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To  
Securities and Exchange Commission

June 12, 2022

Re: File number S7-10-22 in support of the SEC's climate risk rules

Dear Sir/Madam:

I write in support of your proposed climate risk disclosures. To frame my comments, it is useful to summarize what the climate risk disclosure rule would require registrants to disclose:

- the firm's governance of climate-related risks and relevant risk management processes;
- how any climate-related risks identified by the firm have had or are likely to have a material impact on its business and consolidated financial statements, which may manifest over the short-, medium-, or long-term;
- how any identified climate-related risks have affected or are likely to affect the firm's strategy, business model, and outlook; and
- the impact of climate-related events and transition activities on the line items of a registrant's consolidated financial statements, as well as on the financial estimates and assumptions used in the financial statements.

My support is based on my assessment of the costs and benefits of the proposal. Let us start with the costs.

#### 1.0 Compliance costs are not a significant portion of market capitalization

On page 390 of the proposal, the SEC estimates costs in the first year of compliance to be around \$640,000 and annual costs in subsequent years to be \$530,000 for larger companies. On page 399, the SEC estimates assurance costs for large companies to be around \$75,000 to \$145,000. A well-done academic paper by Alexander et al. (2013) estimated the average annual costs of complying with section 404(b) for accelerated filers at \$1.2 million.<sup>1</sup>

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<sup>1</sup> Alexander, Cindy R. & Bauguess, Scott W. & Bernile, Gennaro & Lee, Yoon-Ho Alex & Marietta-Westberg, Jennifer, 2013. "[Economic effects of SOX Section 404 compliance: A corporate insider perspective](#)," [Journal of Accounting and Economics](#), Elsevier, vol. 56(2), pages 267-290.

For the sake of argument let us generously assume that the annual costs of compliance with the climate risk rule is indeed \$1.2 million for all filers, with the clear understanding that no one has claimed that the climate risk rule will be as expensive to implement as section 404(b) was. As of May 4, 2022, the average price-earnings ratio for (i) an S&P 500 firm is 23<sup>2</sup>; (ii) an S&P 400 firm is 15,<sup>3</sup>; and (iii) an S&P 600 small cap firm is 16.<sup>4</sup> If these compliance costs were incurred into perpetuity, without any reduction expected on account of learning and with no corresponding benefits whatsoever, the median S&P 500 firm will suffer a market capitalization loss of approximately \$28 million ( $\$1.2 \text{ million} * 23$ ).

It is worth noting that large accelerated filers are required to report scope 1 and 2 emissions for fiscal 2023 and scope 3 emissions in fiscal 2024. Accelerated filers start in fiscal 2024 and smaller reporting firms in fiscal 2025 although smaller reporting firms are exempt from scope 3. Although these compliance costs will be lower for mid cap and smaller firms, if we were to assume the same costs for these firms, the median S&P 400 mid cap firm will suffer a loss of market capitalization of \$18 million ( $\$1.2 \text{ million} * 15$ ) and the median S&P 600 small firm would suffer a loss of market capitalization of \$19 million ( $\$1.2 \text{ million} * 16$ ).

For simplicity, I have implicitly assumed that the average price-earnings ratio applies to the median firm and price-earnings ratios provide a first-order description of how firms are valued by investors. More sophisticated valuation models can be used without any major changes in inferences drawn. I focus on the median firm because average market capitalizations tend to be positively skewed (i.e., a few large stocks with trillion-dollar valuations such as Apple, Amazon and Microsoft can tilt averages but not affect medians or the middle value of the distribution of market capitalizations).

Coming back to the task at hand, it is useful to benchmark these hypothetical losses to the median market capitalizations of firms in these three indexes. The median market capitalization of an S&P 500 firm is \$29.7 billion as of May 6, 2022<sup>5</sup> and the value loss, if any, from compliance costs would work out to 0.09% of that median market capitalization. Analogous numbers work out to 0.5% of an S&P midcap 400 firm (median market cap is \$5.1 billion as of May 6, 2022)<sup>6</sup> and 1.9% of the median S&P small cap 600 firm (median market cap is \$1.39 billion as of May 6, 2022).<sup>7</sup> These percentages matter because these are much smaller than the stock price volatility experienced by these median companies in a trading day.

