

Greenhouse Gas Disclosure Research: A Look Back and a Look Forward

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Recently, there has been a significant increase in policymaking activities pertaining to environmental, social, and governance (ESG) disclosures by regulators and standard setters around the globe with an emphasis on disclosures related to climate change. This article provides a retrospective summary of research on the relevance of climate disclosures to investors. Drawing on these insights, we provide considerations for future research themes based on recent disclosure proposals. Table 1 summarizes the themes and research questions that we develop in this article.

Table 1: Research themes and related research questions.

Theme	Research Question
<i>#1 – Companies’ Strategic Choice of Disclosure Requirements</i>	<p>If applying alternative disclosure requirements is allowed by a regulator, what strategic considerations drive the companies’ choice of disclosure requirements?</p> <p>Does companies’ choice of disclosure requirements act as a signal conveying private information about, e.g., management’s beliefs and the future performance of the company?</p>
<i>#2 – Unintended Consequences of SEC’s Proposed Disclosure Rules</i>	<p>Does the SEC’s proposed Scope 3 requirement unintentionally diminish companies’ efforts to reduce Scope 3 emissions?</p>

#3 – <i>Transferring Scope 1 Emissions</i>	Does allowing Scope 3 emissions disclosure to be optional result in opportunistic emissions shifting by companies?
#4 – <i>Relevance of Scope 3 Emissions for Investors</i>	<p>Do investors find Scope 3 emissions relevant?</p> <p>Do portfolio managers shift to a more holistic approach of divesting high GHG emission companies regardless of Scope?</p> <p>How does investors’ and/or portfolio managers’ response impact managers’ choices related to managing Scope 1, 2, and 3 emissions?</p> <p>How does investors’ and/or portfolio managers’ response impact managers’ choices related to reporting Scope 1, 2, and 3 emissions?</p>

Recent research supports the materiality of climate disclosures to investors. Specifically, this research examines whether and how the market reacts to companies’ disclosure of greenhouse gas (GHG) emissions. These studies indicate that higher levels of GHG emissions have a negative effect on companies’ equity value (Matsumura et al. 2014; Clarkson et al. 2015; Griffin et al. 2017) and are associated with higher equity risks and related costs (Auzepy et al. 2022; Bolton and Kacperczyk 2021). Interestingly, Auzepy et al. (2022) find that the positive effect of GHG emissions on equity risk is higher for companies in regimes without mandatory emissions disclosure requirements compared to companies in regimes with mandatory emissions disclosure requirements.¹ Collectively, the research on GHG emissions disclosure suggests that companies can increase their market value and decrease their perceived risk if they mitigate their GHG emissions levels, and if regulators move to mandatory disclosure regimes.

¹ See Clarkson, Grewal, and Jackson (2022) for additional insights about market costs GHG emissions impose on firms and the benefits of mandated GHG emissions disclosures.

There are different strategies that companies are employing as well as different types (i.e., scopes) of emissions they can mitigate to increase their equity value or decrease their perceived risk.² Johnson et al. (2020) examine the market reaction to some of these strategies by investigating whether investors value companies differently based on the strategies companies use to mitigate GHG emissions. These strategies include making operational changes, which reduces Scope 1 emissions attributable to the company, and purchasing offsets, which reduces emissions unattributable to the company. Using an experiment, the authors hold constant a company's financial performance, investment in emissions mitigation, and net emissions, and find evidence that retail investors perceive the company to be more valuable when it primarily uses an operational change strategy versus an offsets strategy. However, consistent with theory, this result only occurs when the company's prior sustainability performance is below the industry average and not when it is above the industry average. This difference in company value is consistent with the notion that retail investors believe information about a company's emissions management strategy is material. Supplemental exploratory analyses reveal that these results are mediated by investors' perception that an operational change strategy is more socially and environmentally responsible than an offsets strategy for below industry average companies.

