The Value Relevance of Corporate Sustainability Disclosures:

An Analysis of a Dataset From One Large Asset Owner

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Summary

Corporate environmental and social reporting lacks the comparability across companies that is a characteristic of financial information. To address this weakness, Norges Bank Investment Management (NBIM) created analytical frameworks to measure the quality and scope of reporting relating to three focus areas: climate change, water and children's rights. By translating information published by a global set of companies into standardized data, NBIM has constructed a dataset that can be used for analyzing and comparing companies across time and within sectors.

The purpose of this project is to understand the value relevance of NBIM's dataset. First, we model the determinants of the disclosure scores and climate change performance score. Consistent with prior literature, we find that firms that are larger, higher growth, less closely held and with higher analyst coverage tend to disclose more. We find that the climate change performance score is less a function of observable firm characteristics and is more idiosyncratic. This highlights the different dynamics of measures that capture actual *performance*, versus metrics that capture *disclosures* of efforts.

Next, we take the 'residual' scores – the part of the scores that is uncorrelated with observable firm characteristics, industry and country membership – and test for associations with future financial performance. Across all of our models, the residual disclosure score is not robustly correlated with any metric of future financial performance. However, we find that the residual component of the climate change *performance* score is significantly related to future financial performance. We find even stronger associations for the subset of firms that have above median exposure to climate change risks.

We perform supplementary analysis to understand the motivation behind these disclosures. We find that some firms choose to disclose more because they are currently facing more problems, as measured by the level of negative media attention that the firm receives on the focal issue. We also find that firms disclosing more in the past received more negative media attention on that focal issue in the future. These results hold after controlling for factors, such as firm size, that influence both media attention and disclosure levels. This suggests that higher disclosure around an issue is not necessarily indicative of better current or future performance on the issue but in some cases, it is a signal of future bad news. Conversely, we find a *negative* relation between the climate change performance score and the current level of negative media attention, suggesting that this performance measure indeed captures meaningful efforts to manage climate-related risks.

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Last, we correlate the scores with the materiality and immateriality ratings constructed in Khan, Serafeim and Yoon (2016). The materiality (immateriality) rating has been found to exhibit strong (no) predictive power of future financial performance. We find that the disclosure scores exhibit insignificant correlations with the materiality rating, but exhibit positive correlations with the immateriality rating. Conversely, the climate change performance score exhibits a positive correlation with the materiality rating, but an insignificant correlation with the immateriality rating. This suggests that disclosures about processes and policies on a specific issues that might be material itself might not be indicative of the performance of companies on a range of material issues. Moreover, these findings provide further evidence of the value relevance of the climate change performance score.

We provide a set of recommendations based on our empirical analysis. First, we recommend building a data infrastructure that allows for *performance* comparisons across companies and across time. Our analysis found that the probability of uncovering the value relevance of ESG data increases if the data relates to actual performance, rather than only disclosure. Second, we recommend that investors place at least as much importance on performance-related disclosures (i.e. outcomes) in addition to disclosures conveying policies, management systems and strategies (i.e. inputs). Third, we recommend that investors triangulate data provided by management with data from non-management sources to determine whether ESG information provided by management is reliable. Finally, we encourage investors to support organizations seeking to improve corporate disclosures, and to continue publishing lists with the names of the top companies in each focus area with the best disclosures, in order to promote an increase in the quantity and quality of ESG disclosures.

Introduction

In the past twenty-five years, the world has seen an exponential growth in the number of companies measuring and reporting environmental (i.e. carbon emissions, water consumption, waste generation, etc.), social (i.e. employee, product, customer related, etc.), and governance (i.e. political lobbying, anticorruption board diversity, etc.) data, collectively ESG data. While fewer than 20 companies disclosed ESG data in the early 1990s, the number of companies issuing sustainability or integrated reports had increased to nearly 9,000 by 2016. Investor interest in ESG data also grew rapidly. Signatories to the UN Principles for Responsible Investment (PRI), launched in 2006, committed to incorporating ESG issues into their investment analysis and ownership policies and practices. As of 2016, the principles had about 1,400 signatories with total assets under management of about $60 trillion.[1] As a further sign of the institutionalization of ESG data, Bloomberg terminals integrated ESG data in 2010, dramatically increasing the diffusion of ESG information. As of 2016 more than 100 rating agencies provided ESG data, including large data providers such as Thomson Reuters and Morgan Stanley Capital International (MSCI).

Historically, the increasing demand and supply of ESG information was the result of a growing belief that changes in accounting measurement and corporate reporting could be a potentially powerful "lever" that could incentivize and assist the private sector in addressing environmental and social problems. Akin to how the development of a robust financial accounting infrastructure catalyzed the advancement of capital markets and allowed for more efficient management of resources, the development of a measurement infrastructure for all types of organizational impacts could reshape what we value and manage in business. In line with this accountability argument, many commentators saw the introduction of new metrics as a necessary precursor to the appropriate regulation of

[1] United Nations Principles for Responsible Investment, http://www.unpri.org/signatories/signatories/.

externalities. Other actors suggested that ESG data were value relevant and that these metrics could provide useful information to investors that wanted to assess the riskiness and future prospects of a business. For these reasons, many commentators saw the development of relevant, credible and comparable accounting metrics for ESG issues as critical.

However, many doubted the integrity of company ESG disclosures given the relative ease with which these disclosures could be used to paint a rosier picture of ESG performance. Others suggested that firms committed to improving their ESG performance would be less competitive, and therefore earn lower returns for their shareholders. There was also considerable skepticism that broad-based efforts to improve transparency would in fact be successful, particularly given the lack of regulatory support for the standardization of these kinds of metrics, which left an institutional void in the preparation and production of reporting standards for ESG information. To fill this void, a number of mandatory disclosure regulations had emerged in recent years. Starting in 2010, all South African companies listed on the Johannesburg Stock Exchange were required to either issue an Integrated Report (IR) or explain why they were not doing so. [2] Other countries had mandated the provision of ESG information. For example, in China, the Shanghai Stock Exchange (SHSE) and the Shenzhen Stock Exchange (SZSE) mandated primarily large firms to disclose ESG information for financial years ending on or after December 31, 2008.[3] In Malaysia, the stock exchange Bursa Malaysia made sustainability disclosure a listing requirement for all listed firms starting on December 31, 2007. Brazil, Hong Kong, and India had also mandated sustainability reporting more recently.

[2] Integrated Reports contained, along with traditional financial statements, considerable information about a company's environmental and social record as well as information related to intangible assets such as brands, innovation and relationships with suppliers and employees. The information provided in an IR is meant to be linked to long-run corporate profitability and value. For more information see: http://integratedreporting.org/

[3] Ioannou, Ioannis, and George Serafeim. "The Consequences of Mandatory Corporate Sustainability Reporting: Evidence from Four Countries." Harvard Business School Working Paper, No. 11-100

Stock exchanges were also starting to self-regulate in terms of ESG disclosure. The UN Sustainable Stock Exchange (SSE) initiative was a platform for exploring how exchanges, in collaboration with investors, regulators, and companies, could enhance corporate transparency on ESG issues and encourage sustainable investment. The SSE initiative invited exchanges globally to become a Partner Stock Exchange within the SSE by making a voluntary public commitment to promote improved ESG disclosure and performance among listed companies. As of 2016, 60 stock exchanges were members covering more than 90% of the total market capitalization of all listed firms.[4]

In 2014, the European Union adopted a directive on nonfinancial disclosure requiring affected companies to disclose in their annual management report, information on policies, risks, and outcomes regarding environmental matters, social and employee aspects, respect for human rights, anticorruption and bribery issues, and diversity in their board of directors. The directive did not specify standards that companies should use in disclosing this information. The directive applied to firms either (i) listed on EU exchanges or having significant operations in the EU, (ii) defined to be "large" (i.e., having 500 or more employees), or (iii) designated as public-interest entities by EU Member States due to the nature of their activities, size, or number of employees.[5]

Background on Nonfinancial Disclosure

Despite widespread belief that accounting standards and financial reporting had existed for a very long-time, financial reporting was a recent phenomenon that was not formulated in the US until the early 20th century. The same need for high quality accounting standards and financial reporting that was evident in the US also emerged globally, and by the mid-20th century, financial reporting was

[4] See United Nations Sustainable Stock Exchange Initiative: http://www.sseinitiative.org/stock-exchanges/, accessed December 2016.

[5] European Commission. "Non-Financial Reporting". European Commission, http://ec.europa.eu/finance/company-reporting/non-financial_reporting/index_en.htm

mandatory for every company issuing public equity or debt. Since then, financial reporting has undergone various transformations to adapt to a changing economic landscape and new needs for information. As a result, long-length footnotes to the financial statements, information around board and executive compensation practices, and management discussion and analysis has come to become the norm in most publicly listed large companies. Despite these additional sources of information, many users of financial reports still found the information incomplete and inadequate in explaining the value creation process of an organization. Some investors claimed conventional financial reporting was inadequate because it did not adequately communicate the interplay between strategy, risk management and financial performance.[6] According to a study by the Association of Chartered Certified Accountants (ACCA), investors were sceptical about whether corporate reporting provided a holistic picture of the business. Two-thirds of the three hundred investors participating in the survey reported that they found corporate reports inadequate, while 45 percent stated that they did not see the value of the financial report at all. Their major criticisms related to the insufficient amount of information provided by the company in order for an investor to understand the value creation process within the organization. Over 90 percent of the investors surveyed expressed interest in the incorporation of financial and nonfinancial information into a single report, i.e. an integrated report, or something that would provide a more holistic view of the likely direction of future corporate performance.[7]

ESG Reporting

[6] Ernst & Young (2014) 'Integrated reporting. Elevating value' *Ernst & Young Report.* Available at: http://www.ey.com/Publication/vwLUAssets/EY-Integrated-reporting-summary/$FILE/EY-Integrated-reporting-summary.pdf

[7] ACCA (2013) 'Understanding Investors: directions for corporate reporting' *ACCA. Available at:* http://www.accaglobal.com/uk/en/discover/news/2013/06/investors-reporting.html

Two distinct ideas, each traceable back to the 1980s and 1990s, originated ESG measurement and reporting.

