

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

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Abstract

This paper investigates carbon emissions materiality with regards to financial statements and investigates potential methods of accounting for carbon emission rights. We investigate whether some of the largest U.S. companies should be required to discuss and quantify greenhouse gas emissions, as defined by the GHG Protocol, in the required 10-K annual report. Our analysis uses a new metric, based on social carbon cost, that suggests social cost of carbon emissions could be material, and supports the need for transparent accounting of the financial impact of carbon emissions in the required 10-K annual report. We searched each company's 10-K for information on climate change and emissions-related disclosures. We found that while most companies acknowledge climate change as a risk factor, their 10-K narratives do not discuss or explain the impact of emissions on financial performance. Our findings suggest that climate-related factors are not being appropriately captured in current 10-Ks despite increasing calls for greater transparency on climate-related exposure, raising concerns that investors are not receiving the appropriate information necessary to evaluate investments. Providing such information would allow investors to gain a better understanding of company risks, and enhance their ability to make better investment choices.

Keywords: Carbon Emissions Reporting; Carbon Offsets; Environmental Reporting; Environmental Accounting

Introduction

As world economies move toward tackling climate change, many businesses are adopting carbon pricing as a flexible, cost-effective mechanism to be seen as embracing more sustainable practices in an effort to attract more investors and prevent further government regulation. Carbon pricing assigns a price to greenhouse gas emissions. This serves as an economic signal to emitters, to reduce their carbon footprint, a company can either transform their activities and lower their emissions, or continue emitting and paying for their emissions (The World Bank, n.d.) through the purchase of carbon offsets. Carbon pricing is important both to businesses and investors in evaluating the impact of mandatory carbon prices on business operations and investment

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portfolios, allowing them to reassess investment strategies and reallocate capital toward low-carbon or climate-resilient activities (The WorldBank, n.d.).

As of 2020, internal carbon pricing shows continued growth worldwide, with reports showing that more than 2,000 companies disclose current or planned use of internal carbon pricing (CDP, 2021). With increased awareness about carbon pricing, analyses also show that carbon pricing has a significant impact on a company's reported financial performance, with some estimates showing that "almost half of listed global companies would face a rise or fall of more than 20% in earnings if carbon prices rose to \$100 a tonne" (Schroders, 2017). As such, the Financial Stability Board's Task Force on Climate-Related Financial Disclosures has mandated that "it is important for affected industries to consider the potential impacts of such pricing on business revenues." (Task Force on Climate-Related Financial Disclosures, 2017).

With more and more businesses committing to become carbon neutral over the next several decades, purchasing carbon offsets has increased in popularity as a means to lower a business' greenhouse gas emissions footprint. A carbon offset represents the reduction of one ton of carbon dioxide or its equivalent in other greenhouse gases (Carbon Offset Guide, n.d.; Curran, 2009). Carbon offsets thus allow businesses to cancel their emissions through purchasing carbon credits from an emissions trading scheme (Howard, 2020).

Most significantly, the United States' Securities and Exchange Commission (SEC) recently proposed rule changes that would require registrants to include certain climate-related disclosures in their registration statements and periodic reports, including information about climate-related risks that are reasonably likely to have a material impact on their business, results of operations, or financial condition, and certain climate-related financial statement metrics in a note to their audited financial statements (SEC, 2022). Under this proposal, companies need to disclose their direct greenhouse gas emissions, or scope 1 emissions, and their emissions from their electricity and other forms of energy they use, or scope 2. This paper investigates the materiality of company carbon emissions, discusses the current and potential accounting for carbon emission rights, makes accounting recommendations for carbon emission rights, and introduces a new metric to measure a company's cost of carbon emissions. Our paper fills a gap in existing literature assessing the materiality of carbon emissions reporting among large publicly-traded U.S. companies and proposing a method to account for carbon emissions in the financial statements.

We start with a discussion of why carbon emissions should be accounted for in the 10-K, current and potential ways U.S. and International GAAP account for carbon emissions, and potential issues with measuring carbon emissions. We next use the Carbon Disclosure Project (CDP) to determine the amount of scope 1 and 2 emissions and the optional scope 3 emissions which include indirect emissions resulting from the company's activities, but are from sources the company does not own or control (WRI, 2015). We then calculate and examine the materiality of the social cost of carbon (SCC) emissions for the largest 50 publicly-traded US companies included in the S&P 500. The companies' 10-Ks are then examined to determine the extent of financial disclosure on climate change to determine if current disclosures adequately capture information on carbon emissions. Finally, considering current and potential ways U.S. and International GAAP do and could account for carbon emissions, we recommend how companies should account for carbon emissions.

Throughout this paper, we also use the term 'carbon emissions' as a shorthand for referring to carbon dioxide or greenhouse gases in general (Brander, 2012) and carbon emission rights are items that can be sold or purchased as carbon offsets.

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Literature Review

The Need to Account for Carbon Emissions

In order to enable shareholders to make informed investment decisions, the U.S. federal securities law requires company management of publicly-traded companies to use its judgment to disclose what the management deems to be material information (Congressional Research Service, 2019b). It could thus be argued that the mere recognition of climate risks suffices with required disclosures because federal U.S. securities law does not explicitly require publicly-traded companies to explain specific climate-related risks (Congressional Research Service, 2019b). Nonetheless, a 1988 decision of the U.S. Supreme Court explained that a fact is material if there is a substantial likelihood that a reasonable shareholder would find its omission to alter the total mix of available information significantly (Basic, Inc. v. Levinson, 1988). As such, investors harmed by materially misleading statements or the omission of material facts can seek remedies through civil litigation (Congressional Research Service, 2019b). In fact, the argument that energy-intensive companies have a legal responsibility to disclose the impact of climate change is maturing into a self-standing ground of litigation. (Ganguly et al, 2018). There has also been a rise in investigations and lawsuits alleging that investors are increasingly at risk of making uninformed investment decisions based on inadequate and, in some cases, intentionally misleading statements by companies about their vulnerabilities to the effects of climate change (Wassim, 2019). And, specifically, under current U.S. Security and Exchange Commission (SEC) guidance, publicly-traded companies need to disclose financially material impacts related to climate change, ranging from compliance costs related to emissions regulation, to the physical impacts of changing weather patterns on operations (SEC, 2010; WRI, n.d.). Additionally, the increase demand by investors for climate change information has led the SEC, in March 2021, to requested feedback from the public on the adequacy of current disclosures (Herren Lee, 2021).

The increased emphasis of carbon neutrality by companies and the use of carbon offsets to achieve this goal has the potential to make this information material and increases the usefulness to investors of accounting for carbon emissions in the financial statements. For example, Apple Inc. has recently announced plans to be fully carbon neutral by 2030. The company's goal is to offset all emissions along its entire supply chain and product life cycle, with 25% of emission reduction coming from carbon removal or offsetting projects (Apple, 2020). Other companies, such as Shell, Microsoft, Google, and Amazon have also created partnerships to offset emissions by purchasing carbon credits, with funds invested in offsetting through projects that improve the lives in vulnerable communities around the world (Cohen, 2020). While the accounting for carbon emissions is gaining in importance, it is relatively new and has not been addressed jointly by the United States' Financial Accounting Standards Board (FASB) or the International Accounting Standards Board (IASB). To explore all the possible ways that carbon emissions can be accounted, this paper explores the current and potential accounting methods under both FASB and IASB.

Current and Potential Accounting for Carbon Emissions

Currently, there is little to no specific guidance on accounting for carbon emissions from the IASB or the FASB, resulting in a multitude of ways that companies account for them (Lovell & Ghaleigh, 2013; Allini, Giner, & Caldarelli, 2018). The primary issue that has hindered standard setters is determining if carbon emission rights are a property right, a currency, or a tax (Lovell &

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Ghaleigh, 2013). Carbon emission rights have the quality of all three of these items, making it difficult to classify it within the current accounting standards (Lovell & Ghaleigh, 2013). In 2004, the IASB issued an interpretation defining carbon emission rights as intangible assets accounted for under IAS 38, Intangible Assets (Fornaro, Winkelmann, and Goldstein, 2009; Allini et al., 2018). However, within months of its issuance, the interpretation was withdrawn because accountants in Europe strongly protested the standard's misrepresentation of carbon emission rights (Lovell & Ghaleigh, 2013; Allini et al., 2018). In the absence of international standards, several countries have issued their own standards, furthering differences in accounting for companies from different countries (Allini et al., 2018). European firms can either report their tradable emission rights separately or use them to offset carbon emissions in other sections of the firm, disclosures are voluntary and inconsistent from firm to firm; revenues and assets or expenses and liabilities related to emission rights may or may not be recorded depending on the firm's preference; emission rights may be accounted for at cost or at fair value; (Allini et al., 2018). When emission rights of a company are material, differences in how firms account for emission rights impacts the comparability of the financial statements (Lovell & Ghaleigh, 2013; Lovell et al., 2013), thus impacting the comparability of company ratios (Allini et al., 2018).

From an accounting perspective, there are a number of things to consider when accounting for carbon emissions. Since the IASB's attempt to create a standard for carbon emission rights in 2004, a number of items have changed, including the creation of the European Union Emissions Trading System (EU ETS) in 2005 (Lovell et al., 2013) that provides European firms with available carbon emission rights an opportunity to sell them via a regulated auction (Allini et al., 2018) and the recently launched Emissions Trading System (ETS) from China in 2021. ETSs provide a readily determinable market price that can be used to accrue liabilities (Lovell et al., 2013) and possibly revenues. To fully explore the possible ways to account for carbon emission rights, the paper next discusses the ways in which carbon emission rights could be accounted for under international and U.S. accounting standards. International standards are explored because with global financial markets, if the method of accounting selected will fit into both systems, then comparability of companies across the globe will be enhanced.

Accounting for Carbon Emission Rights as Revenue, Gains, Expenses, and Losses in the Income Statement

Under U.S. Generally Accepted Accounting Principles (GAAP) and International Financial Reporting Standards (IFRS), carbon emission rights sold that constitute the company's main business could be categorized as revenue (FASB ASC 606-10-25-1, 606-10-25-18, 606-10-25-23, and IFRS 15.1), other revenue (FASB ASC 610-10-05-1 and IAS 1.102 and .103), or a gain (FASB, 2021, E82 and E85-87 and IAS 38.113), the determination should be based on whether or not selling carbon emission rights is the primary, or core, business of the company. If it is the primary business of the company, then it should be booked as revenue to denote the reoccurring nature of the income; however, if it is not the primary business of the company, then it should be booked as either other income, if it is an item that occurs on a regular basis, or gain, if it is an item that does not reoccur on a regular basis (IAS 1.86 and FASB, 2021, E80, E82, and E84-87).

Revenues and gains are generally not booked until realized. If emission rights are viewed as a gain on an expected disposal of an asset under IFRS, known as a contingency gain under U.S. GAAP, it would not be recorded until the actual sale occurs (IAS 37.51-.52 and FASB ASC 450-30-25-1).

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Per the EU Commission, starting January, 2018 carbon emission rights should be classified as financial instruments (European Commission, n.d.), while the European Union have adopted IFRS, the EU Commission cannot set IFRS standards, but it can ensure consistency in the accounting choice used for companies within the European Union. If carbon emission rights are treated as financial instruments, under both IFRS and U.S. GAAP, they would be initially booked at fair value (IFRS 9.5.1.1 and FASB ASC 825-10-25-1) and then adjusted to fair value with any unrealized gains or losses booked immediately in the income statement (IFRS 9.5.7.1 and FASB ASC 825-10-55-9).

If the cost of buying carbon emission rights is voluntarily, one potential accounting option a company has would be to apply the cost under other expenses (IAS 1.101 and 1.103; FASB ASC 270-10-45-4), alternatively, if the expense is more a core part of the business, the company can book it as an operating expense. Similar to revenue, the determination of where to book the expense should be based on whether or not selling carbon emission rights is the primary, or core, business of the company.

Alternatively, the potential cost of buying carbon emission rights could fall under the category of a contingent loss. Under both U.S. GAAP and IFRS, a contingent loss, must be accrued in the financial statements if two conditions are met, (1) as of the date of the financial statements, a past event has resulted in a probable present obligation that will result in a future liability and (2) the amount of the liability can be reasonably estimated (FASB ASC 450-20-25-2; IAS 37.14).

If it is unclear if the possible obligation will result in a liability, i.e., if the past event does not result in a probable future obligation, or the amount of the probable liability cannot be estimated, then IFRS and U.S. GAAP do not allow the booking of a loss; however, disclosure of the loss in the notes of the financial statements is required, unless the likelihood of the future liability is remote (IAS 37.28; FASB ASC 450-20-50-2).

