LONG-TERM ENVIRONMENTAL PERFORMANCE GOALS DISCLOSURE: INVESTORS' REACTIONS AND MANAGERS' DISCLOSURE CHOICES

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by

Yulin Zhu

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Dissertation written by:

Yulin Zhu

Undergrad Degree, Bachelor of Economics in International Economics and Trade, Lanzhou University of Finance and Economics, 2016

Grad Degree, Master of Accountancy, University of Denver, 2019

Ph.D., Business Administration: Accounting, Kent State University, 2024

Approved by:

Chair, Doctoral Dissertation Committee

Dr. Wei Li

Dr. Serena Loftus

Members, Doctoral Dissertation Committee

Dr. Indrarini (Rini) Laksmana

Dr. Greta Polites

Ph.D. Program Director

Dr. Jennifer Wiggins-Lyndall

Graduate Dean, Ambassador Crawford College of Business and Entrepreneurship

Dr. Christopher Groening

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Abstract

Environmental protection has emerged as a critical global concern, prompting corporations to enhance transparency through reporting on their environmental performance. On the other hand, management of these corporations has significant discretion over the environment-related reporting, including whether and how to set and disclose future environmental performance targets or goals.

This dissertation focuses on corporations' long-term environmental goals for carbon emissions because both governments and corporations have increasingly made commitments to such long-term goals, such as achieving net-zero carbon emissions by 2050 (Paris Agreement) and 2040 (Climate Pledge). This dissertation includes two essays to delve into the perspectives of two key stakeholders—investors, who utilize environmental performance information for investment decisions, and managers, who are responsible for setting and disclosing external environmental goals.

In my first essay, I investigate investors' perspectives on different environmental goal disclosures (i.e., long-term goals only vs. long-term with short-term goals) and also examine whether investors' pro-environment values impact their judgments. The investigation centers on scenarios where a firm exhibits negative environmental performance, as future environmental goals become particularly relevant in such circumstances. Based on construal level theory, this study predicts that investors' different pro-environmental values shape their responses to companies' environmental goals. The study further examines whether the presence of external commitments, like signing the Climate Pledge, impacts investors' perspectives. To test my hypotheses, I conduct two 2×2 overlapping between-subjects experiments among 64 participants in a professional accounting conference. I manipulate a company's environmental goal disclosure (long-term only vs. short-term in addition to long-term vs. short-term in addition to long-term vs. short-term in addition to long-term with external commitments) and measure investors' pro-environmental values (high vs. low). Findings of this study provide insights that investors' reactions to environmental goals vary based on their pro-environmental values.

Essay 2 investigates two factors influencing managers' decisions to adopt and disclose long-term environmental goals: industry peers' disclosure behavior and the availability of carbon offsets. Grounded in moral reasoning theory, the hypothesis posits that managers are least likely to disclose long-term environmental goals when such disclosures are infrequent among industry peers, and carbon offset programs are unavailable. To test my hypotheses, I conduct a 2×2 between-subjects experiment among 57 MBA students who are current or future managers. In this experiment, I manipulate the disclosure behavior of industry peer firms (high vs. low industry peer disclosure of long-term environmental goals) and the availability of carbon offset (present vs. absent). The results support my hypothesis.

INTRODUCTION

As globalization has made the world more interconnected and interdependent, corporations, organizations, and governments are increasingly advocating for sustainable development. The demand for information about corporate social responsibility (CSR) and firms' environmental, social, and governance (ESG) activities and policies has steadily risen. In the early 1990s, fewer than twenty organizations produced corporate sustainability reports; by 2019, more than 10,000 publicly listed companies produced such reports (Grewal and Serafeim, 2019). According to the U.S. Securities and Exchange Commission (SEC), 83% of registered companies disclose some sustainability information in their regulatory filings (SASB 2017c).

Environmental issues, especially climate change, are now recognized as a global emergency among all sustainability concerns affecting communities and economies. To address climate change, governments and companies have joined forces to accelerate collective action. For example, as of September 2022, 193 countries including the United States, have signed the Paris Agreement, a binding commitment to reduce greenhouse gas (GHG) emissions. An increasing number of firms have chosen to publicly disclose their environmental goal, aiming to achieve net-zero carbon emissions by 2050, in alignment with the Paris Agreement. Net-zero carbon emissions signify a difference between the amount of carbon dioxide that a firm releases into the atmosphere and the amount the firm removes or offsets through various measures such as emission reduction, reforestation, and carbon capture technologies.

While there might be increasing pressures from stakeholders (including investors, customers, and regulatory bodies) for companies to engage in CSR/ESG practices, companies' engagement still remains optional rather than mandatory in most jurisdictions. Consequently, Firms have significant discretion to disclose their CSR/ESG strategies, metrics, goals, and so

forth. For instance, firms can selectively disclose environmental goals regarding their path to achieving carbon neutrality. The timeframe to achieve these goals varies; some companies disclose long-term goals. For example, Walmart stated in their 2021 CSR report, "Our goal is to achieve zero emissions across Walmart's global operations by 2040" (Walmart, 2021 Environmental, Social & Governance Reporting, Climate Change). Other companies disclose short-term goals or goals achievable within a one-year horizon. For instance, Walt Disney stated in their 2021 ESG report, "By 2022, reduce net greenhouse gas (GHG) emissions by 50% from 2012 total levels" (The Walt Disney Company, 2030 Environmental Goals, p. 8). Overall, the lack of a common disclosure framework makes it challenging for investors to make judgments.

In 2024, the SEC implemented the final climate disclosure rules mandating that public companies to include specific climate-related information in their registration statements and annual reports. This measure aims to safeguard both public interest and investor protection. This requirement entails disclosing climate-related targets or goals if they have a significant impact or potential impact on a company's business, operations, or financial status. Additionally, to incentivize the management of public companies to disclose such targets and goals, the SEC rules offer safe harbor protection, shielding management from certain legal liabilities associated with the disclosed information. Safe harbor protection provides a legal buffer, encouraging companies to be transparent about their climate-related goals and targets without fear of undue legal consequences.

In summary, the variations in goal disclosures in practice and the regulatory promotion of such disclosures motivate me to study environmental goal disclosures from the perspectives of two different stakeholders: investors and managers. In my first essay, I investigate investors' perspectives on different environmental goal disclosures, specifically examining whether the

disclosure of only a long-term goal or both long-term and short-term goals affects investors' judgements when firms have negative environmental performances. According to expectancy violation theory, when a firm has a negative environmental performance but discloses a goal that violates investors' expectations, such a negative violation will increase investors' attention (Burgoon, 1978, 1993). The increased attention may lead investors to question the credibility of the environmental goal and influence their subsequent decisions.

Next, I draw upon existing research in accounting and psychology to develop predictions. Construal level theory suggests that decision-makers take into account psychological distance when making decisions. This theory posits that the relationship between psychological distance and decision-making depends on how prospects are perceived in terms of desirability and feasibility (Sagristano et al., 2002; La Ornual et al., 2013).

From an investor's perspective, when assessing a long-term environmental goal, which is linked to a high construal level, the investor's focus is primarily on the desirability of the outcome, with less emphasis placed on the probability of achievement. In contrast, when faced with a short-term goal, feasibility becomes a more significant consideration in the investor's decision-making.

Moreover, I explore whether investors' pro-environment values influence their responses to environmental objectives. Investors with high pro-environmental values prioritize environmental considerations over economic factors (Arnold et al., 2018), and thus potentially perceive short-term environmental goals as facilitating the achievement of long-term objectives. Conversely, investors with low pro-environmental values prioritize economic benefits and may prefer long-term environmental goals due to perceived economic advantages. Ultimately, investors with low pro-environmental values tend to be indifferent to the presence or absence of short-term environmental goals. Therefore, I predict that investors' perspectives on environmental goals will vary depending on their pro-environmental values.

To provide further insight, I also investigate the impact of external commitments on investors' judgment. In 2019, Amazon co-founded the Climate Pledge with Global Optimism, and became the first company to sign the Pledge. The Climate Pledge represents a commitment to achieve net-zero carbon emissions by 2040, a decade earlier than the Paris Agreement's target of 2050. Companies that sign the Climate Pledge commit to regularly measuring and reporting greenhouse gas emissions, as well as implementing decarbonization strategies aligned with the Paris Agreement. I refer to such commitments as external commitments. Given that a highly credible source can enhance a reader's perceived information credibility (Cheung et al. 2009), I anticipate that when companies publicly endorse external commitments, they bolster the perceived credibility of their dedication to improving environmental performance. Consequently, investors are likely to view environmental goals accompanied by external commitments as more credible than goals lacking such endorsements.

In Essay 1, I focus on nonprofessional investors because they constitute a significant and influential segment of the investor population in the stock market (Luo and Salterio, 2022). Institutional investors also consider the demand for sustainable investment products from nonprofessional investors as a crucial factor influencing their investment decisions (Eccles et al. 2017). Specifically, to test my hypotheses, I conducted two 2 x 2 overlapping between-participants experiments using 64 participants recruited from a professional conference as nonprofessional investors. Participants are asked to assume the role of investors. They are provided with information regarding a company's environmental performance and environmental goal disclosure. After reviewing the information, I capture participants' investment decision.

In my first experiment, I manipulate environmental goal disclosure by presenting either a long-term goal only or a combination of long-term and short-term goals (LT only or LST). In the second experiment, I manipulate environmental goal disclosure by indicating whether the company is a signatory to external commitments, thereby influencing the effect of combined long-term and short-term goals (LST or LSTG). In both experiments, I measure participants' pro-environmental values as either high or low (High or Low).

Results of my experiment 1 show a marginally significant main effect of participants' pro-environment values on their investment decisions, indicating that on average, investors with different pro-environment values respond to management's environmental goals differently. However, participants' pro-environmental values do not significantly interact with the time horizon of management's environment goals. Specifically, inconsistent with my prediction, investors with high pro-environmental values, compared to investors with low pro-environmental values, do not react more positively to the inclusion of short-term environmental goals. Results of my experiment 2 shows a marginally significant interaction of participants' pro-environmental values and the external commitment. Specifically, as predicted, investors with high pro-environmental values, compared to investors with high pro-environmental values, react marginally more positively when an external commitment is present.

Essay 1 contributes to the growing literature on investors' responses to environmental disclosures. Prior literature indicates that environmental performance affects investors' decision-making processes (e.g. Sherwood and Pollard, 2023; Tsang et al. 2023; Gillan et al. 2021; Dilla et al. 2019; Elliott et al., 2014; Flammer, 2013; Schneider, 2011; Sharfman and Fernando, 2008). However, there is limited investigation into investors' reactions to environmental performance goals. My study in Essay 1 suggests that the timeframe of disclosed environmental performance

goals, in combination with investors' pro-environmental values, shapes their responses to negative environmental performance. Thus, my findings underscore the significance of investors' psychological distance when firms report negative environmental performance information.

Furthermore, my study in Essay 1 contributes to an emerging area of research on external commitments. With investors' growing awareness of climate risks and increased focus on green investments, particularly following the Paris Agreement (Fahmy, 2022), my results indicate that external commitments can bolster the credibility of environmental disclosures and impact investors' responses to such disclosures.

Thirdly, my results contribute to research on the significance of investors' personal environmental preferences. In CSR/ESG decision-making, personal values are pivotal as they derive from individuals' "inner moral conviction that is defended irrespective of the expectation of others" (Hunecke et al., 2001, p. 832). My findings demonstrate that investors' personal environmental preferences influence their perceptions about environmental goals.

Moreover, my results provide insights for policymakers as they deliberate on environmental disclosure policies related to environmental goals. Although the SEC finalized its climate disclosure rules in March 2024, there are lingering concerns among the public regarding these rules (Khan and Vanderford, 2024). This study delves into investors' varied responses to environmental goals, unveiling potential areas for regulators to provide guidance in future disclosure policies. Additionally, it offers valuable perspectives for policymakers grappling with the complexities of sustainability reporting to enhance corporate transparency, and accountability, and foster responsible business practices.

In my Essay 2, I explore two determinants influencing managers' decisions to adopt and disclose long-term environmental goals. Firstly, drawing from moral reasoning theory, I

investigate whether peer firms' goal-setting practices influence a focal firm's decision to disclose these goals. Moral reasoning theory posits that individuals integrate information from others into their judgments, implying that the behavior of peers can impact decision-making. Extensive literature has examined how peer groups influence various corporate decisions, such as investment decisions (Cho and Muslu, 2021; Foucault and Fresard, 2014), adjustments to capital structure (Leary and Roberts, 2014) and auditor section (Bills et al., 2020). However, limited research has explored the impact of peer firms' disclosure practices on CSR/ESG reports (Malik et al. 2020; Cao et al. 2019; Shroff et al. 2017; Lewis 2014). Specifically, Langfield-Smith (2003) suggests that the influence of specific socio-environmental factors, such as social pressures on environmental responsibility, on management decisions should be examined.