Accountability

The first idea was that companies have an obligation to report information to stakeholders other than shareholders, because of the fact that corporate activities affect many constituents including employees, suppliers, customers and governments, as well as the communities and natural environments in which they operate. A number of high-profile disasters, such as the 1984 Union Carbide gas leak in India and the 1990 *Exxon Valdez* oil spill in Alaska, emphasized the need for corporate accountability and transparency.[8] In 1995, Royal Dutch Shell came under significant pressure for alleged human rights violations stemming from its operations in Nigeria. As part of an effort to repair its damaged reputation, Shell issued a corporate social responsibility report in 1998, becoming one of the first large corporations to do so.[9]

This sentiment that corporations should be held accountable for all their impacts on society had grown stronger as business had gained power over other institutions and as a result, many NGOs pressured large companies to act in ways that were more responsible. In the beginning of the 21st century, the scale of economic activity performed by the private sector was at record levels especially after privatizations of state assets and deregulation. The number of publicly traded companies almost doubled from about 26 thousand in 1991 to more than 47 thousand in 2012, and their market

[8] Maguire, M. (2011) 'The future of Corporate Social Responsibility Reporting' *The Fredercik S. Pardee Center for the Study of the Longer-Range Future, Boston University* Available at: http://www.bu.edu/pardee/files/2011/01/PardeeIIB-019-Jan-2011.pdf

[9] Corporate Watch (2006) 'What's Wrong with Corporate Social Responsibility? Corporate Watch Report 2006' Available at: http://www.corporatewatch.org/?lid=412

capitalization more than quadrupled from $11.3 trillion to $53.2 trillion in the same period.[10] Large-scale transnational corporations had also experienced substantial growth, increasing from 7,000 in the late 1960s to 78,000 in 2006 and accumulating more than 780,000 foreign affiliates during that time.[11]In addition, the largest 500 corporations in the world sold products and services worth over $22 trillion in 2014, while controlling assets valued at more than $100 trillion.[12] This represented approximately 50% of all sales or assets of the approximately 50,000 publicly listed firms around the world. For example, in 2014, Walmart amassed more than $482 billion in net sales.[13] Each "supercenter" store stocked more than 142,000 products supported by a global network of more than 100,000 direct suppliers.[14] The company used approximately 0.5% of all electricity produced in the United States, ranking it ahead of 12 states in electricity consumption.[15] Google was another example of a powerful corporation in the digital world. The effect of Google's brief service lapse in August 2013 underscored the company's central role in the world's information exchange. A five-minute

[10] United Nations."UNCTAD World Investment Report 1994," United Nations Conference on Trade and Development (1994), http://unctad.org/en/Docs/wir94ove.en.pdf; "UNCTAD World Investment Report 2007," United Nations Conference on Trade and Development (2007), http://unctad.org/en/docs/wir2007_en.pdf.

[11] United Nations."UNCTAD World Investment Report 1994," United Nations Conference on Trade and Development (1994), http://unctad.org/en/Docs/wir94ove.en.pdf; "UNCTAD World Investment Report 2007," United Nations Conference on Trade and Development (2007), http://unctad.org/en/docs/wir2007_en.pdf.

[12] Calvert Investments, "The Evolving Role of the Corporation in Society: Implications for Investors," October 2015. http://www.calvert.com/perspective/research/calvert-serafeim-series-report

[13] Walmart. "Our Story," *Walmart* (2015), http://corporate.walmart.com/our-story/; "Our Retail Divisions," *Walmart* (2015), http://news.walmart.com/news-archive/2005/01/07/our-retail-divisions.

[14] Walmart. "Walmart Logistics," *Walmart* (2015), http://corporate.walmart.com/our-story/our-business/logistics.

[15] Stacy Mitchell and Walter Wuthmann, "Walmart's Dirty Energy Secret," *Institute For Local Self-Reliance* (2014), http://ilsr.org/wp-content/uploads/2014/11/ILSR_WalmartCoal_Final.pdf.

outage caused global internet traffic to drop by 40%.[16] Each month, more than 2.2 billion people performed more than 100 billion searches via Google's web-based platform.[17]

In response to growing pressure for corporate accountability and transparency, companies issued social responsibility reports separately from financial reports. These reports varied widely in terms of structure and content due to the lack of regulatory guidelines on how to report this information. Early adopters predominately released a single-issue report, usually disclosing environmental or workplace safety information. This developed into multi-issue reports when companies began disclosing information about the organization's "triple bottom line,"[18] which holistically represented its economic, social, and environmental activities.[19] As the practice evolved, companies used other terms to describe their reports, such as corporate citizenship report or responsibility report, but companies more frequently used the term sustainability report.[20] Between 1999 and 2009, the trend of sustainability reporting grew significantly, from only 35% of the Global Fortune 250 issuing

[16] Tim Worstall, "Analyzing Friday's Google Outage," *Forbes* (2013), http://www.forbes.com/sites/timworstall/2013/08/19/analysing-fridays-google-outage/.

[17] Joshua Barrie, "Google+ Active Users," *Business Insider* (2015), http://www.businessinsider.com/google-active-users-2015-1; Dan Sullivan, "Google: 100 Billion Searches Per Month," *Search Engine Land* (2012); http://searchengineland.com/google-search-press-129925.

[18] The phrase "triple bottom line" was first coined in 1994 by John Elkington, the founder of U.K. consulting firm SustainAbility. He argued that companies should be recognizing three different and separate bottom lines, known as the three Ps: (1) "profit" as the traditional measure of the organization's profit and loss, (2) "people" as a measure of how socially responsible an organization was in its operations, and (3) "planet" as a measure of how environmentally responsible the organization was. This approach aimed to measure an organization's full cost of doing business over a period of time.

[19] Hindle, T. (2009)'Triple Bottom Line, It consists of three Ps: profit, people, and planet' *The Economist* Available at: http://www.economist.com/node/14301663

[20] Terminology regarding the reporting of nonfinancial information is inconsistent and confusing. Some people use the terms "corporate social responsibility (CSR)" and "sustainability" interchangeably whereas for others they mean different things. Each term also has different meanings. For some companies, their CSR report is about philanthropic contributions and community activities. For others, it is about their nonfinancial performance more broadly. Similarly, for some companies their sustainability report is solely about carbon emissions and other environmental concerns while for others it is about nonfinancial performance more broadly. We will use the term "sustainability report" to refer to the entire range of nonfinancial performance information. For a discussion of the origins of the concepts of corporate social responsibility and sustainability see Chapter 5 in Eccles and Krzus (2010).

sustainability reports in 1999 to 80% doing so in 2009.[21] There had also been a sharp increase in the number of companies that incorporated ESG information in their annual reports – in 2008 only 9 percent, in 2011 it was 20 percent and in 2013 over half (51 percent) of the companies that issued annual financial reports also incorporated ESG information.[22]

There was little research documenting the direct effect of ESG reporting on a firm's behavior. Such research was complicated by the fact that both a firm's choice to disclose and the firm's other actions were endogenous and simultaneously determined; therefore attributing a cause and effect relation to reporting was notoriously hard. Consequently, researchers used mandatory disclosure regulations as settings to examine the effect of disclosure on firm behavior. Researchers thought that such settings were more likely to provide evidence on how disclosure influences firm behavior, due to the fact that the disclosure decision was forced upon firms, as opposed to being a voluntary action which could be driven by other factors.

Research had shown that mandatory disclosure regulations were associated with improvements in operating performance relating to the environment, food and water safety, and patient health outcomes.[23] For example, one study examined the effects of an increase in product quality

[21] European Commission (2010) Directorate-General for Enterprise and Industry

[22] KPMG (2013) 'The KPMG Survey of Corporate Responsibility Reporting 2013' *Report*. Available at: http://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications/corporate-responsibility/Pages/corporate-responsibility-reporting-survey-2013.aspx?dm_i=4J5,21EAU,2NHPCK,7CCYT,1

[23] Delmas, M., M.J. Montes-Sancho, and J.P. Shimshack. 2010. Information disclosure policies: Evidence from the electricity industry. *Economic Inquiry* 48 (2): 483-498; Bennear, L.S., and S.M. Olmstead. 2008. The impacts of the "right to know": Information disclosure and the violation of drinking water standards. *Journal of Environmental Economics and Management* 56 (2): 117-130; Jin, G.Z., and P. Leslie. 2003. The effect of information on product quality: Evidence from restaurant hygiene grade cards. *The Quarterly Journal of Economics* 118 (2): 409-451; Dranove, D., D. Kessler, M. McClellan, and M. Satterthwaite. 2002. Is more information better? The effects of 'report cards' on health care providers. *Journal of Political Economy* 111 (3): 555-588.

information.[24] The study found that the placement of hygiene quality grade cards in restaurant windows was associated with increases in restaurant health inspection scores, decreases in the number of foodborne illness hospitalizations, and also found consumer demand becoming more sensitive to changes in restaurants' hygiene quality. Other studies showed heterogeneity in responses to disclosure regulations. For example, in the case of environmental regulations, greater improvement was found in establishments subject to greater internal and external pressure to improve and in those with greater access to the necessary capabilities.[25]

Researchers also investigated whether ESG information had an effect on other stakeholders' behavior. To assess whether customers were willing to pay a premium for green products and services, the 2014 Nielsen Global Survey on Corporate Social Responsibility polled 30,000 consumers in 60 countries throughout North America, Latin America, Europe, Asia-Pacific, the Middle East and Africa. Fifty-five percent of respondents said they were willing to pay more for products and services provided by companies that were committed to positive social and environmental impact. Surprisingly, only 40 percent of North American and European consumers were willing to pay more, compared to 60 percent in Asia-Pacific, Latin America and the Middle East/Africa.[26] To determine if the sentiments expressed by respondents were supported by actual retail performance, researchers reviewed retail sales data across 20 brands in nine countries. These brands either included sustainability claims on packaging or actively promoted their sustainability actions through marketing efforts. The results from

[24] Jin, G.Z., and P. Leslie. 2003. The effect of information on product quality: Evidence from restaurant hygiene grade cards. *The Quarterly Journal of Economics* 118 (2): 409-451.

[25] Doshi, Anil R., Glen W.S. Dowell, and Michael W. Toffel. "How Firms Respond to Mandatory Information Disclosure." *Strategic Management Journal* 34, no. 10 (October 2013): 1209–1231.

[26] Nielsen. "Global Consumers Are Willing To Put Their Money Where Their Heart Is When It Comes To Goods And Services From Companies Committed To Social Responsibility" Nielsen, June 17, 2014, http://www.nielsen.com/ca/en/press-room/2014/global-consumers-are-willing-to-put-their-money-where-their-heart-is.html

a 2014 year-over-year analysis showed an average annual sales increase of two percent for products with sustainability claims on the packaging and an increase of five percent for products that promoted sustainability actions through marketing programs.[27]

Another study conducted two large-scale field experiments with Gap Inc.[28] The authors found that denim jean labels with information about a program to reduce water pollution in manufacturing increased sales by 8% for female shoppers, but had no discernable impact on sales for men or outlet shoppers. They attributed this finding to price-sensitive market segments being less sensitive to green products.[29] Another study provided evidence that consumers would actually choose ethically labeled products over counterparts if given the choice, and perhaps pay a premium for such products.[30] A field experiment conducted with Banana Republic outlet stores found that labels with fair labor standards led to higher sales of more expensive women's clothing by 14% but had no impact on sales of lower-priced items.[31]

Researchers questioned whether companies with higher corporate social performance had better reputations and were perceived as being better places to work. One study obtained corporate social performance ratings for 160 firms in 1993, and asked 75 MBA students to rate each of the firms in terms of its reputation and its attractiveness as an employer on a five-point scale. The authors found

[27] Nielsen. "Global Consumers Are Willing To Put Theier Money Where Their Heart Is When It Comes To Goods And Services From Companies Committed To Social Responsibility" Nielsen, June 17, 2014, http://www.nielsen.com/ca/en/press-room/2014/global-consumers-are-willing-to-put-their-money-where-their-heart-is.html

[28] Hainmueller J, Hiscox MJ. Buying Green? Field Experimental Tests of Consumer Support for Environmentalism. 2012.