Accounting for Carbon Emission Rights as Assets and Liabilities in the Balance Sheet

If the government requires a company to buy carbon emission rights to offset the carbon released in the production of its product, the cost would be categorized as an overhead cost related to inventory (IAS 2.15; FASB ASC 330-10-30-1 and 30-3). It would sit on the balance sheet as inventory until the product was sold, at which time it would become cost of goods sold (FASB ASC 330-10-05-3 and FASB ASC 330-10-30-10).

If a company has carbon emission rights it plans to sell in the future, the emission rights could be viewed as an asset under IFRS and U.S. GAAP (IAS 38.8 (asset) and FASB, 2021, E16-17). If the assets are not categorized as financial instruments, since the assets lack physical substance, they would be considered intangible (IAS 38.10 and 38.21).

Under both IFRS and U.S. GAAP, if carbon emission rights were viewed as intangible assets, it would be easy to record externally purchased carbon emission rights, but more difficult to accrue them when they are internally generated. This is because for most companies, where carbon emission rights are not their primary business, it would be problematic to specifically identify the costs for the intangible assets; the costs would be a part of their normal business. However, as discussed in the similarity and differences section below, it is easier to record an internally generated intangible asset under IFRS.

If it is probable a company will need to purchase carbon emission rights to offset its carbon emissions, this may cause the creation of a liability. Under both U.S. GAAP and IFRS, provisions (IAS 37.13[a]) [(called contingent liabilities under U.S. GAAP (FASB ASC 450-20-25-1 through 2)], must be accrued in the financial statements if two conditions are met, (1) as of the date of the

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financial statements, a past event has resulted in a probable present obligation that will result in a future liability and (2) the amount of the liability can be reasonably estimated (FASB ASC 450-20-25-2; IAS 37.14).

If it is unclear if the possible obligation will result in a liability, if the past event does not result in a probable future obligation, or the amount of the probable liability cannot be estimated, then IFRS and U.S. GAAP refers to the item as a contingent liability (IAS 37.13[b] and FASB ASC 450-20-25-1 through 2). U.S. GAAP and IFRS do not allow the accrual of contingent liabilities when both conditions discussed above are not met. However, disclosure of the potential obligation in the notes of the financial statements is required, unless the likelihood of the future liability is remote (IAS 37.28; FASB ASC 450-20-50-2).

Key Similarities and Dissimilarities Between US GAAP and IFRS in Carbon Emission Rights Accounting

For the most part, the accounting for IFRS and U.S. GAAP is similar. The main difference between the two are in their treatments of internally generated assets and the existence of constructive liabilities under IFRS.

Under IFRS, recognizing internally developed intangible assets would be easier than under U.S. GAAP for two main reasons. First, under IFRS it is easier to initially recognize an internally generated intangible; to be accrued it simply must meet the definition of an intangible asset and the recognition criteria (IAS 38.18). Under IFRS, an intangible asset is defined as an item with the following traits: identifiable, controlled by the company, and will create future economic benefit (IAS 38.10) and the recognition criteria requires it be probable that the expected future economic benefits will flow to the company and the cost can reliably be measured (IAS 38.21). Internally generated carbon emission rights would meet both the definition and recognition criteria under IFRS. This criterion makes initial recognition of internally generated intangible assets easier to achieve under IFRS relative to U.S. GAAP where the cost of developing the emissions rights would need to be automatically expensed until they were specifically identifiable (FASB ASC 350-30-25-3), which would be right when the asset was ready for use and so almost all the cost would be expensed. Secondly, even if the internally generated carbon emissions asset has to initially be expensed under IFRS, companies are allowed to elect to use the revaluation model (IAS 38.72) and, after initial recognition, the company may carry the intangible asset at its fair value less any accumulated amortization (IAS 38.75) allowing the recording of the internally generated carbon emission rights on the books.

Constructive liabilities may result in reporting of carbon emission rights under IFRS. Under current accounting standards a company can only report an expense or liability related to a carbon emission right once the company has incurred the expense of purchasing one or accrued a liability of needing to purchase one in the future. Under U.S. GAAP, to accrue a liability, the company must legally be required to pay the amount and be able to estimate it. This is problematic with carbon offset reporting because the purchase of such items is voluntary, so the company does not have a legal obligation to purchase them. At best, a company can voluntarily disclose this information in the notes to the financial statement. However, under IFRS, a constructive liability can be established by a company's pattern of past practice, statement, or published policy (IAS 37.10) this would require a liability provision for the purchase of carbon emission rights to offset carbon emissions created by companies that show a pattern of having done this in the past, provided the amount of the liability were probable and estimable (IAS 37.14). This indicates that a company under IFRS must take greater care regarding its pattern of purchasing carbon emission

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rights, or else it may create a constructive liability whereby the recording of carbon emission rights ceases to be a voluntary activity.

Recommended Accounting for Carbon Emission Rights

To date there are no firm financial accounting requirements for carbon emissions in the United States to provide standardization on how to report them. Since the amount of carbon emissions, a company has may, through future fines, penalties, or voluntary costs impact a company's future cash flows, the reporting of it would be useful to aid investors in predicting the timing of future cash flows and assessing the company's past success with managing these costs, thus increasing the relevance of the financial statements.

Because of its nature as a tradable item on a regulated market (at least in China and the EU), for companies with access to a regulated emissions market, we advocate treating carbon emission rights as financial instruments whose gains and losses would flow through the income statement. By doing so the FASB would align with how the EU Commission is treating carbon emission rights, increasing comparability among U.S. and European-based companies. For companies without ready access to a regulated emissions market, we recommend treating carbon emission rights as contingent gains and losses, this would ensure the potential liability and loss is captured immediately on the financial statements, while only allowing the booking of a gain when the carbon emission right is actually sold.

When expensing the purchase of carbon emission rights, the cost should be included as a part of inventory and expensed through cost of goods sold or as another expense, depending on the nature of how the company uses the purchase of carbon emission rights (IAS 1.101, 1.103, and 2.15; FASB ASC 270-10-45-4; and, FASB ASC 330-10-30-1 and 30-3).

The next section explores current issues with measuring carbon emissions since one key component to accounting for it is the ability to reasonably measure the carbon emissions.

Issues with Measuring Carbon Emissions

Research suggests that companies often do not disclose emissions data because they do not deem the amounts to meet their materiality threshold for reporting (Climate Disclosure Standards Board, 2016) and companies take a minimally compliant approach to sustainability disclosure, providing the market with information that is inadequate for making investment decisions (Sustainability Accounting Standards Board, 2017). This is made possible by the current variability of carbon pricing and interpretations of what should be included as costs of carbon pollution causing independent assurance of sustainability reports to remain inconsistent (Radin, 2019) and most investors appear dissatisfied with current environmental, social, and governance (ESG) reporting practices (Malik, 2020).

Despite growing evidence suggesting that investors consider climate risk to be financially material and to represent heightened regulatory and litigation risk, it has been noted that there is no consensus on when such risks should be disclosed and how much detail ought to be included in federal filings (Hart, 2015). Furthermore, misalignment continues to exist between the risk perception of investors compared with companies' assessment of the usefulness and impact of climate-related disclosures, which results in companies not disclosing climate risks (Amel-Zadeh, 2019). As such, the lack of appropriate corporate disclosures through required filings, such as the 10-K form in the United States, makes it difficult for investors to identify, assess, and quantify the impact of a company's exposure to climate risks.

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The next section introduces a new metric that could be used by companies to more uniformly report their carbon emissions data.

Data and Methodology

We collected data on the amount of scope 1, 2, and 3 mtCO₂ emissions reported by major U.S. publicly-traded companies for years 2019 and 2020, using company disclosures to the Carbon Disclosure Project (CDP). Because CDP information runs a year behind, we used the CDP 2020 reports to collect 2019 data, and the CDP 2021 reports to collect 2020 data.

Definitions of scope 1, 2, and 3 greenhouse gas emissions are established by the GHG Protocol and are measured in metric tons of carbon dioxide (WRI, 2015). scope 1 emissions include direct GHG emissions that occur from sources that are owned or controlled by the company, for example, vehicles or furnaces. scope 1 emissions exclude GHG emissions the Kyoto Protocol does not cover and direct carbon dioxide emissions from the combustion of biomass (WRI, 2015). scope 2 emissions physically occur at the electric company where the company purchases its electricity (WRI, 2015). scope 3, an optional reporting category, are indirect emissions that are a result of the company's activities, but are from sources the company does not own or control (WRI, 2015), such as employee commuting.

Our sample consists of the 50 largest publicly-traded US companies included in the S&P 500, which represent about half of the market capitalization of the index (Zacks Investment Research, 2022). The most recent carbon emissions data available is for year 2020. These entities attract investors because of significant growth potential and account for about half of the market capitalization of the index. Companies with the largest market capitalization are subject to increased scrutiny about carbon pricing standards (CDP, 2021). In addition, as many of these companies have also set sustainability goals and published ESG data, it is expected that these companies will face increased scrutiny of their corporate sustainability efforts, including rising pressure to demonstrate that they are adequately equipped to manage growth in a way that combats rising concerns about greenwashing (Mattison et al., 2022).

The following companies were not included in the final sample because data was either not reported or not available from the CDP reports for both years 2019 and 2020: Amazon, Tesla, Meta Platforms (formerly Facebook), Berkshire Hathaway, Visa, Netflix, Exxon Mobil, Chevron, Broadcom. In addition, scope 3 emissions data was not available for Thermo Fisher Scientific, Danaher Corporation, and Costco Wholesale Corporation.

We used form 10-K filings from the Securities and Exchange Commission (SEC) to retrieve net income and total assets data for each company included in the sample. In addition, we pulled industry information using the CF office industry classification assigned by the SEC. For every company, industry information is found under company information on EDGAR.

To determine the extent to which companies discuss the potential impact of emissions on financial performance, we reviewed each company's 10-K for information on key phrases, such as "climate change," "global warming," "greenhouse gas," "carbon emissions," and "carbon offset", that would indicate discussion of climate change in the documents. Tables 1 and 2 summarize the extent to which companies disclose risk(s) related to carbon emissions based on the 10-K submitted for year 2020, which is the most recent year included in our analysis.

Table 1 provides a summary of how many of the companies in our sample disclose or describe risk(s) related to carbon emissions in the 10-K submitted for year 2020, which is the most recent year included in our analysis. Table 2 provides a summary of which 10-K section the

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companies in our sample use to disclose risk(s) related to carbon emissions. In the Other category, we have included the three companies that disclose or describe these risks in the Business section (Item 1), one company that describes these risks in the Selected Financial Data section (Item 6), and one company that discloses these risks in the Business & MDA sections (Items 1 & 7).

We classified a company in the category of those that ‘Describe’ climate-related risks if the annual report provides qualitative information about the nature of the company’s exposure to climate change, such as explanations about the nature of the company’s disclosure to climate change or disclosures about the material quantitative impact of exposure to climate change. This is because information may be material in nature even if it is not material in amount. Management may need to provide an explanation in the case of companies that operate in higher-risk industries, for those with no significant quantitative impact in the current reporting period, or even for those that have not yet fully assessed the potential future impact on the financial statements (Dotzlaw, 2022).

In addition, to determine the materiality of a company’s carbon emissions relative to its net income, we created a new metric, calculated as the social cost of carbon (SCC) emissions divided by each company’s reported net income data for the most recent fiscal year. The social cost of carbon (SCC) is the estimated monetary value of the economic damages caused by each ton of carbon pollution produced (EPA, 2016; Base the Social, 2017). SCC is an important input in crafting legislation and regulation as it provides a common language and foundation for projects, policy, and pricing, and also has important practical applications for businesses as it can be used in cost-benefit analyses to inform whether individual projects should be financed or how they should be executed (Pindyck, 2019; Hänsel et al., 2020).

Quantifying SCC, however, is controversial (Congressional Research Service, 2019a; Pindyck, 2019) with estimates ranging greatly. The price determined is not static and typically increases over the projection period in response to the rising damages of climate change (Kapnik and Pandit, 2022). A recent US official government estimate of SCC is about \$45 a ton (EPA, 2016), though academic and practitioner studies have noted that this estimate is low and expert estimates range considerably from a more conservative range of \$80 to \$100 a ton, to a more significant \$200 a ton (Pindyck, 2019; Hänsel et al., 2020).