More importantly, the recently implemented SEC rules mandate firms to disclose climate-related targets or goals if the targets/goals have a significant impact or potential impact on a company's business, operations, or financial status. Therefore, my investigation into the peer effect aims to elucidate whether the new rules will trigger a spillover effect among firms. This effect would entail an increasing number of firms following their peers' lead in disclosing their long-term targets or goals. By examining the peer effect in this context, I seek to provide insights into the potential implications of the SEC rules on firms' disclosure behaviors and the broader dynamics of environmental goal disclosure within industries.

In addition to concerns about how their firm's actions compare to peer firms, managers are likely to consider other various factors when determining their disclosure strategy (Hirst et al., 2007). For instance, managers may contemplate the strategies available to help achieve longterm environmental goals. In practice, firms employ a range of strategies to reduce carbon emissions, such as implementing operational changes. For example, Amazon has announced

plans to "deploy 100,000 custom electric delivery vehicles by 2030" (Amazon 2021 Sustainability Report, p. 13), while Apple aims to "design products and manufacturing processes to be less carbon-intensive through thoughtful material selection, increased material efficiency, and greater product energy efficiency" (Apple 2021 Environmental Progress Report, p. 11). However, it's worth noting that implementing such operational changes could incur significant costs.

Firms also have the option to manage their carbon footprint by purchasing greenhouse gas emission allowances or carbon offsets from third parties. When a firm buys carbon offsets, it essentially compensates for its own emissions by supporting projects elsewhere that reduce emissions, thereby offsetting its overall carbon footprint. These projects include initiatives like renewable energy, forest conservation, or methane capture.

In recent years, there has been a significant expansion in voluntary carbon markets, allowing companies to acquire offsets to manage their greenhouse gas emissions (Shifflet 2022a; McNish 2022). However, carbon offset programs have become increasingly contentious. Supporters argue that purchasing carbon offsets provides a cost-effective way to reduce carbon emissions compared to operational changes. However, critics argue that such programs constitute to greenwashing, enabling corporations to appear environmentally responsible without making real environmental improvements (Clark 2011; Dhanda and Hartman 2011).

Recently, a report from the University of Pennsylvania underscores the prevalence of greenwashing in the carbon offset market, cautioning that misleading claims could worsen environmental issues rather than alleviate them (Romm and Schendler, 2023). Moreover, the University of California's decision to significantly reduce its reliance on carbon offsets has garnered attention, reflecting a broader trend of skepticism towards these programs due to

concerns over their effectiveness and impact (Temple, 2023). This poses a challenge for managers striving to balance profit-driven corporate objectives with ethics-centered environmental goals. Furthermore, lawsuits targeting companies' unreliable utilization of carbon offsets are on the rise, indicating growing concerns about the efficacy and legitimacy of these programs. For instance, Delta Air Lines is currently facing legal action due to its use of carbon credits to assert carbon neutrality, signaling broader scrutiny of companies' approaches to carbon offsetting (Toplensky, 2023). Overall, the debate of the carbon offsets has led to increasing calls for regulation of the programs and the market (KPMG 2022; Schwartzkopff, 2022).

Motivated by these pressing issues, my Essay 2 delves into the combined impact of voluntary carbon offset availability and peer pressure on managers' choices regarding setting and disclosing long-term goals. Specifically, I anticipate that the prevalence of long-term environmental goal disclosure among a firm's industry peers, joined with the availability of carbon offsets, will interactively shape managers' decisions on disclosing firms' environmental goals.

In instances where such a disclosure is widespread among industry peers, moral reasoning suggests that managers perceive such actions as morally upright. Consequently, managers may harbor concerns that a failure to disclose this information could lead to negative judgments (Ditto et al., 2009). Driven by these moral reasoning considerations, managers are inclined to align with the behavior of their industry peers, thereby exhibiting an increased propensity to disclose long-term environmental performance goals.

However, in scenarios where a disclosure among industry peer firms is relatively uncommon, managers' apprehensions about moral responsibility are diminished. Without an external consensus on what constitutes a morally desirable action, managers are less anxious

about being judged in comparison to their peers. Consequently, in such circumstances, managers' concerns about the feasibility of long-term goals assume greater significance in disclosure decisions.

In the realm of environmental performance goals, the availability of carbon offset programs is poised to amplify managers' perceptions of the feasibility of long-term environmental objectives by offering increased flexibility in achieving net-zero emissions. Therefore, I anticipate that the presence of carbon offset programs is likely to bolster managers' inclination to adopt and disclose a long-term environmental goal when an industry peer disclosure is infrequent.

To test my hypotheses, I conduct a 2 x 2 between-participants experiment using 57 MBA students to proxy for firm managers. I manipulate the prevalence of long-term environmental goal disclosures among industry peer firms (*High* or *Low*) by varying the percentage of a firm's industry peers that make such disclosures (85% or 15%). I manipulate the availability of carbon offset programs by varying the choice to purchase carbon credits (*Present* or *Absent*) between conditions. My primary dependent measure is the change in the likelihood that participants will adopt and disclose a long-term environmental goal.

Results of my experiment support my predictions. The change in the likelihood of adopting and disclosing a long-term environmental goal is jointly impacted by both the prevalence of such a disclosure among industry peer firms and the availability of carbon offset programs. Specifically, managers are least likely to provide long-term environmental goal disclosures when these disclosures are rare among industry peers and carbon offset programs are absent. Moreover, supplemental analysis shows that when the prevalence of an industry peer

disclosure is low, managers perceive the long-term environmental goal as more plausible when carbon offset programs are present than absent.

Essay 2 contributes to the literature on the effect of peer pressure on CSR/ESG activities. Prior literature focuses on the impact of peer pressure on corporate financial decisions (Foucault and Fresard, 2014; Leary and Roberts, 2013; Kaustia and Knüpfer, 2012; Cho and Muslu, 2021). The results from my study suggest that managers' environmental goal disclosures can be impacted by peer groups' disclosure of environmental goals. In this aspect, my results also provide insights to the SEC's new climate disclosure rules that encourage firms to set and disclose climate-related targets and goals.

The findings from Essay 2 also contribute to the literature on carbon accounting. Prior research has largely focused on investors' reactions to firms' carbon emissions mitigation strategies (Johnson et al., 2020), showing that such information is associated with firm value (Matsumura et al., 2014; Griffin et al., 2017). In contrast, my study offers insights into how the availability of carbon offsets is likely to influence managers' disclosure decisions. In this aspect, my results also contribute to the current debate about the carbon offsets and provide insights to the calls for the regulations of the carbon offset markets. In March 2024, the SEC mandated firms to disclose the aggregate amount of carbon offsets only if they were integral components in achieving environmental goals. Such a mandate may influence managers' consideration of carbon offsets in adopting their climate-related goals/targets.

In summary, this dissertation significantly enhances our comprehension of investors' responses to environmental disclosures, underscores the significance of external commitments, and elucidates the impacts of peer pressure and the availability of carbon offsets on managers'

environmental goal disclosures. The findings also have implications for policymakers, especially in shaping environmental disclosure policies.

BACKGROUND LITERATURE

1. The Impact of Environmental Performance on Financial Performance

A growing literature provides empirical evidence that a firm's positive environmental performance increases financial value (e.g., Huang, 2021; Flammer, 2013; Clarkson et al., 2011; Clarkson et al., 2008; Neu et al., 1998;). For example, Clarkson et al. (2011) find that better environmental performance, measured by fewer toxins in pounds released into the atmosphere, leads to improved financial performance in a subsequent period. In terms of the stock market, firms with better environmental performance benefit from higher stock returns, lower downside risk (Hsu et al. 2023; Pollard et al. 2018), and a lower cost of capital (Breuer et al. 2018; Schneider, 2011; Sharfman and Fernando, 2008;). Flammer (2013) shows, using an event study, that the stock market reacts positively to positive environmental engagement, such as a firm's announcement of eco-friendly initiatives, and reacts negatively to the announcement of eco-harmful behavior.

Better environmental performance brings firms a competitive advantage in a competitive market. Hughes (2000) focuses on electric utilities and finds that future environmental liabilities, proxied by sulfur dioxide (SO2) emissions, decrease the firm's market value. Clarkson et al. (2004) examine the U.S. pulp and paper firms and conclude that unbooked environmental liabilities for high-polluting firms result in higher market capitalization costs.

However, environmental performance, environmental disclosure, and economic performance are jointly determined (Al-Tuwaijri et al., 2004). A better environmental performance may not create intangible long-run economic benefits considering the potential interaction of those three elements. Borgers et al. (2013) investigate a wide range of U.S. firms over 1992-2009 and

find the positive relationship between environmental performance and risk-adjusted returns becomes less significant or even reverses in the long run.

2. Environmental Disclosure

Corporate environmental information is inevitably needed by a firm's stakeholders. In 2010, the SEC published interpretive guidance as a response to investors' concerns. This guidance requires public companies to disclose climate-change-related information. Firms can either integrate such information within their financial reports or include it in a separate corporate social responsibility (CSR) report or environmental, social, and governance (ESG) report.

On April 15, 2014, the European Parliament approved mandatory CSR disclosure provisions requiring companies to disclose information on their impact on the environment in addition to providing financial reports. Nowadays, developing countries requiew mandatory CSR disclosure. Effective on February 8, 2022, China's Ministry of Ecology and Environment issued new disclosure rules requiring domestic entities to disclose environmental information such as environmental management, carbon emissions, and pollutant generation on an annual basis. On February 11, 2022, India announced new CSR reporting mandate rules. Companies in India are mandated to submit a comprehensive report disclosing their CSR activities for the financial year 2020 and onwards.

Currently, CSR/ESG disclosures are considered voluntary in the United States (Christensen et al., 2021). However, regulators such as the SEC have publicly stated their intent to mandate this information. In September 2021, the SEC posted a sample comment letter on its website requesting public companies disclose their current climate change-related issues such as material climate change transition risks, effects of climate change on operations, purchases or sales of carbon offsets, and so forth. The Comment Letter also requires companies to indicate why a CSR/ESG report is not included in the SEC filings or why certain information is disclosed in the CSR/ESG reports.

Corporations can benefit from voluntarily providing environmental disclosure. Eccles et al. (2014) investigate 180 U.S. companies that voluntarily adopted corporate policies regarding environmental and social issues before the adoption of such policies became widespread. They find that these firms later outperform their peers in the future in terms of stock market and accounting performance. Voluntarily disclosing carbon emissions can moderate the negative impact of emissions on firm value (Clarkson et al., 2013; Griffin et al., 2013; Saka and Oshika, 2014). Matsumura et al. (2014) examine hand-collected carbon emissions data and find that the market penalizes firms for their carbon emissions and that this penalty is higher for firms who do not voluntarily disclose carbon emissions.

Public concerns the credibility of environmental disclosure especially because higher information asymmetry exists between managers and outsiders. Thus companies may engage a third party for carbon disclosure assurance to increase their credibility (Fanning et al., 2021).

However, CSR/ESG disclosures in the U.S. are not subject to mandatory assurance, although some firms do audit their CSR/ESG reports to enhance their credibility (Reimsbach et al., 2018). Additionally, the positive impact of the assurance of sustainability information is more significant when the company has negative performance (Phang and Hoang, 2021). Moreover, when the company has negative performance, investors are more likely to invest with the combined assurance provided than with only CSR/ESG assurance (Bucaro et al., 2020). However, such assurance effect is weaker in the case of integrated CSR/ESG reporting in the financial report than separate reporting (Reimsbach et al., 2018).

2.1 Determinants of Environmental Disclosure

A growing literature investigates the determinants of CSR/ESG disclosures. Firstly, the chief executives play an essential role in CSR/ESG disclosure. Lewis et al. (2014) examine how CEOs with different educational backgrounds and tenure respond to the Carbon Disclosure Project (CDP). They find that firms led by newly appointed CEOs and CEOs with MBA degrees are more likely to respond actively to the Carbon Disclosure Project (CDP), while those led by lawyers are less likely to respond. Peers also impact firms' CSR/ESG disclosure choices. Cao et al. (2019) use a regression discontinuity design to identify the influence of the CSR/ESG disclosures of a firms' peers. They find that peer firms actively follow the voting firm's signaled commitments to CSR/ESG.

Environmental performance is another factor that impacts the environmental disclosure (Patten, 2002; Plumlee et al., 2015). Based on legitimacy theory, Cho and Patten (2007) argue that companies use environmental disclosure as a legitimizing tool. If companies have poorer environmental performance, they are more likely to incorporate more extensive off-setting or positive environmental information in their financial reports. Dai et al. (2018) find firms will issue high-quality CSR reports followed by higher levels of both government and media endorsement. Moreover, worse environmental performers exhibit more optimistic words in their disclosure compared with better environmental performers (Cho et al. 2010). In the same vein, Cho et al. (2012) show voluntary environmental disclosure plays a role in mediating the effect of poor environmental performance on environmental reputation.

