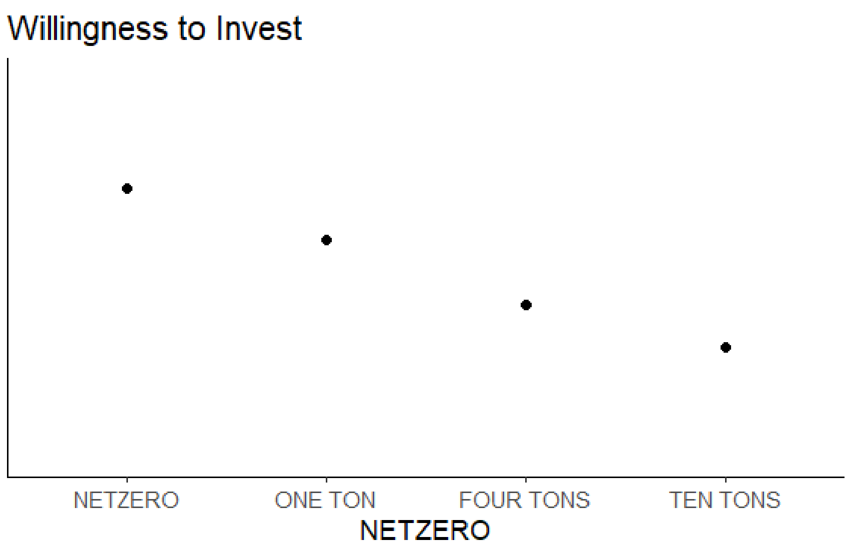
one ton would behave like net zero, and four tons would behave like ten tons. Figure 4.5 presents the expected patterns under the different explanations and the observed pattern.

Figure 4.5: Predictions and Results of Experiment 3

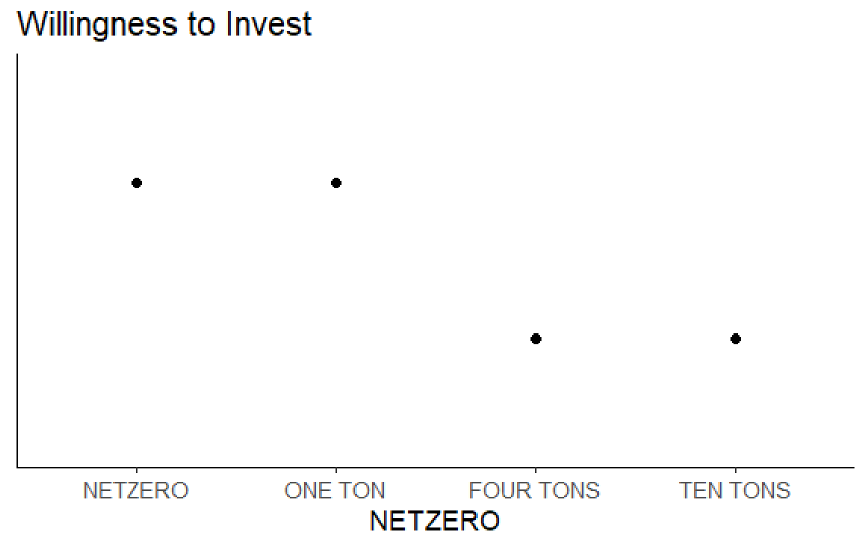
Panel A Predictions if there are no Boundary Conditions



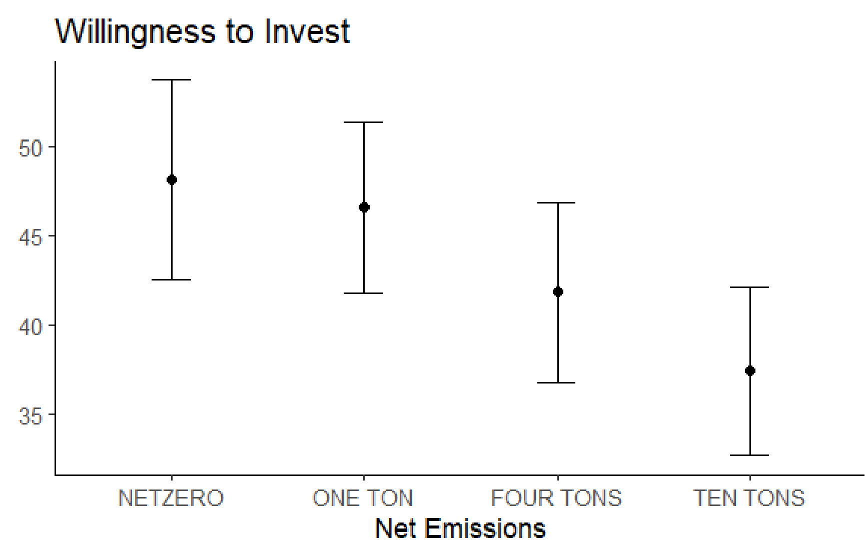
Panel B Predictions for the Difference of Reference Points Explanation



Panel C Predictions for the Net Zero Bundle Explanation



Panel D Results



Notes: Panel A graphically illustrates our predictions if there are no boundary conditions for the net zero fallacy. Panel B graphically illustrates our predictions if participants use the net emissions of both funds as reference points and focus on the difference (*difference of reference points explanation*). Panel C graphically illustrates our predictions if participants always face a net zero-like condition as long as expected returns from the fund are enough to buy and retire emission allowances for the fund's emissions (*net zero bundle explanation*). Panel D plots the means and 95% confidence intervals by experimental cell from our primary results, which we present in more detail in Table 4.3.

4.5.1 Participants

The participant requirements were the same as in experiment 1.[61] We merge the participants from this experiment with participants in the *NO GOAL* conditions from experiment 2, creating a data set akin to a 4 x 1 experiment. Our initial sample consists of 337 participants. Participants in our final sample (see section 4.5.3) are 46.79% male, 51.60% female, and 1.60% other have an average age of 34.7 years, took an average of 2.5 accounting and finance classes, and the median participant reports trading shares at least once a month. They report a relatively high willingness to invest in sustainable financial products (5.1 on a scale from 1 to 7).[62] The remuneration per participant was 2.25 GBP. On average, participants took approximately 13 minutes to complete the study.

4.5.2 Treatment Variables

We manipulated the CO_2 emissions (*ONE TON* vs. *FOUR TONS*) in the case description table. As The table informs participants about *Fund A* and *Fund B* characteristics for a €10,000 investment. The table is as in experiment 2 with one difference. For *ONE TON*, *Fund A*'s (*Fund B*'s) emissions are one ton (four tons) and for *FOUR TONS*, *Fund A*'s (*Fund B*'s) emissions are four tons (seven tons).

4.5.3 Comprehension and Manipulation Checks

We filter participants as in experiment 2, and we have no manipulation checks. Specifically, we asked participants how many tons of CO_2 *Fund A* emitted. Participants used a slider to select between zero and ten tons. We excluded 24 participants (7.1 percent) from our sample who

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61 Specifically, we require that participants reside in countries where the EU ETS is in force, have completed at least 100 prior assignments, have at least a 95% approval rate on prior assignments, and investment experience in the common stock market for participating in the study.

62 Participant characteristics did not differ between cells at a five-percent significance level. However, the age differs between cells at a ten percent significance level. When we include this demographic variable in an ANCOVA repeating our primary results, our inferences do not change.

reported emissions away from zero tons (*NETZERO* condition), or far away from one ton (*ONE TON* condition), four tons (*FOUR TONS* condition) or ten tons (*TEN TONS* condition)[63] because we cannot know whether those participants made their investment decisions under the impression of *Fund A* having the intended emissions level or not. Moreover, we remove one participant due to low effort responses. All following tests use the remaining sample of 312 participants.[64]

4.5.4 Results

Table 4.3 reports our primary analysis. Panel A shows the number of participants, means and standard deviations of *WTI_SF* by experimental cell. Panel D of Figure 4.5 graphically depicts those results. Participants' willingness to invest in Fund A gradually decreases as emissions increase, with the greatest jump from *ONE TON* to *FOUR TONS*. Panel B of Table 4.3 reports results from simple effects tests. Participants in the *NETZERO* condition do not significantly differ from *ONE TON* and have a significantly higher average willingness to invest in Fund A than participants in the *FOUR TONS* and *TEN TONS* conditions. At the other extreme, *TEN TONS* also significantly differs from the *ONE TON* condition but is not significantly different from the *FOUR TON* condition. Additionally, *ONE TON* and *FOUR TONS* differ marginally significantly. This results pattern is consistent with the net zero bundle explanation. Therefore, we can conclusively rule out the emission reduction explanation.

[63] The cutoffs used were identical to those in experiment 1. Additionally, we use between 1 and 2 tons as a cutoff in the *ONE TON* condition, and between 3 and 5 tons as a cutoff in the *FOUR TON* condition. We choose these cutoffs because we want to allow for some imprecision in recalling the information. These cutoffs are consistent with our theory. With these cutoffs, we avoid overlap between the *NETZERO*, *ONE TON*, *FOUR TONS*, and *TEN TONS* conditions.

[64] Removal likelihood does not significantly differ between conditions ($F = 1.440$, $p = 0.231$). Our sampling choices do not affect our inferences.

Table 4.3: Effects of net emissions on investors' investment willingness

Panel A Descriptive Statistics – Mean (Standard Deviations)			
N = 312			
NETZERO	*ONE TON*	*FOUR TONS*	*TEN TONS*
48.10 (25.49) N=82	46.56 (21.14) N=78	41.81 (22.70) N=81	37.41 (19.97) N=71

Panel B Planned comparison with simple effects tests				
Source	Degrees of Freedom	Diff.	*t*-stat	*p*-value
NETZERO vs. *ONE TON*	1	1.54	0.42	0.676
NETZERO vs. *FOUR TONS*	1	6.29	1.66	0.049**
NETZERO vs. *TEN TONS*	1	10.69	2.91	0.002***
ONE TON vs. *FOUR TONS*	1	4.75	1.36	0.087*
ONE TON vs. *TEN TONS*	1	9.15	2.72	0.004***
FOUR TONS vs. *TEN TONS*	1	4.40	1.27	0.205

Notes: Panel A presents the mean, standard deviation (in parentheses), and number of observations (N) of participants' willingness to invest in Sustainability Fund (*WTI_SF*) for each experimental cell. *WTI_SF* is measured as the average of a three-item construct (on a scale from 0 to 100): (i) "How willing are you to invest in Fund A?"; (ii) "Do you view Fund A as more favorable or less favorable in general?", (iii) "Are your feelings toward Fund A as a potential investment generally more positive or more negative?". Panel B presents T-tests (two-tailed) of the mean of *WTI_SF* between two experimental cells in each line. P-values regarding planned comparison of *NETZERO* vs. *FOUR TONS, NETZERO* vs. *TEN TONS, ONE TON* vs. *FOUR TONS,* and *ONE TON* vs. *TEN TONS* are consistent to our theory and therefore are one-tailed equivalents, other p-values are two-tailed. *, **, and *** denote significant at the 10-, 5-, and 1-percent levels, respectively.

4.6 Conclusion

Motivated by recent trends of firms and countries to commit to net zero emission strategies, we investigate whether retail investors are subject to a net zero fallacy, in which they allocate their capital to net zero projects with inefficient emission reductions. We find evidence for our hypothesis that this is the case across two experiments, provide process evidence, and explore boundary conditions of the net zero fallacy. To the best of our knowledge, our study is the first to examine investors' heuristic decision-making given GHG disclosures around a net zero threshold. In extension, we provide two theory-driven interventions, thereby strengthening the theoretical channel of broad bracketing and salient reference points. Our study also has important implications for practitioners who advocate for achieving net zero emissions and demand or regulate GHG disclosures. For instance, they can inform the 36 active emissions trading systems worldwide (ICAP, 2024) about the boundaries of emissions trading as an efficient allocation mechanism of investments. Moreover, they are relevant to understanding the potential effects of voluntary disclosure of only net emissions under standards such as the SBTi or ISO 14068-1:2023 vs. higher transparency under mandatory disclosure regimes such as the EU CSRD.