[29] Ibid.

[30] Hainmueller, J. and Hiscox, M.J. The socially conscious consumer? Field experimental tests of consumer support for fair labor standards. 2015.

[31] Ibid.

a strong, positive association between the ESG measures and the participant-given scores of reputation and attractiveness as an employer, suggesting that potential applicants were aware of firms' corporate social performance and firms with more positive ratings may have competitive advantages over firms with lower ratings, because they attract more applicants.[32]

A more recent study used experimental evidence to identify the causal effect of social responsibility policies on employee compensation and employee performance.[33] The author collaborated with a startup company to randomly assign social responsibility treatments to nearly 600 recruits in two online labor marketplaces, and then observed the effect of social responsibility treatment (either a statement of socially responsible intent or a corporate philanthropy program) on worker behavior; specifically, the amounts of pay workers were willing to accept for a job and their performance on the job after they were hired.[34] The experiment revealed that receiving information about social responsibility caused employees to reduce their salary requirements for a job, and also increased workers' likelihood of going 'above and beyond' for the employer. The results also showed that higher performing workers, who normally command higher wagers, were more responsive to a corporate philanthropy program than lower performing workers, and were willing to give up their wage differential to work in a firm with a corporate philanthropy program.

Value Relevance

The second thesis in favor of ESG disclosure was that companies should supplement the financial information that they are required to report with other nonfinancial information that is of interest to

[32] Turban, D. B. & Greening, D. W. 1997. Corporate social performance and organizational attractiveness to prospective employees. *The Academy of Management Journal*, 40(3): 658-672.

[33] Vanessa C. Burbano. "Social Responsibility Messages and Worker Wage Requirements: Field Experimental Evidence from Online Labor Marketplaces." *Organization Science (forthcoming)*.

[34] Ibid.

shareholders, such as on customers, human capital, innovation, and other intangible assets. Proponents of this shareholder-focused transparency argued that financial information was a lagging indicator; a "rear-view mirror" of the company's performance and an imperfect predictor of future financial performance, nonfinancial information could provide insights into the company's expected future financial performance, and for many companies, market value exceeded book value so additional reporting could provide information on a company's intangible assets that were not captured on the balance sheet.[35]

Researchers had been searching for a link between ESG and financial performance for over 40 years. Between 1972 and 1997, scholars published over 120 research papers on the link between ESG and corporate financial performance. No definitive consensus arose: some researchers found a negative relationship between ESG and financial performance; others found a positive relationship; and others still found no relationship, or contradictory results, even within the same analyses.[36] Given the large number of contradicting studies, a meta-analysis of 52 studies from 1979-1998 sought to establish the relation between ESG and financial performance by correcting for sampling and measurement error.[37] The study found a positive and non-trivial correlation, but did not succeed in resolving the doubts and disagreements among researchers regarding the relationship between ESG and financial performance.[38]

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[35] Eccles, R. G. (1991) 'The Performance Measurement Manifesto' *The Harvard Business Review*. Vol. 69, Issue 1, p. 131-137. See also Eccles, R. G. and Mavrinac, S. C. (1995) 'Improving the Corporate Disclosure Process' *MIT Sloan Management Review* 36, no. 4: 11-25.; Eccles, R. G., Herz, R. H, Mary Keegan, E. M. and Phillips, D. M. H. (2001) *The Value Reporting Revolution: Moving Beyond the Earnings Game*. New York: John Wiley & Sons, Inc., 2001.

[36] Griffin, Jennifer J. and Mahon, John F. 1997. The Corporate Social Performance and Corporate Financial Performance Debate: Twenty-Five Years of Incomparable Research. *Business Society* 97(2)36:5.

[37] Orlitzky, M., Schmidt, Frank L. and Rynes, Sara L. 2001. Corporate Social and Financial Performance: A Meta-analysis. *Organization Studies* 24(3): 403-441.

[38] Ibid.

However, more recent work has made it increasingly plausible that, at the very least, firms that report on higher levels of ESG metrics perform better than their peers. For example, while most of the studies have looked at relatively short-horizon effects, a more recent study investigated the long-term effects of ESG performance. Researchers identified 90 companies that adopted a substantial number of environmental and social policies in the 1990s, far before the hype around sustainability issues that arose in the mid-2000s.[39] Each of these 90 'high sustainability' companies were matched to a company in the same industry and with similar size, profitability, growth opportunities and leverage but lacking environmental and social policies in the 1990's ('low sustainability'). The authors found that more than 15 years after the adoption of those policies, the high sustainability firms were more likely to hold the board of directors responsible for sustainability and top managers' compensation was more likely to depend on sustainability metrics, relative to low sustainability companies. High sustainability firms also had superior stakeholder engagement practices in 2009: they were more likely to identify and address stakeholder concerns, to reach agreement upon a grievance mechanism with concerned stakeholders, and to be transparent with stakeholder engagements and resolutions with the public. High sustainability companies were more long-term oriented than their low sustainability counterparts, using more long-term language in conference calls with analysts, but also attracting more long-term investors. Furthermore, high sustainability companies had superior ESG measurement and disclosure practices. High sustainability companies significantly outperformed, in terms of stock returns, low sustainability companies by 4.8% annually on a value-weighted base and by 2.3% on an equal-weighted base. The outperformance was concentrated in companies with a large environmental impact,

[39] Eccles, Robert G., Ioannis Ioannou, and George Serafeim. "The Impact of Corporate Sustainability on Organizational Processes and Performance." *Management Science* 60, no. 11 (November 2014): 2835–2857.

companies that competed based on human capital and brands, and companies in consumer facing industries.[40]

Several other studies documented that disclosure of ESG data correlated with the market pricing of a company's stock. One study examined how ESG performance could help firms reduce capital constraints using a sample of over 750 firms over the period 2000 to 2009. The authors first established a relation between a composite index of capital constraints and ESG performance, suggesting that, on average, firms with better ESG performance faced lower capital constraints.[41] To address the issue that capital constraints might be driving better ESG performance, the authors used the initiation of coverage by the Thomson Reuters ASSET4 rating agency as an event that caused improvements in ESG performance but was not causing changes in future capital constraints other than through its effect on a company's future ESG performance. Within the pool of companies that ASSET4 initiated coverage and within each industry-country pair, the authors selected the company with the lowest ESG rating and matched it with another company - that ASSET4 initiated coverage on in the same year and belonged in the same industry-country pair - that had the most similar capital constraints. The authors then showed that firms which received a low initial rating and, thus had the highest incentives to improve, indeed improved their ratings and experienced larger decreases in capital constraints relative to firms that received high initial ESG ratings. Further, the authors found two drivers of the relation between ESG performance and access to finance: reduced agency costs

[40] Eccles, Robert G., Ioannis Ioannou, and George Serafeim. "The Impact of Corporate Sustainability on Organizational Processes and Performance." *Management Science* 60, no. 11 (November 2014): 2835–2857.

[41] Cheng, B., Ioannou, I. & Serafeim, G. (2014). "Corporate Social Responsibility and Access to Finance." *Strategic Management Journal*, 35, 1-23.

due to enhanced stakeholder engagement and reduced information asymmetry due to increased ESG disclosure.[42]

A recent study provided first evidence on the value of the Sustainability Accounting Standards Board's (SASB) materiality analysis. Researchers mapped industry-specific guidance on materiality from the SASB to firm-level ESG ratings, in order to identify, for the 2,307 firms in their sample, investments made on material and immaterial sustainability issues.[43] The authors constructed portfolios of firms that performed well along material and immaterial dimensions, and found that firms with good performance on material issues outperformed firms with bad performance on material issues. In contrast, a firm's performance on immaterial issues was not predictive of a firm's future financial performance (i.e. risk-adjusted stock returns and changes in return-on-sales). The firms that had the best future financial performance were the ones that made the highest investments in material issues and the lowest on immaterial issues at the same time.[44] The authors attempted to rule out alternative explanations for their findings by conducting predictive, rather than contemporaneous stock return tests; by making the materiality score uncorrelated with changes in a number of firm characteristics; and by controlling for several firm characteristics and time effects in their models.

Overview of Project

Although corporate reporting on environmental and social risks is on the rise, it is difficult for investors to integrate such data into investment decisions and to manage these risks in large portfolios. One reason is that many companies still do not disclose information on how they

[42] Ibid.

[43] Khan, Mozaffar, George Serafeim, and Aaron Yoon. "Corporate Sustainability: First Evidence on Materiality." *The Accounting Review* Vol. 91, No. 6, pp. 1697-1724.

[44] Ibid.

manage risks related to environmental and social issues. Other reasons include company-reported information often being of poor quality, inconsistent over time, and non-standardized, rendering comparisons across companies or within the same company over time very difficult. To address these weaknesses, Norges Bank Investment Management (NBIM) created three distinct and separate analytical frameworks for climate change strategy, water management and children's rights strategy; the objective of these frameworks is to translate company-reported information into standardized, quantitative and comparable data.[45] By assessing a large number of companies' reporting over time – going as far back as 2008 for the children's rights framework – against a common set of indicators, NBIM has constructed an in-house dataset for analyzing companies' disclosure of policies, management systems and strategies around environmental and social risks, and allowing for comparisons within sectors.

In this project we seek to understand the value relevance of this dataset in order to assist NBIM in determining whether the frameworks capture information that is predictive of future financial performance.

Research Design

Examining the Determinants of Disclosure

NBIM's proprietary dataset includes a number of indicators that measure disclosure of company policies, systems and strategies around managing risks relating to climate change, water and children rights. As a first step, the project will seek to model and examine the determinants of these disclosures. Past literature has shown that disclosure is systematically related to firm-level (i.e. firm size, firm growth, etc.), industry-level (i.e. competition, profitability, risk, etc.), and country-level (i.e. common

45 Norges Bank Investment Management. 2016. Technical Note: Measurement of corporate reporting on environment and social risk management.

versus code law, etc.) variables.[46] Our model associates these variables to sustainability disclosure in order to shed light on the determinants of disclosure.

$Disclosure_{ijct}$ = f($Firm_{it}$, $Industry_{jt}$, Country $level_{ct}$ variables) (1), for firm i, in year t, industry j and country c.

Estimating Firm-Specific Over- or Under-Disclosure

Model (1) serves two purposes. First, it helps us understand what drives disclosure. Second, it gives us an estimate of how much a firm is disclosing, relative to the 'normal' level of disclosure (as predicted by the variables modeled in (1)). Therefore, the level of disclosure is decomposed as follows:

$Disclosure_{ijct}$ = Predicted($Disclosure_{ijct}$) + Residual($Disclosure_{ijct}$) (2)

As can be seen from (2), Residual($Disclosure_{ijct}$) is positive when a firm is disclosing more than what one would predict with model (1). Correspondingly, Residual($Disclosure_{ijct}$) is negative when a firm is disclosing less than what one would predict with model (1). This gives us an estimate of leaders and laggards in disclosure after benchmarking for all variables in model (1).