2.2 Market Consequences of Environmental Disclosure

Investors' personal values affect their responses to CSR/ESG disclosures. Investors who personally value the social benefits of CSR/ESG respond more positively to positive assessment of CSR/ESG performance (Arnold et al., 2018). In addition, perceptions of fairness of CSR/ESG

partially mediate the impact of CSR/ESG investment level on investors' allocation decisions (Brown-Liburd et al., 2018). Cheng et al. (2015) show that firms' strategies impacts investors' reactions to CSR/ESG information. They define sustainability-based differentiation strategy as high strategic relevance, and cost leadership strategy as low strategic relevance. They find that investors perceive ESG indicators to be more important and are more willing to invest in the company if ESG indicators have high strategic relevance.

CSR/ESG performance may also impact investors' assessments of firm financial performance. For instance, Elliott et al. (2014) argue that when investors estimate a firm's value, their affective reactions to CSR/ESG performance unintentionally impact valuation judgments. Positive CSR/ESG performance results in higher fundamental value estimates compared with negative CSR/ESG performance. Guiral et al. (2020) further examine the relationship between CSR/ESG performance and investor judgments. They discover that regardless of whether the CSR/ESG performance is negative or positive, investors value estimates driven by the materiality of CSR/ESG disclosures rather than the presence or absence of the CSR/ESG performance. Firms with good ratings on material sustainability issues have higher market returns compared with firms with poor ratings on these issues (Khan et al., 2016). Moreover, the materiality of CSR/ESG issues impacts the way investors process CSR/ESG information. Guiral et al. (2020) find evidence that investors use a heuristic approach to process material and positive CSR/ESG information, and a more deliberate and systematic approach to process material or negative CSR/ESG information.

However, the impact of CSR/ESG information on investors' price assessments is mixed. Espahbodi et al. (2019) use a find that integrating CSR/ESG priorities into strategy does not significantly affect investors' price assessments or investment allocation, regardless of the trend in the company's financial performance. In contrast, Khemir et al. (2019)'s field experiment in Tunisia shows that CSR/ESG information greatly influenced investment allocation decisions.

The presentation style of the CSR/ESG disclosure can also impact investors' decisions. Elliott (2017) shows that not only the CSR/ESG content but also the CSR/ESG disclosure style impacts investors' decisions. Specifically, less numerate investors are more likely to invest when the CSR/ESG disclosure highlights pictures instead of words. The report format is another factor that could impact investors' judgments. Investors incorporate CSR/ESG information less when such information is integrated with financial information than when separately reported (Bucaro et al., 2020). In addition, CSR/ESG performance measures have a more significant impact on investors' firm value estimates when reported in a separate report than when integrated into a financial report (Haji, 2013).

2.3 Variances in Environmental Disclosure Practices

The most crucial impediment to using CSR/ESG information is the lack of reporting standards (Amel-Zadeh and Serafeim 2018). Corporations have their discretion on what to disclose, and they may selectively present metrics favorable to them. For example, Apple Inc. shows a range of numbers for its annual carbon footprints for 2015 through 2020. This reflects the "potential variances inherent to modeling product-related carbon emissions" (Apple. 2021 Environmental Progress Report, p.35). Its environmental report states that each year Apple Inc. will refine its methodology to ensure the accuracy of its estimates.

In order to help investors analyze and verify CSR/ESG information, ESG rating agencies such as Sustainalytics, MSCI, and RobecoSAM come into play. However, each of these providers has its own technique of assessing ESG aspects and grading methodology. Some of the rating systems are ESG performance-based, while others are ESG risk-based. These ratings often reveal a lack of consensus about an individual firm's ESG performance.

Because companies can choose their own ESG metrics, the ensuing differences and the lack of transparency among companies' peer groups lead to different results by ESG researchers and analysts. For example, Kotsantonis and Serafeim (2019) find that different ESG metrics cause vast "data gaps" among companies and that different gap-filling approaches by ESG analysts lead to significant discrepancies. Christensen et al. (2021) find that a greater ESG disclosure amplifies ESG rating disagreement. A Wall Street Journal article noted, "Environmental, social and governance criteria are hard to define. When we measure how different ESG providers rate companies in the S&P 500, there's often little overlap" (Sindreu and Kent, 2018). Improving measurement across various ESG dimensions needs more effort (Grewal and Serafrim, 2019).

The lack of clear reporting standards and convergence undermines ESG ratings' reliability. Inconsistent ESG ratings introduce uncertainty about how to interpret ESG performance. For example, Halbritter and Dorfleitner (2015) find few trading differences between firms with high and low ESG ratings. In a more recent study, Avramov et al. (2022) show that ESG rating uncertainty leads to higher perceived market risk, higher market premium, and lower investor demand.

3. Carbon Emissions

Carbon dioxide is a greenhouse gas that helps the planet hold the energy it receives from the sun and trap heat close to Earth. The amount of carbon dioxide in the atmosphere plays a key role in regulating Earth's global temperature and climate. Over the past century, rapid industrial development has increased the level of carbon emissions in the atmosphere and broken the balance of the climate system. Excessive atmospheric carbon dioxide traps additional heat and raises Earth's average temperature. This warming causes extreme weather events such as wildfires, droughts, and heatwaves. Nowadays, climate change is a global emergency affecting our communities and economies.

To combat climate change, the governments of many countries signed the Paris Agreement in November 2016. The Paris Agreement is a binding promise to reduce greenhouse gas emissions. The goal of the Paris Agreement is "Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels".

Many countries have set a long-term target of achieving net-zero emissions. For example, on December 8th, 2021, President Biden committed the Federal Government to net-zero emissions by 2050, including directing federal agencies to derive electricity from carbon-free sources by 2030. Sweden, aiming at becoming the world's first fossil-free welfare state, has set a long-term goal of having no net GHG emissions by 2045.

In the meantime, a growing number of the world's best-known corporations, such as Walmart, Amazon, and Coco-Cola, also began transitioning to net-zero carbon emissions and pledging to eliminate their carbon footprints in the decades to come. The Japanese electronics giant, Panasonic Corporation, pledged to offset all greenhouse gas emissions by 2030. It replaced workers with robots, bought carbon credit, and changed to renewable energy. By the end of 2021, Panasonic got its highest-emitting Chinese factory to virtually net-zero carbon dioxide.

One way governments control and curtail carbon emissions is through a cap-and-trade system such as the European Union Carbon Emissions Trading Scheme. For different carbonintensive industries, governments set an emissions cap for each corporation and issue a quantity of emission allowances along with that cap. Companies can buy or sell allowances based on their needs. This trading market motivates firms to save costs by cutting emissions.

Researchers find that the introduction of the cap-and-trade system has impacted firms' value. Johnson et al. (2020) examine the sulfur dioxide (SO₂) emission allowances in U.S. utilities and find that SO₂ emission allowances trading can increase a firm's asset value in the market. Clarkson et al. (2015) argue that carbon emissions shortfalls are negatively associated with firm values, but better carbon performance relative to industry peers can mitigate this negative effect.

However, corporations are at their own discretion to recognize and disclose emissions allowances as either assets or liabilities (Griffin et al. 2017). The absence of accounting standards for emissions allowances and emissions disclosures makes it hard for investors to compare financial statements.

4. Disclosure of Environmental Goals

CSR/ESG reports often contain goals for the company's future environmental performance (Krische 2005). The disclosure of environmental goals can raise an explicit expectation that the company will engage in actions to achieve its stated objective (Fanning et al., 2021). However, management has significant discretion over the disclosure of environmental goals, which creates considerable variation in the environmental goals disclosed.

Some companies do not disclose any environmental performance goals. Rather, they only disclose the current year's environmental performance. For example, Costco's 2019 CSR report described the company's current environmental initiatives, such as reducing chemical use, engaging in sustainable agriculture, and adopting fully recyclable packaging boxes. Other companies compare their current environmental performance with their performance in the past. For example, Walgreens Boots Alliance disclosed the year-over-year change in their carbon

emissions in their 2020 CSR report. Rather than report specific goals for the future, Walgreens Boots Alliance stated, "We will continue to work toward establishing greenhouse gas emission reduction targets in line with climate science, also known as science-based targets" (Walgreens Boots Alliance 2020 Corporate Social Responsibility Report, p.85).

Other firms opt to disclose long-term environmental goals, defined as goals that will be achieved in five or more years. For example, Microsoft's 2020 CSR report contained the following long-term environmental goals:

We will protect more land than we use for our direct operations by 2025... By 2030 we will be carbon negative by reducing our carbon emissions by half... By 2050, we will remove from the environment all the carbon the company has emitted directly or by electrical consumption since its founding. (Microsoft 2022 Corporate Social Responsibility Report, p. 22).

In another example, AT&T stated:

AT&T has committed to becoming carbon neutral, achieving net-zero Scope 1 and 2 GHG emissions by 2035. To help measure our progress, we've revised our science-based target to reduce emissions for these same categories 63% by 2030. (AT &T ESG Summary 2021, p. 22).

In addition to long-term goals, companies often disclose short-term goals, or goals that can be achieved within a one-year horizon. For instance, Home Depot's 2022 ESG report stated, "We've set a science-based target to reduce our emissions 2.1% per year to achieve a 40% reduction by 2030 and 50% reduction by 2035" (The Home Depot 2022 ESG Report, p. 9).

The long-term goals may also relate to a third-party target. Referencing a third-party target can help increase the credibility of long-term climate goals. Various third-party groups such as the United Nations have asked companies to commit to environmental performance goals, such as reaching net-zero emissions before 2050. For example, signatories to The Climate Pledge must agree to "Neutralize any remaining emissions with additional, quantifiable, real,

permanent, and socially beneficial offsets to achieve net-zero annual carbon emissions by 2040" (*The Climate Pledge*). Some companies, such as General Electric, Microsoft, and International Business Machines, have publicly announced their commitment to the environmental performance goals put forward by the Science-Based Targets initiative (SBTi) Net-Zero Framework or Paris Agreement. Other companies like Apple, Inc., American Airlines, Everlane, Hertz, and PepsiCo have signed the United Nations (U.N.)'s Business Ambition for 1.5 °C commitment pledge. I refer to these public commitments as "external commitments". Unlike laws or regulations, external commitments are not binding or enforceable and do not carry legal punishments for violations. While external commitments may convey intent regarding environmental performance, no consequences are imposed for failing to achieve the environmental performance goal.

Driven by the variety of environmental goals disclosed in the current practice, I examine the impact of environmental performance goal horizon on investors' perceptions and reactions. Specifically, my examination focuses on a setting where a company reports current negative environmental performance to avoid potential decision bias. Prior research shows that investors are less likely to process environmental disclosures when environmental performance is positive (Schwarzer and Leppin, 1991). Rather, investors are more likely to carefully process environmental disclosures when they contain negative performance information (Guiral et al., 2020). Based on this prior research, I focus on negative environmental performance setting where disclosed environmental goals are most relevant to investors.

ESSAY ONE: Long-term Environmental Performance Goals: Investors' Reactions

I. Introduction

In an era marked by increased globalization and interconnectedness, the imperative for sustainable development has become a rallying call for corporations, organizations, and governments worldwide. This heightened awareness has fueled a growing demand for information pertaining to Corporate Social Responsibility (CSR) and environmental, social, and governance (ESG) activities. Amid this backdrop, the disclosure of corporate environmental information has become imperative, with stakeholders viewing it as essential. The Securities and Exchange Commission (SEC) responded to investors' concerns by publishing the rules of the enhancement and standardization of climate-related disclosures in 2024, mandating public companies to disclose climate-related information. This requirement entails disclosing climate-related targets or goals if they have a significant impact or potential impact on a company's business, operations, or financial status.

This study builds upon the evolving landscape of environmental goal disclosures to explore how the disclosure of environmental goals (i.e., a long-term goal vs. a long-term plus a short-term goal) interacts with investors' pro-environment values to influence investor decisions, particularly in the context of negative environmental performance. I first draw from the expectancy violation theory, which posits that violations of investors' expectations can lead to increased attention and skepticism. I then rely on construal level theory, which suggests that the psychological distance associated with long-term/short-term environmental goals leads to higherlevel/low-level construal, potentially impacting evaluations of firms as investments. In addition, investors possess varying degrees of pro-environmental values, impacting their responses to environmental performance objectives (Van der Werff et al., 2013; Whitmarsh and O'Neill,

2010). Those with high pro-environmental values prioritize environmental considerations over economic factors more than those with low values (Martin and Moser, 2016). Consequently, I predict that investors with high pro-environmental values may view short-term environmental goals as enhancing the feasibility of achieving long-term objectives, and thus react more positively to long-term with short term goals (compared to long-term goals alone). Conversely, investors with lower pro-environmental values prioritize economic benefits and respond favorably to long-term environmental goals due to perceived economic advantages. Ultimately, I predict that investors with low pro-environmental values tend to be indifferent to the presence or absence of short-term environmental goals.