For instance, the daily stock returns of an S&P 500 firm usually fluctuate between -1% and +1%. Even if the 0.09% loss in market capitalization were to occur, a researcher cannot statistically detect that change because -0.09% is much smaller than -1%. The daily stock returns volatility of an S&P 400 midcap firm and the S&P 600 small cap firm is usually even higher than +/- 1% as firm size is usually inversely related to return volatility. As can be seen, the capitalized value of the loss in compliance costs for an S&P 400 midcap firm and for a S&P 600 small cap firm comfortably fall

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<sup>2</sup> <https://www.wsj.com/market-data/stocks/peyields>

<sup>3</sup> <https://www.bloomberg.com/quote/MID:IND?sref=yv2coi81>

<sup>4</sup> <https://www.bloomberg.com/quote/SML:IND?sref=yv2coi81>

<sup>5</sup> <https://www.spglobal.com/spdji/en/indices/equity/sp-500/#data>

<sup>6</sup> <https://www.spglobal.com/spdji/en/indices/equity/sp-400/#data>

<sup>7</sup> <https://www.spglobal.com/spdji/en/indices/equity/sp-600/#data>

within these volatility bands. In other words, the loss in market capitalization, if any, from compliance costs is likely too tiny for any outsider to detect and to separate from daily volatility in the stock returns for unrelated reasons.

## 2.0 Why not benchmark compliance costs to net income?

A critic might legitimately wonder why I have chosen to benchmark these compliance costs to market capitalization, as opposed to net income. The analysis sketched out in the previous paragraph implicitly does so at the portfolio level. That is, if compliance costs capitalized into the future is 0.09% of market capitalization of the median S&P 500 firm (\$29.7 billion), given the price-earnings ratio of 23, the annual compliance costs for the median firm would also be 0.09% of the median firm's earnings. Analogous ratios would conceptually apply to S&P mid cap and small cap firms.

Having said that, I am not in favor of benchmarking compliance costs to net income for the following three reasons:

First, as of June 6, 2022, I found 6,827 publicly listed firms, listed on U.S. exchanges and incorporated in the U.S. on S&P's CAPIQ database for whom I could calculate a market value of equity. Of these, 2,571 firms, or 38%, reported a loss in the year 2021. Even a one dollar increase in compliance costs would arguably be onerous to around 40% of publicly listed firms. Hence, a measure that is negative for 40% of the listed firms cannot serve as a defensible basis for enacting policy proposals. Second, the benefits of the proposed rule change are likely to be realized via lower estimation risk, as argued later, and hence via lower cost of capital. It is difficult to have conversations about cost of capital without considering either the market capitalization or the enterprise value (debt plus market capitalization of equity) of the firm. Third, arguably the firms most likely to resist the rule change would be smaller and financially distressed firms. The rule already allows slower adoption for such firms. On top of that, I worry that even a 25-50 basis point increase in interest rates might slip such firms into further distress. Surely, no one is likely to argue that the Federal Reserve should not increase interest rates because small, distressed firms will slip into further financial trouble.

The above arguments generally assume (i) no benefits whatsoever from enactment of the climate risk disclosures and (ii) no reduction in compliance costs on account of learning and experience. Neither assumption describes the situation well. The biggest benefit from SEC disclosures in my mind is the reduction in the estimation risk of investors.

## 3.0 Benefit related to estimation risk

Estimation risk can be defined as investor uncertainty about the parameters of the stock return distribution or of the cash flow process of the firm. Estimation risk usually increases a firm's cost of capital. The market, as of now, absent regulation of the kind proposed by the SEC, does not produce the optimal amount of information on climate risk, due to market failures such as information asymmetries, principal-agent problems between investors and issuers and coordination problems among issuers detailed below.

I firmly believe that the disclosures required by the proposed rule will (or, at least, can reasonably be expected to) increase stock market efficiency by enabling investors to more accurately assess the climate-related financial risk faced by a firm and, in turn, more accurately price that firm's securities. Even a very modest reduction in estimation risk can decrease cost of capital by more than enough to pay for the already modest compliance costs outlined above.