Those contributions should be interpreted considering the following limitations. With experiments focusing on internal validity, our findings primarily generalize by theory. Hence, the boundaries of applicability of our theory likely delineate the boundaries of our findings' external validity. Prior research suggests that retail investors have other priorities than institutional investors when investing socially responsibly (Cheah, & Phau, 2011; Cohen, & Simnett, 2015; Eccles, Serafeim, & Krzus, 2011; McLachlan, & Gardner, 2004). Moreover, institutional investors have more resources to process information and are likely less prone to narrow bracketing. Thus, it is unclear whether our findings extend to an institutional investor setting because it is unclear how relevant narrow bracketing and salient reference points are for their investment decisions. Future research could explore impacts of net zero GHG reporting on institutional investors.

Moreover, we claim that investing more in a net zero project than in a non-net zero project with identical emission reductions represents a "net zero fallacy". This claim rests on the assumption that there is no rational incremental utility in achieving the net zero benchmark, beyond the utility from reducing emissions. The intuition behind this assumption is that, to achieve a net zero economy, single projects necessarily need to have net negative emissions, e.g., by using carbon capture technologies. This is because some production processes, e.g., sourcing materials, physically cannot reduce emissions to zero. Moreover, even on a global portfolio level, the world economy likely has to enter a phase of net carbon capture (or net negative GHG emissions) to achieve its climate goals (UN, 2020). Hence, reaching net zero emissions is unlikely to have sustainability effects beyond the emission reduction from previous net positive emissions. However, this is ultimately an empirical question that future research could address.

Appendix 4A

Event Study on Net Zero Achievement Announcements

We conduct a simple event study to establish that companies disclose achievements of net zero emissions and that capital markets care about these disclosures. We use a broad definition of net zero achievements because it allows us to shed some light on the scope of such disclosures, improves the power of our tests, and underscores the salience of the net zero threshold even if defined loosely. For an event to enter our sample, we require that the company specifically announced zero net emissions according to its calculation, regardless of the measurement model, calculation format, and emission compensations. The announcement can be for the entire company or only a unit (e.g., a plant or subsidiary) or product. Moreover, we require a one-time announcement with a clear date (e.g., we exclude cases when firms first announce they will likely have achieved net zero emissions and later confirm it).

To identify events, we combine three search strategies in early April 2024. (1) We search the examples and news related to the carbon neutral certification of Climate Impact Partners via https://www.carbonneutral.com/. (2) We search for PAS 2060, a globally applied standard to certify carbon neutrality, on LexisNexis.[65] (3) We search for a combination of company name and “carbon neutral” on Google for all companies included in the Dow Jones Sustainability Europe Index. This strategy resulted in 25 events for which we are confident that there was a clear net zero disclosure on an identifiable date. Table 4.4 provides an overview of the companies, announcement content, date, and link to the source document of all events.

[65] See https://www.bsigroup.com/en-GB/capabilities/environment/pas-2060-carbon-neutrality/ (last accessed May 7, 2024).

Table 4.4: Events included in event study

Company	Event description	Date	Link
ASUSTeK Computer INC	Net zero product	2011-12-07	https://www.edgemiddleeast.com/news/587231-asus-claims-first-carbon-neutral-notebook
Volvo Car AB	Net zero plant	2018-01-22	https://www.climateaction.org/news/volvo-engine-plant-goes-carbon-neutral
VMware LLC	Net zero company	2018-09-01	https://news.vmware.com/esg/achieving-carbon-neutrality
Atos SE	Net zero company	2019-04-18	https://atos.net/en/2019/press-release_2019_04_18/atos-offsets-100-of-its-carbon-emissions-through-global-wind-farm-program
Worldline SA	Net zero company	2019-04-25	https://worldline.com/en-gb/home/top-navigation/media-relations/press-release/worldline-becomes-the-first-company-to-neutralize-its-co%C2%B2-emissions.html
ASR Nederland NV	Net zero company	2019-09-19	https://www.asrnl.com/news-and-press/news/asr-draait-definitief-de-aardgaskraan-dicht
Volkswagen AG	Net zero plant	2019-10-10	https://www.volkswagen-group.com/de/pressemitteilungen/zentrale-und-stammwerk-von-bentley-motors-jetzt-co2-neutral-16986
Logitech International SA	Net zero product	2019-12-04	https://www.carbonneutral.com/news/logitechs-entire-gaming-portfolio-certified-carbonneutral
Investec Group	Net zero company	2020-02-24	https://www.investec.com/en_ch/welcome-to-investec/press/investec-achieves-carbon-neutrality.html
Norsk Hydro ASA	Net zero company	2020-03-12	https://www.hydro.com/globalassets/04-sustainability/hydroclimatemodel2019.pdf
Arçelik AŞ	Net zero plant	2020-09-21	https://www.presseportal.ch/de/pm/100058222/100855813
Infosys Limited	Net zero company	2020-10-28	https://www.prnewswire.com/in/news-releases/infosys-turns-carbon-neutral-30-years-ahead-of-2050-the-timeline-set-by-the-paris-agreement-820272285.html
Jacobs INC	Net zero company	2020-12-10	https://www.prnewswire.com/news-releases/jacobs-achieves-net-zero-carbon-emissions-and-100-renewable-energy-301190085.html
Banco Santander, SA	Net zero company	2021-02-22	https://www.santander.com/en/stories/santander-is-now-fully-carbon-neutral-what-does-that-mean
Gamesys Group PLC	Net zero company	2021-03-03	https://www.accesswire.com/633090/gamesys-group-plc-announces-carbon-trust-certifies-gamesys-carbon-neutral
BBVA SA	Net zero company	2021-03-24	https://www.bbva.com/en/sustainability/bbva-meets-goal-to-become-carbon-neutral-in-2020/
Severfield PLC	Net zero company	2021-08-31	https://www.severfield.com/news/severfield-is-carbon-neutral

Coca-Cola Europacific Partners PLC	Net zero plant	2021-09-01	https://www.environmentenergyleader.com/2021/09/how-2-european-coca-cola-manufacturing-sites-reached-carbon-neutral-status/
Diageo PLC	Net zero plant	2021-09-28	https://www.diageo.com/en/news-and-media/press-releases/2021/diageo-opens-its-first-carbon-neutral-whiskey-distillery-in-north-america
GEA Group AG	Net zero plant	2021-11-01	https://www.gea.com/en/news/trade-press/2021/gea-builds-first-carbon-neutral-juice-production-plant-for-innocent/
Arkema SA	Net zero product	2021-11-16	https://www.arkema.com/global/en/media/newslist/news/global/products/2021/20211116-arkema-and-eos-lanch-a-carbon-neutral-impact-powder/
Planet Labs PBC	Net zero company	2022-02-01	https://de.scsglobalservices.com/news/planet-labs-pbc-becomes-a-carbon-neutral-company
Stellantis NV	Net zero business unit	2022-02-09	https://www.bodyshopmag.com/2022/news/stellantis-adds-new-pas2060-certificate-to-green-initiatives/
Iveco Group NV	Net zero plant	2022-10-18	https://www.aftermarketinternational.com/en/202210187268/news/iveco-group-inaugurates-a-new-fully-carbon-neutral-manufacturing-plant.html
K.K. Bridgestone	Net zero plant	2023-09-12	https://press.bridgestone-emea.com/de/bridgestone-kuendigt-verifizierung-seines-ersten-klimaneutralen-reifenwerks-an/

Notes: This table provides an overview of all events included in the event study. Event descriptions and dates are from the source reported in the last column. Last access of all links is May 7, 2024.

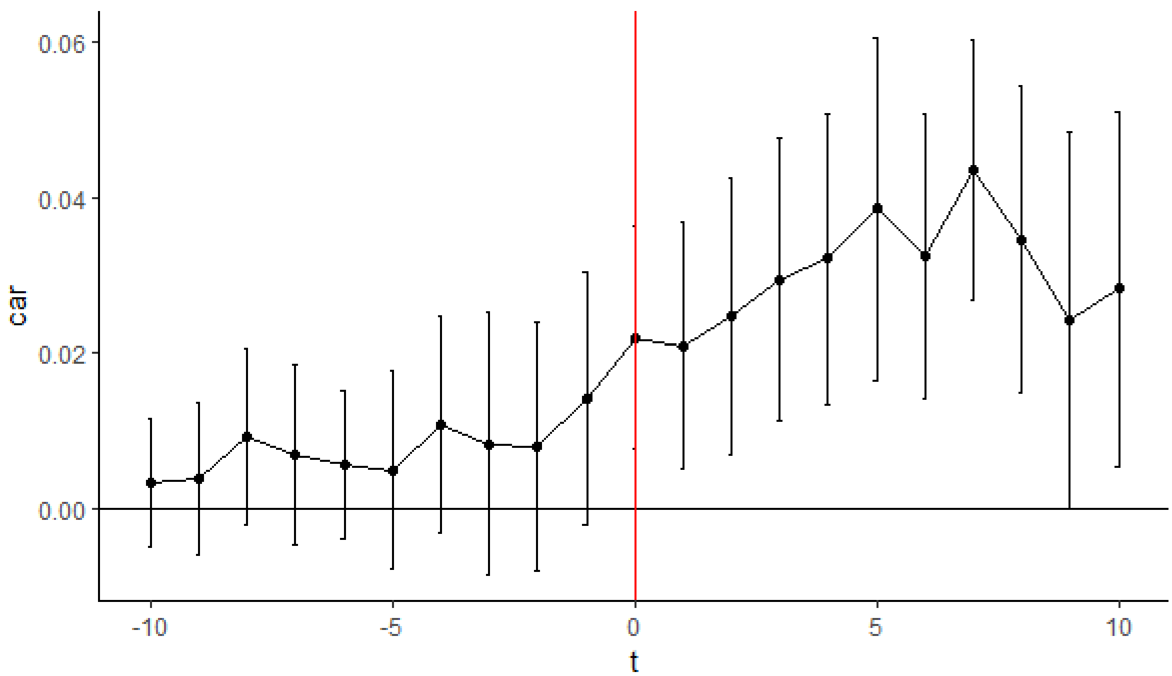
For each event, we calculate market-adjusted returns as the simple difference between the return of the event stock and the index return of the STOXX Europe 600. To calculate cumulative market adjusted returns, we simply use the sum of multiple returns of longer trading days windows. Day 0 identifies the day of the announcement or the first trading day after the announcement if the announcement day was a weekend or holiday. Table 4.5 presents t-tests for whether the average (cumulative) market-adjusted return is different from zero for three different event windows. The (cumulative) market-adjusted returns are significantly positive in all event windows. Figure 4.6 corroborated this finding. It shows the cumulative market-adjusted return (*car*) in the window [-10; *t*] where *t* is the trading day relative to the announcement day and is presented on the x-axis. The cumulative market-adjusted returns are statistically indistinguishable from zero until day -1 and consistently significantly positive from the event date until day 10.

Table 4.5: Events study results

Event window	(Cumulative) market-adjusted return	T-value
[0; 0]	0.776 %	1.833*
[-1; 1]	1.495 %	4.030***
[-10; 10]	2.656 %	2.479**

Notes: This table reports average (cumulative) market-adjusted returns of the 25 events reported in Table 4.5, where the (cumulative) market-adjusted return is the (sum of the daily) simple difference between the return of the event stock and the index return of the STOXX Europe 600 over the event window. The last column presents simple t-tests for whether the average (cumulative) market-adjusted return is different from zero. *, **, and *** denote significant at the 10-, 5-, and 1-percent two-tailed levels, respectively.

Figure 4.6: Cumulative market-adjusted returns around the event date



Notes: This figure presents the cumulative market-adjusted return (*car*) in the window [-10; *t*] where *t* is the trading day relative to the announcement day and is presented on the x-axis.

Appendix 4B

Figure 4.7: Comparison of Experimental materials between Cell A and Cell B

Cell A

You have just inherited 10,000€. You plan to invest them into diversified investment funds to achieve financial return, but also contribute to environmental sustainability. You come across Sustainability Fund, briefly presented below. A non-sustainable fund with similar risk and liquidity would be expected to have 400 € more return but also 3 additional tons of CO2 emissions. One EU emission right (= 1 ton of CO2) currently costs 100€.

Fund designation	**Sustainability Fund**
Expected return	**300€** per 10,000€ invested
Risk classification	Risk level 4 out of 7
Liquidity classification	Liquidity level 7 out of 7
CO2 emissions	**10 tons** per 10,000€ invested
Diversification	Globally diversified portfolio

Cell B

You have just inherited 10,000€. You plan to invest them into diversified investment funds to achieve financial return, but also contribute to environmental sustainability. You come across Sustainability Fund, briefly presented below. A non-sustainable fund with similar risk and liquidity would be expected to have 400 € more return but also 3 additional tons of CO2 emissions. One EU emission right (= 1 ton of CO2) currently costs 100€.