Extensive research highlights that investors' reactions are significantly influenced by the credibility of accounting disclosures, with source credibility playing a pivotal role. Previous studies underscore that the credibility of an information source not only enhances perceptions of reliability but also directly shapes attitudes. Therefore, when companies publicly endorse external commitments, they enhance the perceived credibility of their dedication to improving environmental performance. Consequently, I predict that investors are more inclined to perceive environmental goals accompanied by external commitments, compared to goals lacking such endorsements, as credible.

I focus on nonprofessional investors in my study because they constitute a significant and influential segment of the investor population in the stock market (Luo and Salterio, 2022). Institutional investors also consider the demand for sustainable investment products from nonprofessional investors as a crucial factor influencing their investment decisions (Eccles et al. 2017). Specifically, to test my hypotheses, I conducted two 2 x 2 overlapping between-participants experiments using 64 participants recruited from a professional conference as

nonprofessional investors. Participants are asked to assume as investors. They are provided with information about a company's environmental performance and environmental goal disclosure. After reviewing the information, participants are asked to answer questions regarding their investment decision.

In my first experiment, I manipulate environmental goal disclosure based on whether a firm discloses a long-term goal only versus a long-term environmental goal with a short-term environmental goal (*LT only* or *LST*) and measure participants' pro-environmental values (*High* or *Low*). In the second experiment, I manipulate environmental goal disclosure based on whether the company is a signatory to external commitments to influence the effect of combined long-term and short-term goals (*LST* or *LSTG*) and measure participants' pro-environmental values (*High* or *Low*).

Results of my experiment 1 show a marginally significant main effect of participants' pro-environment values on their investment decisions, indicating that on average, investors with different pro-environment values respond to management's environmental goals differently. However, participants' environmental values do not significantly interact with the time horizon of management's pro-environment goals. Specifically, inconsistent with my prediction, investors with high pro-environmental values, compared to investors with low pro-environmental values, do not react more positively to the inclusion of short-term environmental goals. Results of my experiment 2 shows a marginally significant interaction of participants' pro-environmental values and the external commitment. Specifically, as predicted, investors with high pro-environmental values, compared to investors with low pro-environmental values, react marginally more positively when an external commitment is present.

The results of this study contribute to the literature on ESG disclosures. While prior studies have explored the impact of environmental performance on investment decisions, limited attention has been given to investors' reactions to disclosed environmental performance goals. The study adds nuance to our understanding of how the temporal horizon of disclosed goals, coupled with investors' pro-environmental values, influences reactions to negative environmental performance.

Moreover, this research aligns with the evolving landscape of mandatory ESG/CSR reporting practices. Despite the SEC's finalization of climate disclosure rules in March 2024, companies retain discretion in disclosing their environmental performance goals. Through an examination of how investors react differently to these goals, this study identifies potential areas where regulators could offer guidance in future disclosure policies. As policymakers navigate the intricacies of sustainability reporting, the findings of this study provide valuable perspectives to shape future policy frameworks. This ensures that corporate environmental practices are characterized by enhanced transparency and accountability, ultimately contributing to more responsible business conducts.

Furthermore, there is widespread discussion surrounding whether firms' disclosing a long-term environmental goal is merely a "cheap talk", with some perceive this goal as insincere or lacking in commitment (Sindreu and Kent, 2018; Shifflet, 2022; Romm et al. 2023). This study contributes valuable insights by examining how individuals' pro-environmental values influence their perceptions of the environmental goal disclosures. By shedding light on the role of pro-environmental values in shaping attitudes towards long-term environmental objectives, this research enhances our understanding of the complexities surrounding environmental discourse and policy implementation.

The remainder of the paper is organized as follows. The next section further discusses related literature and develops my hypotheses. My methodology and research design are discussed in section three and the results are presented in section four. Finally, section five concludes and identifies limitations of this research.

II. Background and Hypotheses Development

1. The Impact of Short-term Goals on Investors' Reactions to Long-Term Environment Goals.

As per the expectancy violation theory, when a company exhibits poor environmental performance but communicates a goal that contradicts investors' expectations, this incongruity heightens investors' attention (Burgoon, 1978, 1993). Consequently, the increased scrutiny may lead investors to question the credibility of the environmental goal, which in turn, impact their subsequent decision-making. Applying this theory to a practical scenario, if a company discloses negative environmental performance but simultaneously reveals long-term goals, such as achieving net-zero emissions in alignment with the Paris Agreement or the Climate Pledge, these ambitious objectives deviate from investors' expectations shaped by the company's existing unfavorable environmental track record.

The construal level theory posits that decision-makers consider factors with varying degrees of psychological distance. According to Trope and Liberman (2003), psychological distance encompasses the perceived timing, location, individuals involved, and likelihood of an event. This theory also asserts that the construal level, representing the extent of psychological distance, influences predictions, evaluations, and behavior (Trope and Liberman, 2003). In the context of investors' reactions to environmental performance goals, I contend that the psychological distance investors associate with long-term environmental goals differs from that

with short-term goals. Long-term goals, being "not present in the direct experience of reality," are likely perceived as psychologically distant, prompting a higher-level construal (Fujita and Carnevale, 2012). Then, a presence of a short-term environmental target would reduce investors' psychological distance from long-term goals by bringing them closer to reality (Fujita et al., 2006). This increased physical proximity leads investors to process environmental performance at a lower construal level, enabling them to envision outcomes closer to reality when a firm discloses both short-term and long-term goals compared to disclosing only a long-term goal.

The relationship between psychological distance and decision-making is founded on the perception of prospects in terms of desirability and feasibility (Sagristano et al., 2002; La Ornual et al., 2009). Desirability refers to the perceived value of the outcome of a risky prospect, often measured in monetary terms, while feasibility concerns the likelihood of attaining that outcome. Liberman and Trope (1998) have shown that as the construal level increases, the significance of desirability in decision-making amplifies while feasibility diminishes. Building upon these insights and applying them to uncertain prospects, Sagristano et al. (2002) demonstrate that individuals, particularly under high construal level, prioritize the overarching objective of achieving a desirable outcome, with less emphasis on the specific probability of its attainment.

Therefore, in this study, from an investor's perspective: when considering a long-term environmental goal, which is associated with a high construal level, the desirability of the outcome takes precedence. In this context, the probability of achieving the goal carries less weight compared to its desirability. Conversely, when confronted with a short-term goal, feasibility becomes more prominent in decision-making.

2. The Moderating Effect of Environmental Values on Investors' Reactions

Existing literature demonstrates that individuals' pro-environment values significantly influence various environmental decisions (Van der Werff et al., 2013; Whitmarsh and O'Neill, 2010). For instance, Van der Werff et al. (2013) argue that individuals with high proenvironment values are more likely to participate in environmentally conscious behaviors such as carbon offsetting, emphasizing the salience of the environmental impact of their actions. Kahle et al. (1988) suggest that individuals' values may both lead and reflect changes in elusive societal goals. In an accounting context, Martin and Moser (2016) discover that pro-environment managers are inclined to invest in projects with positive environmental benefits, even in the face of negative economic returns. These findings underscore the priority of environmental considerations over economic factors for pro-environment individuals.

Expanding upon prior research, I propose that investors hold varying degrees of proenvironmental values, which are likely to influence investors' responses to environmental performance objectives. Investors with high pro-environmental values will prioritize environmental considerations over economic factors to a greater extent than those with low proenvironmental values. Consequently, when investors with high pro-environmental values evaluate a company with unfavorable environmental performance, including short-term environmental goals enhances the perceived feasibility of achieving long-term environmental objectives, potentially eliciting a more favorable response than the disclosure of long-term environmental goals alone.

Conversely, investors with lower pro-environmental values allocate less importance to environmental considerations but put more weight on the economic benefit. Drawing from Sagristano et al.'s (2002) findings, which suggest a decreased emphasis on the specific probability of an action under high construal levels, I predict that investors with low pro-

environmental values may respond favorably to long-term environmental goals, primarily due to the perceived economic advantages. In other words, investors with low pro-environmental values exhibit indifference towards the presence or absence of short-term environmental goals.

Therefore, I predict:

H1: When long-term environmental performance goals are present, investors with high pro-environmental values, compared to investors with low pro-environmental values, exhibit a more positive reaction to the inclusion of short-term environmental performance goals.

3. The Impact of External Commitments on Investors' Reactions

Extensive research has shown that investors' reactions are shaped by the credibility of accounting disclosures (Hovland and Weiss, 1951). Within this literature, source credibility emerges as a critical factor influencing investor responses. Previous studies emphasize that the credibility of an information source not only enhances perceptions of the information's reliability but also directly molds attitudes (Cheung et al., 2009). Building on this understanding, my investigation focuses on how external commitments impact investors' responses to environmental goal disclosures.

When companies publicly announce their endorsement of external commitments, they bolster the perceived credibility of their commitment to enhancing environmental performance. Consequently, investors are more likely to view environmental goals accompanied by external commitments, compared to goals lacking such commitments, as credible.

Therefore, for investors with high pro-environmental values, the disclosure of short-term environmental goals alongside long-term goals supported by external commitments amplifies the
perceived feasibility of achieving environmental objectives, particularly when compared to scenarios without external endorsements.

Conversely, for investors with low pro-environmental values, since the allure of attaining economic benefits outweighs the perceived feasibility of the environmental goal, whether the company achieves the environmental goals or not does not impact their investment decisions as long as the economic benefit remains unaffected. In other words, for investors with low proenvironmental values, the presence of external commitments may not influence their investment decisions.

Therefore, I predict:

H2: When long-term and short-term environmental performance goals are present, investors with high pro-environmental values, compared to investors with low pro-environment values, exhibit a greater positive reaction to the inclusion of external commitment.

III. Methodology

1. Participants

Participants are recruited from accounting professionals attending an in-person professional development conference. Sixty-four participants spend approximately 15 minutes completing the study. Participants are 46 years old, on average. Fifty-nine percent of participants identify themselves as male, and 83 percent are Certified Public Accountants (CPAs). On average, participants have 22 years of work experience, and 70% are directly involved in financial reporting in their current jobs.

Eighty-nine percent of participants report previous stock market or mutual fund investments, and 91% of participants plan to invest within the next five years. Overall, these

participants have both the experience and the knowledge needed to understand the information in the instrument (Elliott et al., 2007).

2. Research Design and Procedures

I conduct two 2 x 2 between-participants overlapping experiments. All participants are asked to assume to be investors and begin the study by reading background information about a fictional firm and a CEO letter. The information of the firm is modeled on a real company in the chemical manufacturing industry. The environmental performance and environmental goal disclosure are stated in the CEO letter. Participants are then required to answer questions regarding their judgments and assessments.

The first 2 x 2 experiment examines whether adding a short-term environmental goal to the current long-term environmental goal and investors' pro-environment values jointly impact investors' perceptions. One independent variable, a firm's goal disclosure, Long-term only (*LT only*) vs. Long-term plus short-term (*LST*), is manipulated between participants. The other measured independent variable is investors' pro-environmental values (*High* or *Low*). The second 2 x 2 experiment examines whether a firm's addition of an external commitment impacts investors' reaction to its long-term goal plus short-term goal disclosures. *Environmental Goal Disclosure*, Long-term plus short-term (*LST*) vs. Long-term plus short-term plus external commitment (*LSTG*) is a manipulated independent variable. *Pro-Environmental Value* (*High* or *Low*) is a measured independent variable.

3. Environmental Disclosure Goals Manipulation

I manipulate environmental goal disclosure in the CEO letter by varying the absence or presence of the short-term goal. Specifically, in my first experiment, participants in the *LT Only* condition receive the CEO letter that states the firm's long-term goal only, "The goal of [the

company] is to achieve net-zero annual carbon emissions by 2040." Participants in the LST condition receive the CEO letter that states the firm's long-term goal and short-term goal, "The goal of [the company] is to achieve net-zero annual carbon emissions by 2040. We plan to reach this goal by reducing our carbon emissions by an average of 6% per year."

In my second experiment, participants in the *LST* condition receive the CEO letter that states, "The goal of [the company] is to achieve net-zero annual carbon emissions by 2040. We plan to reach this goal by reducing our carbon emissions by an average of 6% per year." Participants in the *LSTG* condition receive the CEO letter that adds the statement about its commitment to the Climate Pledge to the *LST* condition by stating, "As a signatory of The Climate Pledge, the goal of [the company] is to achieve net-zero annual carbon emissions by 2040. We plan to reach this goal by reducing our carbon emissions by an average of 6% per year".