Let me elaborate a bit more on the three market failures associated with increased estimation risk, should the SEC's climate disclosure rules not get enacted: (i) information asymmetry; (ii) principal-agent issues; and (iii) coordination problems among issuers.

### *3.1 Information asymmetry*

Climate risk can be broadly divided into two types of risk: transition risk and physical risk. Physical risk refers to the loss of revenue streams or assets or additional investments caused by physical effects of climate change such as sea level rise, wildfires or water stress, for instance. Transition risk refers to the loss of revenue streams or assets or additional investment that arises from the firm's efforts to reduce or eliminate green house emissions that cause climate change. Transition risk stems sometimes from societal changes such as public policy initiatives or from competitors switching to a low carbon alternative product that consumers demand. Transition risk could involve, for instance, the efforts of auto makers to create productive capacity for electric vehicles, in response to rising consumer demand or regulation imposed by states or countries mandating a switch from gas powered cars to electric ones. The assets or revenue streams tied to gas powered cars would be stranded or might need to be written off as consumer interest in such vehicles wanes.

Physical and transition risks, in turn, can feed into several other sources of risk such as (i) operational risk or the risk that the firm's routine operations would be disrupted on account of property damage or business interruption; (ii) credit risk for a financial institution as climate risk increases the probability that an affected borrower defaults on its loan obligations or interest payments; (iii) liquidity risks such as the simultaneous run on banks or moves to withdraw deposits from banks by customers trying to tide over abrupt climate events; (iv) insurance risk that might lead to both higher insurance premiums and the withdrawal of insurance coverage altogether from areas or regions more prone to climate risk; (v) market risk or the probability that asset prices either gradually or abruptly price in climate risk; and (vi) last not but least systemic risk caused by entire countries' inability to cope with floods (e.g., Bangladesh) and the related impact on U.S. banks and companies with direct or indirect exposure to such a country via customers, suppliers and employees.

To accurately understand physical and transition risks, and the associated risks detailed above, the investor requires multiple types of data. Physical risk requires data on current and future physical hazards derived from historical data and climate models, topographical data, locational data of assets and information on vulnerability of these assets and the ability of the company to adapt to climate change.

The data for assessing physical risks from climate change for a firm are available in an incomplete manner from a mosaic of several sources with varying degrees of reliability. In a few cases, non-profits and government agencies make macro data available for geographical constituencies. Climate Central, for instance, provides data on sea level rise linked to topography, World Resources Institute has data on water stress and Max Planck Institute on wildfire vulnerability.

However, there is little data on which firm has stores or distribution centers or offices or facilities in the areas identified as vulnerable to water stress or wildfires or sea level rise. Several for profit companies such as McKinsey, Moody's, Carbone 4, MSCI sell data where they estimate a particular firm's vulnerability to physical risk but the data are of varying quality and are unaffordable to individual investors or researcher teams like mine. Moreover, these private vendors use proprietary data and methodologies. As a result, the ratings and scores produced by these private vendors, even if an investor could afford to purchase them, are un-comparable across firms and might even be

inconsistent across time for the same firm. Mandatory disclosures of the kind the SEC has mandated would go a long way in addressing the difficulty investors experience with estimating the nature of climate risk affecting specific public firms.

An investor can begin to measure transition risks with an inventory of the scope 1, scope 2 and scope 3 emissions of a firm. In our research, we have found that barely 25%-30% of U.S. companies actually disclose even scope 1 emissions (see Aswani et al. 2021).<sup>8</sup> Even the company self-disclosed data are collected via annual questionnaires by CDP (Carbon Disclosure Project) and are most important unaudited and vary widely in terms of depth and detail. Some disclose scope 1, some scope 2 and 3 and some disclose nothing at all. To get around these data problems, data vendors such as Trucost try to fit proprietary models to estimate emissions of non-disclosing firms. Unfortunately, these models appear rather naïve in that we were able to statistically uncover most of the variation in these estimates as a function of firm size, growth, industry membership and time (Aswani et al. 2021). Hence these estimated emissions are not all that informative to an investor interested in assessing emissions. The SEC's disclosure rules will mandate consistent, comparable and audited disclosures of scope 1, 2 and 3 disclosures on U.S. firms and enable investors to reduce their estimation risk related to how much a company is exposed to climate change.