Separating 'Cheap Talk' from 'Credible Commitment'

Disclosure could be a good proxy for performance if a firm that discloses more indeed adopts better systems, policies and strategies that lead to better management of climate change, water and children rights issues. However, firms have incentives to portray themselves as good corporate citizens, therefore generating incentives to cheap talk. We will attempt to differentiate between indicators that are more likely to capture cheap talk (i.e. policy, strategy or intention statements) versus indicators that

[46] See, for example: Ioannou, Ioannis, and George Serafeim. "What Drives Corporate Social Performance? The Role of Nation-level Institutions." *Journal of International Business Studies* 43, no. 9 (December 2012): 834–864 and Healy, Paul M., and George Serafeim. "An Analysis of Firms' Self-reported Anticorruption Efforts." *Accounting Review* 91, no. 2 (March 2016): 489–511.

are more likely to capture credible commitment and therefore are more likely to be a better proxy for performance (i.e. management systems and risks). To do so we recalibrate models (1) and (2) after allocating indicators to two different categories based on how likely they are to proxy for performance. Therefore, we will have two ratings:

$$\text{Disclosure}_{ijct} = \text{Soft Commitment Disclosure}_{ijct} + \text{Hard Commitment Disclosure}_{ijct} \quad (3)$$

The components in model (3) will be decomposed as in model (2).

Dependent Variables

Our dependent variables are future stock returns, ROA, stock return volatility, and Tobin's Q.[47] To address reverse causality, we examine the predictive ability of sustainability data in the future (i.e. using disclosure data from year t to predict financial performance in year t+1). Moreover, models (1) and (2) ensure that our sustainability scores are uncorrelated with observable characteristics that could influence future financial performance, therefore mitigating the probability of correlated omitted variables (i.e. more profitable firms having better sustainability disclosure rather than the other way round). Moreover, our models control for the level of the dependent variable at the time of measure of the disclosure variables to mitigate the probability of documenting a correlation due to reverse causality. Our fourth model is:

$$\text{Stock return}_{it} \text{ or } \text{ROA}_{it} \text{ or } \text{Vol}_{it} \text{ or } Q_{it} = f(\text{Disclosure}_{ijct}) \quad (4)$$

Data and Sample

The starting point for the sample is NBIM's proprietary dataset that contains measures of companies' disclosures relating to climate change, water management and children's rights across selected sectors

[47] Tobin's q is the ratio of the market value of a company's assets (as measured by the market value of its outstanding stock and debt) divided by the replacement cost of the company's assets (book value).

and companies. Measurements include 5 years of data (2011-2015) across approximately 3,000 companies for the climate change strategy framework; 5 years of data (2010-2011, 2013-2015) across approximately 350 companies for water management; and 7 years of data (2008-2011, 2013-2015) across approximately 350 companies for children's rights strategy. NBIM has chosen to focus on companies that operate in sectors that exposes them to risks related to climate change (i.e. Oil & Gas, Coal Mining, Utilities, Cement, Steel Aluminum and Transport), water (i.e. Food & Beverages, Mining & Industrial Metals, Pharmaceuticals, Forestry & Paper, Electricity & Multi-utilities and Water Utilities), or children's rights (i.e. Apparel, Mining, Technology Hardware & Equipment and Agriculture). Among these, NBIM assesses a selection of the largest companies in the equity portfolio by market capitalization and the size of equity holdings.

NBIM's dataset for children's rights management consists of 2,862 firm-years. After omitting 217 firm-years for which a unique identifier (i.e. ISIN) is missing and 175 firm-years for which financial variables needed for subsequent analyses are unavailable, we are left with a final sample of 2,470 firm-years. The same process is followed for the water management and climate change databases. The water (climate change) dataset from NBIM consists of 1,940 (17,192) firm-years, and after omitting 94 (118) firm-years with missing ISIN and 71 (143) firm-years with missing financial data, 1,775 (16,931) firm-years remain.

Exhibits 1A, 2A and 3A present the country representation across the samples for children's rights, water and climate change, respectively. Across all three samples, the United States (US) has by far highest representation, with 29% representation in the children's rights sample; 25% in the water sample; and 20% in the climate change sample. Japan has the second highest representation in the children's rights sample at 10%, followed by Canada and Great Britain (GB) at 6% each. Canada has the second highest representation in the water sample at 11%, followed by GB (6.5%), Australia (6.2%)

and Japan and China (5.75% each). GB has the second highest representation in the climate change sample at 9.8%, followed by Japan (7.6%) and Brazil (4.7%).

Exhibits 1B, 2B and 3B present the industry representation across the three samples. These distributions are consistent with NBIM's focus on companies that operate in sectors that exposes them to risks related to the three focus areas. For instance, the most represented sectors in the children's rights sample are Metals & Mining (27.1%), Textiles, Apparel & Luxury Goods (16.9%), Food Products (9.4%) and Technology Hardware (7.3%); the most represented sectors in the water sample are Metals & Mining (27.7%), Electric Utilities (14.6%) and Food Products (13.5%); and the most represented sectors in the climate change sample are Oils, Gas & Consumable Fuels (5.6%) and Metals & Mining (5.4%).

Variables Definition and Measurement

Independent Variables in the Determinants Model

As described in the Research Design section, our first step is to model the determinants of disclosures pertaining to children's rights, water and climate change risks. Following prior literature on the determinants of disclosure levels, we include a number of time-varying financial variables at the firm level. All of these variables are constructed using data from Worldscope. We include *Return on Assets*$_{it}$ as a measure of profitability, calculated as total net income over total assets. *Volatility*$_{it}$ is the daily stock return volatility over the fiscal year. *Market-to-Book Ratio*$_{it}$ is the market value of equity over book value of equity calculated at fiscal year-end. *Research & Development*$_{it}$ is research and development expenditures over sales. *Size*$_{it}$ is defined as the natural logarithm of total assets. *Leverage*$_{it}$ is calculated as one minus the ratio of shareholder's equity over total assets. *Pct Closely Held Shares*$_{it}$ is the percentage of shares held by investors owning more than 5% each. *ADR*$_{it}$ is an indicator variable equal to one if a company trades an American Depositary Receipt. *Analyst Following*$_{it}$ is the number of analysts issuing

earnings forecasts for the firm. We include country and industry fixed effects to control for disclosure practices that are specific to countries and industries. We also include year fixed effects to control for macroeconomic shocks to disclosure affecting all firms.

Independent Variables in the Future Financial Performance Model

We define three independent variables within each sample (i.e. children's rights, water and climate change) and one additional independent variable specific to the climate change sample.

The first independent variable is the *Overall Score* for firm *i* in year *t*. *Overall Score* is calculated as the equal-weighted average of the Governance Structure Disclosure Score, the Risk Assessment Disclosure Score, the Supply Chain Management Disclosure Score, the Strategy and Implementation Disclosure Score and the Performance Reporting Score, all obtained directly from NBIM's proprietary dataset. *Overall Score* reflects the overall disclosure score achieved by a firm in a given year, for a given focus area (i.e. children's rights, water or climate change). The interested reader should refer to NBIM's technical note for more details, but broadly: [48]

- Governance Structure Disclosure Score: NBIM considers the extent to which companies have put in place organizational structures, policies that provide board oversight of how management handles risks relating to the focus area;
- Risk Assessment Disclosure Score: NBIM reviews whether companies have provided an assessment of their exposure to risks in each focus area;

[48] Norges Bank Investment Management. 2016. Technical Note: Measurement of corporate reporting on environment and social risk management.

- Supply Chain Management Disclosure Score: NBIM considers the extent to which companies disclose focus-area risks in the supply chain, and whether companies have a formal program, initiative or management system to address these supply chain risks.
- Strategy and Implementation Disclosure Score: NBIM assesses the extent to which companies have disclosed strategies for handling risks in each focus area;
- Performance Reporting Score: NBIM assesses whether companies are transparent in disclosing their performance in each of the focus areas, such as providing relevant key performance indicators.

The second independent variable is *Hard Commitment Score* for firm *i* in year *t*. *Hard Commitment Score* is calculated as the equal-weighted average of the Strategy and Implementation Disclosure Score and the Performance Reporting Score. We assess disclosures around management systems and implementation practices, as well as disclosures about performance, as being more likely to capture credible commitment to managing risks related to each of the focus areas. The third independent variables is *Soft Commitment Score* for firm *i* in year *t*. *Soft Commitment Score* is calculated as the equal-weighted average of the Governance Structure Disclosure Score, the Risk Assessment Disclosure Score, and the Supply Chain Management Disclosure Score. We assess these components as being more likely to capture cheap talk (i.e. policy or intention statements). Since firms have incentives to portray themselves as good corporate citizens, we generate these two variables in order to differentiate between indicators that are more likely to capture cheap talk versus indicators that are more likely to capture credible commitment and therefore are more likely to be a better proxy for performance.

The fourth and final independent variable is the *Performance Outcome Score* for firm *i* in year *t*, available for the climate change sample. NBIM assesses whether the company has made improvements in greenhouse gas emission intensity based on disclosed and estimated emissions data, and constructs a

Performance Outcomes Score. We use NBIM's raw score as our measure of *Performance Outcome Score.* Since this score is based on performance – rather than disclosure – we assess its impact on future financial performance separately from the disclosure scores (i.e. *Overall Score, Hard Commitment Score* and *Soft Commitment Score*).

Exhibits 1C, 2C and 3C present summary statistics and Pearson univariate correlations across the aforementioned variables. As expected, *Overall Score*, *Hard Commitment Score* and *Soft Commitment Score* have high variation. Interestingly, the water sample has the highest on-average *Overall Score*, followed by children's rights and climate change. The financial variables are relatively consistent across the samples, with small differences that would be expected given the variation in sector and county representation. Given the similarity of the Pearson correlation matrices across the three samples, they will be discussed in aggregate. Each of the disclosure scores (i.e. *Overall Score*, *Hard Commitment Score* and *Soft Commitment Score*) are positively associated with Return on Assets, Market-to-Book Ratio, Research & Development, Size, Leverage, Analyst Following and ADR, and are negatively associated with Volatility and Pct Closely Held Shares. These correlations are mostly all statistically significant for the children's rights and climate change samples, while some statistical significance is lost for some variables in the water sample. Overall, these results are consistent with prior literature (e.g. Ioannou and Serafeim 2012; Healy and Serafeim 2016).

Dependent Variables in the Future Financial Performance Model (Model 4)

Our dependent variables are future (one-year, two-year and three-year ahead) annual stock returns, return on assets, stock return volatility, and Tobin's Q. Annual stock returns data are obtained from Worldscope. Return on assets and volatility are defined as above. Tobin's Q is calculated using Worldscope data as the market value of equity minus the book value of equity plus total assets, over total assets.