Fund designation	**Sustainability Fund**
Expected return	**300€** per 10,000€ invested
Risk classification	Risk level 4 out of 7
Liquidity classification	Liquidity level 7 out of 7
CO2 emissions	**0 tons** per 10,000€ invested
Diversification	Globally diversified portfolio

Figure 4.8: Comparison of Experimental materials between Cell C and Cell D

Cell C

You have just inherited 10,000€. You plan to invest them into diversified investment funds to achieve financial return, but also contribute to environmental sustainability. You come across Sustainability Fund, briefly presented below. A non-sustainable fund with similar risk and liquidity would be expected to have 400 € more return but also 3 additional tons of CO2 emissions. One EU emission right (= 1 ton of CO2) currently costs 100€.

Fund designation	**Sustainability Fund**
Expected return	**300€** per 10,000€ invested
Risk classification	Risk level 4 out of 7
Liquidity classification	Liquidity level 7 out of 7
CO2 emissions	**10 tons** per 10,000€ invested
Diversification	Globally diversified portfolio

You have access to an experienced **investment advisor** telling you as follows:

To achieve financial return and contribute to environmental sustainability, you need to balance risk, liquidity, return, and CO2 emissions of your portfolio of investments (not just single positions). Considering the above-mentioned Funds and Certificates, the two most direct options to balance financial return and environmental sustainability are 1) invest in Sustainability Fund, or 2) invest in the alternative non-sustainable fund and compensate for CO2 emissions by purchasing EU emission rights. Comparing Sustainability Fund with the alternative non-sustainable fund, risk and liquidity are the same, while returns fall by 133€ for reducing 1 ton of CO2

Cell D

You have just inherited 10,000€. You plan to invest them into diversified investment funds to achieve financial return, but also contribute to environmental sustainability. You come across Sustainability Fund, briefly presented below. A non-sustainable fund with similar risk and liquidity would be expected to have 400 € more return but also 3 additional tons of CO2 emissions. One EU emission right (= 1 ton of CO2) currently costs 100€.

Fund designation	**Sustainability Fund**
Expected return	**300€** per 10,000€ invested
Risk classification	Risk level 4 out of 7
Liquidity classification	Liquidity level 7 out of 7
CO2 emissions	**0 tons** per 10,000€ invested
Diversification	Globally diversified portfolio

You have access to an experienced **investment advisor** telling you as follows:

To achieve financial return and contribute to environmental sustainability, you need to balance risk, liquidity, return, and CO2 emissions of your portfolio of investments (not just single positions). Considering the above-mentioned Funds and Certificates, the two most direct options to balance financial return and environmental sustainability are 1) invest in Sustainability Fund, or 2) invest in the alternative non-sustainable fund and compensate for CO2 emissions by purchasing EU emission rights. Comparing Sustainability Fund with the alternative non-sustainable fund, risk and liquidity are the same, while returns fall by 133€ for reducing 1 ton of CO2

Appendix 4C

Figure 4.9: Comparison of Experimental materials between Cell A and Cell B

Cell A

You have just inherited 10,000€ and plan to invest them into diversified investment funds. You come across Funds A and B, briefly presented below.

One EU emission right allowing to emit 1 ton of CO_2 currently costs 100€.

Fund designation	**FUND A**	**FUND B**
Expected return (yearly)	**300€** per 10,000€ invested	**700€** per 10,000€ invested
Risk classification	Risk level 4 out of 7	Risk level 4 out of 7
Liquidity classification	Liquidity level 7 out of 7	Liquidity level 7 out of 7
CO_2 emissions (yearly)	**10 tons** per 10,000€ invested	**13 tons** per 10,000€ invested
Diversification	Globally diversified portfolio	Globally diversified portfolio

Cell B

You have just inherited 10,000€ and plan to invest them into diversified investment funds. You come across Funds A and B, briefly presented below.

One EU emission right allowing to emit 1 ton of CO_2 currently costs 100€.

Fund designation	**FUND A**	**FUND B**
Expected return (yearly)	**300€** per 10,000€ invested	**700€** per 10,000€ invested
Risk classification	Risk level 4 out of 7	Risk level 4 out of 7
Liquidity classification	Liquidity level 7 out of 7	Liquidity level 7 out of 7
CO_2 emissions (yearly)	**0 tons** per 10,000€ invested	**3 tons** per 10,000€ invested
Diversification	Globally diversified portfolio	Globally diversified portfolio

Figure 4.10: Comparison of Experimental materials between Cell C and Cell D

Cell C

You have just inherited 10,000€ and plan to invest them into diversified investment funds. You come across Funds A and B, briefly presented below.

One EU emission right allowing to emit 1 ton of CO_2 currently costs 100€.

Fund designation	**FUND A**	**FUND B**
Expected return (yearly)	**300€** per 10,000€ invested	**700€** per 10,000€ invested
Risk classification	Risk level 4 out of 7	Risk level 4 out of 7
Liquidity classification	Liquidity level 7 out of 7	Liquidity level 7 out of 7
CO_2 emissions (yearly)	**10 tons** per 10,000€ invested	**13 tons** per 10,000€ invested
Diversification	Globally diversified portfolio	Globally diversified portfolio

Fund A joined the climate goals of the Paris Climate Agreement. Its **goal** was to achieve **10 tons of CO_2** emissions **per 10,000€.** Fund A **has now achieved this goal** well in time.

Cell D

You have just inherited 10,000€ and plan to invest them into diversified investment funds. You come across Funds A and B, briefly presented below.

One EU emission right allowing to emit 1 ton of CO_2 currently costs 100€.

Fund designation	**FUND A**	**FUND B**
Expected return (yearly)	**300€** per 10,000€ invested	**700€** per 10,000€ invested
Risk classification	Risk level 4 out of 7	Risk level 4 out of 7
Liquidity classification	Liquidity level 7 out of 7	Liquidity level 7 out of 7
CO_2 emissions (yearly)	**0 tons** per 10,000€ invested	**3 tons** per 10,000€ invested
Diversification	Globally diversified portfolio	Globally diversified portfolio

Fund A joined the climate goals of the Paris Climate Agreement. Its **goal** was to achieve **0 tons of CO_2** emissions **per 10,000€.** Fund A **has now achieved this goal** well in time.

Appendix 4D

Figure 4.11: Comparison of Experimental materials between ONE TON and FOUR TONS Condition

ONE TON Condition

You have just inherited 10,000€ and plan to invest them into diversified investment funds. You come across Funds A and B, briefly presented below.

One EU emission right allowing to emit 1 ton of CO2 currently costs 100€.

Fund designation	**FUND A**	**FUND B**
Expected return (yearly)	**300€** per 10,000€ invested	**700€** per 10,000€ invested
Risk classification	Risk level 4 out of 7	Risk level 4 out of 7
Liquidity classification	Liquidity level 7 out of 7	Liquidity level 7 out of 7
CO2 emissions (yearly)	**1 ton** per 10,000€ invested	**4 tons** per 10,000€ invested
Diversification	Globally diversified portfolio	Globally diversified portfolio

FOUR TONS Condition

You have just inherited 10,000€ and plan to invest them into diversified investment funds. You come across Funds A and B, briefly presented below.

One EU emission right allowing to emit 1 ton of CO2 currently costs 100€.

Fund designation	**FUND A**	**FUND B**
Expected return (yearly)	**300€** per 10,000€ invested	**700€** per 10,000€ invested
Risk classification	Risk level 4 out of 7	Risk level 4 out of 7
Liquidity classification	Liquidity level 7 out of 7	Liquidity level 7 out of 7
CO2 emissions (yearly)	**4 tons** per 10,000€ invested	**7 tons** per 10,000€ invested
Diversification	Globally diversified portfolio	Globally diversified portfolio

Appendix 4E

Table 4.6: Original sample: Effects of NETZERO and ADVICE on WTI_SF

Panel A Descriptive Statistics – Mean (Standard Deviations)

N = 294	Net zero strategy		
Investment Advice	*NO NETZERO*	*NETZERO*	Overall
NO ADVICE	53.08 (27.88) N=67 [cell A]	62.48 (25.65) N=80 [cell B]	58.20 (27.01) N=147
ADVICE	58.35 (24.18) N=65 [cell C]	64.19 (21.51) N=82 [cell D]	61.61 (22.84) N=147
Overall	55.68 (26.16) N=132	63.35 (23.59) N=162	

Panel B Two-way ANOVA Results, DV = *WTI_SF*

Source	Sum of Squares	Degrees of Freedom	*F*	*p*-value
Intercept	1,030,715	1	1,677.57	<0.001**
NETZERO	4,219	1	6.87	**0.003*** **
ADVICE	886	1	1.44	0.116
INTERACTION	231	1	0.38	**0.135**
Error	178,179	290		

Panel C Planned comparison with simple effects tests

Comparison	Degrees of Freedom	Diff.	*t*-stat	*p*-value
Cell A vs. cell B	1	-9.40	-2.11	0.037**
Cell A vs. cell C	1	-5.27	-1.16	0.248
Cell B vs. cell D	1	-1.71	-0.46	0.647
Cell C vs. cell D	1	-5.84	-1.52	0.130

Notes: Panel A presents the mean, standard deviation (in parentheses), and number of observations (N) of participants' willingness to invest in Sustainability Fund (*WTI_SF*) for each experimental cell. Columns denote the *NETZERO* manipulation and rows denote the *ADVICE* manipulation which we present in detail in Appendix 4B. *WTI_SF* is measured as the average of a two-item construct (on a scale from 0 very unattractive; very unlikely to 100 very attractive; very likely): (i) "How attractive is an investment in Sustainability Fund as part of your diversified portfolio?"; (ii) "How attractive is a purchase of EU emission rights to compensate for emitted CO2?". Panel B reports results of a full-factorial ANOVA with *WTI_SF* as the dependent variable, and the *NETZERO* and *ADVICE* manipulation as treatment variables. P-values reflect our hypothesis tests and are one-tailed equivalents. Panel C presents T-tests (two-tailed) of the mean of *WTI_SF* between two experimental cells in each line. *, **, and *** denote significant at the 10-, 5-, and 1-percent levels, respectively.

5 Conclusion

In recent years, sustainability accounting has become a major part of corporate reporting and is also increasingly being taken into account in investment decisions (e.g., Andonov, Hochberg, & Rauh, 2018; Barber, Morse, & Yasuda, 2021; Bauer, Ruof, & Smeets, 2021; Dyck et al., 2019; Riedl, & Smeets, 2017). In this sense, sustainability accounting is becoming increasingly important for investor valuation judgment and results in sizable effects on financial markets (Hartzmark, & Sussman, 2019). Thus, to understand why investors behave as they do, it is essential to analyze how they balance prosocial preferences with liquidity, risks, and returns of available investment alternatives to arrive at an optimal investment decision. This thesis, consisting of three individual research papers, has examined how sustainability accounting shapes investors' valuation judgment using foremost experimental, but also archival evidence. It provides valuable contributions to the literature on the influence of prosocial preferences and investors' considerations of sustainability aspects in investment decisions, as well as several implications for practitioners. In more detail the papers can be concluded as follows:

Chapter two studies the importance of an investment's DoS for investors' valuation judgments, motivated by major financial markets establishing sustainable finance strategies, aiming for a redirection of capital flows to more socially responsible investments. Recruiting private investors from Prolific and using a 2 x 2 x 2 between-subjects experiment, confirms previous findings of a willingness to pay for sustainability. Moreover, it shows that investors' valuation judgment increases proportionally to an investment's DoS. Thus, it makes important contributions to the literature on the influence of prosocial preferences on investors' valuation judgment (Barber, Morse, & Yasuda, 2021; Bauer, Ruof, & Smeets, 2021; Riedl, & Smeets, 2017; Hartzmark, & Sussman, 2019). It also has important implications for practitioners (e.g. investment advisors and portfolio managers) and regulators, as it demonstrates that a high DoS creates an investment incentive for investors.