Because SCC estimates are controversial, we used three different SCC price points to calculate each company’s cost of emissions. Our lower SCC boundary is \$45 per ton, consistent with official US government guidance (EPA, 2016). Our upper boundary of SCC is \$200 per ton, consistent with most recent research (Pindyck, 2019; Hänsel et al., 2020). We also considered a mid-range estimate of \$125 per ton, based on the suggested expert consensus (van den Bergh & Botzen, 2014; Pindyck, 2019).

This new metric is a strong measure of potential materiality because, as companies move toward net-zero emissions, one approach toward calculating a budget allowance for purchasing carbon offsets needed entails calculating the social cost of carbon (SCC) emissions by multiplying the social cost of carbon (SCC) against the amount of emissions, and then buying as many carbon offsets as needed to meet the budget allowance (Kim & Pierce, 2018). We collected the corresponding net income figures reported by each company for fiscal year 2019 and 2020 from the form 10-K, the company’s annual report, as published with the U.S. Securities and Exchange Commission (SEC). While carbon emissions are frequently calculated relative to revenue, a new EU climate benchmark uses a measure of carbon intensity that divides a company’s emissions by its enterprise value (Funk, 2020). In addition, net income has been used by auditing guidance to describe the materiality threshold as 5% of net income (SEC, 1999; Hart, 2015).

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Additionally, to get a more accurate understanding of each company's exposure to a potential liability from carbon emissions, we also calculated each company's estimated cost of carbon emissions as a percentage of year-end total average assets for 2019 and 2020. This is consistent with the view that carbon emissions are a hidden liability that is currently not properly recognized because many companies price these emissions at zero (Eccles and Muliken, 2021)

We estimated the total social cost of carbon (SCC) emissions for each company by multiplying amount of scope 1 and 2, or scope 3, carbon emissions reported by each company, measured in metric tons of carbon dioxide (mtCO₂), by the estimated social cost of one ton of mtCO₂.

Our use of SCC is consistent with the 2016 decision of the 7th U.S. Circuit Court of Appeals which unanimously upheld U.S. Department of Energy's (DOE) use of the social cost of carbon as "economically justified" in regulatory impact analyses (Zero Zone, Inc., et al. v. United States Department of Energy, 2016).

Results

To determine the extent to which companies discuss the potential impact of emissions on financial performance, we reviewed each company's 10-K for information on key phrases, such as "climate change," "global warming," "greenhouse gas," "carbon emissions," and "carbon offset", that would indicate discussion of climate change in the documents. As shown in Table 1, about one third of the companies in our sample do not address emissions in their annual report, with companies in the Office of Life Sciences and Office of Trade & Services appearing more likely not to address these risks.

As shown in Table 2, more than half of the companies that address climate-related risks do so in the 'Risk Factors' section of the annual report though, as noted in Table 1, for about one third of the companies in our sample, the 10-K narratives do not discuss or explain the impact of emissions on financial performance. This is despite SEC guidance that makes specific reference to the "reputational damage" as one particular indirect risk which some companies face as a result of climate change, and which could pose potential adverse consequences to operations or financial condition. (SEC, 2010).

Table 3 shows estimates of the social cost of scope 1 and 2 emissions for carbon prices ranging from \$45 a metric ton to \$200 a metric ton. Tables 4 and 5 show the estimated social cost of scope 1 and 2 emissions as a percentage of each company's average total assets and net income for fiscal years 2019 and 2020. The percentages of scope 1 and 2 emissions relative to total assets tend to be under 5 percent, except for NextEra Energy, the only company reporting from the Office of Energy & Transportation, and Linde plc, from the Office of Life Science. The percentages of scope 1 and 2 emissions relative to net income are mostly under 5 percent, except for NextEra Energy, Procter & Gamble Company, Linde plc, PepsiCo Inc., Texas Instruments, AT&T Inc., Costco Wholesale Corporation, Walmart Inc., and Lowe's Companies, Inc. The Offices of Life Sciences, Manufacturing, Trade & Services, Salesforce, Inc.

Reviewing the scope 1 and 2 emissions for the industries relative to total assets, Offices of Life Science, Technology, and Finance tends to have low percentages, the Offices of Manufacturing and Trade & Services has low numbers, but more variance, and the one reporting entity from the Office of Energy & Transportation has 2020 data ranging from 1.59% of total assets to 7.06% of total assets depending on the estimated cost per mtCO₂.

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Reviewing the scope 1 and 2 emissions for the industries relative to net income, the Office of Technology, tends to have low percentages. The Office of Trade & Services has a few companies with significant numbers and a wide variation in reported numbers. The Office of Manufacturing has some companies showing significant numbers as the mtCO₂ cost increases and a noticeable variance of reported numbers. The Office of Life Science has a company with extremely high numbers and a noticeable variance of reported numbers. The one reporting entity from the Office of Energy & Transportation has 2020 data ranging from 82.30% of total assets to 365.78% of net income depending on the estimated cost per mtCO₂. Finally, the Office of Finance has some absolute values that would be high, but in all these cases it is because the companies reported losses, which could skew the results. As shown in these tables, the total estimated value of scope 1 and 2 emissions exceeds 5% of net income at the \$125 and \$200 metric ton prices for some companies.

For example, as shown in Tables 5c and 8c, one could argue that our estimates of Procter and Gamble's cost of emissions relative to net income are considerable. In fact, in a recent press release, Procter & Gamble announced the intent to reduce scope 1 and 2 emissions in half by 2030, with an additional investment in projects to offset emissions for the remainder of scope 1 and 2 emissions (Rathi, 2020). The company's required annual 10-K form makes, however, a generic statement about the company needing to "successfully manage compliance with laws and regulations, as well as manage new and pending legal and regulatory matters in the U.S. and abroad" without, referencing the scope of its emissions.

Under current guidance, publicly-traded companies need to disclose financially material impacts related to climate change, ranging from compliance costs related to emissions regulation, to the physical impacts of changing weather patterns on operations (SEC, 2010; WRI, n.d.). As such, existing guidance suggests the company should disclose the potentially material cost of meeting its emissions goals through offsets or planned production improvements needed to reduce emissions.

The lack of detailed discussion on climate risks in the company's required 10-K is noteworthy not only because the company does not discuss the impact of emissions of financial performance and operations, but because the company also fails to address the resulting potential impact of reputational damage.

Table 6 shows estimates of the social cost of scope 3 emissions for carbon prices ranging from \$45 a metric ton to \$200 a metric ton. Tables 7 and 8 show the estimated social cost of scope 3 emissions as a percentage of each company's average total assets and net income for fiscal years 2019 and 2020. Our computations shown in Tables 7 and 8 suggest that the estimated cost of scope 3 emissions as a percentage of total assets or net income could be concerning, especially during years of downturn such as year 2020 when the Covid-19 pandemic slowed down economic activity for many of these companies.

It is interesting to note that, for scope 3, there were wide variations across offices with regards to estimated amounts, with the exception of companies in Energy & Transportation. The lack of variance among the companies in this office was due to the fact that only one firm reported results.

The percentages of scope 3 emissions relative to total assets tend to be under 5 percent, except for Procter & Gamble, Pepsco Inc., Coca-Cola Company, Nike Inc., Cisco Systems, Home Depot, Walmart Inc., McDonald's Corporation, Lowe's Companies Inc. The percentages of scope 3 emissions relative to net income are mostly above 5 percent. The Offices of Life Sciences, Manufacturing, Trade & Services all have several companies with higher percentages in this area.

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Discussion of financial exposure due to scope 3 emissions exposure is, however, rather limited or non-existent, despite clear guidance on disclosure of material impact of climate change (SEC, 2010), even though some companies acknowledge the likelihood of climate change impact. For example, in its annual 10-K report, Johnson & Johnson notes that “Changes to global climate, extreme weather and natural disasters that could affect demand for the Company's products and services, cause disruptions in manufacturing and distribution networks, alter the availability of goods and services within the supply chain, and affect the overall design and integrity of the Company's products and operations” (Johnson & Johnson, 2020). The company, however, fails to provide or discuss the impact of such factors on financial performance. The Home Depot, Inc. also notes its commitment to “conducting business in an environmentally responsible manner” but also falls short of disclosing the scope of its carbon emissions and potential impact on operations (Home Depot, 2020).

Despite evidence of the potential impact of climate change on financial performance, our results show that companies provide minimal discussion of exposure to emissions. For example, as shown in the tables below, large retail companies such as Procter & Gamble, Lowe's, Home Depot, and Walmart, report very high scope 3 emissions from their supply chain and use of sold products. As such, the value of such emissions relative to the companies' total assets and net income is substantial. In addition, because maritime shipping, which has been touted as a rather inexpensive transportation method and has quadrupled in the last decades, is considered one of the most heavily polluting forms of transportation, it is expected that retailers and manufacturers are expecting to face increasing pressures to monitor and manage maritime freight emissions.

However, despite such concerning reports, discussion of the potential impact of carbon emissions on the companies' financials in the financial reports is limited. For example, Lowe's annual report to shareholders for 2020 makes no mention of climate change regulations or the potential impact from carbon emissions (Lowe's (2020).

Similarly, despite Walmart committing to reducing 1 billion metric tons of carbon emissions from global supply chains by 2030, climate change is not mentioned in the company's required annual disclosures to the SEC (Walmart, 2020). In its annual report, Walmart noted that the company is subject to a range of factors that may affect financial performance estimates and expectations and urges investors and other readers to consider such risks, uncertainties, and other factors when evaluating financial statements. The company further notes that, as a result of changes in facts, assumptions, and other circumstances, “actual results may differ materially from those discussed in or implied or contemplated by our forward-looking statements.” (Walmart, 2020).

As another example, Microsoft's most recent 10-K suggests potential increase in operating costs resulting from climate change, and warns that “long-term effects of climate change on the global economy and the IT industry in particular are unclear”. (Microsoft, 2020). Such statements are significant not only because of increased investor scrutiny, but also in light of recent research suggesting large technology companies underreport greenhouse emissions and may present investors with inaccurate information, such as carbon footprint emissions that are calculated differently for different audiences (Klaassen & Stoll, 2021).

The lack of appropriate discussion around factors that may materially impact financial performance is also consistent with concerns that the main focus of annual reports to providing information that targets stakeholders, as opposed to providing information intended to meet the needs of investors (Deloitte, 2017). While financial markets are increasingly using the information available to them to start pricing in the low-carbon transition, existing research suggests that the effective market pricing of climate transition is hampered by insufficient data, including

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financially material metrics and analytical tools to measure and manage climate transition risks, and lack of policy clarity regarding carbon pricing and support for renewables (OECD, 2021).

The COVID-19 pandemic has also highlighted the increasing importance that investors assign to sustainability factors. For example, ESG funds' focus on nontraditional risks appear to have led these portfolios to be more resilient during the COVID-19 downturn (Whieldon & Clark, 2021).

As such, the lack of detailed discussion on carbon emissions in required annual reports raises concerns that the principles-based "materiality" standard has not led to sufficient disclosure to ensure investors are provided information that is consistent, reliable, and comparable despite increasing awareness and calls for company disclosures on climate-related exposure (Lee, 2020). The growing attention to sustainability practices, along with growing concerns of 'ESG washing', thus increases the risk that such practices undermine market confidence and integrity, at a time where investments that are better aligned with climate transitions and a sustainable recovery from the Covid-19 pandemic are critical (OECD, 2021).

Conclusion

The results of our study indicate that climate-related factors may be material, which may account for the increase in risk companies are experiencing with regards to this topic. As noted by prior studies, inaction by companies on climate change practices will likely lead to increased public and financial scrutiny, including the risk of downgrades (Darby, 2016; Flavelle, 2017). In addition to claims by shareholders and investors for greater transparency and disclosure of information relating to climate risk disclosure, the argument that energy-intensive companies have a legal responsibility to disclose the impact of climate change is maturing into a self-standing ground of litigation (Ganguly et al, 2018). Companies with carbon emissions also face increased risk of strategic private climate litigation, which highlights the importance for directors to give consideration to financial implications of climate risks in order to comply with their fiduciary duties (Benjamin, 2020).

As such, it would be appropriate for companies to prepare and present scenarios of climate-related impact based on different SCC estimates and to discuss the impact of climate-related factors on financial performance in the required annual report, ensuring the dissemination of information needed by investors to determine the true underlying economic reality of each entity. By providing specific information on climate-related factors, companies would provide investors with information needed to evaluate company risks, ultimately leading to enhanced transparency and disclosure, enhancing their ability to make sound investment choices.