Results

What Do Disclosures Scores Correlate With?

The literature on voluntary disclosure suggests variables that are correlated with firms' propensity to voluntarily provide more information. In Exhibit 4, we find evidence consistent with the predictions of the voluntary disclosure literature. In general, we find that larger, growth, less closely held, and with higher analyst coverage firms tend to disclose more information. Our models explain approximately 33, 45, and 53% of the variation in climate, water, and children's rights disclosures. Both the coefficients on the industry and the country fixed effects are jointly significant suggesting that there is significant variability in disclosure levels across industries and countries.

One key finding stands out in Column (2) of Exhibit 4. This is the lower explanatory power (at 19.7%) of the model when the dependent variable is the climate change performance outcome score. This variable captures actual performance rather than disclosure. As a result, it is to a lesser extent a function of industry and country membership, and observable firm characteristics. This result highlights the different dynamics of metrics that capture *performance* and *outcomes* of efforts, versus metrics that capture *disclosures* of efforts to address an issue. The former seems to be much more firm-specific and idiosyncratic while the latter seems to be explained much more by a firm's industry and country membership along with observable firm characteristics.

Do Disclosure Scores Correlate with Future Firm Financial Performance?

Our predicted models separate the disclosure scores into two components: the predicted component of the disclosure based on the financial characteristics of the firm and the residual component that relates to firm-specific unmodeled characteristics. As we discussed above, larger firms, growth firms, less closely held firms, and firms with higher analyst coverage tend to disclose more information. Therefore, the predicted component of disclosure is higher for firms that exhibit these characteristics.

In contrast, the residual component of disclosure captures any information that this metric provides to an investor over and above all the financial metrics that are included in the determinants model.

Exhibits 5 to 8 present results of the association between the residual disclosure score and future financial performance – that is, future return on assets, Tobin's Q, annual returns and return volatility. There is only one instance where our models estimate a significant relationship between the residual disclosure score and future financial performance: in Panel C of Exhibit 5, there is evidence that the residual disclosure score for climate change issues is positively related to one-year ahead return on assets. However, this result loses statistical significance when using two-year ahead return on assets as the dependent variable, and the relationship disappears completely when using three-year ahead return on assets; consequently, the result is not robust. Across all the other models, we find that the residual disclosure score is not correlated with any metrics of future financial performance. All models control for the current level of the dependent variable and for year, country and industry indicator variables.

In contrast, we find that in some specifications (i.e. Exhibit 5, Panel A; Exhibit 6, Panels A-C; and Exhibit 7, Panels A-C) the predicted component of disclosure is positively related to future profitability and market valuation and negatively to stock returns volatility. However, this should not be interpreted as evidence that ESG metrics have investment value, due to the fact that this is the component of disclosure scores that can be fully explained by observable financial characteristics.

A notable exception to this result pattern is the climate change performance outcome score. We find that the residual component of this score is significantly related to future financial performance (see Exhibit 9). Firms that have been able to decarbonize their business operations have better financial performance in the future. We note that the decreases in commodity prices during 2014 and 2015 cannot explain our results, as the empirical specifications derive estimates from within-industry

comparisons and thereby firms that are exposed to the same commodity price shocks. In additional analysis, we also control for the governance rating of a firm, as measured by MSCI to ensure that our results are not driven by the quality of corporate governance in a firm. All the results are unchanged following this addition in the model.

Moreover, to understand better if this association is indeed driven by the performance of the companies on the climate change metric, rather than unobservable characteristics that are correlated with both the climate change metric and future financial performance, we segment the sample and keep only firms that have high exposure to climate change concerns. To define this, we compute the median score of the 'Climate Change Exposure Score' in MSCI's database, and firms in NBIM's dataset having above-median Climate Change Risk Exposure Score are deemed to have the highest exposure to climate change concerns. We find even stronger associations between the climate change performance outcome score and future financial performance for this sample, increasing our confidence that the climate change metric captures meaningful value relevant information. The economic effects are moderate but meaningful for this sample. A one standard deviation increase in the climate performance score is associated with approximately a 0.5% increase in ROA and 1.3% increase in annual stock returns.

What could explain why the climate change performance outcome score is the only metric that exhibits robust associations with future financial performance among all metrics? First, it could be that climate change is a more value-relevant issue compared to water risks and children's rights. Indeed, as economies transition to a low carbon world, firms that can decarbonize their operations and products will be more competitive. Regulatory forces (i.e. cap and trade programs, carbon taxes or regulations that mandate low carbon emissions of products) or market forces (i.e. low carbon operations and products being more cost competitive or higher quality) could produce this result. It is not clear that

the same economic dynamics characterize firms that are more water efficient or that protect children's rights. Aside this possible explanation, even *within* the climate change metrics, we find a stronger association between the performance outcome score and future financial performance than between the disclosure score and future financial performance. A plausible explanation for this is that the performance outcome score is exactly what the other measures are not: it measures performance and it is outcome based. In contrast, all the other metrics we have examined are disclosure scores of inputs rather than outcomes. They measure a firm's disclosure of efforts to improve their performance on climate change, water risks or children's rights issues. Such efforts might not necessarily translate into actual performance either because there is a disconnect between inputs and outcomes or because disclosures are misleading indicators of a company's real efforts to improve its performance as it relates to climate, water or children rights issues. To shed further light on this possible explanation, we perform the analysis below.

Do Disclosure Scores Correlate with Future Reputation Risk?

In Exhibit 10, we re-estimate our determinants model (1) by adding two independent variables. The first, is the level of negative media attention that firm *i* receives on the focal issue (e.g. climate, water, children's rights) in the same year that we measure firm *i*'s disclosure scores. The second, is the level of negative media attention that firm *i* receives on the focal issues two years ahead. Both variables are measured by RepRisk. The objective is to understand whether firms that already receive negative media attention on the focal issues tend to disclose more information about the issues, and whether firms that disclosed more efforts to address the issues in the past received negative media attention in the future.

We find strong positive associations both for water and children's rights. In the case of children's rights (Exhibit 10, Column 4) we find that the firms disclosing more information are firms that already

have negative media attention on children's rights issues, but also tend to have even more negative media attention in the future. In the case of water risks (Exhibit 10, Column 3), we find that firms disclosing more tend to have more negative media attention on water related issues in the future. These results hold after controlling for factors, such as firm size, that could influence both media attention and disclosure. An interpretation of this finding is that managers preempt future negative news by disclosing more information about the presence of policies, strategies and management systems. In contrast, we find no analogous relation for climate change disclosure scores. Instead, for the climate performance outcome score we find a *negative* relation with the current level of negative media attention. This suggests that indeed this performance metric captures meaningful efforts to manage climate-related risks and performance of the company.

Do Disclosure Scores Correlate with Value Relevant ESG Metrics?

To gain further insights into the value relevance of the ESG metrics in this dataset, in Exhibit 11 we correlated the disclosure scores with the materiality and immateriality ratings constructed in Khan, Serafeim and Yoon (2016). As described earlier in this report, the researchers mapped industry-specific guidance on materiality from the Sustainability Accounting Standards Board (SASB) to firm-level ESG ratings, in order to identify investments made on material and immaterial sustainability issues.[49] The researchers constructed portfolios of firms that performed well along material and immaterial dimensions, and found that firms with good performance on material issues outperformed firms with bad performance on material issues. In contrast, a firm's performance on immaterial issues was not predictive of a firm's future financial performance (i.e. risk-adjusted stock returns and changes in return-on-sales).

49 Khan, Mozaffar, George Serafeim, and Aaron Yoon. "Corporate Sustainability: First Evidence on Materiality." *The Accounting Review* (Forthcoming).

Given that the Khan et al. (2016) analysis was performed only for US listed stocks, our sample is limited to stocks that are listed in the US. Merging the disclosure scores for each of the samples (i.e. children's rights, water and climate change) with the materiality and immateriality scores, we find that the disclosure scores all exhibit insignificant correlations with the materiality scores. In contrast, they exhibit significant positive correlations with the immateriality index. The correlation between the immateriality score and children's rights, water or climate is 0.72, 0.75 or 0.33 respectively. This does not mean that for the industries we study here the issues of climate, water and children's rights are not financially material. Rather it suggests that disclosures of policies and systems on those specific issues are not capturing the full spectrum of performance on material issues. Consistent with the results above suggesting the value relevance of the climate change performance outcome score, we find that this is the only metric that exhibits a positive and significant correlation with the materiality score (0.27). It is also the only metric that exhibits an insignificant correlation with the immateriality score.

Recommendations

Based on the results of the empirical analysis, we provide a set of recommendations related to the value relevance of ESG data and how investors could improve the data being collected.

Performance, not just disclosure

The ESG ratings available by data providers traditionally reflect the presence or absence of disclosure rather than an objective comparison of firm performance on a particular dimension. This reflects the absence of high quality, comparable disclosures made by companies that would allow for performance comparisons. One main conclusion from our analysis is that the probability of uncovering the value relevance of ESG data increases if the data relates to actual performance, rather than only disclosure. Most of NBIM's data captures the extent of disclosure, but the climate change framework also measures performance outcomes, which our analysis found to be value-relevant. We recommend

building a data infrastructure that allows for performance comparisons across companies and across time, which we believe could provide valuable data to investors. The CDP offers a promising source of performance-related water metrics; their recent questionnaires (2013, 2014 and 2015) request specific KPIs relating to water use and efficiency, and to the extent that firms provide this information, NBIM can use it in the analytical framework for water issues.

Inputs versus outcomes

We have determined from our analysis that a distinction needs to be made between performance and disclosure. We also assert that the same distinction needs to be made between inputs versus outcomes. Much of what ESG ratings measure is management systems, policies and strategies to improve ESG performance. But such efforts might not materialize to actual improvements, in which case the investor is weighing the efforts to improve performance rather than the actual performance. An investor should be aware to the extent that the rating is measuring the efforts to achieve an outcome versus the outcome itself. We recommend that investors place higher weight on performance-related disclosures than on disclosures conveying policies, management systems and strategies.

Triangulation with data supplied by non-management sources

In the absence of clear performance outcome data, investors might need to rely on inputs or disclosures of those inputs to form ratings. It then becomes important to complement data supplied by management with data supplied by other independent, non-management sources. As we saw in our analysis, in some cases increased disclosure does not reflect better performance. Some firms choose to disclose more because they are facing more problems and are attempting to assuage concerns regarding these problems. Complementing data supplied by management with data supplied by media, employees, customers, suppliers, etc. might prove very useful. For example, a number of data providers perform analysis of media coverage of companies on ESG-related concerns, and their

measures are independent of management's ESG reporting. Other organizations create rankings of companies based on employee data measuring internal corporate culture and climate. Other data providers now use big data techniques to gather ESG data. We recommend that investors utilize data from non-management sources to determine whether ESG information provided by management is consistent with – or inconsistent with – external ESG information about the firm, and thus whether it is reliable.