Transition risk also looks ahead to the future plans of companies to cut emissions, and to manage policy and techno-economic change in a decarbonizing economy. A large number of U.S. companies has promised to get to a net zero emissions goal, and a reasonable investor would want to know how these promises inform a company's strategy. During the course of collecting data for another research project aimed to assessing at the credibility of such pledges (Desai et al. 2022), my co-authors and I ran into considerable challenges associated with accessibility, comparability and consistency of the claimed pathways to net zero.<sup>9</sup> The underlying data are scattered across press releases, 10-K financial reports, sustainability reports, and company websites. We found tremendous variation in every aspect of a path to that promise of net-zero emissions, the reporting, and the associated verifiability of a given path. Even for companies without specific emissions-cutting pledges, investors want to understand the risks posed by policy and techno-economic change, how they will be managed, and how sensitive financial assumptions are to those risks.

On top of that, companies follow diverse frameworks, such as those proposed by the Task Force on Climate-Related Financial Disclosures (TCFD), the Sustainability Accounting Standards Board (SASB), and the Global Reporting Initiative (GRI). Some subscribe to the Science-Based Targets Initiative (SBTI) whereas others sign up to the Transition Pathway Initiative (TPI). Vendors have developed methodologies for temperature scores that provide a summary way to assess what level of warming plans a company is aligned with. But these scores tend to be created from proprietary models, details of which are opaque to investors. The SEC's disclosure rules will help by providing consistent, comparable disclosures of how firms intend to manage transition risk and enable investors to reduce estimation risk associated with understanding transition plans of a company.

### *3.2 Principal-agent problems*

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<sup>8</sup> [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3800193](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3800193)

<sup>9</sup> <https://leading.gsb.columbia.edu/features/oil-and-gas-majors-may-be-more-responsive-to-pressure-on-climate-than-widely-believed/>

The area of sustainability disclosures is rife with greenwashing or the practice of managers (the agents) not following through on their ESG or climate promises made to providers of capital (the investors or principals). My co-authors and I have written several academic papers on this issue. For instance, the Business Round Table pledges to stakeholder capitalism barely lived up to those promises (Rajgopal and Raghunandan 2021).<sup>10</sup> ESG funds rarely appear to have processes to deliver on their promises related to investing in sustainable stocks in their prospectuses (Rajgopal and Raghunandan 2022).<sup>11</sup> Despite claims that employers and senior managers wanted to cushion the blow of the pandemic on employees by “sharing the pain” imposed by the pandemic, we see weak evidence that these claims were realized in practice (Afzali et al. 2021).<sup>12</sup> At a more micro-level, muscle lite companies hide potentially lower cost labor in off balance sheet entities but claim to invest generously in human capital development.<sup>13</sup> Lodging REITs manage to operate hotels without paying any significant taxes by legal engineering but claim to be stellar corporate citizens.<sup>14</sup> Companies that take subsidies from the U.S. state governments barely disclose what they are supposed to do in return. Of the 1,715 instances of aid, subsidies and grants given by various states to publicly traded companies in the U.S, only 15% of the grants have explicit reporting requirements on both the number of jobs that the companies initially promised to create and the number of jobs they actually created as a result of the subsidy.<sup>15</sup>

We believe that such greenwashing is prevalent in the world of climate risk disclosures as well. In work in progress, we find that green bonds do not appear to be associated with lower corporate emissions in future years. The carbon offset market that several companies rely on to get to net zero emissions, is in urgent need of assurance and credibility.<sup>16</sup> For instance, it is hard to know whether the renewable energy certificates (RECs) used by companies to report lower net emissions incrementally reduce worldwide emissions. It is unclear whether scope 1, 2 and 3 emissions reported voluntarily by companies even measure comparable activities. Mandating audited climate disclosures, of the kind the SEC, has proposed, along with increased enforcement, will go a long way towards addressing this principal-agent problem.