4. Pro-environmental Values Measurement

Followed by Bouman et al. (2018), I use three questions to measure investors' environmental self-identity, which reflects "the extent to which someone perceives oneself as the type of person who acts environmentally friendly" (Bouman, et al., 2018, p. 3). Participants are told to rate on a 7-point scale (1 strongly disagree, 7 strongly agree). I then compute a composite score by calculating the median of all three items. Participants with a score above the median are determined as having high pro-environmental values (*High*). Participants with a score below the median are determined as having low pro-environmental values (*Low*).¹

¹ Pro-environmental Values is a measured variable. To ensure that my experiment equally distributes participants based on their pro-environmental values, I split the samples into high pro-environmental values and low pro-environmental values by the median. However, because not all conference participants submit their responses, the sample size is unbalanced across the manipulated Goal conditions. The results remain consistent when using the mean (Median = 6, Mean = 6.03).

5. Dependent Variables

For both experiments, I elicit investment decisions with the question "Imagine you have inherited\$10,000 and are interested in investing in a company in the chemical industry to maintain a diversified portfolio, how much of your \$10,000 would you invest in [the company]?" My dependent variable *Invest* is participants' response on a 6-point scale (1 = \$0, 2 = \$2,000, 3 = \$4,000, 4 = \$6,000, 5 = \$8,000 and 6 = \$10,000).²

IV. Results

1. Comprehension Checks and Manipulation Checks

To test participants' comprehension of the experiment, I first ask them to indicate whether the company's environmental performance is positive or negative. Eighty-nine percent of participants correctly indicate that the company's environmental performance is negative.

Next, I o ask participants to indicate the environmental goal disclosure [the company] disclosed. Participants' responses are not associated with participants' pro-environmental values $(\chi 2 = 0.05; p = 0.82)$, but are significantly associated with the environmental goals disclosure manipulation ($\chi 2 = 2.34; p = 0.10$). These results provide support that my comprehension check is successful. There are no qualitative differences when those who answered the comprehension check guestions incorrectly are removed. Therefore, my analyses use the full sample.

To test the efficacy of the environmental goals disclosure manipulation, participants are asked to indicate the environmental goal description they read. Seventy-eight percent of participants correctly answered this question based on their experimental condition. Responses

² I also test how attractive participants believe [the company] to be and how likely they are willing to invest by asking them to respond to the following questions: "How attractive do you think [the company] is as an investment option, relative to other possible investment options?" (1 = Very Unattractive, 7 = Very Attractive) and "How likely are you to invest in [the company]?" (1 = Very Unlikely, 7 = Very Likely). The results are consistent with the results reported here.

are significantly associated with the environmental goals disclosure manipulation ($\chi 2 = 20.29$; p < < 0.01) and are not associated with the environmental perspective measurement ($\chi 2 = 0.69$; p = 0.50). These results provide support that my manipulation is successful. There is no qualitative difference when those who answered the manipulation check questions incorrectly are removed. Therefore, my analyses use the full sample.

2. Tests of Hypotheses

To test my first hypothesis, I conduct a 2×2 analysis of variance (ANOVA) with *Environmental Goal Disclosure (LT only* or *LST*) and *Pro-Environmental Value (High* or *Low*) as the independent variables. Dependent variable, *Invest*, extract from the question "Imagine you have inherited\$10,000 and are interested in investing in a company in the chemical industry to maintain a diversified portfolio, how much of your \$10,000 would you invest in [the company]?"

Panel A of Table 1 reports the descriptive statistics and Panel B presents the ANOVA results. Given that my hypothesis predicts an ordinal interaction that investors with high proenvironmental values react more positively when a short-term environmental goal is present than when it is absent, I further utilize simple effects analysis to help identify the impact of the short-term goal at different levels of pro-environmental values. Panel C reports the simple effects. ANOVA results in Panel B indicate a marginally significant main impact of *Pro-Environmental Value* (F = 2.41, p=0.06), indicating that on average, participants with different proenvironmental values react to management's goals differently. However, the interaction between *Pro-Environmental Value* and *Environmental Goal Disclosure* is insignificant (F = 0.09, p=0.77). Specifically, although Panel A shows that investors with high pro-environmental values react more positively in the *LST* condition (*mean* = 1.79, *sd*=0.80) than in the *LT only* condition (*mean* = 1.73, *sd*=1.01), the difference is insignificant (F = 0.01, p=0.91; Panel C). Thus, the result is inconsistent with my prediction for the investors with high pro-environmental values. Investors with low pro-environmental values also react indifferently (F=0.09, p=0.77, Panel C) in the LST condition (mean = 0.34, sd=1.33) and in the LT Only condition (mean= 0.11, sd=1.77). These findings provide evidence that the presence of short-term environmental goals does not impact the investment judgments of investors with low pro-environmental values, consistent with my prediction for this group of investors.

[Insert Table 1]

My second hypothesis predicts that for investors with high pro-environmental values, having a climate pledge can increase the positive reaction to the presence of short-term environmental performance goals. I conduct a 2 × 2 ANOVA with *Environmental Goal* Disclosure (LST or LSTG) and Pro-Environmental Value (High or Low) as the independent variables and *Invest* as the dependent variable. Table 2, Panel A shows the descriptive statistics of Invest by experimental conditions, Panel B presents the ANOVA results, and Panel C presents the follow-up simple tests. The ANOVA results show a marginally significant interaction between Goal Disclosure and Pro Environmental Value (F = 2.50, p = 0.06), indicating a joint impact of goal disclosure and investors' pro-environmental values on investment decision. Specifically, Panel A shows that participants with high pro-environmental values have a higher mean in the LSTG condition (mean = 2.20, sd= 1.30) than in the LST condition (mean = 1.79, sd = 0.80). The follow-up simple effect test reveals that the difference is marginally significant (F = 0.67, p=0.09). These results provide evidence for my second hypothesis that investors with high proenvironmental values react more positively when green commitments are present than when they are absent.

Also, investors with low pro-environmental values react indifferently (F = 0.67, p=0.42) in the LST condition (*mean* = 2.22, *sd*= 1.20) and the LSTG condition (*mean* =1.50, *sd* =0.55). These findings further provide evidence that investors with low pro-environmental values react indifferently toward different environmental goal disclosures.

[Insert Table 2]

3. Supplemental Analysis

To provide additional insights, I examined investors' perceptions of environmental goal disclosure and the management's credibility. I first replaced my main dependent variable with *Goal Plausible*, which is captured by asking for participants' agreement with "[The company] will achieve its goal of net-zero annual carbon emissions by 2040". Participants rate on a 7-point scale from 1 (strongly disagree) to 7 (strongly agree) based on the information they read before.

For my first experiment, Table 3 Panel A shows the descriptive statistics for *Goal Plausible* by experimental conditions. The descriptive statistics reveal that investors with low pro-environmental values react indifferently in the *LST* condition and *LT* only condition (F=0.02, p=0.89). These findings provide evidence that for investors with low pro-environmental values, the feasibility of the environmental goal does not impact their investment decisions.

[Insert Table 3]

For my second experiment, the descriptive statistics for *Goal Plausible* showed in Table 4 Panel A and the ANOVA test results shown in Table 4 Panel B indicate that investors with low pro-environmental values perceive indifferently with external commitment present or absent (F=0.15, p=0.70).

[Insert Table 4]

To test the impact of management's credibility, I capture my last dependent variable, *Management Commitment*, by asking participants to rate on a 7-point scale with the question "[The company]'s management is committed to reducing the carbon emissions resulting from the company's operations." (1 = Strongly Disagree, 7 = Strongly Agree)".

For my first experiment, the descriptive statistics in Table 5, Panel A and the ANOVA test results showed in Table 5, Panel B provides evidence that management credibility has no impact on investors with low-environmental values ((F=0.07, p=0.79).

[Insert Table 5]

For my second experiment, Table 6, Panel A, shows the descriptive statistics of the *Management Commitment*. Investors with high pro-environmental values react more positively when external commitment is present (*mean* = 5.00, *sd*= 1.87) than absent (*mean* = 3.57, *sd*= 1.40). The ANOVA test shown in Table 6, Panel B indicates a significant main impact of *Goal* ((F = 3.55, p=0.04). The follow-up simple effects provide evidence about the effect of *Goal* for investors with high pro-environmental values ((F=3.17, p=0.05). These findings reveal that for investors with high pro-environmental values, the presence of external commitment increased management credibility, thus increasing the feasibility of achieving the environmental goal. However, the presence of external commitment does not impact investors with low pro-environmental values.

[Insert Table 6]

V. Conclusion

I experimentally examine how the disclosure of environmental goals and proenvironmental values impact investors' decisions. My results show that investors with different environmental values respond to management's environmental goals differently, but investors do not distinguish the short-term or long-term goals significantly. Additionally, my results suggest that with an external commitment, investors with high pro-environment values are more likely to perceive that the management is more credible compared with firms without an external commitment. However, the goal plausibility and the management credibility do not impact investors' perceptions if they have low pro-environmental values. Overall, my findings provide evidence that investors' perceptions of environmental goal disclosure vary based on proenvironmental values.

As with all research, my study has limitations that provide opportunities for future research. First, due to the small sample size and unbalanced sample distribution among conditions, my results regarding the reactions of investors with high pro-environmental values are not significant. This is because not all conference participants submit the survey, leading to an imbalance in sample size across different goal conditions. Future research could address this limitation by increasing the sample size. Future research could also expand to other groups of participants to check the generalizability of my results. Second, my experiment focuses on negative environmental performance. Results might change with a focus on positive environmental performance. Third, my experiment is limited in the information I provide to participants, which may limit the external validity of my findings. For example, professional investors have greater access to information about a firm's prior environmental performance, and their reactions may differ. Future research could investigate whether a firm's prior environmental performance impacts investors' perceptions of environmental goal disclosure. Lastly, I recruited nonprofessional investors to participate in the study, as they represent a significant portion of the investor population (Luo and Salterio, 2022), and their perspectives are valuable in

understanding market dynamics. Further studies could explore whether professional investors, who possess specialized knowledge and experience, exhibit different reactions or decisionmaking processes in similar contexts.

ESSAY TWO: Long-term Environmental Performance Goals: Managers' Disclosure Decisions

I. Introduction

In recent years, the heightened focus on sustainability, particularly concerning environmental impacts, has led to an increasing number of companies publicly declaring their commitment to environmental protection and sustainability initiatives. An illustrative example of this trend is Amazon's founding of the Climate Pledge in 2021, in partnership with Global Optimism. Signatories of the Climate Pledge commit to achieving net zero carbon emissions by 2040. Remarkably, within less than three years, 474 companies across 41 countries have joined the pledge, demonstrating a global momentum towards achieving carbon neutrality. This study examines two factors—peer pressure and the availability of carbon offset—that could jointly impact management's decision to set and disclose a long-term environmental goal such as achieving the net zero carbon emissions by 2040.

First, in the context of setting long-term environmental goals, the influence of peer behavior becomes particularly relevant. The disclosure of such commitments represents a firm's dedication to sustainable practices, reflecting its ethical stance towards environmental stewardship. Consequently, prevailing industry norms and behaviors regarding these disclosures are likely to shape managers' perceptions of what constitutes morally responsible behavior in the realm of sustainability.

Despite a surge in studies examining the influence of peers on various financial decisions in the corporate landscape (Cho and Muslu, 2021; Bills et al., 2020; Foucault and Fresard, 2014; Kaustia and Knufer, 2012), a notable gap remains in understanding how industry peer pressure influences managers' decisions regarding Corporate Social Responsibility (CSR) and Environmental, Social, and Governance (ESG) choices. This study aims to address this gap by investigating the impact of industry peer firms on the change of managers' disclosure decisions within CSR or ESG reporting frameworks.

Research in the realm of moral psychology has shown that individuals often seek external validation for their moral decisions, and the behavior of peers can significantly influence moral choices (Cialdini et al., 1990; Darley and Batson, 1973). In the corporate context, this phenomenon extends to managers, who, in the absence of clear ethical guidelines, are likely to turn to the behaviors of industry peers for guidance on moral decisions.

In line with this, this study hypothesizes that when a significant proportion of industry peer firms disclose long-term environmental goals, managers are more likely to feel morally accountable to conform to this prevailing norm. Conversely, when such disclosures are rare among industry peers, managers may perceive less moral accountability, and other factors, such as the achievability of long-term goals, may play a more prominent role in disclosure decisions. Moreover, compared with low disclosure prevalence, when the prevalence of such disclosures among peer firms is high, managers are more likely to perceive a high possibility of achieving long-term environmental goals.