In a related study, Johnson et al. (2022) provide insights for policymakers as to one impact of disaggregating Scope 1 and 2 emissions in ESG reporting. Specifically, Johnson et al. (2022) examine how management's focus on mitigating direct versus indirect emissions

² The Greenhouse Gas Protocol identifies three scopes of emissions. Scope 1 emissions include "GHG emissions from sources that are owned or controlled by the company, for example, emissions from combustion in owned or controlled boilers, furnaces, vehicles, etc.; emissions from chemical production in owned or controlled process equipment". Scope 2 emissions are the indirect GHG emissions "from the generation of purchased energy". Scope 3 emissions are all other indirect emissions that occur in the overall value chain of the organization—both upstream and downstream—but are not owned or controlled by the company. (See, *A Corporate Accounting and Reporting Standard REVISED EDITION*, <http://www.ghgprotocol.org/corporate-standard>, retrieved May 22, 2022.)

influences the ability to attract capital from investors, and how this ability is moderated by the company's environmental, social, and corporate governance (ESG) performance combined with adoption of an external emissions target. Using an experiment, they find that retail investors perceive a company with a relatively poor ESG performance record as more socially responsible and are therefore more willing to invest when management focuses on mitigating direct (e.g., Scope 1) versus indirect (e.g., Scope 2) emissions. The authors also find that, regardless of ESG performance, adopting an external industry-based emissions target diminishes willingness to invest when management focuses on mitigating indirect emissions, but not when they focus on mitigating direct emissions.³

The calculation of Scope 3 emissions can be considerably costly for companies (Schmidt et al. 2021). This is due to the need for a detailed understanding of the entire value chain as well as related data inputs from the various suppliers and clients both up and down the value chain (Schmidt et al. 2021). For this reason, current measurement and reporting requirements have focused on Scope 1 and 2 emissions (Shrimali 2021). However, Scope 3 emissions have an outsized impact for most companies' overall emissions.⁴ Thus, focus is shifting towards better measuring, managing, and reporting of Scope 3 emissions (Shrimali 2021).

Unfortunately, the current GHG Protocol Scope 3 disclosures “offers so much scope for discretion and ambiguity that companies can more or less mark their emissions to model — or even refuse to disclose them at all.” (Fickling and He 2020). In response to these concerns,

³ We paraphrased and summarized the abstracts of Johnson et al. (2020) and (2022) to provide the background on these studies.

⁴ For example, on average, the Scope 3 emissions are 5.5 times the amount of combined Scope 1 and Scope 2 emissions (<https://www.bsr.org/en/our-insights/report-view/scope-3-emissions-science-based-targets-climate-action-value-chain>, accessed May 23, 2022). And, “for many businesses, Scope 3 emissions account for more than 70 percent of their carbon footprint.” (<https://www2.deloitte.com/uk/en/focus/climate-change/zero-in-on-scope-1-2-and-3-emissions.html>, accessed May 23, 2022).

the Securities and Exchange Commission (SEC), the International Sustainability Standards Board (ISSB), and the European Financial Reporting Advisory Group (EFRAG) have proposed measuring and reporting requirements related to Scope 3 emissions. We next provide some considerations for future research themes based on these proposals and finally derive corresponding research questions.

Future Research Themes

Research Theme #1 – Companies’ Strategic Choice of Disclosure Requirements

It is unclear at this point whether the SEC and other regulators relying on the disclosure requirements outlined by the ISSB and the EFRAG will allow multinational enterprises to use alternative reporting based on the disclosure requirements put forth by the other regimes. Whether or not alternative reporting is allowed, there are important differences across these three regimes pertaining to Scope 3 emission disclosure requirements.⁵ Specifically, the SEC proposal indicates the SEC will require companies to disclose Scope 3 emissions if they are material or if companies have set targets or goals to reduce Scope 3 emissions. Similarly, disclosure of Scope 3 is required by EFRAG and, as with all mandatory disclosure requirements established by the European Sustainability Reporting Standards, presumed to be material. However, the presumption is rebuttable on the basis of reasonable and supportable evidence.⁶ The ISSB will require disclosure of Scope 3 emissions. However, they include flexibility in the measurement and reporting.⁷

⁵ Note that the proposals informing the following comparison of disclosure requirements are subject to revision.

⁶ Just recently, the European Commission proposed a number of changes to the initial EFRAG proposal with the aim of reducing the reporting burden and easing the first-time application of the standards. With the proposed changes, most disclosures become subject to a materiality assessment, comparable to the SEC proposal.

⁷ The ISSB confirmed that they will require reporting of Scope 3 emissions. However, there is discussion on various short-term relief provisions including such ideas as additional time, “safe harbour” provisions, and additional measurement guidance, among others. (<https://www.corporatedisclosures.org/content/top-stories/issb-confirm-scope-3-emissions-in-ifs-s2.html>; <https://www.iasplus.com/en/meeting-notes/issb/2022/december/climate>; both accessed June 20, 2023).