Based on our research of possible ways to account for carbon emission rights, unless the company's main business is creating carbon emission rights to sell for a profit, we recommend treaty carbon emission rights financial instruments when companies have access to regulated emissions market and like contingent gains and losses when the company does not have access to a regulated emissions market. We recommend this treatment because, given the wide variation in carbon pricing, there is too much room for a company to manipulate its financial statements upward in the absence of a regulated market if it had the ability to book revenue from the creation of a carbon emission rights before they are actually sold. When expensing the purchase of carbon emission rights, the cost should be included as a part of inventory and expensed through cost of goods sold or as another expense, depending on the nature of how the company uses the purchase

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of carbon emission rights (IAS 1.101, 1.103, and 2.15; FASB ASC 270-10-45-4; and, FASB ASC 330-10-30-1 and 30-3).

In summary, this paper has demonstrated that the lack of transparent environmental accounting in financial reporting is becoming an issue as the amount of environmental costs for companies becomes more material. The paper recommends potential accounting treatments and introduces a new measure to better disclose environmental costs on the financial statements.

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Table 1: This table provides a summary of how many of the companies in our sample disclose or describe risk(s) related to carbon emissions in the 10-K submitted for year 2020, which is the most recent year included in our analysis. To determine this, we initially reviewed each company’s 10-K for information on key phrases, such as “climate change,” “global warming,” “greenhouse gas,” “carbon emissions,” and “carbon offset”. We classified a company in the category of those that ‘Describe’ climate-related risks if the annual report provides qualitative information about the nature of the company’s exposure to climate change, such as explanations about the nature of the company’s disclosure to climate change or disclosures about the material quantitative impact of exposure to climate change

CF Office	Number of Companies with No Disclosures	Number of Companies that	
		Disclose	Describe
Life Sciences	4	5	2
Energy and Transportation	1	0	2
Manufacturing	1	2	5
Finance	1	2	2
Technology	2	6	3
Trade & Services	5	3	3
Total (% of Sample Size)	15 (30%)	18 (36%)	17 (34%)

Table 2: This table provides a summary of which 10-K section the companies in our sample use to disclose risk(s) related to carbon emissions. In the Other category, we have included the 3 companies that disclose or describe these risks in the Business section (Item 1), 1 company that describes these risks in the Selected Financial Data section (Item 6), and 1 company that discloses these risks in the Business & MDA sections (Items 1 & 7).

CF Office	Section where Companies that Disclose/Describe Carbon Emissions			
	Risk Factors (Item 1A)	Business & Risk Factors (Items 1 & 1A)	Risk Factors & MDA (Items 1A & 7)	Other
Life Sciences	5	0	0	1

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Energy and Transportation	1	1	0	1
Manufacturing	4	1	1	0
Finance	2	1	1	1
Technology	6	0	0	0
Trade & Services	4	3	0	2
Total (% of Sample Size)	22 (44%)	6 (12%)	2 (4%)	5 (10%)

Table 3: This table shows the estimated cost of scope 1 and 2 emissions data at various prices per metric ton of carbon dioxide (mtCO₂) for the sample considered. Emissions are measured in mtCO₂. Estimated costs are presented in millions of dollars.

Table 3a: Office of Energy & Transportation							
Company Name	Ticker Symbol	Estimated Cost of Scope 1 & 2 Emissions @45/mtCO ₂		Estimated Cost of Scope 1 & 2 Emissions @125/mtCO ₂		Estimated Cost of Scope 1 & 2 Emissions @200/mtCO ₂	
		2019	2020	2019	2020	2019	2020
Exxon Mobil Corporation	XOM	N/A	N/A	N/A	N/A	N/A	N/A
Chevron Corporation	CVX	N/A	N/A	N/A	N/A	N/A	N/A
NextEra Energy Inc.	NEE	N/A	\$1,949,701	N/A	\$5,415,835	N/A	\$8,665,336
Summary Statistics:							
Minimum		N/A	\$1,949,701	N/A	\$5,415,835	N/A	\$8,665,336
Maximum		N/A	\$1,949,701	N/A	\$5,415,835	N/A	\$8,665,336
Mean		N/A	\$1,949,701	N/A	\$5,415,835	N/A	\$8,665,336

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Table 3b: Office of Finance							
Company Name	Ticker Symbol	Estimated Cost of Scope 1 & 2 Emissions @45/mtCO2		Estimated Cost of Scope 1 & 2 Emissions @125/mtCO2		Estimated Cost of Scope 1 & 2 Emissions @200/mtCO2	
		2019	2020	2019	2020	2019	2020
Berkshire Hathaway Inc.	BRK.B	N/A	N/A	N/A	N/A	N/A	N/A
JPMorgan Chase & Co.	JPM	\$28,701	\$3,319	\$79,725	\$9,220	\$127,559	\$14,751
UnitedHealth Group Inc.	UNH	\$7,521	\$7,795	\$20,891	\$21,654	\$33,425	\$34,646
Bank of America Corporation	BAC	\$3,652	\$2,748	\$10,145	\$7,634	\$16,232	\$12,215
Wells Fargo & Company	WFC	\$4,364	\$3,871	\$12,123	\$10,752	\$19,396	\$17,203
Summary Statistics:							
Minimum		\$3,652	\$2,748	\$10,145	\$7,634	\$16,232	\$12,215
Maximum		\$28,701	\$7,795	\$79,725	\$21,654	\$127,559	\$34,646
Mean		\$11,060	\$4,433	\$30,721	\$12,315	\$49,153	\$19,704

Table 3 (continued): This table shows the estimated cost of scope 1 and 2 emissions data at various prices per metric ton of carbon dioxide (mtCO₂) for the sample considered. Emissions are measured in mtCO₂. Estimated costs are presented in millions of dollars.

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Table 3c: Office of Life Science							
Company Name	Ticker Symbol	Estimated Cost of Scope 1 & 2 Emissions @45/mtCO2		Estimated Cost of Scope 1 & 2 Emissions @125/mtCO2		Estimated Cost of Scope 1 & 2 Emissions @200/mtCO2	
		2019	2020	2019	2020	2019	2020
Johnson & Johnson	JNJ	\$42,014	\$33,645	\$116,705	\$93,459	\$186,727	\$149,534
Procter & Gamble Company	PG	\$182,266	\$117,893	\$506,295	\$327,482	\$810,072	\$523,971
Thermo Fisher Scientific Inc.	TMO	\$7,248	N/A	\$20,133	N/A	\$32,213	N/A
Pfizer Inc.	PFE	N/A	\$53,864	N/A	\$149,623	N/A	\$239,396
Abbott Laboratories	ABT	\$43,740	\$40,770	\$121,500	\$113,250	\$194,400	\$181,200
Merck & Co. Inc.	MRK	\$48,239	\$44,721	\$133,996	\$124,225	\$214,394	\$198,760
AbbVie Inc.	ABBV	\$25,389	\$22,872	\$70,525	\$63,533	\$112,840	\$101,652
Eli Lilly and Company	LLY	\$33,702	\$30,205	\$93,616	\$83,904	\$149,786	\$134,246
Danaher Corporation	DHR	N/A	\$5,255	N/A	\$14,597	N/A	\$23,355
Linde plc	LIN	\$1,686,285	\$1,674,720	\$4,684,125	\$4,652,000	\$7,494,600	\$7,443,200
Medtronic Plc	MDT	\$12,625	\$12,194	\$35,068	\$33,871	\$56,109	\$54,194
Summary Statistics:							
Minimum		\$7,248	\$5,255	\$20,133	\$14,597	\$32,213	\$23,355
Maximum		\$1,686,285	\$1,674,720	\$4,684,125	\$4,652,000	\$7,494,600	\$7,443,200
Mean		\$231,279	\$203,614	\$642,440	\$565,594	\$1,027,905	\$904,951

Table 3 (continued): This table shows the estimated cost of scope 1 and 2 emissions data at various prices per metric ton of carbon dioxide (mtCO₂) for the sample considered. Emissions are measured in mtCO₂. Estimated costs are presented in millions of dollars.

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Table 3d: Office of Manufacturing							
Company Name	Ticker Symbol	Estimated Cost of Scope 1 & 2 Emissions @45/mtCO2		Estimated Cost of Scope 1 & 2 Emissions @125/mtCO2		Estimated Cost of Scope 1 & 2 Emissions @200/mtCO2	
		2019	2020	2019	2020	2019	2020
Tesla Inc.	TSLA	N/A	N/A	N/A	N/A	N/A	N/A
NVIDIA Corporation	NVDA	\$3,094	\$4,128	\$8,594	\$11,468	\$13,751	\$18,348
PepsiCo Inc.	PEP	\$223,995	\$198,455	\$622,209	\$551,263	\$995,534	\$882,021
Coca-Cola Company	KO	\$70,151	\$69,360	\$194,863	\$192,667	\$311,780	\$308,267
Broadcom Inc.	AVGO	N/A	N/A	N/A	N/A	N/A	N/A
NIKE Inc.	NKE	\$11,510	\$9,300	\$31,972	\$25,833	\$51,156	\$41,333
Intel Corporation	INTC	\$125,460	\$129,690	\$348,500	\$360,250	\$557,600	\$576,400
Texas Instruments Incorporated	TXN	\$44,100	\$86,253	\$122,501	\$239,593	\$196,002	\$383,349
Summary Statistics:							
Minimum		\$3,094	\$4,128	\$8,594	\$11,468	\$13,751	\$18,348
Maximum		\$223,995	\$198,455	\$622,209	\$551,263	\$995,534	\$882,021
Mean		\$79,718	\$82,864	\$221,440	\$230,179	\$354,304	\$368,286

Table 3 (continued): This table shows the estimated cost of scope 1 and 2 emissions data at various prices per metric ton of carbon dioxide (mtCO₂) for the sample considered. Emissions are measured in mtCO₂. Estimated costs are presented in millions of dollars.

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Table 3e: Office of Technology							
Company Name	Ticker Symbol	Estimated Cost of Scope 1 & 2 Emissions @45/mtCO2		Estimated Cost of Scope 1 & 2 Emissions @125/mtCO2		Estimated Cost of Scope 1 & 2 Emissions @200/mtCO2	
		2019	2020	2019	2020	2019	2020
Microsoft Corporation	MSFT	\$12,332	\$15,583	\$34,257	\$43,287	\$54,810	\$69,259
Apple Inc.	AAPL	\$2,275	\$2,134	\$6,319	\$5,929	\$10,110	\$9,486
Alphabet Inc.	GOOGL	\$38,743	\$42,755	\$107,619	\$118,764	\$172,191	\$190,022
Meta Platforms (data under Facebook)	FB	N/A	N/A	N/A	N/A	N/A	N/A
Adobe Inc.	ADBE	\$2,490	\$1,997	\$6,918	\$5,548	\$11,068	\$8,876
Salesforce, Inc.	CRM	\$6,323	\$3,821	\$17,563	\$10,615	\$28,101	\$16,984
Comcast Corporation	CMCSA	\$89,785	\$100,017	\$249,403	\$277,824	\$399,045	\$444,519
Cisco Systems, Inc.	CSCO	\$10,287	\$9,129	\$28,576	\$25,357	\$45,722	\$40,572
Verizon Communications Inc.	VZ	\$195,361	\$178,416	\$542,671	\$495,600	\$868,273	\$792,961
AT&T Inc.	T	\$293,627	\$260,472	\$815,630	\$723,532	\$1,305,009	\$1,157,652
Intuit Inc.	INTU	\$317	\$190	\$881	\$529	\$1,410	\$846
Summary Statistics:							
Minimum		\$317	\$190	\$881	\$529	\$1,410	\$846
Maximum		\$293,627	\$260,472	\$815,630	\$723,532	\$1,305,009	\$1,157,652
Mean		\$65,154	\$61,451	\$180,984	\$170,699	\$289,574	\$273,118

Table 3 (continued): This table shows the estimated cost of scope 1 and 2 emissions data at various prices per metric ton of carbon dioxide (mtCO2) for the sample considered. Emissions are measured in mtCO2. Estimated costs are presented in millions of dollars.