Support for initiatives to improve corporate disclosure

The quantity and quality of ESG data has increased dramatically over the past twenty years. However, the data still lack comparability both across time and across companies, are frequently not assured or receive limited assurance, and lack value relevance as the materiality of the data is frequently not considered. Support for organizations that can increase the quality and quantity of disclosure is encouraged. This could be achieved by engaging with stock exchanges to create listing guidelines around ESG disclosure, supporting corporate reporting organizations such as CDP, SASB, GRI, and the IIRC, or engaging with securities regulators that seek to improve the availability of value relevant information in the market. We encourage investors to continue publishing lists with the names of the top companies in each focus area with outstanding records for disclosing information on their risk management and performance; these lists signal what investors regards as important elements in good corporate reporting and may place pressure on companies to improve their disclosures.

Appendix

Exhibit 1A: Country Frequency for Children Rights Sample

Country	Freq.	Percent	Country	Freq.	Percent
Australia	89	3.6	Japan	245	9.92
Austria	5	0.2	Korea	70	2.83
Belgium	9	0.36	Sri Lanka	12	0.49
Bermuda	28	1.13	Luxembourg	5	0.2
Brazil	61	2.47	Morocco	1	0.04
Canada	164	6.64	Mexico	36	1.46
Switzerland	55	2.23	Malaysia	9	0.36
Chile	3	0.12	Netherlands	14	0.57
China	119	4.82	Peru	5	0.2
Cayman Islands	4	0.16	Philippines	3	0.12
Germany	62	2.51	Poland	17	0.69
Denmark	7	0.28	Portugal	2	0.08
Egypt	7	0.28	Qatar	7	0.28
Spain	34	1.38	Russia	18	0.73
Finland	14	0.57	Saudi Arabia	2	0.08
France	68	2.75	Singapore	13	0.53
Great Britain	146	5.91	Sweden	28	1.13
Greece	8	0.32	Thailand	9	0.36
Hong Kong	91	3.68	Turkey	8	0.32
Indonesia	15	0.61	Taiwan	103	4.17
India	66	2.67	United States	716	28.99
Ireland	10	0.4	Vietnam	2	0.08
Israel	1	0.04	South Africa	46	1.86
Italy	33	1.34	**Total**	**2,470**	**100**

Exhibit 1B: Industry Frequency for Children Rights Sample

GICS Industry	Freq.	Percent	GICS Industry	Freq.	Percent
Energy Equipment & Services	7	0.28	Beverages	40	1.62
Oil, Gas & Consumable Fuels	67	2.71	Food Products	234	9.47
Chemicals	39	1.58	Household Products	2	0.08
Construction Materials	5	0.2	Personal Products	14	0.57
Containers & Packaging	1	0.04	Health Care Equipment & Supplies	1	0.04
Metals & Mining	670	27.13	Health Care Providers & Services	2	0.08
Paper & Forest Products	2	0.08	Pharmaceuticals	12	0.49
Building Products	1	0.04	Banks	8	0.32
Construction & Engineering	2	0.08	Diversified Financial Services	1	0.04
Electrical Equipment	2	0.08	Consumer Finance	1	0.04
Industrial Conglomerates	34	1.38	Real Estate Management & Development	7	0.28
Machinery	12	0.49	Internet Software & Services	1	0.04
Trading Companies & Distributors	20	0.81	IT Services	14	0.57
Commercial Services & Supplies	6	0.24	Software	37	1.5
Marine	2	0.08	Communications Equipment	46	1.86
Auto Components	2	0.08	Technology Hardware, Storage	181	7.33
Household Durables	11	0.45	Electronic Equipment	27	1.09
Leisure Products	22	0.89	Semiconductors & Semiconductor Equipment	140	5.67
Textiles, Apparel & Luxury Goods	419	16.96	Diversified Telecommunication Services	2	0.08
Media	9	0.36	Wireless Telecommunication Services	5	0.2
Distributors	8	0.32	Electric Utilities	1	0.04
Internet & Catalog Retail	8	0.32	Multi-Utilities	1	0.04
Multiline Retail	67	2.71	Water Utilities	2	0.08
Specialty Retail	237	9.6	Independent Power and Renewable Electricity Producers	1	0.04
Food & Staples Retailing	37	1.5	**Total**	**2,470**	**100**

Exhibit 1C: Summary Statistics for Children Rights Sample

	Variable	Mean	St. Dev.	1	2	3	4	5	6	7	8	9	10	11
1	Overall Score	21.53	27.53	1										
2	Hard Commitment Disclosure Score	5.24	9.61	0.8859*	1									
3	Soft Commitment Disclosure Score	16.30	19.54	0.9734*	0.7564*	1								
4	Return on Assets	0.07	0.09	0.0480*	0.0578*	0.0389	1							
5	Volatility	32.33	9.78	-0.2768*	-0.2501*	-0.2674*	-0.1149*	1						
6	Market-to-Book Ratio	2.96	2.93	0.0974*	0.0968*	0.0893*	0.4069*	-0.0787*	1					
7	Research & Development	0.17	0.47	0.0359	0.0219	0.0397*	-0.0148	0.017	-0.0446*	1				
8	Size	8.12	1.54	0.5239*	0.4266*	0.5287*	-0.0847*	-0.3121*	-0.0917*	0.0700*	1			
9	Leverage	0.47	0.20	0.1212*	0.0992*	0.1222*	-0.2321*	-0.1027*	0.1226*	-0.0309	0.3003*	1		
10	Pct Closely Held Shares	27.74	25.85	-0.2665*	-0.2304*	-0.2624*	0.0683*	0.0636*	0.0109	-0.0275	-0.1818*	-0.0183	1	
11	Analyst Following	25.08	14.74	0.1964*	0.1914*	0.1825*	0.0102	-0.1754*	-0.0363	0.1031*	0.2814*	0.0700*	0.0107	1
12	ADR	0.15	0.36	0.2019*	0.1408*	0.2151*	0.0281	-0.0936*	0.0324	-0.035	0.2665*	0.0950*	-0.0119	0.2230*

* is statistically significant at the 5% level.

Exhibit 2A: Country Frequency for Water Sample

Country	Freq.	Percent	Country	Freq.	Percent
Australia	110.00	6.20	Israel	1	0.06
Austria	1.00	0.06	Italy	24	1.35
Belgium	11.00	0.62	Japan	102	5.75
Bermuda	1.00	0.06	Korea	28	1.58
Brazil	48.00	2.70	Sri Lanka	2	0.11
Canada	195	10.99	Mexico	37	2.08
Switzerland	21	1.18	Malaysia	18	1.01
Chile	20	1.13	Nigeria	1	0.06
China	102	5.75	Netherlands	12	0.68
Columbia	2	0.11	Peru	6	0.34
Cayman Islands	2	0.11	Philippines	26	1.46
Czech Republic	4	0.23	Poland	18	1.01
Germany	24	1.35	Portugal	22	1.24
Denmark	8	0.45	Qatar	3	0.17
Egypt	1	0.06	Russia	27	1.52
Spain	40	2.25	Saudi Arabia	1	0.06
Finland	23	1.3	Singapore	7	0.39
France	44	2.48	Sweden	23	1.3
Great Britain	116	6.54	Thailand	14	0.79
Greece	5	0.28	Turkey	9	0.51
Hong Kong	65	3.66	Taiwan	12	0.68
Hungary	2	0.11	United States	442	24.9
Indonesia	9	0.51	Vietnam	1	0.06
India	56	3.15	South Africa	16	0.9
Ireland	13	0.73	**Total**	**1,775**	**100**

Exhibit 2B: Industry Frequency for Water Sample

GICS Industry	Freq.	Percent	GICS Industry	Freq.	Percent
Energy Equipment & Services	1	0.06	Household Products	1	0.06
Oil, Gas & Consumable Fuels	73	4.11	Personal Products	9	0.51
Chemicals	14	0.79	Health Care Equipment & Supplies	2	0.11
Construction Materials	6	0.34	Health Care Providers & Services	3	0.17
Containers & Packaging	20	1.13	Biotechnology	4	0.23
Metals & Mining	493	27.77	Pharmaceuticals	70	3.94
Paper & Forest Products	114	6.42	Diversified Financial Services	4	0.23
Construction & Engineering	8	0.45	Real Estate Management & Development	3	0.17
Electrical Equipment	1	0.06	IT Services	1	0.06
Industrial Conglomerates	12	0.68	Software	1	0.06
Machinery	4	0.23	Electronic Equipment, Instruments & Components	1	0.06
Commercial Services & Supplies	6	0.34	Semiconductors & Semiconductor Equipment	1	0.06
Auto Components	1	0.06	Diversified Telecommunication Services	1	0.06
Textiles, Apparel & Luxury Goods	1	0.06	Electric Utilities	260	14.65
Media	1	0.06	Gas Utilities	17	0.96
Internet & Catalog Retail	1	0.06	Multi-Utilities	109	6.14
Food & Staples Retailing	3	0.17	Water Utilities	66	3.72
Beverages	130	7.32	Independent Power and Renewable Electricity Producers	92	5.18
Food Products	241	13.58	**Total**	**1,775**	**100**

Exhibit 2C: Summary Statistics for Water Sample

	Variable	Mean	St. Dev.	1	2	3	4	5	6	7	8	9	10	11
1	Overall Score	39.6	28.6	1										
2	Hard Commitment Disclosure Score	15.4	10.4	0.8714*	1									
3	Soft Commitment Disclosure Score	22.5	19.0	0.9567*	0.7462*	1								
4	Return on Assets	0.04	0.08	-0.0263	-0.0274	-0.0203	1							
5	Volatility	29.0	11.9	-0.2492*	-0.2313*	-0.2618*	-0.1911*	1						
6	Market-to-Book Ratio	2.4	2.6	-0.0321	-0.0459	-0.0267	0.2547*	-0.013	1					
7	Research & Development	0.3	0.6	-0.0208	-0.0271	-0.0228	0.011	-0.0771*	-0.0475*	1				
8	Size	8.7	1.6	0.4850*	0.4430*	0.4635*	0.0637*	-0.4177*	-0.1362*	0.0398	1			
9	Leverage	0.5	0.2	0.1854*	0.1518*	0.1927*	-0.1028*	-0.3081*	0.0546*	-0.0785*	0.5039*	1		
10	Pct Closely Held Shares	27.2	27.6	-0.1794*	-0.1525*	-0.1896*	0.1428*	0.1249*	0.0338	-0.0048	-0.0868*	-0.0531*	1	
11	Analyst Following	13.7	8.3	0.3005*	0.2578*	0.2879*	0.1040*	-0.2006*	0.0398	0.0398	0.5661*	0.2491*	-0.0317	1
12	ADR	0.2	0.4	0.2149*	0.1867*	0.1986*	0.0286	-0.1208*	0.0052	0.0628*	0.2540*	0.0764*	0.0768*	0.3541*

* is statistically significant at the 5% level.