### *3.3 Coordination problems among firms*

A few Chief Financial Officers (CFOs) I have spoken with complain that disclosing emissions and transition plans when competitors hesitate to do so, on the margin, dissuades them from making similar disclosures. A mandated disclosure rule for all listed companies solves this problem.

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<sup>10</sup> [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3609056](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3609056)

<sup>11</sup> [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3826357](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3826357)

<sup>12</sup> [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4053005](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4053005)

<sup>13</sup> <https://www.forbes.com/sites/shivaramrajgopal/2022/03/20/asset-lite-companies-rely-on-labor-based-arbitrage-heres-the-investor-and-esg-case-for-disclosing-their-labor-practices/?sh=35efaa2e5f09>

<sup>14</sup> <https://www.forbes.com/sites/shivaramrajgopal/2022/05/03/hotels-in-name-only-the-strange-case-of-lodging-reits/?sh=18a029f7c215>

<sup>15</sup> <https://www.forbes.com/sites/shivaramrajgopal/2021/06/07/it-should-be-mandatory-to-disclose-political-influence-seeking-and-payoffs-from-the-state-theres-an-evidence-based-reason-why/?sh=376cb4901eb3>

<sup>16</sup> <https://features.propublica.org/brazil-carbon-offsets/inconvenient-truth-carbon-credits-dont-work-deforestation-redd-acre-cambodia/>

#### 4.0 Management's assumptions that affect future cash flow impact due to climate change

A key strength of our financial reporting system is comparability across companies. In my experience, investors have little comparable information on climate related assumptions and estimates in financial statements. For instance, the ongoing global efforts to decarbonize, whether via regulation or technological innovation, will render several current products (gas vehicles) obsolete. Such impending obsolescence typically implies shorter useful lives for property, plant and equipment (PPE) used to manufacture the cars or potential write downs of car inventory. The high prices of oil and gas in today's market actually make it cheaper for consumers to switch to renewables. In preparing a firm's financial statements, management must implicitly or explicitly rely on assumptions and estimates regarding how decarbonization will affect the firm's future trajectory. Understanding these assumptions and estimates will aid investors in valuing the firm's securities.

To make this concrete, consider the channels that British Petroleum (BP)'s auditors, Deloitte, highlight, under "key audit matters" as the potential impact of climate change on BP's 2021 financial statements (page 138 of BP's 20-F for 2021):<sup>17</sup>

- Oil and gas price assumptions and estimates, related to future emissions costs depending on the future demand and supply of oil due to climate change and the energy transition, affect the value-in-use of BP's oil and gas PPE assets for impairment testing.
- The timing of the decommissioning expenditures for oil and gas PPE assets and expected liabilities change depending on the trajectory of climate change.
- Potential decommissioning costs and asset retirement obligations that stem from assets divested by BP may revert back to BP if climate change concerns increase liquidity and resilience concerns in the oil and gas industry.
- Provisions for costs associated with decommissioning refining assets may need to increase if reduction in demand in oil and gas were to occur on account of climate change concerns.
- Potential viability of the exploration and appraisal costs, capitalized as assets, would be called into question if oil and gas prices are forecasted to fall in the future on account of concerns associated with climate change.
- The recoverability of the carrying value of refining assets depends on (i) changes in demand and supply of oil on account of climate change concerns; and (ii) adoption of electric vehicles in markets where BP has significant refining capacity.
- BP's stated intention to reduce hydrocarbon production by around 40% in 2030 relative to 2019 would require an assessment of realization proceeds from sale to a third party relative to value in use by BP.
- The useful lives of refining assets may shorten as society and BP moves to a "net zero" emissions goal such that depreciation charges are understated.
- The goodwill balances on BP's balance sheet related to upstream oil and gas assets may have to be impaired if forecasts of future oil and gas prices, due to the energy transition and the adoption of electric vehicles, are likely to fall.
- Provisions for cash outflows to settle climate change related litigation brought against BP may have to increase.