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Table 3f: Office of Trade & Services							
Company Name	Ticker Symbol	Estimated Cost of Scope 1 & 2 Emissions @45/mtCO2		Estimated Cost of Scope 1 & 2 Emissions @125/mtCO2		Estimated Cost of Scope 1 & 2 Emissions @200/mtCO2	
		2019	2020	2019	2020	2019	2020
Amazon.com Inc.	AMZN	N/A	N/A	N/A	N/A	N/A	N/A
Home Depot Inc.	HD	\$83,563	\$78,648	\$232,121	\$218,466	\$371,393	\$349,545
Visa Inc.	V	N/A	N/A	N/A	N/A	N/A	N/A
Walt Disney Company	DIS	\$80,398	\$60,419	\$223,327	\$167,831	\$357,323	\$268,530
Netflix Inc.	NFLX	N/A	N/A	N/A	N/A	N/A	N/A
Mastercard Incorporated	MA	\$156	\$156	\$435	\$435	\$696	\$696
PayPal Holdings, Inc.	PYPL	\$2,601	\$1,130	\$7,226	\$3,138	\$11,562	\$5,020
Accenture Plc	ACN	\$10,512	\$7,962	\$29,200	\$22,116	\$46,721	\$35,386
Costco Wholesale Corporation	COST	\$49,885	\$117,656	\$138,570	\$326,823	\$221,712	\$522,917
Walmart Inc.	WMT	\$790,362	\$739,208	\$2,195,450	\$2,053,355	\$3,512,719	\$3,285,367
McDonald's Corporation	MCD	\$26,962	\$23,796	\$74,894	\$66,099	\$119,830	\$105,759
Lowe's Companies, Inc.	LOW	\$21,813	\$85,627	\$60,592	\$237,853	\$96,947	\$380,565
Summary Statistics:							
Minimum		\$156	\$156	\$435	\$435	\$696	\$696
Maximum		\$790,362	\$739,208	\$2,195,450	\$2,053,355	\$3,512,719	\$3,285,367
Mean		\$118,473	\$123,845	\$329,090	\$344,013	\$526,545	\$550,420

Table 4: This table shows the estimated cost of scope 1 and 2 emissions data, calculated at various prices per metric ton of carbon dioxide (mtCO₂), as a percentage of total assets for the sample considered.

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Table 4a: Office of Energy & Transportation							
Company Name	Ticker Symbol	Estimated Cost of Scope 1 & 2 Emissions as % of Total Assets					
		@45/mtCO ₂		@125/mtCO ₂		@200/mtCO ₂	
		2019	2020	2019	2020	2019	2020
Exxon Mobil Corporation	XOM	N/A	N/A	N/A	N/A	N/A	N/A
Chevron Corporation	CVX	N/A	N/A	N/A	N/A	N/A	N/A
NextEra Energy	NEE	N/A	1.59%	N/A	0.00%	N/A	7.06%
Summary Statistics:							
Minimum		N/A	1.59%	N/A	0.00%	N/A	7.06%
Maximum		N/A	1.59%	N/A	0.00%	N/A	7.06%
Mean		N/A	1.59%	N/A	0.00%	N/A	7.06%

Table 4b: Office of Finance							
Company Name	Ticker Symbol	Estimated Cost of Scope 1 & 2 Emissions as % of Total Assets					
		@45/mtCO ₂		@125/mtCO ₂		@200/mtCO ₂	
		2019	2020	2019	2020	2019	2020
Berkshire Hathaway Inc.	BRK.B	N/A	N/A	N/A	N/A	N/A	N/A
JPMorgan Chase & Co.	JPM	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
UnitedHealth Group Inc.	UNH	0.01%	0.01%	0.02%	0.00%	0.03%	0.02%
Bank of America Corporation	BAC	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Wells Fargo & Company	WFC	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Summary Statistics:							
Minimum		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Maximum		0.01%	0.01%	0.02%	0.00%	0.03%	0.02%
Mean		0.00%	0.00%	0.01%	0.00%	0.01%	0.01%

Table 4 (continued): This table shows the estimated cost of scope 1 and 2 emissions data, calculated at various prices per metric ton of carbon dioxide (mtCO₂), as a percentage of total assets for the sample considered.

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Table 4c: Office of Life Science							
Company Name	Ticker Symbol	Estimated Cost of Scope 1 & 2 Emissions as % of Total Assets					
		@45/mtCO₂		@125/mtCO₂		@200/mtCO₂	
		2019	2020	2019	2020	2019	2020
Johnson & Johnson	JNJ	0.03%	0.02%	0.08%	0.00%	0.12%	0.09%
Procter & Gamble Company	PG	0.16%	0.10%	0.43%	0.00%	0.69%	0.44%
Thermo Fisher Scientific Inc.	TMO	0.04%	N/A	0.11%	N/A	0.17%	N/A
Pfizer Inc.	PFE	N/A	0.03%	N/A	0.00%	N/A	0.14%
Abbott Laboratories	ABT	0.06%	0.06%	0.18%	0.00%	0.29%	0.26%
Merck & Co. Inc.	MRK	0.06%	0.05%	0.16%	0.00%	0.26%	0.23%
AbbVie Inc.	ABBV	0.03%	0.02%	0.10%	0.00%	0.15%	0.08%
Eli Lilly and Company	LLY	0.08%	0.07%	0.23%	0.00%	0.36%	0.31%
Danaher Corporation	DHR	N/A	0.01%	N/A	0.00%	N/A	0.03%
Linde plc	LIN	1.87%	1.92%	5.20%	0.00%	8.33%	8.51%
Medtronic Plc	MDT	0.01%	0.01%	0.04%	0.00%	0.06%	0.06%
Summary Statistics:							
Minimum		0.01%	0.01%	0.04%	0.00%	0.06%	0.03%
Maximum		1.87%	1.92%	5.20%	0.00%	8.33%	8.51%
Mean		0.26%	0.23%	0.72%	0.00%	1.16%	1.02%

Table 4 (continued): This table shows the estimated cost of scope 1 and 2 emissions data, calculated at various prices per metric ton of carbon dioxide (mtCO₂), as a percentage of total assets for the sample considered.

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Table 4d: Office of Manufacturing							
Company Name	Ticker Symbol	Estimated Cost of Scope 1 & 2 Emissions as % of Total Assets					
		@45/mtCO₂		@125/mtCO₂		@200/mtCO₂	
		2019	2020	2019	2020	2019	2020
Tesla Inc.	TSLA	N/A	N/A	N/A	N/A	N/A	N/A
NVIDIA Corporation	NVDA	0.03%	0.03%	0.07%	0.00%	0.11%	0.12%
PepsiCo Inc.	PEP	0.29%	0.23%	0.80%	0.00%	1.27%	1.03%
Coca-Cola Company	KO	0.08%	0.08%	0.23%	0.00%	0.37%	0.36%
Broadcom Inc.	AVGO	N/A	N/A	N/A	N/A	N/A	N/A
NIKE Inc.	NKE	0.05%	0.03%	0.14%	0.00%	0.22%	0.15%
Intel Corporation	INTC	0.09%	0.09%	0.26%	0.00%	0.42%	0.40%
Texas Instruments Incorporated	TXN	0.25%	0.46%	0.70%	0.00%	1.12%	2.05%
Summary Statistics:							
Minimum		0.03%	0.03%	0.07%	0.00%	0.11%	0.12%
Maximum		0.29%	0.46%	0.80%	0.00%	1.27%	2.05%
Mean		0.13%	0.15%	0.37%	0.00%	0.59%	0.69%

Table 4 (continued): This table shows the estimated cost of scope 1 and 2 emissions data, calculated at various prices per metric ton of carbon dioxide (mtCO₂), as a percentage of total assets for the sample considered.

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Table 4e: Office of Technology							
Company Name	Ticker Symbol	Estimated Cost of Scope 1 & 2 Emissions as % of Total Assets					
		@45/mtCO₂		@125/mtCO₂		@200/mtCO₂	
		2019	2020	2019	2020	2019	2020
Microsoft Corporation	MSFT	0.00%	0.01%	0.01%	0.00%	0.02%	0.02%
Apple Inc.	AAPL	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Alphabet Inc.	GOOGL	0.02%	0.01%	0.04%	0.00%	0.07%	0.06%
Meta Platforms (data under Facebook)	FB	N/A	N/A	N/A	N/A	N/A	N/A
Adobe Inc.	ADBE	0.01%	0.01%	0.03%	0.00%	0.06%	0.04%
Salesforce, Inc.	CRM	0.01%	0.01%	0.04%	0.00%	0.07%	0.03%
Comcast Corporation	CMCSA	0.03%	0.04%	0.10%	0.00%	0.15%	0.17%
Cisco Systems, Inc.	CSCO	0.01%	0.01%	0.03%	0.00%	0.04%	0.04%
Verizon Communications Inc.	VZ	0.07%	0.06%	0.20%	0.00%	0.31%	0.26%
AT&T Inc.	T	0.05%	0.05%	0.15%	0.00%	0.24%	0.21%
Intuit Inc.	INTU	0.01%	0.00%	0.02%	0.00%	0.02%	0.01%
Summary Statistics:							
Minimum		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Maximum		0.07%	0.06%	0.20%	0.00%	0.31%	0.26%
Mean		0.02%	0.02%	0.06%	0.00%	0.10%	0.09%

Table 4 (continued): This table shows the estimated cost of scope 1 and 2 emissions data, calculated at various prices per metric ton of carbon dioxide (mtCO₂), as a percentage of total assets for the sample considered.

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Table 4f: Office of Trade & Services							
Company Name	Ticker Symbol	Estimated Cost of Scope 1 & 2 Emissions as % of Total Assets					
		@45/mtCO₂		@125/mtCO₂		@200/mtCO₂	
		2019	2020	2019	2020	2019	2020
Amazon.com Inc.	AMZN	N/A	N/A	N/A	N/A	N/A	N/A
Home Depot Inc.	HD	0.18%	0.13%	0.49%	0.00%	0.78%	0.57%
Visa Inc.	V	N/A	N/A	N/A	N/A	N/A	N/A
Walt Disney Company	DIS	0.05%	0.03%	0.15%	0.00%	0.24%	0.14%
Netflix Inc.	NFLX	N/A	N/A	N/A	N/A	N/A	N/A
Mastercard Incorporated	MA	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PayPal Holdings, Inc.	PYPL	0.01%	0.00%	0.02%	0.00%	0.02%	0.01%
Accenture Plc	ACN	0.04%	0.02%	0.11%	0.00%	0.17%	0.11%
Costco Wholesale Corporation	COST	0.12%	0.23%	0.32%	0.00%	0.51%	1.04%
Walmart Inc.	WMT	0.37%	0.32%	1.04%	0.00%	1.66%	1.44%
McDonald's Corporation	MCD	0.07%	0.05%	0.19%	0.00%	0.30%	0.21%
Lowe's Companies, Inc.	LOW	0.06%	0.23%	0.17%	0.00%	0.28%	1.03%
Summary Statistics:							
Minimum		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Maximum		0.37%	0.32%	1.04%	0.00%	1.66%	1.44%
Mean		0.10%	0.11%	0.28%	0.00%	0.44%	0.50%

Table 5: This table shows the estimated cost of scope 1 and 2 emissions data, calculated at various prices per metric ton of carbon dioxide (mtCO₂), as a percentage of net income for the sample considered.

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Table 5a: Office of Energy & Transportation							
Company Name	Ticker Symbol	Estimated Cost of Scope 1 & 2 Emissions as % of Net Income					
		@45/mtCO₂		@125/mtCO₂		@200/mtCO₂	
		2019	2020	2019	2020	2019	2020
Exxon Mobil Corporation	XOM	N/A	N/A	N/A	N/A	N/A	N/A
Chevron Corporation	CVX	N/A	N/A	N/A	N/A	N/A	N/A
NextEra Energy Inc.	NEE	N/A	82.30%	N/A	228.61%	N/A	365.78%
Summary Statistics:							
Minimum		N/A	82.30%	N/A	228.61%	N/A	365.78%
Maximum		N/A	82.30%	N/A	228.61%	N/A	365.78%
Mean		N/A	82.30%	N/A	228.61%	N/A	365.78%

Table 5b: Office of Finance							
Company Name	Ticker Symbol	Estimated Cost of Scope 1 & 2 Emissions as % of Net Income					
		@45/mtCO₂		@125/mtCO₂		@200/mtCO₂	
		2019	2020	2019	2020	2019	2020
Berkshire Hathaway Inc.	BRK.B	N/A	N/A	N/A	N/A	N/A	N/A
JPMorgan Chase & Co.	JPM	0.08%	0.01%	0.22%	0.03%	0.35%	0.05%
UnitedHealth Group Inc.	UNH	-113.91%	-49.62%	-316.42%	-137.82%	-506.27%	-220.51%
Bank of America Corporation	BAC	0.01%	0.02%	0.04%	0.04%	0.06%	0.07%
Wells Fargo & Company	WFC	0.02%	0.12%	0.06%	0.33%	0.10%	0.52%
Summary Statistics:							
Minimum		-113.91%	-49.62%	-316.42%	-137.82%	-506.27%	-220.51%
Maximum		0.08%	0.12%	0.22%	0.33%	0.35%	0.52%
Mean		-28.45%	-12.37%	-79.03%	-34.36%	-126.44%	-54.97%

Table 5 (continued): This table shows the estimated cost of scope 1 and 2 emissions data, calculated at various prices per metric ton of carbon dioxide (mtCO₂), as a percentage of net income for the sample considered.