The second focal point of this study revolves around carbon offset strategies, a controversial yet prevalent approach adopted by firms to mitigate their carbon emissions. Carbon offsets entail purchasing credits from third parties to compensate for emissions, allowing firms

flexibility in achieving environmental goals without making direct operational changes. However, the ethical implications of this strategy have been debated, with some viewing it as a cost-effective means to meet carbon targets, while others criticize it as a form of "greenwashing" that fails to address the root causes of emissions (Clark, 2011; Dhanda and Hartman, 2011; Romm and Schendler, 2023; Temple, 2023). The debate has led to increasing calls for the regulations of the carbon offsets programs and the related markets (e.g., KPMG, 2022: Schwartzkopff, 2022)

The availability of carbon offset programs introduces a layer of complexity to managers' decisions regarding long-term environmental goals. On one hand, these programs offer a seemingly straightforward avenue for achieving environmental targets, potentially influencing managers' perceptions of the feasibility and achievability of such goals. On the other hand, concerns about the ethical implications of relying on carbon offsets may introduce a moral dimension to managers' decision-making processes.

This study posits that managers, driven by their moral reasoning, may weigh the ethical considerations of carbon offset strategies when deciding on long-term environmental goal disclosures. The presence or absence of carbon offset programs may amplify or mitigate managers' concerns about being morally accountable for their environmental decisions. Consequently, the study hypothesizes that the availability of carbon offset programs interacts with the prevalence of long-term environmental goal disclosures among industry peer firms to influence managers' disclosure decisions.

To empirically test these hypotheses, the research employs a 2 x 2 between-participants experiment with industry peer disclosure prevalence and carbon offset presence as manipulated variables. Participants, drawn from an MAB class at a public university, are presented with

scenarios as the role of a firm's Chief Executive Officer, tasked with deciding on the disclosure of long-term environmental goals.

The findings contribute valuable insights to the ongoing discourse on corporate environmental responsibility and offer implications for future research and managerial practices in the domain of sustainability. Firstly, this study contributes to the existing literature on the influence of peer pressure on CSR and ESG activities. While prior research predominantly examines peer pressure's effects on financial decisions (Cho and Muslu 2021; Shroff et al. 2017; Foucault and Fresard, 2014; Leary and Roberts, 2014; Kaustia and Knüpfer, 2012), the findings of this study suggest that managers' disclosures regarding environmental goals can be influenced by their peer groups' disclosure practices.

Secondly, this essay enriches the literature on carbon accounting, which has previously focused on investors' reactions to firms' carbon emissions mitigation strategies (Johnson et al. 2020; Griffin et al., 2017; Matsumura et al., 2014). This study sheds light on how the availability of carbon offsets programs influences managers' disclosure decisions.

Additionally, this study also yields valuable insights for regulators. Specifically, my results provide insights to the SEC's new climate disclosure rules that encourage firms to set and disclose climate-related targets and goals. Since the findings of my study indicate that the economic advantages of carbon offset programs have a more restrained effect on managers' tendencies to adopt and disclose long-term environmental goals, they also contribute to the current debate about the carbon offsets and provide insights to the calls for the regulations of the carbon offset markets. In March 2024, the SEC mandated firms to disclose the aggregate amount of carbon offsets only if they were integral components in achieving environmental goals. Such a

mandate may influence managers' consideration of carbon offsets in adopting their climaterelated goals/targets.

The remainder of the paper is organized as follows. The next section further discusses related literature and develops my hypotheses. My methodology and research design are discussed in section three and the results are presented in section four. Finally, section five concludes and identifies the limitations of this research.

II. Background and Hypotheses Development

1. Industry Peer Firm Disclosure

A growing number of studies explore the "peer effect" or the effect of "peer pressure" on various firm-specific decisions. Researchers find peer firms' behaviors and characteristics essential in shaping managers' financial decisions, especially when peers' behaviors signal positive returns. For example, Kaustia and Knüpfer (2012) find that new individual investors are more likely to enter the stock market if local peers have good portfolio returns. Similarly, Foucault and Fresard (2014) argue that peer firms' market valuations will impact managers' investment decisions since peer groups' market value informs managers about their own firm's growth opportunities. Bills et al. (2020) find that when firms have similar products, they are more likely to enlist the same auditor. Peer firms also impact corporate financial policy. Smaller, less successful firms are more likely to change their capital structures—by issuing equity or increasing leverage ratios—than their larger and more successful peers (Leary and Roberts, 2014). In addition, Shroff et al. (2017) find that the information environment of peer firms within an industry influences the cost of capital for other firms. In a recent study, Cho and Muslu (2021) find that a company tends to invest more in capital when it observes other companies in its industry expressing optimism about the industry's future and the investment opportunities available.

Following peers may not necessarily have a direct benefit, but not doing so may lead to drawbacks. For example, Kaustia and Rental (2015) found that firms fear losing a portion of retail investor trading volume in the long run. Therefore, they are more likely to split their stock if their peer firms have recently done so.

Most of the studies focus on the peer effect on financial-related decisions. Few examine the effect of industry peer pressure on managers' CSR/ESG choices. For instance, Malik et al. (2019) identified peer pressure as a new determinant of CSR. They find that a bank's CSR expenditure increases as its peer banks' CSR expenditures increase. Cao et al. (2019) examine how firms respond to their product-market peers' adoption of corporate social responsibility and find that the adoption of CSR by peers is a strategic reaction to competitive pressures rather than propagation by financial intermediaries.

Since environmental disclosure has drawn more and more attention, it is reasonable to expect that managers may pay close attention to what their industry peers are doing and reshape their disclosures accordingly. Moral reasoning explores how individuals perceive actions as either right or wrong, and a large body of evidence has shown that managers' moral reasoning impacts a variety of workplace decisions (Elm and Nichols 1993). Managers' moral reasoning processes often result in decisions that are easily justifiable to others so the managers will not be judged negatively as decision-makers (Shafir et al., 1993; Simonson 1989). As a result, managers can incorporate information about the behavior of others into their judgments, such that the behavior of peers is likely to impact decisions. Specifically, managers are likely to feel morally accountable to comply with the behavior of industry peer firms, as they are concerned about being perceived negatively for a lack of conformity.

Consequently, if most peer firms in the same industry have disclosed a long-term environmental goal, such as becoming carbon-neutral or achieving net-zero carbon emissions by 2030/2040, it is reasonable to expect that a manager will also try to set and disclose the same goal.

2. Carbon Offset Strategies

Firms have various strategies for reducing carbon emissions and achieving net-zero carbon emissions in the long run. First, corporations can reduce emissions by making operational changes such as developing low-carbon designs, increasing energy efficiency, and using renewable electricity. Alternatively, firms can purchase offsets from third parties instead of making operational changes. For example, governments control and curtail carbon emissions through a cap-and-trade system such as the European Union Carbon Emissions Trading Scheme. For different carbon-intensive industries, governments set an emissions cap for each corporation and issue a number of emission allowances along with that cap. Companies can buy or sell allowances based on their needs. Cadez and Czerny (2016) explore different corporate strategies to mitigate the effects of large CO₂ polluters from three EU countries and find that carbon offsets trading is the only relatively widely deployed strategy.

Carbon offsets are a controversial topic. Some believe the environmental benefits are equivalent (Hyams and Fawcett, 2013) because "emitting and offsetting one ton of emissions is the equivalent of not emitting one ton of emissions" (Johnson et al., 2020, p. 647). Economists argue that carbon trading is the most cost-efficient way to achieve country-level carbon emissions targets (Goodstein, 2002). In contrast, critics consider carbon offsets greenwashing because corporations do not change the environmental impact but only appear environmentally responsible (Clark, 2011; Dhanda and Hartman 2011). A recent study conducted by the University of Pennsylvania sheds light on the prevalence of greenwashing within the carbon

offset market, cautioning against the potential exacerbation of environmental issues through misleading claims rather than their mitigation (Romm and Schendler, 2023). Delta Air Lines currently faces legal proceedings over its utilization of carbon credits to assert carbon neutrality, underscoring broader scrutiny of companies' approaches to carbon offsetting (Toplensky, 2023).

Overall, carbon offsets provide flexibility for corporations to achieve environmental goals. Since managers can either reduce carbon emissions through their operational improvements or buy carbon offset credits from other companies, managers may perceive increased chances of achieving long-term environmental goals.

However, managers may believe it is unethical to become carbon-neutral by purchasing carbon offsets (Dhanda and Hartman 2011; Hyams and Fawcett, 2013). They fear being accused of greenwashing: implying that the company is doing more to protect the environment than it really is. One way to impact an individual's moral judgment is by affecting their perceptions of an actor's moral accountability for an act (Ditto et al., 2009).

In sum, based on the above discussion, I expect that when a long-term environmental goal disclosure is prevalent among industry peers, moral reasoning suggests that managers view such actions as moral; thus, managers may be concerned that failing to disclose this information will be judged negatively (Ditto et al. 2009). Driven by their moral reasoning concerns, managers are likely to conform to the behavior of their industry.

However, when a disclosure among industry peer firms is relatively rare, managers' concerns about moral accountability are lessened. In the absence of an external consensus on the morally desirable action, managers are likely less concerned about being judged relative to peers. In this setting, managers' concerns about the achievability of long-term goals play a greater role in disclosure decisions. The availability of carbon offset programs can allow firms to reduce

emissions in a less complicated and costly way than making operational changes (Kolk and Pinkse 2005). Therefore, the presence of carbon offset programs is likely to increase managers' tendency to adopt and disclose a long-term environmental goal when an industry peer disclosure is rare. Therefore, I predict:

H1: Managers are least likely to disclose long-term environmental performance goals when the prevalence of such disclosures among peer firms is low and carbon offset programs are absent.

III. Methodology

1. Participants

Participants are recruited from an MAB class at a public university. Fifty-seven participants spend approximately 15 minutes completing the study during the last week of the semester in exchange for extra credits. Participants are 27 years old, on average. Fifty-six percent of participants identify themselves as male, and 95% are native speakers of English or have equivalent fluency in English. On average, participants have taken an average of 2.61 and 2.84 accounting- and finance-related courses, respectively.

Participants have an average of seven years of working experience. Over 80% have evaluated firms' performance by analyzing at least one firm's financial statements before. Participants rate themselves an average of 4.11 on a seven-point scale in response to the question, "Are you familiar with the carbon emission issues" ($1 = Not \ at \ all$; $7 = To \ a \ very \ great$ *extent*). Overall, these participants have both the experience and the knowledge needed to understand the information in the instrument (Elliott et al., 2007).

2. Research Design and Procedures

I conduct a 2 x 2 between-participants experiment with the prevalence of long-term environmental goal disclosures among industry peer firms (*High* or *Low*) and carbon offsets (*Present* or *Absent*) as my manipulated, independent variables. All participants assume they are a fictional firm's Chief Executive Officer (CEO) and receive background information about the firm's operations, financial position, and environmental disclosures. The information of the firm is modeled on a real company in the chemical manufacturing industry. Then participants need to indicate how likely they want to set and disclose the proposed environmental goal of achieving net-zero annual carbon emissions by 2040 and their perceptions about disclosing such an environmental goal. The judgement is made on a 7-point scale. Then they will receive information from a sustainability consulting firm, which provides information about the percentage of industry peer firms that disclose the same environmental goal and also the introduction of carbon offset programs. After reviewing the information from the consulting firm, participants need to indicate again how likely they want to set and disclose the proposed environmental goal of achieving net-zero annual carbon emissions by 2040 and their perceptions about such an environmental goal. The primary dependent variable, *Likelihood*, reflects any change in participants' disclosure tendencies after receiving information from the sustainability consulting firm. After responding to the dependent measure, participants answer questions about their perceptions and judgments. Participants conclude the study by answering manipulation checks and demographic questions.

3. Disclosure Prevalence Manipulation

The information from a sustainability consulting firm includes details about the prevalence of long-term environmental goal disclosures among industry peer firms, wherein I manipulate the percentage of industry peer firms that disclose a long-term environmental goal.

Participants in the high (low) industry peer pressure condition are told that "85% (15%) of the firms' peer chemical manufacturers and distributors disclose an environmental goal of achieving net-zero annual carbon emissions by 2040 in their ESG reports".

4. Carbon Offsets Manipulation

I manipulate carbon offsets by providing information about the Carbon Offsets Program. Participants in the carbon offsets present condition are told that "Carbon Offset Program is another strategy firms can use to reduce carbon emissions" and are then given introductory information about the program. Participants in the carbon offsets absent condition do not receive such information.

5. Management Decisions

Participants are asked to indicate their perceptions of disclosing the environmental goal before and after my manipulations of the peer pressure and the carbon offsets. Specifically, I first capture participants' disclosure decision with the question "How likely are you to set and disclose the proposed environmental goal of achieving net-zero annual carbon emissions by 2040?" (1 = Very Unlikely, 7 = Very Likely). After I provide information about the percentage of industry peers' disclosure decisions and the option of participating in carbon offsets programs, participants are asked to indicate "How likely are you **now** to set and disclose the proposed environmental goal of achieving net-zero annual carbon emissions by 2040" (1 = Very Unlikely, 7 = Very Likely). I capture the change in their decisions as my first main dependent variable, *Likelihood*. Participants are also asked to indicate "Given the company's annual net emission reduction rate of about 6.5%, [the company's] proposed environmental goal of achieving net-zero annual carbon emissions by 2040 is plausible" (1 = Strongly Disagree, 7 = Strongly Agree). I capture their decisions as my second dependent variable, *Plausible*.