Exhibit 3A: Country Frequency for Climate Sample

Country	Freq.	Percent	Country	Freq.	Percent
Argentina	28	0.17	Korea	731	4.32
Australia	669	3.95	Kuwait	3	0.02
Austria	111	0.66	Lithuania	7	0.04
Belgium	173	1.02	Luxembourg	33	0.19
Bahrain	1	0.01	Morocco	14	0.08
Bermuda	49	0.29	Mexico	86	0.51
Brazil	803	4.74	Malaysia	145	0.86
Canada	629	3.72	Nigeria	3	0.02
Switzerland	317	1.87	Netherlands	261	1.54
Chile	65	0.38	Norway	124	0.73
China	586	3.46	New Zealand	135	0.8
Columbia	45	0.27	Pakistan	14	0.08
Cayman Islands	6	0.04	Peru	30	0.18
Czech Republic	19	0.11	Philippines	86	0.51
Germany	551	3.25	Poland	168	0.99
Denmark	131	0.77	Portugal	96	0.57
Egypt	19	0.11	Qatar	12	0.07
Spain	328	1.94	Romania	11	0.06
Estonia	9	0.05	Russia	135	0.8
Finland	154	0.91	Saudi Arabia	5	0.03
France	663	3.92	Singapore	154	0.91
Faroe Islands	3	0.02	Slovakia	2	0.01
Great Britain	1,668	9.85	Slovenia	8	0.05
Greece	17	0.1	Sweden	275	1.62
Hong Kong	328	1.94	Thailand	127	0.75
Hungary	221	1.31	Turkey	329	1.94
Indonesia	108	0.64	Taiwan	329	1.94
India	613	3.62	United States	3,311	19.56
Ireland	90	0.53	British Virgin Islands	3	0.02
Israel	39	0.23	Vietnam	2	0.01
Italy	267	1.58	South Africa	292	1.72
Japan	1,290	7.62	**Total**	**16,931**	**100**

Exhibit 3B: Industry Frequency for Climate Sample

GICS Industry	Freq.	Percent	GICS Industry	Freq.	Percent
Energy Equipment & Services	226	1.33	Beverages	190	1.12
Oil, Gas & Consumable Fuels	954	5.63	Food Products	447	2.64
Chemicals	633	3.74	Tobacco*	65	0.38
Construction Materials	237	1.40	Household Products	77	0.45
Containers & Packaging	137	0.81	Personal Products	124	0.73
Metals & Mining	919	5.43	Health Care Equipment & Supplies	193	1.14
Paper & Forest Products	148	0.87	Health Care Providers & Services	207	1.22
Aerospace & Defense	159	0.94	Health Care Technology	50	0.30
Building Products	182	1.07	Biotechnology	165	0.97
Construction & Engineering	356	2.10	Pharmaceuticals	309	1.83
Electrical Equipment	183	1.08	Life Sciences Tools & Services	89	0.53
Industrial Conglomerates	225	1.33	Banks	780	4.61
Machinery	528	3.12	Thrifts & Mortgage Finance	68	0.40
Trading Companies & Distributors	204	1.20	Diversified Financial Services	240	1.42
Commercial Services & Supplies	244	1.44	Consumer Finance	98	0.58
Professional Services	158	0.93	Capital Markets	363	2.14
Air Freight & Logistics	136	0.80	Insurance	426	2.52
Airlines	193	1.14	Real Estate Investment Trusts (REITs)	579	3.42
Marine	156	0.92	Real Estate Management & Development	511	3.02
Road & Rail	169	1.00	Internet Software & Services	121	0.71
Transportation Infrastructure	172	1.02	IT Services	260	1.54
Auto Components	249	1.47	Software	234	1.38
Automobiles	159	0.94	Communications Equipment	124	0.73
Household Durables	270	1.59	Technology Hardware, Storage & Peripherals	153	0.90
Leisure Products	81	0.48	Electronic Equipment, Instruments & Components	316	1.87
Textiles, Apparel & Luxury Goods	228	1.35	Semiconductors & Semiconductor Equipment	277	1.64

Hotels, Restaurants & Leisure	355	2.10	Diversified Telecommunication Services	200	1.18
Diversified Consumer Services	82	0.48	Wireless Telecommunication Services	164	0.97
Media	413	2.44	Electric Utilities	426	2.52
Distributors	79	0.47	Gas Utilities	103	0.61
Internet & Catalog Retail	96	0.57	Multi-Utilities	170	1.00
Multiline Retail	154	0.91	Water Utilities	64	0.38
Specialty Retail	305	1.80	Independent Power and Renewable Electricity Producers	308	1.82
Food & Staples Retailing	240	1.42	**Total**	**16,931**	**100**

**NBIM does not invest in Tobacco companies. The sample comprises of all companies that CDP provides information to NBIM for the purposes of accountability and not necessarily all companies that NBIM holds shares.*

Exhibit 3C: Summary Statistics for Climate Sample

	Variable	Mean	St. Dev.	1	2	3	4	5	6	7	8	9	10	11	12
1	Overall Score	18.3	22.2	1											
2	Hard Commitment Disclosure Score	12.3	14.3	0.9834*	1										
3	Soft Commitment Disclosure Score	6.0	8.5	0.9340*	0.8542*	1									
4	Performance Outcome Score	2.5	5.0	0.3448*	0.3580*	0.2998*	1								
5	Return on Assets	0.04	0.08	0.0162*	0.0197*	0.0074	0.0192*	1							
6	Volatility	27.6	8.5	-0.1034*	-0.0989*	-0.1020*	-0.0329*	-0.2607*	1						
7	Market-to-Book Ratio	2.6	3.0	0.0112	0.0161*	0.0004	0.0137	0.3201*	-0.0587*	1					
8	Research & Development	0.7	4.6	0.0304*	0.0290*	0.0300*	0.0141	-0.0073	0.0510*	-0.0056	1				
9	Size	8.3	1.7	0.3451*	0.3448*	0.3122*	0.2202*	-0.0713*	-0.1643*	-0.1517*	-0.0411*	1			
10	Leverage	0.6	0.2	0.0817*	0.0755*	0.0864*	0.0189*	-0.2936*	0.0761*	0.0661*	-0.0981*	0.4441*	1		
11	Pct Closely Held Shares	28.4	28.2	-0.1953*	-0.1929*	-0.1813*	-0.1126*	0.0145	0.1617*	-0.0357*	0.0300*	-0.1051*	0.0292*	1	
12	Analyst Following	12.9	9.1	0.2686*	0.2771*	0.2253*	0.1915*	0.0928*	0.0035	0.1446*	0.0492*	0.4587*	0.1086*	-0.0868*	1
13	ADR	0.1	0.3	0.2092*	0.2078*	0.1915*	0.1241*	-0.0304*	-0.0260*	-0.0176*	-0.0083	0.1908*	0.0293*	-0.0072	0.1321*

* is statistically significant at the 5% level.

Exhibit 4: Determinants of Disclosure

	Climate		Water	Children's Rights
	(1)	(2)	(3)	(4)
Dependent variable:	**Overall Score**	**Performance Outcome Score**	**Overall Score**	**Overall Score**
Return on Assets	1.009	-0.5353	-9.7765	-1.3656
	[2.434]	[.5264]	[8.909]	[6.7410]
Volatility	-0.051	-0.0053	-0.1247	-0.1335
	[.0307]*	[.0053]	[0.0778]	[0.0727]*
Market-to-Book Ratio	0.333	0.0587	0.6905	0.8586
	[.0818]***	[.0156]***	[0.4746]	[0.2633]***
Research & Development	0.144	0.0154	0.5540	0.2986
	[.0497]***	[.0103]	[0.4619]	[0.0813]***
Size	5.216	0.6809	9.2617	7.7914
	[.2302]***	[.0457]***	[0.8074]***	[0.6802]***
Leverage	-0.537	-0.7641	-8.7913	-6.0388
	[1.339]	[.2408]***	[5.7274]	[4.4302]
Pct Closely Held Shares	-0.046	-0.0043	-0.0057	-0.0574
	[.0099]***	[.0018]**	[0.0340]	[0.0329]*
Analyst Following	0.207	0.0434	0.2151	0.0785
	[.0368]***	[.0068]***	[0.1417]	[0.0438]*
ADR	5.643	0.6280	3.8277	1.9840
	[.8514]***	[.1636]***	[2.7357]	[2.6417]
# Observations	16,931	16,931	1,775	2,470
Adjusted R-squared	33.5%	19.7%	45.3%	53.3%
Year Fixed Effects	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes

Coverage years: 2011-2015 (climate), 2010-2011, 2013-2015 (water) and 2008-2011, 2013-2015 (children rights). ***,**,* is statistically significant at the 1,5and 10% level respectively.

Exhibit 5: Relationship between Disclosure and Future Return on Assets

Panel A: Children's Rights Sample	**(1)**	**(2)**	**(3)**
Dependent Variable:	**Return on Assets_t+1**	**Return on Assets_t+2**	**Return on Assets_t+3**
Overall Score Predicted	0.0003	0.0006	0.0008
	[.0001]**	[.0001]***	[0.0002]***
Overall Score Residual	-0.0001	-0.0001	-0.0002
	[.0001]	[.0001]	[.0001]
Lagged Return on Assets_t	0.5562	0.4274	0.3377
	[.0335]***	[0.0381]***	[0.0447]***
# observations	2,065	1801	1,588
Adjusted R-squared	0.5027	0.373	0.2824
Year Fixed Effects	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes

Panel B: Water Sample	**(1)**	**(2)**	**(3)**
Dependent Variable:	**Return on Assets_t+1**	**Return on Assets_t+2**	**Return on Assets_t+3**
Overall Score Predicted	0.0002	0.0003	0.00015
	[.0001]	[.0001]	[0.0002]
Overall Score Residual	0.0001	0.00003	0.00015
	[.00008]	[.0001]	[.0001]
Lagged Return on Assets_t	0.5646	0.4217	0.5117
	[.05053]***	[0.0669]***	[0.0816]***
# observations	1,368	1,078	819
Adjusted R-squared	0.4688	0.3324	0.3804
Year Fixed Effects	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes

Panel C: Climate Change Sample	**(1)**	**(2)**	**(3)**
Dependent Variable:	**Return on Assets_t+1**	**Return on Assets_t+2**	**Return on Assets_t+3**
Overall Score Predicted	0.0001	0.0001	0.00008
	[.00001]	[.0001]	[0.0001]
Overall Score Residual	**0.0001**	**0.00007**	0.00001
	[.00002]* **	**[.00004]***	[.00007]
Lagged Return on Assets_t	0.6104	0.5356	0.4092
	[.0192]***	[0.0243]***	[0.0425]***
# observations	12,702	7,038	2,081
Adjusted R-squared	0.4217	0.3458	0.3244
Year Fixed Effects	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes

Coverage years: 2011-2015 (climate), 2010-2011, 2013-2015 (water) and 2008-2011, 2013-2015 (children rights). ***,**,* is statistically significant at the 1,5and 10% level respectively.