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Table 5c: Office of Life Science							
Company Name	Ticker Symbol	Estimated Cost of Scope 1 & 2 Emissions as % of Net Income					
		@45/mtCO₂		@125/mtCO₂		@200/mtCO₂	
		2019	2020	2019	2020	2019	2020
Johnson & Johnson	JNJ	0.29%	0.22%	0.81%	0.61%	1.29%	0.97%
Procter & Gamble Company	PG	4.60%	0.90%	12.77%	2.50%	20.43%	4.00%
Thermo Fisher Scientific Inc.	TMO	0.20%	N/A	0.54%	N/A	0.87%	N/A
Pfizer Inc.	PFE	N/A	0.56%	N/A	1.56%	N/A	2.49%
Abbott Laboratories	ABT	1.19%	0.91%	3.30%	2.52%	5.27%	4.03%
Merck & Co. Inc.	MRK	0.49%	0.63%	1.37%	1.75%	2.19%	2.81%
AbbVie Inc.	ABBV	0.32%	0.49%	0.89%	1.37%	1.43%	2.20%
Eli Lilly and Company	LLY	0.41%	0.49%	1.13%	1.35%	1.80%	2.17%
Danaher Corporation	DHR	N/A	0.14%	N/A	0.40%	N/A	0.64%
Linde plc	LIN	70.82%	63.77%	196.73%	177.15%	314.77%	283.44%
Medtronic Plc	MDT	0.27%	0.25%	0.75%	0.70%	1.21%	1.13%
Summary Statistics:							
Minimum		0.20%	0.14%	0.54%	0.40%	0.87%	0.64%
Maximum		70.82%	63.77%	196.73%	177.15%	314.77%	283.44%
Mean		8.73%	6.84%	24.25%	18.99%	38.81%	30.39%

Table 5 (continued): This table shows the estimated cost of scope 1 and 2 emissions data, calculated at various prices per metric ton of carbon dioxide (mtCO₂), as a percentage of net income for the sample considered.

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Table 5d: Office of Manufacturing							
Company Name	Ticker Symbol	Estimated Cost of Scope 1 & 2 Emissions as % of Net Income					
		@45/mtCO₂		@125/mtCO₂		@200/mtCO₂	
		2019	2020	2019	2020	2019	2020
Tesla Inc.	TSLA	N/A	N/A	N/A	N/A	N/A	N/A
NVIDIA Corporation	NVDA	0.07%	0.15%	0.21%	0.41%	0.33%	0.66%
PepsiCo Inc.	PEP	0.31%	2.79%	0.85%	7.74%	1.36%	12.39%
Coca-Cola Company	KO	0.78%	0.89%	2.17%	2.48%	3.47%	3.97%
Broadcom Inc.	AVGO	N/A	N/A	N/A	N/A	N/A	N/A
NIKE Inc.	NKE	0.29%	0.37%	0.79%	1.02%	1.27%	1.63%
Intel Corporation	INTC	0.60%	0.62%	1.66%	1.72%	2.65%	2.76%
Texas Instruments Incorporated	TXN	0.88%	1.54%	2.44%	4.28%	3.91%	6.85%
Summary Statistics:							
Minimum		0.07%	0.15%	0.21%	0.41%	0.33%	0.66%
Maximum		0.88%	2.79%	2.44%	7.74%	3.91%	12.39%
Mean		0.49%	1.06%	1.35%	2.94%	2.16%	4.71%

Table 5 (continued): This table shows the estimated cost of scope 1 and 2 emissions data, calculated at various prices per metric ton of carbon dioxide (mtCO₂), as a percentage of net income for the sample considered.

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Table 5e: Office of Technology							
Company Name	Ticker Symbol	Estimated Cost of Scope 1 & 2 Emissions as % of Net Income					
		@45/mtCO₂		@125/mtCO₂		@200/mtCO₂	
		2019	2020	2019	2020	2019	2020
Microsoft Corporation	MSFT	0.03%	0.04%	0.09%	0.10%	0.14%	0.16%
Apple Inc.	AAPL	0.00%	0.00%	0.01%	0.01%	0.02%	0.02%
Alphabet Inc.	GOOGL	0.11%	0.11%	0.31%	0.29%	0.50%	0.47%
Meta Platforms (data under Facebook)	FB	N/A	N/A	N/A	N/A	N/A	N/A
Adobe Inc.	ADBE	0.08%	0.04%	0.23%	0.11%	0.38%	0.17%
Salesforce, Inc.	CRM	5.02%	0.09%	13.94%	0.26%	22.30%	0.42%
Comcast Corporation	CMCSA	0.69%	0.95%	1.91%	2.64%	3.06%	4.22%
Cisco Systems, Inc.	CSCO	0.09%	0.08%	0.25%	0.23%	0.39%	0.36%
Verizon Communications Inc.	VZ	0.99%	0.97%	2.74%	2.70%	4.39%	4.32%
AT&T Inc.	T	1.96%	-6.82%	5.45%	-18.94%	8.71%	-30.30%
Intuit Inc.	INTU	0.02%	0.01%	0.06%	0.03%	0.09%	0.05%
Summary Statistics:							
Minimum		0.00%	-6.82%	0.01%	-18.94%	0.02%	-30.30%
Maximum		5.02%	0.97%	13.94%	2.70%	22.30%	4.32%
Mean		0.90%	-0.45%	2.50%	-1.26%	4.00%	-2.01%

Table 5 (continued): This table shows the estimated cost of scope 1 and 2 emissions data, calculated at various prices per metric ton of carbon dioxide (mtCO₂), as a percentage of net income for the sample considered.

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Table 5f: Office of Trade & Services							
Company Name	Ticker Symbol	Estimated Cost of Scope 1 & 2 Emissions as % of Net Income					
		@45/mtCO₂		@125/mtCO₂		@200/mtCO₂	
		2019	2020	2019	2020	2019	2020
Amazon.com Inc.	AMZN	N/A	N/A	N/A	N/A	N/A	N/A
Home Depot Inc.	HD	0.74%	0.61%	2.06%	1.70%	3.30%	2.72%
Visa Inc.	V	N/A	N/A	N/A	N/A	N/A	N/A
Walt Disney Company	DIS	0.73%	-2.11%	2.02%	-5.86%	3.23%	-9.38%
Netflix Inc.	NFLX	N/A	N/A	N/A	N/A	N/A	N/A
Mastercard Incorporated	MA	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%
PayPal Holdings, Inc.	PYPL	0.11%	0.03%	0.29%	0.07%	0.47%	0.12%
Accenture Plc	ACN	0.22%	0.15%	0.60%	0.43%	0.96%	0.68%
Costco Wholesale Corporation	COST	1.35%	2.90%	3.74%	8.05%	5.99%	12.88%
Walmart Inc.	WMT	11.01%	4.86%	30.58%	13.51%	48.93%	21.61%
McDonald's Corporation	MCD	0.45%	0.50%	1.24%	1.40%	1.99%	2.24%
Lowe's Companies, Inc.	LOW	0.94%	2.00%	2.62%	5.56%	4.19%	8.89%
Summary Statistics:							
Minimum		0.00%	-2.11%	0.01%	-5.86%	0.01%	-9.38%
Maximum		11.01%	4.86%	30.58%	13.51%	48.93%	21.61%
Mean		1.73%	0.99%	4.80%	2.76%	7.67%	4.42%

Table 6: This table shows the estimated cost of scope 3 emissions data at various prices per metric ton of carbon dioxide (mtCO₂) for the sample considered. Estimated costs are presented in millions of dollars.

Table 6a: Office of Energy & Transportation

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Company Name	Ticker Symbol	Estimated Cost of Scope 3 Emissions @45/mtCO2		Estimated Cost of Scope 3 Emissions @125/mtCO2		Estimated Cost of Scope 3 Emissions @200/mtCO2	
		2019	2020	2019	2020	2019	2020
Exxon Mobil Corporation	XOM	N/A	N/A	N/A	N/A	N/A	N/A
Chevron Corporation	CVX	N/A	N/A	N/A	N/A	N/A	N/A
NextEra Energy Inc.	NEE	\$680	\$98,018	\$1,889	\$272,272	\$3,023	\$435,636
Summary Statistics:							
Minimum		\$680	\$98,018	\$1,889	\$272,272	\$3,023	\$435,636
Maximum		\$680	\$98,018	\$1,889	\$272,272	\$3,023	\$435,636
Mean		\$680	\$98,018	\$1,889	\$272,272	\$3,023	\$435,636

Table 6b: Office of Finance							
Company Name	Ticker Symbol	Estimated Cost of Scope 3 Emissions @45/mtCO2		Estimated Cost of Scope 3 Emissions @125/mtCO2		Estimated Cost of Scope 3 Emissions @200/mtCO2	
		2019	2020	2019	2020	2019	2020
Berkshire Hathaway Inc.	BRK.B	N/A	N/A	N/A	N/A	N/A	N/A
JPMorgan Chase & Co.	JPM	\$188	\$1,628	\$523	\$4,521	\$837	\$7,234
UnitedHealth Group Inc.	UNH	\$6,693	\$9,607	\$18,593	\$26,687	\$29,748	\$42,699
Bank of America Corporation	BAC	\$346	\$148,113	\$961	\$411,424	\$1,537	\$658,279
Wells Fargo & Company	WFC	\$163	\$111,053	\$452	\$308,481	\$723	\$493,569
Summary Statistics:							
Minimum		\$163	\$1,628	\$452	\$4,521	\$723	\$7,234
Maximum		\$6,693	\$148,113	\$18,593	\$411,424	\$29,748	\$658,279
Mean		\$1,848	\$67,600	\$5,132	\$187,778	\$8,211	\$300,445

Table 6 (continued): This table shows the estimated cost of scope 3 emissions data at various prices per metric ton of carbon dioxide (mtCO2) for the sample considered. Estimated costs are presented in millions of dollars.

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Table 6c: Office of Life Science							
Company Name	Ticker Symbol	Estimated Cost of Scope 3 Emissions @45/mtCO2		Estimated Cost of Scope 3 Emissions @125/mtCO2		Estimated Cost of Scope 3 Emissions @200/mtCO2	
		2019	2020	2019	2020	2019	2020
Johnson & Johnson	JNJ	\$17,269	\$919,409	\$47,968	\$2,553,913	\$76,749	\$4,086,260
Procter & Gamble Company	PG	\$18,106	\$11,125,792	\$50,294	\$30,904,977	\$80,471	\$49,447,963
Thermo Fisher Scientific Inc.	TMO	N/A	N/A	N/A	N/A	N/A	N/A
Pfizer Inc.	PFE	\$24,413	\$171,820	\$67,815	\$477,278	\$108,504	\$763,644
Abbott Laboratories	ABT	\$18,270	\$504,995	\$50,750	\$1,402,764	\$81,200	\$2,244,422
Merck & Co. Inc.	MRK	\$11,493	\$319,655	\$31,925	\$887,931	\$51,080	\$1,420,690
AbbVie Inc.	ABBV	\$10,956	\$52,604	\$30,434	\$146,124	\$48,694	\$233,798
Eli Lilly and Company	LLY	\$23,066	\$7,918	\$64,073	\$21,993	\$102,516	\$35,189
Danaher Corporation	DHR	N/A	N/A	N/A	N/A	N/A	N/A
Linde plc	LIN	\$943,605	\$649,080	\$2,621,125	\$1,803,000	\$4,193,800	\$2,884,800
Medtronic Plc	MDT	\$9,313	\$10,741	\$25,868	\$29,836	\$41,389	\$47,737
Summary Statistics:							
Minimum		\$9,313	\$7,918	\$25,868	\$21,993	\$41,389	\$35,189
Maximum		\$943,605	\$11,125,792	\$2,621,125	\$30,904,977	\$4,193,800	\$49,447,963
Mean		\$119,610	\$1,529,113	\$332,250	\$4,247,535	\$531,600	\$6,796,056

Table 6 (continued): This table shows the estimated cost of scope 3 emissions data at various prices per metric ton of carbon dioxide (mtCO₂) for the sample considered. Estimated costs are presented in millions of dollars.