Remarkably, it can be quite difficult to obtain comparable detailed impacts of climate change or transition risks for BP's American peers such as Exxon and Chevron, and not to mention, the

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<sup>17</sup> <https://www.bp.com/en/global/corporate/investors/annual-report.html>



hundreds of smaller upstream and downstream oil and gas companies in the United States. Section F of the SEC rules explicitly requests registrants to provide contextual information, including a description of the significant inputs and assumptions used and policy decisions made by the registrant, to assess the implications of climate change and transition risks on financial statements.

I support such disclosure to enable an investor to compare how managements of Exxon or Chevron or other U.S. oil and gas companies view the impact of climate change and transition risk on their financial statements relative to say a British Petroleum. If we do not provide such comparability, on the margin, institutional investors might simply move capital from U.S. oil and gas firms to overseas regimes where such disclosure requirements are mandated of oil and gas and other companies.

Scholars have documented time and again that capital tends to flee regimes characterized by opacity and greater information asymmetries between the manager and the investor.<sup>18</sup> Section F of the new rules, in my mind, furthers one of the SEC's key missions related to facilitating capital formation in U.S. markets.<sup>19</sup>

#### 5.0 Climate metrics in voluntary contracts such as executive compensation agreements and debt contracts

Climate metrics are increasingly used in contracts such as executive compensation contracts and debt agreements. Mandating consistency and comparability in these metrics will improve the efficiency of such contracting arrangements.

For instance, BP's 2021 annual report states that 20% of CEO's annual bonus depends on "environmental performance" whereas 30% of performance shares depend on "low carbon/ energy transition."<sup>20</sup> In Chevron's 2021 proxy statement, Chevron introduced a link between annual bonus and lower carbon future, defined as reducing GHG intensity, increasing renewable energy and carbon offsets, and investing in low-carbon technologies.<sup>21</sup> The CEO of Exxon Mobil's long-term incentives in its 2021 proxy statement are linked to methane reduction.<sup>22</sup>

Without comparable and consistent disclosures of the kind the SEC asks for, an investor will have a hard time understanding whether Chevron CEO's goal of reducing methane emissions intensity is more effective than Exxon CEO's goal of merely reducing methane in accomplishing the compensation committee's objectives. To appreciate this point better, consider compensation plans written on say ROE (return on equity). Even if companies do not rely on GAAP mandated net income or shareholder's equity, they clearly spell out, thanks to SEC regulation, the differences between their non-GAAP number and the GAAP number. We do not have a regulatory arrangement to get companies to disclose what exactly is covered by their GHG intensity measure or how methane reduction is actually measured.

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<sup>18</sup> <https://www.brookings.edu/research/transparency-and-international-investor-behavior/>

<sup>19</sup> <https://www.sec.gov/about.shtml>

<sup>20</sup> <https://www.bp.com/en/global/corporate/investors/annual-report.html>

<sup>21</sup> <https://www.chevron.com/-/media/shared-media/documents/chevron-proxy-statement-2021.pdf>

<sup>22</sup> <https://corporate.exxonmobil.com/-/media/Global/Files/investor-relations/annual-meeting-materials/proxy-materials/2021-Proxy-Statement.pdf>



Similarly, U.S. firms are beginning to issue green bonds linked to promises associated with climate related metrics. For instance, Verizon's Green Bond Report states that as of February 2022, Verizon has allocated over \$991 million of net proceeds of its third green bond entirely to variable power purchase agreements (VPPAs) for renewable energy projects for approximately 0.9 GW of new renewable energy generating capacity.<sup>23</sup> These purchase agreements have a 15-year term. Verizon states that it avoided approximately 1,534,216 metric tons of carbon-dioxide annually. A footnote states that the estimated annual amount of renewable energy generated by the projects covered by the VPPAs was determined based on the full amount of Verizon's contracted capacity with respect to those projects.