IV. Results

1. Manipulation Checks

To test the efficacy of the industry peer manipulation, participants are asked to indicate the percentage of peer firms who disclose an environmental goal of achieving net-zero annual carbon emissions by 2040. Eighty-one percent of participants correctly answered this question based on their experimental condition. As expected, responses are significantly associated with *Disclosure Prevalence* ($\chi^2 = 9.65$; p < 0.01) and are not associated with *Carbon Offsets* ($\chi^2 =$ 0.01; p = 0.91). Eighty-six percent of participants in the *Carbon Offsets Present* condition correctly indicated that they received information from the sustainability consultant about the carbon offsets program. Responses are not associated with *Disclosure Prevalence* ($\chi^2 = 1.00$; p =0.31). Collectively, these results are indicative of two successful manipulations. Four participants responded to both manipulation check questions incorrectly. I remove these four participants from our sample and conduct subsequent analyses on the 53 participants who responded to either manipulation check question correctly. Inferences are unchanged when the four participants who answered both manipulation check questions incorrectly are included in the analyses.

2. Tests of Hypothesis

H1 predicts that managers are least likely to disclose long-term environmental performance goals when the prevalence of such disclosures among peer firms is low and carbon offset programs are absent. To test this hypothesis, I conduct a 2 × 2 analysis of variance (ANOVA) with *Disclosure Prevalence (High* or *Low*) and *Carbon Offsets (Absent* or *Present*) as the independent variables and *Likelyhood* as the dependent variable. Table 1, Panel A provides descriptive statistics for my main dependent variable, *Likelihood*, by experimental condition. It shows that the change in likelihood for the participants to disclose the long-term goal is lowest when these participants are informed that the prevalence of such disclosures among peer forms is low and carbon offset programs are absent (mean = -0.70). In other words, this result shows that, in the absence of peer pressure and carbon offset programs, managers have the least incentive to alter their choices regarding environmental goal disclosure.

[Insert Table 1]

Table 1, Panel B reports the traditional ANOVA results, which reveal a significant Disclosure Prevalence × Carbon Offset interaction effect (F = 3.16; p = 0.04).

Table 1, Panel C presents the follow-up tests of simple effects. The follow-up simple effects test shows a significant effect of *Disclosure Prevalence* when Carbon Offset is absent (F=3.29, p=0.04). These results provide evidence that the presence of carbon offset programs increases the likelihood of disclosure when the prevalence of peer disclosures is low. Overall, the results in Table 1 provide evidence that is consistent with my first hypothesis.

Table 2, Panel B presents a 2 × 2 analysis of variance (ANOVA) with *Disclosure Prevalence* (*High* or *Low*) and *Carbon Offsets* (*Absent* or *Present*) as the independent variables and *Plausible* as the dependent variable. The descriptive statistics in Table 2, Panel A indicate that with a carbon offset program, managers perceive the long-term environmental goal as more plausible compared with no carbon offset program. It is even more plausible when the prevalence of long-term environmental goal disclosures among industry peer firms is low compared with the high prevalence of such disclosures. Table 2, Panel C presents the follow-up tests of simple effects. The traditional ANOVA reveals a marginally significant simple effect of carbon offset (*F* = 2.65 p = 0.06), yet an insignificant interaction effect (*F* = 0.38; p = 0.27). To further identify the impact of disclosure prevalence on managers' disclosure choices, the follow-up simple effects test reveals a marginal significant effect of carbon offset when disclosure prevalence is low (F=2.34, p=0.07). These results provide additional insights into managers' belief in the long-term environmental goal as more plausible when they have the option to buy carbon offsets.

[Insert Table 2]

3. Supplemental Analysis – Path Analysis

Since prior literature reports the impacts of managers' pro-environmental values on their decisions (e.g., Bryan et al. 2019; Martin and Moser 2016), I check whether managers' proenvironment values influence my results. I use three questions to measure managers' environmental self-identity, which reflects "the extent to which someone perceives oneself as the type of person who acts environmentally friendly" (Bouman, et al., 2018, p. 3), on 7-point scales (1 strongly disagree, 7 strongly agree). I then compute a composite score by calculating the mean of all three items. Participants with a score above the mean are classified as having high proenvironmental values, while those with a score below the mean are classified as having low proenvironmental values. Among my 57 samples, only 6 are classified as having low proenvironmental values. The results remain consistent whether I include or exclude these 6 samples.

I next turn to path analysis to examine whether the prevalence of long-term environmental goal disclosures among industry peer firms and the availability of carbon offset programs exert indirect effects on the change of managers' disclosure decisions *through* perceptions of the achievability of the proposed long-term environmental goal. The independent variables are *Disclosure Prevalence*, *Carbon Offsets*, and *Disclosure Prevalence* × *Carbon Offsets*, the process variable is *Plausible*, and the dependent variable is *Likelihood*. Figure 1 shows this model, which appears to be a good fit. The Standardized Root Mean Square Residual (SRMR) is 0.08, the Comparative Fit Index (CFI) is 0.96, and a chi-squared statistic divided by its degrees of freedom (χ^2/df) is 1.20 (the chi-square test is also insignificant (p = 0.31, two-tailed)). The model omits insignificant paths to ease exposition.

[Insert Figure 1]

Consistent with my expectations, the model suggests that the presence of carbon offset programs increases managers' assessments of the achievability of the proposed long-term environmental goal (*coeff.* = 0.37; p < 0.01, one-tailed), which increases the managers' tendencies to adopt and disclose the long-term environmental goal (*coeff.* = 0.39; p < 0.01, one-tailed). In addition, *Carbon Offsets* exert a significant indirect effect on *Likelihood* via *Plausible* (*coeff.* = 0.36; p < 0.02, one-tailed). Taken together, this evidence offers additional support for our expectation that the availability of carbon offset programs impacts managers' perceptions of the achievability of long-term environmental goals, which ultimately impacts their adoption and disclosure of long-term environmental goals.

In addition, there is a direct effect of both *Disclosure Prevalence* and the *Disclosure Prevalence* × *Carbon Offsets* interaction on *Likelihood* (*coeff.* = 0.24; p = 0.04, one-tailed, for *Disclosure Prevalence; coeff.* = -0.37; p < 0.01, one-tailed, for *Disclosure Prevalence* × *Carbon Offsets*). This indicates that the effect of *Disclosure Prevalence* on *Likelihood* is not explained by managers' plausibility perceptions, nor is the effect of the *Disclosure Prevalence* × *Carbon Offsets* interaction. These results are consistent with *Plausible* partially, rather than fully, explaining the effect of my manipulations on *Likelihood*. One explanation for this finding may be that managers' judgments about moral accountability are separate from their judgments about the achievability of the long-term environmental goal, as suggested by my theory.

V. Conclusion

In this study, I experimentally examine how the prevalence of long-term environmental goal disclosures among industry peer firms and the availability of carbon offset programs industry impact managers' disclosure of long-term environmental goals. The results suggest that both factors jointly impact managers' decisions to adopt and disclose such goals. Specifically, high prevalence of long-term environmental goal disclosures among a firm's industry peers increases managers' tendency to adopt and disclose similar goals, consistent with this peer behavior increasing managers' perceptions of moral responsibility. Further analysis shows that managers' perceptions of the plausibility of achieving such goals are higher when carbon offset programs are present, resulting in greater tendencies to adopt and disclose long-term environmental goals.

As with all research, my study has limitations that provide opportunities for future research. First, my experiment focuses on the availability of carbon offset programs due to the current debate around the costs and benefits of such programs. Future research could explore how the presence of alternative carbon reduction strategies impacts inferences. Second, my experiment is limited in the information I provide to participants, which may limit the external validity of my findings. For example, managers have other resources or standards to evaluate industry peer performances. Future research could investigate other factors that may impact managers' decisions. Thirdly, the participants in my sample do not exhibit variation in pro-environmental values. Future research could investigate whether managers with low pro-environmental values react differently.

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ТАВ	LE 1	
The impact of short-	-term goal on Invest	
Panel A: Measures of Invest, Mean [Standard	Deviation] n	
	Environmental G	oal Disclosure
	LT Only	LST
Low Pro-Environmental Value	2.37	2.22
	[1.54]	[1.20]
	19	9
High Pro-Environmental Value	1.73	1.79
	[1.01]	[0.80]
	11	14

TABLES AND FIGURES FOR ESSAY ONE

Panel B: 2 × 2 ANOVA Model of Invest

Source of Variation	Sum of Squares	d.f.	Mean Square	F-Statistic	<i>p</i> -value
Goal	0.02	1	0.02	0.02	0.90
Pro_Env	3.56	1	3.56	2.41	0.06^{\dagger}
Goal × Pro_Env	0.13	1	0.13	0.09	0.77
Error	72.52	49	1.48		

Panel C: Tests of Simple Effects for Invest

Source of Variation	d.f.	F-Statistic	<i>p</i> -value
Effect of Goal (LT Only vs. LST) given High	1	0.01	0.91
Effect of Goal (LT Only vs. LST) given Low	1	0.09	0.77
Effect of Pro_Env given LST Goal	1	1.94	0.17
Effect of Pro_Env given LT Only Goal	1	0.71	0.40

Table 1 presents evidence from a between-subjects experiment wherein I manipulate *Environmental Goal Disclosure* (*LT only*--Long-term environmental performance goal or *LST*--Short-term environmental performance goal in addition to a long-term environmental performance goal). And a measured variable, *Pro-Environmental Value* (*High* or *Low*). My dependent variable, *Invest*, extract of question: "How much of your \$10,000 would you invest in [the company]." (1 = \$0, 6 = \$10,000). Panel B presents a 2×2 ANOVA with *Environmental Goal Disclosure* and *Pro-Environmental Value* as the independent variables and *Invest* as the dependent variable. Panel C presents the simple main effects. [†] Indicates one-tailed *p*-value.

Panel A: Measures of Invest, Mean [Standard	Deviation] n		
	Environmental Goal Disclosure		
	LST	LSTG	
Low Pro-Environmental Value	2.22	1.50	
	[1.20]	[0.55]	
	9	6	
High Pro-Environmental Value	1.79	2.20	
	[0.80]	[1.30]	
	14	5	

TABLE 2The impact of external commitments on Invest

Panel B: 2 × 2 ANOVA Model of Invest

	Sum of		Mean		
Source of Variation	Squares	d.f.	Square	F-Statistic	<i>p</i> -value
Goal	0.17	1	0.17	0.18	0.67
Pro_Env	0.13	1	0.13	0.13	0.71
Goal × Pro_Env	2.35	1	2.35	2.50	0.06^{\dagger}
Error	28.21	30	0.94		

Panel C: Tests of Simple Effects for Invest

Source of Variation	d. I.	F-Statistic	<i>p</i> -value
Effect of Goal (LST vs. LSTG) given High	1	2.00	0.09^{\dagger}
Effect of Goal (LST vs. LSTG) given Low	1	0.67	0.42
Effect of <i>Pro_Env</i> given Goal (LST)	1	1.11	0.30
Effect of <i>Pro_Env</i> given Goal (LSTG)	1	1.42	0.24

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Table 2 presents evidence from a between-subjects experiment wherein I manipulate *Environmental Goal Disclosure* (*LST*--Short-term environmental performance goal in addition to a long-term environmental performance goal or *LSTG*- Short-term environmental performance goal in addition to a long-term environmental performance goal, but also have external commitments). And a measured variable, *Pro-Environmental Value* (*High* or *Low*). My dependent variable, *Invest*, extract of question: "How much of your \$10,000 would you invest in [the company]." (1 = \$0, 6= \$10,000). Panel A presents descriptive statistics by condition. Panel B presents a 2×2 ANOVA with *Environmental Value* (*Bigh* or *Low*). And with *Environmental Goal Disclosure* and *Pro-Environmental Value* as the independent variables and *Invest* as the dependent variable. Panel C presents the simple main effects. [†] Indicates one-tailed *p*-value.