Exhibit 6: Relationship between Disclosure and Future Tobin's Q

Panel A: Children's Rights Sample	**(1)**	**(2)**	**(3)**
Dependent Variable:	**Tobin's Q_t+1**	**Tobin's Q _t+2**	**Tobin's Q _t+3**
Overall Score Predicted	0.0013	0.0045	0.0084
	[.0008]	[.0016]***	[0.0023]***
Overall Score Residual	-0.0003	0.0002	0.0004
	[.0008]	[.0013]	[.0018]
Lagged Tobin's Q_t	0.8214	0.6596	0.5618
	[.0265]***	[0.0338]***	[0.0394]***
# observations	2,055	1,791	1,577
Adjusted R-squared	0.7816	0.6304	0.5640
Year Fixed Effects	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes

Panel B: Water Sample	**(1)**	**(2)**	**(3)**
Dependent Variable:	**Tobin's Q_t+1**	**Tobin's Q _t+2**	**Tobin's Q _t+3**
Overall Score Predicted	0.0015	0.0018	0.0028
	[.0007]**	[.0011]	[0.0014]*
Overall Score Residual	-0.0002	0.0003	-0.00004
	[.0005]	[.0007]	[.0010]
Lagged Tobin's Q_t	0.6874	0.5236	0.4249
	[.0263]***	[0.0375]***	[0.0475]***
# observations	1,361	1,073	815
Adjusted R-squared	0.8113	0.6808	0.641
Year Fixed Effects	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes

Panel C: Climate Change Sample	**(1)**	**(2)**	**(3)**
Dependent Variable:	**Tobin's Q_t+1**	**Tobin's Q _t+2**	**Tobin's Q _t+3**
Overall Score Predicted	-0.0012	-0.0016	-0.0008
	[.0004]***	[.0008]*	[0.0013]
Overall Score Residual	**0.0003**	0.0002	-0.0001
	[.0001]*	[.0003]	[.0007]
Lagged Tobin's Q_t	0.8955	0.8112	0.685
	[.0091]***	[0.0178]***	[0.0385]***
# observations	12,612	6,936	1,987
Adjusted R-squared	0.8683	0.7625	0.7251
Year Fixed Effects	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes

Coverage years: 2011-2015 (climate), 2010-2011, 2013-2015 (water) and 2008-2011, 2013-2015 (children rights). ***,**,* is statistically significant at the 1,5and 10% level respectively.

Exhibit 7: Relationship between Disclosure and Future Annual Stock Returns

Panel A: Children's Rights Sample	**(1)**	**(2)**	**(3)**
Dependent Variable:	**Annual Return_t+1**	**Annual Return_t+2**	**Annual Return_t+3**
Overall Score Predicted	-0.0003	0.0003	0.0018
	[.0007]	[.0007]	[0.0007]**
Overall Score Residual	-0.0006	-0.0005	0.00005
	[.0004]	[.0005]	[.0005]
Lagged Annual Return_t	-0.1203	-0.0395	0.0579
	[.0227]***	[0.0141]***	[0.0177]***
# observations	2,044	1,786	1,577
Adjusted R-squared	0.2755	0.256	0.1909
Year Fixed Effects	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes

Panel B: Water Sample	**(1)**	**(2)**	**(3)**
Dependent Variable:	**Annual Return_t+1**	**Annual Return_t+2**	**Annual Return_t+3**
Overall Score Predicted	0.0001	0.0001	-0.0004
	[.0005]	[.0006]	[0.0008]
Overall Score Residual	-0.0004	0.0002	-0.0005
	[.0003]	[.0004]	[.0005]
Lagged Annual Return_t	0.0869	0.0035	-0.0527
	[.0251]***	[.0342]	[0.0347]
# observations	1,353	1,066	814
Adjusted R-squared	0.2048	0.2804	0.3071
Year Fixed Effects	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes

Panel C: Climate Change Sample	**(1)**	**(2)**	**(3)**
Dependent Variable:	**Annual Return_t+1**	**Annual Return_t+2**	**Annual Return_t+3**
Overall Score Predicted	0.0000	-0.0011	-0.0011
	[.0003]	[.0005]**	[0.0007]
Overall Score Residual	0.0002	-0.00002	-0.0001
	[.0001]	[.0001]	[.0003]
Lagged Annual Return_t	0.0265	0.0918	0.011
	[.0125]**	[.0276]***	[0.0288]
# observations	12,501	6,848	1,961
Adjusted R-squared	0.1643	0.217	0.2205
Year Fixed Effects	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes

Coverage years: 2011-2015 (climate), 2010-2011, 2013-2015 (water) and 2008-2011, 2013-2015 (children rights). ***,**,* is statistically significant at the 1,5and 10% level respectively.

Exhibit 8: Relationship between Disclosure and Future Stock Return Volatility

Panel A: Children's Rights Sample	**(1)**	**(2)**	**(3)**
Dependent Variable:	**Volatility_t+1**	**Volatility_t+2**	**Volatility_t+3**
Overall Score Predicted	-0.0007	-0.0013	-0.0019
	[.0001]***	[.0001]***	[0.0002]**
Overall Score Residual	-0.00003	0.00002	0.0001
	[.00007]	[.0001]	[.0001]
Lagged Volatility_t	0.007	0.0047	0.0032
	[.0002]***	[0.0003]***	[0.0004]***
# observations	2,093	1,813	1,599
Adjusted R-squared	0.7519	0.6078	0.5511
Year Fixed Effects	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes

Panel B: Water Sample	**(1)**	**(2)**	**(3)**
Dependent Variable:	**Volatility_t+1**	**Volatility_t+2**	**Volatility_t+3**
Overall Score Predicted	-0.0002	-0.0006	-0.0009
	[.00008]***	[.0001]***	[0.0002]***
Overall Score Residual	-0.00001	0.00002	-0.00001
	[.00004]	[.00008]	[.0001]
Lagged Volatility_t	0.0088	0.0075	0.0065
	[.0001]***	[0.0002]***	[0.0003]***
# observations	1,408	1,099	843
Adjusted R-squared	0.9291	0.8664	0.8168
Year Fixed Effects	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes

Panel C: Climate Change Sample	**(1)**	**(2)**	**(3)**
Dependent Variable:	**Volatility_t+1**	**Volatility_t+2**	**Volatility_t+3**
Overall Score Predicted	-0.0003	-0.0004	-0.0002
	[.00003]***	[.0006]***	[0.0001]**
Overall Score Residual	-0.00001	0.0003	0.00004
	[.00001]	[.00002]	[.00004]
Lagged Volatility_t	0.8751	0.8114	0.7447
	[.0062]***	[0.0103]***	[0.0202]***
# observations	12,920	7,278	2,253
Adjusted R-squared	0.8975	0.8260	0.7951
Year Fixed Effects	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes

Coverage years: 2011-2015 (climate), 2010-2011, 2013-2015 (water) and 2008-2011, 2013-2015 (children rights). ***,**,* is statistically significant at the 1,5and 10% level respectively.

Exhibit 9: Relationship between Performance Score and Future Financial Performance

Climate Change Sample	**(1)**	**(2)**	**(3)**
Dependent Variable:	**Return on Assets_t+2**	**Tobin's Q_t+2**	**Annual Return_t+2**
Performance Outcome Score Predicted	0.0033	0.0089	0.0145
	[.0016]**	[.0101]	[.006]**
Performance Outcome Score Residual	**0.0009**	**0.0058**	**0.00284**
	[.0004]**	**[.0019]*****	**[.0014]****
Lagged Dependent Variable_t	0.5202	0.8254	0.1141
	[.0721]***	[.0498]***	[.0376]***
# observations	1,221	1,201	1,182
Adjusted R-squared	0.3849	0.8043	0.3617
Year Fixed Effects	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes

Coverage years: 2011-2015 (climate), 2010-2011, 2013-2015 (water) and 2008-2011, 2013-2015 (children rights). ***,**,* is statistically significant at the 1,5and 10% level respectively.

Exhibit 10: Determinants of Disclosure with Future Reputation Risk

	Climate		Water	Children's Rights
	(1)	(2)	(3)	(4)
Dependent variable:	**Overall Score**	**Performance Outcome Score**	**Overall Score**	**Overall Score**
Negative News_t	-0.2549	**-0.1665**	-0.2772	**0.9197**
	[0.2006]	**[0.0683]****	[0.5752]	**[0.3320]*****
Negative News_t+2	0.3363	0.1116	**1.1026**	**1.3918**
	[0.2130]	[0.0853]	**[0.4028]*****	**[0.4274]*****
Return on Assets	-6.1707	-6.1707	-8.4600	-0.7334
	[5.088]	[5.088]	[12.312]	[7.2597]
Volatility	-0.0998	-0.0998	-0.1801	-0.2275
	[.0515]*	[.0515]*	[.0872]**	[0.0846]***
Market-to-Book Ratio	0.2769	0.2769	1.4627	0.3512
	[.1410]**	[.1410]**	[.5302]***	[0.2567]
Research & Development	0.2256	0.2256	0.6324	0.1088
	[.1060]**	[.1060]**	[.5760]	[0.1337]
Size	4.0172	4.0172	9.5616	6.6201
	[.4092]***	[.4092]***	[1.0661]***	[0.8707]***
Leverage	-1.0251	-1.0251	-4.6550	-6.2445
	[2.378]	[2.378]	[6.4271]	[5.2480]
Pct Closely Held Shares	-0.0396	-0.0396	-0.0079	-0.0445
	[.0160]**	[.0160]**	[.0373]	[0.0374]
Analyst Following	0.1860	0.1860	0.2840	-0.0500
	[.0567]***	[.0567]***	[.16135]*	[0.0626]
ADR	3.2311	3.2311	4.8258	2.9842
	[1.231]***	[1.231]***	[2.9102]*	[2.910]
# Observations	4,961	4,061	854	1,351
Adjusted R-squared	34.8%	19.7%	54.0%	52.7%
Year Fixed Effects	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes

Coverage years: 2011-2015 (climate), 2010-2011, 2013-2015 (water) and 2008-2011, 2013-2015 (children rights). ***,**,* is statistically significant at the 1,5and 10% level respectively.

Exhibit 11: Correlations with Materiality and Immateriality Ratings

	Children's rights Disclosure	Water Disclosure	Climate Disclosure	Climate Performance
Material ESG issues	0.2840	0.1746	0.0320	0.2701**
Immaterial ESG Issues	0.7183***	0.7495***	0.3306***	0.1238

Coverage years: 2011-2012 (climate), 2010-2011 (water) and 2008-2011 (children rights). ***,**,* is statistically significant at the 1,5and 10% level respectively.
Note: Material (Immaterial) ESG issues is a metric that measures a company's investments on industry-specific material (immaterial) sustainability issues. Both variables are from Khan, Serafeim and Yoon (2016). Sample includes only US stocks as the Khan et al. (2016) study examined only US stocks and not all stocks that are included in the analyses in the previous tables.