The third chapter experimentally analyzes the magnitude of a firm's CPDR as a determinant of investors' valuation judgment, focusing on the mediating role of investors' attribution of motives to a firm's CPDR. As CPDR is often highly visible and a particularly critical observed component of sustainability accounting (Berlemann, & Steinhardt, 2017; Van Aalst, 2006), this topic is of particular relevance. Conducting an incentivized 2 x 2 between-subjects experiment with retail investors, this chapter reveals that investors associate a higher magnitude of a firm's CPDR with values-driven corporate social behavior and reward it with a higher assessment of a firm's value. A lower magnitude of a firm's CPDR can be perceived as an ingratiating attempt to win favor and affect investors' valuation judgments negatively. In line with the existing literature, it also demonstrates that CSR skepticism negatively affects private investors' valuation judgment. Thus, it seems like private investors appreciate authentic interest in social problems and reward it with a higher valuation but refuse and penalize CPDR rooted in self-interest. These findings explain why previous research finds CPDR announcements to entail both positive and negative capital market reactions (Chen, Patten, & Roberts, 2008; Muller, & Kräussl, 2011). Hence, this chapter extends the behavioral finance literature, examining the influence of CSR-induced attributions on investors' valuation judgment (Ellen, Webb, & Mohr, 2006; Forehand, & Grier, 2003; Skarmeas, & Leonidou, 2013; Vlachos et al., 2009).

Motivated by recent trends of firms and countries to commit to net zero emission strategies, chapter four investigates whether retail investors are subject to a net zero fallacy, in which they allocate their capital to net zero projects with inefficient emission reductions. Conducting an event study and three sequential between-subjects experiments involving retail investors, this chapter establishes that companies disclose achievements of net zero emissions and that capital markets care about these disclosures. Moreover, it shows across all experiments that retail investors are subject to a net zero fallacy, provides process evidence, and explores boundary conditions of the net zero fallacy. In extension, it provides two theory-driven interventions, thereby strengthening the theoretical channel of broad bracketing and salient reference points. Using archival and experimental methods, this chapter contributes to the large literature on investors' considerations of sustainability aspects in their valuation judgment (e.g., Bauer, Ruof, & Smeets, 2021; Biktimirov, & Afego, 2022; Hartzmark, & Sussman, 2019) and expands the growing stream of literature on economic effects of GHG disclosure (e.g., Chithambo et al., 2022; Tomar, 2023). It also has important implications for practitioners who advocate for achieving net zero emissions and demand or regulate GHG disclosures, by informing about the boundaries of emissions trading as an efficient allocation mechanism of investments.

The contributions of this dissertation should be interpreted considering the following limitations. However, these limitations also point out avenues for future research. First, it is important to mention that generalizability is a pertinent concern in experimental accounting and finance research, as this dissertation relies foremost on experimental methodology. Experiments naturally focus on internal validity and generalize by theory alignment. Thus, the boundaries of applicability of each study's underlying theory likely delineate the boundaries of its findings' external validity. Second, the studies in this dissertation rely on retail investors as participants in the experiments. Prior research suggests that retail investors have other priorities than institutional investors when investing socially responsibly and that institutional investors have more resources to process information (Cheah, & Phau, 2011; Cohen, & Simnett, 2015; Eccles, Serafeim, & Krzus, 2011; McLachlan, & Gardner, 2004). Thus, it is unclear whether the findings extend to an institutional investor setting because it is unclear how relevant each specific context examined is for their investment decisions. Future research could explore those impacts on institutional investors. Moreover, some contributions rest on assumptions (e.g., “net zero fallacy”, that there is no rational incremental utility in achieving the net zero benchmark, beyond the utility from reducing emissions), or are based on specific regulatory and corporate context (e.g., US CPDR regulatory and corporate context). Future research could thus, conduct experiments in other regulatory contexts. The assumptions made are highly likely, as argued, but ultimately are empirical questions that future research could address. While archival studies could provide generalizable results based on large data sets, they mostly provide only quantitative evidence on observable outcomes. Hence, as the relationships between key persons influencing institutional investors' valuation judgments (e.g., analysts, fund managers, and board members) are not publicly observable, there is a need for more qualitative research on these topics.

References

Chapter 1

Ameer, R., & Othman, R. (2012). Sustainability Practices and Corporate Financial Performance: A Study Based on the Top Global Corporations. *Journal of Business Ethics, 108*(1), 61-79.

Andonov, A., Hochberg, Y. V., & Rauh, J. D. (2018). Political Representation and Governance: Evidence from the Investment Decisions of Public Pension Funds. *The Journal of Finance, 73*(5), 2041-2086.

Andreoni, J. (1990). Impure altruism and donations to public goods: A theory of warm-glow giving. *Economic Journal, 100*, 464-477.

Barber, B. M., Morse, A., & Yasuda, A. (2021). Impact investing. *Journal of Financial Economics, 139*, 162–185.

Bauer, R., Ruof, T., & Smeets, P. (2021). Get Real! Individuals Prefer More Sustainable Investments. *The Review of Financial Studies, 34*(8), 3976-4043.

Becker, G. S. (1974). A theory of social interactions. *Journal of Political Economy, 82*, 1063-1093.

Berlemann, M., & Steinhardt, M. F. (2017). Climate change, natural disasters, and migration - a survey of the empirical evidence. *CESifo Economic Studies, 63*(4), 353-385.

Biktimirov, E. N., & Afego, P. N. (2022). Do investors value environmental sustainability? Evidence from the FTSE Environmental Opportunities 100 index. *Finance Research Letters, 44*(2), 102-112.

Carbon Disclosure Project [CDP] (2017). Out of the starting blocks: Tracking progress on corporate climate action. https://www.cdp.net/en/research/global-reports/tracking-climate-progress-2017, retrieved July 16, 2024.

Chapple, L., Clarkson, P., & Gold, D. (2013). The Cost of Carbon: Capital Market Effects of the Proposed Emission Trading Scheme (ETS). *Abacus, 49*(1), 1-33.

Chen, C. J., Patten, D., & Roberts, R.W. (2008). Corporate charitable contributions: A corporate social performance or legitimacy strategy?. *Journal of Business Ethics*, *82*(3), 131-144.

Chithambo, L., Tauringana, V., Tingbani, I., & Achiro, L. (2022). Stakeholder pressure and greenhouses gas voluntary disclosures. *Business Strategy and the Environment, 31*(1), 159-172.

Clarkson, P., Li, Y., Pinnuck, M., & Richardson, G. (2015). The Valuation Relevance of Greenhouse Gas Emissions under the European Union Carbon Emissions Trading Scheme. *European Accounting Review*, *24*(3), 551-580.

Çop, S., Olorunsola, V. O., & Alola, U. V. (2021). Achieving environmental sustainability through green transformational leadership policy: Can green team resilience help?. *Business Strategy and the Environment*, *30*(1), 671-682.

Deryugina, T. (2017). The fiscal cost of hurricanes: Disaster aid versus social insurance. *American Economic Journal: Economic Policy, 9*(3), 168-198.

Dierynck, B., Jacob, M., Müller, M. A., Peters, C. P. H., & Van Pelt, V. (2024). Public Tax Disclosures and Fair Share Perceptions. *Working Paper*. Available at SSRN 3729938.

Dyck, A., Lins, K. V., Roth, L., & Wagner, H. F. (2019). Do institutional investors drive corporate social responsibility? International evidence. *Journal of Financial Economics, 131*, 693-714.

Eckel, C. C., & Grossman, P. J. (1996). Altruism in anonymous dictator games. *Games and Economic Behavior, 16*, 181-91.

Ellen, P. S., Webb, D. J., & Mohr, L. A. (2006). Building corporate associations: Consumer attributions for corporate socially responsible programs. *Journal of the Academy of Marketing Science, 34*(2), 147-157.

Forehand, M., & Grier, S. (2003). When is honesty the best policy? The effect of stated company intent on consumer skepticism. *Journal of Consumer Psychology, 13*(3), 349-356.

Griffin, P., Lont, D., & Sun, E. (2017). The Relevance to Investors of Greenhouse Gas Emission Disclosures. *Contemporary Accounting Research, 34*(2), 1265-1297.

Haney, A. B., Pope, J., & Arden, Z. (2020). Making it personal: Developing sustainability leaders in business. *Organization & Environment*, *33*(2), 155-174.

Hartzmark, S. M., & Sussman, A. B. (2019). Do Investors Value Sustainability? A Natural Experiment Examining Ranking and Fund Flows. *The Journal of Finance, 74*(6), 2789-2837.

Levit, D. (2019). Soft shareholder activism. *The Review of Financial Studies, 32*(7), 2775-2808.

Markowitz, H. (1952). Portfolio Selection. *The Journal of Finance, 7*(1), 77-91.

Martin, P. R., & Moser, D. V. (2016). Managers' green investment disclosures and investors' reaction. *Journal of Accounting and Economics, 61*(1), 239-254.

Matsumura, E., Prakash, R., & Vera-Muñoz, S. (2014). Firm-Value Effects of Carbon Emissions and Carbon Disclosures. *The Accounting Review, 89*(2), 695-724.

Muller, A., & Kräussl, R. (2008). Do markets love misery? Stock prices and corporate philanthropic disaster response. *Academy of Management Proceedings, 2008*(1), 1-6.

Muller, A., & Kräussl, R. (2011). The value of corporate philanthropy during times of crisis: The sensegiving effect of employee involvement. *Journal of Business Ethics, 103*(2), 203-220.

Pedersen, L., Fitzgibbons, S., & Pomorski, L. (2021). Responsible Investing: The ESG-efficient Frontier. *Journal of Financial Economics, 142*(2), 572-597.

Perrini, F., & Tencati, A. (2006). Sustainability and stakeholder management: the need for new corporate performance evaluation and reporting systems. *Business Strategy and the Environment, 15*(5), 296-308.

Riedl, A., & Smeets, P. (2017). Why do investors hold socially responsible mutual funds? *The Journal of Finance, 72*(6), 2505-2550.

Schaltegger, S., & Burritt, R. L. (2010). Sustainability accounting for companies: Catchphrase or decision support for business leaders?. *Journal of World Business, 45*(4), 375-384.

Skarmeas, D., & Leonidou, C. N. (2013). When consumers doubt, watch out! The role of CSR skepticism. *Journal of Business Research, 66*(10), 1831-1838.

Tomar, S. (2023). Greenhouse Gas Disclosure and Emissions Benchmarking. *Journal of Accounting Research, 61*(2), 451-492.

United Nations [UN] (2020). Carbon neutrality by 2050: the world's most urgent mission. https://www.un.org/sg/en/content/sg/articles/2020-12-11/carbon-neutrality-2050-the-world%E2%80%99s-most-urgent-mission, retrieved July 16, 2024.

United Nations [UN] (2021). COP26: Together for our planet. https://www.un.org/en/climatechange/cop26, retrieved July 16, 2024.

Van Aalst, M. K. (2006). The impacts of climate change on the risk of natural disasters. *Disasters, 30*(1), 5-18.

Vlachos, P. A., Tsamakos, A., Vrechopoulos, A. P., & Avramidis, P. K. (2009). Corporate social responsibility: attributions, loyalty, and the mediating role of trust. *Journal of the Academy of Marketing Science*, *37*(2), 170-180.

Chapter 2

Ahmed, M., Gao, Y., & Satchell, S. (2021), Modeling Demand for ESG. *The European Journal of Finance, 27*(16), 1669-1683.

Andonov, A., Hochberg, Y. V., & Rauh, J. D. (2018). Political Representation and Governance: Evidence from the Investment Decisions of Public Pension Funds. *The Journal of Finance, 73*(5), 2041-2086.

Andreoni, J. (1990). Impure altruism and donations to public goods: A theory of warm-glow giving. *Economic Journal*, *100*, 464-477.

Andreoni, J., & Miller, J. (2002). Giving according to GARP: An experimental test of the consistency of preferences for altruism. *Econometrica, 70*, 737–753.

Barber, B. M., Morse, A., & Yasuda, A. (2021). Impact investing. *Journal of Financial Economics, 139*, 162-185.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*(6), 1173-1182.

Bauer, R., Ruof, T., & Smeets, P. (2021). Get Real! Individuals Prefer More Sustainable Investments. *The Review of Financial Studies, 34*(8), 3976-4043.

Becker, G. S. (1974). A theory of social interactions. *Journal of Political Economy, 82*, 1063-93.

Benabou, R., & Tirole, J. (2010). Individual and corporate social responsibility. *Economica, 77*, 1-19.