These disclosures are somewhat ambiguous. Does this mean Verizon is taking credit for capacity yet to go online over the next 15 years? Are these emissions avoided truly accretive to the environment? Is Verizon, in effect, buying carbon offsets to compensate for its brown power consumption? Did the counterparty that provides the renewable capacity only sell these energy credits once to Verizon as opposed to someone else as well, given that PPAs are settled in dollars and not by the exchange of real electricity. Standardized SEC disclosure on climate metrics would help an investor address some of these questions and lead to greater credibility, efficiency and growth of the green bond market.

## 6.0 Quantifying benefits

In section 1 of this letter, I estimate the impact of compliance costs on market capitalizations of a median S&P 500 firm to be roughly \$28 million (\$1.2 million\* 23). What might the estimated magnitude of benefits from lowered estimation risk from SEC disclosures be? This question is harder to address from first principles as we have to go find major investors in their marketplace and survey their improved assessments of climate risk exposures of the companies they hold.

An alternate approach is more tractable. Instead of attempting to quantify the magnitude of benefits, I propose we consider the capitalized value of compliance costs as the "break even" threshold that any estimate of benefits has to breach for the proposed SEC rules to come out as a net positive in terms of benefits.

Let us go back to the data for a minute. The median market capitalization of an S&P 500 firm is \$29.7 billion and the price-earnings ratio is 23. A loss in market capitalization due to capitalized compliance costs, all else constant, will reduce the earnings in price-earnings by 0.09%. Hence, all else constant, the price earnings ratio will fall by 0.09% to 22.9793.

Simplified valuation theory suggests that price earnings ratios are defined as market capitalization of the firm/(cost of equity capital – expected growth rate in earnings), ignoring dividend payouts for now. Cost of equity capital is usually computed using the CAPM (Capital Asset Pricing Model) as the sum of the risk-free rate + beta for the individual stock \* risk premium for holding stocks as opposed to bonds that the representative investor expects. Hence, the question boils down to how much of a decrease in individual beta for a stock do we need for the price-earnings ratio to go back from the now reduced 22.9793 level back to 23? The decrease in beta will have to undetectably small for this to happen. The point being, we need a very small improvement in estimation risk for the costs of the SEC climate rule to "break-even" in terms of benefits via improved cost of capital.

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<sup>23</sup> <https://www.verizon.com/about/sites/default/files/2022-02/2022-green-bond-impact-report.pdf>

## 7.0 Indirect costs and benefits

I may have ignored indirect costs that represent potentially unintended consequences of the SEC rules. But to be fair, I have also ignored many indirect benefits which may include (i) saving investors thousands of hours that would otherwise be spent gathering climate risk data from disparate sources and grappling with comparability and credibility of voluntary disclosures;<sup>24</sup> (ii) enabling firms to credibly differentiate their climate friendly products (e.g., a net zero brand of gas for instance would be more credible if the oil and gas firm that claims to be net zero is credible and comparable); and (iii) improving firms' ability to attract and retain human capital due to increased confidence in employers' climate disclosures.<sup>25</sup>

In closing, I reiterate why I believe the SEC's climate risk disclosures, as proposed, would be associated with modest compliance costs. These compliance costs will be more than made up by even a minimal reduction in estimation risk an investor faces in understanding the exposure of a firm to physical and transition risks associated with climate change. Such a reduction in estimation risk would likely lower the firm's cost of capital. It is particularly important to emphasize that estimation risk exists even for a firm not materially exposed to climate risk. Mandatory audited disclosures that assure an investor that a particular company is not materially vulnerable to climate risk would reduce the estimation risk and cost of capital for such a firm as well.

I hope the SEC considers my suggestions seriously. As usual, please feel free to contact us in case you have questions on my letter.

Sincerely,



Shiva Rajgopal  
Columbia Business School

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<sup>24</sup> As a data point, our research team spent an average of at least six hours per firm in our study of whether 57 oil and gas firms' declaration of net zero is credible. Imagine multiple research teams in the investor community replicating such efforts across thousands of public firms.

<sup>25</sup> [https://www0.gsb.columbia.edu/mygsb/faculty/research/pubfiles/25680/Burbano\\_Social\\_Responsibility.pdf](https://www0.gsb.columbia.edu/mygsb/faculty/research/pubfiles/25680/Burbano_Social_Responsibility.pdf)