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Table 6d: Office of Manufacturing							
Company Name	Ticker Symbol	Estimated Cost of Scope 3 Emissions @45/mtCO2		Estimated Cost of Scope 3 Emissions @125/mtCO2		Estimated Cost of Scope 3 Emissions @200/mtCO2	
		2019	2020	2019	2020	2019	2020
Tesla Inc.	TSLA	N/A	N/A	N/A	N/A	N/A	N/A
NVIDIA Corporation	NVDA	\$4,007	\$93,350	\$11,131	\$259,306	\$17,810	\$414,890
PepsiCo Inc.	PEP	\$38,583	\$2,458,295	\$107,175	\$6,828,597	\$171,480	\$10,925,755
Coca-Cola Company	KO	\$33,654	\$2,268,911	\$93,485	\$6,302,530	\$149,575	\$10,084,048
Broadcom Inc.	AVGO	N/A	N/A	N/A	N/A	N/A	N/A
NIKE Inc.	NKE	\$7,167	\$798,404	\$19,908	\$2,217,788	\$31,853	\$3,548,460
Intel Corporation	INTC	\$40,905	\$497,475	\$113,625	\$1,381,875	\$181,800	\$2,211,000
Texas Instruments Incorporated	TXN	\$44,021	\$208	\$122,280	\$579	\$195,647	\$926
Summary Statistics:							
Minimum		\$4,007	\$208	\$11,131	\$579	\$17,810	\$926
Maximum		\$44,021	\$2,458,295	\$122,280	\$6,828,597	\$195,647	\$10,925,755
Mean		\$28,056	\$1,019,440	\$77,934	\$2,831,779	\$124,694	\$4,530,846

Table 6 (continued): This table shows the estimated cost of scope 3 emissions data at various prices per metric ton of carbon dioxide (mtCO2) for the sample considered. Estimated costs are presented in millions of dollars.

Table 6e: Office of Technology

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Company Name	Ticker Symbol	Estimated Cost of Scope 3 Emissions @45/mtCO2		Estimated Cost of Scope 3 Emissions @125/mtCO2		Estimated Cost of Scope 3 Emissions @200/mtCO2	
		2019	2020	2019	2020	2019	2020
Microsoft Corporation	MSFT	\$10,269	\$486,799	\$28,524	\$1,352,220	\$45,639	\$2,163,551
Apple Inc.	AAPL	N/A	\$960,615	N/A	\$2,668,375	N/A	\$4,269,400
Alphabet Inc.	GOOGL	\$41,014	\$421,920	\$113,927	\$1,172,000	\$182,283	\$1,875,200
Meta Platforms (data under Facebook)	FB	N/A	N/A	N/A	N/A	N/A	N/A
Adobe Inc.	ADBE	\$1,554	\$19,721	\$4,318	\$54,780	\$6,908	\$87,648
Salesforce, Inc.	CRM	\$3,770	\$26,460	\$10,472	\$73,500	\$16,755	\$117,600
Comcast Corporation	CMCSA	\$75,398	N/A	\$209,439	N/A	\$335,102	N/A
Cisco Systems, Inc.	CSCO	\$7,364	\$1,124,365	\$20,455	\$3,123,237	\$32,727	\$4,997,179
Verizon Communications Inc.	VZ	\$163,259	\$703,819	\$453,496	\$1,955,052	\$725,594	\$3,128,083
AT&T Inc.	T	\$213,458	\$203,099	\$592,938	\$564,164	\$948,701	\$902,662
Intuit Inc.	INTU	\$111	\$866	\$308	\$2,406	\$492	\$3,850
Summary Statistics:							
Minimum		\$111	\$866	\$308	\$2,406	\$492	\$3,850
Maximum		\$213,458	\$1,124,365	\$592,938	\$3,123,237	\$948,701	\$4,997,179
Mean		\$57,355	\$438,629	\$159,320	\$1,218,415	\$254,911	\$1,949,464

Table 6 (continued): This table shows the estimated cost of scope 3 emissions data at various prices per metric ton of carbon dioxide (mtCO2) for the sample considered. Estimated costs are presented in millions of dollars.

Table 6f: Office of Trade & Services

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Company Name	Ticker Symbol	Estimated Cost of Scope 3 Emissions @45/mtCO2		Estimated Cost of Scope 3 Emissions @125/mtCO2		Estimated Cost of Scope 3 Emissions @200/mtCO2	
		2019	2020	2019	2020	2019	2020
Amazon.com Inc.	AMZN	N/A	N/A	N/A	N/A	N/A	N/A
Home Depot Inc.	HD	\$51,330	\$8,331,006	\$142,584	\$23,141,683	\$228,134	\$37,026,692
Visa Inc.	V	N/A	N/A	N/A	N/A	N/A	N/A
Walt Disney Company	DIS	\$33,551	N/A	\$93,198	N/A	\$149,116	N/A
Netflix Inc.	NFLX	N/A	N/A	N/A	N/A	N/A	N/A
Mastercard Incorporated	MA	\$12	\$15,483	\$34	\$43,010	\$54	\$68,815
PayPal Holdings, Inc.	PYPL	\$993	\$608	\$2,759	\$1,690	\$4,415	\$2,704
Accenture Plc	ACN	\$7,334	\$30,510	\$20,373	\$84,749	\$32,597	\$135,599
Costco Wholesale Corporation	COST	\$63,403	N/A	\$176,120	N/A	\$281,793	N/A
Walmart Inc.	WMT	\$413,565	\$7,707,122	\$1,148,792	\$21,408,672	\$1,838,067	\$34,253,875
McDonald's Corporation	MCD	\$19,413	\$2,393,783	\$53,924	\$6,649,398	\$86,279	\$10,639,036
Lowe's Companies, Inc.	LOW	\$61,260	\$3,149,580	\$170,167	\$8,748,833	\$272,267	\$13,998,133
Summary Statistics:							
Minimum		\$12	\$608	\$34	\$1,690	\$54	\$2,704
Maximum		\$413,565	\$8,331,006	\$1,148,792	\$23,141,683	\$1,838,067	\$37,026,692
Mean		\$72,318	\$3,089,727	\$200,883	\$8,582,576	\$321,414	\$13,732,122

Table 7: This table shows the estimated cost of scope 3 emissions data, calculated at various prices per metric ton of carbon dioxide (mtCO2), as a percentage of total assets for the sample considered.

Table 7a: Office of Energy & Transportation

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Company Name	Ticker Symbol	Estimated Cost of Scope 3 Emissions as % of Total Assets					
		@45/mtCO ₂		@125/mtCO ₂		@200/mtCO ₂	
		2019	2020	2019	2020	2019	2020
Exxon Mobil Corporation	XOM	N/A	N/A	N/A	N/A	N/A	N/A
Chevron Corporation	CVX	N/A	N/A	N/A	N/A	N/A	N/A
NextEra Energy Inc.	NEE	N/A	0.08%	N/A	0.00%	N/A	0.36%
Summary Statistics:							
Minimum		0.00%	0.08%	0.00%	0.00%	0.00%	0.36%
Maximum		0.00%	0.08%	0.00%	0.00%	0.00%	0.36%
Mean		0.00%	0.08%	0.00%	0.00%	0.00%	0.36%

Table 7b: Office of Finance							
Company Name	Ticker Symbol	Estimated Cost of Scope 3 Emissions as % of Total Assets					
		@45/mtCO ₂		@125/mtCO ₂		@200/mtCO ₂	
		2019	2020	2019	2020	2019	2020
Berkshire Hathaway Inc.	BRK.B	N/A	N/A	N/A	N/A	N/A	N/A
JPMorgan Chase & Co.	JPM	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
UnitedHealth Group Inc.	UNH	0.01%	0.01%	0.02%	0.00%	0.03%	0.03%
Bank of America Corporation	BAC	0.00%	0.01%	0.00%	0.00%	0.00%	0.03%
Wells Fargo & Company	WFC	0.00%	0.01%	0.00%	0.00%	0.00%	0.03%
Summary Statistics:							
Minimum		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Maximum		0.01%	0.01%	0.02%	0.00%	0.03%	0.03%
Mean		0.00%	0.00%	0.00%	0.00%	0.01%	0.02%

Table 7 (continued): This table shows the estimated cost of scope 3 emissions data, calculated at various prices per metric ton of carbon dioxide (mtCO₂), as a percentage of total assets for the sample considered.

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Table 7c: Office of Life Science							
Company Name	Ticker Symbol	Estimated Cost of Scope 3 Emissions as % of Total Assets					
		@45/mtCO₂		@125/mtCO₂		@200/mtCO₂	
		2019	2020	2019	2020	2019	2020
Johnson & Johnson	JNJ	0.01%	0.55%	0.03%	0.00%	0.05%	2.46%
Procter & Gamble Company	PG	0.02%	9.44%	0.04%	0.00%	0.07%	41.94%
Thermo Fisher Scientific Inc.	TMO	N/A	N/A	N/A	N/A	N/A	N/A
Pfizer Inc.	PFE	0.01%	0.10%	0.04%	0.00%	0.07%	0.46%
Abbott Laboratories	ABT	0.03%	0.72%	0.08%	0.00%	0.12%	3.20%
Merck & Co. Inc.	MRK	0.01%	0.36%	0.04%	0.00%	0.06%	1.61%
AbbVie Inc.	ABBV	0.01%	0.04%	0.04%	0.00%	0.07%	0.20%
Eli Lilly and Company	LLY	0.06%	0.02%	0.15%	0.00%	0.25%	0.08%
Danaher Corporation	DHR	N/A	N/A	N/A	N/A	N/A	N/A
Linde plc	LIN	1.05%	0.74%	2.91%	0.00%	4.66%	3.30%
Medtronic Plc	MDT	0.01%	0.01%	0.03%	0.00%	0.05%	0.05%
Summary Statistics:							
Minimum		0.01%	0.01%	0.03%	0.00%	0.05%	0.05%
Maximum		1.05%	9.44%	2.91%	0.00%	4.66%	41.94%
Mean		0.13%	1.33%	0.37%	0.00%	0.60%	5.92%

Table 7 (continued): This table shows the estimated cost of scope 3 emissions data, calculated at various prices per metric ton of carbon dioxide (mtCO₂), as a percentage of total assets for the sample considered.

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Table 7d: Office of Manufacturing							
Company Name	Ticker Symbol	Estimated Cost of Scope 3 Emissions as % of Total Assets					
		@45/mtCO₂		@125/mtCO₂		@200/mtCO₂	
		2019	2020	2019	2020	2019	2020
Tesla Inc.	TSLA	N/A	N/A	N/A	N/A	N/A	N/A
NVIDIA Corporation	NVDA	0.03%	0.61%	0.09%	0.00%	0.15%	2.71%
PepsiCo Inc.	PEP	0.05%	2.87%	0.14%	0.00%	0.22%	12.74%
Coca-Cola Company	KO	0.04%	2.68%	0.11%	0.00%	0.18%	11.89%
Broadcom Inc.	AVGO	N/A	N/A	N/A	N/A	N/A	N/A
NIKE Inc.	NKE	0.03%	2.90%	0.09%	0.00%	0.14%	12.89%
Intel Corporation	INTC	0.03%	0.34%	0.09%	0.00%	0.14%	1.53%
Texas Instruments Incorporated	TXN	0.25%	0.00%	0.70%	0.00%	1.11%	0.00%
Summary Statistics:							
Minimum		0.03%	0.00%	0.09%	0.00%	0.14%	0.00%
Maximum		0.25%	2.90%	0.70%	0.00%	1.11%	12.89%
Mean		0.07%	1.57%	0.20%	0.00%	0.32%	6.96%

Table 7 (continued): This table shows the estimated cost of scope 3 emissions data, calculated at various prices per metric ton of carbon dioxide (mtCO₂), as a percentage of total assets for the sample considered.