Benson, K. L., & Humphrey, J. E. (2008). Socially responsible investment funds: Investor reactions to current and past returns. *Journal of Banking & Finance*, *32*(9), 1850-1859.

Berinsky, A. J., Huber, G. A., & Lenz, G. (2012). Evaluating online labor markets for experimental research: Amazon.com's Mechanical Turk. *Political Analysis*, *20*(3), 351-368.

Berry, R. H., & Yeung, F. (2013). Are Investors Willing to Sacrifice Cash for Morality? *Business Ethics*, *117*(3), 477-492.

Bollen, N. (2007). Mutual fund attributes and investor behavior. *Journal of Financial and Quantitative Analysis*, *42*, 683-708.

Bonroy, O., & Constantatos, C. (2014). On the Economics of Labels: How Their Introduction Affects the Functioning of Markets and the Welfare of All Participants. *American Journal of Agricultural Economics*, *97*(1), 239-259.

Boush, D. M., Friestad, M., & Rose, G. M. (1994). Adolescent skepticism toward TV advertising and knowledge of advertiser tactics. *Journal of Consumer Research*, *21*(1), 165-175.

Braak-Forstinger, C., & Selian, A. (2020). How to increase family office engagement in impact investing. *Bertelsmann Stiftung*, Gütersloh.

Brusuelas, J., Depew K., & DeCandido, A. (2019). ESG Investment rises, but tracking methods fall short. *The Real Economy*, *49*, 65-80.

Buchheit, S., Doxey, M. M., Pollard, T., & Stinson, S. R. (2017). A technical guide to using Amazon's Mechanical Turk in behavioral accounting research. *Behavioral Research in Accounting*, *30*(1), 111-122.

Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's Mechanical Turk: A new source of inexpensive, yet high-quality, data? Perspectives on Psychological Science, *6*(1), 3-5.

Busch, T., Bauer, R., & Orlitzky, M. (2016). Sustainable development and financial markets. *Business & Society*, *55*, 303-329.

Busch, T., Bruce-Clark, P., Derwall, J., Eccles, R., Hebb, T., Hoepner, A., Klein, C., Krueger, P., Paetzold, F., Scholtens, B., & Weber, O. (2021). Impact investments: a call for (re)orientation. *Business and Economics*, *1*(33).

Byrne, B. M. (2013). *Structural equation modeling with AMOS: Basic concepts, applications, and programming*. Routledge, NY.

Cappucci, M. (2018). The ESG Integration Paradox. *Journal of Applied Corporate Finance*, *30*(2), 22-28.

Casler, K., Bickel, L., & Hackett, E. (2013). Separate but equal? A comparison of participants and data gathered via Amazon's MTurk, social media, and face-to-face behavioral testing. *Computers in Human Behavior*, *29*(6), 2156–2160.

Cason, T., & Gangadharan, L. (2002). Environmental Labeling and Incomplete Consumer Information in Laboratory Markets. *Journal of Environmental Economics and Management*, *43*(1), 113-134.

Cengiz, C-B., Braun, D., & von Nitzsch, R. (2010). Alpha-Vehikel oder Preis für das gute Gewissen? Eine Performanceanalyse ethischer Investments. *Corporate Finance biz, 1*(4), 263-271.

Cheah, I., & Phau, I. (2011). Attitudes towards environmentally friendly products: The influence of ecoliteracy, interpersonal influence and value orientation. *Marketing Intelligence and Planning, 29*(5), 452-472.

Cohen, J. R., & Simnett, R. (2015). CSR and Assurance Services: A Research Agenda. *Auditing: A Journal of Practice & Theory*, *34*(1), 59-74.

Connors, S., Anderson-MacDonald, S., & Thomson, M. (2017). Overcoming the 'Window Dressing' Effect: Mitigating the Negative Effects of Inherent Skepticism Towards Corporate Social Responsibility. *Journal of Business Ethics*, *145*(3), 599-621.

Cordeiro, J. J., & Tewari, M. (2015). Firm characteristics, industry context, and investor reactions to environmental CSR: a stakeholder theory approach. *Journal of Business Ethics*, *130*, 833-849.

Crump, M. J., McDonnell, J. V., & Gureckis, T. M. (2013). Evaluating Amazon's Mechanical Turk as a tool for experimental behavioral research. *PloS ONE*, *8*(3), e57410.

Dorfleitner, G., & Nguyen, M. (2016). Which proportion of SR investments is enough? A surveybased approach. *Business Research*, *9*(1), 1-25.

Dorfleitner, G., & Utz, S. (2014). Profiling German-speaking socially responsible investors. *Qualitative Research in Financial Markets*, *6*(2), 118-156.

Dyck, A., Lins, K. V., Roth, L., & Wagner, H. F. (2019). Do institutional investors drive corporate social responsibility? International evidence. *Journal of Financial Economics, 131*, 693-714.

Eccles, N. S., & Viviers, S. (2011). The Origins and Meanings of Names Describing Investment Practices that Integrate a Consideration of ESG Issues in the Academic Literature. *Journal of Business Ethics*, *104*(3), 389-402.

Eccles, R., Serafeim, G., & Krzus, M. P. (2011). Market Interest in Nonfinancial Information. *Journal of Applied Corporate Finance*, *23*(4), 113-127.

Eckel, C. C., & Grossman, P. J. (1996). Altruism in anonymous dictator games. *Games and Economic Behavior, 16*, 181-91.

Elliott, W. B., Grant, S. M., & Hodge, F. D. (2018). Negative news and investor trust: The role of $Firm and #CEO Twitter use. *Journal of Accounting Research, 56*(5), 1483-1519.

Elliott, W. B., Jackson, K. E., Peecher, M. E., & White, B. J. (2014). The unintended effect of corporate social responsibility performance on investors' estimates of fundamental value. *The Accounting Review, 89*(1), 275-302.

Entine, J. (2003). The myth of social investing: A critique of its practice and consequences for corporate social performance research. *Organization & Environment*, *16*(3), 352-368.

European Commission [EC] (2009). Europeans' attitudes towards the issue of sustainable consumption and production (Flash EB Series #256). Washington, DC: *European Commission—Flash Eurobarometer*.

European Commission [EC] (2021). Overview of sustainable finance. https://finance.ec.europa.eu/sustainable-finance/overview-sustainable-finance_en, retrieved March 19, 2024.

European Commission [EC] (2023). Strategy for financing the transition to a sustainable economy. https://finance.ec.europa.eu/publications/strategy-financing-transition-sustainable-economy_en?prefLang=de&etrans=de, retrieved March 19, 2024.

Eurosif (2021). Eurosif Report 2021: Fostering Investor Impact Placing it at the heart of sustainable finance. Brussels, Belgium: Sakuma-Keck, K., van Hoorn, V., Casarsa, F., Gallagher, H., Lavayssière, M., & Rathke S.

Flammer, C. (2018). Competing for government procurement contracts: the role of corporate social responsibility. *Strategic Management Journal*, *39*(5), 1299-1324.

Forehand, M., & Grier, S. (2003). When is honesty the best policy? The effect of stated company intent on consumer skepticism. *Journal of Consumer Psychology*, *13*(3), 349-356.

Friedrich, C. (2021). Private Investigations and Self-Disclosure of Suspected Fraud: Experimental Evidence on Forensic Accounting Services. *Behavioral Research in Accounting*, *33*(1), 65-79.

Gibson, R., & Krueger, P. (2017). The Sustainability Footprint of Institutional Investors. *Swiss Finance Institute Research paper series*, *17*(5).

Global Sustainable Investment Alliance [GSIA] (2020). Global Sustainable Investment Review 2020. New York, USA: Arai, M., Van Hoorn, V., Lanz, D., Woll, L., & O'Connor, S.

Gutsche, G., & Ziegler, A. (2019). Which private investors are willing to pay for sustainable investments? Empirical evidence from stated choice experiments. *Journal of Banking & Finance*, *102*(C), 193-214.

Gutsche, G., & Zwergel, B. (2020). Investment Barriers and Labeling Schemes for Socially Responsible Investments. *Schmalenbach Business Review*, *72*(2), 111-157.

Hartzmark, S. M., & Sussman, A. B. (2019). Do Investors Value Sustainability? A Natural Experiment Examining Ranking and Fund Flows. *The Journal of Finance*, *74*(6), 2789-2837.

Heeb, F., Kölbel, J. F., Paetzold, F., & Zeisberger, S. (2023). Do investors care about impact?. *The Review of Financial Studies*, *36*(5), 1737-1787.

Heinemann, K., Zwergel, B., Gold, S., Seuring, S., & Klein, C. (2018). Exploring the Supply-Demand-Discrepancy of Sustainable Financial Products in Germany from a Financial Advisor's Point of View. *Sustainability*, *10*(4), 944-964.

Heinkel, R., Kraus, A., & Zechner, J. (2001). The effect of green investment on corporate behavior. *Journal of Financial and Quantitative Analysis, 36*, 431-49.

Horton, J. J., Rand, D. G., & Zeckhauser, R. J. (2011). The online laboratory: Conducting experiments in a real labor market. *Experimental Economics, 14*(3), 399-425.

Jang, B., Koo, H., Liu, H., & Loewesenstein, M. (2007). Liquidity Premia and Transaction Costs. *The Journal of Finance, 62*(5), 2329-2366.

Johnson, J. A., Theis, J., Vitalis, A., & Young, D. (2020). The influence of firms' emissions management strategy disclosures on investors' valuation judgments. *Contemporary Accounting Research*, *37*(2), 642-664.

Klinger, S., Bayne, K. M., Yao, R. T., & Payn, T. (2022). Credence Attributes in the Forestry Sector and the Role of Environmental, Social and Governance (ESG) Factors. *Forests, 13*(3), 432-451.

Krüger, P. (2015). Corporate goodness and shareholder wealth. *Journal of Financial Economics, 115*, 304-29.

Krüger, P., Sautner, Z., & Starks, L. T. (2020). The importance of climate risks for institutional investors. *Review of Financial Studies, 33*, 1067-111.

Kunz, J. (2020). Corporate social responsibility and employees motivation—broadening the perspective. *Schmalenbach Business Review*, *72*, 159-191.

Lichtenstein, D. R., Drumwright, M. E., & Braig, B. M. (2004). The effect of corporate social responsibility on customer donations to corporate-supported nonprofits. *Marketing*, *68*, 16-32.

MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods*, *1*(2), 130-149.

Markowitz, H. (1952). Portfolio Selection. *The Journal of Finance, 7*(1), 77-91.

McLachlan, J., & Gardner, J. (2004). A comparison of socially responsible and conventional investors. *Journal of Business Ethics, 52*(1), 11-25.

Mohr, L. A., Eroğlu, D., & Ellen, P. S. (1998). The Development and Testing of a Measure of Skepticism Toward Environmental Claims in Marketers' Communications. *The Journal of Consumer Affairs, 32(1)*, 30-55.

Natixis Global Asset Management (2019). Global Survey of Individual Investors: Six simple reasons why yesterday's volatile markets are a wake-up call for investors today. Frankfurt, Germany: Natixis Investment Managers.

Obermiller, C., & Spangenberg, E. R. (1998). Development of a scale to measure consumer scepticsm toward advertising. *Consumer Psychology*, *7*, 159-186.

Palan, S., & Schitter, C. (2018). Prolific.ac - A subject pool for online experiments. *Journal of Behavioral and Experimental Finance*, *17*(1), 22-27.

Pastor, L., Stambaugh, R. F., & Taylor, L. A. (2021). Sustainable investing in equilibrium. *Journal of Financial Economics, 142*, 550-71.

Pedersen, L., Fitzgibbons, S., & Pomorski, L. (2021). Responsible Investing: The ESG-efficient Frontier. *Journal of Financial Economics, 142*(2), 572-597.

Peer, E., Brandimarte, L., Samat, S., & Acquisti, A. (2017). Beyond the Turk: Alternative platforms for crowdsourcing behavioral research. *Journal of Experimental Social Psychology, 70*(2), 153-163.

Revelli, C. (2017). Socially responsible investing (SRI): From mainstream to margin? *Research in International Business and Finance*, *39*(B), 711-717.

Riedl, A., & Smeets, P. (2017). Why do investors hold socially responsible mutual funds? *The Journal of Finance*, *72*(6), 2505-2550.