Panel A: Measures of Goal Plausible, Mean [S	Standard Deviation	n	
	Environmental Goal Disclosure		
	LT Only	LST	
Low Pro-Environmental Value	3.82	3.44	
	[1.22]	[1.33]	
	19	9	
High Pro-Environmental Value	3.50	3.53	
	[1.45]	[1.66]	
	11	14	

TABLE 3
The impact of short-term goal on Goal Plausible

Panel B: 2 × 2 ANOVA Model of Goal Plausible

	Sum of		Mean		
Source of Variation	Squares	<u>d.f.</u>	Square	F-Statistic	<i>p</i> -value
Goal	0.49	1	0.49	0.25	0.61
Pro_Env	0.37	1	0.37	0.19	0.66
Goal × Pro_Env	0.17	1	0.17	0.09	0.77
Error		49	1.96		

Panel C: Tests of Simple Effects for Goal Plausible

Source of Variation	d.f.	F-Statistic	<i>p</i> -value
Effect of Goal (LT Only vs. LST) given High	1	0.32	0.58
Effect of Goal (LT Only vs. LST) given Low	1	0.02	0.89
Effect of Pro_Env given Goal (LT Only)	1	0.30	0.58
Effect of <i>Pro_Env</i> given Goal (LST)	1	0.01	0.92

Table 3 presents evidence from a between-subjects experiment wherein I manipulate *Environmental Goal Disclosure* (*LT Only*--Long-term environmental performance goal or *LST*--Short-term environmental performance goal in addition to a long-term environmental performance goal). And a measured variable, *Pro-Environmental Value* (*High* or *Low*). My dependent variable, *Goal Plausible*, extract of question: "[The company]'s environmental goals are plausible." (1 = Strongly Disagree, 7 = Strongly Agree). Panel B presents a 2×2 ANOVA with *Environmental Goal Disclosure* and *Pro-Environmental Value* as the independent variables and *Goal Plausible* as the dependent variable. Panel C presents the simple main effects. [†] Indicates one-tailed *p*-value.
Panel A: Measures of Goal Plausible Mean [S	tandard Deviation	1] n <i>Coal Disclosu</i>
	LST	LSTG
Low Pro-Environmental Value	3.44	3.17
	[1.33]	[1.33]
	9	6
High Pro-Environmental Value	3.53	3.60
	[1.66]	[1.14]
	14	5

TABLE 4
The impact of green commitments on Goal Plausible

Panel B: 2 × 2 ANOVA Model of Goal Plausible

	Sum of		Mean		
Source of Variation	Squares	d.f.	Square	F-Statistic	<i>p</i> -value
Goal	0.06	1	0.06	0.03	0.86
Pro_Env	0.44	1	0.44	0.23	0.63
Goal × Pro_Env	0.26	1	0.26	0.14	0.71
Error	55.76	30	1.86		

Panel C: Tests of Simple Effects for Goal Plausible

Source of Variation	d.f.	F-Statistic	<i>p</i> -value
Effect of Goal (LST vs. LSTG) given High	1	0.02	0.89
Effect of Goal (LST vs. LSTG) given Low	1	0.15	0.70
Effect of <i>Pro_Env</i> given Goal (LST)	1	0.01	0.92
Effect of <i>Pro_Env</i> given Goal (LSTG)	1	0.28	0.60

Table 4 presents evidence from a between-subjects experiment wherein I manipulate *Environmental Goal Disclosure* (*LST*--Short-term environmental performance goal in addition to a long-term environmental performance goal or *LSTG*- Short-term environmental performance goal in addition to a long-term environmental performance goal, but also have external commitments). And a measured variable, *Pro-Environmental Value* (*High* or *Low*). My dependent variable, *Goal Plausible*, extract of question: "[The company]'s environmental goals are plausible." (1 = *Strongly Disagree*, 7 = *Strongly Agree*). Panel B presents a 2 × 2 ANOVA with *Environmental Goal Disclosure* and *Pro-environmental Value* as the independent variables and *Goal Plausible* as the dependent variable. Panel C presents the simple main effects. [†] Indicates one-tailed *p*-value.

Panel A: Measures of Management Commitment, Mean [Standard Deviation] n				
	Environmental Goal Disclosure			
	LT Only	LST		
Low Pro-Environmental Value	3.95	4.11		
	[1.31]	[1.62]		
	19	9		
High Pro-Environmental Value	3.64	3.57		
	[1.86]	[1.40]		
	11	14		

 TABLE 5

 The impact of short-term goal on Management Commitment

Panel B: 2 × 2 ANOVA Model of Management Commitment

	Sum of		Mean		
Source of Variation	Squares	d.f.	Square	F-Statistic	<i>p</i> -value
Goal	0.03	1	0.03	0.01	0.91
Pro_Env	2.22	1	2.22	0.97	0.33
Goal × Pro_Env	0.16	1	0.16	0.07	0.79
Error	111.81	49	2.28		

Panel C: Tests of Simple Effects for Management Commitment

Source of Variation	d.f.	<i>F</i> -Statistic	<i>p</i> -value
Effect of Goal (LT Only vs. LST) given High	1	0.01	0.92
Effect of Goal ((LT Only vs. LST) given Low	1	0.07	0.79
Effect of <i>Pro_Env</i> given Goal (LT Only)	1	0.30	0.59
Effect of <i>Pro_Env</i> given Goal (LST)	1	0.70	0.41

Table 5 presents evidence from a between-subjects experiment wherein I manipulate *Environmental Goal Disclosure* (*LT Only*--Long-term environmental performance goal or *LST*--Short-term environmental performance goal in addition to a long-term environmental performance goal). And a measured variable, *Pro-Environmental Value* (*High* or *Low*). My dependent variable, *Management Commitment*, extract of question: "[The company]'s management is committed to reducing the carbon emissions resulting from the company's operations." (1 = Strongly Disagree, 7 = Strongly Agree)". Panel A presents descriptive statistics by condition. Panel B presents a 2×2 ANOVA with *Environmental Goal Disclosure* and *Pro-Environmental Value* as the independent variables and *Management Commitment* as the dependent variable. Panel C presents the simple main effects. [†] Indicates one-tailed *p*-value.

Panel A: Measures of Management Credibility	y Factor, Mean [S	tandard Deviation] n		
	Environmental Goal Disclosure			
	LST	LSTG		
Low Pro-Environmental Value	4.11	4.83		
	[1.62]	[1.47]		
	9	6		
High Pro-Environmental Value	3.57	5.00		
	[1.40]	[1.87]		
	14	5		

TABLE 6
<i>The impact of external commitments on Management Commitment</i>

Panel B: 2 × 2 ANOVA Model of Management Commitment

	Sum of		Mean		
Source of Variation	Squares	d.f.	Square	F-Statistic	<i>p</i> -value
Goal	8.42	1	8.42	3.55	0.04^{\dagger}
Pro_Env	0.25	1	0.25	0.11	0.75
Goal × Pro_Env	0.91	1	0.91	0.38	0.54
Error	71.15	30	2.37		

Panel C: Tests of Simple Effects for Management Commitment

Source of Variation	d.f.	F-Statistic	<i>p</i> -value
Effect of Goal (LST vs. LSTG) given High	1	3.17	0.05^{\dagger}
Effect of Goal (LST vs. LSTG) given Low	1	0.79	0.38
Effect of <i>Pro_Env</i> given Goal (LST)	1	0.67	0.42
Effect of <i>Pro_Env</i> given Goal (LSTG)	1	0.03	0.86

Table 6 presents evidence from a between-subjects experiment wherein I manipulate *Environmental Goal Disclosure* (*LST*--Short-term environmental performance goal in addition to a long-term environmental performance goal or *LSTG*- Short-term environmental performance goal in addition to a long-term environmental performance goal, but also have external commitments). And a measured variable, *Pro-Environmental Value* (*High* or *Low*). My dependent variable, *Management Commitment*, extract of question: "[The company]'s management is committed to reducing the carbon emissions resulting from the company's operations." (1 = Strongly Disagree, 7 = Strongly Agree)". Panel A presents descriptive statistics by condition. Panel B presents a 2 × 2 ANOVA with *Environmental Goal Disclosure* and *Pro-Environmental value* as the independent variables and *Management Commitment* as the dependent variable. Panel C presents the simple main effects. [†] Indicates one-tailed *p*-value.

TABL	ES AND FIGU	URES FOR	ESSAY TWO		
	T	ABLE 1			
	Test o	f Hypothesis			
Panel A: Descriptive Statistic	es of <i>Likelihood</i>	l by Conditi <i>Disclosure</i>	on, Mean [Sta <i>Prevalence</i>	ndard Devia	ation] <i>n</i>
		Low	High		
Car	bon Offsets	-0.70	0.21		
	Absent	[1.49]	[1.42]		
	Carbon Offsets		14		
Car			-0.36		
	Present	[0.88]	[1.08]		
		15	14		
Panel B: 2 × 2 ANOVA Mode	l of <i>Likelihood</i>	,			
Source of Variation	S.S.	df	M.S.	F-Stat.	<i>p</i> -value
Disclosure Prevalence (DP)	1.26	1	1.26	0.85	0.36^{\dagger}
Carbon Offsets (CO)	0.01	1	0.01	0.01	0.93†
$DP \times CO$	4.69	1	4.69	3.16	0.04^{\dagger}

Panel C: Tests of Simple Effects for Likelihood

Error

Source of Variation	df	F-Statistic	<i>p</i> -value
Effect of Disclosure Prevalence given Carbon Offsets Absent	1	3.29	0.08
Effect of Disclosure Prevalence given Carbon Offsets Present	1	0.41	0.52
Effect of Carbon Offsets given Low Disclosure Prevalence	1	1.62	0.10^{+}
Effect of Carbon Offsets given High Disclosure Prevalence	1	1.54	0.22

49

1.48

72.60

Table 1 presents evidence from a between-subjects experiment wherein I manipulate the prevalence of long-term environmental disclosures among a firm's industry peers (high vs. low) and the availability of carbon offset programs (absent vs. present). The dependent variable, *Likelihood*, reflects changes in participants' disclosure of long-term environmental goals after reviewing the two manipulations. Panel A presents descriptive statistics by condition. Panel B presents a 2×2 ANOVA with *Disclosure Prevalence* and *Carbon Offsets* as the independent variables and *Likelihood* as the dependent variable. Panel C presents follow-up tests of simple effects. [†] Indicates one-tailed *p*-value, consistent with my directional prediction.

Panel A: Descriptive Statistics of Plausibl	e by Condition	n, Mean [Stan	dard Deviation] <i>n</i>
	Disclosure		
	Low	High	
Carbon Offsets	4.70	5.00	
Absent	[1.42]	[1.24]	
	10	14	
Carbon Offsets	5.47	6.14	
Present	[1.13]	[0.86]	
	15	14	

 TABLE 2

 Supplemental Analysis on Manager's Perception of Goal Plausibility

Panel B: 2 × 2 ANOVA Model of *Plausible*

Source of Variation	S.S.	df	M.S.	F-Stat.	<i>p</i> -value
Disclosure Prevalence (DP)	3.08	1	3.08	2.30	0.14
Carbon Offsets (CO)	11.78	1	11.78	8.81	$< 0.01^{\dagger}$
$DP \times CO$	0.46	1	0.46	0.34	0.56
Error	65.55	49	1.34		

Panel C: Tests of Simple Effects for Plausible

Source of Variation	df	F-Statistic	<i>p</i> -value
Effect of Disclosure Prevalence given Carbon Offsets Absent	1	0.39	0.53
Effect of Disclosure Prevalence given Carbon Offsets Present	1	2.48	0.12
Effect of Carbon Offsets given Low Disclosure Prevalence	1	2.64	0.06^{\dagger}
Effect of Carbon Offsets given High Disclosure Prevalence	1	6.83	$< 0.01^{+}$

Table 2 presents evidence from a between-subjects experiment wherein we manipulate the prevalence of long-term environmental disclosures among a firm's industry peers (high vs. low) and the availability of carbon offset programs (absent vs. present). The dependent variable, *Plausible*, is participants' agreement with the following statement, "Given the company's annual net emission reduction rate of about 6.5%, [the company's] proposed environmental goal of achieving net-zero annual carbon emissions by 2040 is plausible" on a 7-point scale (1 = *Strongly Disagree*, 7 = *Strongly Agree*). Panel A presents descriptive statistics by condition. Panel B presents a 2×2 ANOVA with *Disclosure Prevalence* and *Carbon Offsets* as the independent variables and *Plausible* as the dependent variable. Panel C presents follow-up tests of simple effects. [†] Indicates one-tailed *p*-value, consistent with my directional prediction.



FIGURE 1 Supplemental Evidence from Structural Equations Analysis

Figure 1 reports the results of a path analysis using three independent variables, *Disclosure Prevalence, Carbon Offsets*, and *Disclosure Prevalence* × *Carbon Offsets*, one process variable, *Plausible* and one dependent variable, *Likelihood*. The model appears to be a good fit, with a Standardized Root Mean Square Residual (SRMR) of 0.08, a Comparative Fit Index (CFI) of 0.96, and a chi-squared statistic divided by its degrees of freedom (χ^2/df) of 1.20 (the chi-square test is also insignificant (p = 0.31)). I report statistically significant standardized coefficient estimates along each hypothesized path. In addition to depicted statistically significant direct effects, the model reveals a statistically significant indirect effect of *Carbon Offsets* on *Likelihood* via *Plausibility* (coeff. = 0.36, p = 0.02, one-tailed). [†], ^{††}, and ^{†††} denote statistical significance for directional predictions at the p = 0.10, 0.05, and 0.01 one-tailed levels, respectively.