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Table 7e: Office of Technology							
Company Name	Ticker Symbol	Estimated Cost of Scope 3 Emissions as % of Total Assets					
		@45/mtCO₂		@125/mtCO₂		@200/mtCO₂	
		2019	2020	2019	2020	2019	2020
Microsoft Corporation	MSFT	0.00%	0.17%	0.01%	0.00%	0.02%	0.74%
Apple Inc.	AAPL	N/A	0.29%	N/A	0.00%	N/A	1.29%
Alphabet Inc.	GOOGL	0.02%	0.14%	0.04%	0.00%	0.07%	0.63%
Meta Platforms (data under Facebook)	FB	N/A	N/A	N/A	N/A	N/A	N/A
Adobe Inc.	ADBE	0.01%	0.09%	0.02%	0.00%	0.03%	0.39%
Salesforce, Inc.	CRM	0.01%	0.04%	0.02%	0.00%	0.04%	0.19%
Comcast Corporation	CMCSA	0.03%	N/A	0.08%	N/A	0.13%	N/A
Cisco Systems, Inc.	CSCO	0.01%	1.17%	0.02%	0.00%	0.03%	5.19%
Verizon Communications Inc.	VZ	0.06%	0.23%	0.16%	0.00%	0.26%	1.03%
AT&T Inc.	T	0.04%	0.04%	0.11%	0.00%	0.18%	0.17%
Intuit Inc.	INTU	0.00%	0.01%	0.01%	0.00%	0.01%	0.04%
Summary Statistics:							
Minimum		0.00%	0.01%	0.01%	0.00%	0.01%	0.04%
Maximum		0.06%	1.17%	0.16%	0.00%	0.26%	5.19%
Mean		0.02%	0.24%	0.05%	0.00%	0.09%	1.07%

Table 7 (continued): This table shows the estimated cost of scope 3 emissions data, calculated at various prices per metric ton of carbon dioxide (mtCO₂), as a percentage of total assets for the sample considered.

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Table 7f: Office of Trade & Services							
Company Name	Ticker Symbol	Estimated Cost of Scope 3 Emissions as % of Total Assets					
		@45/mtCO₂		@125/mtCO₂		@200/mtCO₂	
		2019	2020	2019	2020	2019	2020
Amazon.com Inc.	AMZN	N/A	N/A	N/A	N/A	N/A	N/A
Home Depot Inc.	HD	0.11%	13.68%	0.30%	0.00%	0.48%	60.79%
Visa Inc.	V	N/A	N/A	N/A	N/A	N/A	N/A
Walt Disney Company	DIS	0.02%	N/A	0.06%	N/A	0.10%	N/A
Netflix Inc.	NFLX	N/A	N/A	N/A	N/A	N/A	N/A
Mastercard Incorporated	MA	0.00%	0.05%	0.00%	0.00%	0.00%	0.22%
PayPal Holdings, Inc.	PYPL	0.00%	0.00%	0.01%	0.00%	0.01%	0.00%
Accenture Plc	ACN	0.03%	0.09%	0.08%	0.00%	0.12%	0.41%
Costco Wholesale Corporation	COST	0.15%	N/A	0.41%	N/A	0.65%	N/A
Walmart Inc.	WMT	0.20%	3.38%	0.54%	0.00%	0.87%	15.03%
McDonald's Corporation	MCD	0.05%	4.78%	0.13%	0.00%	0.21%	21.25%
Lowe's Companies, Inc.	LOW	0.18%	8.51%	0.49%	0.00%	0.78%	37.84%
Summary Statistics:							
Minimum		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Maximum		0.20%	13.68%	0.54%	0.00%	0.87%	60.79%
Mean		0.08%	4.36%	0.22%	0.00%	0.36%	19.36%

Table 8: This table shows the estimated cost of scope 3 emissions data, calculated at various prices per metric ton of carbon dioxide (mtCO₂), as a percentage of net income for the sample considered.

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Table 8a: Office of Energy & Transportation							
Company Name	Ticker Symbol	Estimated Cost of Scope 3 Emissions as % of Net Income					
		@45/mtCO2		@125/mtCO2		@200/mtCO2	
		2019	2020	2019	2020	2019	2020
Exxon Mobil Corporation	XOM	N/A	N/A	N/A	N/A	N/A	N/A
Chevron Corporation	CVX	N/A	N/A	N/A	N/A	N/A	N/A
NextEra Energy Inc.	NEE	0.02%	4.14%	0.06%	11.49%	0.09%	18.39%
Summary Statistics:							
Minimum		0.02%	4.14%	0.06%	11.49%	0.09%	18.39%
Maximum		0.02%	4.14%	0.06%	11.49%	0.09%	18.39%
Mean		0.02%	4.14%	0.06%	11.49%	0.09%	18.39%

Table 8b: Office of Finance							
Company Name	Ticker Symbol	Estimated Cost of Scope 3 Emissions as % of Net Income					
		@45/mtCO2		@125/mtCO2		@200/mtCO2	
		2019	2020	2019	2020	2019	2020
Berkshire Hathaway Inc.	BRK.B	N/A	N/A	N/A	N/A	N/A	N/A
JPMorgan Chase & Co.	JPM	0.00%	0.01%	0.00%	0.02%	0.00%	0.02%
UnitedHealth Group Inc.	UNH	-101.38%	-61.15%	-281.61%	-169.86%	-450.57%	-271.77%
Bank of America Corporation	BAC	0.00%	0.83%	0.00%	2.30%	0.01%	3.68%
Wells Fargo & Company	WFC	0.00%	3.36%	0.00%	9.35%	0.00%	14.95%
Summary Statistics:							
Minimum		-101.38%	-61.15%	-281.61%	-169.86%	-450.57%	-271.77%
Maximum		0.00%	3.36%	0.00%	9.35%	0.01%	14.95%
Mean		-25.34%	-14.24%	-70.40%	-39.55%	-112.64%	-63.28%

Table 8 (continued): This table shows the estimated cost of scope 3 emissions data, calculated at various prices per metric ton of carbon dioxide (mtCO₂), as a percentage of net income for the sample considered.

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Table 8c: Office of Life Science							
Company Name	Ticker Symbol	Estimated Cost of Scope 3 Emissions as % of Net Income					
		@45/mtCO₂		@125/mtCO₂		@200/mtCO₂	
		2019	2020	2019	2020	2019	2020
		2019	2020	2019	2020	2019	2020
Johnson & Johnson	JNJ	0.12%	5.98%	0.33%	16.62%	0.53%	26.60%
Procter & Gamble Company	PG	0.46%	84.91%	1.27%	235.86%	2.03%	377.38%
Thermo Fisher Scientific Inc.	TMO	N/A	N/A	N/A	N/A	N/A	N/A
Pfizer Inc.	PFE	0.15%	1.79%	0.42%	4.96%	0.67%	7.94%
Abbott Laboratories	ABT	0.50%	11.23%	1.38%	31.21%	2.20%	49.93%
Merck & Co. Inc.	MRK	0.12%	4.51%	0.33%	12.54%	0.52%	20.06%
AbbVie Inc.	ABBV	0.14%	1.14%	0.39%	3.16%	0.62%	5.06%
Eli Lilly and Company	LLY	0.28%	0.13%	0.77%	0.36%	1.23%	0.57%
Danaher Corporation	DHR	N/A	N/A	N/A	N/A	N/A	N/A
Linde plc	LIN	39.63%	24.72%	110.09%	68.66%	176.14%	109.86%
Medtronic Plc	MDT	0.20%	0.22%	0.56%	0.62%	0.89%	0.99%
Summary Statistics:							
Minimum		0.12%	0.13%	0.33%	0.36%	0.52%	0.57%
Maximum		39.63%	84.91%	110.09%	235.86%	176.14%	377.38%
Mean		4.62%	14.96%	12.84%	41.55%	20.54%	66.49%

Table 8 (continued): This table shows the estimated cost of scope 3 emissions data, calculated at various prices per metric ton of carbon dioxide (mtCO₂), as a percentage of net income for the sample considered.

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Table 8d: Office of Manufacturing							
Company Name	Ticker Symbol	Estimated Cost of Scope 3 Emissions as % of Net Income					
		@45/mtCO₂		@125/mtCO₂		@200/mtCO₂	
		2019	2020	2019	2020	2019	2020
Tesla Inc.	TSLA	N/A	N/A	N/A	N/A	N/A	N/A
NVIDIA Corporation	NVDA	0.10%	3.34%	0.27%	9.27%	0.43%	14.84%
PepsiCo Inc.	PEP	0.05%	34.53%	0.15%	95.91%	0.23%	153.45%
Coca-Cola Company	KO	0.37%	29.21%	1.04%	81.13%	1.66%	129.82%
Broadcom Inc.	AVGO	N/A	N/A	N/A	N/A	N/A	N/A
NIKE Inc.	NKE	0.18%	31.45%	0.49%	87.35%	0.79%	139.76%
Intel Corporation	INTC	0.19%	2.38%	0.54%	6.61%	0.86%	10.58%
Texas Instruments Incorporated	TXN	0.88%	0.00%	2.44%	0.01%	3.90%	0.02%
Summary Statistics:							
Minimum		0.05%	0.00%	0.15%	0.01%	0.23%	0.02%
Maximum		0.88%	34.53%	2.44%	95.91%	3.90%	153.45%
Mean		0.30%	16.82%	0.82%	46.71%	1.31%	74.74%

Table 8 (continued): This table shows the estimated cost of scope 3 emissions data, calculated at various prices per metric ton of carbon dioxide (mtCO₂), as a percentage of net income for the sample considered.

Table 8e: Office of Technology

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Company Name	Ticker Symbol	Estimated Cost of Scope 3 Emissions as % of Net Income					
		@45/mtCO ₂		@125/mtCO ₂		@200/mtCO ₂	
		2019	2020	2019	2020	2019	2020
Microsoft Corporation	MSFT	0.03%	1.10%	0.07%	3.05%	0.12%	4.89%
Apple Inc.	AAPL	N/A	1.67%	0.00%	4.65%	0.00%	7.44%
Alphabet Inc.	GOOGL	0.12%	1.05%	0.33%	2.91%	0.53%	4.66%
Meta Platforms (data under Facebook)	FB	N/A	N/A	N/A	N/A	N/A	N/A
Adobe Inc.	ADBE	0.05%	0.37%	0.15%	1.04%	0.23%	1.67%
Salesforce, Inc.	CRM	2.99%	0.65%	8.31%	1.81%	13.30%	2.89%
Comcast Corporation	CMCSA	0.58%	N/A	1.60%	N/A	2.57%	N/A
Cisco Systems, Inc.	CSCO	0.06%	10.03%	0.18%	27.85%	0.28%	44.56%
Verizon Communications Inc.	VZ	0.83%	3.84%	2.29%	10.66%	3.67%	17.05%
AT&T Inc.	T	1.43%	-5.32%	3.96%	-14.76%	6.34%	-23.62%
Intuit Inc.	INTU	0.01%	0.05%	0.02%	0.13%	0.03%	0.21%
Summary Statistics:							
Minimum		0.01%	-5.32%	0.00%	-14.76%	0.00%	-23.62%
Maximum		2.99%	10.03%	8.31%	27.85%	13.30%	44.56%
Mean		0.68%	1.49%	1.69%	4.15%	2.71%	6.64%

Table 8 (continued): This table shows the estimated cost of scope 3 emissions data, calculated at various prices per metric ton of carbon dioxide (mtCO₂), as a percentage of net income for the sample considered.

Table 8f: Office of Trade & Services

Accounting for Carbon Emissions Among Large U.S. Companies: Does Materiality Matter

Company Name	Ticker Symbol	Estimated Cost of Scope 3 Emissions as % of Net Income					
		@45/mtCO ₂		@125/mtCO ₂		@200/mtCO ₂	
		2019	2020	2019	2020	2019	2020
Amazon.com Inc.	AMZN	N/A	N/A	N/A	N/A	N/A	N/A
Home Depot Inc.	HD	0.46%	64.75%	1.27%	179.87%	2.03%	287.79%
Visa Inc.	V	N/A	N/A	N/A	N/A	N/A	N/A
Walt Disney Company	DIS	0.30%	N/A	0.84%	N/A	1.35%	N/A
Netflix Inc.	NFLX	N/A	N/A	N/A	N/A	N/A	N/A
Mastercard Incorporated	MA	0.00%	0.24%	0.00%	0.67%	0.00%	1.07%
PayPal Holdings, Inc.	PYPL	0.04%	0.01%	0.11%	0.04%	0.18%	0.06%
Accenture Plc	ACN	0.15%	0.59%	0.42%	1.63%	0.67%	2.62%
Costco Wholesale Corporation	COST	1.71%	N/A	4.75%	N/A	7.61%	N/A
Walmart Inc.	WMT	5.76%	50.70%	16.00%	140.84%	25.60%	225.34%
McDonald's Corporation	MCD	0.32%	50.60%	0.89%	140.56%	1.43%	224.90%
Lowe's Companies, Inc.	LOW	2.65%	73.57%	7.35%	204.36%	11.77%	326.98%
Summary Statistics:							
Minimum		0.00%	0.01%	0.00%	0.04%	0.00%	0.06%
Maximum		5.76%	73.57%	16.00%	204.36%	25.60%	326.98%
Mean		1.27%	34.35%	3.52%	95.43%	5.63%	152.68%