Scheler, F. (2021). The ESG trend from a systematic investor's perspective. *Amadeus Quantamental SARL*, *4*(1).

Sen, S., & Bhattacharya, C. B. (2001). Does doing good always lead to doing better? Consumer reactions to corporate social responsibility. *Marketing Research*, *38*, 225-243.

Sharpe, W. (1964). Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk. *The Journal of Finance, 19*(3), 425-442.

Statman, M. (2004). What do investors want? *Journal of Portfolio Management*, *30*(5), 153-161.

Vanhamme, J., & Grobben, B. (2009). "Too Good to be True!". The effectiveness of CSR history in countering negative publicity. *Journal of Business Ethics, 85*(2), 273-283.

Wins, A., & Zwergel, B. (2016). Comparing those who do, might and will not invest in sustainable funds: A survey among German retail investors. *Business Research, 9*(1), 51-99.

Chapter 3

Arthur, M. (2003). Share price reactions to work-family initiatives: An institutional perspective. *Academy of Management Journal, 46*, 497-505.

Asay, H. S., Elliott, W. B., & Rennekamp, K. (2017). Disclosure readability and the sensitivity of investors' valuation judgments to outside information. *The Accounting Review, 92*(4), 1-25.

Barone, M. J., Miyazaki, A. D., & Taylor, K. A. (2000). The influence of cause-related marketing on consumer choice: does one good turn deserve another?. *Journal of Academy Marketing Science, 28*(2), 248-262.

Bartkus, B., Morris, S., & Seifert, B. (2002). Governance and corporate philanthropy: Restraining Robin Hood?‘. *Business & Society, 41*(3), 319-344.

Becker-Olsen, K. L., Cudmore, B. A., & Hill, R. P. (2006). The impact of perceived corporate social responsibility on consumer behavior. *Journal of Business Research, 59*(1), 46-53.

Berinsky, A. J., Huber, G. A., & Lenz, G. (2012). Evaluating online labor markets for experimental research: Amazon.com's Mechanical Turk. *Political* Analysis, *20*(3), 351-368.

Berlemann, M., & Steinhardt, M. F. (2017). Climate change, natural disasters, and migration—a survey of the empirical evidence. *CESifo Economic Studies*, *63*(4), 353-385.

Bhattacharya, R., Devinney, T. M., & Pillutla, M. M. (1998). A formal model of trust based on outcomes. *Academy of Management Review, 23*(3), 189-207.

Bonner, S. E., Clor-Proell, S. M., & Koonce, L. (2014). Mental accounting and disaggregation based on the sign and relative magnitude of income statement items. *The Accounting Review, 89*(6), 2087-2114.

Boush, D. M., Friestad, M., & Rose, G. M. (1994). Adolescent skepticism toward TV advertising and knowledge of advertiser tactics. *Journal of Consumer Research, 21*(1), 165-175.

Brammer, S., & Millington, A. (2005). Corporate reputation and philanthropy: an empirical analysis‘, *Journal of Business Ethics, 61*, 29-44.

Brammer, S., & Millington, A. (2008). Does it pay to be different? An analysis of the relationship between corporate social and financial performance. *Strategic Management Journal, 29*(12), 1325-1343. http://dx.doi.org/10.1002/smj.714

Brown-Liburd, H., & Zamora, V. L. (2015). The Role of Corporate Social Responsibility (CSR) Assurance in Investors' Judgments When Managerial Pay is Explicitly Tied to CSR Performance. *Auditing: A Journal of Practice & Theory, 34*(1), 75-96.

Buchheit, S., Doxey, M. M., Pollard, T., & Stinson, S. R. (2017). A technical guide to using Amazon's Mechanical Turk in behavioral accounting research. *Behavioral Research in Accounting, 30*(1), 111-122.

Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's Mechanical Turk: A new source of inexpensive, yet high-quality, data?. *Perspectives on Psychological Science*, *6*(1), 3-5.

Byrne, B. M. (2013). *Structural equation modeling with AMOS: Basic concepts, applications, and programming*. Routledge, NY.

Campbell, M. C., & Kirmani, A. (2000). Consumers' use of persuasion knowledge: The effects of accessibility and cognitive capacity on perceptions of an influence agent. *Journal of Consumer Research, 27*(1), 69-83.

Carroll, A. B. (1979). A three-dimensional conceptual model of corporate performance. *Academy of Management Review*, *4*(4), 497-505.

Carroll, A. B. (1991). The pyramid of corporate social responsibility: Toward the moral management of organizational stakeholders. *Business Horizons, 34*(4), 39-48.

Casler, K., Bickel, L., & Hackett, E. (2013). Separate but equal? A comparison of participants and data gathered via Amazon's MTurk, social media, and face-to-face behavioral testing. *Computers in Human Behavior, 29*(6), 2156-2160.

Chapman, E. L., Chambers, J. Q., Ribbeck, K. F., Baker, D. B., Tobler, M. A., Zeng, H., & White, D. A. (2008). Hurricane Katrina impacts on forest trees of Louisiana's Pearl River basin. *Forest Ecology and Management, 256*(5), 883-889.

Cheah, I., & Phau, I. (2011). Attitudes towards environmentally friendly products: The influence of ecoliteracy, interpersonal influence and value orientation. *Marketing Intelligence and Planning*, *29*(5), 452-472.

Chen, C. J., Patten, D., & Roberts, R.W. (2008). Corporate charitable contributions: A corporate cocial performance or legitimacy strategy?. *Journal of Business Ethics*, *82*(3), 131-144.

Chen, W., Han, J., & Tan, H. T. (2016). Investor reactions to management earnings guidance attributions: The effects of news valence, attribution locus, and outcome controllability. *Accounting, Organizations and Society*, *55*(1), 83-95.

Cohen, J., Holder-Webb, L., Nath, L., & Wood, D. (2011). Retail investors' perceptions of the decision-usefulness of economic performance, governance, and corporate social responsibility disclosures. *Behavioral Research in Accounting*, *23*(1), 109-129.

Cohen, J. R., & Simnett, R. (2015). CSR and assurance services: A research agenda. *Auditing: A Journal of Practice & Theory, 34*(1), 59-74.

Crump, M. J., McDonnell, J. V., & Gureckis, T. M. (2013). Evaluating Amazon's Mechanical Turk as a tool for experimental behavioral research. *PloS ONE*, *8*(3).

Damodaran, A. (2020). Equity risk premiums: Determinants, estimation and implications - The 2020 Edition. *NYU Stern School of Business*, New York, NY.

David, H. (2015). Why are there still so many jobs? The history and future of workplace automation. *Journal of Economic Perspectives*, *29*(3), 3-30.

Davis, M. H. (1980). Interpersonal reactivity index. *American Psychological Association PsycTests*, *17*(2), 86-102.

Dean, D. (2003). Consumer perception of corporate donations: Effects of company reputation for social responsibility and type of donation'. *Journal of Advertising, 32*, 91-102.

Deryugina, T. (2017). The fiscal cost of hurricanes: Disaster aid versus social insurance. *American Economic Journal: Economic Policy*, *9*(3), 168-198.

Dietz, J., & Kleinlogel, E. P. (2014). Wage cuts and managers' empathy: how a positive emotion can contribute to positive organizational ethics in difficult times. *Journal of Business Ethics, 119*(2), 461-472.

Du, S., Bhattacharya, C. B., & Sen, S. (2007). Reaping relational rewards from corporate social responsibility: The role of competitive positioning. *International Journal of Research in Marketing*, *24*(3), 224-241.

Ebenbach, D. H., Moore, C. F., & Parsil S. A. (1998). *Internally and externally motivated environmental attitudes.* Paper presented at the Annual Convention of the Midwestern Psychological Association. The University of Chicago, Chicago.

Eccles, R., Serafeim, G., & Krzus, M. P. (2011). Market interest in nonfinancial information. *Journal of Applied Corporate Finance, 23*(4), 113-127.

Ellen, P. S., Webb, D. J., & Mohr, L. A. (2000). Charitable programs and the retailer: do they mix?. *Journal of Retailing, 76(3)*, 393-406.

Ellen, P. S., Webb, D. J., & Mohr, L. A. (2006). Building corporate associations: Consumer attributions for corporate socially responsible programs. *Journal of the Academy of Marketing Science, 34*(2), 147-157.

Elliott, W. B., Grant, S. M., & Rennekamp, K. M. (2017). How disclosure features of corporate social responsibility reports interact with investor numeracy to influence investor judgments. *Contemporary Accounting Research*, *34*(3), 1596-1621.

Elliott, W. B., Jackson, K. E., Peecher, M. E., & White, B. J. (2014). The unintended effect of corporate social responsibility performance on investors' estimates of fundamental value. *The Accounting Review*, *89*(1), 275-302.

European Commission [EC] (2011). Eine neue EU-Strategie (2011–14) für die soziale Verantwortung der Unternehmen (CSR). https://eur-lex.europa.eu/legal-content/DE/TXT/PDF/?uri=CELEX:52011DC0681&from=FR, retrieved July 13, 2021.

Fombrun, C., & Shanley, M. (1990). What‘s in a name? Reputation building and corporate strategy‘. *Academy of Management Journal, 33*, 233-258.

Forehand, M., & Grier, S. (2003). When is honesty the best policy? The effect of stated company intent on consumer skepticism. *Journal of Consumer Psychology, 13*(3), 349-356.

Franklin, D. (2008). Just good business: A special report on corporate social responsibility. *Economist Newspaper*, *856*(3), 3-22.

Friestad, M., & Wright, P. (1994). The persuasion knowledge model: How people cope with persuasion attempts. *Journal of Consumer Research, 21*(1), 1-31.

Gilbert, D. T., & Malone, P. S. (1995). The correspondence bias. *Psychological Bulletin, 117*(1), 21-38.

Godfrey, P. C. (2005). The relationship between corporate philanthropy and shareholder wealth: A risk management perspective. *Academy of Management Review, 30*(4), 777-798.

Godfrey, P. C., Merrill, C. B., & Hansen, J. M. (2009). The relationship between corporate social responsibility and shareholder value: an empirical test of the risk management hypothesis. *Strategic Management Journal, 30*(4), 425-445.

Gutsche, G., & Ziegler, A. (2019). Which private investors are willing to pay for sustainable investments? Empirical evidence from stated choice experiments. *Journal of Banking & Finance*, *102*(C), 193-214.

Hales, J., Matsumura, E. M., Moser, D. V., & Payne, R. (2016). Becoming sustainable: A rational decision based on sound information and effective processes?. *Journal of Management Accounting Research*, *28*(2), 13-28.

Hess, D., Rogovsky, N., & Dunfee, T. (2002). The next wave of corporate community involvement: Corporate social initiatives‘. *California Management Review, 44*(2), 110-125.

Hillman, A. & Keim, G. (2001). Shareholder value, stakeholder management, and social issues: What‘s the bottom line?‘. *Strategic Management Journal, 22,* 125-140.
Hollender, J. (2004). What matters most: Corporate values and social responsibility. *California Management Review, 46*(4), 111-119.
Horton, J. J., Rand, D. G., & Zeckhauser, R. J. (2011). The online laboratory: Conducting experiments in a real labor market. *Experimental Economics, 14*(3), 399-425.
Jin, L., & He, Y. (2018). How the frequency and amount of corporate donations affect consumer perception and behavioral responses. *Journal of the Academy of Marketing Science, 46*(6), 1072-1088.
Johnson, J. A., Theis, J., Vitalis, A., & Young, D. (2020). The influence of firms' emissions management strategy disclosures on investors' valuation judgments. *Contemporary Accounting Research*, *37*(2), 642-664.
Jones, E. E., & Davis, K. E. (1965). From acts to dispositions the attribution process in person perception. *Advances in Experimental Social Psychology, 2*(1), 219-266.
Jones, T. (1995). Instrumental stakeholder theory: A synthesis of ethics and economics‘. *Academy of Management Review*, *20*, 404-437.
Kelley, H. H., & Michela, J. L. (1980). Attribution theory and research. *Annual Review of Psychology, 31*(1), 457-501.
Klein, J., & Dawar, N. (2004). Corporate social responsibility and consumers’ attributions and brand evaluations in a product–harm crisis. *International Journal of Research in Marketing, 21*(3), 203-217.
Kleindorfer, P. R., & Saad, G. H. (2005). Managing disruption risks in supply chains. *Production and Operations Management, 14*(1), 53-68.
Kortenkamp, K. V., & Moore, C. F. (2001). Ecocentrism and anthropocentrism: moral reasoning about ecological commons dilemmas. *Journal of Environmental Psychology, 21*(3), 261-272. https://doi.org/10.1006/jevp.2001.0205.
Lange, D., & Washburn, N. T. (2012). Understanding attributions of corporate social irresponsibility. *The Academy of Management Review*, *37*(2), 300-326.
Lev, B., Petrovits, C., & Radhakrishnan, S. (2010). Is doing good good for you? How corporate charitable contributions enhance revenue growth. *Strategic Management Journal*, *31*(2), 182-200.
Liang, H., & Renneboog L. (2017). On the foundations of corporate social responsibility. *The Journal of Finance, 72*(2), 853-910.
Luo, X., & Bhattacharya, C. B. (2006). Corporate social responsibility, customer satisfaction, and market value. *Journal of Marketing, 70*(4), 1-18.
MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods, 1*(2), 130-149.
Martin, P. R., & Moser, D. V. (2016). Managers’ green investment disclosures and investors’ reaction. *Journal of Accounting and Economics*, *61*(1), 239-254.
McGuire, J., Dow, S., Argheyd, S. & Argheyd, K. (2003). CEO incentives and corporate social performance‘, *Journal of Business Ethics, 45*(4), 341-359.
McLachlan, J., & Gardner, J. (2004). A comparison of socially responsible and conventional investors. *Journal of Business Ethics, 52*(1), 11-25.