If alternative reporting is allowed, companies will have the ability to choose which disclosure requirements to follow, and the choices companies make will likely be driven by strategic factors. Given how costly the measurement and disclosure of Scope 3 emissions are, companies may strategically choose the requirements that minimize this cost. Alternatively, companies may strategically choose the requirements that provide high-quality information. Thus, companies' choice of disclosure requirements may act as a signal conveying private information about things such as management's beliefs as well as about the future performance of the company.

Research Theme #2 – Unintended Scope 3 Consequences of SEC's Proposed Disclosure Rules

The SEC's proposal currently indicates that disclosure of Scope 3 emissions will be required if the registrant has set an emissions reduction target or goal that includes Scope 3 emissions. Such a requirement makes sense for companies that have a target or goal in place because investors would want to be able to track a firm's progress toward meeting that target or goal. However, for companies that have not yet set targets or goals or for companies that have not yet incorporated Scope 3 emissions into their existing targets or goals, this disclosure requirement coupled with the costly nature of measuring and disclosing Scope 3 emissions may disincentivize companies from doing so. Consequently, the SEC's proposed Scope 3 requirement may unintentionally diminish companies' efforts to reduce Scope 3 emissions. Yet, stakeholders are pushing for companies' Scope 3 information (SEC 2022). Future research can explore the inherent tension between stakeholder demands for Scope 3 disclosures and companies' ability to avoid reporting this costly information to examine factors that may nudge managers to choose disclosure over non-disclosure.

Research Theme #3 – Transferring Scope 1 Emissions

The current proposals by the SEC and ISSB would make the measurement and disclosure of Scope 1 and 2 emissions mandatory. In contrast, the proposals would not make the measurement and disclosure of Scope 3 unconditionally mandatory. Similarly, Scope 1, 2, and 3 disclosure would be required by EFRAG and presumed to be material (which is, however, rebuttable on the basis of reasonable and supportable evidence). Consequently, one way for companies to obfuscate their emissions is to shift their emissions from Scope 1 (which are required to be disclosed) to Scope 3 (which are not required to be disclosed) by transferring business activities to independent third parties. Companies can, for example, outsource, i.e., pay another company for goods or services that were previously produced/provided by the company itself. In other cases, shifting emissions may even come along with cost savings. For example, in 2022, one U.S. company discontinued its complimentary transportation service for its guests between its amusement park and the nearest airport. Consequently, the company transferred its guests' transportation needs to third parties (e.g., taxis, Uber, and Lyft) and shifted the associated emissions from the company's Scope 1 to Scope 3. If the company does not disclose its Scope 3 emissions, such a move would make it appear that the company's absolute emissions have come down. In actuality, the opposite might be the case because the company's guests' transportation needs may be creating more emissions, given individual car services likely generate more emissions per passenger than the company's shuttle service. Research could provide insight into whether allowing Scope 3 emissions disclosure to be optional results in opportunistic emissions shifting by companies.

Research Theme #4 – Relevance of Scope 3 Emissions for Investors

To date, prior research does not find evidence that Scope 3 disclosures are relevant to investors (Auzepy et al. 2022) or are considered when investors construct exclusionary investment screens (Bolton and Kacperczyk 2021). These results are puzzling because, for some industries, Scope 3 emissions constitute the largest proportion of absolute emissions by far and theoretically provide useful information about company-specific, climate-related risks. These risks include transition risk (i.e., risks companies face as the world transitions to a low carbon economy such as changes in regulation; shifts in investor, creditor, and consumer preferences; and technological innovation). Thus, research exploring if and when investors find Scope 3 emissions relevant would be useful to regulators.

Additionally, Bolton and Kacperczyk (2021) note that portfolio managers' current focus on Scope 1 emissions and lack of focus on Scope 3 may lead to an overweighting of portfolios with higher Scope 3 emissions. As Scope 3 reporting becomes more common and accuracy concerns are addressed (Kaplan and Ramanna 2022), future research could explore: (1) whether portfolio managers shift to a more wholistic approach of divesting high GHG emission companies (regardless of Scope), and to what extent this impacts managers' choices related to (2) managing as well as (3) reporting Scope 1, 2, and 3 emissions.

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