Mohr, L. A., Eroğlu, D., & Ellen, P. S. (1998). The development and testing of a measure of skepticism toward environmental claims in marketers' communications. *The Journal of Consumer Affairs, 32(1)*, 30-55.

Moser, D. V., & Martin, P. R. (2012). A broader perspective on corporate social responsibility research in accounting. *The Accounting Review, 87*(3), 797-806.

Muller, A., & Kräussl, R. (2008). Do markets love misery? Stock prices and corporate philanthropic disaster response. *Academy of Management Proceedings, 2008*(1), 1-6.

Muller, A., & Kräussl, R. (2011a). The value of corporate philanthropy during times of crisis: The sensegiving effect of employee involvement. *Journal of Business Ethics, 103*(2), 203-220.

Muller, A., & Kräussl, R. (2011b). Doing good deeds in times of need: A strategic perspective on corporate disaster donations. *Strategic Management Journal*, *32*(9), 911-929.

Muller, A., & Whiteman, G. (2009). Exploring the geography of corporate philanthropic disaster response: A study of Fortune Global 500 firms. *Journal of Business Ethics*, *84*(4), 589-603.

Obermiller, C., & Spangenberg, E. R. (1998). Development of a scale to measure consumer skepticism toward advertising. *Journal of Consumer Psychology, 7*(2), 159-186.

Obermiller, C., Spangenberg, E., & McLachlan, D. L. (2005). Ad skeptecism: The consequences of disbelief. *Journal of Advertising, 34*(3), 7-17. https://doi.org/10.1080/00913367.2005.10639199

Öberseder, M., Schlegelmilch, B. B., & Gruber, V. (2011). "Why Don't Consumers Care About CSR?": A qualitative study exploring the role of CSR in consumption decisions. *Journal of Business Ethics, 104*(2), 449-460.

Orlitzky, M., Schmidt, F. L., & Rynes, S. L. (2003). Corporate social and financial performance: A meta-analysis. *Organization Studies, 24*(3), 403-441.

Paolacci, G., Chandler, J., & Ipeirotis, P. G. (2010). Running experiments on amazon mechanical turk. *Judgment and Decision Making*, *5*(5), 411-419.

Parguel, B., Benoît-Moreau, F., & Larceneux, F. (2011). How sustainability ratings might deter 'Greenwashing': A closer look at ethical corporate communication. *Journal of Business Ethics, 102*(15), 15-28.

Patten, D. (2008). Does the market value corporate philanthropy? Evidence from the response to the, 2004 Tsunami relief effort‘. *Journal of Business Ethics, 81*(3), 599-607.

Peloza, J. (2006). Using corporate social responsibility as insurance for financial performance‘. *California Management Review, 48*(2), 52-72.

Piper, K. (2020). Why Amazon's donation to the Australian wildfires provoked a backlash — but Facebook's didn't. https://www.vox.com/future-perfect/2020/1/14/21064244/amazon-bezos-wildfires-donation-backlash, retrieved August 05, 2021.

Pirsch, J., Gupta, S., & Grau, S. L. (2007). A framework for understanding corporate social responsibility programs as a continuum: An exploratory study. *Journal of Business Ethics, 70*(2), 125-140.

Porter, M. E., & Kramer, M. R. (2002). The competitive advantage of corporate philanthropy. *Harvard Business Review, 80*(12), 56-69.

Rindova, V. P., & Fombrun, C. J. (1999). Constructing competitive advantage: the role of firm–constituent interactions. *Strategic Management Journal*, *20*(8), 691-710.

Saiia, D. H., Carroll, A. B., & Buchholtz, A. K. (2003). Philanthropy as strategy: When corporate charity “Begins at Home”. *Business & Society, 42*(2), 169-201.

Schmitt, M. T., & Branscombe, N. R. (2002). The meaning and consequences of perceived discrimination in disadvantaged and privileged social groups. *European Review of Social Psychology, 12*(1), 167-199.

Seifert, B., Morris, S. A., & Bartkus, B. R. (2004). Having, giving, and getting: Slack resources, corporate philanthropy, and firm financial performance. *Business & Society, 43*(2), 135-161.

Sen, S., & Bhattacharya, C. B. (2001). Does doing good always lead to doing better? consumer reactions to corporate social responsibility. *Journal of Marketing Research, 38*(2), 225-243.

Sen, S., Bhattacharya, C. B., & Korschun, D. (2006). The role of corporate social responsibility in strengthening multiple stakeholder relationships: A field experiment. *Journal of the Academy of Marketing Science, 34*(2), 158-166.

Singh, S., Kristensen, L., & Villaseñor, E. (2009). Overcoming skepticism towards cause related claims: the case of Norway. *International Marketing Review*, 26(3), 312-326.

Skarmeas, D., & Leonidou, C. N. (2013). When consumers doubt, watch out! The role of CSR skepticism. *Journal of business research, 66*(10), 1831-1838.

Smith, R. E., & Hunt, S. D. (1978). Attributional processes and effects in promotional situations. *Journal of Consumer Research, 5*(3), 149-158.

Tidwell, M. (2006). The Ravaging Tide: strange weather, future Katrinas, and the coming death of America's coastal cities. *Simon and Schuster*, New York, NY.

Tilcsik, A., & Marquis, C. (2013). Punctuated generosity: How mega-events and natural disasters affect corporate philanthropy in US communities. *Administrative Science Quarterly, 58*(1), 111-148.

Van Aalst, M. K. (2006). The impacts of climate change on the risk of natural disasters. *Disasters, 30*(1), 5-18.

Vanhamme, J., & Grobben, B. (2009). “Too Good to be True!”. The effectiveness of CSR history in countering negative publicity. *Journal of Business Ethics*, *85*(2), 273-283.

Vlachos, P. A., Tsamakos, A., Vrechopoulos, A. P., & Avramidis, P. K. (2009). Corporate social responsibility: attributions, loyalty, and the mediating role of trust. *Journal of the Academy of Marketing Science*, *37*(2), 170-180.

Wang, H., Choi, J., & Li, J. (2008). Too little or too much? Untangling the relationship between corporate philanthropy and firm financial performance. *Organization Science, 19*(1), 143-159. https://doi.org/10.1287/orsc.1070.0271

Wang, S., Gao, Y., Hodgkinson, G. P., Rousseau, D. M., & Flood, P. C. (2015). Opening the black box of CSR decision making: A policy-capturing study of charitable donation decisions in China. *Journal of Business Ethics, 128*(3), 665-683.

Weems, C. F., Watts, S. E., Marsee, M. A., Taylor, L. K., Costa, N. M., Cannon, M. F., & Pina, A. A. (2007). The psychosocial impact of Hurricane Katrina: Contextual differences in psychological symptoms, social support, and discrimination. *Behaviour Research and Therapy, 45*(10), 2295-2306.

Zafirovski, M. (2003). Human rational behavior and economic rationality. *Electronic Journal of Sociology*.

Chapter 4

Alessi, L., Ossola, E., & Panzica, R. (2021). What Greenium Matters in the Stock Market? The Role of Greenhouse Gas Emissions and Environmental Disclosures. *Journal of Financial Stability, 54*(1), 1-18.

Andonov, A., Hochberg, Y. V., & Rauh, J. D. (2018). Political Representation and Governance: Evidence from the Investment Decisions of Public Pension Funds. *The Journal of Finance, 73*(5), 2041-2086.

Asay, H. S., Guggenmos, R. D., Kadous, K., Koonce, L., & Libby, R. (2022). Theory testing and process evidence in accounting experiments. *The Accounting Review*, *97*(6), 23-43.

Asay, H. S., Hales, J., Hinds, C., & Rupar, K. (2023). Nonprofessional investor judgments: Linking dependent measures to constructs. *The Accounting Review*, *98*(7), 1-32.

Backus, M., Blake, T., & Tadelis, S. (2019). On the Empirical Content of Cheap-Talk Signaling: An Application to Bargaining. *Journal of Political Economy 127*, 1599-1628.

Barber, B. M., Morse, A., & Yasuda, A. (2021). Impact investing. *Journal of Financial Economics, 139*, 162-185.

Bauer, R., Ruof, T., & Smeets, P. (2021). Get Real! Individuals Prefer More Sustainable Investments. *The Review of Financial Studies, 34*(8), 3976-4043.

Benz, L., Paulus, S., Scherer, J., Syrycal, J., & Trück, S. (2021). Investors' Carbon Risk Exposure and their Potential for Shareholder Engagement. *Business Strategy and the Environment, 30*(1), 282-301.

Biktimirov, E. N., & Afego, P. N. (2022). Do investors value environmental sustainability? Evidence from the FTSE Environmental Opportunities 100 index. *Finance Research Letters, 44*(2), 102-112.

Blankespoor, E., deHaan, E., & Marinovic, I. (2020). Disclosure processing costs, investors' information choice, and equity market outcomes: A review. *Journal of Accounting and Economics, 70*(3), 1-46.

Boettcher, M., Brent, K., Buck, H. J., Low, S., McLaren, D., & Mengis, N. (2021). Navigating Potential Hype and Opportunity in Governing Marine Carbon Removal. *Frontiers in climate, 21*(3), 456-464.

Busse, M. R., Lacetera, N., Pope, D. G., Silva-Risso, J., & Sydnor, J. R., (2013). Estimating the effect of salience in wholesale and retail car markets. *American Economic Review, 103*, 575-579.

California Air Resources Board (2024). Cap-and-Trade Program – About. https://ww2.arb.ca.gov/our-work/programs/cap-and-trade-program/about, retrieved May 13, 2024.

Carbon Disclosure Project [CDP] (2017). Out of the starting blocks: Tracking progress on corporate climate action. https://www.cdp.net/en/research/global-reports/tracking-climate-progress-2017, retrieved October 16, 2023.

Chapple, L., Clarkson, P., & Gold, D. (2013). The Cost of Carbon: Capital Market Effects of the Proposed Emission Trading Scheme (ETS). *Abacus, 49*(1), 1-33.

Cheah, I., & Phau, I. (2011). Attitudes towards environmentally friendly products: The influence of ecoliteracy, interpersonal influence and value orientation. *Marketing Intelligence and Planning, 29*(5), 452-472.

Chithambo, L., Tauringana, V., Tingbani, I., & Achiro, L. (2022). Stakeholder pressure and greenhouses gas voluntary disclosures. *Business Strategy and the Environment, 31*(1), 159-172.

Choi, D., Gao, Z., & Jiang, W. (2020). Attention to Global Warming. *The Review of Financial Studies, 33*(3), 1112-1145.

Clarkson, P., Li, Y., Pinnuck, M., & Richardson, G. (2015). The Valuation Relevance of Greenhouse Gas Emissions under the European Union Carbon Emissions Trading Scheme. *European Accounting Review*, 24(3), 551-580.

Cohen, J. R., & Simnett, R. (2015). CSR and assurance services: A research agenda. *Auditing: A Journal of Practice & Theory, 34*(1), 59-74.

Davenport, T. H., & Ronanki, R. (2018). Artificial intelligence for the real world. *Harvard Business Review, 82*(1), 108-116.

Diederich, J., & Goeschl, T. (2014). Willingness to Pay for Voluntary Climate Action and Its Determinants: Field-Experimental Evidence. *Environmental and Resource Economics, 57*(2), 405-429.

Dierynck, B., Jacob, M., Müller, M. A., Peters, C. P. H., & Van Pelt, V. (2024). Public Tax Disclosures and Fair Share Perceptions. *Working Paper*. Available at SSRN 3729938.

Dyck, A., Lins, K. V., Roth, L., & Wagner, H. F. (2019). Do institutional investors drive corporate social responsibility? International evidence. *Journal of Financial Economics 131*, 693-714.

Eccles, R., Serafeim, G., & Krzus, M. P. (2011). Market interest in nonfinancial information. *Journal of Applied Corporate Finance, 23*(4), 113-127.

Elliott, W. B., Grant, S. M., & Hodge, F. D. (2018). Negative news and investor trust: The role of $Firm and #CEO Twitter use. *Journal of Accounting Research 56*(5), 1483-1519.

European Commission [EC] (2016). The EU Emissions Trading System (EU ETS). https://climate.ec.europa.eu/system/files/2016-12/factsheet_ets_en.pdf, retrieved November 16, 2023.

European Commission [EC] (2024). What is the EU ETS?. https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/what-eu-ets_en, retrieved May 13, 2024.

Friedrich, C. (2021). Private Investigations and Self-Disclosure of Suspected Fraud: Experimental Evidence on Forensic Accounting Services. *Behavioral Research in Accounting, 33*(1), 65-79.

Gabaix, X. (2019) Behavioral Inattention. *Handbook of Behavioral Economics, 2*(1), 261-343.

Gilovich, T., Griffin, D., & Kahneman, D. (2002). *Heuristics and biases: The psychology of intuitive judgment*. Cambridge University Press.

Griffin, P., Lont, D., & Sun, E. (2017). The Relevance to Investors of Greenhouse Gas Emission Disclosures. *Contemporary Accounting Research, 34*(2), 1265-1297.

Gutsche, G., & Zwergel, B. (2020). Investment Barriers and Labeling Schemes for Socially Responsible Investments. *Schmalenbach Business Review, 72*(2), 111-157.

Hartzmark, S. M., & Sussman, A. B. (2019). Do Investors Value Sustainability? A Natural Experiment Examining Ranking and Fund Flows. *The Journal of Finance, 74*(6), 2789-2837.

Heeb, F., Kölbel, J., Paetzold, F., & Zeisberger, S. (2023): Do Investors Care about Impact? *The Review of Financial Studies, 36*(5), 1737-1787.

Hirshleifer, D. (2015). Behavioral Finance. *Annual Review of Financial Economics, 51*(7), 133-159.

Hook, L. (2020) China pledges to be 'carbon neutral' by 2060. *The Financial Times*. Available at: https://www.ft.com/content/730e4f7d-3df0-45e4-91a5-db4b3571f353, retrieved April 29, 2024.

Hukkanen, P., & Keloharju, M. (2019). Initial Offer Precision and M&A Outcomes. *Financial Management*, *48*(1), 291-310.

Hurd, M. D. (2009). Subjective Probabilities in Household Surveys. *Annual Review of Economics, 1*(1), 543-562.

International Carbon Action Partnership [ICAP] (2024). *Emissions Trading Worldwide: Status Report 2024*. Berlin: International Carbon Action Partnership.

Johnson, J., Theis, J., Vitalis, A., & Young, D. (2020). The Influence of Firms' Emissions Management Strategy Disclosures on Investors' Valuation Judgments. *Contemporary Accounting Research*, *37*(2), 642-664.

Jugnandan, S., & Willows, G. D. (2023). Towards an integrated debiasing framework for consumer financial decisions: A reflection on debiasing research. *International Journal of Consumer Studies, 47*(4), 1544-1560.

Kahneman, D., & Frederick, D. (2002). Representativeness Revisited: Attribute Substitution in Intuitive Judgment, in *Heuristics and Biases: The Psychology of Intuitive Judgment*: Cambridge University Press, 49-81.

Kay, C. S. (2024). Extraverted introverts, cautious risk-takers, and selfless narcissists: A demonstration of why you can't trust data collected on MTurk. *Working Paper*. Available at OSF.

Kuo, W.-Y., Lin, T.-C., & Zhao, J. (2015). Cognitive Limitation and Investment Performance: Evidence from Limit Order Clustering. *Review of Financial Studies 28*, 838-875.

Lacetera, N., Pope, D. G., & Sydnor, J. R. (2012). Heuristic thinking and limited attention in the car market. *American Economic Review, 102*(5), 2206-2236.

Liu, H., Zhang, W., Zhang, X., & Li, D. (2023). Abnormal Temperature and Retail Investors' Trading Behavior. *Finance Research Letters*, *55*(B), 1-8.

Löschel, A., Sturm, B., & Uehleke, R. (2017) Revealed preferences for voluntary climate change mitigation when the purely individual perspective is relaxed – evidence from a framed field experiment. *Journal of Behavioral and Experimental Economics*, *67*(4), 149-160.

Markowitz, H. (1952). The utility of wealth. *Journal of Political Economy*, 60(2), 151-158.

Martin, P., & Moser, D. (2016). Managers' Green Investment Disclosures and Investors' Reaction. *Journal of Accounting and Economics*, *61*(1), 239-254.

Matsumura, E., Prakash, R., & Vera-Muñoz, S. (2014). Firm-Value Effects of Carbon Emissions and Carbon Disclosures. *The Accounting Review*, *89*(2), 695-724.

McLachlan, J., & Gardner, J. (2004). A comparison of socially responsible and conventional investors. *Journal of Business Ethics, 52*(1), 11-25.

Momblanco, H., Aiuto, K., & Huckins, S. (2024). Overview of GHG Protocol Integration in Regulatory Climate Disclosure Rules. https://ghgprotocol.org/sites/default/files/2024-03/GHG-Protocol-Integration.pdf, retrieved May 13, 2024.

Morgan Stanley Capital International [MSCI] Sustainability Institute (2023). The MSCI Net-Zero Tracker - A guide to progress by listed companies toward global climate goals. https://www.msci.com/documents/1296102/41874802/NetZero-Tracker-NOV-cbr-en.pdf/, retrieved November 16, 2023.

Palan, S., & Schitter, C. (2018). Prolific.ac - A subject pool for online experiments. *Journal of Behavioral and Experimental Finance, 17*(1), 22-27.

Peer, E., Brandimarte, L., Samat, S., & Acquisti, A. (2017). Beyond the Turk: Alternative platforms for crowdsourcing behavioral research. *Journal of Experimental Social Psychology, 70*(2), 153-163.

Rabin, M., & Weizsäcker G. (2009). Narrow Bracketing and Dominated Choices. *American Economic Review, 99*(4), 1508-43.

Read, D., Loewenstein, G., Rabin, M., Keren, G., & Laibson D. (1999). Choice Bracketing. *Journal of Risk and Uncertainty, 19*(3), 171-197.

Science Based Targets initiative [SBTi] (2024). SBTi Corporate Net-Zero Standard – Version 1.2. https://sciencebasedtargets.org/resources/files/Net-Zero-Standard.pdf, retrieved May 13, 2024.

Shah, A. K., & Oppenheimer, D. M. (2008). Heuristics made easy: an effort-reduction framework. *Psychological Bulletin, 134*(2), 207-222.

Simon, B. (1955). A Behavioral Model of Rational Choice. *The Quarterly Journal of Economics 69*(1), 99-118.

Thaler, R. H. (1999). Mental accounting matters. *Journal of Behavioral Decision Making, 12*, 183-206.

Tomar, S. (2023). Greenhouse Gas Disclosure and Emissions Benchmarking. *Journal of Accounting Research*, 61(2), 451-492.

Tversky, A., & Kahneman, D. (1974). Judgment under Uncertainty: Heuristics and Biases. *Science, 185*(4157), 1124-1131.

Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science, 211*(4481), 453-458.

United Nations [UN] (2020). Carbon neutrality by 2050: the world’s most urgent mission. https://www.un.org/sg/en/content/sg/articles/2020-12-11/carbon-neutrality-2050-the-world%E2%80%99s-most-urgent-mission, retrieved November 16, 2023.

Chapter 5

Andonov, A., Hochberg, Y. V., & Rauh, J. D. (2018). Political Representation and Governance: Evidence from the Investment Decisions of Public Pension Funds. *The Journal of Finance, 73*(5), 2041-2086.

Barber, B. M., Morse, A., & Yasuda, A. (2021). Impact investing. *Journal of Financial Economics, 139*, 162-185.

Bauer, R., Ruof, T., & Smeets, P. (2021). Get Real! Individuals Prefer More Sustainable Investments. *The Review of Financial Studies, 34*(8), 3976-4043.

Berlemann, M., & Steinhardt, M. F. (2017). Climate change, natural disasters, and migration - a survey of the empirical evidence. *CESifo Economic Studies, 63*(4), 353-385.

Biktimirov, E. N., & Afego, P. N. (2022). Do investors value environmental sustainability? Evidence from the FTSE Environmental Opportunities 100 index. *Finance Research Letters, 44*(2), 102-112.

Cheah, I., & Phau, I. (2011). Attitudes towards environmentally friendly products: The influence of ecoliteracy, interpersonal influence and value orientation. *Marketing Intelligence and Planning, 29*(5), 452-472.

Chen, C. J., Patten, D., & Roberts, R.W. (2008). Corporate charitable contributions: A corporate social performance or legitimacy strategy?. *Journal of Business Ethics*, *82*(3), 131-144.

Chithambo, L., Tauringana, V., Tingbani, I., & Achiro, L. (2022). Stakeholder pressure and greenhouses gas voluntary disclosures. *Business Strategy and the Environment, 31*(1), 159-172.

Cohen, J. R., & Simnett, R. (2015). CSR and assurance services: A research agenda. *Auditing: A Journal of Practice & Theory, 34*(1), 59-74.

Dyck, A., Lins, K. V., Roth, L., & Wagner, H. F. (2019). Do institutional investors drive corporate social responsibility? International evidence. *Journal of Financial Economics, 131*, 693-714.

Eccles, R., Serafeim, G., & Krzus, M. P. (2011). Market interest in nonfinancial information. *Journal of Applied Corporate Finance, 23*(4), 113-127.

Ellen, P. S., Webb, D. J., & Mohr, L. A. (2006). Building corporate associations: Consumer attributions for corporate socially responsible programs. *Journal of the Academy of Marketing Science, 34*(2), 147-157.

Forehand, M., & Grier, S. (2003). When is honesty the best policy? The effect of stated company intent on consumer skepticism. *Journal of Consumer Psychology, 13*(3), 349-356.

Hartzmark, S. M., & Sussman, A. B. (2019). Do Investors Value Sustainability? A Natural Experiment Examining Ranking and Fund Flows. *The Journal of Finance, 74*(6), 2789-2837.

McLachlan, J., & Gardner, J. (2004). A comparison of socially responsible and conventional investors. *Journal of Business Ethics, 52*(1), 11-25.

Muller, A., & Kräussl, R. (2011). The value of corporate philanthropy during times of crisis: The sensegiving effect of employee involvement. *Journal of Business Ethics, 103*(2), 203-220.

Riedl, A., & Smeets, P. (2017). Why do investors hold socially responsible mutual funds? *The Journal of Finance, 72*(6), 2505-2550.

Skarmeas, D., & Leonidou, C. N. (2013). When consumers doubt, watch out! The role of CSR skepticism. *Journal of Business Research, 66*(10), 1831-1838.

Tomar, S. (2023). Greenhouse Gas Disclosure and Emissions Benchmarking. *Journal of Accounting Research*, *61*(2), 451-492.

Van Aalst, M. K. (2006). The impacts of climate change on the risk of natural disasters. *Disasters*, *30*(1), 5-18.

Vlachos, P. A., Tsamakos, A., Vrechopoulos, A. P., & Avramidis, P. K. (2009). Corporate social responsibility: attributions, loyalty, and the mediating role of trust. *Journal of the Academy of Marketing Science*, *37*(2), 170-180.

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